Food and Agriculture Organization of the United Nations

SMALL RUMINANT VALUE CHAINS

IN WESTERN BALKAN COUNTRIES

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SMALL RUMINANT SECTOR OVERVIEW

The small ruminant population in Western Balkan countries has been decreasing for the past five years. Albania, as the country with the largest small ruminant population in the region, has recorded the largest decline, with the sheep population going from 1.97 million to 1.48 million between 2016 and 2021. Over the same period, the sheep population in Serbia remained constant, at about 1.7 million. A declining trend has also been observed for the other Western Balkan countries, although the decline is not as pronounced as it is in Albania.

Serbia and Albania are the largest small ruminant meat producers in the Western Balkans. Although Albania has a larger population of small ruminants than Serbia, the latter produces more small ruminant meat than the former. Production of small ruminant meat was steadily increasing in Albania until 2018, after which production plummeted. Other Western Balkan countries have also seen a decline in small ruminant meat production. Serbia is the only country that has expanded small ruminant meat production (by 44.6 percent) over the past 15 years.

Albania is undoubtedly the largest small ruminant milk producer in the region. However, as with the small ruminant population, milk production in Albania is showing signs of decline after a period of constant expansion. A similar declining trend is observed in other Western Balkan countries. The large gap between Albania and other Western Balkan countries, in terms of sheep milk produced — despite having a similar number of sheep — reflects the fact that the small ruminant sector in Albania is more focused on milk production than in other countries.

Consumption of mutton and goat meat in Albania is the highest in the Western Balkans, and among the highest in the world, at around 8.68 kg/capita for 2020. Other Western Balkan countries consume much less — between 0.61 kg/capita and 3.33 kg/capita annually. However, survey data with small ruminant farmers shows that the median small ruminant meat consumption in their families for all Western Balkan countries is about 20kg per family member annually.

Throughout the 2016–2020 period, Bosnia and Herzegovina was the largest importer of live small ruminants, while Serbia and Montenegro were the largest importers of sheep and goat meat (fresh, chilled or frozen).). It appears that overall, Western Balkan countries import more live small ruminants (USD 7.23 million) annually than slaughtered small ruminants (USD 1.22 million).

The largest exporter of live small ruminants in the region is Serbia, with export values increasing from USD 6.2 million in 2016 to USD 9.8 million in 2020, a growth of 58 percent in five years. The largest exporter of sheep and goat meat (fresh, chilled or frozen) is North Macedonia, which saw values drop from USD 13.82 million in 2016 to USD 10.67 million in 2020. Other Western Balkan countries have negligible exports of small ruminants.

VALUE CHAIN ANALYSIS

There are four main channels for small ruminant milk to flow from the primary producer to the end consumer, including the informal channel, the intermediary channel, coordination level one (from farmer to processor — no support from processor), and coordination level two (from farmer to processor — the processor provides support to the farmer).

Three main channels are observed in the small ruminant meat value chain, namely the direct channel, local processing channel, and industrial meat processing channel.

Small ruminant farmers in Albania have the least farmland — ownership of land is ten times less than for Serbia farmers and 13 times less than for Montenegro farmers. Serbia uses considerably more farmland for the production of feeds compared with other Western Balkan countries. Interestingly, even though smal ruminant farmers in Albania have much less farmland available, they use approximately the same surface area for producing feeds as farmers in Bosnia and Herzegovina, and much more than farmers in Montenegro.

Albania also has the lowest availability of pastures and meadows, most of which is rented from central or local government. This is unlike other countries where renting from private owners is more commonplace. Due to climate change, the frequency and duration of drought have increased; during the summer months pastures dry up and there is no feeds, which puts pressure on farmers to buy feed, leading to an increase in costs. Furthermore, the high uncertainty over long term access to pastures, meadows and farmland P/M/F makes small ruminant farmers reluctant to expand their herd size. In addition, the lack of long-term contracts for pasture use reduces the likelihood of investing in pastures improvement because small ruminant farmers do not know if they will get access to that pasture next year. Small ruminant farmers in Albania have the lowest level of assets owned. Their access to technology such as smartphones and laptops is also the lowest of the Western Balkan countries included in the study. These are important instruments to get access to information.

Small ruminant farmers in Serbia, Montenegro, and Bosnia and Herzegovina appear not to be focused on small ruminant milk production and selling, though they have more cheese production equipment and cheese storage than their Albania counterparts. On the other hand, access to cooling tanks is low for all countries, which is particularly important for Albania farmers who are engaged in milk selling.

The share of household members involved in the small ruminants business is high in all Western Balkan countries. The employment of external labour is limited. Most of the work is therefore carried out by family members.

In terms of overall herd size, Albania has the lowest, but this is because small ruminant farmers in the other countries keep much more lambs than Albanian farmers. This shows that in Albania, sheep farmers are more focused on milk production and wean or sell the lambs early on, whereas sheep farmers in Serbia, Montenegro, and Bosnia and Herzegovina focus more on meat production and keep lambs for a longer period.

One of the top three problems identified in the study is the limited availability of labour. Another key issue impeding small ruminant business development there appears to be low product prices. Farmers in Serbia, Montenegro, and Bosnia and Herzegovina rank meat prices as the top problem, while farmers in Albania rank both milk and meat prices as problems. Farmers in Albania, and Bosnia and Herzegovina, also cite the lack of financial resources for investment as a problem affecting their business.

Selling small ruminants as live animals is the common way to sell animals. In Serbia and Montenegro, farmers use abattoirs to sell their live animals, more so than in Albania and Bosnia and Herzegovina. This indicates that food safety is more easily controlled in Serbia and Montenegro than in Albania and Bosnia and Herzegovina. The trader channel is commonly used by all countries, though Bosnia and Herzegovina, and Serbia, tend to use it more. The traders operate as supply consolidators, meaning they buy small ruminants in small numbers from many farmers and then sell to abattoirs or the meat industry. Small ruminant farmers in Bosnia and Herzegovina use direct selling of live small ruminants to end consumers to a large extent, with Albanian farmers doing so to a lesser extent, with Serbia and Montenegro farmers doing so much less.

With the exception of Albania, the share of small ruminant farmers selling milk in the other countries is limited, which suggests that in Montenegro, Serbia, and Bosnia and

Herzegovina, the small ruminant milk value chain is not developed. Most milk quantities in Montenegro and Bosnia and Herzegovina are sold directly to end consumers. Normally, selling directly to consumers pays off because there is no intermediary involved, but food safety issues and control of this informal market are very poor. Milk collection and transport is one of the weakest points in the value chain. The collection of raw milk is organized mostly by milk processors and private milk collectors.

Small ruminant farmers tend not to have any milk cooling equipment; hence, collections are made at least once a day and sometimes even twice a day, which has considerable impact on efficiency and costs. In general, milk from various farms is frequently mixed and transported in the same load, even though the milk might be of different quality. Inadequate cleaning and disinfection of milk containers is common.

In all Western Balkan countries, sheep and goat milk is almost exclusively processed for cheese. Milk delivered to processors is processed in a different way based on tradition, experience, and knowledge. Small ruminant milk supply by farmers represents the main problem for the milk processing industry. Apart from milk processors that produce cheese, small ruminant farmers process their milk as cheese. In Bosnia and Herzegovina, Serbia, and Montenegro, the share of farmers producing cheese is high, while in Albania, small ruminant farmers producing cheese are far fewer. It can be argued that the higher the share of farmers producing cheese, the less developed is the processing value chain level.

One of the reasons that small ruminant farmers process milk to produce cheese is that the prices offered to them from processors are very low. Thus, they engage in processing activities to add more value to their production, and also to increase product shelf life. However, the production of cheese at the farm gate is much more difficult and costly for any national food authority to monitor and control, which has large implications for food safety.

The small ruminant wool value chain is not developed in any of the Western Balkan countries. Farmers often either throw away or burn small ruminant wool, which are environmental polluters that require sustainable interventions in order to address the problem.

VALUE CHAIN ORGANIZATION AND GOVERNANCE

The majority of farmers in Albania and Montenegro sell most of their milk to one or two main buyers, whereas in Serbia, only 50 percent of farmers sell to one or two buyers. In general, no prior agreements (contracts) between farmers and milk buyers are in place, which adds uncertainty and impedes the prospects for investment. When there is no agreement in place, it is difficult to create price incentives for higher quality of milk, or to control, or sanction, the party that is deviating from the agreement, which might result in losses for either party.

The number of dairies operating within a one hour drive of farms is critical in Montenegro and Bosnia and Herzegovina, and farmers do not have any alternative for where to sell their milk. About 50 percent of Albanian and Serbian farmers have limited options for where to sell their milk. This could also be one of the reasons farmers process cheese themselves.

Services offered by buyers to farmers provide an important support to farmers to improve milk quality and safety standards and further develop their business. However, services offered to small ruminant farmers in Serbia, Montenegro, and Bosnia and Herzegovina are non existent. In Albania, about one third of farmers selling milk claim to receive services from the buyer, such as herd health management, breed management, and animal feeding. This is another indication that the small ruminant milk value chain in Albania is more advanced than in the other Western Balkan countries.

In Albania, in over 90 percent of cases, milk is collected by the buyer, while in Montenegro, in 66.7 percent of cases it is the farmer who delivers to the buyer. In Serbia and Montenegro, about

one third of farmers deliver to the buyer. This places higher costs pressure on farmers. Moreover, transportation of the milk by the farmer, under inadequate conditions, does not ensure milk quality and safety standards. It should be noted that milk price differentiation according to quality (fat and dry matter content, etc.) is not a common practice in Western Balkan countries.

Unlike the milk value chain, farmers tend to sell small ruminants to many buyers rather than to one or two buyers. Only Montenegro farmers differ — 83 percent of them sell most small ruminants to one or two buyers. This could be related to the market channel used by farmers, where around 70 percent of Montenegro farmers claim to sell their small ruminants to abattoirs. Consequently, it can be deduced that Montenegro farmers have a more stable relationship with meat buyers than their counterparts in other Western Balkan countries.

As with the milk value chain, no prior agreements are observed between farmers and buyers. Even when prior agreements are in place, they tend to be informal. Furthermore, services offered by buyers to farmers are scarce, particularly in Montenegro, Bosnia and Herzegovina, and Serbia, while in Albania, about 25 percent of farmers claim to receive some services from their meat buyers.

Regarding buyer influence on small ruminant meat (or live animal) prices, Serbian and Montenegrin farmers appear to be in a more difficult position than those in Albania and Bosnia and Herzegovina. Hence, about 92.7 percent of the respondents in Serbia and 58.7 percent in Montenegro point out that meat buyers have a large influence in setting the price of meat.

In Albania, Serbia, and Montenegro, more than 80 percent of small ruminant farmers sell small ruminants as live animals, while more than 50 percent of small ruminant farmers in Bosnia and Herzegovina sell slaughtered animals and, what is more critical, 45 percent of them state that they slaughter on their farms, which is usually outside the monitoring and control of the national food authority. This poses significant food safety risks for the small ruminant meat value chain in Bosnia and Herzegovina.

More than 90 percent of Montenegro's small ruminant farmers carry out one to three transactions to sell their small ruminants. They also have the highest transaction size compared with the other countries, with an average of 74.47 small ruminants sold per transaction. On the other hand, the majority of Bosnia and Herzegovina's small ruminant farmers have the highest number of transactions, with ten or more transactions annually and an average of nine small ruminants sold per transaction. In this context, Bosnia and Herzegovina's small ruminant value chain appears to have the highest transaction cost, while Montenegro has the lowest. Albania and Serbia fall somewhere in between these two.

The main parturition (lambing) months for Western Balkan countries are January and February, with small differences from country to country — for Montenegro, March is an important parturition month, while for Albania, Bosnia and Herzegovina, and Serbia, December is a key month.

Small ruminant farmers in Albania appear to have the lowest level of cooperation compared to their counterparts in other Western Balkan countries, where most cooperation is on an informal basis. Farmers mainly cooperate with respect to labour exchange and machinery exchange. In Albania, however, only about 25 percent of farmers cooperate over such activities, and the activity they mainly cooperate on is joint input supply.

FARM MANAGEMENT PRACTICES

In Albania, only 5.5 percent of the surveyed farmers used milk testing services during 2020, while in Bosnia and Herzegovina 16.7 percent did so. In 2021, 19.9 percent of the farmers in Serbia and 42.1 percent of farmers in Montenegro carried out milk testing. On the other hand, buyers in Bosnia and Herzegovina do not perform analyses of milk safety in more than 75 percent of the cases. In Albania, Serbia, and Montenegro,

the figures are 31 percent, 35.3 percent, and 40 percent respectively.

In all of the countries included in the study, most small ruminants are milked by hand. Moreover, more than 40 percent of farmers in Serbia and Montenegro mix morning and afternoon milk, a practice that is less used in Albania, and Bosnia and Herzegovina.

A large share (more than 90 percent) of small ruminant farmers in Serbia and Montenegro keep an animal register. In Bosnia and Herzegovina, only 31.4 percent of farmers say they have one, while in Albania 53.5 percent of farmers keep an animal registry. Serbian and Montenegrin farmers appear to be more rigorous, with all of them conducting identification and registration, whereas in Albania, and Bosnia and Herzegovina, around 75 percent of them do so.

The use of advisory services is particularly concerning for farmers in Albania, and Bosnia and Herzegovina, where the majority of them — 98 percent in Albania and 90.7 percent in Bosnia and Herzegovina — have not used any advisory services in the past five years. In Serbia and Montenegro, more than 70 percent have used advisory services.

It appears that most of the small ruminant farmers in the region implement mating controls, although Bosnia and Herzegovina has the largest share (27.5 percent) that do not. Moreover, those that carry out mating control keep rams or bucks in their herds.

More than 70 percent of farmers in Albania, Serbia, and Montenegro request medical help from private veterinarians, but in Bosnia and Herzegovina this figure is 42.6 percent. Private veterinarians are expensive, and the availability of public veterinarians is more limited.

SUPPORT POLICIES

While there are some differences in responses, direct support measures are cited as the most needed type of policy support by small ruminant farmers in Western Balkan countries. In most cases, this is requested in the form of direct payments per head (for milking small ruminants). Support schemes involving a third party (for instance, payment per litre delivered to the milk processor or payment for the animal feed area) do not entirely benefit the farmer, because the third party uses its influence to extract part of the value (for example, by reducing the milk price because the farmer is being compensated by the government). In addition, direct payments per head appear to be the least bureaucratic procedure, and the easiest to apply for.

In absolute values for 2017–2019, Montenegro and Albania have the lowest budget for agriculture support, namely less than EUR 30 million and EUR 40 million per annum, respectively. They are followed by Kosovo, and Bosnia and Herzegovina, with about EUR 70 million and EUR 80 million, respectively, North Macedonia with close to EUR 150 million, Serbia with over EUR 300 million, and Turkiye with about EUR 2.5 billion to EUR 3 billion per annum.

On the other hand, relative data on budgetary support per agricultural area and population show that differences in support per hectare between the countries are significant, ranging from EUR 32/ha and EUR 39/ha in Albania, and Bosnia and Herzegovina, to EUR 150/ha in Kosovo. The total support per hectare in the Western Balkans and Turkiye is less than half the European Union average. However, the numbers are comparable to some European Union countries — for example, EUR 137/ha in Latvia, EUR 175/ha in Lithuania, EUR 214/ha in Bulgaria, and EUR 218/ha in Romania. Payments per inhabitant vary from EUR 13 in Albania to EUR 68 in North Macedonia. Compared with the European Union, support per inhabitant in Western Balkan countries and Turkiye is significantly lower.

INTERVENTION STRATEGIES

An intervention strategy aims to replicate successful business models in different places, and thus emulate success stories. But the context for any business model should be considered.

A key in any intervention strategy is identifying an entry point. In this context, governments or donor agencies, which would target the development of small ruminant milk value chains, could use as entry points businesses that have made large specific investments in the small ruminant value chain. The idea here is that these businesses have a vested interest in developing the value chain themselves because they are locked in due to the investments they have made. Consequently, to protect and further develop their investment, they work closely with their farm suppliers because ultimately these farmers are like the "workers" of their business, and without them the business cannot flourish. Thus, they are highly likely to develop relationships with their farm suppliers, which is a key element for value chain development.

At the same time, the buyer (such as a processor, or exporter) might not always have an interest in the development of the small ruminant value chain as a mechanism to support the growth of their investment, especially in mountainous and remote areas where generally small ruminants are reared. In these areas, large investments from buyers are limited. In this context, an intervention strategy for small ruminant value chain development should focus on building collective action as a means to overcome market failure (that is to say, unfair product prices, limited access to information, services, technology and financial resources).

All Western Balkan countries included in the study are in the process of integration with the European Union, and they therefore need to align with and fulfil EU standards. In this context, interventions in Western Balkan countries should also consider alignment with EU strategies. The European Union's Green Deal is the European Union's main new growth strategy to transition to a sustainable economic model. Some interventions that will support the small ruminant sector in Western Balkan countries align with the Green Deal include:

- supporting agrobiodiversity;
- optimize the use of inputs, including feeding, and veterinary medicines;
- drive to more complex, energy intensive processing activities;
- the issue of pasture management; and
- the issue of plastic packaging.

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1. Introduction

1.1 Rationale

Small ruminants play an important role in the food and nutritional security of a considerable rural population in Western Balkan countries, especially for landless or marginal farmers, and smallholders. The socioeconomic value of small ruminant farming, compared to other livestock types, is immense for poor farmers. Goats and sheep are also among the main meat-producing animals in these countries. Small ruminants produce a variety of products such as meat, milk, hides and skins, wool, and manure, and they are very resilient to extreme climatic conditions — they can sustain themselves on sparse vegetation.

Poor rural populations who cannot afford to keep a cow use goats or sheep as the best alternative source of supplementary income and milk. Unlike cows, goats can be kept easily. This is one reason why poor rural households keep few goats. Unlike cows, goats can be kept easily. They provide a stable source of income and nutrition for the large rural population in disadvantaged agricultural areas which suffer from low agricultural productivity on account of frequent drought, moisture deficit, a poor resource base, and low adoption of technologies. Therefore, the small ruminant sector assumes critical importance in areas that are often at high altitude, or are wasteland and vulnerable zones.

Large parts of the Western Balkans are hilly or mountainous. These areas are rich in grasslands that are favourable for the development of animal husbandry, primarily sheep and goat farming. The production of small ruminants is particularly important for hilly and mountainous areas, since it represents a significant source of income for farmers with no alternatives for income generation. However, the small ruminant sector in Western Balkan countries has been experiencing economic and structural difficulties in recent decades, mainly with respect to a decrease in livestock numbers. Compared with 2015, the small ruminant population in Albania has gone from 2.85 million heads to 2.25 million heads (in 2021), a decline of 20.9 percent (INSTAT, 2022). In North Macedonia, over the same period, the small ruminant population decreased by about 14 percent (from 822 000 to 709 000 heads). The rate of decline is less for Serbia, Montenegro, and Bosnia and Herzegovina, at about 5 percent, 4.2 percent and 0.7 percent respectively (FAOSTAT, 2022). The sector is facing challenges in all of the countries, such as a shortage of labour, increasing costs, limited financial support, lack of profitability, food safety issues, and climate change.

Considering that Western Balkan countries are on the path to accession to the European Union, in this pre-accession period, the role of agricultural and rural development policy is crucial to prepare a viable farming sector that can withstand the competitive pressures of the single market after joining. The economic and financial opportunities that the European Union provides — through access to the single market and the instruments of the Common Agricultural Policy (CAP) — are additional strong incentives to prepare the agricultural sectoragriculture sector for EU integration. To maximize the benefits of the single market and CAP measures, these countries need to adjust their agricultural support policies and align them with the CAP.

In this context, this study assesses the small ruminant value chain in Western Balkan countries to identify challenges and opportunities affecting the sector. The focus of the analysis will be on designing an action plan on how to support the development of the small ruminant sector in these countries.

1.2 Study objectives

The study has two main objectives related to the assessment of the small ruminant value chain:

1. Analysis of small ruminant production and trade in Albania, Bosnia and Herzegovina, Serbia, and Montenegro.
2. Design of an action plan on how to support the development of small and medium enterprises involved in small ruminant production, processing, and marketing.

Other objectives of the study are to:

- Identify best practices along the small ruminant value chain, particularly among producers and entrepreneurs.
- Assess the demand for small ruminant products in the market and identify the gaps and bottlenecks in the marketing of these products.
- Identify challenges and opportunities for small ruminant sector development.

The primary beneficiaries of the results of this study will be the governments of these countries, particularly the ministries of agriculture (policy and service delivery agencies). Given the interest in the empirical evidence that will be provided by the study, a larger spectrum of institutions and agencies may also benefit. The ultimate beneficiaries of potentially improved agricultural and rural development policy are farmers and rural citizens.

1.3 Methodology

The study employs the value chain analysis approach by looking at value chain actors, products, and activities that add value, bottlenecks, market potential for growth, the potential for upgrading, and possible synergies. The analysis is firmly rooted in primary and secondary data collection. The secondary data were obtained through a review of previous studies, policy documents and statistical databases (for example in institutes of statistics, FAOSTAT, EUROSTAT). Relevant studies were subjected to a rigorous review. Secondary statistical data were subjected to a standard descriptive analysis, including simple tables and graphs depicting statistical and historical trends.

The primary data and information collection consisted of the following:

- Around 15 semi-structured and in-depth interviews targeting various categories of actors and experts in Albania (such as processors, abattoirs, government institution employees).
- Structured survey with 200 small ruminant farmers in Albania, 204 small ruminant farmers in Bosnia and Herzegovina, 141 small ruminant farmers in Serbia, and 121 small ruminant farmers in Montenegro.

Based on the value chain evaluation, an intervention strategy for small ruminant sector development in the Western Balkans is designed.

1.4 Report structure

The remainder of this report is structured as follows — the second section provides a description of the small ruminant sector in the countries included in the study (Albania, Bosnia and Herzegovina, Serbia, and Montenegro), and also in North Macedonia. The third and fourth sections dive deeper into an analysis of the small ruminant value chain, followed by a discussion of farm management practices in section five. Then, a SWOT analysis for the sector is developed, and finally, intervention strategies proposed.

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2. Small ruminant sector overview

The production, consumption, and trade trends in the small ruminant sector in Albania, Bosnia and Herzegovina, Montenegro, North Macedonia, and Serbia will be discussed in this section.

2.1 Production trends

2.1.1 Small ruminant population trend

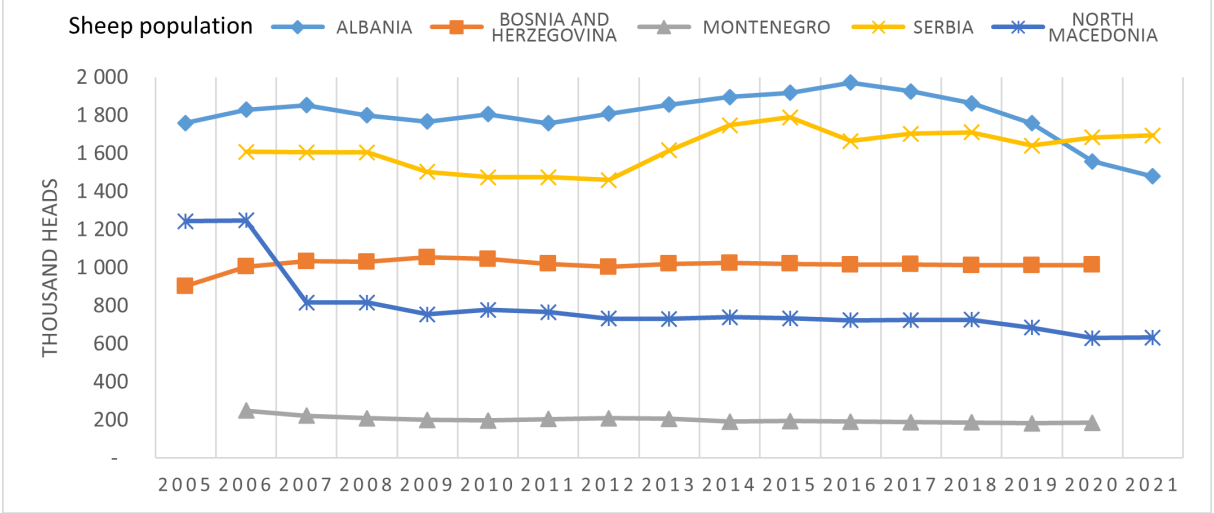
The two countries with the largest sheep population in the Western Balkans are Albania and Serbia (Figure 1). Albania had the largest sheep population until 2019, but since 2016 this has declined, going from 1.97 million sheep in 2016 to 1.48 million in 2021, or a decrease of 25 percent. The sheep population in Serbia has increased since 2012, going from 1.46 million to 1.7 million in 2021. The sheep population in Bosnia and Herzegovina has remained stagnant at around 1 million heads over the past 15 years, while the North Macedonia sheep population has halved over the past 15 years, going from 1.24 million in 2005 to 630 000 in 2021. Finally, Montenegro has the smallest sheep population of Western Balkan countries; it has remained at about 190 000 heads over the past ten years.

Figure 1 also shows the number of sheep slaughtered in every country from 2005 to 2020, and similar trends are observed here, with a downward trend in Albania and North Macedonia noticeable over the past 15 years. Most of this decrease happened between 2007 and 2012, when there was a reduction from 2 million to 1.2 million – a 40 percent decline in five years. Since 2012, the number of sheep slaughtered in Albania has ranged from between 1.2 and 1.4 million heads per year.

The decline in North Macedonia has been continuous for the past 15 years – the number of animals slaughtered dropped from 410 000 heads in 2005 to 127 000 heads in 2020, a 69 percent decline. Bosnia and Herzegovina also saw a decline in sheep slaughtering, from 130 000 heads in 2010 to 60 000 heads in 2020. Montenegro has seen small year-to-year fluctuations, with an average 28 000 heads of sheep slaughtered per year. Serbia is the only country to have increased sheep slaughtering, going from 1.15 million heads to 1.5 million heads in 2013, and since then slightly down.

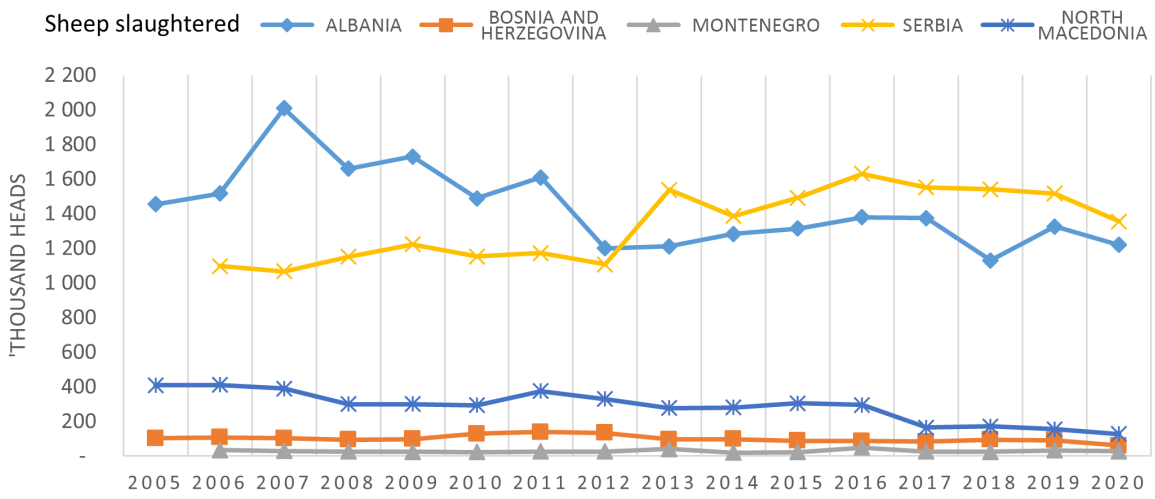
For goats, Albania has by far the largest population in the Western Balkans (see Figure 2). However, as with sheep, the number of goats there has decreased since 2016, when the goat population was 941 000 heads. In 2021, it was 775 000, a 18 percent decline. Serbia has the second largest goat population, at about 200 000

Figure 1. Sheep population and sheep slaughtered in Western Balkan countries, 2005–2021



Source: FAOSTAT. 2022. https://fenix.fao.org/faostat/internal/en/#data; EUROSTAT. 2022. https://ec.europa.eu/eurostat/data/database

Figure 1 *(Cont.)*. Sheep population and sheep slaughtered in Western Balkan countries, 2005–2021

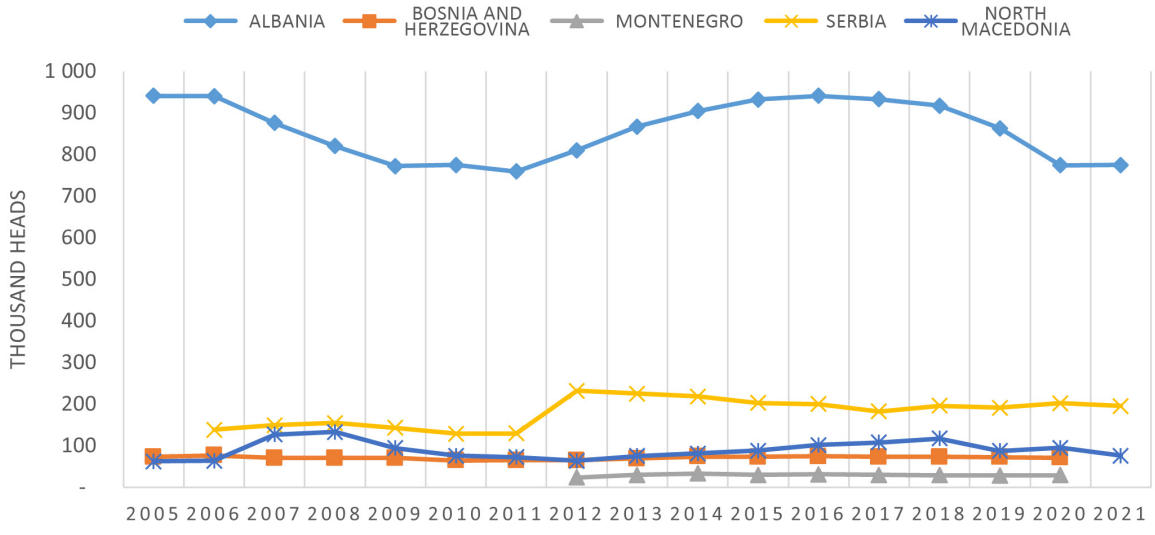


Source: FAOSTAT. 2022. https://fenix.fao.org/faostat/internal/en/#data; EUROSTAT. 2022. https://ec.europa.eu/eurostat/data/database

heads over the past ten years. Other countries have smaller goat populations. After the goat population went from 64 000 in 2012 to 117 000 in 2018 in North Macedonia, this had decreased to 76 000 by 2021. Bosnia and Herzegovina has a similar number of goats to North Macedonia, but with a consistent population of around 70 000 heads. Montenegro has the smallest goat population, of about 29 000 heads, largely unchanged over the past decade.

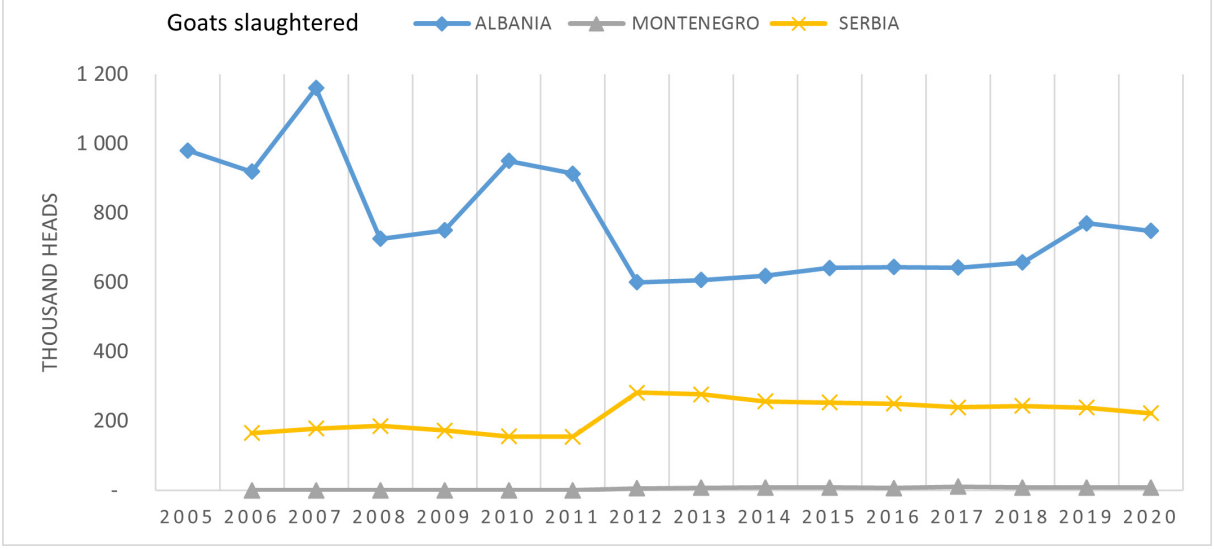
The goat slaughtering trend is similar to that of sheep. In Albania, the number of goats slaughtered declined sharply between 2007 to 2012, going from 1.16 million heads to 600 000. That number then rose to 748 000 heads in 2020. In Serbia, the number of goats slaughtered was 155 000 in the years prior to 2012, increasing to 281 000 in 2012, and then coming down to about 222 000 in 2020. Data for Montenegro show

Figure 2. Goat population and goats slaughtered in Western Balkan countries, 2005–2020



Source: FAOSTAT. 2022. https://fenix.fao.org/faostat/internal/en/#data

Figure (*Cont.*). Goat population and goats slaughtered in Western Balkan countries, 2005–2020



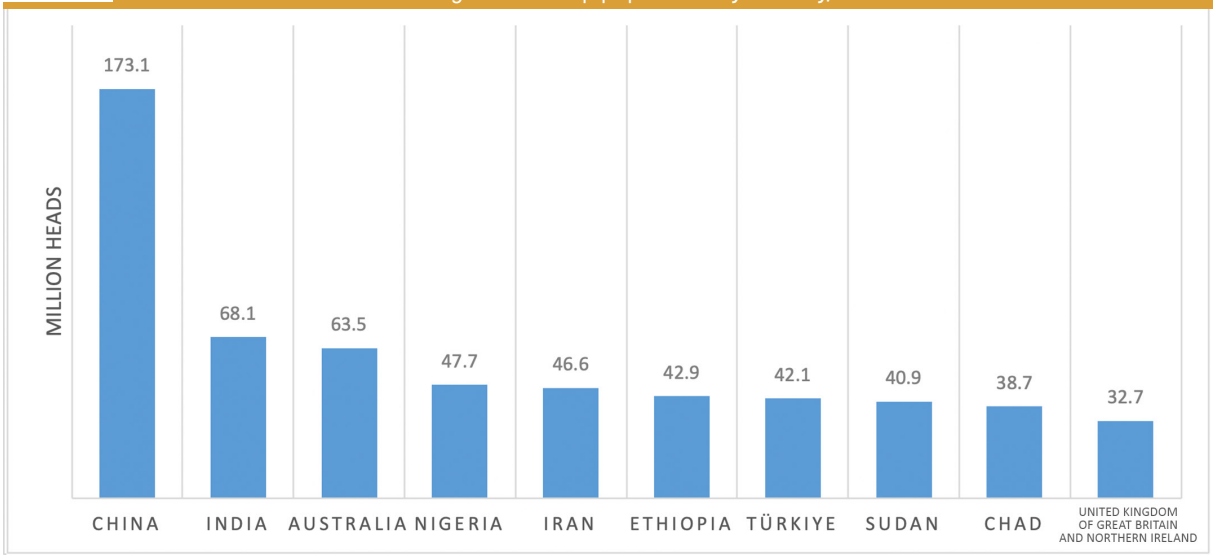
Source: FAOSTAT. 2022. https://fenix.fao.org/faostat/internal/en/#data

about 8 000 goats slaughtered annually, while Bosnia and Herzegovina, and North Macedonia, have no reported data on goat slaughtering.

Small ruminant population, global trends

The global sheep population increased from 1.1 billion heads to 1.26 billion heads over the 2005–2020 period, an increase of about 14.5 percent. Figure 3 and Figure 4 present the countries with the largest sheep populations, and development trends. As Figure 3 shows, the leading country with regard to the number of sheep is China, with 173.1 million heads, followed by India and Australia with 68.1 million and 63.5 million heads, respectively. Figure 4 outlines how those numbers have evolved over the past 15 years. For instance, the sheep population in China has fluctuated slightly over this period, but shows an overall upward trend, which is similar to the situation in India. Australia shows a different picture, with numbers having gone down from more

Figure 3. Sheep population by country, 2020

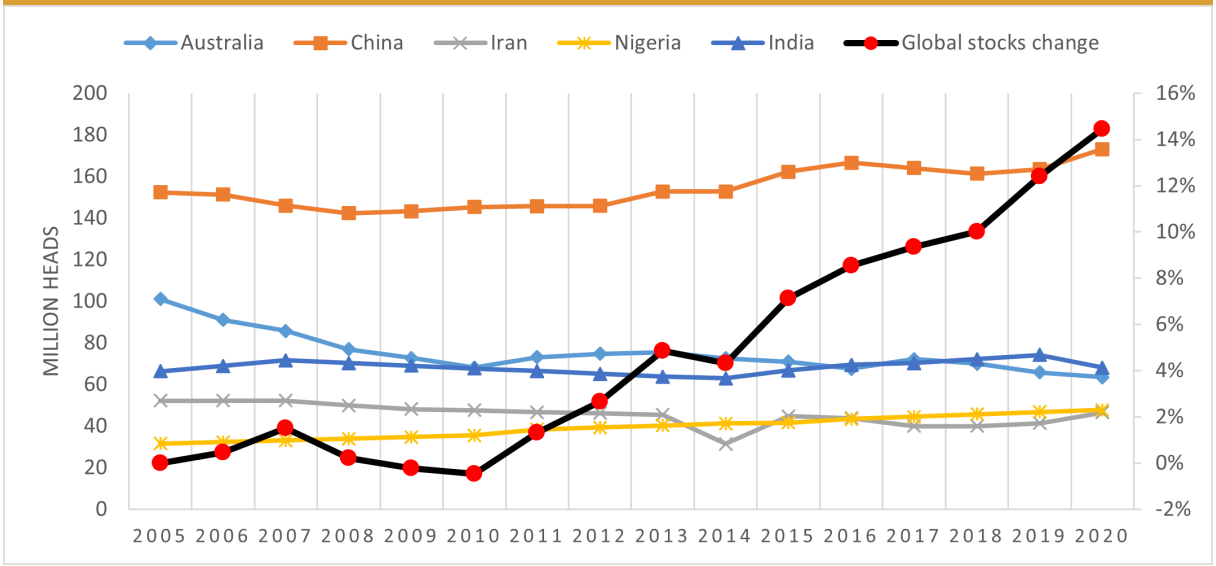


Source: FAOSTAT. 2022. https://fenix.fao.org/faostat/internal/en/#data

than 100 million heads in 2005 to 63.5 million in 2020, a decline of about 36.5 percent.

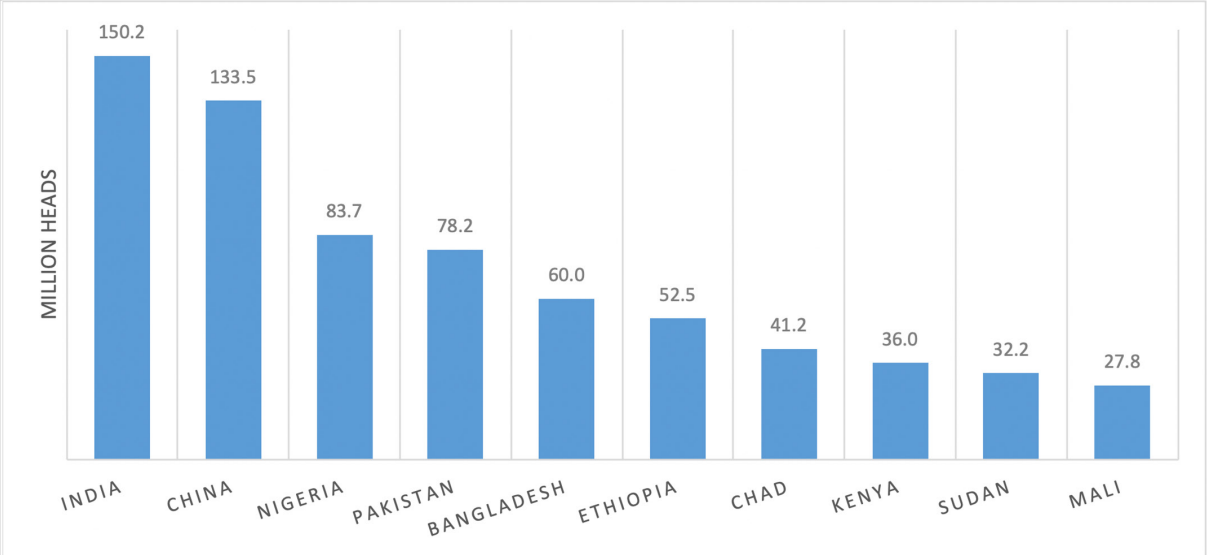
Regarding the global goat population, the trend is also upwards. Figure 5 and Figure 6 present the leading countries in terms of goat population, and the development trend from 2005 to 2020.

Figure 4. Sheep population trend in leading sheep breeding countries, 2005–2020



Source: FAOSTAT. 2022. https://fenix.fao.org/faostat/internal/en/#data

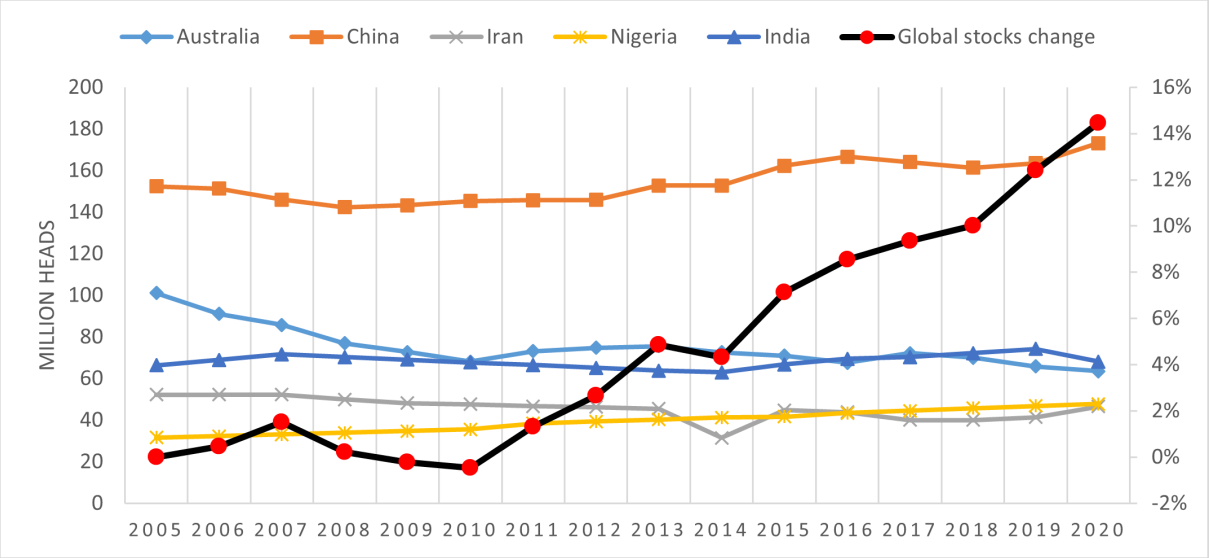
Figure 5. Goat population by country, 2020



Source: FAOSTAT. 2022. https://fenix.fao.org/faostat/internal/en/#data

The country with the largest goat population is India, with 150.2 million heads, followed by China and Nigeria with 133.5 million and 83.7 million heads, respectively (Figure 5). As Figure 6 shows, China used to have the largest population of goats, but that changed in 2017. Overall, the world's goat population is increasing faster the sheep population. In 2005, there were about 851 million goats, while in 2019 there were 1.13 billion, an increase of 32.6 percent.

Figure 6. Goat population trend in leading goat breeding countries, 2005–2020



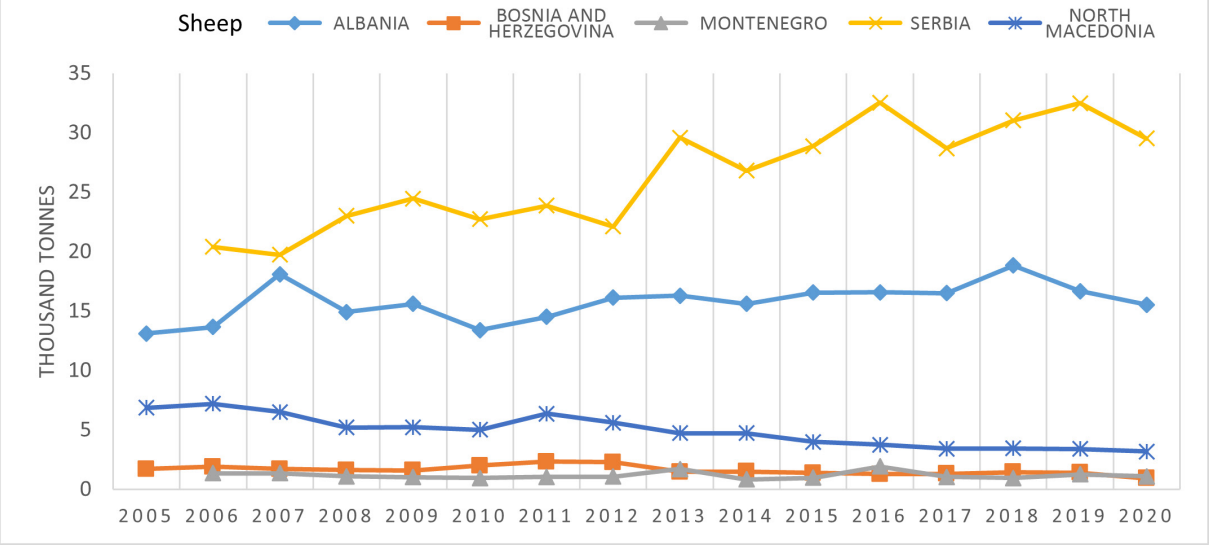
Source: FAOSTAT. 2022. https://fenix.fao.org/faostat/internal/en/#data

2.1.2 Production of milk and meat from small ruminants

Small ruminant meat production

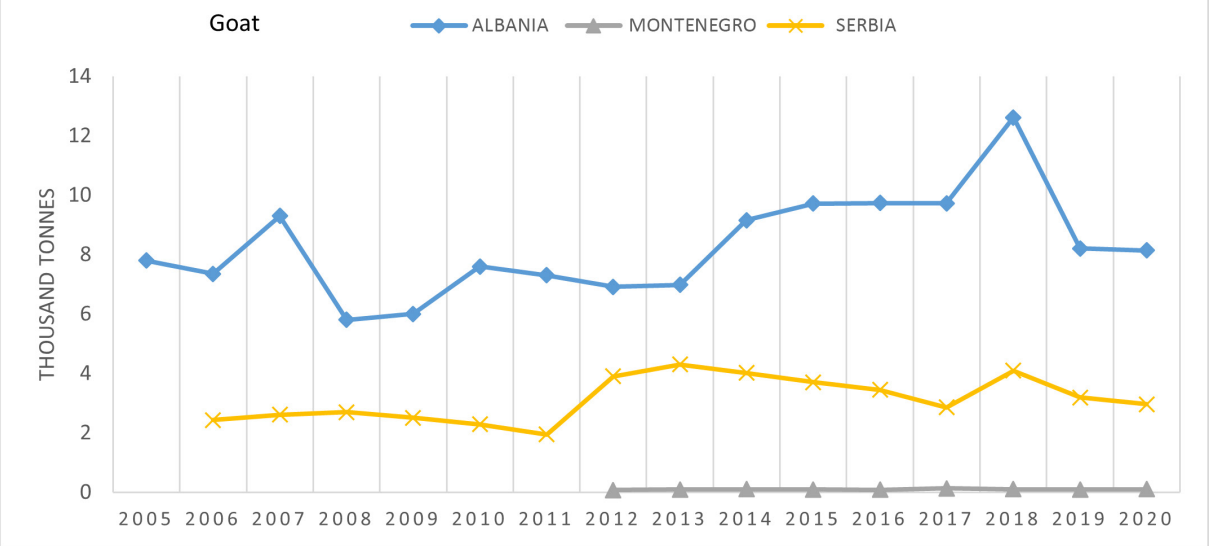
As with data on the small ruminant population, Serbia and Albania appear to be the largest small ruminant meat producers in the Western Balkans (see Figure 7). Though Albania has a larger population of small ruminants than Serbia, the latter appears to produce more small ruminant meat. Production of meat from small ruminants has been steadily increasing

Figure 7. Production of sheep (top) and goat (bottom) meat in Western Balkans, 2005–2020



Source: FAOSTAT. 2022. https://fenix.fao.org/faostat/internal/en/#data

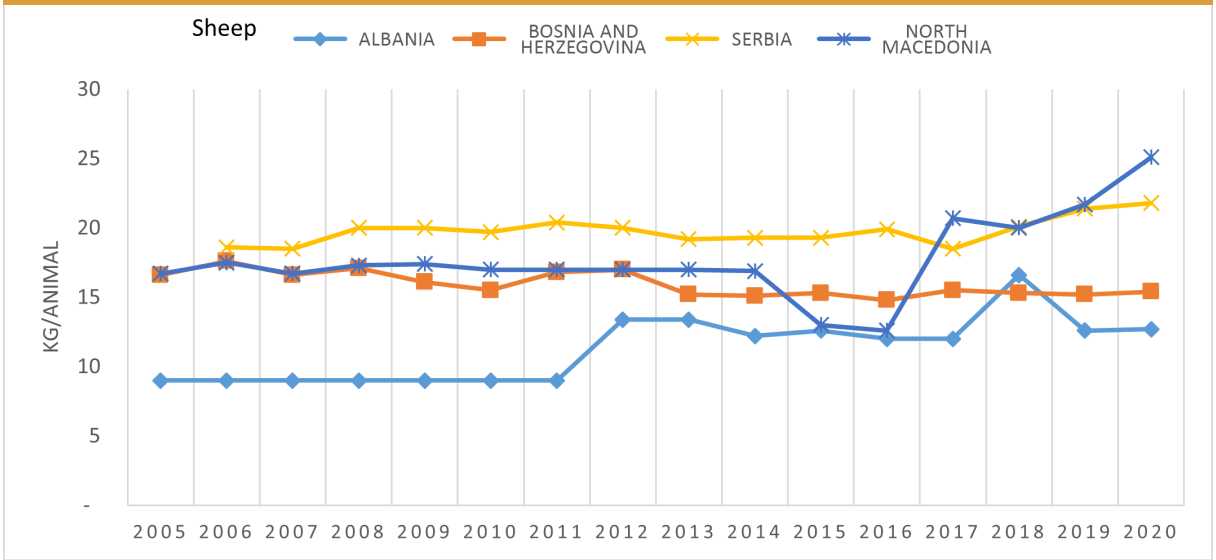
Figure 7 *(Cont.)*. Production of sheep (top) and goat (bottom) meat in Western Balkans, 2005–2020



Source: FAOSTAT. 2022. https://fenix.fao.org/faostat/internal/en/#data

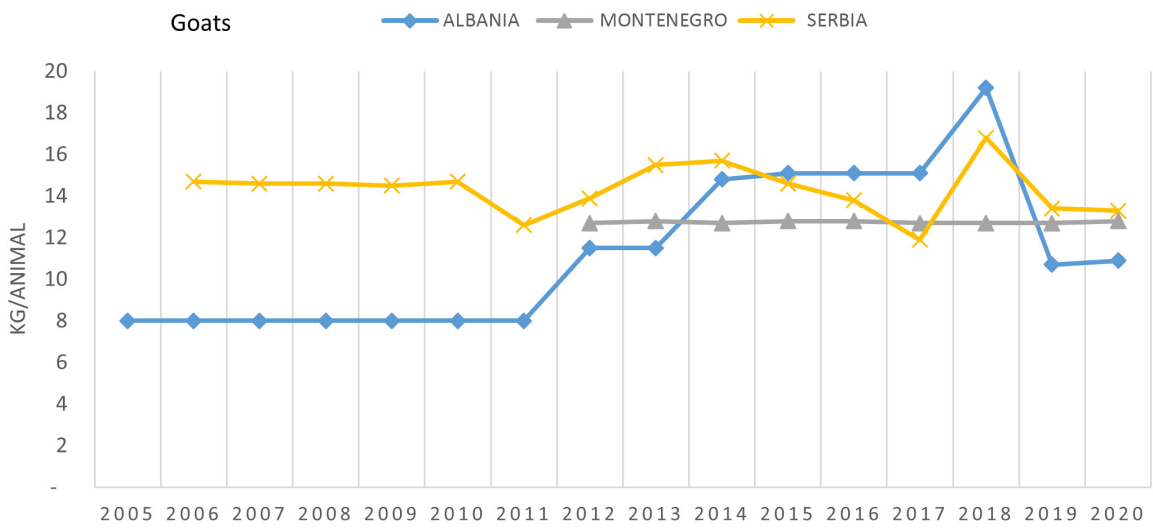
in Albania over the past decade. This was triggered primarily by an increase in local demand, especially with the development of the agrotourism sector. However, as the population of small ruminants has declined rapidly, this has also affected meat production, which in 2020 showed a considerable decrease compared with 2018. In 2018, sheep and goat meat production in Albania stood at 18 800 tonnes and 12 600 tonnes, respectively, which in 2020 dropped to 15 500 tonnes and 8 100 tonnes (declines of 17.5 percent and 35 percent).

Figure 8. Yield of sheep meat (top) and goat meat (bottom) in Western Balkans, 2005–2020



Source: FAOSTAT. 2022. https://fenix.fao.org/faostat/internal/en/#data

Figure 8 *(Cont.)*. Yield of sheep meat (top) and goat meat (bottom) in Western Balkans, 2005–2020



Source: FAOSTAT. 2022. https://fenix.fao.org/faostat/internal/en/#data

Serbia appears to be the only country in the Western Balkans to show an upward trend in sheep meat production, which increased from 20 400 tonnes in 2006 to 29 500 tonnes in 2020, an increase of 44.6 percent. The production of goat meat in Serbia was increasing considerably until 2012, when it jumped from 1 900 tonnes to 3 900 tonnes. Since then, it has declined, dropping to 3 000 tonnes in 2020.

The third largest sheep meat producer is North Macedonia, whose production decreased from 6 900 tonnes in 2005 to 3 200 tonnes in 2020. A similar pattern is observed in Bosnia and Herzegovina, whose production of sheep meat declined from 2 300 tonnes in 2011 to 900 tonnes in 2020. Montenegro has produced 1 100 tonnes of sheep meat per year over the past decade.

In addition to the quantity of meat produced, another indicator that needs to be pointed out when analysing meat production is the meat yield per animal. Figure 8 shows the evolution of the yield (carcass weight) per animal in Western Balkan countries. Despite being the country with the largest population of small ruminants, Albania has the lowest meat yield per animal. This might also be the reason why Albania produces much less meat than Serbia. Thus, 2020 data show the average slaughtered sheep carcass weight of a slaughtered sheep carcass in Albania of 13 kg, Serbia 22 kg, North Macedonia 25 kg, and Bosnia and Herzegovina 15 kg. Meat yield per sheep in Montenegro is considerably higher, at about 39 kg/sheep (note: Montenegro data are not shown in Figure 8).

As seen in Figure 8, Albania has improved its small ruminant meat yield over the past 15 years, going from 9 kg/animal to 13 kg/animal (slaughtered carcass weight). However, it is still much lower than other Western Balkan countries. North Macedonia has shown considerable improvement, going from 13 kg/sheep in 2016 to 25 kg/sheep in 2020. Serbia has also improved over the past decade, going from 19 kg/sheep to 22 kg/sheep in 2020. Sheep carcass weight in Bosnia and Herzegovina has been more consistent over those years, at about 15.5 kg. The sheep meat yield in Montenegro has also been consistent, at about 39 kg/sheep.

Small ruminant milk production

Figure 9 outlines the evolution of milk production from small ruminants in Western Balkan countries. Albania is by far the largest small ruminant milk producer in the region. However, as with its small ruminant population, this is showing signs of decline following a period of constant expansion. This decline has also occurred in other Western Balkan countries. North Macedonia shows the

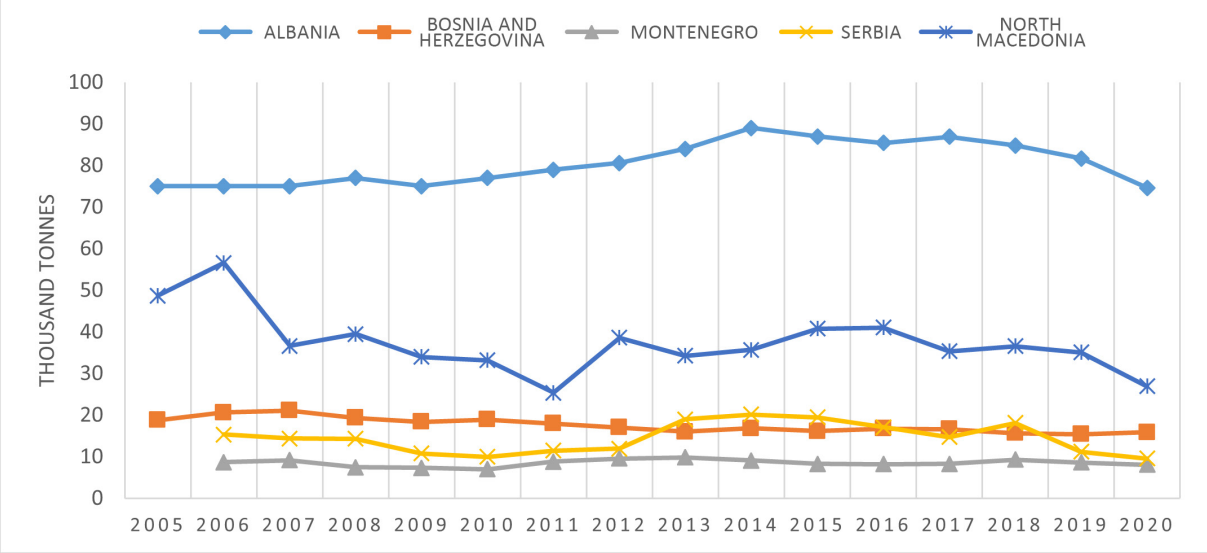
largest decrease in sheep milk, going from a peak of 56 600 tonnes in 2006, to 26 900 tonnes in 2020 (a decline of 52.5 percent).

Another fact that can be deduced from Figure 9 is the large gap — in sheep milk produced — between Albania and other Western Balkan countries such as Serbia, and Bosnia and Herzegovina, even though the sheep population difference between these countries is not significant (in 2020, the populations in Albania, Serbia, and Bosnia and Herzegovina, were 1.56 million, 1.69 million and 1.01 million heads, respectively). The main reason for the difference is the specialization of the sector. In other words, 1.18 million sheep — or 75.6 percent of the total sheep population in Albania — are milk ewes. In Serbia, and Bosnia and Herzegovina, only 3.5 percent and 13.2 percent of the sheep populations are milk ewes (EUROSTAT, 2022).

One could therefore argue that the small ruminant sector in Albania, compared to other Western Balkan countries, is more focused on milk production. However, FAOSTAT data for 2020 show that in Albania, milk yield for both sheep and goats is 64.9 L and 125.7 L/animal, respectively, much lower than the Serbian figures of 142.5 L/sheep and 291.3 L/goat. North Macedonia has a much higher goat milk yield at about 222 L/goat. The lower milk yield in Albania compared to Serbia and North Macedonia could be related to the breeds that are not specialized in milk production. In addition, the specialization of the Albanian small ruminant sector towards milk production can justify to a certain extent the low slaughtered carcass weight compared to other Western Balkan countries.

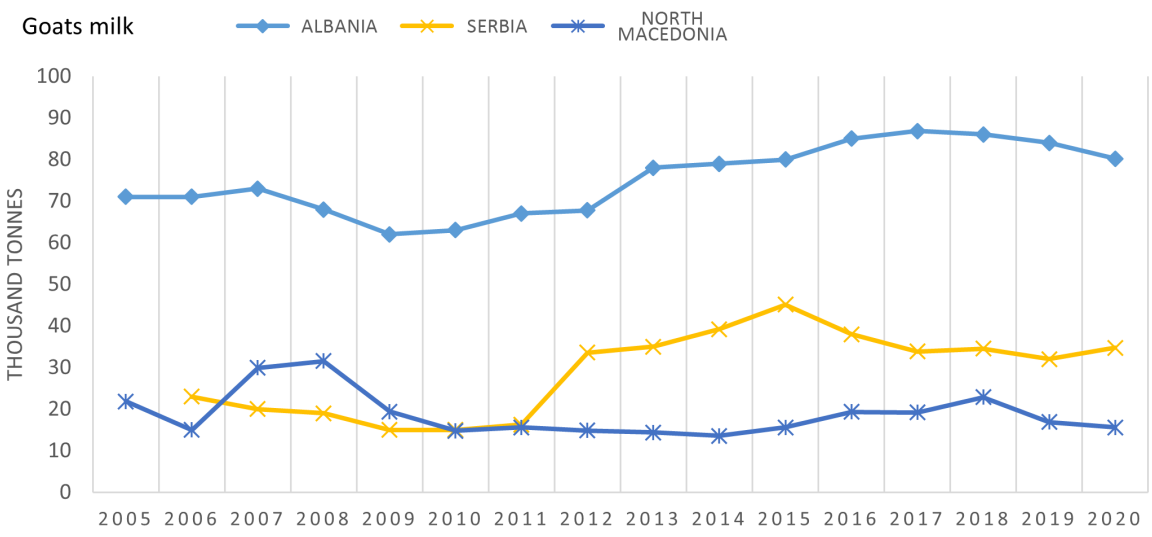
Based on the data outlined above, it appears that either the small ruminant sector in Bosnia and Herzegovina is inefficient, or that the data is unreliable. In 2020, it had a much larger sheep population than North Macedonia, but produced much less meat and much less milk.

Figure 9. Production of milk from small ruminants in Western Balkan countries, 2005–2020



Source: FAOSTAT. 2022. https://fenix.fao.org/faostat/internal/en/#data

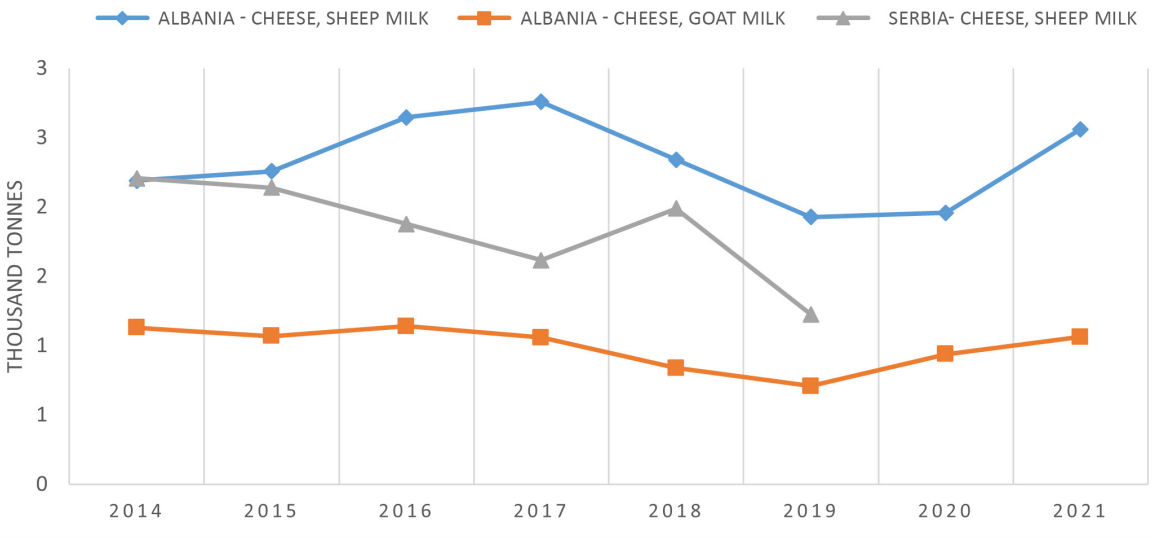
Figure 9 *(Cont.)*. Production of milk from small ruminants in Western Balkan countries, 2005–2020



Source: FAOSTAT. 2022. https://fenix.fao.org/faostat/internal/en/#data

Data on cheese production – using milk from small ruminants – are available only for Albania and Serbia from the FAOSTAT database, which uses an imputation methodology. However, there are differences between the FAOSTAT data and the Albanian INSTAT, on cheese production using small ruminant milk. Figure 10 presents the evolution of small ruminant cheese production in Albania and Serbia, based on FAOSTAT data for Serbia and INSTAT for Albania. Interestingly, small ruminant cheese production in Albania shows a downward trend between 2016 and 2019, and an upward one from 2019 to 2021, even though milk production there has been declining. The increase in small ruminant cheese production in Albania might be explained therefore by an expansion in small ruminant milk imports. Unfortunately, there are no data on imports categorized by type of livestock. However, it should be noted that Albanian imports of dairy products have tripled in the past two decades. Moreover, interviews with small ruminant processors in the country point to an increase in milk imports.

Figure 10. Small ruminant cheese produced in Albania and Serbia, 2015–2020



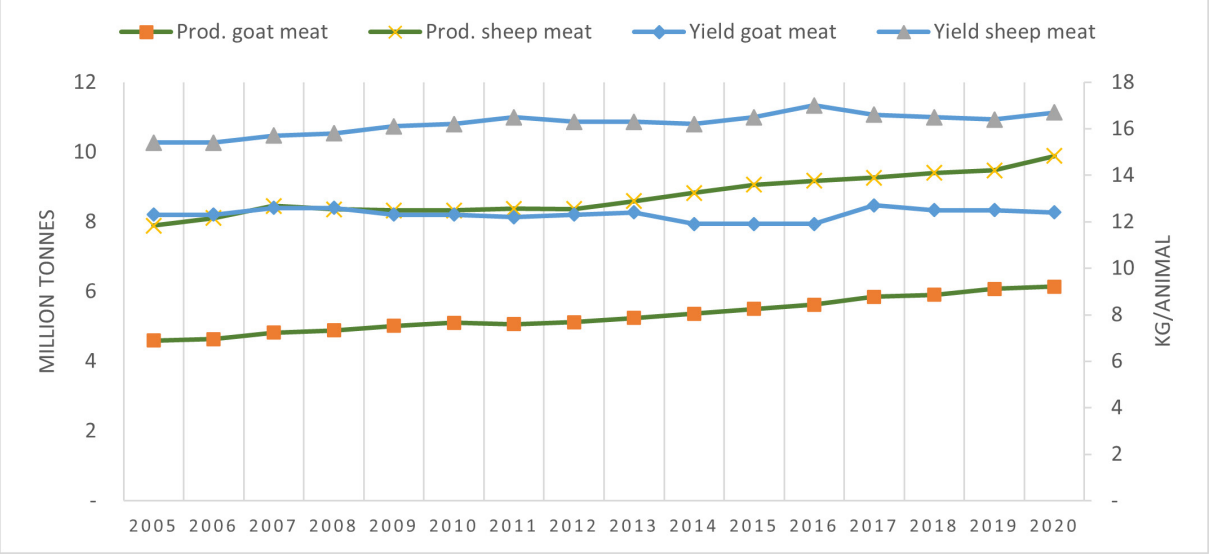
Sources: INSTAT. 2022. http://www.instat.gov.al/; FAOSTAT. 2022. https://fenix.fao.org/faostat/internal/en/#data

In Serbia, on the other hand, small ruminant cheese production has been declining since 2014, which is in line with the decline in milk production presented in Figure 9.

Global production of milk and meat from small ruminants

The global production of meat from small ruminants has been growing at a modest rate. As presented in Figure 11, the growth rate of goat meat production is much higher than that of sheep. Goat and sheep meat production has increased by about 33.6 percent (from 4.6 million to 6.14 million tonnes) and 25.4 percent (7.89 million to 9.89 million tonnes), respectively, since 2005. In other words, the average annual growth rate globally is around 1.52 percent for sheep and 1.95 percent for goats. On the other hand, the yield of meat from small ruminants (slaughtered carcass weight) appears to be constant throughout the years for both goat and sheep, at around 12.5 kg and 16.5 kg per animal, respectively. Based on these data, the small ruminant meat yields for Albania, and Bosnia and Herzegovina, are lower than the global average, indicating inefficiency in small ruminant meat production in both countries — especially in Albania, where the average carcass weight of sheep is 12.7 kg. Small ruminant meat yield values for Serbia, North Macedonia, and Montenegro, however, are much higher than the global average.

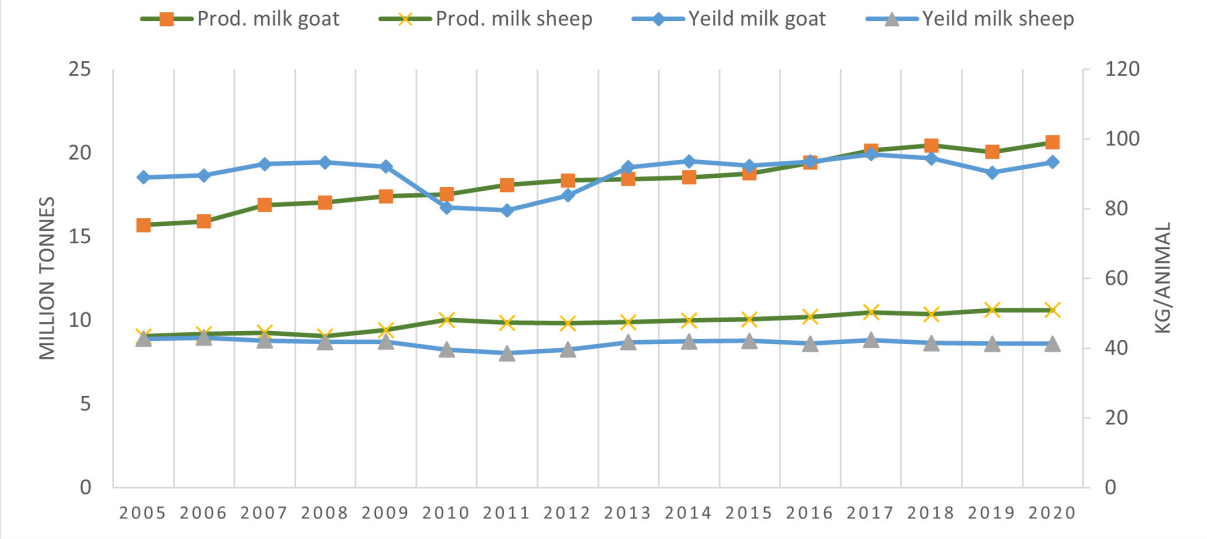
Figure 11. Global production of meat from small ruminants, and meat yields, 2005–2020

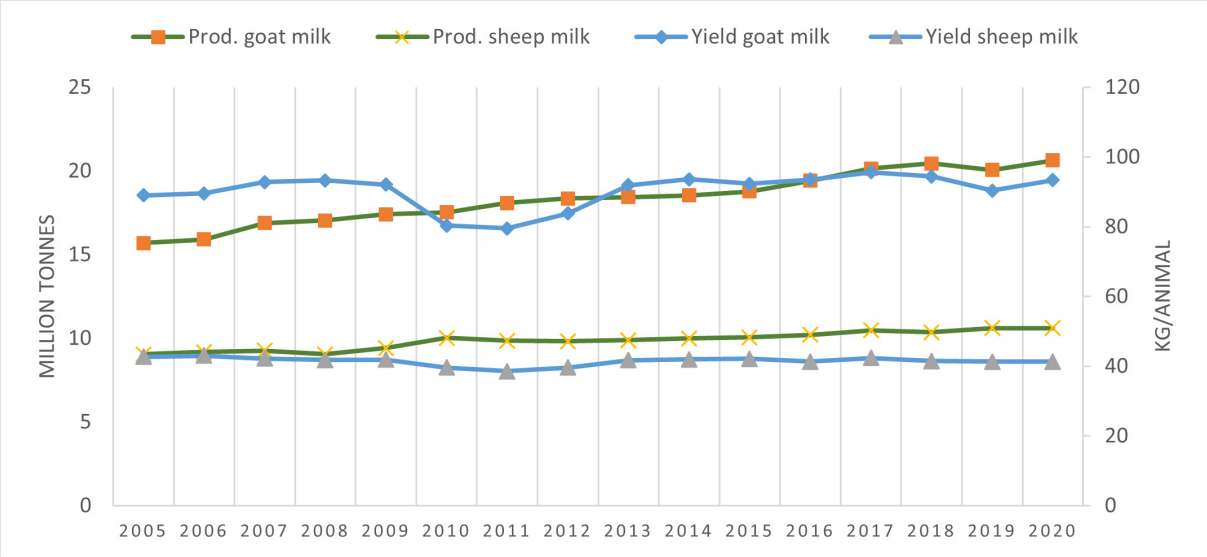


Source: FAOSTAT. 2022. https://fenix.fao.org/faostat/internal/en/#data

A similar situation is observed in global milk production from small ruminants (Figure 12). Goat and sheep milk production have increased by about 31.5 percent and 17.5 percent, respectively, since 2005. Thus, the average annual growth rate of sheep milk is around 1.1 percent, and goat milk 1.8 percent. Furthermore, the global goat milk yield fluctuates a bit above and below 95 L, while the sheep milk yield is more stable, at about 42 L per lactation cycle.

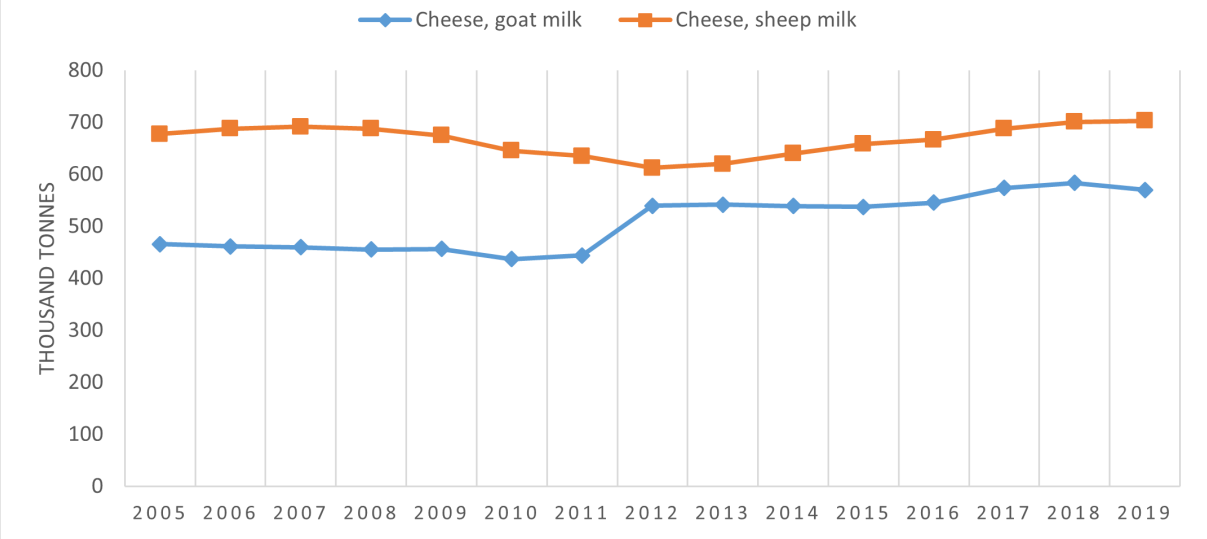
Figure 12. Global production of milk from small ruminants, and milk yields, 2005–2020





Source: FAOSTAT. 2022. https://fenix.fao.org/faostat/internal/en/#data

Figure 13. Global production of small ruminant cheese, 2005–2019



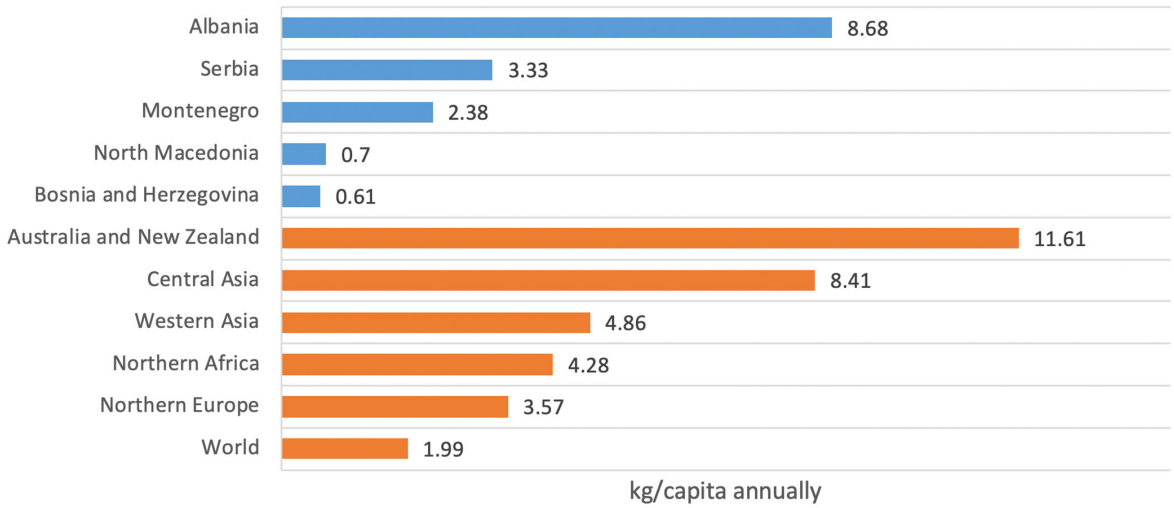
Source: FAOSTAT. 2022. https://fenix.fao.org/faostat/internal/en/#data

Figure 13 shows global production of goat and sheep cheese. Global goat cheese production was mostly constant between 2005 and 2011 at around 455 000 tonnes, before increasing between 2011 and 2019 to 570 000 tonnes, an increase of 25 percent. On the other hand, global production of sheep cheese decreased between 2005 and 2012, followed by an increase from 612 000 tonnes in 2012 to 703 000 tonnes in 2019 (a 14.8 percent increase).

2.2 Consumption trends

Based on Food and Agriculture Organization of the United Nations (FAO) methodology, food supply quantity available for human consumption of mutton and goat meat in Albania is the highest in the Western Balkans and among the top in the world, at around 8.68 kg/capita annually (FAOSTAT, 2022). On the other hand, consumption in Bosnia and Herzegovina, and North Macedonia, is low, at 0.61 kg and 0.7 kg/capita annually, respectively, even lower than the global average of 1.99 kg/capita (Figure 14). Serbia and Montenegro have a modest consumption of 3.3 kg and 2.38 kg/capita annually, respectively.

Figure 14. Consumption of mutton and goat meat, 2019



Source: FAOSTAT. 2022. https://fenix.fao.org/faostat/internal/en/#data

The survey with small ruminant farmers shows a different picture regarding the consumption of small ruminant meat (see Table 1), though this is focused on households that breed small ruminants, which is not representative of the population as a whole. Assuming that the slaughtered weight of small ruminants for consumption is 16 kg, and that there are four family members, then the consumption of small ruminant meat is around 26 kg/capita annually in Albania, 31.5 kg/capita in Bosnia and Herzegovina, 18.96 kg/capita in Serbia, and 20.72 kg/capita in Montenegro. There are differences in average consumption between the countries, but the distribution of small ruminant consumption is similar (that is, 1st quintile [Q1], median and 3rd quintile [Q3]).[1]). In general, the median of the population is more robust to outliers than the average. Thus, considering the median consumption (Table 1), Albania, Bosnia and Herzegovina, and Serbia consume about 20 kg/capita annually of meat from small ruminants (five small ruminant heads, 16 kg per head, four family members). In Montenegro, the consumption is slightly lower (assuming a similar slaughter carcass weight of 16 kg), but as outlined above, Montenegro has the highest yield of meat from small ruminants.

[1] By using the 1st quintile, median, and 3rd quintile together, we can understand the spread and distribution of a dataset. These three values provide a concise overview of the data''s central tendency and dispersion. The 1st quintile, also known as the lower quartile or 25th percentile, divides the data set into four equal parts. It represents the value below which 25 percent of the data points fall. The median is the middle value in a data set when it is arranged in ascending or descending order. It divides the data set into two equal parts. Fifty percent of the data values are below the median, and the other 50 percent are above it. Similarly, the 3rd quintile, also known as the upper quartile, is the value above which 75 percent of the data points fall. It divides the data into four equal parts, with the top 25 percent of the values falling above Q3.

Table 1. Small ruminants used for farming-family consumption

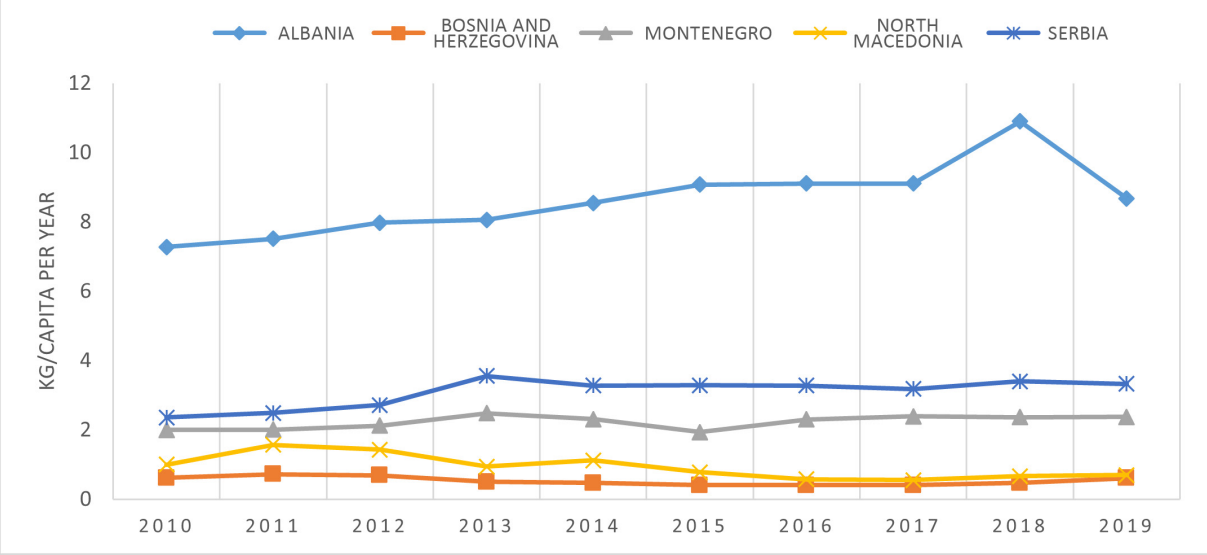
Number of small ruminants used for family consumption	Mean	Std. Dev	Q1	Median	Q3
Albania	6.5	5.24	3	5	10
Bosnia and Herzegovina	7.87	9.81	3	5	10
Serbia	4.74	3.95	2	5	6
Montenegro	5.18	4.79	2	4	6

Note: Q1 is first quintile; Q3 is third quintile; Std. dev is standard deviation.

Considering that one of the main drivers of meat production in Western Balkan countries is domestic demand, investigating consumption patterns can shed more light on the evolution of meat production. It should be noted that another driver of meat production from small ruminants is exports, which for Albania, Bosnia and Herzegovina, and Montenegro is non existent for this type of product.

Therefore, to explore in more detail the consumption patterns of mutton and goat meat, Figure 15 outlines consumption for the 2010–2019 period for Western Balkan countries. Albania's consumption expanded rapidly, before declining in 2019. This decline could have been the trigger for the reduction in meat production highlighted already. On the other hand, the consumption of mutton and goat meat in other Western Balkan countries is much lower than in Albania. Serbia appears to have the second largest per capita consumption of mutton and goat meat, which shows a slight upward trend over the past decade. A similar pattern is observed for Montenegro, which has the third largest consumption per capita in the Western Balkans. North Macedonia is the only Western Balkan country whose consumption of mutton and goat meat has decreased, going from 1.57 kg/capita annually in 2011 to 0.7 kg/capita in 2019. This could also be a reason for the reduction in small ruminant meat produced there. Bosnia and Herzegovina has had a consistently low consumption of mutton and goat meat throughout the 2010–2019 period, at around 0.5 kg/capita annually, which explains to a certain extent the low production of meat in the country pointed out above

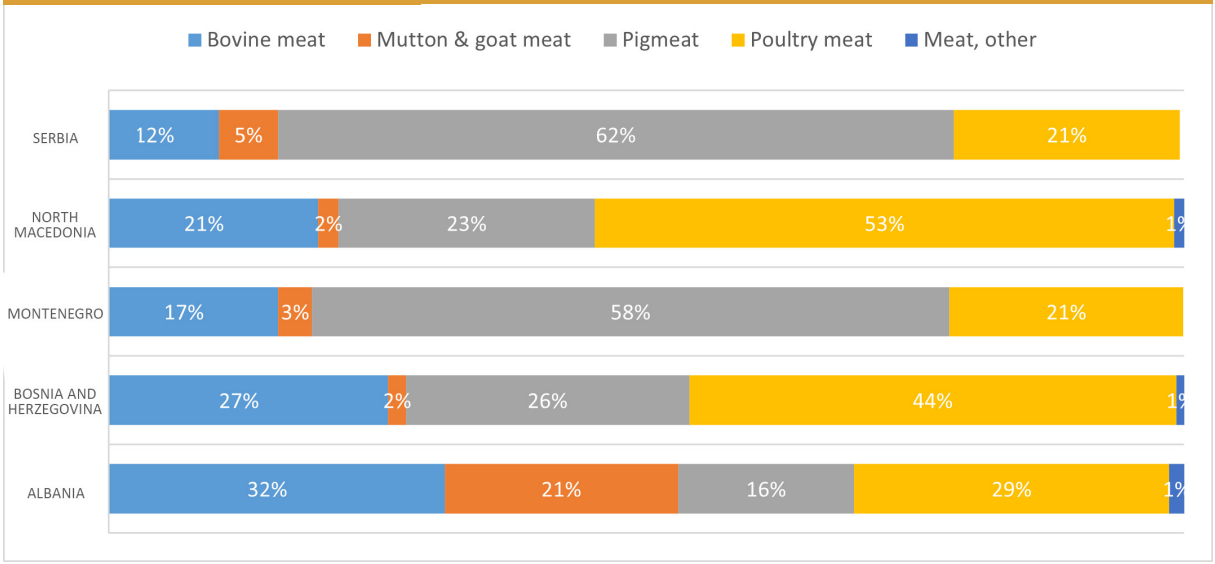
Figure 15. Consumption trends of mutton and goat meat in the Western Balkans, 2010–2019



Source: FAOSTAT. 2022. https://fenix.fao.org/faostat/internal/en/#data

Looking at the overall structure of meat consumption in Western Balkan countries, it appears that there are considerable differences between countries in terms of type of meat consumed. Thus, in Albania, bovine meat is the most consumed, followed by poultry, and mutton and goat meat. North Macedonia, and Bosnia and Herzegovina, have similar meat consumption patterns, with poultry accounting for about 50 percent of the meat consumed, followed by bovine and pig meat with a similar share of meat consumption. For Serbia and Montenegro, pig meat accounts for about 60 percent of the total meat consumed per capita, followed by poultry (accounting for 21 percent), and then bovine meat.

Figure 16. Overall meat consumption structure in Western Balkan countries, 2019



Note: Total meat consumption – Montenegro 76.8 kg; Serbia 61.5 kg; Albania 40.71 kg; North Macedonia 37.8 kg; Bosnia and Herzegovina 37.8 kg.

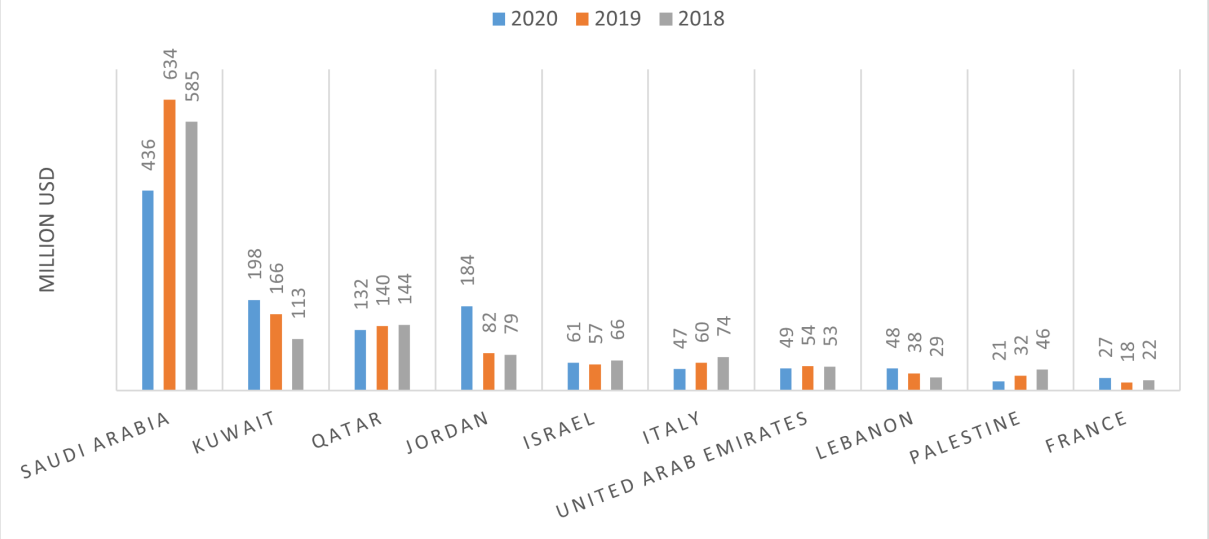
Source: FAOSTAT. 2022. https://fenix.fao.org/faostat/internal/en/#data

2.3 Trade trends

The above sections pointed out that the global sheep and goat populations have been increasing steadily over the past 15 years. Meat produced from sheep and goats has grown annually at a rate of about 1.52 percent (for sheep meat) and 1.95 percent (for goat meat). In order to have a comprehensive picture, the global and regional trade trends for the small ruminant sector are presented here.

Figure 17 and Figure 18 present the leading countries in live sheep and goat (or HS0104, the harmonized system code) imports and exports for 2018, 2019 and 2020. Global live sheep and goat imports totalled USD 1.55 billion in 2020 (ITC, 2021). Based on International Trade Centre (ITC) data, the annual growth rate of world imports between 2016 and 2020 for live sheep and goats (HS0104) is -2 percent – that is to say, that imports were down. Saudi Arabia is the leading live sheep and goat importer, followed by Kuwait and Qatar. The top five importing countries of live sheep and goats are located in the Near East, and jointly account for about 65 percent of total global imports.

Figure 17. Leading countries in live sheep and goat imports

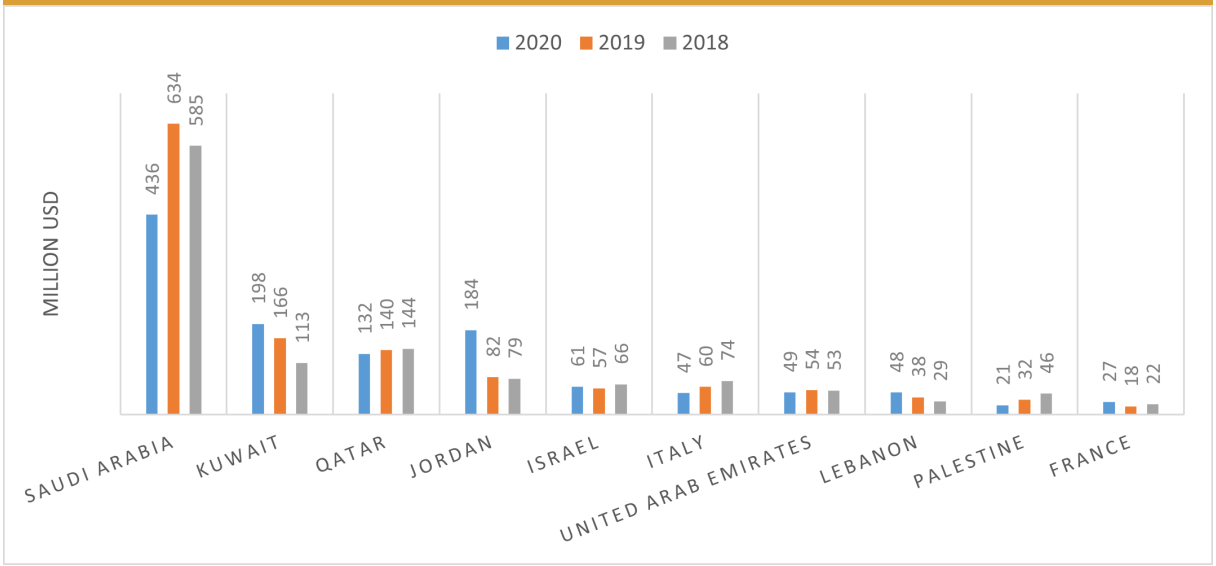


Source: UN Comtrade. 2021. https://comtrade.un.org/

The same data show that world exports of live sheep and goats dropped by 4 percent between 2016 and 2020, also a downward trend. Global exports of live sheep and goats in 2020 were worth USD 1.38 billion (ITC, 2021).

The leading exporter of live sheep and goats in 2018 was Sudan (data for Sudan after 2018 are not available), followed by Romania, Spain and Australia.

Figure 18. Leading countries in live sheep and goat exports

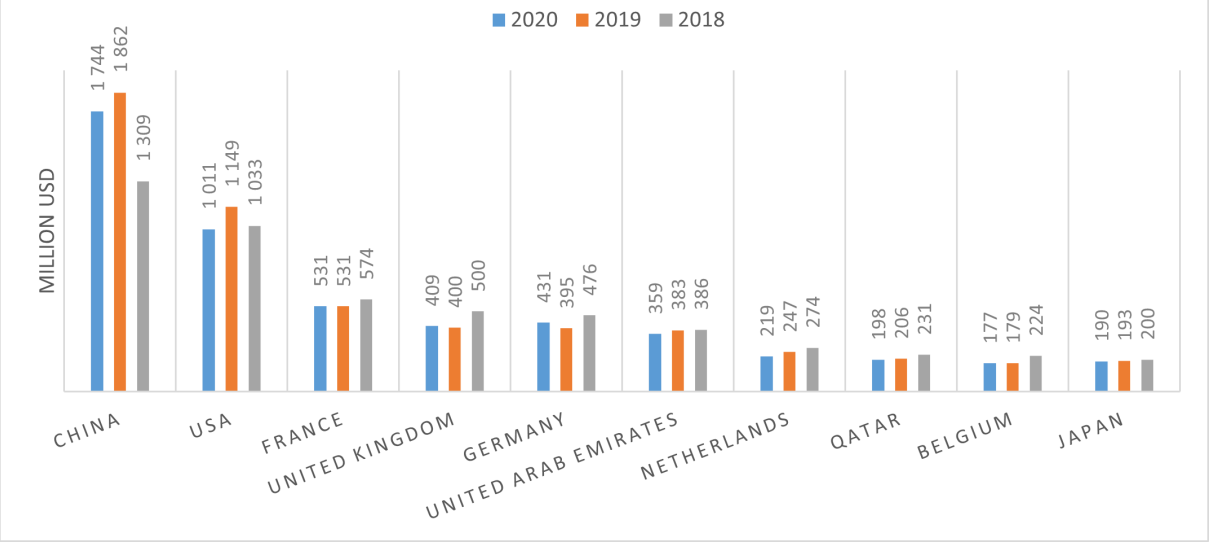


Source: UN Comtrade. 2021. https://comtrade.un.org/

While the leading importers of live small ruminants are located in the Near East, the leading importers of small ruminant meat (HS0204) are China, followed by the United States of America and three of the biggest economies in Europe (Figure 19). Global imports of sheep or goat meat (fresh, chilled or frozen) amounted to USD 7.59 billion in 2020, and showed an average annual growth rate of 6 percent over the 2016–2020 period (ITC, 2021).

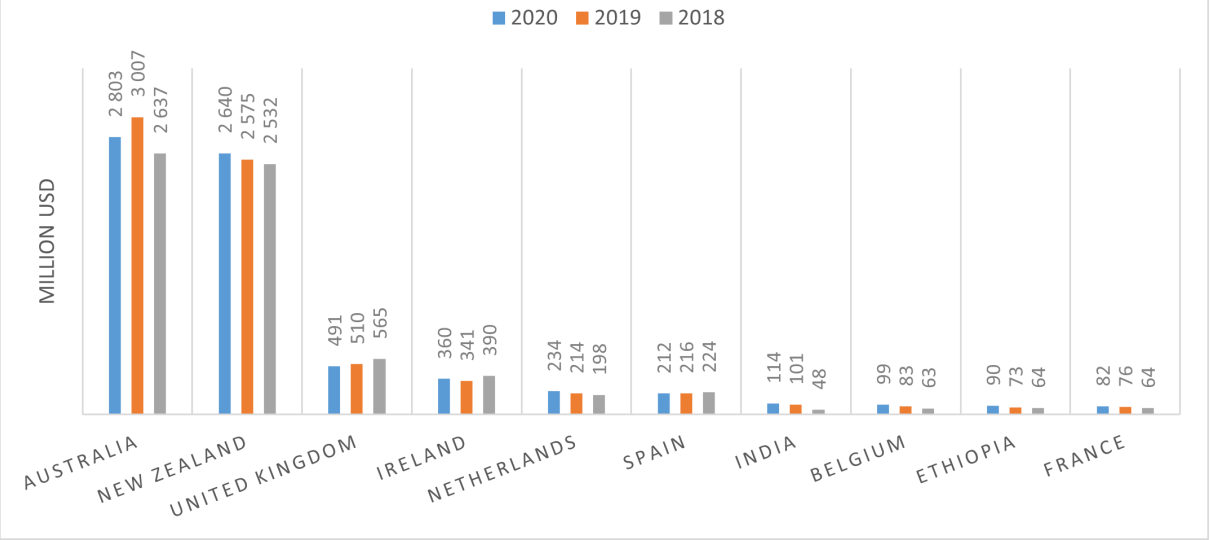
The two main exporters of sheep or goat meat are Australia and New Zealand, accounting for over 70 percent of global exports, which in 2020 stood at around USD 7.4 billion. The annual growth rate of small ruminant meat exports for the period 2016–2020 was 6 percent.

Figure 19. Leading countries in sheep and goat meat imports (fresh, chilled or frozen)



Source: UN Comtrade. 2021. https://comtrade.un.org/

Figure 20. Leading countries in sheep and goat meat exports (fresh, chilled or frozen)



Source: UN Comtrade. 2021. https://comtrade.un.org/

2.3.1 European Union and Near East markets for small ruminant meat

The trade figures above show that European Union and Near East markets are high potential export markets for sheep and goat meat from Western Balkan countries. The prices for lamb in Germany (as well as in other European Union countries) are high, the packaging is typically quite small, and consumers expect to pay more for lamb than other meat, to benefit from its health properties and nutritional value (Euromonitor International, 2017). Similarly, the United Arab Emirates relies heavily on agricultural imports from international markets. Consumers there generally prefer high quality tender beef and lamb. Lamb benefits not only from market demand, but also from higher prices from cultural–religious demand over the Hajj period (Euromonitor International, 2017).

EU market for small ruminant meat

The European Union is the second largest importer of sheep and goat meat in the world. The Directorate-General for Agriculture and Rural Development (DG AGRI) short term outlook report estimates a 97 percent self-sufficiency in sheep and goat meat, a figure that in 2013 was 86 percent (DG AGRI, 2021). Currently, there are 60.4 million sheep and 11.9 million goats in the European Union (Eurostat, 2022). This is a decline of about 8 percent (from 78.8 million to 72.3 million heads) since 2010 (Eurostat, 2022), and it may be due to a number of factors, including the level of profitability, part-time farmers, reduced labour availability, and the lack of uptake of technology and innovation.

In 2020, total imports of sheep and goat meat into the European Union was 239 000 tonnes, with the top five countries accounting for more than 80 percent of that figure (see Table 2). The leading sources of imports for European Union countries are New Zealand and Australia. Currently, only North Macedonia and Serbia (of Western Balkan countries) export small ruminants to countries in the European Union.

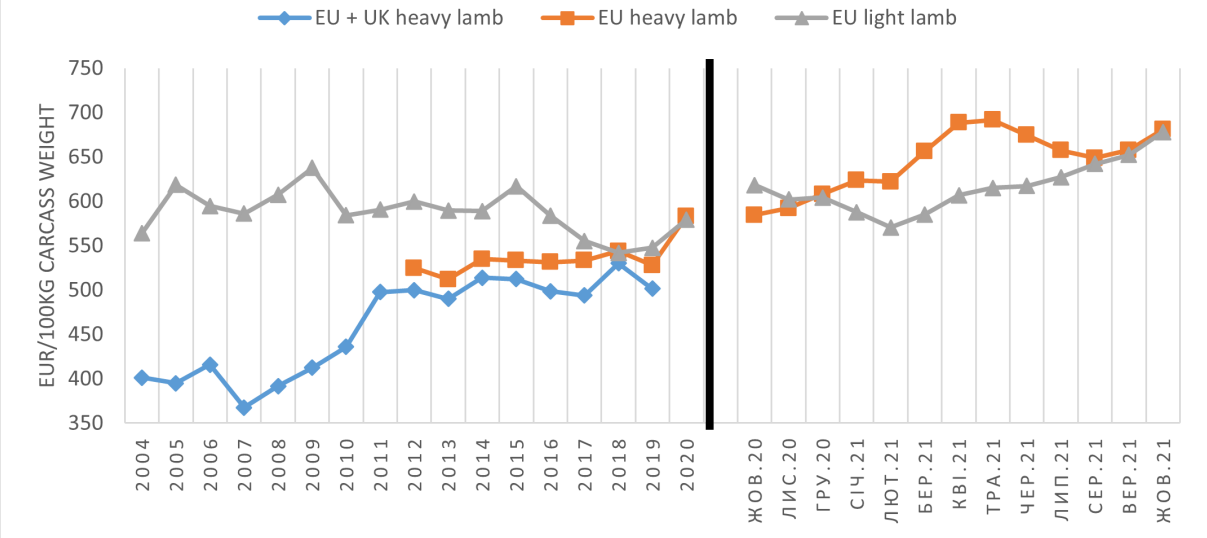
Table 2. Leading importers of sheep and goat meat in the European Union, 2020

Country	Share of EU imports by trade value
France	29.2%
Germany	23.7%
Netherlands	12.1%
Belgium	9.7%
Italy	7.7%
Total imports (million USD)	**1 818**
Total imports (thousand tonnes)	**239**

Source: UN Comtrade. 2021. https://comtrade.un.org/

Lamb prices in the European Union (that is, the weighted average of all European Union countries) are outlined in Figure 21. Since the start of the COVID-19 pandemic, prices have increased rapidly. This could be attributed to disruptions in supply logistics costs caused by the pandemic.

Figure 21. Evolution of lamb price in the European Union, 2004–2021



Note: Heavy lambs (those over 13 kg) are produced in Ireland, light lambs are reared in southern regions such as Greece and Italy, whereas the Spanish and French production is mixed (DG AGRI, 2021).

Source: Eurostat. 2022 https://ec.europa.eu/eurostat/data/database

Near East market for small ruminant meat

In 2020, the top four importers in the Near Eastern region (United Arab Emirates, Qatar, Saudi Arabia, and Kuwait) accounted for more than 90 percent of sheep and goat meat imports in the region (Table 3). A major point of difference from the European Union is that these countries import from a large number of countries across the globe. Though New Zealand and Australia are the leading suppliers, other countries such as Brazil, India and Ethiopia, also export to the Near East. However, none of the Western Balkan countries export to the Near East. Clearly, there is potential to do so, after catering to the requirements of the domestic market and meeting the quality requirements of the importing countries.

Table 3. Leading importers of sheep and goat meat in the Near East, 2020

Country	Share of Near East imports by trade value
United Arab Emirates	41.7%
Qatar	23%
Saudi Arabia	13.2%
Jordan	12.5%
Total imports (million USD)	**862**
Total imports (thousand tonnes)	**133**

Source: UN Comtrade. 2021. https://comtrade.un.org/

A Euromonitor International study (2017) emphasizes some practical approaches to improving the small ruminant trade with European Union and Near East regions:

- Raise awareness of taste and attributes of meat produced in these regions.
- Consolidate production to enhance quality consistency and volume supply.
- Develop livestock populations for long-term trade sustainability.
- Achieve international certification (GLOBAL GAP, HACCP, etc.).
- Learn from international best practices to modernize laboratories.
- Identify opportunities for partnerships in air freight.

2.3.2 Western Balkan market for small ruminant meat

Table 4 and Table 5 present the details of trade of small ruminants in the Western Balkan for the period 2016–2020. Bosnia and Herzegovina was the largest importer of live small ruminants, while Serbia and Montenegro were the largest importers of sheep and goat meat (Table 4). It is clear from the table that the Western Balkan countries import more live animals than processed meat.

The largest exporter of live small ruminants in the region is Serbia, with export values increasing from USD 6.2 million in 2016 to USD 9.8 million in 2020, an expansion of 58 percent in five years (Table 5), while the largest exporter of sheep and goat meat is North Macedonia. Other Western Balkan countries have negligible exports of small ruminants. Bosnia and Herzegovina has the highest deficit in terms of the sheep and goat meat trade, whereas North Macedonia and Serbia have a positive trade balance from trade of meat from small ruminants.

Table 4. Imports of live small ruminants and small ruminant meat in Western Balkan countries

Value of imports of live small ruminants					
Country	**2020**	**2019**	**2018**	**2017**	**2016**
Albania	0.53	3.21	-	-	-
Bosnia and Herzegovina	3.98	5.42	4.76	4.50	4.61
Montenegro	1.68	3.04	2.81	2.30	1.78
North Macedonia	0.83	0.07	0.08	0.11	0.14
Serbia	0.21	0.53	1.28	0.63	0.15
Western Balkan total value of imports	**7.23**	**12.27**	**1.28**	**7.54**	**6.69**
Value of imports of sheep or goat meat (fresh, chilled or frozen)					
Albania	0.26	0.26	-	-	-
Bosnia and Herzegovina	0.25	0.39	0.48	0.50	0.60
Montenegro	0.29	0.85	0.94	0.81	0.63
North Macedonia	-	0.01	0.00	0.00	0.00
Serbia	0.42	1.13	0.85	0.78	0.92
Western Balkan total value of imports	**1.22**	**2.64**	**2.28**	**2.08**	**2.15**

Note: Values are in million USD.

Source: UN Comtrade. 2021. https://comtrade.un.org/

Table 5. Exports of live small ruminants and small ruminant meat in Western Balkan countries

Value of exports of live small ruminants (million USD)					
Country	**2020**	**2019**	**2018**	**2017**	**2016**
Albania	-	-	-	-	-
Bosnia and Herzegovina	-	-	-	-	-
Montenegro	0.7	-	-	-	-
North Macedonia	-	-	-	-	-
Serbia	9.8	7.2	7.7	6.0	6.2
Western Balkan total value of imports	**10.5**	**7.2**	**7.7**	**6.0**	**6.2**
Value of exports of sheep or goat meat (fresh, chilled or frozen) (million USD)					
Albania	-	-	-	-	-
Bosnia and Herzegovina	0.01	0.03	0.08	0.12	-
Montenegro	-	-	-	-	-
North Macedonia	10.67	10.81	12.34	11.19	13.82
Serbia	0.42	0.25	0.33	0.34	0.17
Western Balkan total value of imports	**11.09**	**11.09**	**12.74**	**11.65**	**13.99**

Source: UN Comtrade. 2021. https://comtrade.un.org/

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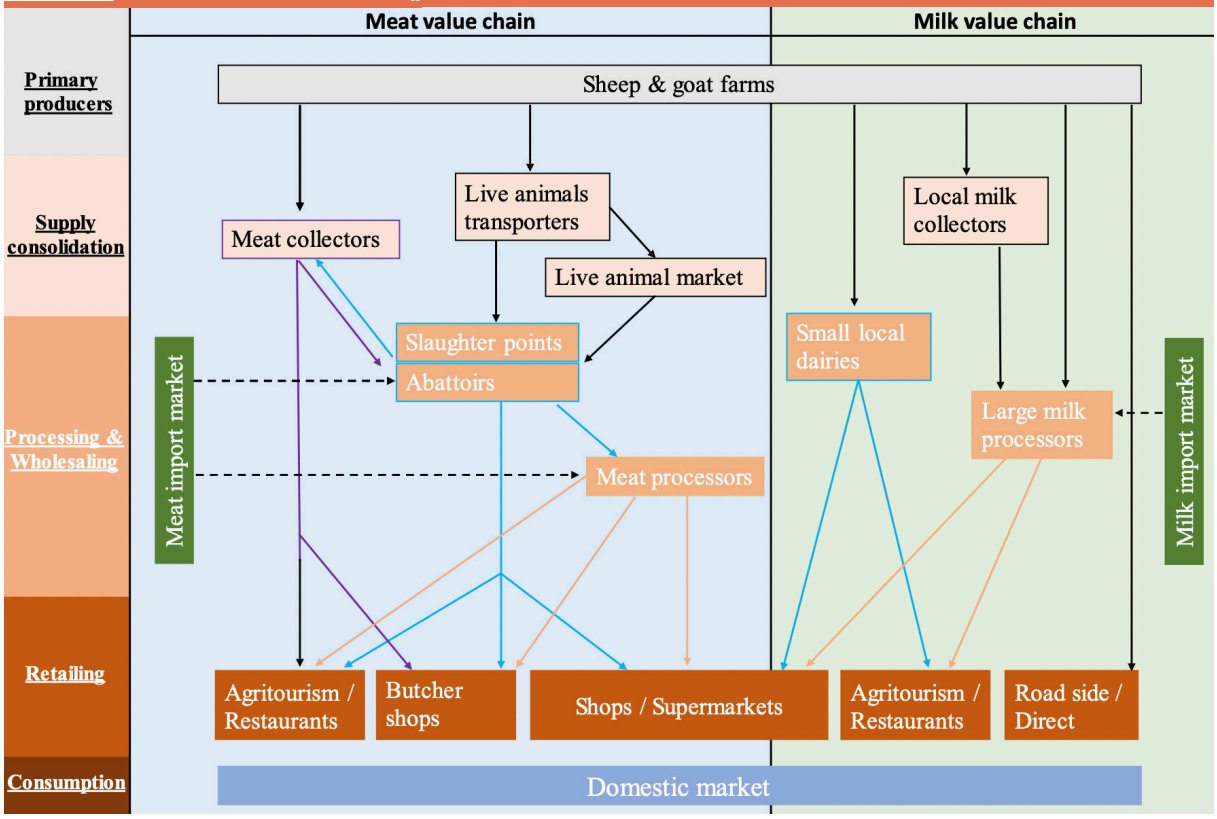
3. Value chain analysis

This section discusses the way the small ruminant value chain is structured in Western Balkan countries, to provide a broad understanding of the key players in the chain and functioning of the chain. First, it outlines a general structure of the small ruminant value chain, the main channels through which small ruminant products move from producer to end consumer, and the actors involved in each channel. Subsequently, a detailed assessment of the activities at all levels in the value chain is provided, starting with small ruminant producers which are the focus of the primary data collection of this study, followed by actors involved in small ruminant transportation and processing, and continuing with milk collectors and processors. The section concludes with a summary subsection that outlines the main messages

3.1 Value chain structure

A full map of the small ruminant value chain as observed in the countries where the study was conducted is provided in Figure 22. The figure shows different channels through which small ruminant meat and milk might move from small ruminant farmers to end consumer, but these channels are not necessarily operational in all Western Balkan countries in the same way. In some countries, the milk value chain might be more developed than the meat value chain, or the same channel in two different countries might face different issues. Thus, the figure should be considered a general picture of all potential channels used to move small ruminant products from producer to end consumer in the Western Balkan countries included in the study. The following sections will delve into the specifics of small ruminant value chains for each country. In addition, Box 1 and Box 2 give a brief overview of the main channels of the small ruminant milk and meat value chains, and involved actors in each channel.

Figure 22. Small ruminant milk and meat value chain



Source: Authors' own elaboration.

Box 1. Small ruminant milk value chain and main channels

As one may observe from the right-hand side of Figure 22, the main actors in the milk value chain are small ruminant farmers, milk collectors, milk processors and dairy product wholesalers and retailers. Each of the main levels of the chain are discussed in subsection 3.2 (small ruminant farmers) and 3.5 (milk collection and processing).

As shown in the figure, there are four main channels for milk, from the primary producer to the end consumer (all channels start with the black arrow at farm level). The first channel is the informal one, where milk or small ruminant cheese go directly from producer to end consumers. This channel works in different ways, including:

- Selling by the roadside in main cities. In general, this is used by smallholders living in the vicinity of cities.
- Selling directly to consumers in their houses. In this case, the farmer delivers the milk or small ruminant cheese directly to consumer homes or delivers it to a specific place where his clients go and pick it up.
- In villages selling directly to neighbouring farmers.

A second channel is the intermediary channel, where the farmer sells the milk to a local collector, who consolidates supply and then sells to a larger processor. Generally, this channel is used by smallholders who are located far from the processor (or are in remote areas). This channel tends to operate informally and is prone to problems with milk quality and safety.

The third is the coordination channel, where the farmer sells directly to the milk processor. However, selling directly to a local small processor and large milk processor is very different. Selling to local small processor is done primarily by local smallholders who in general cannot produce large quantities and lack milk quality standards. In addition, local processors also lack the capacities to provide assistance to the farmers. On the other hand, large processors have attempted in recent years (especially in Albania) to coordinate directly with larger farmers and also provide to them assistance with veterinary services or install cooling tanks on their farms. It should be noted that the latter approach is done with farmers who produce large daily quantities of milk. Moreover, the channel from farmer to large milk processor tends to be more formal and the milk supplied is of higher quality and standards. In this context, the coordination channel can be considered at two levels: coordination level 1 – farmer to small local dairy; coordination level 2 – farmer to large milk processor.

Information obtained from interviews shows that sales of small ruminant milk in Bosnia and Herzegovina, Serbia, and Montenegro is low.

Box 2. Small ruminant meat value chain and main channels

The left-hand side of Figure 22 shows the main channels and actors of the small ruminant meat value chain. The main actors in meat value chain are small ruminant farmers, live animal transporters, meat collectors, live animal markets, abattoirs and slaughter points, meat processors and retail shops (butcher shops, restaurants, and supermarkets).

Three main channels are observed in the small ruminant meat value chain, namely the direct channel (purple line in the figure), the local processing channel (blue line in the figure), and the industrial meat processing channel (orange line in the figure).

The direct channel operates in different ways, including:

- Direct selling of live animals to agrotourism business operators. This is either done from farmer to agrotourism or through an intermediary (such as a meat collector). The intermediary transports the animals to the abattoir/slaughter point and then sends the slaughtered animal to the agrotourism agent.
- Direct selling to end consumers, where the end consumer buys a lamb directly from a farmer during festive times (such as Easter). However, this is rarely used.
- Direct selling to butcher shops in cities.
- Direct selling through the live animal market.

In the local processing channel, the meat collectors or abattoirs buy live animals either directly or through the live animal market, process the meat and sell it to end consumers via the retail market.

Lastly, the industrial meat processing channel operates with much larger quantities; purchases are not made directly from small ruminant farmers but rather through a supply consolidator (such as a meat collector or local abattoirs). Moreover, their source of supply is not only domestic small ruminants, but also imports. Once they process the small ruminant meat they sell through supermarkets.

3.2 Small ruminant farmers

A small ruminant farm is described in detail, starting with an outline of the family farm profile, followed by an analysis of the farm's factors of production (land, labour, and capital), continuing with production capacity outputs and costs; concluding with the problems faced by small ruminant farmers.

3.2.1 Family farm profile

Table 6 presents the profile of the respondent and his/her family. The average respondent age is about 50 years. The share of female respondents is highest in Bosnia and Herzegovina (about 21 percent), and lowest in Serbia (5.8 percent). Regarding respondents' experience with the small ruminant sector, the average for all countries appears to be above 20 years. All countries appear to have similar family sizes (about 4.4 members) and structure (gender and age).

Table 6. Family farm profile

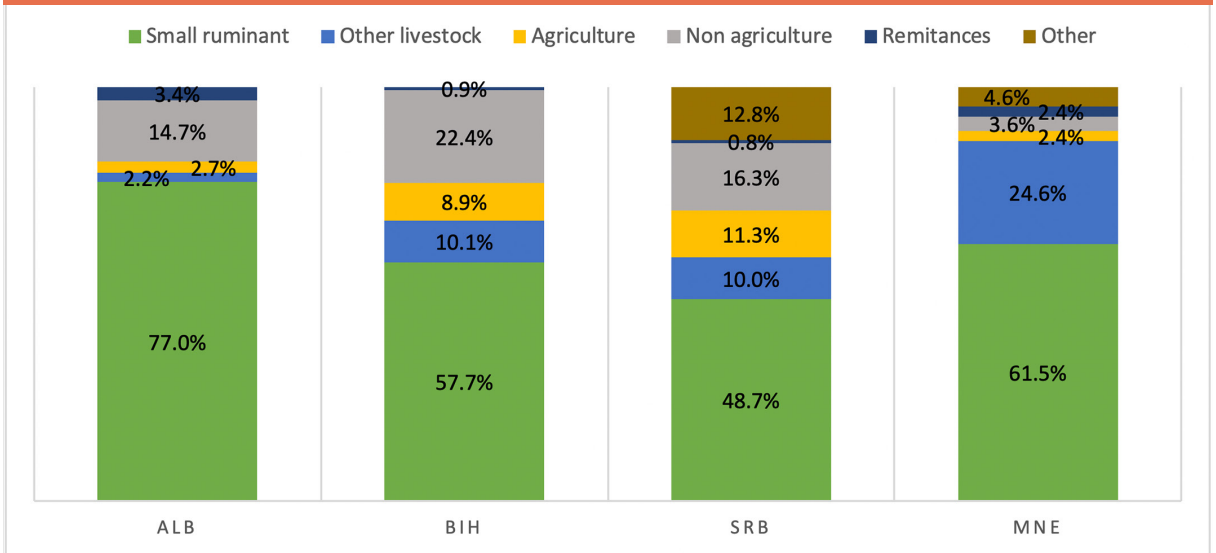
	Albania	Bosnia and Herzegovina	Serbia	Montenegro
Respondent age	50.62 (13.8)	50.74 (13.06)	49.98 (11.57)	48.81 (12)
Respondent gender	12.0%	21.1%	9.93%	5.79%
Experience with small ruminants	21.75 (10.07)	22.72 (15.19)	21.89 (14.72)	29.32 (13.44)
Family size	4.37 (1.89)	4.3 (2.16)	4.9 (2.56)	4.68 (2.08)
Male members	2.18 (1.03)	2.25 (1.17)	2.4 (1.29)	2.45 (1.13)
Family members above 14 years	3.59 (1.33)	3.68 (1.8)	4.11 (1.84)	3.77 (1.42)
Male family members above 14 years	1.92 (0.81)	1.93 (1.01)	2.06 (1.04)	2.15 (0.96)
Household members involved with small ruminants* (+14)	2.72 (1.17)	2.99 (1.52)	3.53 (2.22)	3.54 (1.37)
Male household members involved with small ruminants* (+14)	1.6 (0.71)	1.72 (0.87)	1.91 (0.99)	2.11 (0.92)
Emigrated out (2013–2020)	**18%**	**13.2%**	**9.22%**	**9.92%**

Note: Albania N=200; Bosnia and Herzegovina N=204; Serbia N=141; Montenegro N=121 (N refers to the sample size in each country); mean values are presented for continuous variables, and in parentheses their standard deviation; * for Albania and Bosnia and Herzegovina, data are for 2020, for Serbia and Montenegro for 2021; respondents' gender shows share of the sample that were female respondents; emigrated out shows share of the sample that had at least one family member emigrate out.

The share of respondents that claimed that at least one family member has emigrated since 2013 is presented at the bottom of the table, Albania with the highest at 18 percent, followed by Bosnia and Herzegovina (13.2 percent), while Serbia and Montenegro have a similar rate of about 9.5 percent.

The household income structure is presented in Figure 23. The share of income generated by small ruminants as a proportion of total family income is highest in Albania (at 77 percent), and lowest in Serbia (48.7 percent). Aside from Albania, all other countries get at least 20 percent of their income from other livestock activity or from agricultural activity (yellow and blue colours in the figure). Serbia has the highest share of income from non-agricultural activities at 29.1 percent (grey, dark blue and brown colours in the figure). In this context, Albania's small ruminant farmers have the highest dependency on the small ruminant business, while Montenegrin farmers have the highest dependency on the agricultural sector overall.

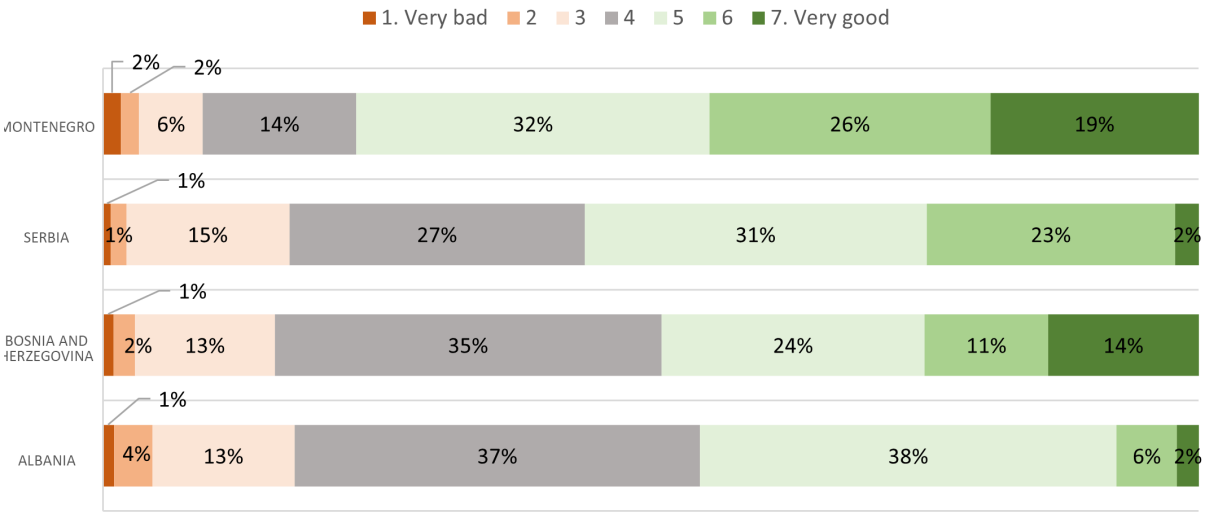
Figure 23. Household income structure



3.2.2 Family farm well-being

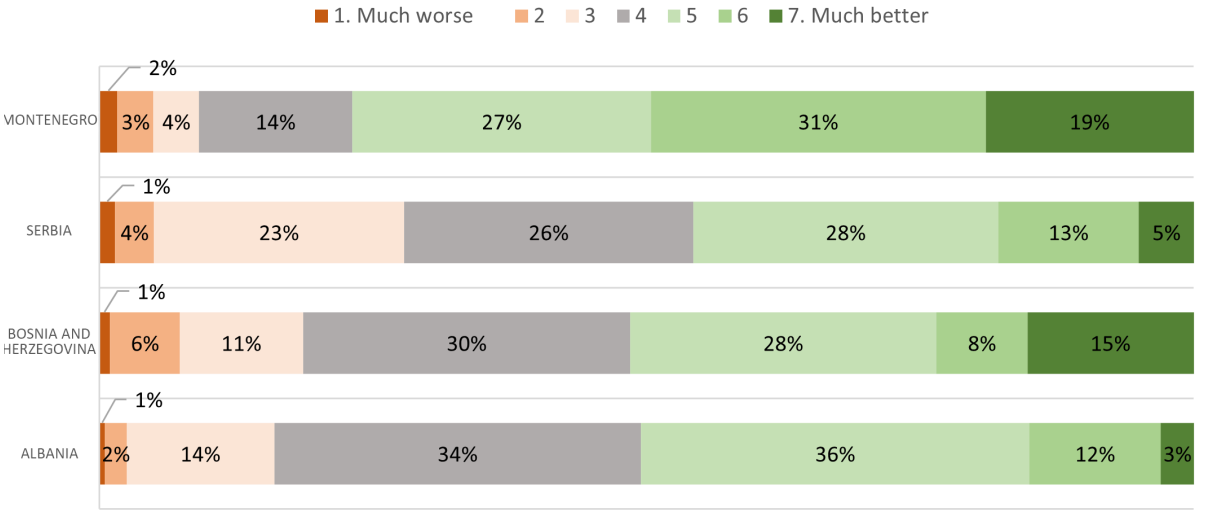
Respondents were asked to assess on a Likert scale their household well-being compared to their fellow villagers. The distribution of answers is presented in Figure 24. Albanian farmers appear to have the lowest share of respondents who find that they are better off than their fellow villagers (green colour in the figure), while Montenegro's small ruminant farmers have the highest share of respondents who consider their household well-being as much better than that of their fellow villagers. Statistical tests show that small ruminant farmers (in all countries except Montenegro) perceive that their family well-being is similar to the well-being of their fellow villagers.

Figure 24. Family farm well-being compared to fellow villagers



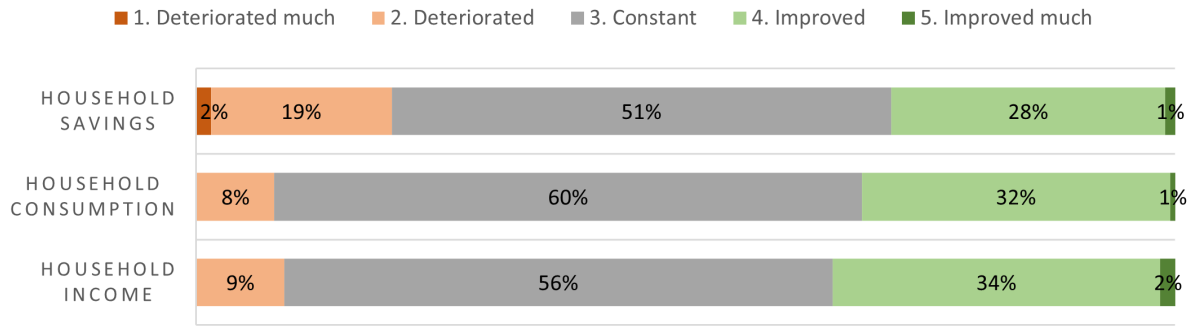
Respondents were also asked to assess present household well-being to five years ago on a Likert scale measure (Figure 25). Serbia appears to have the lowest share of respondents saying that their household well-being is better now than five years ago. Montenegro has the highest share of respondents who say that they are better off now than five years ago.

Figure 25. Family farm well-being compared to five years ago



Respondents were also asked to assess the evolution of three indicators of family farm well-being over the past three years, namely household savings, household consumption, and household income. A third of respondents in Albania find that the situation regarding these indicators has improved over the past three years (Figure 26). Statistical tests show that for household consumption and household income, Albanian farmers perceive those to have improved over the past three years.

Figure 26. Family farm well-being indicators development in Albania



In Bosnia and Herzegovina, small ruminant farmers provide slightly more negative answers than Albanian respondents (Figure 27), especially for household savings, which about 46.1 percent of them think has deteriorated. Statistical tests shows that, with regard to household savings, Bosnia and Herzegovina farmers perceive the situation to have deteriorated over the past three years.

Figure 27. Family farm well-being indicators development in Bosnia and Herzegovina

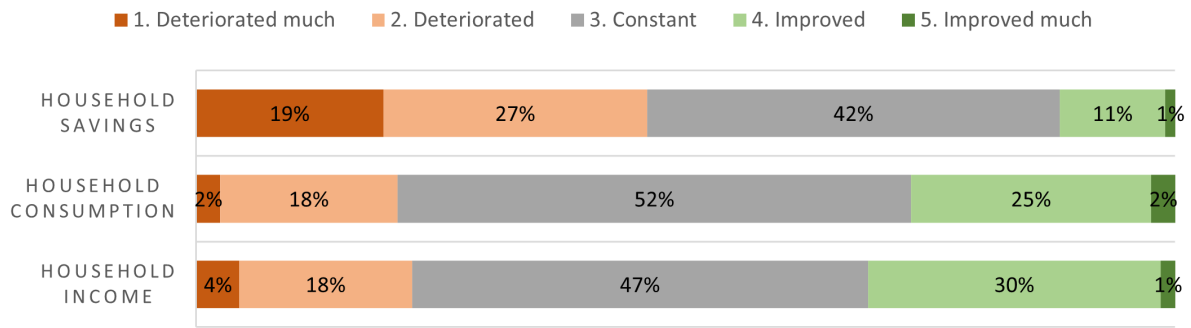
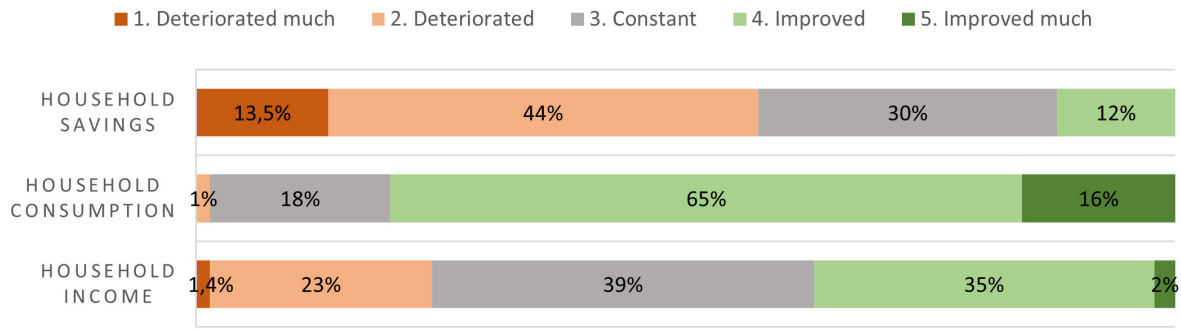


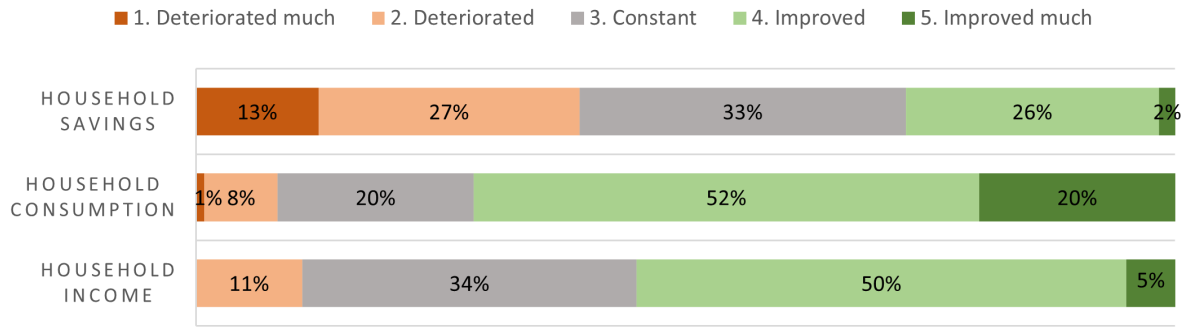
Figure 28 presents the answers of Serbian farmers, which shows a different pattern. Household consumption appears to have expanded considerably over the past three years – 80.1 percent claim that it has improved (or much improved); while household savings have deteriorated for the same period, with 57.5 percent saying that it has deteriorated or much deteriorated.

Figure 28. Family farm well-being indicators development in Serbia



A similar pattern is evident in Montenegro, with household savings having deteriorated and household consumption having improved. A reason for this could be that data for Serbia and Montenegro were collected about a year later than for Albania, and Bosnia and Herzegovina (which were collected in the first half of 2021). Significant changes occurred in the second half of 2021 and during 2022, particularly the spike in input prices and the start of the war in Ukraine. Having said that, Montenegro shows the highest share of respondents claiming that their income has improved (about 55 percent answering improved or much improved).

Figure 29. Family farm well-being indicators development in Montenegro



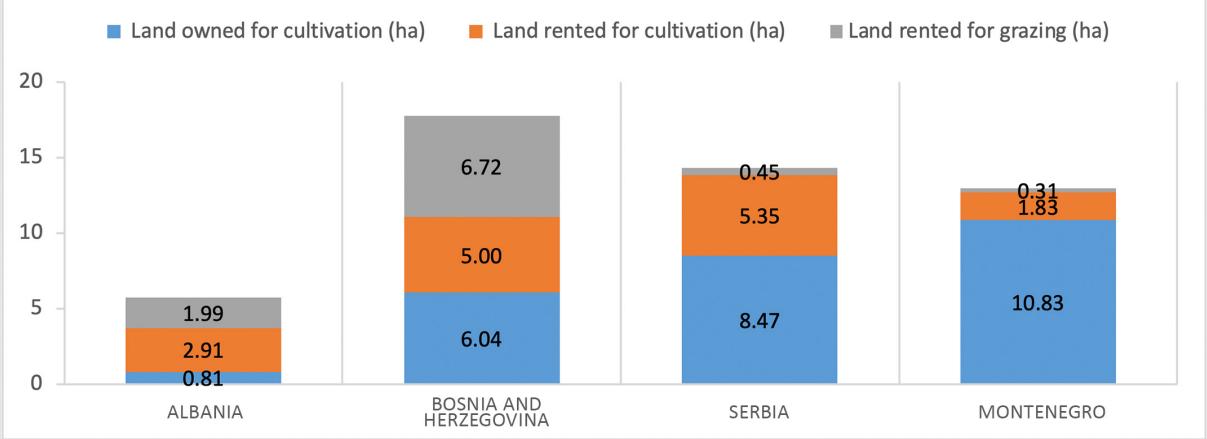
3.2.3 Factors of production

This subsection focuses on the production factors (land, labour, capital) for each of the countries included in the study.

Farmland

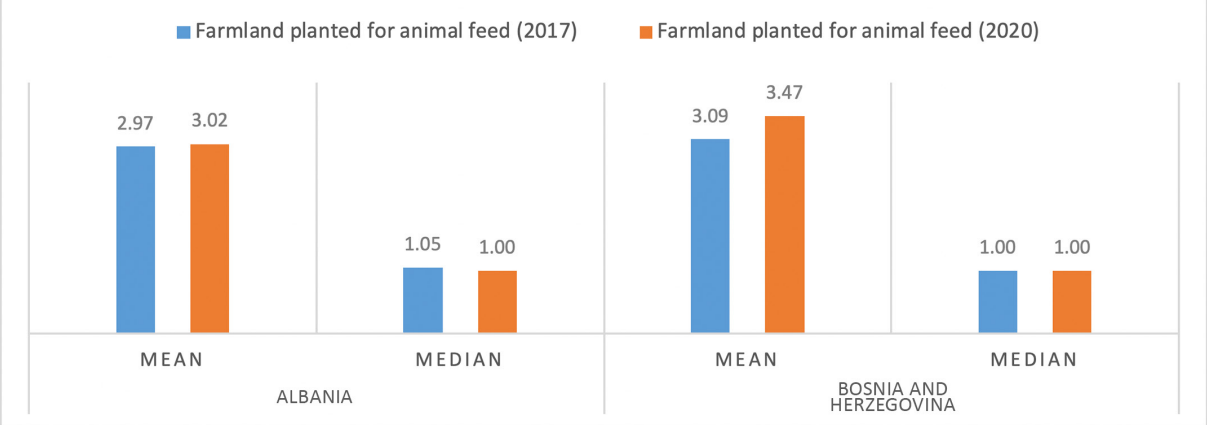
Figure 30 presents farmland used by small ruminant farmers in the countries included in the study. There are three categories of farmland – that which is owned, rented land used for cultivation, and rented land used for grazing. Small ruminant farmers in Albania have the least farmland available – owned land is ten times less than it is in Serbia, and 13 times less than in Montenegro. Serbian and Montenegrin farmers have a similar amount of farmland. Small ruminant farmers in Bosnia and Herzegovina own less land than those in Serbia and Montenegro; they tend to rent more farmland for grazing animals.

Figure 30. Farmland used by small ruminant farmers



In addition to farmland used by farmers, an important indicator is the share of the land used to cultivate feeds, which is a key component in small ruminant farm costs. As outlined in Figure 31, Serbia uses considerably more farmland for feeds than the other Western Balkan countries.

Figure 31. Farmland used for production of feeds

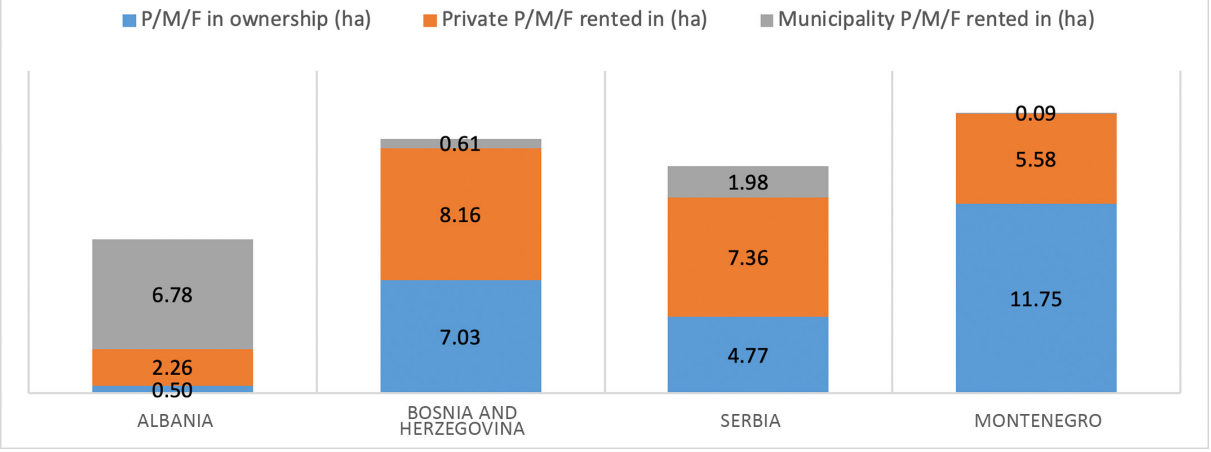


Interestingly, even though Albanian small ruminant farmers have much less farmland, they use approximately the same surface area for the production of feeds as farmers in Bosnia and Herzegovina, and much more than Montenegrin farmers. While small ruminant farmers in Montenegro have a similar amount of farmland as Serbian farmers, they use eight times less land for the production of feeds.

Pastures, meadows and forests

Figure 32 shows how much pastures, meadows and forests are owned by farmers or rented for grazing small ruminants. As with farmland available, Albanian farmers have the lowest amounts of pastures, meadows and forests, most of which is rented from the government (central or local) – which is not the case for other countries, where land is rented from private owners.

Figure 32. Pastures, meadows and forests used by small ruminant farmers



Notes: P/M/F is pastures/meadows/forests; Albania N=148; Bosnia and Herzegovina N=179; Serbia N=99; Montenegro N=116 (here, N refers to the number/sample that answered this question).

In general, pastures are available in mountainous areas where small ruminants are kept in extensive regimes. In lowland areas, land is used for cultivation purposes and small ruminants are kept in intensive regimes. However, there are differences from region to region in all countries.

Pastures are normally used between March April and October November. However, due to climate change, drought frequency has increased, during summer months pastures dry up, and there are no feeds, which puts pressure on farmers to buy feeds, leading to cost increases. On the other hand, the increased frequency of precipitation in spring makes it more difficult to preserve the first cut on meadows and grasslands. Moreover, the decrease in small ruminants in all Western Balkan countries means that pastures that are less used are more likely to degrade.

Ultimately, another issue that emerged during interviews with small ruminant farmers in Albania was the limited access to pastures, meadows and forests through long term contracts. In general, contracts are for one season, which increases uncertainty – especially for farmers who have large small ruminant herds – because they do not know if they can get the same access for the following year. This makes farmers reluctant to expand their herd size.[2] For the same reason, this lack of long-term contracts for pasture use reduces the likelihood of investing in improvements. Many small ruminant farmers claimed during interviews that if they had at least a five-year contract, they would be willing to invest to improve pastures.

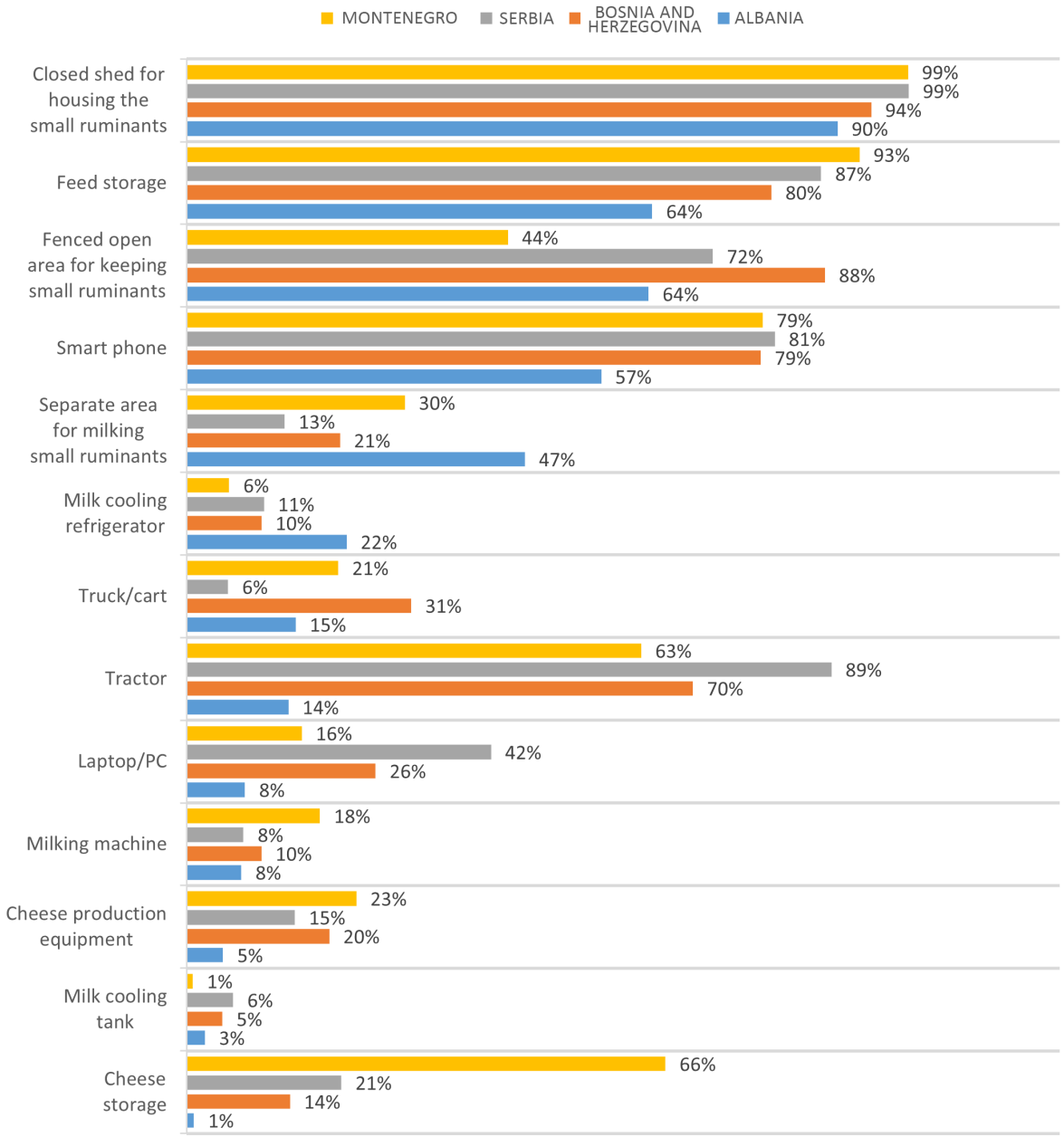
Assets

Figure 33 outlines the assets owned by small ruminant farmers in the countries included in the study. It appears that farmers in Albania own the fewest assets, although they do have more separate areas for milking animals than farmers in other countries. This shows that small ruminant farmers in Albania are more focused on milk production than farmers in other countries. Access to technology – such as smartphones and laptops, that allow access to information – is also lowest in Albania.

Another element that is particularly relevant to food safety is access to cooling tanks, which is considerably low in all of the countries. While this might not be a problem for farmers not focused on selling milk (like most small ruminant farmers in Montenegro, Serbia, and Bosnia and Herzegovina), it is critical for those that sell milk and are in remote areas, which is generally the case for small ruminant farmers in Albania.

[2]This is particularly true for those with large herds (more than 500 small ruminant heads).

Figure 33. Assets owned by small ruminant farmers



As pointed out above, small ruminant farmers in Serbia, Montenegro, and Bosnia and Herzegovina appear not to be focusing on the production and selling of milk, though it is obvious from the figure that small ruminant farmers in these countries have more cheese production equipment and cheese storage than their Albanian counterparts. Only two farmers (1 percent of the sample) in Albania claimed to have cheese storage, one with 100 kg storing capacity the other with 5 000 kg capacity. On the other hand, 65.8 percent of Montenegro's small ruminant farmers have cheese storage – although on average their capacity is half of those in Serbia, and Bosnia and Herzegovina (Table 7).

Table 7. Cheese storage capacities of small ruminant farmers

	Bosnia and Herzegovina	Serbia	Montenegro
Mean (kg)	1 534.2	1 337.7	726.0
Std. Dev	1 770.6	1 856.6	534.1
First quintile (Q1)	50	180	350
Median	1 000	1 000	500
Third quintile (Q3)	2 000	2 000	1 000

It can be argued that small ruminant farmers' ownership of cheese storage allows them to specialize in farm milk processing and the selling of cheese. At the same time, farm cheese production makes the monitoring of food safety much more difficult for food authorities, and the limited control over this process, combined with informal selling (direct selling to end consumers), raises considerable food safety concerns.

Labour

Labour is the most problematic factor across all Western Balkan countries. From Table 6, the share of household members (older than 14 years) involved with the small ruminant business can be calculated, which for all countries is above 75 percent. On the other hand, employment of external labour is limited (see Table 8); therefore, most work is done by family members.

Table 8. Hired shepherds by small ruminant farmers

Hired shepherds	Albania	Bosnia and Herzegovina	Serbia	Montenegro
0	83%	83.3%	82.3%	91.7%
1	11%	11.8%	17.7%	8.3%
2	5%	3.9%	0%	0%
>=3	1%	1%	0%	0%

Note: Albania N=200; Bosnia and Herzegovina N=204; Serbia N=141; Bosnia and Herzegovina N=121.

Table 9 shows the average payment that made to employed shepherds, which appears to be lowest in Albania, and highest in Bosnia and Herzegovina. Serbia and Montenegro have similar payments.

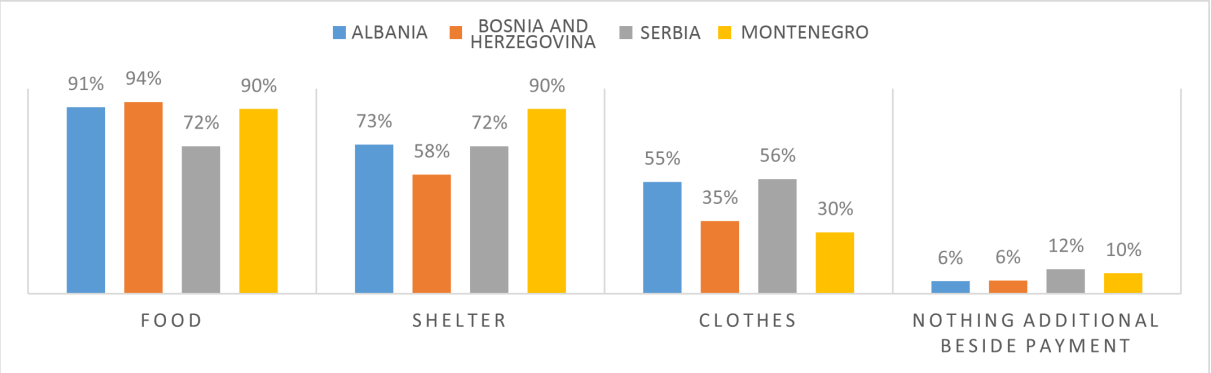
Table 9. Payment for hired shepherds

Payment per shepherd (EUR/month)	Mean	Std. Dev	Median
Albania	257.3	77.3	258.6
Bosnia and Herzegovina	413.8	140.1	450
Serbia	329.9	69.7	341
Montenegro	332	41	310

Shepherds are also provided with other benefits such as food and clothing (see Figure 34).

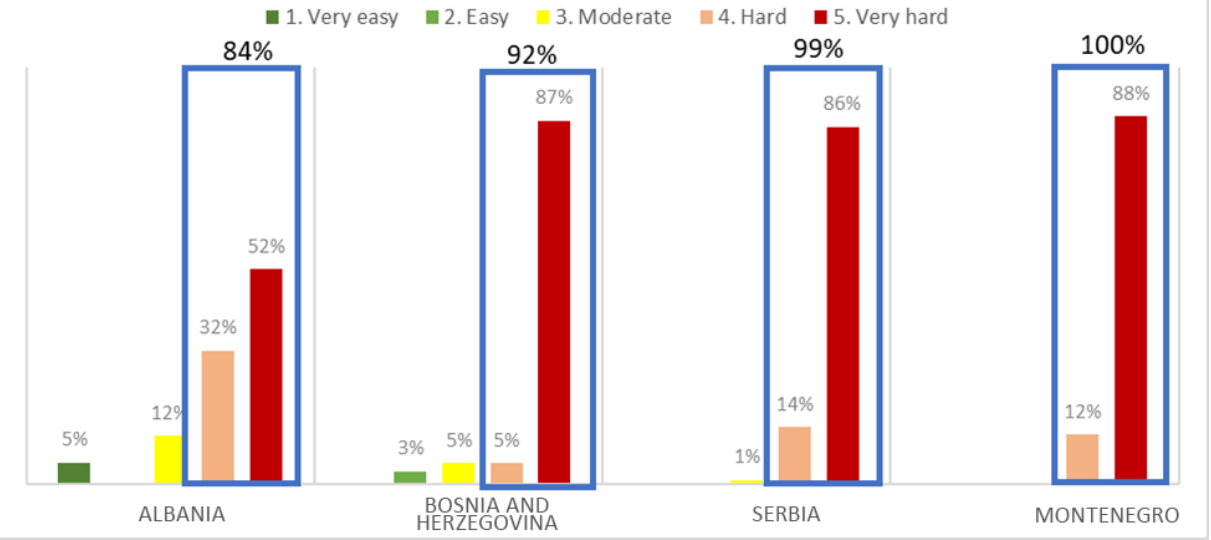
However, when asked about the difficulty in finding shepherds, the majority of respondents said it was very difficult (see Figure 35). One farmer in Korca, Albania, told of how one of his neighbours returned from Italy with 150 sheep, but after not being able to find a shepherd for over a year, decided to sell all the animals and get out of the small ruminant business.

Figure 34. Provision of additional benefits to hired shepherds



Note: This data are only for those that have hired and paid a shepherd; Albania N= 33; Bosnia and Herzegovina N=31; Serbia N=25; Montenegro N=10.

Figure 35. Degree of difficulty in finding shepherds



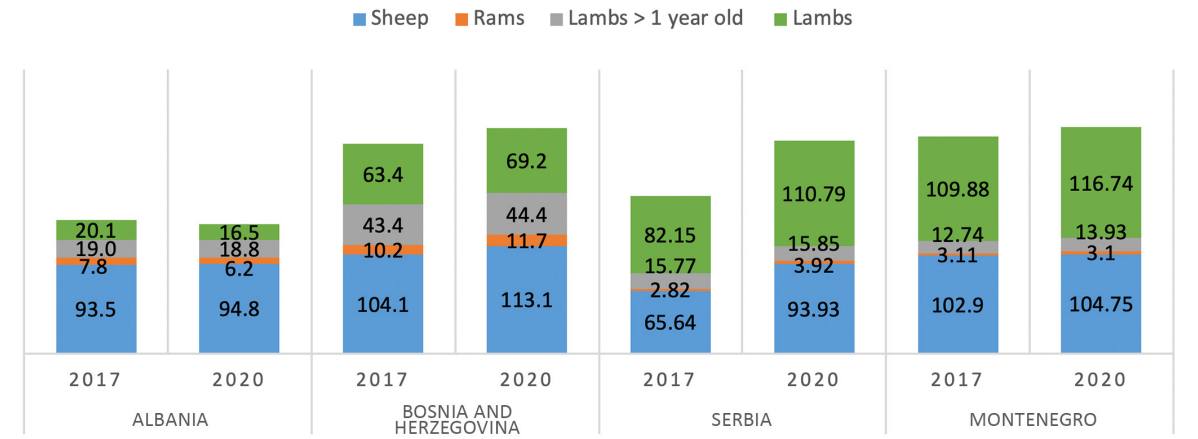
3.2.4 Production capacity, output and costs

This subsection presents the small ruminant production capacities by outlining their herd size and structure, outputs produced and production costs.

Small ruminant herd structure

The herd size structure for 2017 and 2020 is shown in Figure 36. In terms of overall herd size, Albania has the smallest, but this is because small ruminant farmers in the other countries keep more lambs than Albanian farmers. This further demonstrates how in Albania, sheep farmers are more focused on milk production and remove the lambs early on, whereas sheep farmers in Serbia, Montenegro, and Bosnia and Herzegovina are more focused on meat production and keep lambs for a longer period. If we only consider sheep and rams, small ruminant farmers in Albania have similar herd sizes to their counterparts in other Western Balkan countries. It is clear that Serbian sheep farmers have expanded considerably their base herd size, from 68 sheep in 2017 to 98 in 2021. Sheep herd sizes in other countries are either constant or show a modest increase.

Figure 36. Sheep herd structure

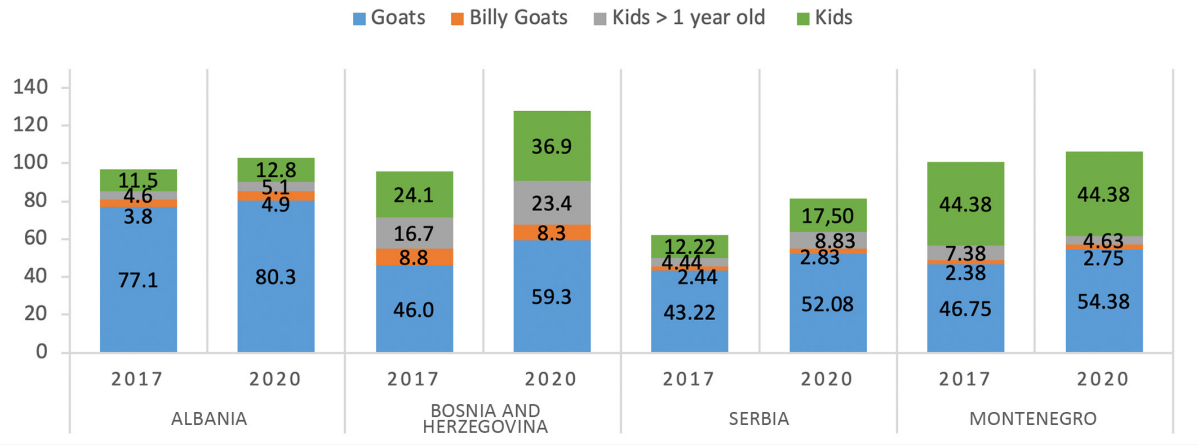


Note: Albania N = 182; Bosnia and Herzegovina N=193; Serbia N=136; Montenegro N=113.

As with sheep structure, Montenegro and Bosnia and Herzegovina goat farmers keep a large number of kids compared to the base herd, which suggests that with goats also, the orientation is towards meat, whereas Serbian and Albanian farmers focus on milk production. However, it should be noted that farmers generally have far fewer goats than sheep. Only 14 percent of small ruminant farmers in Albania are goat farmers, and in the other countries it is less than 10 percent. Less than 5 percent of the sample keep both goats and sheep.

Regarding base goat herd size, Albanian farmers appear to have on average the biggest herd size of about 85 (goats and billy goats). All of the countries show an increase in the number of goats compared to 2017 (see Figure 37).

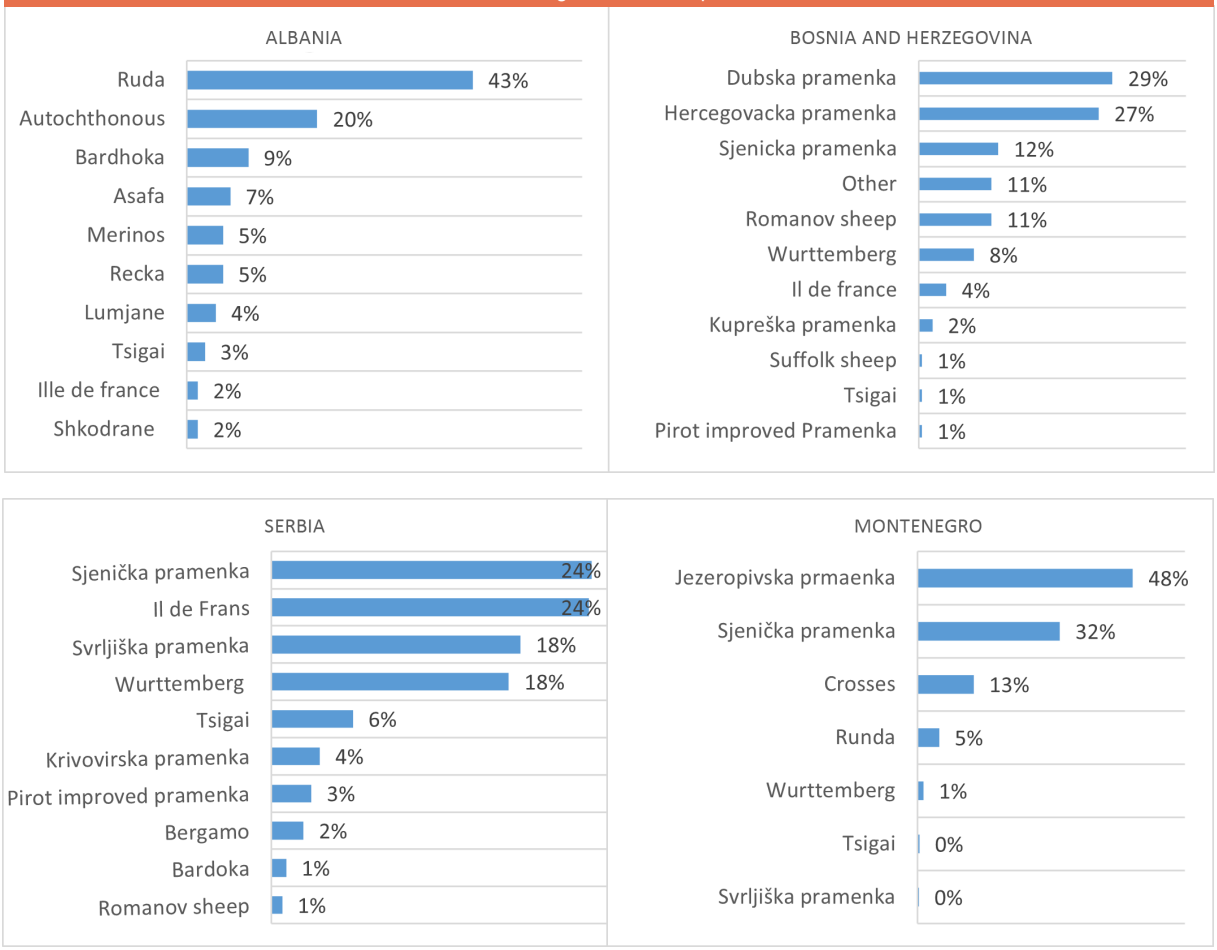
Figure 37. Goat herd structure



Note: Albania N = 28; Bosnia and Herzegovina N=16; Serbia N=10; Montenegro N=6.

Figure 38 shows the main breeds owned by sheep farmers in Western Balkan countries.

Figure 38. Sheep breeds



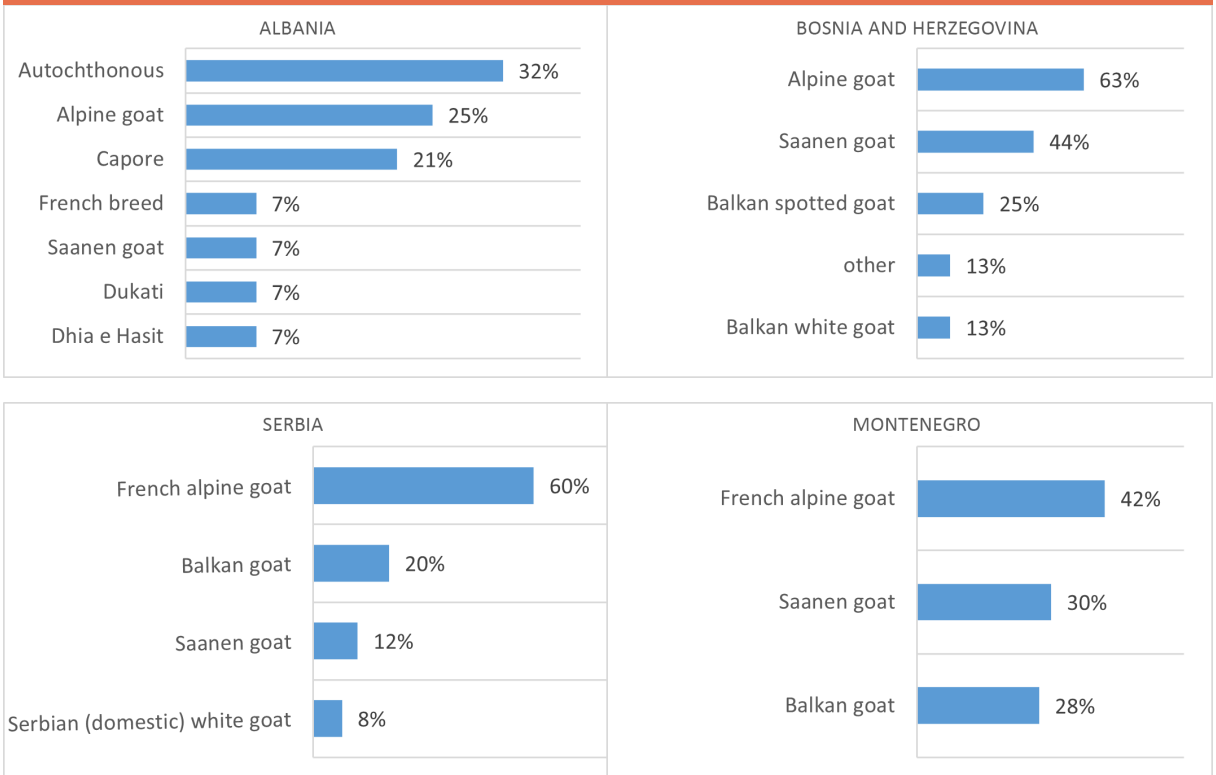
Note: Albania N=182; Bosnia and Herzegovina N=193; Serbia and Montenegro are a weighted average of the declared heads by breed.

In regard to goat breeds, there are more similarities between countries than with sheep breeds (see Figure 39). The most common goat breed, in all countries except Albania, is the Alpine breed. In Albania, the autochthonous breeds account for the largest share of goats, although the Alpine breed is also prominent.

Small ruminant fertility indicators

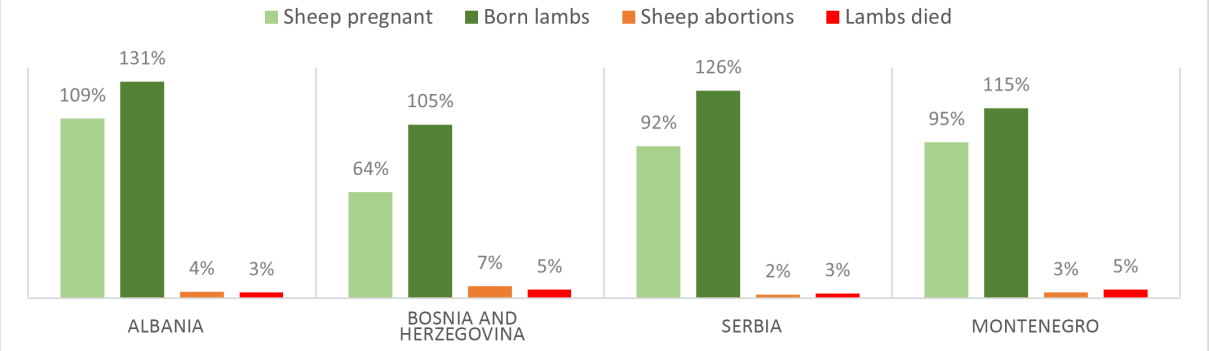
Figure 40 and Figure 41 show sheep and goat fertility indicators in all Western Balkan countries. Sheep in Bosnia and Herzegovina appear to be much worse than in other countries. It has a low sheep pregnancy ratio, and sheep abortion and lamb mortality after abortion is considerably higher than in the other countries.

Figure 39. Goat breeds



Note: Albania N=28; Bosnia and Herzegovina N=16; Serbia and Montenegro are a weighted average of the declared heads by breed.

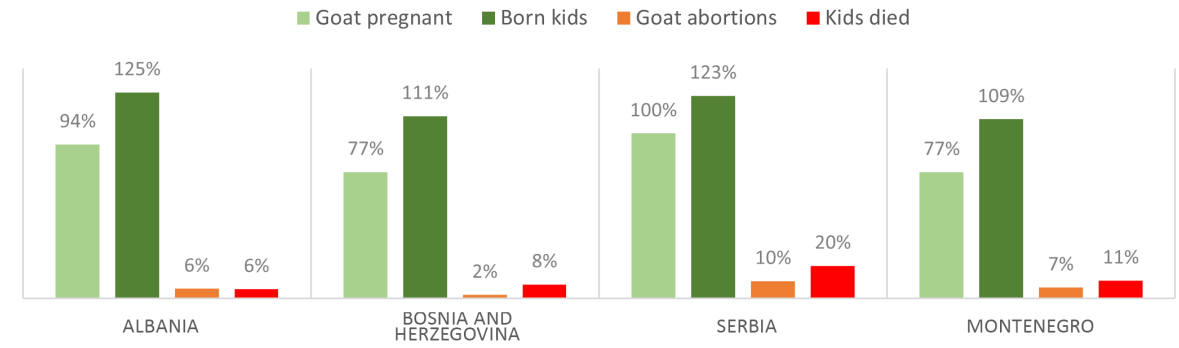
Figure 40. Sheep fertility indicators



Notes: Albania N=182; Bosnia and Herzegovina N=193; Serbia N=132; Montenegro N=108; sheep pregnant – the ratio of pregnant sheep to total sheep; born lambs – the ratio of born lambs to sheep pregnant; sheep abortions – share of pregnant sheep that have aborted; lambs died – share of lambs that die.

With regard to goat fertility indicators, Albania performs best, which is explained by the greater specialization of Albania in goat breeding. Albania has by far the largest goat population in the Western Balkans. The figure shows a concerning picture for goat abortions and kids' mortality after abortion in Serbia.

Figure 41. Goat fertility indicators

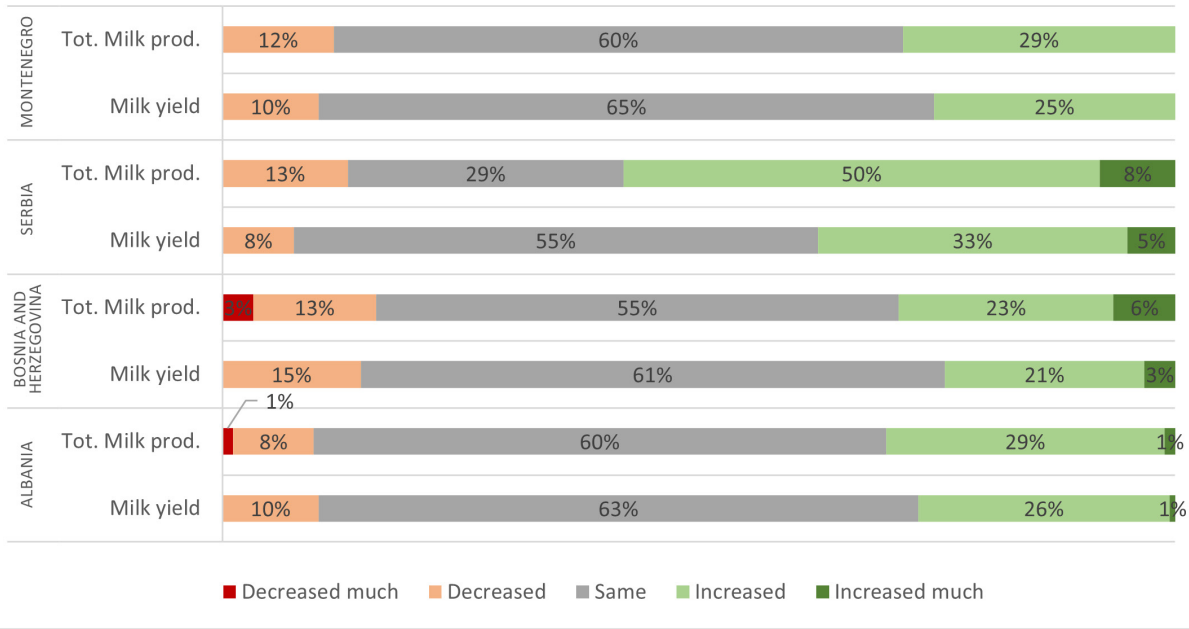


Notes: Albania N=28; Bosnia and Herzegovina N=16; Serbia N=11; Montenegro N=7; goats pregnant – the ratio of pregnant goats to total goats; born kids – the ratio of born kids to goats pregnant; goat abortions – share of pregnant goats that have aborted; kids died – share of kids that died.

Small ruminant milk yield and output

The change in milk yield and total milk production during the past three years is analysed from the respondents' perspective (Figure 42). Answers in all countries are similar, with the majority claiming that milk yield and total milk production have not changed over the past three years. In addition, the mean values for each of the elements outlined in Figure 42 are about 3.15, which shows no change during the past three years. The only exception is total milk yield in Serbia, which for the majority (57.9 percent) of small ruminant farmers has increased, with a mean value of 3.52 (which is a significant increase).

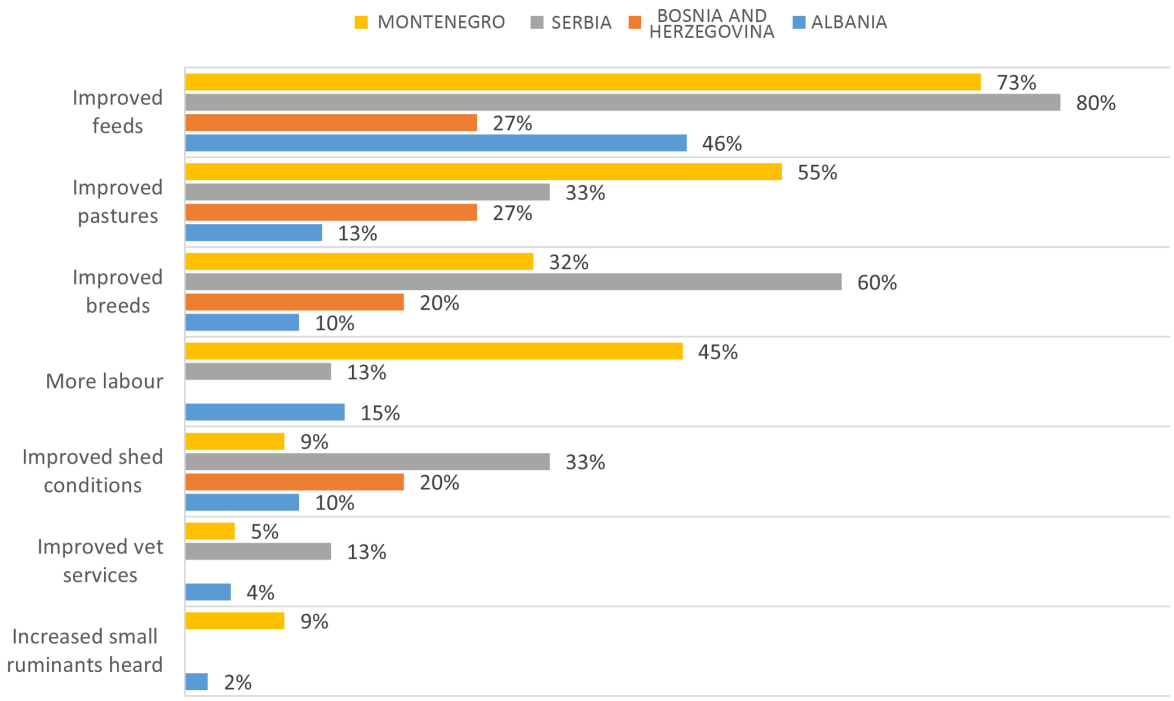
Figure 42. Farmer perception of the development of milk production and yield over past three years



Note: Albania N=178; Bosnia and Herzegovina N=62; Serbia N=40; Montenegro N = 79.

Figure 43 outlines the main reasons for the increase in milk yield given by the farmers who answered that milk yield has improved. The percentages in the figure indicate the number of times of the total sample (of the country) that a specific reason was mentioned; each respondent could select more than one answer. The primary reason for improved milk yield is improved feeds, followed by improved pastures, and then improved breeds.

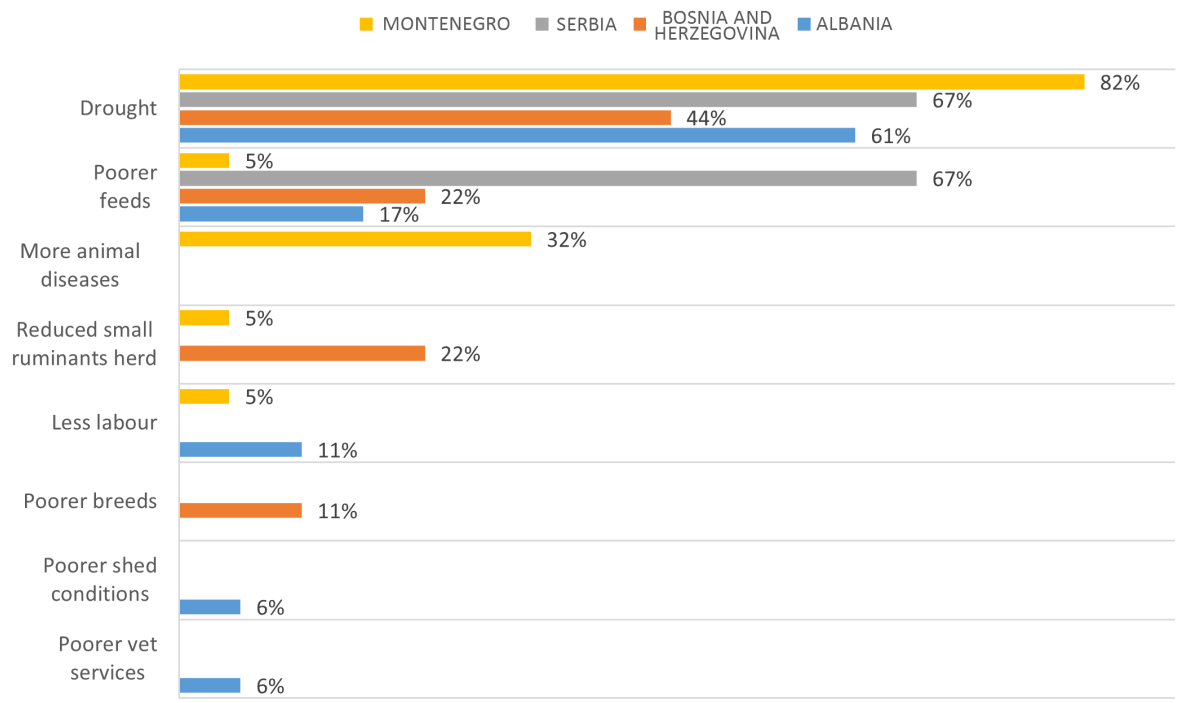
Figure 43. Reasons for increased milk yield



Note: Albania N=48; Bosnia and Herzegovina N=15; Serbia N =15; Montenegro N=22.

Figure 44 summarizes the main reasons that respondents gave for decreased yield. Drought is the primary reason for the decrease in all countries. It should be noted that coming to conclusions based on the numbers shown in the figure might be misleading, because in Serbia for example, only three respondents said milk yield had decreased.

Figure 44. Reasons for decreased milk yield



Note: Albania N=18; Bosnia and Herzegovina N=9; Serbia N=3; Montenegro=22.

Table 10 presents the average survey sample milk yield of sheep and goats in all countries and the distribution form (first quintile – Q1, median, third quintile – Q3). The reported milk yield is for the period after the lamb or kid are weaned from their mother. The data show that small ruminant milk yield has not changed over the past three years.

It appears from the table that Albanian milk yield is the highest, for both sheep and goats. This contradicts the results shown in section 2.1.2, where data from FAOSTAT show that sheep and goat milk yield in Albania is among the lowest in the Western Balkans. FAOSTAT reports a milk yield of 64.9 L/sheep and 125.7 L/goat in 2020; whereas, based on the data from Table 10, the average milk yield per lactation cycle is about 149 L/sheep.

The FAOSTAT report for Serbia for 2020 shows a milk yield of 142.5 L/sheep and 291.3 L/goat. Based on data from the table, the average milk yield in Serbia per one lactation cycle is around 59 L/sheep. The figure for Serbian goat milk yield is not far off the FAOSTAT reported data; however, the numbers reported for sheep milk yield in Serbia and Albania are considerably different. It should be noted that FAOSTAT data are not based on surveys but on imputation methodology.

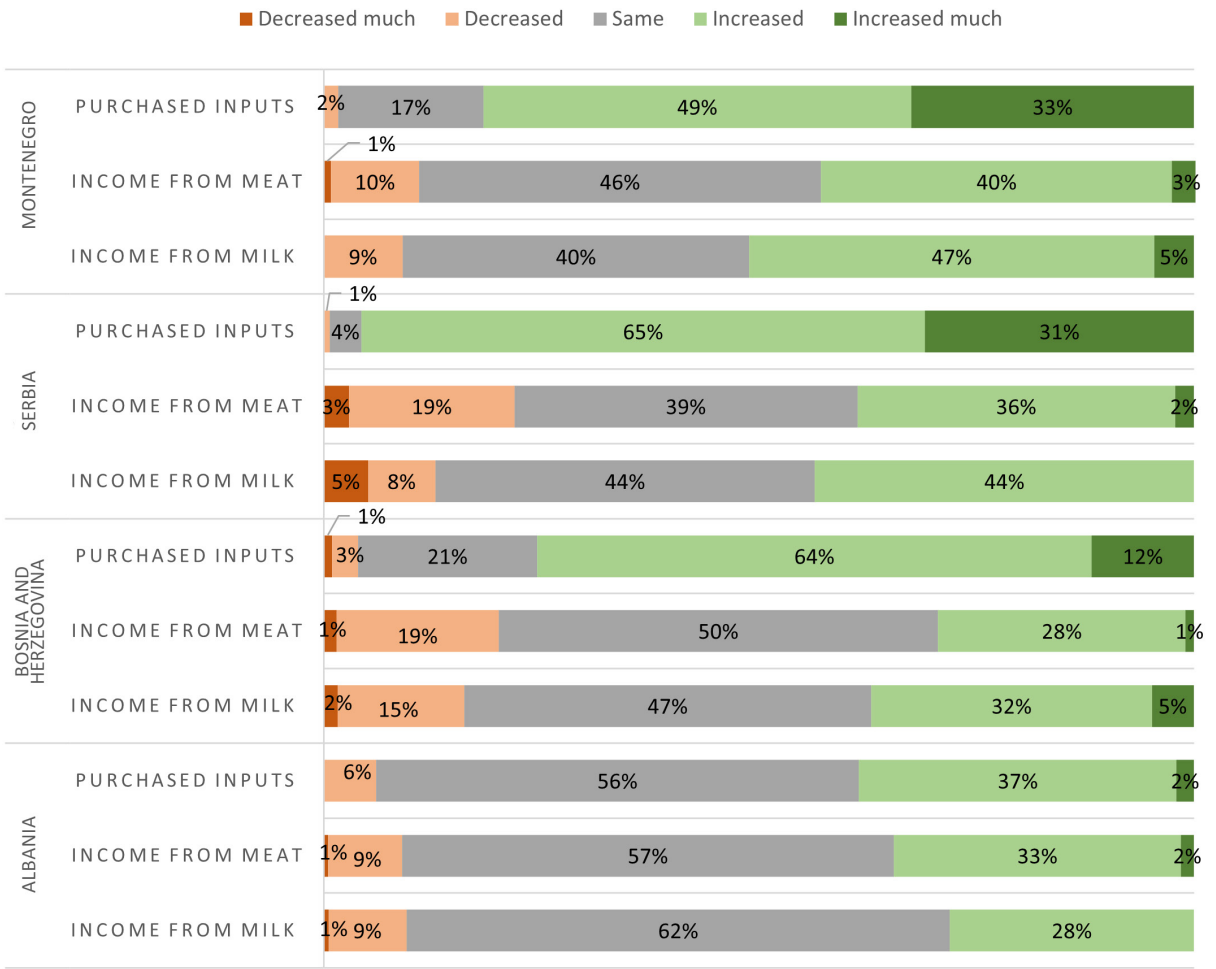
Table 10. Small ruminant milk yields in Western Balkan countries (L/day)

		Mean	Std. Dev	Q1	Median	Q3
Sheep						
Albania	2017	0.89	0.61	0.50	0.70	1.00
	2020	0.88	0.55	0.50	0.75	1.00
Bosnia and Herzegovina	2017	0.46	0.43	0.21	0.33	0.52
	2020	0.52	0.47	0.24	0.33	0.58
Serbia	2017	0.48	0.15	0.40	0.45	0.50
	2021	0.49	0.15	0.40	0.50	0.50
Montenegro	2017	0.41	0.13	0.30	0.40	0.47
	2021	0.43	0.13	0.30	0.43	0.50
Goats						
Albania	2017	1.92	1.36	1.00	1.25	2.50
	2020	1.78	1.24	1.00	1.25	2.50
Bosnia and Herzegovina	2017	1.46	0.85	0.89	1.09	2.00
	2020	1.29	1.01	0.43	0.91	2.13
Serbia	2017	1.54	0.63	1.00	1.40	2.00
	2021	1.47	0.44	1.10	1.35	2.00
Montenegro	2017	1.56	0.52	1.00	1.80	2.00
	2021	1.46	0.56	1.00	1.50	2.00

Small ruminant farm input costs and income

Figure 45 outlines the perception of small ruminant farmers of the development of purchased input costs and income from milk and meat over the past three years. Apart from Albanian farmers, a significant majority state that purchased inputs costs have increased considerably.

Figure 45. Farmers' perception of income and costs over past three years



One of the reasons for the difference between Albania and other countries (especially Montenegro and Serbia) could be related to when the data were collected, which for Serbia and Montenegro was the first half of 2022, while for Albania it was the first half of 2021. In fact, agricultural input costs have spiked considerably, particularly since the start of the war in Ukraine.

Income from meat and milk show a similar distribution among the countries, with mean values ranging between 3.15 and 3.4 (indicating that income has remained constant).

Table 11 shows a more objective measurement of average purchased input costs per small ruminant for two time periods. As with the perception data in Figure 45, a significant jump in purchased input costs per small ruminant is observed in Serbia and Montenegro (especially at the median value), while for Albania and Bosnia and Herzegovina, the change in cost is modest. Another fact that emerges from the table is that Serbian farmers spend much more per small ruminant than farmers in other countries – about EUR 60/animal annually.

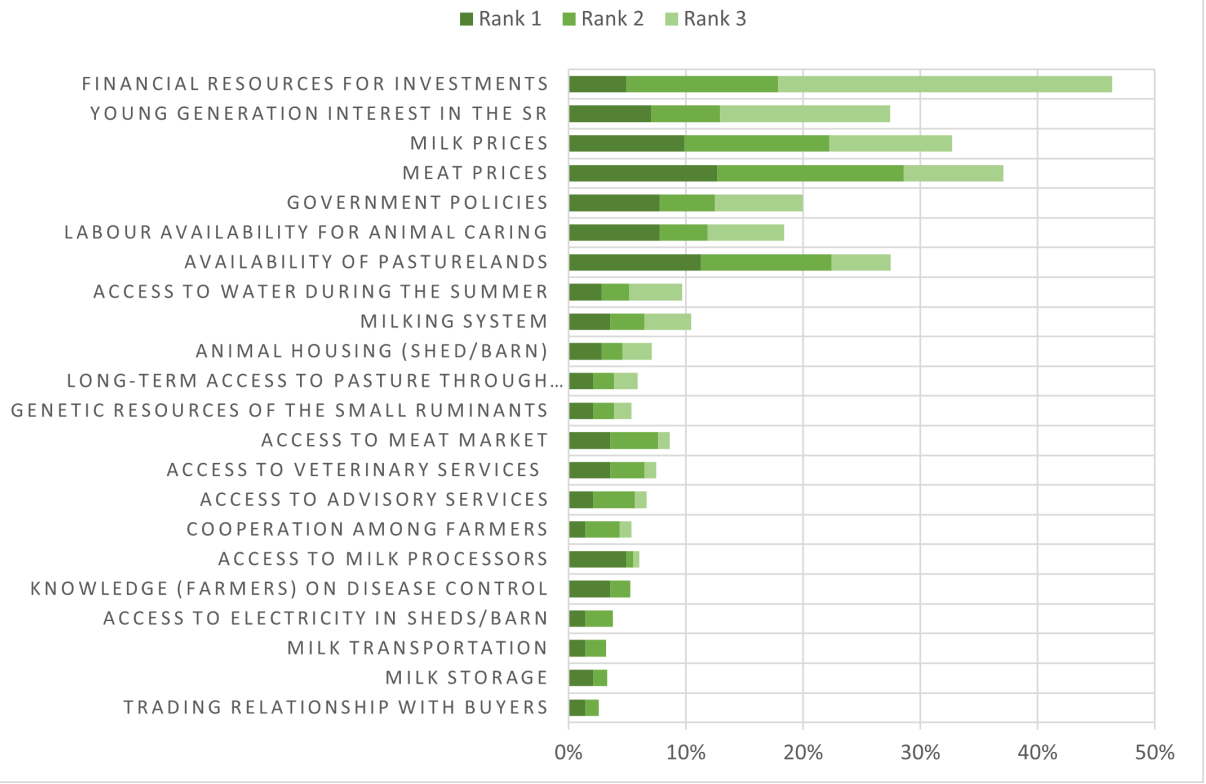
Table 11. Average purchased input cost per small ruminant in a year (EUR)

		Mean	Std. Dev	Q1	Median	Q3
Albania	2017	36.47	15.86	24.31	33.08	45.37
	2020	37.76	16.74	24.31	34.03	47.93
Bosnia and Herzegovina	2017	32.88	17.51	20.16	26.32	40.32
	2020	33.09	18.4	19.32	26.95	40.63
Serbia	2017	51.87	30.91	32.78	46.31	58.77
	2021	59.85	36.46	33.53	51.18	69.34
Montenegro	2017	27.73	18.15	15.69	22.86	38.46
	2021	29.06	12.58	18.75	28.46	38.67

3.2.5 Problems faced by small ruminant farmers

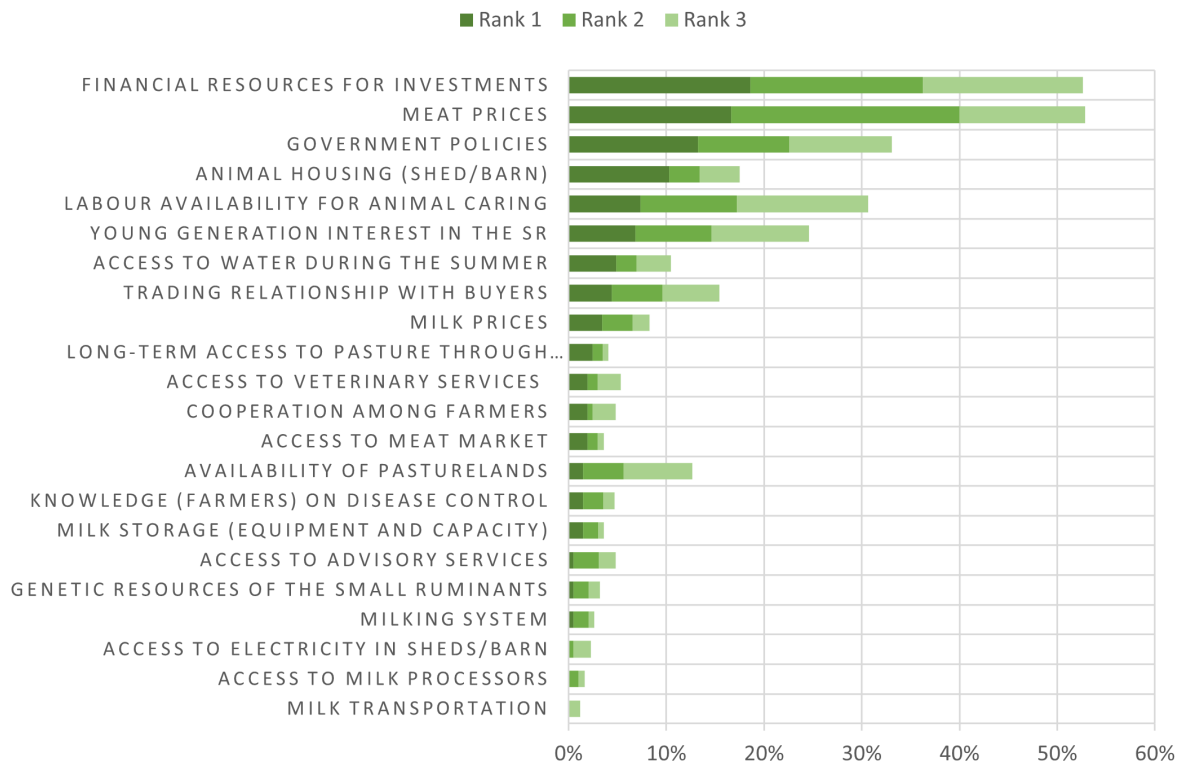
This subsection outlines the main problems faced by small ruminant farmers in each country. Figures 46–49 outline the ranking of problems in all countries included in the study. The respondents were asked to rank their top three problems from a large list of issues that were identified prior to conducting the survey through interviews with small ruminant value chain actors. Figure 46 outlines the main problems ranked by small ruminant farmers in Albania. The most important issue for them is limited financial resources for investment, and this is also linked with government policies. The second most important problem appears to be the lack of interest of the younger generation to get involved in the small ruminant business, which compromises the future of the sector and the likelihood of investment in the sector. Moreover, this increases problems in terms of the lack of labour force. Milk and meat prices are a significant problem for small ruminant farmers who complain that they are too low, making the business unprofitable. For Albanian farmers, the availability of pastures is also a significant problem.

Figure 46. Problems faced by small ruminant farmers in Albania



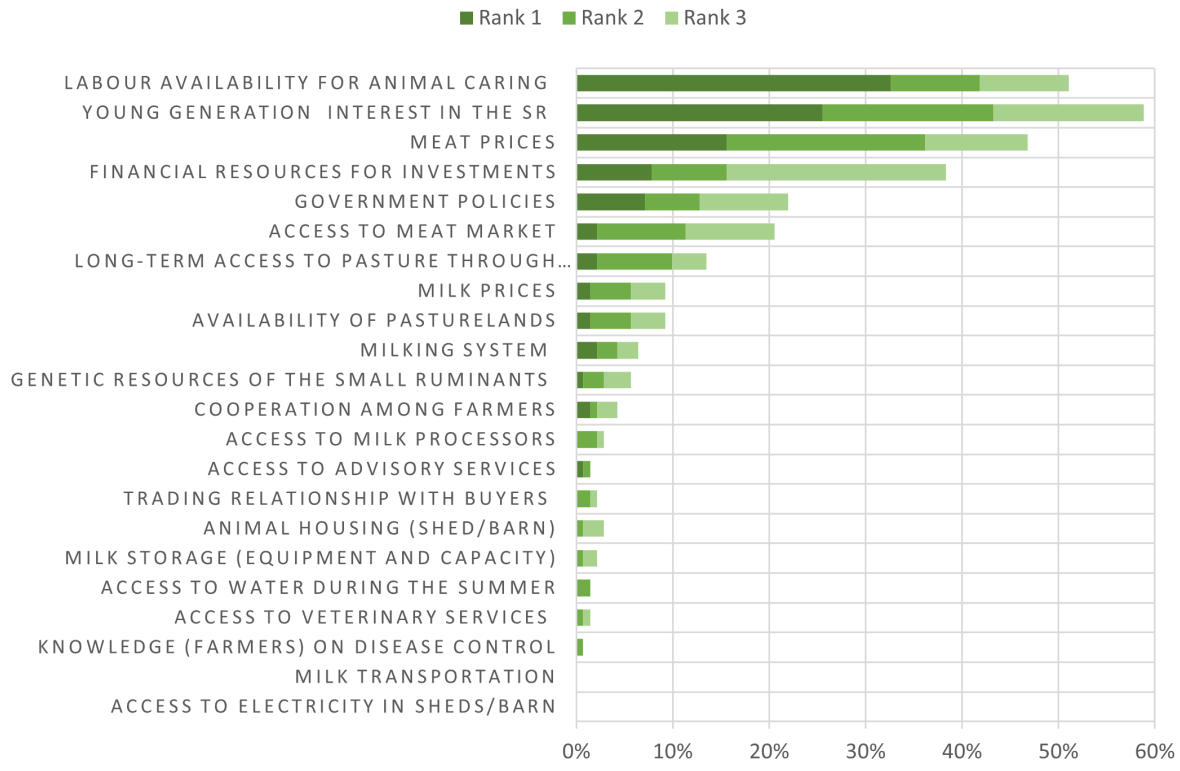
Farmers in Bosnia and Herzegovina farmers also put a lack of financial resources for investment as the most important problem affecting their business development, which is closely related to the third most important problem, government policies (Figure 47). Meat prices are rated the second most important problem, which is linked directly to their profitability. Interestingly, animal housing is ranked as a key problem by many small ruminant farmers in Bosnia and Herzegovina. It is also worth mentioning labour availability, and the interest of the younger generation, ranked the fifth and sixth most important.

Figure 47. Problems faced by small ruminant farmers in Bosnia and Herzegovina



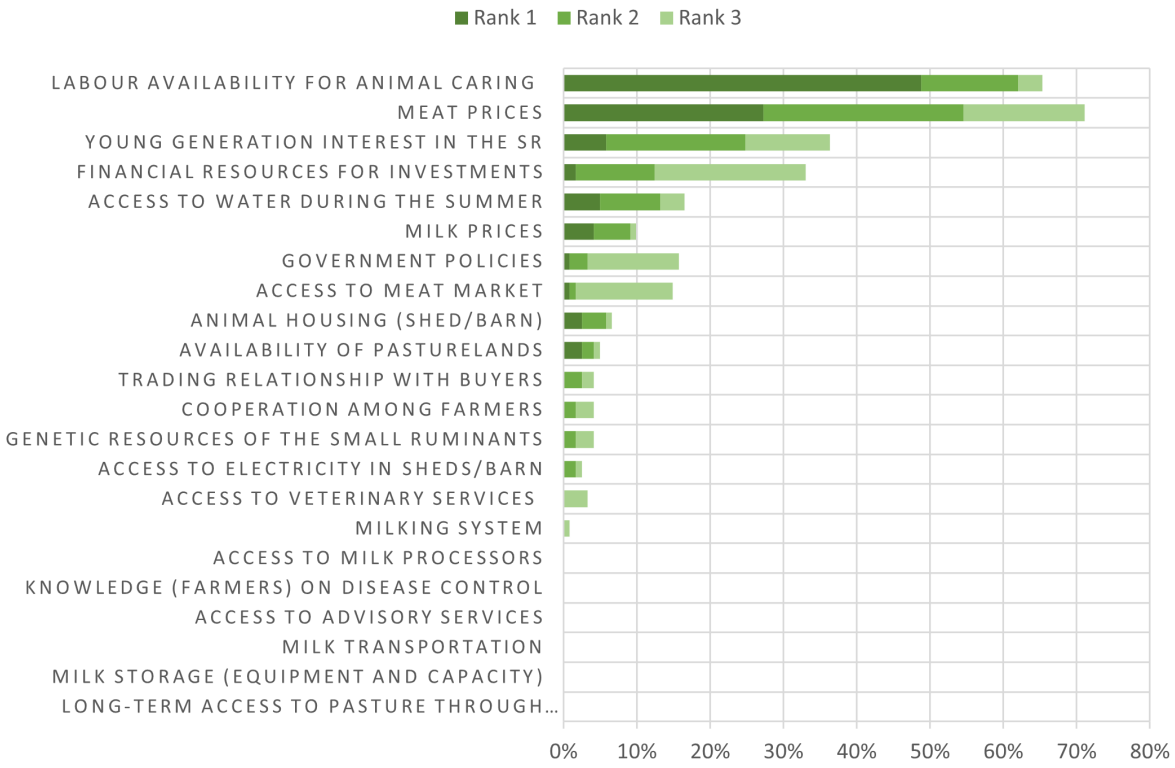
Small ruminant farmers in Serbia rank as their number one problem labour availability, followed by the lack of interest of the younger generation (Figure 48). The third most important problem for them is related to meat prices, which are considered low, making the small ruminant business unprofitable. After that come the lack of financial resources for investment, and government policies.

Figure 48. Problems faced by small ruminant farmers in Serbia



Finally, the main problems affecting small ruminant farmers in Montenegro are presented in Figure 49. Those are similar to the problems in Serbia — limited labour availability and interest of the younger generation in the small ruminant business are ranked first and third, with meat prices ranked as the second most problematic issue. A lack of financial resources for investment is ranked fourth. Also worth mentioning that access to water during the summer period is ranked fifth in Montenegro, higher than in other countries.

Figure 49. Problems faced by small ruminant farmers in Montenegro



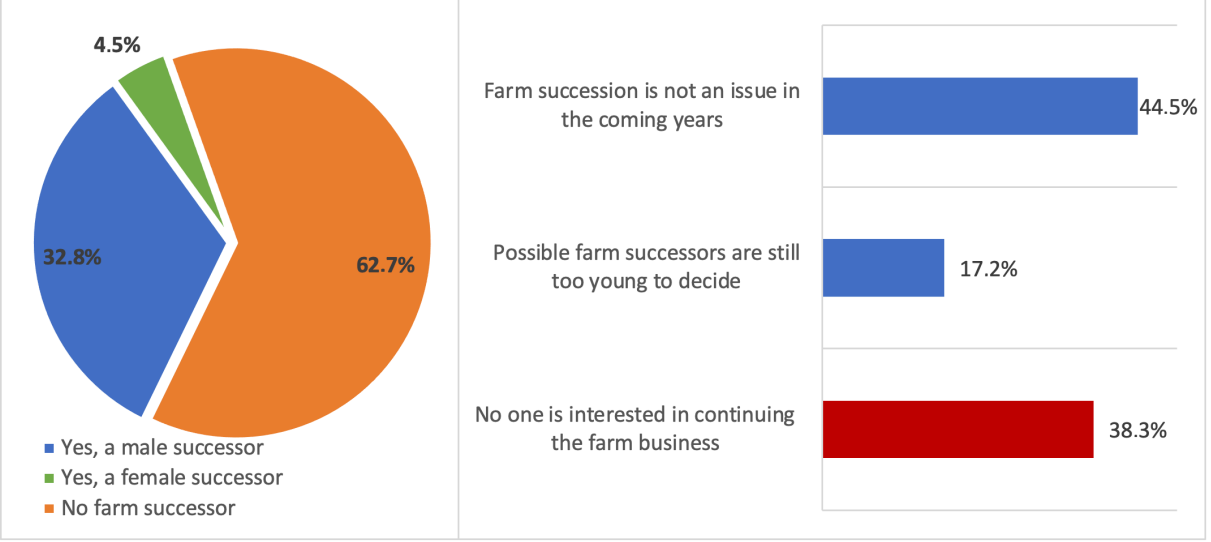
It is evident that the lack of interest of the younger generation to engage in the small ruminant business is among the top three problems affecting its development in all Western Balkan countries. In this context, and to further investigate the issue, small ruminant farmers were asked if a farm successor had been designated to continue the business in future, the answers to which are presented in figures 50–53. The figures also outline why a farm successor might not have been designated yet.

As can be seen from Figure 50, about 66.5 percent of respondents in Albania stated that no farm successor had been designated yet. It is concerning that 60.9 percent of them gave as the main reason that nobody was interested in continuing the business – this has a significant impact on future investment in the small ruminant sector.

Figure 50. Designation of a farm successor in Albania

In Bosnia and Herzegovina, a large share of respondents said that no farm successor had been designated yet (Figure 51). In Albania, the numbers saying that nobody was interested were much lower, at 38.3 percent.

Figure 51. Designation of a farm successor in Bosnia and Herzegovina



In Serbia, around 64.5 percent of respondents claimed that no farm successor had been designated yet, 36 percent of whom gave the reason as a lack of interest (Figure 52). A similar pattern is observed in Montenegro, where the majority of respondents (83.5 percent) pointed out that no farm successor had been designated yet, with 40 percent of those saying there was a lack of interest (Figure 53).

Figure 52. Designation of a farm successor in Serbia

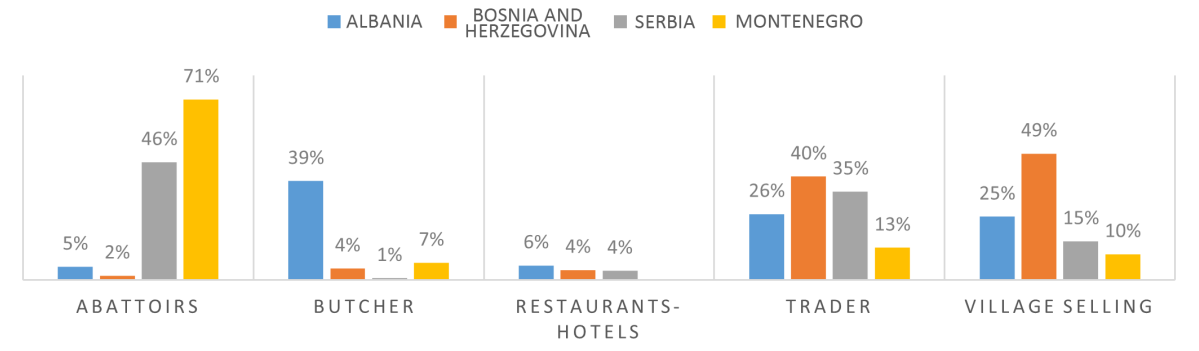
Figure 53. Designation of a farm successor in Montenegro

3.3 Market channels for live small ruminants

Figure 22 outlined a general structure of the small ruminant meat and milk value chain that is representative for all Western Balkan countries. The following sections present the channels that are used by small ruminant farmers in the countries included in the study, and issues affecting them. Figure 54 shows the main channels that small ruminant farmers use to sell their small ruminants as live animals. The abattoir channel can be considered the most formal and safest in terms of food safety. In general, abattoirs are subject to regular controls by national food authorities. The figure shows that small ruminant farmers in Serbia and Montenegro use this channel to sell their live animals considerably more than those in Albania and Bosnia and Herzegovina, indicating that food safety is more easily controlled in Serbia and Montenegro.

Small ruminant farmers in Albania tend to use butcher shops a lot, while in other countries this channel is rarely used. These shops are generally monitored by national food authorities and need to be licensed, but depending on the region or city, the frequency of controls and severity of sanction varies greatly. Within the value chain, this actor is the closest to the end consumer, so the prices paid to the farmer are higher than that paid by abattoirs. However, the number of small ruminants that can be sold directly to butcher shops is much lower than can be sold to abattoirs, which have a much higher processing capacity.

Figure 54. Market channels for sale of live small ruminants



The restaurant–hotel channel is used sparingly by small ruminant farmers and operates primarily on the basis of personal contacts. This channel places much importance on meat quality and safety, and so the prices paid by them tend to be higher compared to other channels.

The trader channel is commonly used by all countries, though Bosnia and Herzegovina, and Serbia, tend to use it more. The traders operate as supply consolidators, meaning they buy small ruminants in small numbers from many small ruminant farmers (or at the live animal market) and then sell to abattoirs or the meat industry. They need to be licensed to transport the animals from the farm or live animal market (see Box 3 on some issues related to animal markets in Albania) to the abattoir. Interviews with small ruminant value chain stakeholders show that in many cases, the conditions of the trucks used to transport the animals do not fulfil the minimum requirements, and there are several cases of transporters operating without a licence.

Box 3. Live animal markets in Albania

The live-animal markets in Albania operate in different regions (such as Shkodra, Korca, Elbasan) and are opened on a specific day of the week, with different people bringing in vehicles to sell the animals. These markets have made headlines on several occasions because of the conditions that animals were transported in, and the inadequate conditions of the market, with no water for the animals, and mud and dust the norm. People involved with the markets claim that they do not fulfil the minimum standards of hygiene.

In addition, the law on veterinary services stipulates that a veterinarian must be present at the entrance to the live animal market, to check certificates, and to register or de-register from the identification system every animal that enters and leaves, but this is not always the case.

The selling of live animals in villages (or direct selling to end consumers) is the most informal channel and the hardest to monitor by national food authorities. As a result, this channel has a higher likelihood of food safety issues. It is evident that small ruminant farmers in Bosnia and Herzegovina use this channel to a large extent, followed by Albanian farmers, while those in Serbia and Montenegro use it much less. The farmers that sell through this channel make many transactions with a limited number of animals. However, the profit margins farmers make by selling through this channel are among the highest, since there is no intermediary involved.

The live small ruminant channel, as presented in Table 12, provides descriptive information on all countries included in the study about the average number of small ruminants sold in a year, the average weight of small ruminant sold, the average age of small ruminant sold, and small ruminant live weight price for 2017 and 2020 (2021 for Serbia and Montenegro). Small ruminant farmers in Albania sell animals much earlier (in terms of age) than the other countries, resulting in the average weight for small ruminants sold to be lower compared to other countries.

Table 12. Average number of small ruminants sold and their weight, age and selling price per kg

		Mean	Std. Dev	Q1	Median	Q3
Albania	Number of small ruminants sold	117.3	154.3	30	80	140
	Average weight of small ruminant sold	37.76	16.74	24.31	34.03	47.93
	Average age of small ruminant sold (months)	3.3	1	3	3	3.5
	Small ruminant live weight price 2017	3	0.4	3	3	3.2
	Small ruminant live weight price 2020	3.2	0.4	3	3.1	3.4
Bosnia and Herzegovina	Number of small ruminants sold	49.8	72.4	20	30	60
	Average weight of small ruminant sold	30.3	8.8	25	30	35
	Average age of small ruminant sold (months)	5.2	1.9	4	5	6
	Small ruminant live weight price 2017	3	1.3	2	3	3
	Small ruminant live weight price 2020	3.3	1.3	3	3	3
Serbia	Number of small ruminants sold	78.8	109.4	35	45	90
	Average weight of small ruminant sold	33.4	5.5	30	35	36
	Average age of small ruminant sold (months)	4.2	4	3	3.5	4
	Small ruminant live weight price 2017	2.2	0.4	2	2	2.4
	Small ruminant live weight price 2021	2.5	0.4	2.1	2.6	2.9
Montenegro	Number of small ruminants sold	93.1	46.5	60	84	120
	Average weight of small ruminant sold	43.9	5.5	40	44	46
	Average age of small ruminant sold (months)	5.7	0.9	5	6	6
	Small ruminant live weight price 2017	2.3	0.1	2.3	2.3	2.3
	Small ruminant live weight price 2021	2.5	0.1	2.5	2.5	2.5

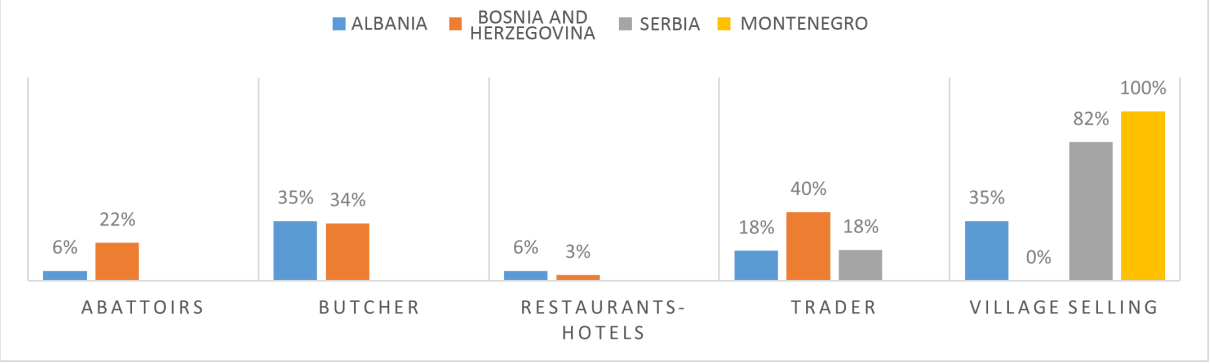
Note: weight is expressed in kg; prices are in EUR/kg.

Small ruminant farmers in Montenegro sell older animals, which results in a higher animal weight. As a result, Montenegrin farmers receive the lowest average selling price of about EUR 2.5/kg (live weight). A similar price is obtained by Serbian farmers, while farmers in Albania and Bosnia and Herzegovina receive EUR 3.2/kg and EUR 3.3/kg, respectively. The reason for the higher prices received by farmers in Albania and Bosnia and Herzegovina might be related to the channel that they use to sell the animals. As pointed out above, Montenegro and Serbia tend to sell most animals through abattoirs which pay much less than other channels. The influence of abattoirs in reducing prices is closely related to their asymmetrical market power compared to farmers. In addition, when a large number of small ruminants are sold, this channel is the only one that can accommodate such transaction because they have the capacities to process and market the final products.

3.4 Meat processing

Selling small ruminants as live animals is the common way for small ruminant farmers to sell their animals. However, in a few cases, small ruminant farmers also sell slaughtered animals. The main channels that small ruminant farmers use to sell slaughtered animals are shown in Figure 55. There are very few cases of slaughtered small ruminants sold in Albania, Montenegro and Serbia, but about 60 percent of the sample in Bosnia and Herzegovina state that they sell slaughtered small ruminants.

Figure 55. Market channels for selling slaughtered small ruminants



Note: Albania N=17; Bosnia and Herzegovina N=121; Serbia N=11; Montenegro N=6.

Montenegro and Serbia sell slaughtered animals directly to end consumers in most cases. Albanian farmers also frequently sell slaughtered small ruminants directly to end consumers, but also use butcher shops and traders, while Bosnia and Herzegovina sells slaughtered small ruminants through traders, butcher shops or abattoirs. It should be noted that selling slaughtered animals to channels other than direct selling (village selling) does not necessarily mean that the farmer slaughters the animals, but the selling price is determined by slaughter weight rather than live weight.

Table 13 outlines some descriptive statistics about average quantity sold of slaughtered small ruminants, and prices for two time periods. It appears that small ruminant farmers in Albania who sell slaughtered animals are more prominent than in the other countries. Hence, the average small ruminant meat slaughter weight sold by Albanian farmers is about four times higher than for farmers in Serbia, Montenegro, and Bosnia and Herzegovina. Aside from Montenegro, the prices of small ruminant meat have increased over the past three years. It should be noted that the prices of small ruminant meat have increased by at least another 20 percent above the values reported in the table since the start of the war in Ukraine.

Table 13. Quantity sold and prices of slaughtered small ruminant meat

		Mean	Std. Dev	Q1	Median	Q3
Albania	Quantity sold of slaughtered small ruminant meat	1908.3	1375.4	1000	1600	2650
	Small ruminant meat slaughter weight price 2017	5.90	1.13	5.79	6.20	6.61
	Small ruminant meat slaughter weight price 2020	6.30	0.47	5.79	6.61	6.61
Bosnia and Herzegovina	Quantity sold of slaughtered small ruminant meat	573.3	664.8	100	400	860
	Small ruminant meat slaughter weight price 2017	5.96	2.09	5	6	6
	Small ruminant meat slaughter weight price 2020	6.49	2.19	5	6	7

Table 13 *(Cont.)*. Quantity sold and prices of slaughtered small ruminant meat

		Mean	Std. Dev	Q1	Median	Q3
Serbia	Quantity sold of slaughtered small ruminant meat	466.7	280.6	300	350	400
	Small ruminant meat slaughter weight price 2017	4.43	2.36	2.51	4.26	5.24
	Small ruminant meat slaughter weight price 2021	4.47	2.32	2.73	4.26	5.11
Montenegro	Quantity sold of slaughtered small ruminant meat	453.3	291.7	220	400	500
	Small ruminant meat slaughter weight price 2017	8.25	6.54	4.75	5.50	11.75
	Small ruminant meat slaughter weight price 2021	7.25	6.28	4	5	5.50

Note: Q is quantity expressed in kg; prices are in EUR/kg.

On-farm processing of meat (for example, drying) is uncommon — in Albania, only one farmer carries out processing; in Bosnia and Herzegovina only four do so; in Montenegro two, and in Serbia none.

3.4.1 Abattoirs and slaughtering points

Abattoirs supply the domestic market with fresh meat, while raw material for the processing industries is mostly imported as frozen meat. Some are publicly owned and some are private — and most are under used (if operating). Figure 54 clearly shows that only Montenegro and Serbia slaughter most small ruminants through abattoirs; Albania and Bosnia and Herzegovina rarely use them. The Government of Albania has made efforts to enforce the slaughter of animals in abattoirs. However, as the figures show, not much has changed, even if — according to the interviews — the situation has significantly improved in the municipality of Tirana.

Abattoirs that perform better are those run by major processors and traders (importers), which deal with large volumes of animals. In Albania, some of the abattoirs are modern. Investments in new abattoirs, or in modernizing of existing facilities, will become viable only with the stronger enforcement of the law related to animal slaughtering — otherwise, financing new investments without such a prerequisite in place implies exposure to high risk. This is relevant also for other Western Balkan countries, especially Bosnia and Herzegovina, where it appears that most animals are sold informally without proper monitoring.

In addition to abattoirs, there are also slaughtering points, which are facilities with basic slaughtering tools and operate in critical poor hygienic conditions. While the Government of Albania shut those down a couple of years ago and has managed to do so for some time in major cities, subsequently they reopened due to market pressure.

Thus, any initiative to modernize existing abattoirs, or build new ones, should be done only on condition the law is also enforced.

3.4.2 Meat processors in Albania

The meat processing industry in Albania was the first agro-industrial sector to consolidate, and can also be considered the most efficient and advanced subsector within the agro industrial sector. The reason for this was the availability of cheap imported frozen meat and the presence of a few large importers with major deep-freezing facilities, which allowed meat processing companies to rely on a reliable flow of quality-controlled meat, bypassing domestic production of fresh meat (Skreli and Imami, 2019).

The main products of the meat processing industry are sausages and other cold cuts,

mostly based on pork meat. Poultry and beef are also processed. Companies use modern technology in processing frozen meat, but have limited know-how in processing fresh meat.

According to Skreli and Imami (2019), there are at least two meat processors located in Durres region (including Kaziu), around five in Fier, four in Korca (including Fix and Tona, which are strong players at national level), two in Lezha (including INCA, which is export oriented), three in Shkoder (including Kimca), and six in Vlora. Tirana hosts two of the biggest meat processors: EHW and KMY.

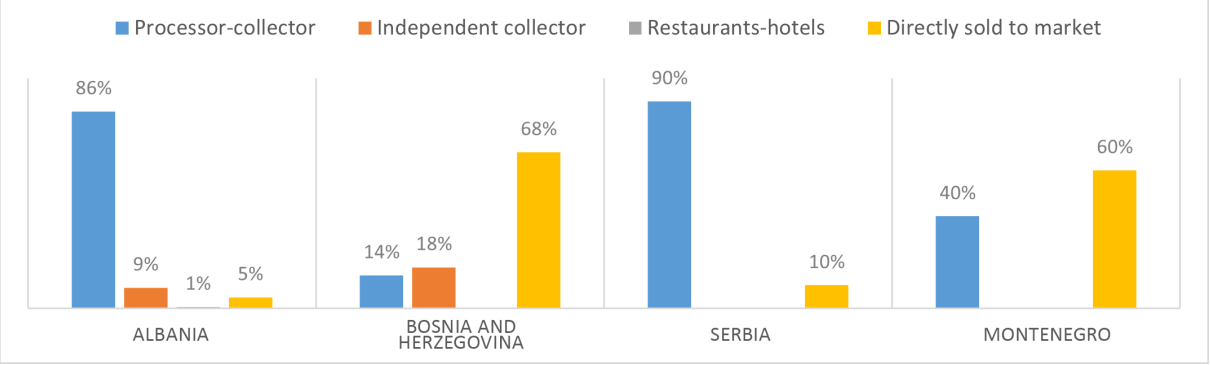
Albanian standards, according to the Food Law and orders of the Ministry of Agriculture and Rural Development (MARD), are often applied – even EU standards on hygiene, public authority, traceability, and HACCP standards are in place at big companies. Major processors such as EHW and KMY have invested in their own distribution and retail networks.

While large meat processors have already invested in modern technology, investments might be needed for smaller processors to meet the standards (in terms of modernizing their production facilities, processing lines, and storage). However, they face strong and growing competition in the local market from both major local producers and importers, who are advantaged by being formalized, and through improvements in standards control.

3.5 Milk collection and processing

This subsection discusses the small ruminant milk value chain, or the right-hand side of Figure 22. Thus, the main channels used by small ruminant farmers to sell milk are presented in Figure 56. First, it needs to be pointed out that, with the exception of Albania, the proportion of small ruminant farmers selling milk in the other countries is limited, implying that in Montenegro, Serbia, and Bosnia and Herzegovina, the small ruminant milk value chain is not developed. This is particularly true for Montenegro and Bosnia and Herzegovina, where the share of farmers selling milk to processors is negligible. On the other hand, Albanian and Serbian small ruminant farmers sell most of their milk to processors.

Figure 56. Market channels for small ruminant milk



Note: Albania N=167; Bosnia and Herzegovina N=28; Serbia N=10; Montenegro N=5.

Table 14 outlines the milk prices received by small ruminant farmers in each country for two time periods. Prices appear to have increased over the past three years, but it should be noted that after the conflict in Ukraine started, they increased by at least a further 20 percent. Another noticeable element is that the prices received by small ruminant farmers in Bosnia and Herzegovina are much higher than in the other countries. This is directly related to the market channel these farmers use to sell their milk – direct selling to end consumers. Selling directly to consumers pays off because there is no intermediary involved, but food safety

issues, and control of this informal market, are problems. In addition, the use of these channels to such an extent impedes the development of the dairy industry because finding enough milk supplies to justify investment in processing capacity is limited, and competition is unfair (formal businesses pay taxes while informal ones do not).

Table 14. Selling price of small ruminant milk by market channel

		Mean	Std. Dev	Min	Q1	Median	Q3	Valid responses
Sheep								
Albania	2017	0.73	0.13	0.43	0.68	0.72	0.85	155
	2020	0.81	0.09	0.43	0.77	0.85	0.85	155
Bosnia and Herzegovina	2017	1.00	0.00	1.00	1.00	1.00	1.00	12
	2020	1.33	0.49	1.00	1.00	1.00	2.00	15
Serbia	2017	0.73	0.06	0.68	0.68	0.72	0.79	4
	2021	0.73	0.26	0.31	0.68	0.85	0.89	5
Goats								
Albania	2017	0.47	0.07	0.43	0.43	0.43	0.51	18
	2020	0.50	0.07	0.43	0.47	0.47	0.51	18
Bosnia and Herzegovina	2017	1.23	0.44	1.00	1.00	1.00	1.00	13
	2020	1.53	0.72	1.00	1.00	1.00	2.00	17
Serbia	2017	0.57	0.40	0.30	0.30	0.38	1.02	3
	2021	0.48	0.21	0.34	0.36	0.43	0.43	5
Montenegro	2017	0.70	0.26	0.55	0.55	0.55	1.00	3
	2021	0.87	0.55	0.55	0.55	0.55	1.50	3

3.5.1 Milk collectors

Milk collection and transport is one of the weakest points in the value chain. The collection of raw milk is organized mostly by milk processors and private milk collectors. In general, milk processors usually only collect milk from the area where the processing unit is located, and specialized private collectors collect milk from remote areas.

As already pointed out, small ruminant farmers tend not to have any milk cooling equipment, hence collections are made at least once a day, and sometimes even twice a day, which has a considerable impact on efficiency and costs. A private milk collector typically collects milk from 50 to 150 farms (approximately 500 L to 1 500 L per day). They earn about 2 cents to 7 cents per litre of milk for the collection service, depending on the collection distance.

In general, milk from different farms is frequently mixed and transported in the same load, even though the milk might be of different quality. Inadequate cleaning and disinfection of milk containers is common. In mountainous areas, the time it takes to collect milk and transport it is even longer (up to four hours without any cooling). Milk containers are not made from food grade plastic or stainless material, and most milk is not stored and transported at the required temperature.

3.5.2 Milk processors

In all Western Balkan countries, sheep and goat milk is almost exclusively processed into cheese. Milk delivered to processors is processed in a different way based on tradition, experience, and knowledge. Small ruminant milk supplies from farmers represent the main problem for the milk processing industry. In general, the

supply from farms suffers from poor safety, and quite often from high collection costs, though it differs from region to region. In some areas, high milk price combined with low milk quantity results in low business profitability. Increasing the quantity and quality of milk production is the basis for the development of a modern and business oriented dairy industry. A sufficient milk supply to processing plants is important for the use of equipment and distribution of fixed costs over higher production.

Processing technology is characterized by two types of processing units, namely seasonal processing units and mechanized processing units. The seasonal processing units are quite typical, especially in the case of small ruminant milk processing. The dairy industry suffers from fragmentation, poor quality of inputs, and poor processing practices. Numerous cheese plants are without adequate storage capacities, and the milk is usually processed using quite basic technology. Smaller processes suffer from insufficient knowledge of the technological process, resulting in low and inconsistent product (cheese) standards and quality. Interviews show that there is a need for technology expertise and education.

The short period over which sheep and goat milk is available (100 to 150 days a year) requires relatively big flocks for milk supply, otherwise the cost of milk collection could be high, and the control of milk quality is difficult. In such conditions, small processing units (up to 5 tonnes/day) located in the production area seems more appropriate.

Apart from milk processors that produce cheese, small ruminant farmers also process their milk as cheese. In Bosnia and Herzegovina, Serbia, and Montenegro, the share of farmers producing cheese is high, while in Albania, small ruminant farmers producing cheese are far fewer (7.5 percent of the sample). It can be argued that the higher the share of farmers producing cheese, the less developed the processing value chain level.

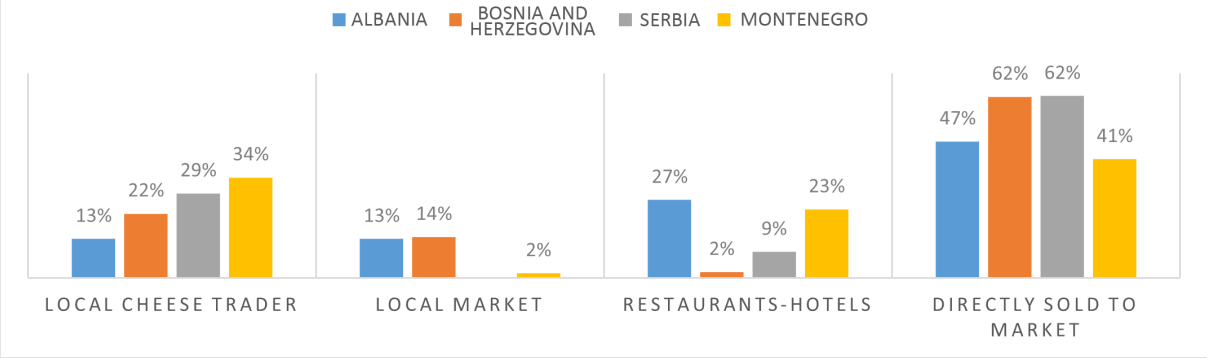
Table 15. Cheese production, 2017 and 2020

		Mean	Std. Dev	Q1	Median	Q3
Albania	small ruminant cheese produced 2017	624.2	679.8	95	200	1 200
	small ruminant cheese produced 2020	654.2	823.9	100	200	1 150
Bosnia and Herzegovina	small ruminant cheese produced 2017	1 419.4	1 989.6	400	1 000	2 000
	small ruminant cheese produced 2020	1 461.7	2 250.5	600	1 000	1 500
Serbia	small ruminant cheese produced 2017	888.7	782.8	350	600	1 230
	small ruminant cheese produced 2020	928.2	572.2	500	800	1 250
Montenegro	small ruminant cheese produced 2017	575.5	772.6	250	400	610
	small ruminant cheese produced 2020	629.1	788.8	250	400	604
	small ruminant cream cheese produced 2017	265.4	124.5	200	246.5	300
	small ruminant cream cheese produced 2021	264.8	125	168	250	309

Table 15 contains descriptive data on the amount of cheese produced by small ruminant farmers for two time periods. Albanian farmers, in addition to the fact that, compared to their counterparts, fewer are engaged in cheese production, also produce much less cheese than the others. Bosnia and Herzegovina small ruminant farmers appear to produce on average more cheese than the farmers in other countries. The main channels that small ruminant farmers employ to commercialize their cheese production are shown in Figure 57. A large share of cheese is sold directly to the market (end consumer), which is mostly informal and not monitored by national food authorities. About a third of Serbian and Montenegrin farmers also sell to local cheese traders, who then sell to markets, while about 25 percent of farmers in Albania and Bosnia and Herzegovina sell through restaurants and hotels, which are usually agrotourism businesses that promote the slow food movement and focus on local and traditional products.

Small ruminant farmers in Montenegro (44.6 percent of them) also produce cream cheese, using the same channels that they use to sell small ruminant cheese.

Figure 57. Market channels for selling small ruminant cheese



Note: Albania N=15; Bosnia and Herzegovina N=50; Serbia N=45; Montenegro N=64.

Table 16 presents the amount of cheese that small ruminant farmers sell, and the prices they have obtained for two time periods. In addition, information is provided about the share of production that farmers can sell on average. As can be seen, Bosnia and Herzegovina small ruminant farmers are able to sell about 50 percent of their production, while they produce much more cheese than farmers in the other countries. Montenegro farmers have a low share of cheese sold as a proportion of total cheese produced. Farmers in Albania and Serbia manage to sell a considerable share of the cheese they produce. Regarding prices, they have increased slightly over the past three years. Since the conflict in Ukraine started, they have gone up by at least 20 percent.

Table 16. Small ruminant cheese quantity sold by farmers and selling price

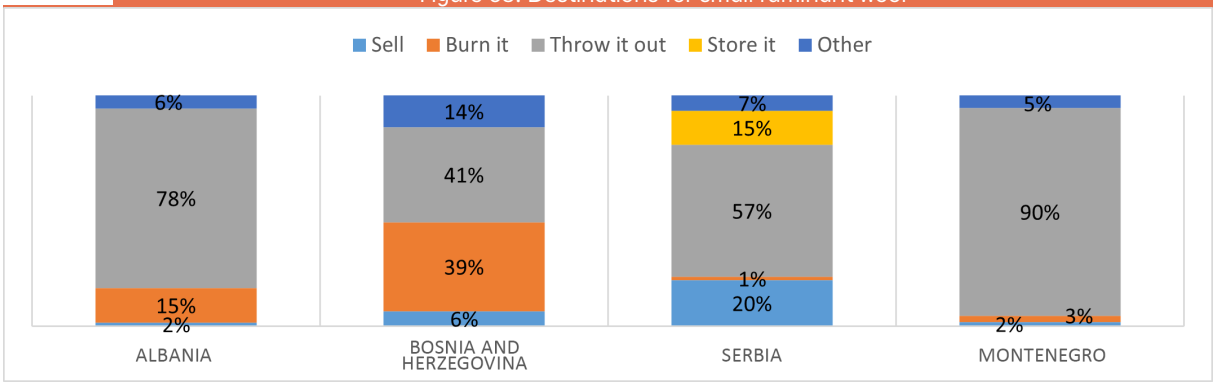
		Mean	Std. Dev	Q1	Median	Q3
Albania	Quantity sold small ruminant cheese *Share of total production	552.7 (84.5%)	687.7	100	200	1 000
	small ruminant cheese price 2017	4.47	0.96	3.83	5.11	5.11
	small ruminant cheese price 2020	4.68	0.87	4.26	5.11	5.11
		Mean	**Std. Dev**	**Q1**	**Median**	**Q3**
Albania	Quantity sold small ruminant cheese *Share of total production	552.7 (84.5%)	687.7	100	200	1 000
	small ruminant cheese price 2017	4.47	0.96	3.83	5.11	5.11
	small ruminant cheese price 2020	4.68	0.87	4.26	5.11	5.11
Bosnia and Herzegovina	Quantity sold small ruminant cheese *Share of total production	708.6 (48.5%)	795.2	40	500	1 000
	small ruminant cheese price 2017	7.64	9.34	5	5	10
	small ruminant cheese price 2020	8.18	8.32	5	5	10
Serbia	Quantity sold small ruminant cheese *Share of total production	840.8 (90.6%)	710.1	500	650	1 000
	small ruminant cheese price 2017	4.25	1.92	3.41	4.26	4.58
	small ruminant cheese price 2021	5.54	2.35	4.26	5.11	5.97
Montenegro	Quantity sold small ruminant cheese *Share of total production	407 (64.7%)	318.7	235	300	490
	small ruminant cheese price 2017	3.56	1.20	3	3.50	4
	small ruminant cheese price 2020	4.19	1.61	4	4	4
	Quantity sold small ruminant cream cheese *Share of total production	216.63 (81.8%)	115.16	130	200	280
	small ruminant cream cheese price 2017	17.37	1.86	15	18	18
	small ruminant cream cheese price 2021	19.94	1.67	20	20	20

Problems regarding low prices are always among the top ranked problems of small ruminant farmers. One of the reasons they engage in processing milk to produce cheese is that the prices offered to them from processors are very low. Thus, they engage in processing activities to add more value to their production, which also increases the product shelf life. However, production of cheese at farm gate is much more difficult and costly for any national food authorities to monitor and control, which has large implications for food safety.

3.6 Wool value chain

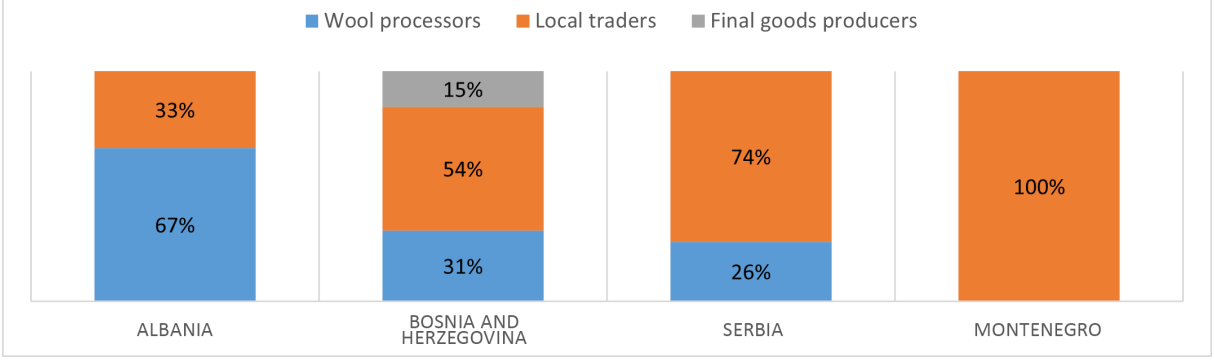
The small ruminant wool value chain is not developed in any of the Western Balkan countries, as Figure 58 shows – most farmers either throw out or burn small ruminant wool. Both of these actions are environmental polluters, and it requires sustainable interventions to address the issue.

Figure 58. Destinations for small ruminant wool



Only a few farmers manage to sell their small ruminant wool, but do so on an irregular basis. The main channels used by small ruminant farmers to sell wool are shown in Figure 59.

Figure 59. Market channels for small ruminant wool



Note: Albania N=3; Bosnia and Herzegovina N=13; Serbia N=27; Montenegro N=2.

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4.Value chain organization and governance

This section follows the analysis of the small ruminant value chain outlined above and completes it by further discussing issues related to value chain organization and governance. These issues are first discussed for the milk value chain, followed by the meat value chain, and a discussion of horizontal cooperation among farmers, which is a key aspect of value chain organization and a mechanism to oppose the buyers' power. Finally, the section is concluded with a summary of findings about small ruminant value chain organization and governance.

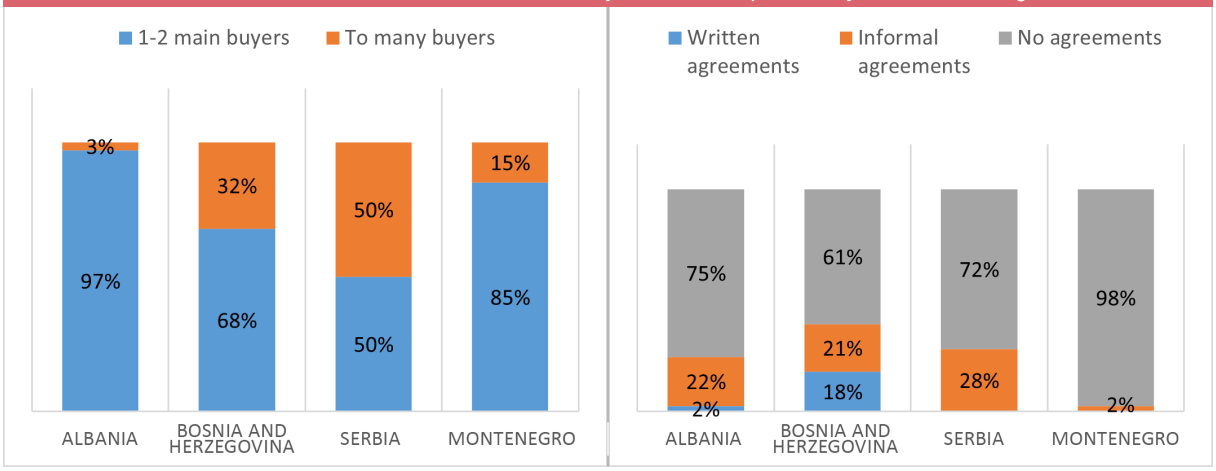
4.1 Milk value chain

When discussing value chain organization and governance, one of the primary elements to analyse is the quality of the relationship between trading parties. The literature shows that an above average performance is achieved through good trading relationships. There are different components proposed in the literature to measure relationship quality, including trust between trading parties, satisfaction with the relationship, and so on. Here, the focus is on elements that are more tangible (observable) rather than latent (unobservable), as suggested in the literature. Thus, some of the elements analysed here are relationship stability (number of buyers where the production is sold), relationship duration (number of months that the farmer has been selling to the same buyers), type of agreement, services offered by the buyer, time of payment, and buyer influence on product prices.

Figure 60 provides information on the number of buyers to which farmers sell their production (left hand side) and type of agreement that they have with the buyer. Good relationships are commonly created when most production is sold to one or two buyers and there is at least an informal agreement about the way the product is going to be sold (in terms of price, time, quality). As can be seen, the majority of Albanian and Montenegrin farmers sell the largest share of their milk production to one or two main buyers. In Serbia, only 50 percent of farmers sell to one or two buyers.

On the other hand, no prior agreements are observed between farmers and milk buyers. When prior agreements are made, they tend to be informal. The lack of agreements (contracts) between trading parties makes the future of the relationship uncertain, which impedes the investment likelihood for both parties. In addition, when there is no agreement in place, it is difficult to put price incentives for higher quality milk or to control (or sanction) the party that is deviating from the agreement, which might result in losses for the party being damaged.

Figure 60. Farmer and milk buyer relationship, stability and contracting

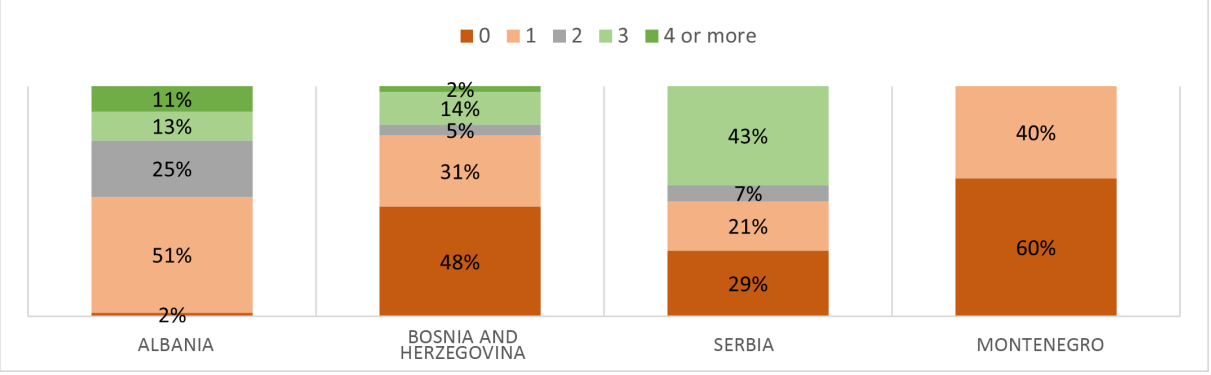


Note: Albania N = 167; Bosnia and Herzegovina N = 28; Serbia N=20; Montenegro N=40.

While selling to the same buyers is an indicator of stability, sometimes one is obliged to sell to the same buyer because there is nobody else to sell to. In this context, Figure 61 shows how many dairies are located about one hour drive from the farm location, which is an indicator of how concentrated the market is on the buyer's side. As can be see, the situation is more critical in Montenegro and Bosnia and Herzegovina, where farmers do not have an alternative for where to sell their milk. About 50 percent of Albanian and Serbian farmers have limited options for where to sell their milk. This could also be one of the reasons why farmers engage in the production of cheese themselves.

Another indicator that is related to market concentration on the buyer's side is the distance from the farm to the closest dairy. The average distance (measured in minutes) from the farm to the closest dairy for Albania is 20.75 minutes (Std. Dev 17.17), Bosnia and Herzegovina 48.5 minutes (Std. Dev 48.85), Serbia 32.8 minutes (Std. Dev 22.45) and Montenegro 72 minutes (Std. Dev 53.46). These results are in line with the number of dairies that are about a one hour drive from farms. Again, Montenegro farmers have to travel much longer distances to deliver small ruminant milk to dairies.

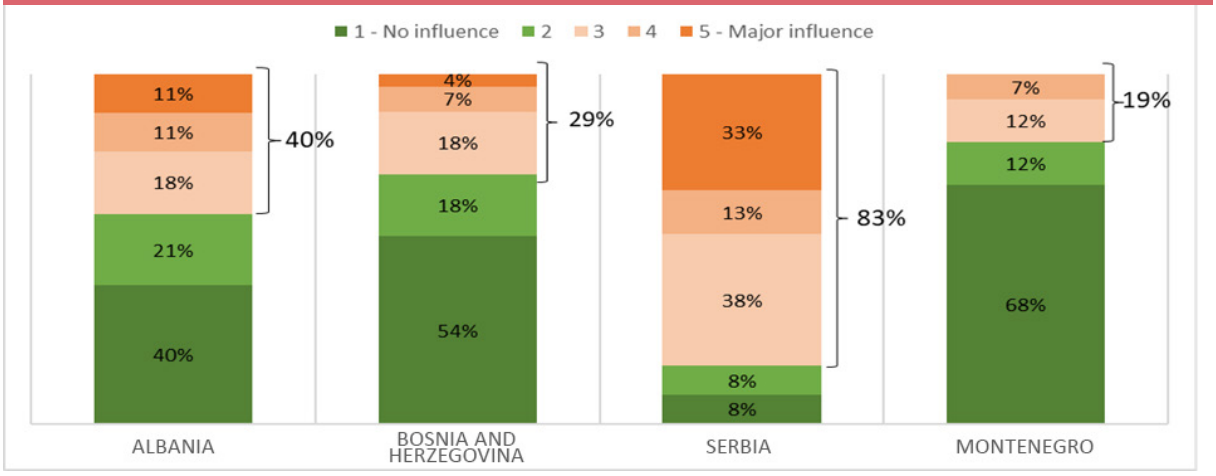
Figure 61. Number of dairies operating within one-hour drive of farms



Note: Albania N=200; Bosnia and Herzegovina N=42; Serbia N=14; Montenegro N=5.

Contrary to the discussion above are the results of Figure 62 — the more concentrated the market on the side of the buyer, the higher their influence and power in terms of changing product prices in their interests. However, this does not appear to be the case in either Montenegro or Bosnia and Herzegovina, which have much high market concentration on the buyer side than Albania and Serbia — but only a small share of them claim that the buyer has influence on prices. Instead, most Serbian farmers say that the buyer has influence on milk prices.

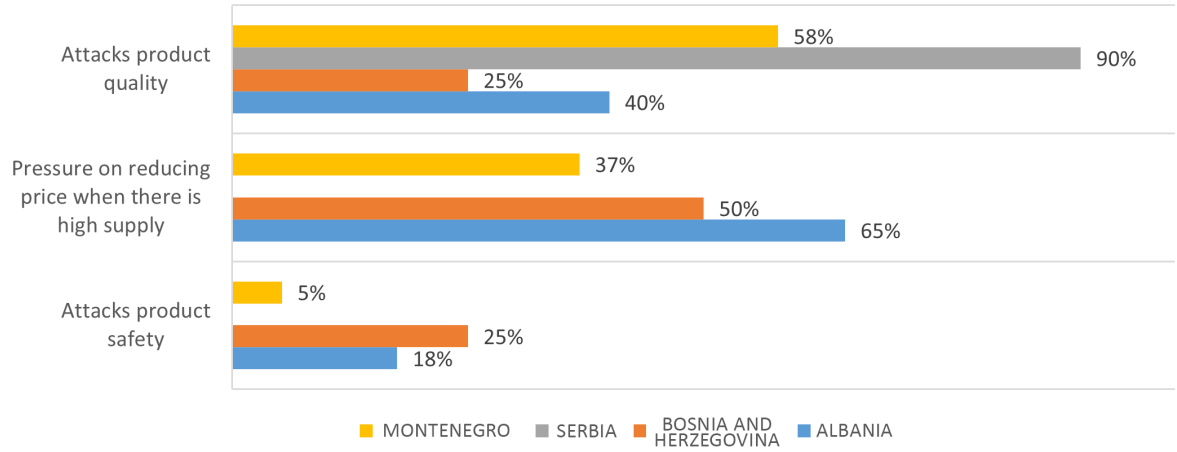
Figure 62. Farmer perception of milk buyers' influence on price



The result above is surprising; a potential explanation could be that only those farmers that have alternatives for the sale of the milk (in Montenegro and Bosnia and Herzegovina) engage in milk selling (that is to say, the general picture of market concentration does not apply to them), while the others that have no alternatives engage in cheese production.

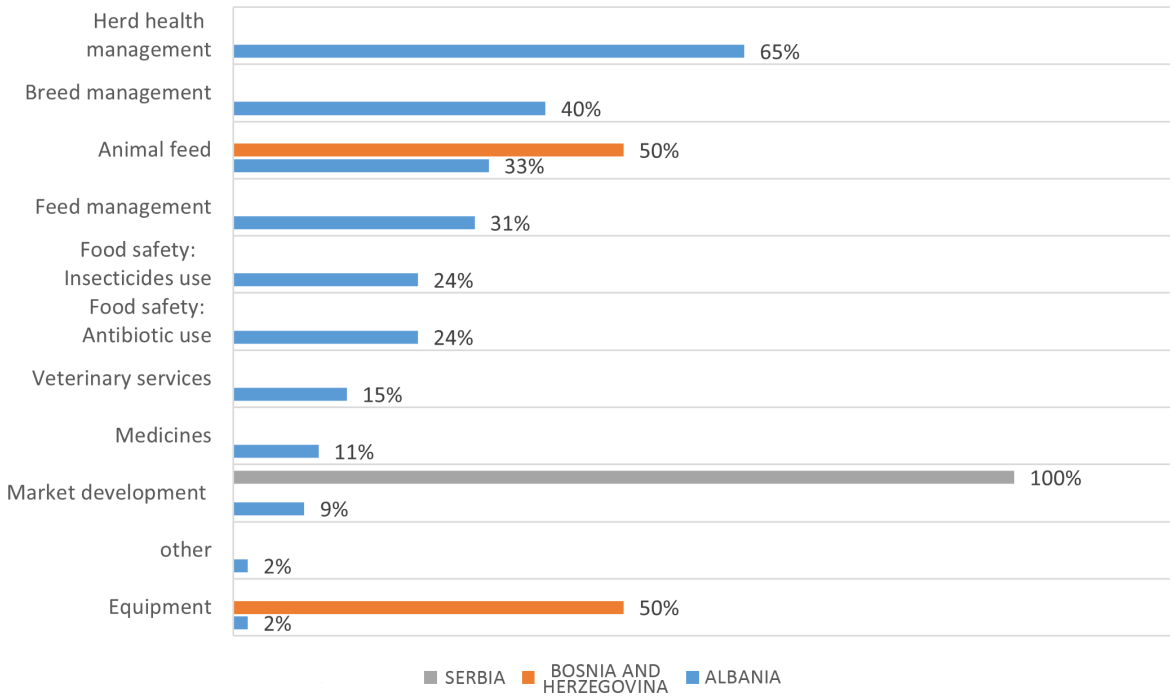
Furthermore, those who claimed that the buyer has significant influence on setting the price also stated that the main mechanisms through which the buyer reduces the price is by complaining about the milk quality (Figure 63).

Figure 63. Mechanisms through which milk buyers reduce prices for farmers



Another important element of the relationship between farmer and milk buyers is the services offered by the buyer to the farmer. Services offered by the buyer to farmers provide an important support to farmers to improve milk quality and safety standards and further develop their business. Normally, the buyer has much more financial and technical capacities to assist the farmer, which results in better quality of milk that can improve the quality of the end processed product (such as cheese) that can be sold for a higher price. However, as can be seen from Figure 64, services offered to small ruminant farmers in Serbia, Montenegro and Bosnia and Herzegovina are non existent. In Albania, about one third of farmers who sell milk claim to receive services from the buyer—such as herd health management, breed management, animal feeding and so on. This is another indication that the small ruminant milk value chain in Albania is at a more advanced stage than in the other Western Balkan countries.

Figure 64. Services offered by milk buyers



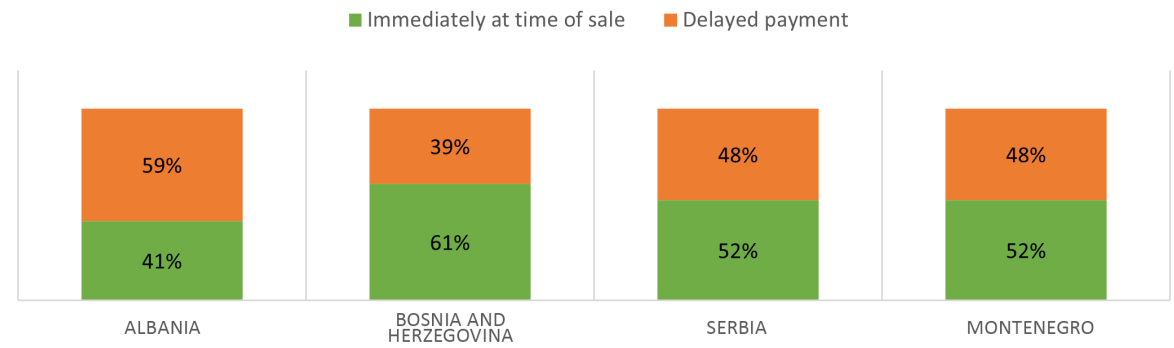
Note: Albania N = 55; Bosnia and Herzegovina N = 2; Serbia N=1; Montenegro N=0.

The time of payment by the buyer is another element of value chain organization, where in some studies it is an indication or an indirect measurement of trust, while in other an indirect measurement of buyer's power. Figure 65 shows the situation regarding the time of payment by the buyer to the small ruminant farmer in the countries included in the study. The share of farmers that receive delayed payment is lowest in Bosnia and Herzegovina (39.3 percent) and highest in Albania (58.7 percent).

From an efficiency point of view, for small ruminant milk buyers, it is more convenient to make regular payments at prespecified intervals (such as every two weeks, or every month). Thus, more important than just knowing whether the payment is delayed is the average waiting time. For those that get delayed payment, aside from Serbia which has the highest waiting time (about 52 days) for small ruminant farmers to be paid, in the other Western Balkan countries farmers have to wait less than a month.

At the same time, advance payments are not commonplace, with very few farmers claiming to receive advance payments from buyers.

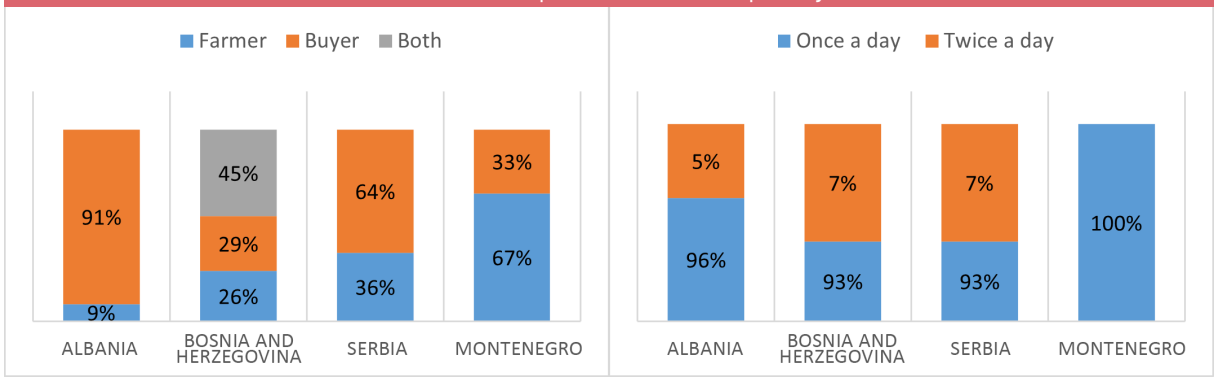
Figure 65. Time of payment by milk buyers



Note: Albania N = 167; Bosnia and Herzegovina N = 28; Serbia N=23; Montenegro N=44.

Figure 66 provides information about the agent transporting the milk and how many times a day that milk is collected. Both elements have important implications for efficiency and costs. In Albania, in over 90 percent of the cases, milk is collected by the buyer. In Montenegro, in 66.7 percent of the cases it is the farmer who delivers to the buyer.[3] For Serbia and Montenegro, about one third of the farmers have to deliver to the buyer. This puts higher costs pressure on the farmer side. Moreover, considering that in all countries, except Serbia, more than 90 percent of small ruminant farmers store milk in plastic or metal containers (Figure 67), transportation of the milk by the farmer using these containers does not ensure milk quality and safety standards. Lastly, in most cases, milk is delivered (or collected) once a day. In the absence of cooling tanks, collection once a day (at a higher transportation cost) is the only option to ensure milk quality and safety standards. If more investments in cooling and storing systems were made, collection could be made at longer time intervals, which would in turn reduce transportation costs.

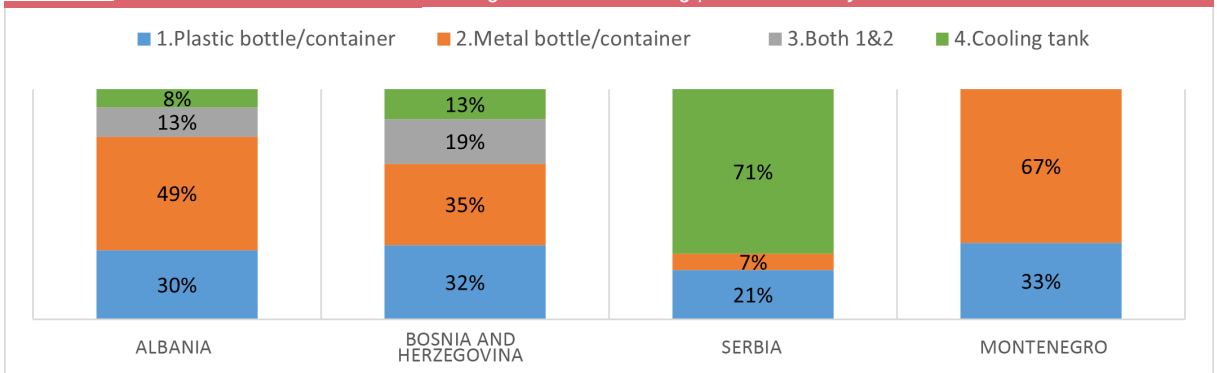
Figure 66. Milk transportation and times per day milk is collected



Note: Albania N = 55; Bosnia and Herzegovina N = 2; Serbia N=1; Montenegro N=0.

Finally, it should be noted that milk price differentiation according to quality (for example, fat and dry matter content) is not a common practice in Western Balkan countries. The lack of price differentiation leads to limited incentive for farmers to comply with milk quality and safety requirements.

Figure 67. Milk storing prior to delivery



Note: Albania N=166; Bosnia and Herzegovina N=31; Serbia N=14; Montenegro N=3.

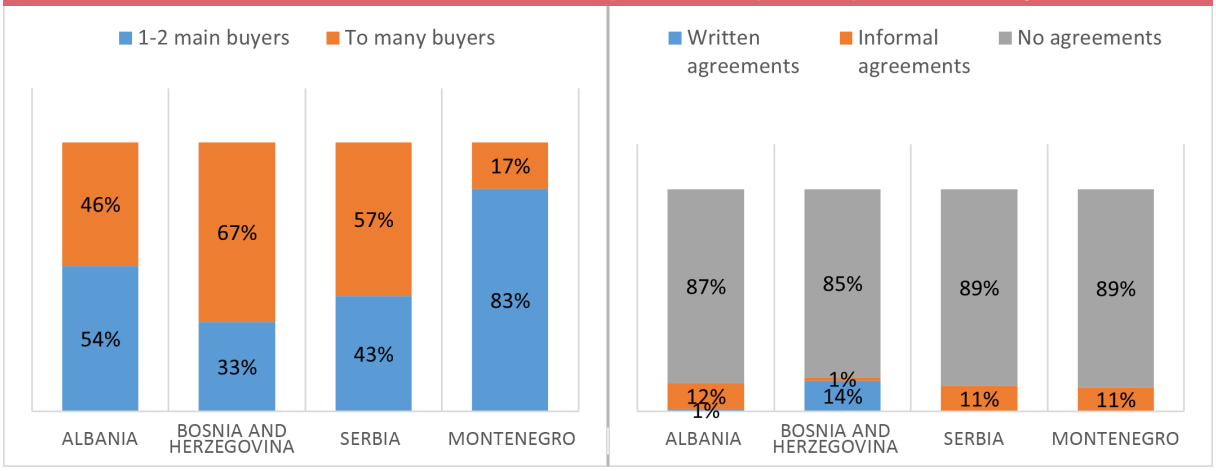
[3] It should be noted that for this question only three answers were available for analysis. Deriving conclusions from three respondents is not representative.

4.2 Meat value chain

As with the milk value chain, analysis of meat value chain organization and governance starts by investigating the relationship stability and type of agreement between small ruminant farmers and buyers. Unlike the milk value chain, farmers tend to sell small ruminants to many buyers, rather than to one or two buyers. Only Montenegrin farmers appear to have a more stable relationship, where 83 percent of them sell most small ruminants to one or two buyers. This could be related to the market channel used by farmers (see Figure 54), where around 70 percent of Montenegrin farmers claim to sell their small ruminants to abattoirs. It can be deduced that Montenegrin farmers have a more stable relationship with meat buyers than their counterparts in the other countries.

In this case also, no prior agreements are observed between farmers and buyers. Even when prior agreements are made, they tend to be informal. This makes relationships uncertain and might impede the likelihood of investment for farmers. Meat buyers (processors), even if they do not secure enough supplies from the domestic market, are able to find supplies at reasonable prices in import markets. Data presented here show that Western Balkan countries do import small ruminants (in general live animals).

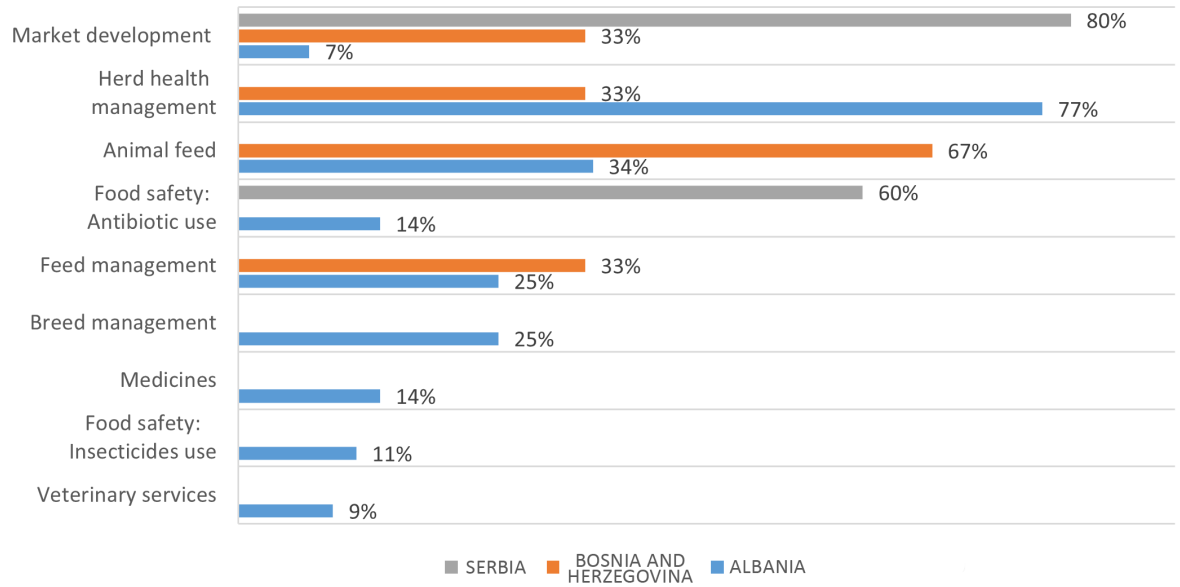
Figure 68. Farmer and meat buyer relationship, stability and contracting



Note: Albania N = 198; Bosnia and Herzegovina N = 202; Serbia N = 141; Montenegro N=121.

Services offered by buyers to farmers are scarce, particularly in Montenegro, Bosnia and Herzegovina, and Serbia (Figure 69), while in Albania, about 25 percent of farmers claim to receive some services from their meat buyers. The main service that they receive is in relation to herd health management. About 80 percent of Serbian farmers that said they received services are consulted by the buyer about market development.

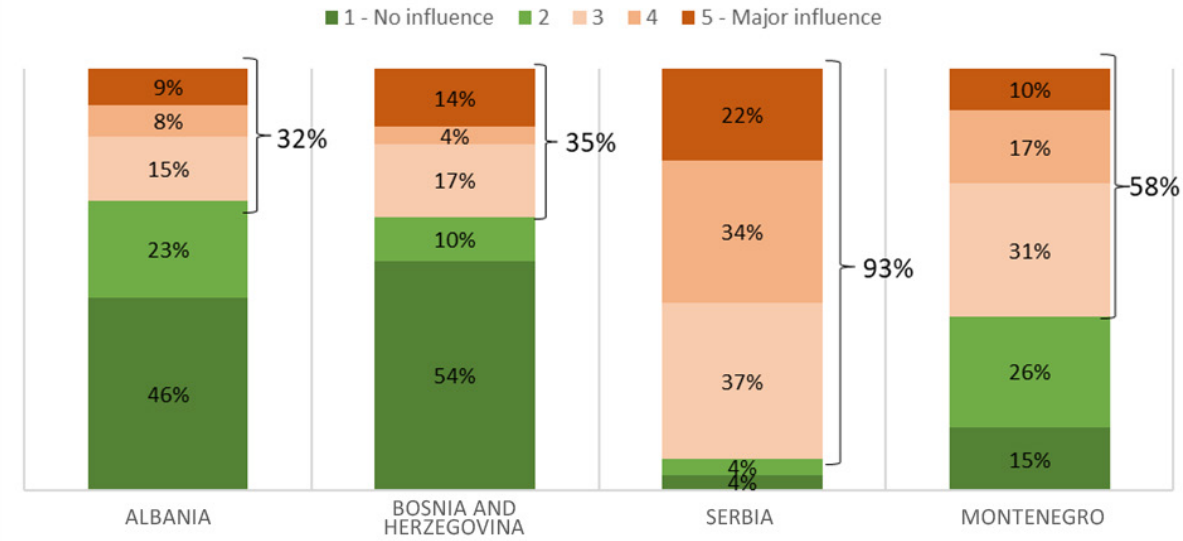
Figure 69. Services offered by meat buyers



Note: Albania N = 44; Bosnia and Herzegovina N = 3; Serbia N=5; Montenegro N=0.

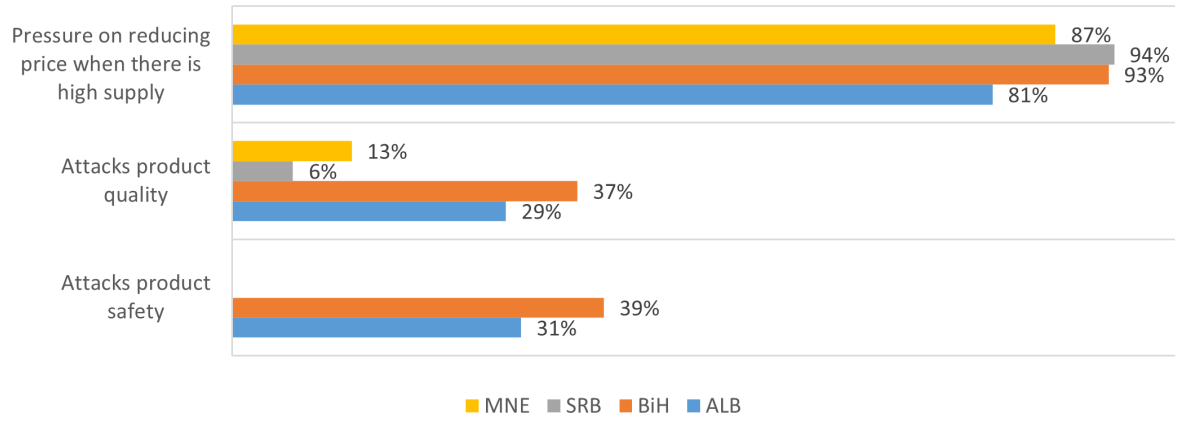
Regarding buyer influence on small ruminant meat (or live animal) prices, Serbia and Montenegro farmers appear to be in a more difficult position than their counterparts in Albania and Bosnia and Herzegovina. Hence, about 92.7 percent of the respondents in Serbia and 58.7 percent in Montenegro point out that meat buyers have a large influence in setting the price of meat (or live animals).

Figure 70. Farmer perception of meat buyers' influence on price



In addition, those that claim that the buyer has a significant influence on setting the price (Figure 70) also state that the main mechanisms through which the buyer reduces the price is by applying pressure to reduce the price in high supply seasons (Figure 71).

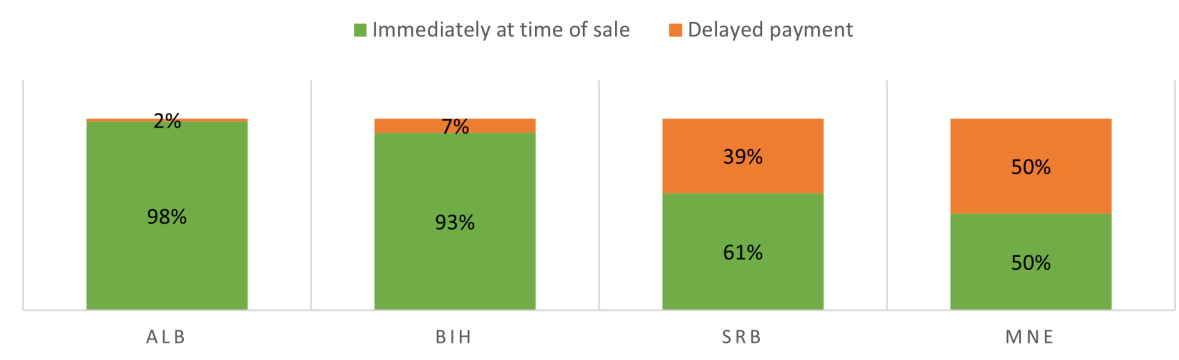
Figure 71. Mechanisms through which meat buyers reduce prices for farmers



The time taken to pay as outlined in the subsection above could indicate an indirect measure of trust or indirect measure of buyer power exploitation. Figure 72 outlines the time taken to make payments to small ruminant farmers. The share of farmers that receive delayed payment is highest in Montenegro at 49.6 percent, followed by Serbia with 38.8 percent, while the numbers that get delayed payment in Bosnia and Herzegovina, and Albania, are negligible.

For those whose payment is delayed, the average waiting time in Serbia is 54.81 days, and 28.7 days in Montenegro. The waiting time for Serbian farmers is considerable, which coupled with buyer's large influence on prices, further indicates that small ruminant farmers in Serbia and Montenegro — within the small ruminant meat value chain — are being squeezed by buyers.

Figure 72. Time of payment by meat buyers



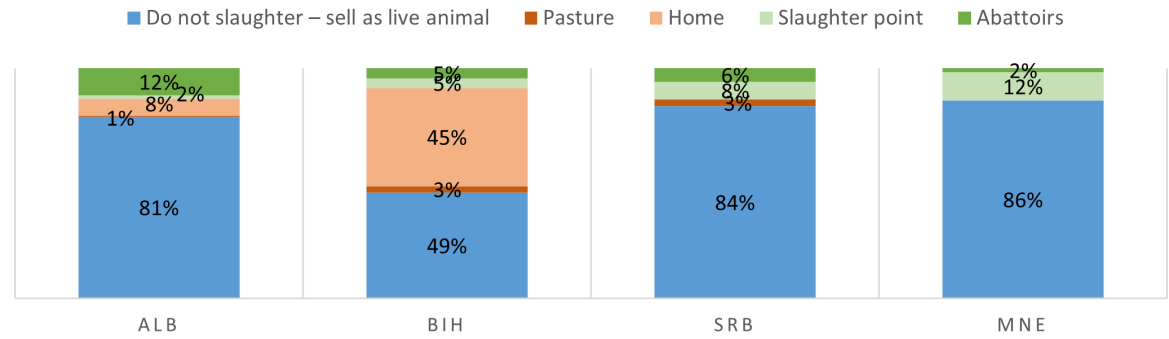
Note: Albania N = 198; Bosnia and Herzegovina N = 202; Serbia N=139; Montenegro N=121

As with the small ruminant milk value chain, advance payments are not common for the meat value chain. Few farmers claim to receive advance payment. The elements discussed so far focus primarily on the governance of the trading relationship between small ruminant farmers and buyers. The next part examines the organizational aspect of the small ruminant meat value chain, including whether animals are sold as live animals or slaughtered, transportation, number of small ruminant transactions in a year, number of animals sold in a transaction, whether lambing is synchronized with festive periods, and if this synchronization results in added benefits for small ruminant farmers.

Figure 73 outlines where small ruminant farmers slaughter their animals. For Albania, Serbia, and Montenegro, more than 81 percent of small ruminant farmers sell small ruminants as live animals, while more than 50 percent of small ruminant farmers in Bosnia and Herzegovina sell slaughtered animals; and, what is more critical, 45 percent of the sample say that they slaughter at home, generally outside the monitoring and control of national food authorities. This poses significant food safety risks for the small ruminant meat value chain in Bosnia and Herzegovina.

In addition, those that slaughter small ruminants in Albania and Bosnia and Herzegovina claim to pay a slaughtering fee, which for Albania is EUR 3.31 on average per small ruminant, while in Bosnia and Herzegovina is EUR 5 per small ruminant. Serbian and Montenegrin farmers did not say they pay a slaughtering fee.

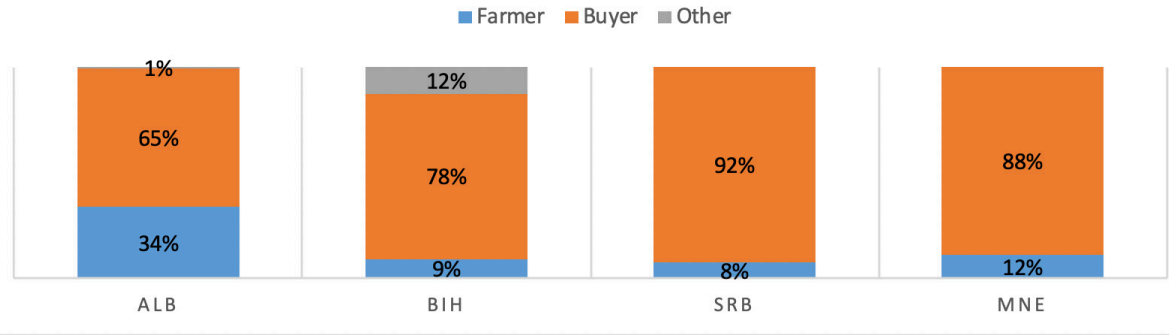
Figure 73. Slaughtering place of small ruminants



Note: Albania N = 200, Bosnia and Herzegovina N=204; Serbia N=141; Montenegro N=121.

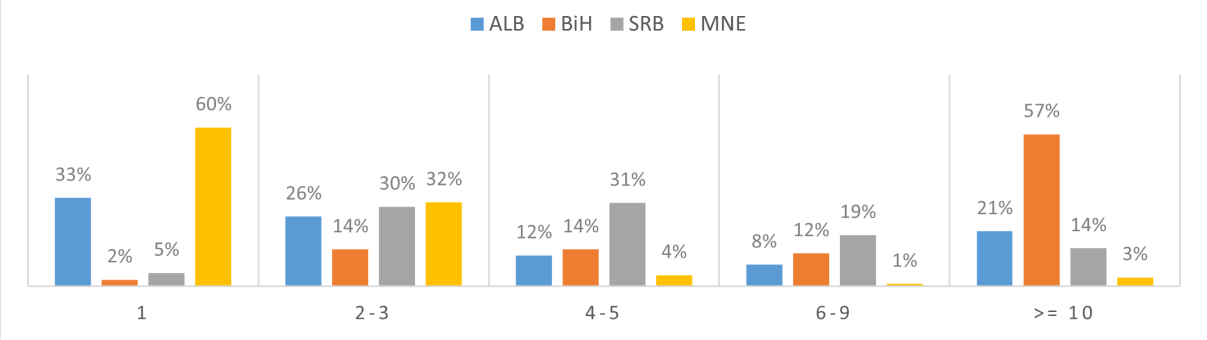
Figure 74 shows the agent transporting the animals, which in most cases is done by the buyer. The transportation operator should have license and a truck that fulfils specific criteria for animal transportation. This license and truck are quite costly and difficult to maintain for small individual farmers for personal use. In general, transporters are specialized agents who operate either as commissioners (they get paid commission for transporting animals) or buyers of animals.

Figure 74. Animal transportation



Another key element of value chain organization, which impacts costs and efficiency, is the size and frequency of transactions. As can be seen from Figure 75, more than 90 percent of Montenegrin small ruminant farmers carry out one to three transactions to sell all their small ruminants. Furthermore, they also have the highest transaction size compared to other countries, with an average of 74.47 small ruminants sold in a single transaction (see Table 17). The majority of small ruminant farmers in Bosnia and Herzegovina have the highest number of transactions, with ten or more transactions annually and an average of nine small ruminants sold per transaction.

Figure 75. Number of times per year small ruminants are sold by farmers



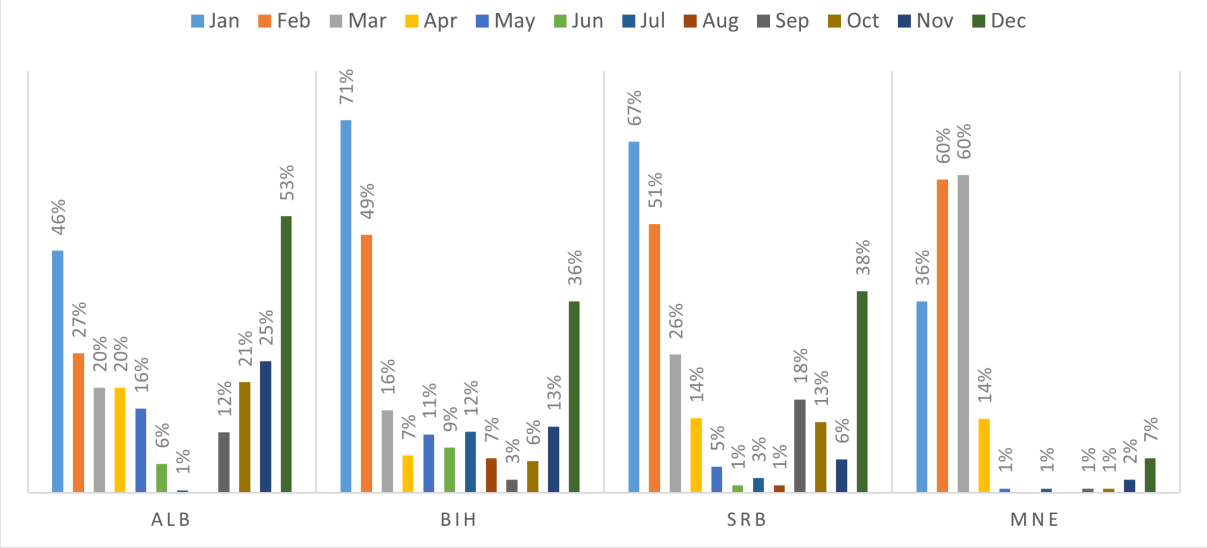
Transaction costs are highest when trading relationships are characterized by a high number of transactions with small volumes. In this context, the Bosnia and Herzegovina small ruminant value chain appears to have the highest transaction cost, and the Montenegro value chain the lowest transaction cost. Albania and Serbia fall somewhere in between these two, with Albania data closer to Montenegro, and Serbia closer to Bosnia and Herzegovina.

Table 17. Small ruminants sold in a single transaction

Small ruminants sold in a single transaction (average)	Mean	Std. Dev	Q1	Median	Q3
Albania	42.76	71.78	6	15	50
Bosnia and Herzegovina	9	15.29	1	5	10
Serbia	20.64	25.61	7	13	20
Montenegro	70.47	43.05	40	61	100

Figure 76 outlines the lambing/kidding for all Western Balkan countries included in the study. In a sense, this figure also provides an overview of the supply of small ruminants through the year. The main lambing/kidding months for Western Balkan countries are January and February, with small differences from country to country – for Montenegro, March is an important lambing/kidding month, and for Albania, Bosnia and Herzegovina, and Serbia, December is a key month.

Figure 76. Lambing/kidding months



In this line of discussion, small ruminant farmers were also asked whether they synchronize lambing/kidding with national holidays. Around 48 percent and 59 percent of the surveyed farmers in Albania, and Bosnia and Herzegovina, respectively, say they do so; whereas Serbian (19.8 percent) and Montenegrin (2.5 percent) farmers do so much less. Those that do this do so because of better prices and because it is easier to sell due to increased demand (see Figure 77).

Figure 77. Benefits of synchronizing lambing/kidding with national holidays

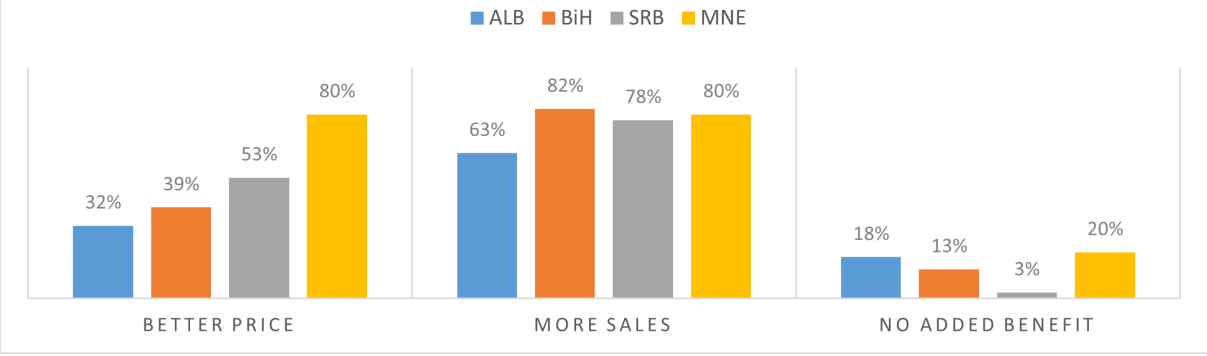


Table 18 shows the average increased sales or increased price when selling during national holidays. All farmers apart from those in Montenegro claim to get at least a 10 percent increase in small ruminant prices during the national holidays. The sales increase during national holidays ranges from 12.8 percent in Montenegro to 30.6 percent in Albania.

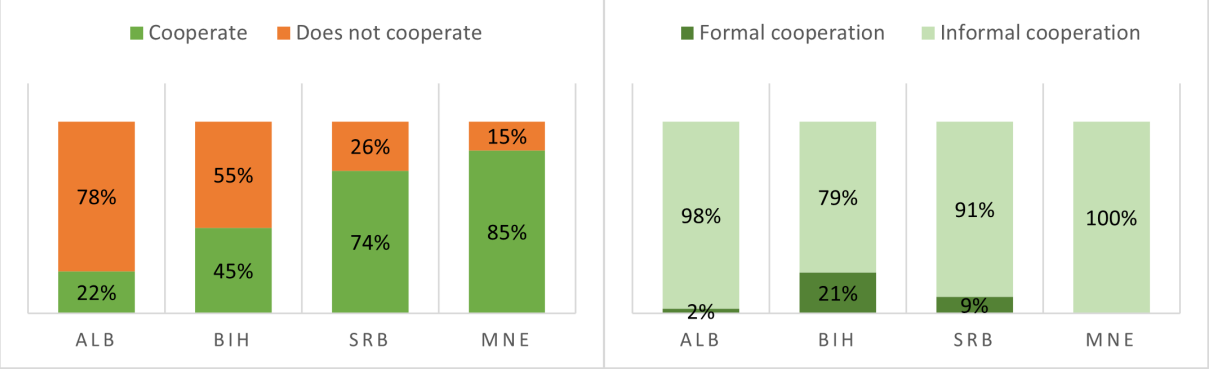
Table 18. Price and sales benefits of synchronizing lambing/kidding with national holidays

	Mean	Std. Dev	Q1	Median	Q3
Price increase					
Albania	12.3%	6.1%	10%	10%	20%
Bosnia and Herzegovina	11.3%	7.4%	5%	10%	20%
Serbia	15.7%	7.7%	5%	10%	15%
Montenegro	5.5%	1.6%	5%	5%	5%
Price increase					
Albania	30.6%	18.4%	20%	30%	30%
Bosnia and Herzegovina	18.7%	18.9%	10%	10%	20%
Serbia	26.7%	27%	5%	10%	20%
Montenegro	12.8%	4.7%	10%	10%	10%

4.3 Farmer–farmer cooperation

Whereas the two sections above focused on vertical relationships (that is, farmer–buyer), the focus of this last section is to look at horizontal relationships among farmers themselves (that is to say, cooperation). Hence, Figure 78 presents the level of cooperation, and whether cooperation is formalized or not. One thing that is evident from the figure is the low level of cooperation among small ruminant farmers in Albania compared to other Western Balkan countries. What is also clear is that most cooperation takes place on an informal basis.

Figure 78. Farmer–farmer cooperation

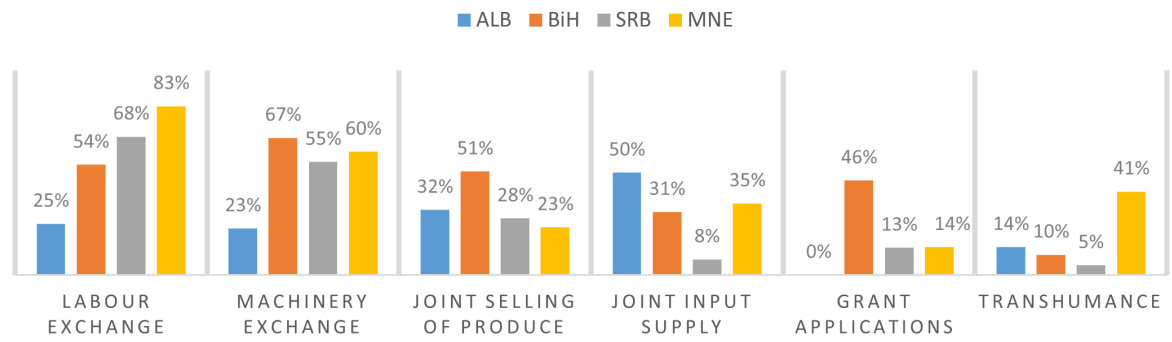


Note: Albania N=200; Bosnia and Herzegovina N=202; Serbia N=141; Montenegro N=121.

In addition, small ruminant farmers that claim to cooperate were further asked what type of activity they cooperate on. These activities and the distribution of answers for each country are presented in Figure 79. The main activities farmers cooperate on include labour exchange and machinery exchange. In Albania, the main activity for cooperation is joint input supply.

An interesting fact that emerges from the answers is that they help each other with problematic issues. For example, the biggest problem that Montenegrin and Serbian farmers face is labour availability, and to address this they tend to cooperate more on labour exchange (for example, taking turns to send small ruminants to pastures).

Figure 79. Activities that farmers cooperate on



Cooperation is generally highlighted as a mechanism that can help smallholders to balance the asymmetric power relations they have with their buyers. To further address this, farmers would need to cooperate in terms of joint selling of their produce.

5. Farm management practices

The two previous sections focused on how the small ruminant value chain is structured, its actors and activities, and issues relating to organization and governance. In this section, the focus shifts to the small ruminant farm, which is the base level of the small ruminant value chain. As the saying goes, "a chain is as strong as its weakest link", and from the evidence so far, the farm level appears to be the most problematic of the small ruminant value chain.

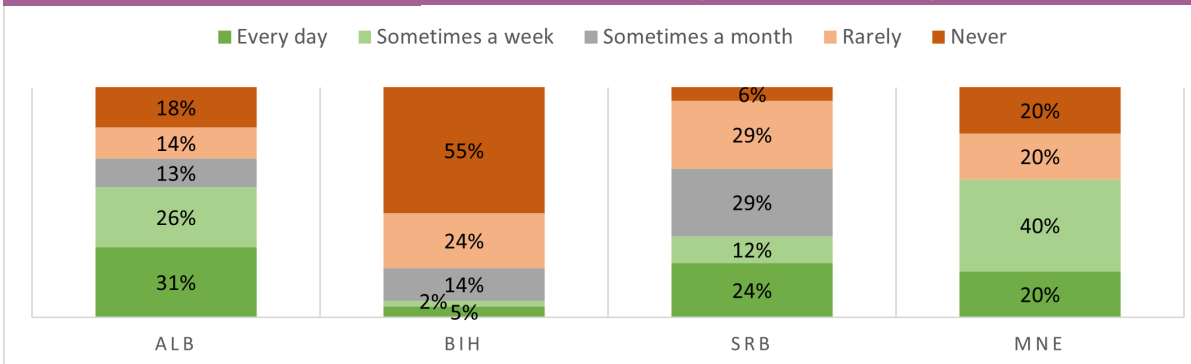
5.1 Food safety and quality standards

One mechanism to control milk safety and quality standards is through laboratory analyses and tests. In Albania, only 5.5 percent of the (200) surveyed farmers claim to have used milk testing services during 2020, while in Bosnia and Herzegovina, of those that are engaged in selling of milk (N=42), 16.7 percent used milk testing services in 2020. Data for Serbia and Montenegro are for 2021 – 19.9 percent of Serbian farmers and 42.1 percent of Montenegrin farmers did milk testing in 2021.

Respondents were asked about the frequency of analysis and testing for milk safety and quality conducted by the buyer of their milk. The distribution of answers is outlined in Figure 80. First, it needs to be noted that only farmers who sell milk regularly answered this question, and those are very few in Montenegro, Serbia, and Bosnia and Herzegovina. It appears that milk tests in Bosnia and Herzegovina are never or rarely done in more than 75 percent of cases.

Another element that affects milk safety and quality is whether farmers mix morning and afternoon milk, especially when the milk is not stored appropriately. More than 40 percent of Serbian and Montenegrin small ruminant farmers mix morning and afternoon milk, while less than 25 percent of farmers in Bosnia and Herzegovina and Albania do so. When asked about the share of milk production milked in the afternoon, this was 47 percent of the production in Albania, 31 percent in Bosnia and Herzegovina, 48.2 percent in Serbia, and 38 percent in Montenegro.

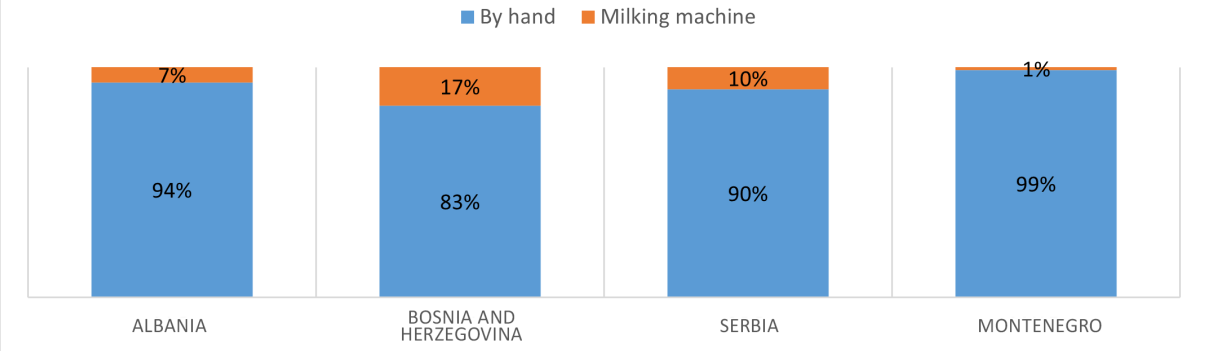
Figure 80. Number of times buyer tests milk for safety



Note: Albania N=200; Bosnia and Herzegovina N=42; Serbia N=16; Montenegro N=5.

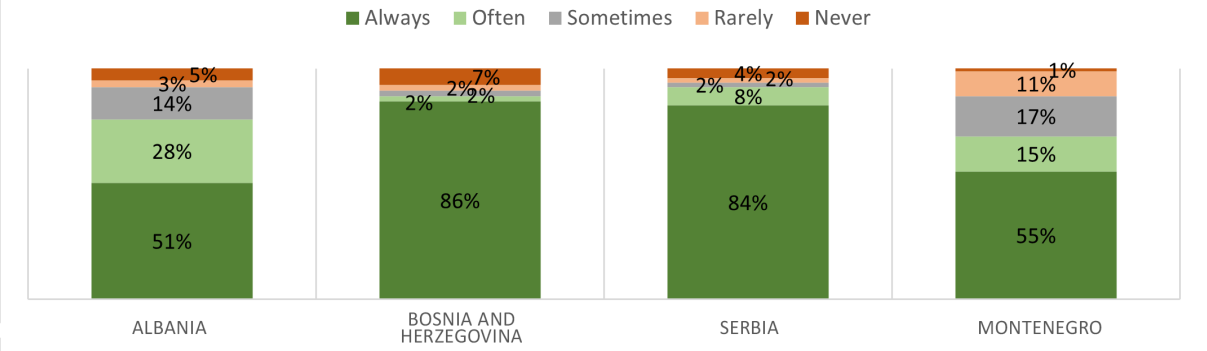
As Figure 81 shows, in every country, the majority of small ruminants are milked by hand. This approach, under limited hygienic conditions, compromises milk safety standards. Furthermore, this takes much longer than milking with a milking machine. Some farmers said that a lack of access to electricity makes the use of milking machines unfeasible. Others said that they could not afford to buy one.

Figure 81. Methods of milking



Having potable water in the milking area is an important element for ensuring minimum hygienic conditions. As Figure 82 outlines, more than 75 percent of small ruminant farmers claim to have – always or often – potable water in their milking area. However, the situation appears problematic in Albania and Montenegro, where about 50 percent always have potable water in the milking area.

Figure 82. Presence of potable water in milking area



5.2 General farm management

Some general farm management practices, such as having an animal registry, identification and registration of animals, keeping records on costs and income, and use of advisory services, are discussed in this section. When small ruminant farmers implement these practices, it is highly likely that farm performance is higher.

Figure 83 outlines the distribution of answers in all countries with regard to possession of an animal farm registry (left-hand side of the figure) and identification and registration of small ruminants (right-hand side). A large share (more than 90 percent) of small ruminant farmers in Serbia and Montenegro keep an animal register. Only 31.4 percent in Bosnia and Herzegovina have one, while in Albania, 53.5 percent keep an animal registry.

In regard to the identification and registration of small ruminants, Serbian and Montenegrin farmers appear to be more rigorous, with all of them doing this; whereas in Albania and Bosnia and Herzegovina only around 75 percent of them do so.

Figure 83. Animal farm registry, identification and registration

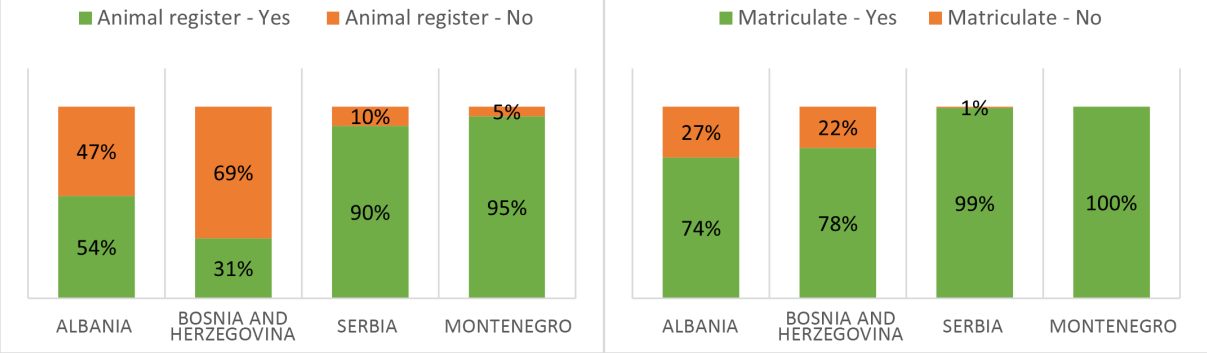
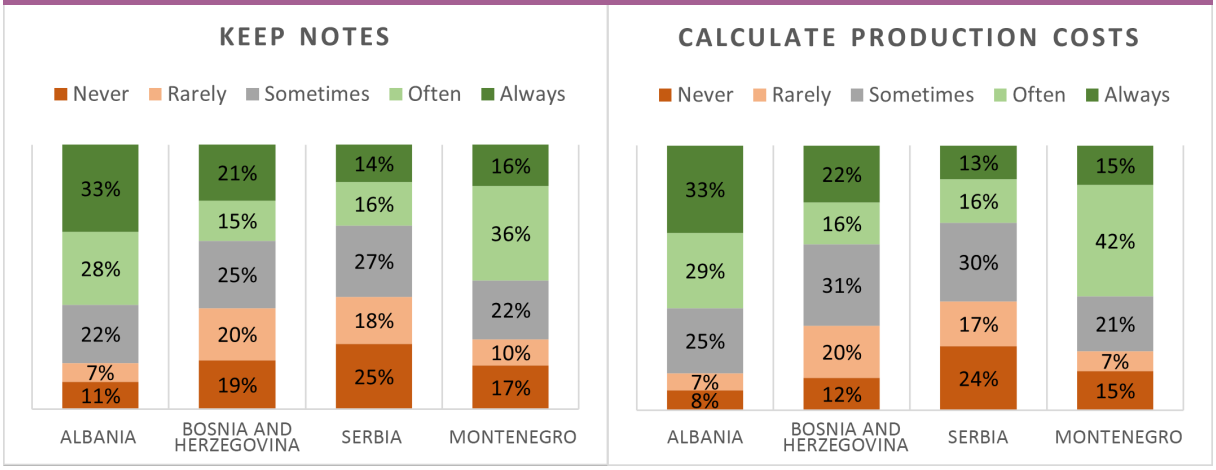


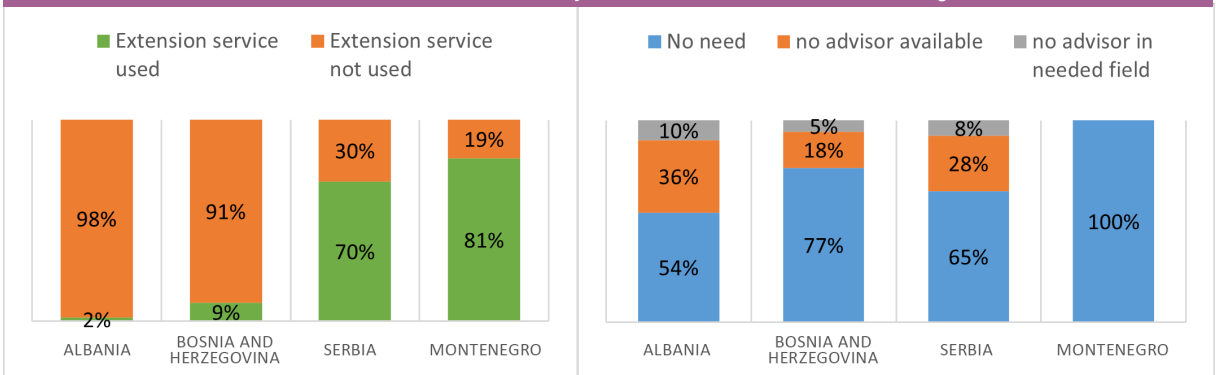
Figure 84 shows whether farmers keep records and calculate production costs. By not implementing such management practices, a business is like "a ship without a compass". Fewer farmers in Bosnia and Herzegovina and Serbia keep records (often or always) of costs and revenues than in the other countries. A similar pattern is seen for the calculation of production costs.

Figure 84. Keeping record of expenses and revenues, and calculation of costs



Finally, Figure 85 points out the use of advisory services by farm households during the past five years (left-hand side of the figure). The situation is particularly concerning for farmers in Albania and Bosnia and Herzegovina, where the vast majority have not used any advisory services. Farmers there say they do not need any advice (54 percent in Albania and 77 percent in Bosnia and Herzegovina), or that there is no advisory service available (36 percent in Albania and 18 percent in Bosnia and Herzegovina). From interviews, it emerges that the "no need" reason for not using the advisory services is more related to the farmers' limited trust in the capabilities of the advisors in providing appropriate advice than in the real need of farmers for advice. The situation is different in Serbia and Montenegro, where more than 70 percent of small ruminant farmers have used advisory services.

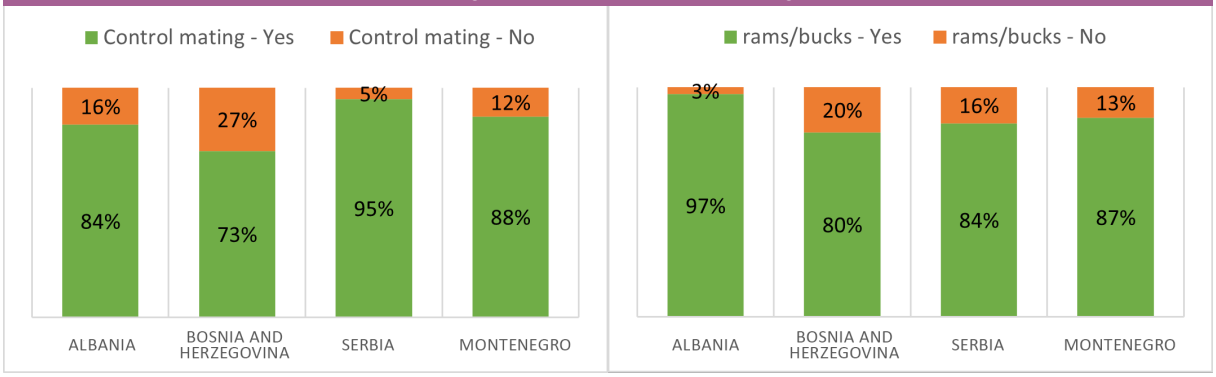
Figure 85. Use of advisory services and reasons for not using them



5.3 Breed management practices

Another management practice that can boost small ruminant farm performance is breed management. Figure 86 provides information on mating control in each country. On the left-hand side of the figure, the share of farmers doing mating control is shown in green. In all countries, it appears that the majority of small ruminant farmers do mating control, with the largest share of farmers who do not perform mating control observed in Bosnia and Herzegovina. Moreover, those that do mating control keep rams or bucks in their herds (right-hand side of the figure).

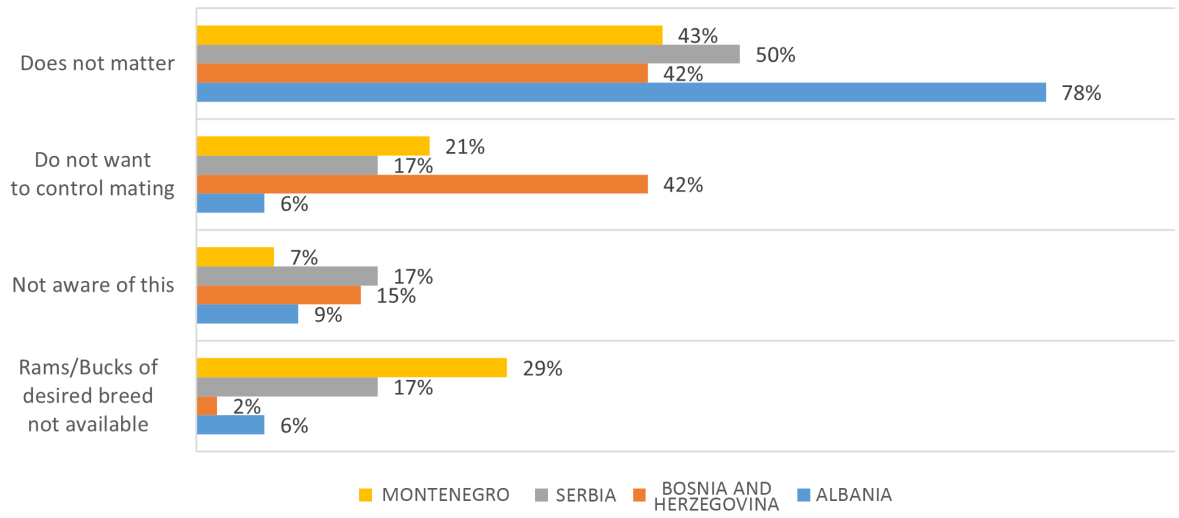
Figure 86. Small ruminant mating control



Note: Albania N=200; Bosnia and Herzegovina N=204; Serbia N=141; Montenegro N=121.

When small ruminant farmers who do not perform mating control are asked why, the majority say either that it does not matter, or that they do not want to (see Figure 87). These reasons reflect a lack of knowledge on the issue, which requires training and education to change such mindsets.

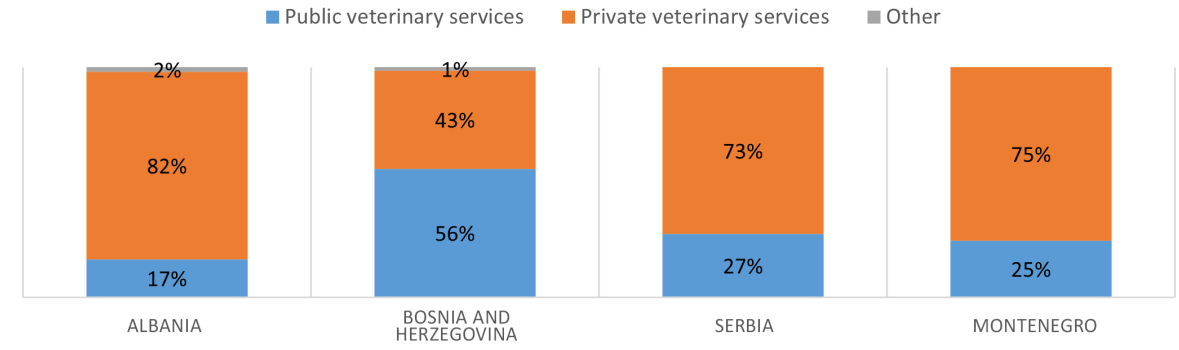
Figure 87. Reasons for not performing mating control



5.4 Animal health management practices

When it comes to animal health, apart from Bosnia and Herzegovina, more than 70 percent of farmers in Albania, Serbia, and Montenegro request medical help from private veterinarians. In Bosnia and Herzegovina, the use rate of private veterinarians is 42.6 percent. Private veterinarians are much more expensive, and the availability of public ones is limited. The average distance to the nearest public veterinary service is around 15 km for Albania, Bosnia and Herzegovina, and Serbia, and 17.6 km for Montenegro.

Figure 88. Agents used by farmers for medical services for small ruminants



Regarding vaccination of small ruminants, the use of private veterinary services is the most used option for Albanian, Serbian and Montenegrin farmers. Of those that vaccinate their small ruminants, farmers usually know the diseases for which a vaccine is needed. It should be noted that very few farmers claim not to vaccinate.

Figure 89. Agents that vaccinate small ruminants

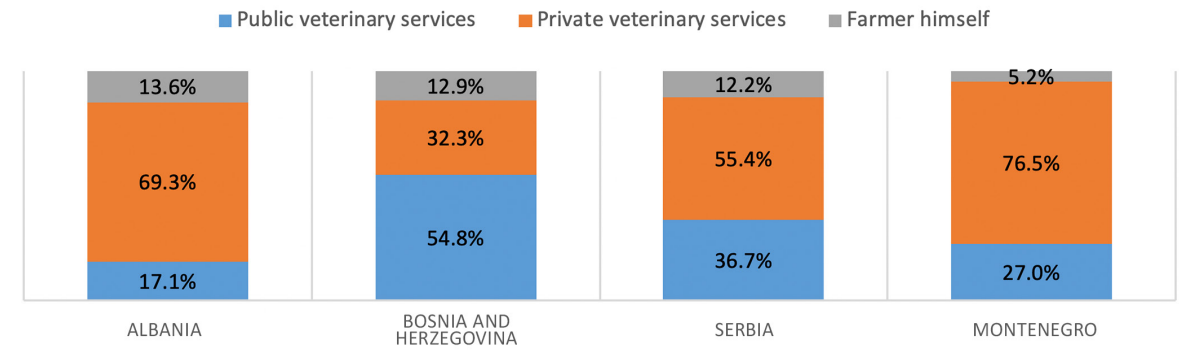


Figure 90 shows the number of small ruminants lost to disease during 2020 for Albania and Bosnia and Herzegovina, and 2021 for Serbia and Montenegro. A large number of farmers in Albania, Bosnia and Herzegovina, and Serbia claim not to have lost any animals due to disease. In Montenegro, almost one third of small ruminant farmers have not lost any animals to disease.

Figure 90. Number of small ruminants lost to disease, 2020

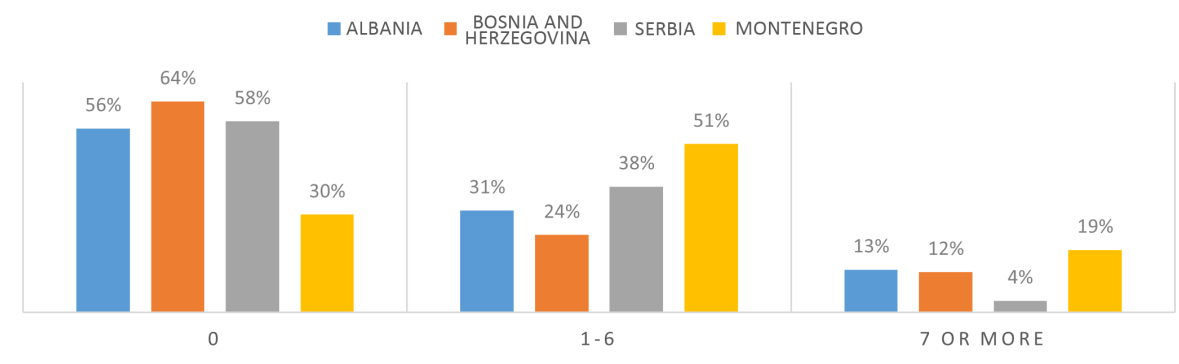
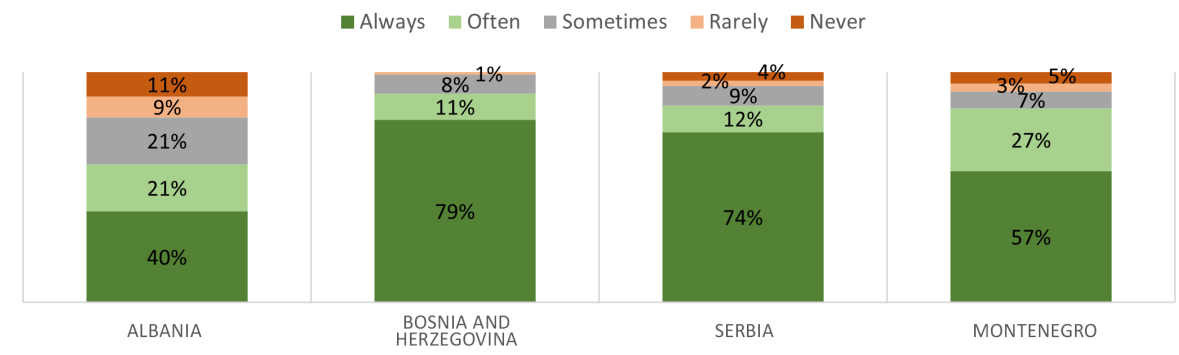


Figure 91 outlines whether farmers use protective clothing (such as gloves and boots) while handling dead animals and aborted foetuses. Albania and Montenegro have the lowest share of farmers claiming to always use protective clothing, while farmers in Serbia and Bosnia and Herzegovina appear to be more careful.

Figure 91. Use of protective clothing while handling dead animals



6. SWOT analysis and small ruminant sector support policies

This is a SWOT (strengths, weaknesses, opportunities, threats) analysis for the small ruminant sector in Western Balkan countries. It also attempts to provide potential intervention strategies that can lead to future small ruminant sector development there.

6.1 SWOT analysis

The SWOT analysis in Figure 92 is developed based on the discussion and analysis of the previous sections. Despite the differences that exist between Western Balkan countries included in the study, the small ruminant sector in these countries also have considerable similarities. Thus, the SWOT is presented for all countries in one figure. When there is an aspect specific to a particular country, the name of the country is shown in brackets.

Box 4. SWOT analysis for the small ruminant sector in Western Balkan countries

STRENGTHS

General

- Long tradition in small ruminant breeding.
- Pastures in Western Balkan countries good for grazing.
- Larger farms own tractors and produce their own feeds (in Serbia, Montenegro, and Bosnia and Herzegovina).
- Small ruminant farmers' willingness to cooperate (Serbia, Montenegro).

Small ruminant meat value chain

- Establishing of modern abattoirs (Albania, Serbia, Montenegro).
- Modern facilities and technology for frozen meat processing (Albania, Serbia, Montenegro).
- Existing export market channel for small ruminants (Serbia).

Small ruminant milk value chain

- Investment in facilities and up to date technology by a significant number of milk processing factories (Albania).

WEAKNESSES

General

- Lack of labour availability – limited interest in small ruminant sector by younger generation.
- Milk and meat prices offered to farmers are very low – making small ruminant business unprofitable.
- Limited financial resources of small ruminant farmers to invest in the business.
- Insufficient feed resources, especially during winter.

Box 4 *(Cont.)*. SWOT analysis for the small ruminant sector in Western Balkan countries

- Insufficient feed resources, especially during winter.
- Poor maintenance of pastures and meadows.
- Limited access to pastures and meadows through long term contracts.
- High feed cost – since the start of the Ukraine conflict, feed costs have increased considerably.
- Small arable land available makes production of feeds expensive, while buying feeds is considerably more expensive (Albania).
- Limited availability of public advisory and veterinary services (Albania, Bosnia and Herzegovina).
- Lack of trust in public advisory services (Albania, Bosnia and Herzegovina).
- Public advisory services' knowledge is not updated with current best practices (Albania, Bosnia and Herzegovina).
- Inappropriate animal housing conditions (Albania, Bosnia and Herzegovina).
- Poor breeds resulting in low milk and meat yields (Albania).
- Insufficient technical equipment, outdated machines, and a small number of attachments for tractors.

Small ruminant meat value chain

- Limited investment in processing of animal by products.
- No waste disposal system (farms, abattoirs, and meat processing, milk processing plants).
- Limited coordination (no contracts) between farmers and meat buyers – high uncertainty.
- High transaction costs for selling small ruminants (Bosnia and Herzegovina, Serbia).
- High informality for selling small ruminant products (particularly in Bosnia and Herzegovina).
- Outdated facilities and equipment in slaughtering points (Albania).
- Abattoirs owned by municipalities face high costs and no income (Albania).

Small ruminant milk value chain

- Milk value chain is underdeveloped – coordination between buyer and farmer is non existent – most farmers process milk on farms (Serbia, Montenegro, Bosnia and Herzegovina).
- Outdated milk processing technology and (often) incomplete set of equipment for smaller dairy processing plants – the situation is even worse for in farm processing.
- High transportation cost for milk due to low quantities.
- Cheese quality varies considerably from processor to processor and from region to region.
- Lack of contracts between farmers and buyers – no price incentive based on quality standards.
- Poor milk safety and quality standards.
- Most milking is done by hand – no milking machines available.
- Poor infrastructure for milk collection.

Box 4 *(Cont.)*. SWOT analysis for the small ruminant sector in Western Balkan countries

OPPORTUNITIES

General

- Pasture, good for grazing – sufficient rainfall (but changing with climate change).
- Favourable government and IPARD (EU financial instrument to support agriculture) policies.
- Access to high animal genetics.
- Potential to increase the number of animals.
- Donor support for investments and technical assistance to improve standards.

Small ruminant meat value chain

- Export opportunity for lamb meat.

Small ruminant milk value chain

- Stable domestic demand for dairy/cheese.

THREATS

General

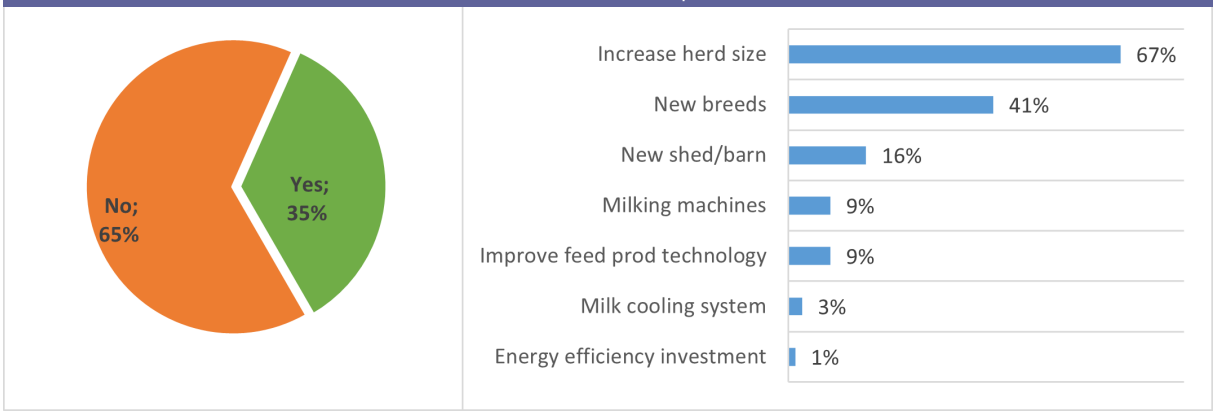
- Laws and regulations are not enforced.
- Climate change.
- Emigration (especially in Albania).
- No significant exports to date (aside from Serbia) – limited supply and safety problems.

6.2 Farmers' future investment plans

Prior to designing of an intervention strategy for the further development of the small ruminant sector in Western Balkan countries by capitalizing on strengths and opportunities and reducing the negative effects of the weaknesses and threats outlined here, it is imperative to investigate future investment plans. Figures 93 to 96 present small ruminant farmers' willingness to invest in their business, and the type of investment planned.

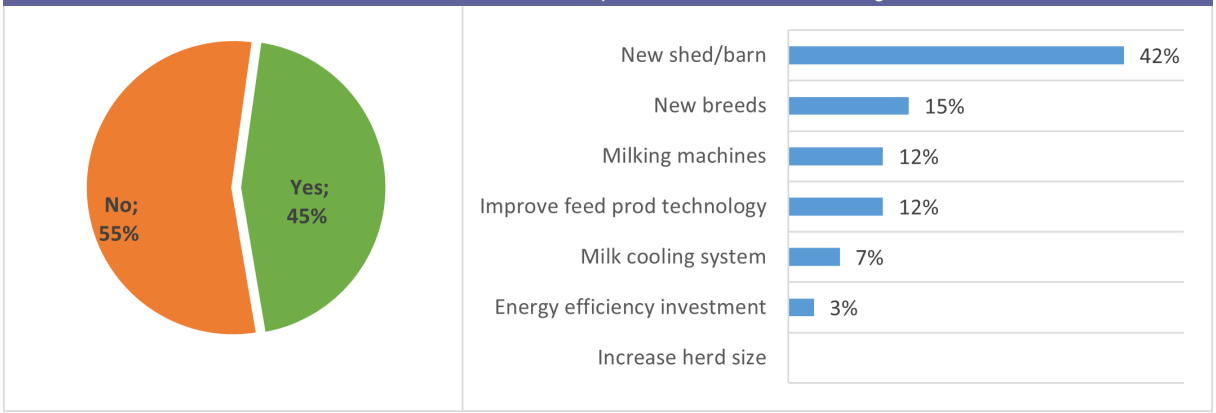
Starting with Albanian farmers, Figure 93 shows that about 35 percent of the respondents plan to invest in the future, of which 67.1 percent plan to expand their herd size and 41.4 percent plan to introduce new breeds (most likely more specialized breeds). The third most mentioned investment plan (15.7 percent) is to build a new shed or barn.

Figure 93. Future investment plans of Albanian farmers



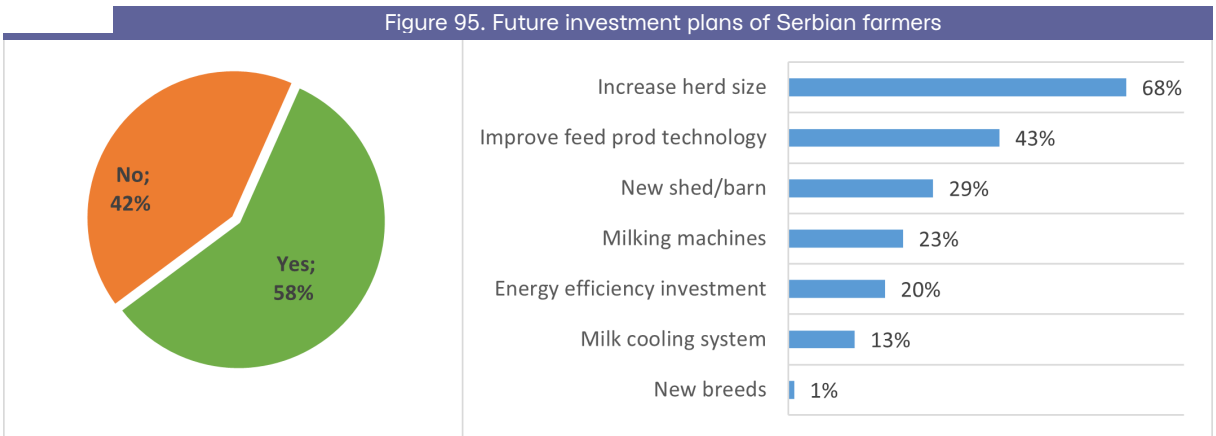
Small ruminant farmers in Bosnia and Herzegovina appear to be more willing than Albanian farmers to invest in the future, with 45.1 percent of the respondents having future investment plans (Figure 94). The most mentioned investment plan is building a new shed or barn (42 percent). The second most mentioned item (15 percent of the cases) is improvement of breeds.

Figure 94. Future investment plans of Bosnia and Herzegovina farmers



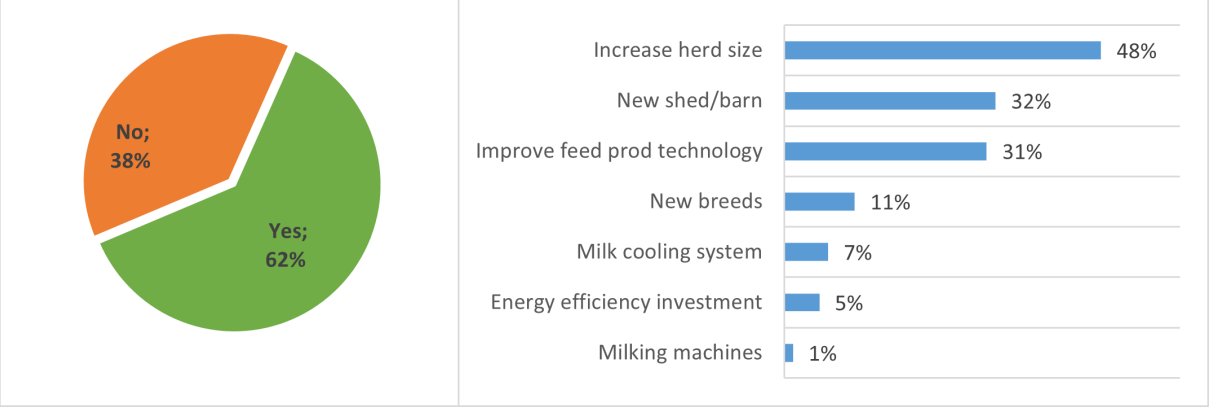
Serbian farmers show a higher willingness to invest, with more than 55 percent saying they intend to do so (Figure 95). The two most important types of investment mentioned are increased herd size and improved feed production technology, which is especially relevant since the conflict in Ukraine pushed up animal feeding costs considerably. The third most mentioned investment type is building a new shed or barn.

Figure 95. Future investment plans of Serbian farmers



Montenegrin small ruminant farmers appear to have the highest willingness to invest, with 62 percent of them confirming to have such plans (Figure 96). Similar to Albania and Serbia, the most important investment type is increased herd size. The second and third most mentioned investment types are building a new shed or barn, and improving feed production technology.

Figure 96. Future investment plans of Montenegrin farmers



From these descriptive statistics, it appears that Albanian farmers have the lowest willingness to invest, and Montenegrin and Serbian farmers the highest. In Albania, Serbia, and Montenegro, the apparent willingness to invest to expand herd size is encouraging given the considerable reduction in the small ruminant population in Western Balkan countries (particularly in Albania). However, these future investments need to be backed up by financial support, which is ranked among the top problems hampering sector development.

6.3 Support policies most needed by small ruminant farmers

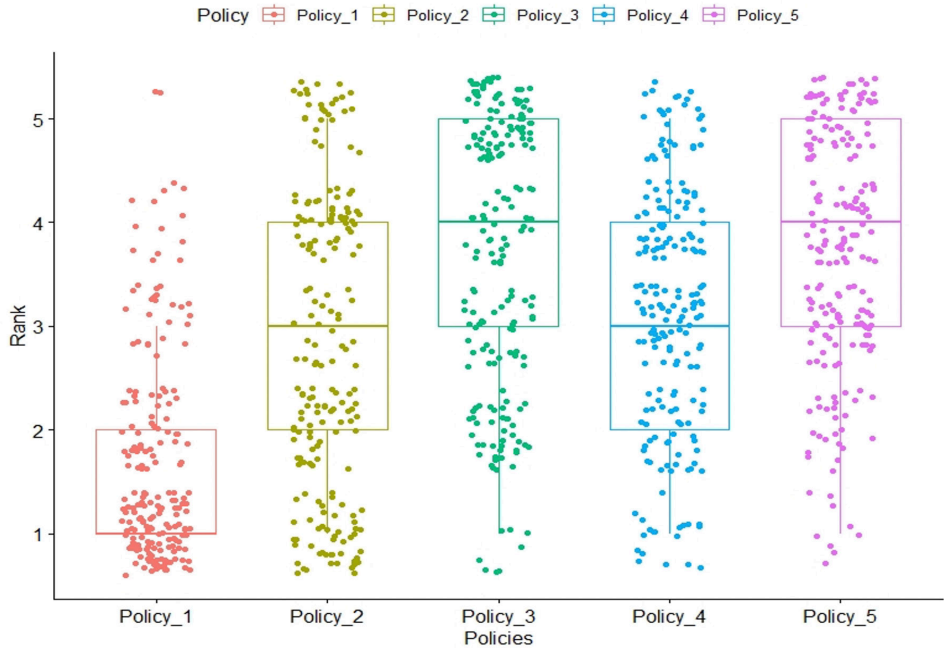
To develop a bottom–up intervention strategy, another element that needs to be analysed is the type of policy support that the target group (small ruminant farmers) needs the most, even though the type of policy may not be the most feasible one. The following figures show the rank distributions for each country for the most needed policy support by small ruminant farmers. The respondents in each country had to rank the first (most important) to the last (least important) five support policies, including:

1. Direct payments per head (for milking small ruminants) – Policy 1.
2. Direct payment per milk delivered to the processors – Policy 2.
3. Grants for investments (but partially self-financed) – Policy 3.
4. Payments per ha of animal feed area – Policy 4.
5. Vouchers for veterinary service and per input purchase (feed drugs for animals) – Policy 5.

Figure 97 presents the ranking distribution of the support policies; the rectangle gives information on the mean values and quintiles. Though from the figure it is clear that direct payment per head (for milking small ruminants) is ranked number one most of the time, non-parametric statistical tests are employed to analyse whether the difference in ranking between policies is statistically significant.[4] From the output of the tests, it emerges that the most requested policy support in Albania is direct payment per head (for milking small ruminants), followed by direct payment per milk delivered to the processors in second place, and payments per ha of animal feed area in third place. The least requested policies are policies 3 and 5.

[4]The Kruskal-Wallis test is employed to look for differences between groups, but does not show which pairs of groups are different. To identify specific difference, Pairwise Wilcox tests are employed for comparisons between group levels, with corrections for multiple testing.

Figure 97. Support policies as ranked by Albanian farmers



The results show that the most requested policy support in Bosnia and Herzegovina is grant on investments (but partially self-financed) (Figure 98), followed by direct payments per head (for milking small ruminants) and payments per ha of animal feed area. The least requested policies are policies 5 and 2.

Figure 98. Support policies as ranked by Bosnia and Herzegovina farmers

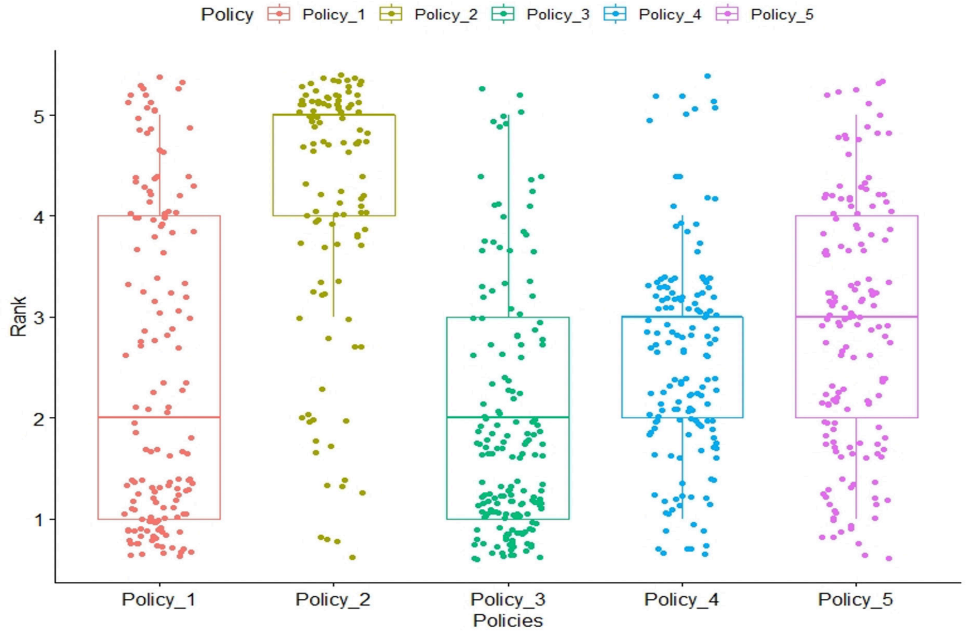
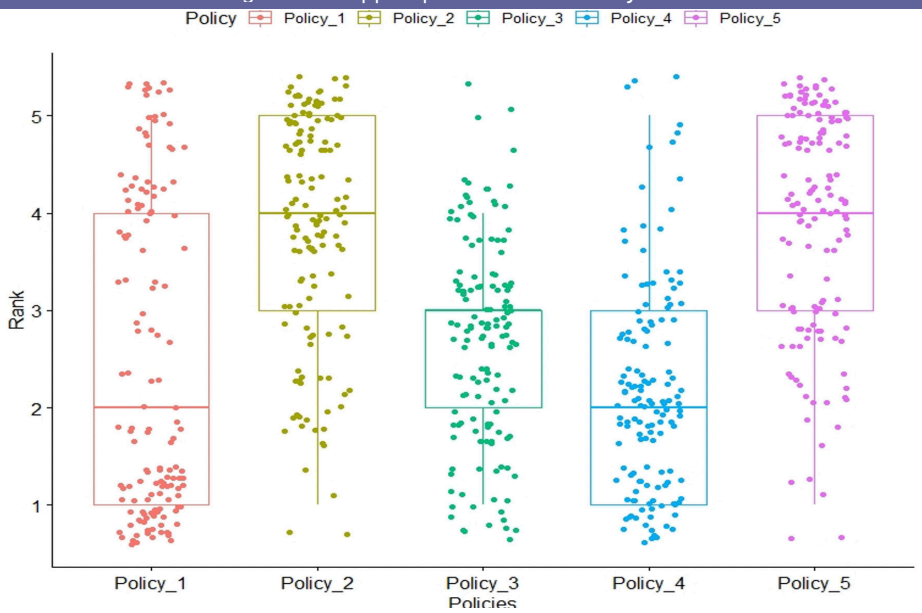


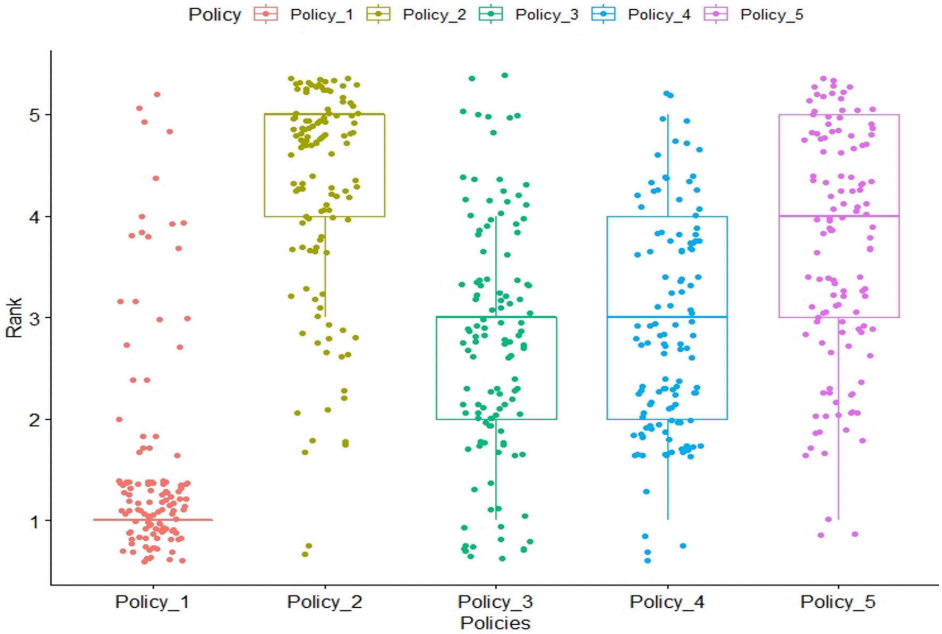
Figure 99 shows the top policies ranked by Serbian farmers – policies 4, 1 and 3. The statistical tests confirm the two highest ranked policies (no significant difference between the two) to be policy 4 (payments per ha of animal feed area) and policy 1 (direct payments per head). Then comes grant on investments (but partially self-financed), and the least requested policies are policies 2 and 5.

Figure 99. Support policies as ranked by Serbian farmers



For Montenegro farmers, the highest ranked policy support needed is direct payments per head (for milking small ruminants). In second place, with a similar test score, are grant on investments (but partially self-financed) and payments per ha of animal feed area. Then comes policy 5, and the least requested is policy 2.

Figure 100. Support policies as ranked by Montenegro farmers



While there are some differences in terms of the overall ranking of policies in Western Balkan countries, direct support measures appear to be the type of policy support most needed by small ruminant farmers. In most cases, this is needed in the form of direct payments per head (for milking small ruminants). With support schemes involving a third party (that is, payment per litre delivered to the milk processor or payment for animal feed area), not all the support will be taken by the farmer because the third party uses its influence to extract part of the value (for example, by reducing the milk price because the farmer is being compensated by the government). In addition, direct payments per head appear to be the least bureaucratic procedure and the easiest to apply for.

6.4 National support schemes for small ruminants in the Western Balkans

The focus here is to present national support measures currently provided directly to the small ruminant sector in the form of direct payments. Table 19 outlines the national schemes for direct payments based on output (that is, milk). All countries apart from Albania provide milk payments for small ruminants, ranging from EUR 0.06/L to EUR 0.2/L. Albanian farmers used to benefit by about EUR 0.085/L of milk delivered to processors, but since 2019 this support measure has been removed.

Table 19. Direct payment schemes supporting the small ruminant sector (based on output)

Payments based on output (EUR/litre)	North Macedonia	Serbia	Montenegro	Bosnia and Herzegovina	Albania
Dairy premium – granted for cow, sheep and goat milk delivered to dairies (from 2018 different premium for cow milk, than sheep and goat milk).	0.06–0.07; 0.07–0.09				
Dairy premium – granted for cow, sheep or goat milk delivered to dairies; paid for min 3 000 L/quarter of cow milk (in 2010: 3 500 L), (1 500 L/quarter in LFA) and max 3 million L/quarter (in 2012 no limits); in 2012 different amounts for first and second half of the year.		0.06			
Dairy premium – granted to farmers delivering min 400 L of cow, sheep or goat milk per month to dairies.			0.06		
Addition for large milk producers – granted to farmers producing min 5 000 L/month; paid for delivered quantities above this minimum.			0.01		
Milk quality addition – goat and sheep milk with less than 1.5 million microorganisms per ml			0.02		
Support is given to producers who process raw milk on their farm.			0.06		

Table 19 *(Cont.)*. Direct payment schemes supporting the small ruminant sector (based on output)

Payments based on output (EUR/litre)	North Macedonia	Serbia	Montenegro	Bosnia and Herzegovina	Albania
Dairy premium (Federation of Bosnia and Herzegovina) – granted for cow, sheep or goat milk delivered to dairies; paid for min three milk cows and production of min 500 L/month and max. 550 000 L/month and max (sheep and goat milk min 300 L and max 300 000 L per year); min fat content 3.2 percent (goat milk 5 percent).				0.15–0.13	
Dairy premium (small ruminant) – granted for cow, sheep or goat milk delivered to dairies; different amounts for standard quality (up to 400 000 somatic cells and up to 100 000 mo/ml of cow's milk; up to 1 million mo/ml of sheep and goat milk) and out of standard quality (mo stands for milk organisms).					
Max EUR 178 952/beneficiary.				0.13–0.20	
Dairy premium.					-

Source: **Agriculture and agricultural policy database.** 2022. Agricultural Policy Plus. http://app.seerural.org/agricultural-statistics/

In addition to direct payments based on output, small ruminant farmers in the Western Balkans also benefit from direct payments based on livestock numbers (see Table 20). These payments are provided for breeding sheep and goats and range from EUR 8 to EUR 60 per head. Some countries also provide direct payments for slaughtered lambs and kids through the abattoirs.

Table 20. Direct payment schemes supporting the small ruminant sector (based on livestock number)

Payments based on livestock number (EUR/head)	North Macedonia	Serbia	Montenegro	Bosnia and Herzegovina	Albania
Granted for sheep and goat rearing, all categories (min 30 sheep and 10 goats) 2010–2012: different amounts for sheep and goats; 2018: additional 10 percent for herds 100–500 sheep or 50–150 goats).	19; 21				
Addition to payments for sheep and goats for kept female lambs and kids.	11				
Additional payment – granted for lambs delivered to abattoirs.	6.5				
Payment for shepherd dogs – additional payments to sheep producers (min 50 sheep, and max 7 dogs).	32				

Table 20 *(Cont.)*. Direct payment schemes supporting the small ruminant sector (based on livestock number)

Payments based on livestock number (EUR/head)	North Macedonia	Serbia	Montenegro	Bosnia and Herzegovina	Albania
Payments for quality breeding sheep and goats – granted for animals with registered pedigree; paid for min 30 sheep/10 goats (2010; 2018), 30 sheep/goats (2011), 10 sheep/5 goats (2015) and max 150 sheep/goats (2010–2011).		59.4			
Payment for slaughtered lambs and kids – granted for lambs (from 2013) and young goats (from 2015) delivered to abattoirs or intended for export; min 10 lambs (5 goats) in fattening; average weight below 50 kg/lamb (30 kg/goat).		17			
Payments for sheep and goats – granted to farmers rearing more than 40 sheep (30 goats); paid for the number of animals above this minimum.			8		
Payment for breeding sheep and goats (Federation of Bosnia and Herzegovina) – paid for min 50 ewes (25 she goats) and max 750 (1 300 from 2019).				25;13	
Payment for breeding sheep and goats (small ruminant) – min 100 ewes (50 she goats); max EUR 12 782/beneficiary. In 2019 basic herd of min 125 heads, or min 65 ewes or min 30 she goats, in 2021 100 ewes and 20 goats, max 10 000 EUR/ beneficiary.				10; 20	
Payment for breeding sheep and goats (Brčko District) – paid for min 20 ewes (ten she goats).				41; 36	
Payment for slaughtered lambs (Brčko District) – Granted for lambs delivered to registered abattoir; min 20 heads.				26	
Payment for sheep and goats (min 100 heads of milking animals, based on first come first served principle).					10

Source: **Agriculture and agricultural policy database.** 2022. Agricultural Policy Plus. http://app.seerural.org/agricultural-statistics/

Finally, small ruminant farmers could also benefit from direct support measures based on the area cultivated with field crops. Table 21 highlights the main direct payment schemes in the countries under study. As can be seen from the table, Western Balkan countries provide different payments per ha of field crops, in some cases the support is direct, in others it is indirect (like the fuel support scheme in Albania). In general, the minimum eligibility criteria to benefit from direct payments for cereals based on area is 1 ha.

Table 21. Direct payment schemes supporting the small ruminant sector (based on area)

Payments based on area (EUR/ha)	North Macedonia	Serbia	Montenegro	Bosnia and Herzegovina	Albania
Payment for field crops excluding tobacco – decreasing payments depending on area under cultivation (2010: full amount for 0.3–20 ha; 2013: full amount for 0.3–10 ha; 2019: 20 percent higher payments for 5–50 ha).	194–311				
Additional payment for cereals sown with certified seeds – addition to payments for field crops; (modulation scheme applied; 2010: full amount for 0.3–20 ha; 2013: full amount for 0.3–10 ha).	39				
Additional payments for cereals – granted for cereals and sunflower, for area 10–50 ha (2016), and 5–50 ha (2018–2020), with min required yields.	93				
Payment for field and permanent crops – granted for area under cereals, potatoes, vegetables, feed crops, industrial plants, leaf tobacco, orchards, and vineyards		59.4			
Payments for field crops except tobacco – Min eligible area: 1 ha for cereals, 0.5 ha for other crops.					
Arable crops produced for mercantile purposes (cereals, potatoes, buckwheat, and other crops).			200		
Feed crops in the year of sowing.			200		
Feed crops in the following four years.			100		
Cereal seeds.			300		
Seed potato (elite category).			700		
Users under the age of 40 are entitled to an additional payment.			10		
Payment for wheat (Federation of Bosnia and Herzegovina) – Paid for min 1 ha and max 200 ha; min sold quantity 3.5 t/ha.				302	
Payment for wheat (small ruminant) – granted for autumn sowing wheat; min eligible area 1.5 ha; min yield 4 t/ha.				153	
Payment for wheat (Brčko District) – min eligible area 1.5 ha.				153	
Payment for maize (Federation of Bosnia and Herzegovina) – granted for green maize for silage; paid for min 2 ha and max 400 ha.				143; 112	

Source: **Agriculture and agricultural policy database.** 2022. Agricultural Policy Plus. http://app.seerural.org/agricultural-statistics/

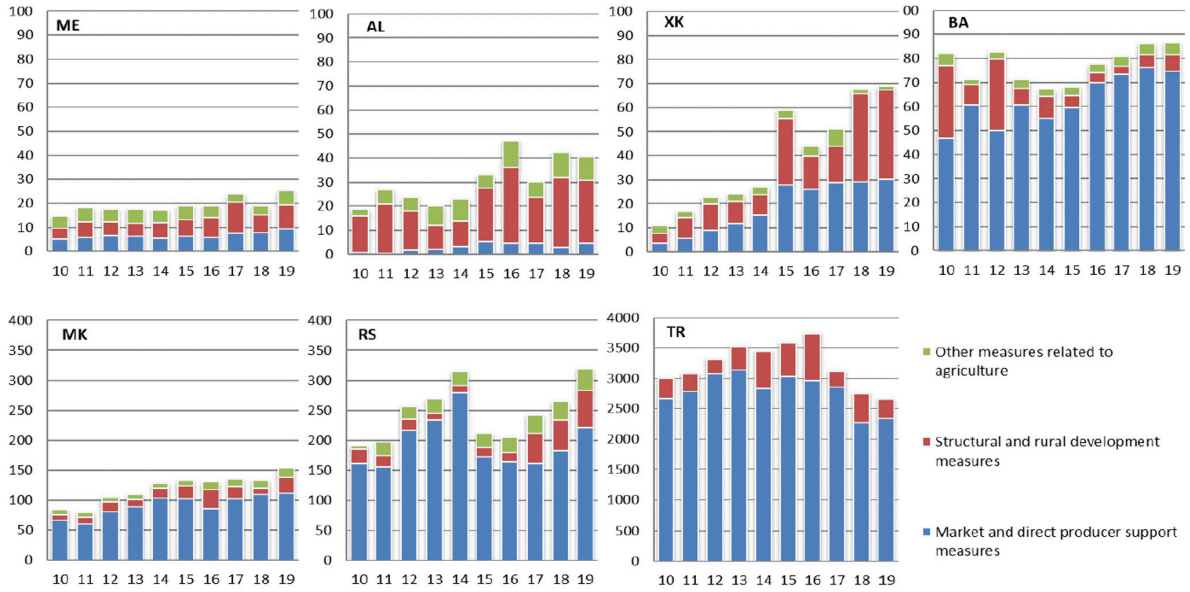
Table 21 *(Cont.)*. Direct payment schemes supporting the small ruminant sector (based on area)

Payments based on area (EUR/ha)	North Macedonia	Serbia	Montenegro	Bosnia and Herzegovina	Albania
Payment for maize (Brčko District) – granted for green maize for silage; min eligible area 1.5 ha.				153	
Payment for barley (Federation of Bosnia and Herzegovina) – paid for min 1 ha and max 200 ha; min sold quantity 3 t/ha.				169; 133	
Payment for barley (Brčko District) – min eligible area 1.5 ha.				153	
Payment for feed crops (Federation of Bosnia and Herzegovina) – paid for min 2 ha and max 400 ha (2019).				143; 112	
Payments for cereal and oil plant seeds (Federation of Bosnia and Herzegovina) – min sold (or own used) quantities: 3 t/ha (wheat), 2.5 t/ha (barley), 2 t/ha (soya, sunflower); paid for max 300 ha (wheat), or 100 ha (maize, soya, sunflower); in some years different payment for wheat and barley seed and for maize, soya and sunflower seeds.				460; 511; 562	
Payment per ha for wheat – subsidy scheme budget ALL 500 million. Distribution: first come first serve. Paid for min 1 ha.					254
Fuel subsidy for feed crops – tax exemption. The equivalent of tax exemption, converted in free of charge fuel per ha (depending on the product it ranges from 50 L to 100 L of fuel per ha).					80–160

Source: **Agriculture and agricultural policy database.** 2022. Agricultural Policy Plus. http://app.seerural.org/agricultural-statistics/

These tables provide clear information on the type of direct payment support that small ruminant farmers might benefit from. However, it is difficult to assess the amount of money that goes on direct support to farmers only based on these tables. Assessing the amount of money that goes directly to farmers is critical because farmers that get more support from the government are in a more advantageous position and have a higher likelihood of success in competing against their counterparts in other countries. Thus, Figure 101 shows the development of the total annual support allocated to agriculture in the Western Balkans and Turkiye during the 2010–2019 period. The support over time shows mixed patterns across the countries and territories. In general, support for agriculture has increased over the past decade in all countries apart from Turkiye, which shows a declining trend over the final three years of analysed data.

Figure 101. Total budgetary support for agriculture, 2010–2019 (million EUR)

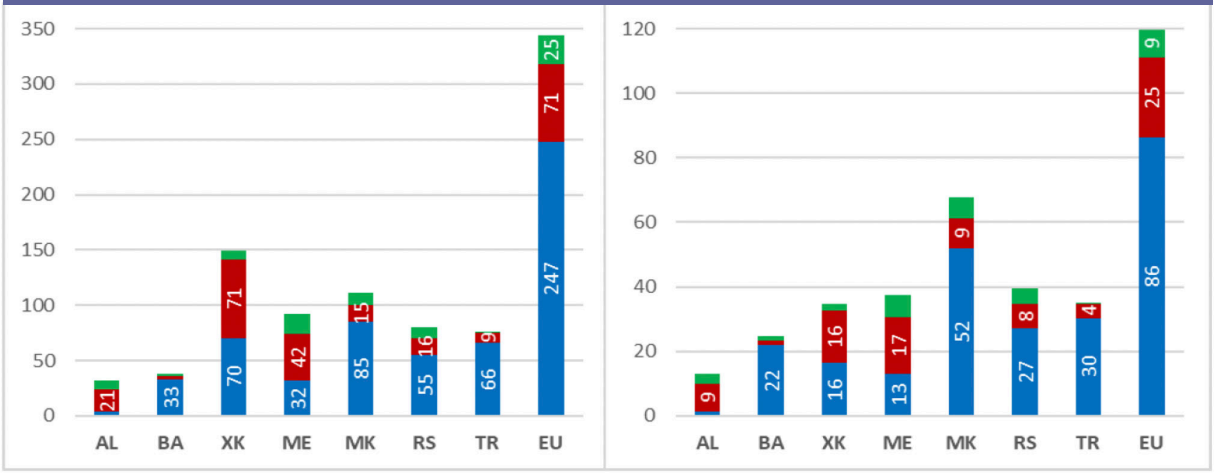


Source: **Martinovska, Stojcheska, A., Kotevska, A., Janeska Stamenkovska, I., Dimitrievski, D., Zhllima, E., Vasko, Z., Bajramovic, S. *et al.*** 2021. Recent agricultural policy developments in the context of the EU approximation process in the pre-accession countries. EUR 30687 EN, Publications Office of the European Union, Luxembourg, 2021, ISBN 978-92-76-37270-7. doi:10.2760/041338, JRC124502.

In absolute values for 2017–2019, Montenegro and Albania have the lowest budget, namely less than EUR 30 million and EUR 40 million per annum, respectively. They are followed by Kosovo and Bosnia and Herzegovina, with about EUR 70 million and EUR 80 million, respectively, North Macedonia with close to EUR 150 million, Serbia with over EUR 300 million, and Turkiye with about EUR 2 500 million to EUR 3 000 million per annum (Figure 101).

The data presented in Figure 101 are not directly comparable due to the large differences between countries in terms of their agricultural area and population. Therefore, Figure 102 presents a more comparable view of total agricultural support, namely support per hectare (ha) of farmland and per inhabitant for 2017–2019 (Martinovska, Stojcheska et al., 2021).

Figure 102. Total budgetary support (EUR/ha, left) and per capita (EUR/inhabitant), 2017–2019



Note: blue indicates market and direct producer support measures, red indicates structural and rural development measures, and green indicates other measures related to agriculture.

Figure 102 also provides comparative figures for the European Union. The differences in the support per hectare between the countries are rather significant, ranging from EUR 32/ha and EUR 39/ha in Albania and Bosnia and Herzegovina, respectively, to EUR 150/ha in Kosovo. The total support per hectare in the Western Balkans and Turkiye is less than half of the European Union average. However, some of Western Balkan countries and Türkiye are more comparable to certain eastern European Union countries, for example EUR 137/ha in Latvia, EUR 175/ha in Lithuania, EUR 214/ha in Bulgaria, and EUR 218/ha in Romania (European Commission, 2019). Payments per inhabitant vary from EUR 13 in Albania to EUR 68 North Macedonia. Compared with the European Union, the support per inhabitant in Western Balkan countries and territories and Turkiye is significantly lower.

It is clear from the Figure 102 that support provided to Albanian farmers is inferior to the support provided to other Western Balkan countries or European Union countries. Despite limited budgetary support, a key factor for sector development is to target and support the farmers with the highest likelihood to develop in future. However, evidence from interviews with Albanian farmers shows that public funding does not always go to what extension services call "potential farmers". Box 4 presents three cases of potential farmers as considered by extension services in Albania.

Box 5. Who is a potential farmer? Who should government support?

VN is a 65-year-old cow farmer, close to retirement age, with his business in decline — he cut the cow numbers to 24 from 120 that he used to have. He cultivates 30 ha of land with maize, wheat, alfalfa, and so on. Due to high input prices, he has reduced feeds and used only half the fertilizers he used last year. He has benefited from both petrol scheme and per head support. His son has emigrated to England and does not intend to take over his father's farm.

EP, aged 37, working in partnership with his brother, GP, aged 31, have 24 cows. They cultivate 25.5 ha of which 17.5 ha is maize, 1 ha wheat, and 7 ha alfalfa. While they intend to expand the cow herd size, they lack the financial means, and have requested a subsidized interest loan. Current asset conditions are poor. They have started to build a barn, and their stable was in very poor condition. EP explains: "I have fed to cows the same quantity of wheat and maize as last year but have used half the soya quantity. The price of soya is high. I know the soya is very important in the ration — one gets 6 kg of milk for 1 kg of soya (you earn ALL 300 for 6 kg of milk, which costs ALL 100) but I cannot use more due to budget limitations. Cow milk yield is 20 L to 22 L per cow per day. I have to feed at least 70 percent of their ration; otherwise, I lose."

DK is a 35-year-old cow farmer. He has ten cows and cultivates 9.5 ha of land, of which maize is 3.5 ha, wheat 3 ha, alfalfa 2 ha, and beans 1 ha. He explains: "I have reduced the quantities of inputs used. For basic fertilization, last year I used 15 kg to 17 kg of DAP per dynym*, this year I used only 10 kg; last year I fertilized the crop twice using 30 kg per dynym, this season I fertilized only once using 15 kg. I do not have money for more fertilizer. I have also reduced the quantity of concentrate (maize, wheat, soya) fed to cows from 10 kg to 6 kg per animal." The young farmer is very insecure about the next step.

* 1 dynym = 0.1 hectare.

Source: Interview with VN, and EP, GP and DK.

The three cases outlined in Box 4 show that defining a potential farmer is of critical importance, especially when budget support is limited. Providing support to farmers who are most likely going to retire is like throwing away money. On the other hand, not supporting farmers that are young and have the passion to grow their business is the best way to destroy

the future potential of an economic sector. Therefore, having a clear definition of potential farmers which should be the first in line to be supported should be of utmost importance to any government support scheme. This should be combined with a monitoring mechanism which collects data continuously to keep track of what is happening, and measures the impact of any intervention. Without such a mechanism, any government is like a ship without a compass.

6.5 Small ruminant farmers' willingness to continue and grow their business

The focus here shifts to assessing how much small ruminant farmers would like to grow their small ruminant business. To that end, two hypothetical situations were created, and a contingent valuation method was employed to assess their willingness to accept (WTA) the proposed situation. Contingent valuation is a recognized method for assessing the WTA compensation for environmental goods and services that are not easily traded in existing markets. This approach has been applied to various contexts, including agriculture and climate-related information, as demonstrated in studies by Amegnaglo et al. (2017), Tesfaye et al. (2020), and Paparrizos et al. (2021). It has also been used for evaluating advisory services (Shausi, Ahmad and Abdallah, 2019), irrigation services (Tang, Wang and Zhao, 2015), public goods, and crop insurance (Fahad and Jing, 2018). There is little by way of research that explores small ruminant farmers' willingness to continue and grow their business. The interest behind this assessment emerges from the discussion in section 2, which showed a considerable contraction of the small ruminant population in Western Balkan countries and abandonment of the sector by farmers. Thus, a double bounded contingent valuation approach is used for the assessment, since it is advantageous to other contingent evaluation approaches due to the provision of tighter confidence intervals, even with small sample sizes (Paparrizos et al., 2021).

This approach consists of two consecutive WTA questions, both of which can be answered either with "yes" or "no" (Table 22 and Table 23). In each question, respondents are given an offer representing a hypothetical payment per small ruminant head for permanently increasing the herd size (first situation), while in the second situation, the offer represents a payment for leaving the small ruminant business (as a proxy of the value that they put on their business). If the response to the initial offer is "no", then the follow-up question presents the respondent with a higher bid; while a "yes" response is followed up with a lower bid. It should be noted that the first bid is generated at random from a list of bids that were created from consultations with different stakeholders.

Table 22. Double-bounded dichotomous choice contingent valuation approach for assessing WTA (increase herd size)

Situation	Select
HD1. Would you be willing to **permanently increase** your base small ruminant herd size, if you are paid/subsidized with _____EUR more per small ruminant head per year?	1. Yes (fill only HD2) 2. No (fill only HD3)
HD2. If **YES** in **HD1**, would you be willing to **permanently increase** your base small ruminant herd size, if you are paid/subsidized with _____-Z EUR more per small ruminant head per year?	1. Yes 2. No
HD3. If **NO** in **HD1**, Would you be willing to **permanently increase** your base small ruminant herd size, if you are paid/subsidized with _____+Z EUR more per small ruminant head per year?	1. Yes 2. No

In order to control the factors influencing the WTA, logistic regression analyses was carried out. The control variables included in the model are presented in Table A and Table B in the annex.

Table 23. Double-bounded dichotomous choice contingent valuation approach for assessing WTA (continue small ruminant business)

Situation	Select
HC1. Would you be willing to **leave** the small ruminant breeding business if you are paid _____EUR per month for 2 years as social compensation?	1. Yes (fill only HC2) 2. No (fill only HC3)
HC2. If **YES** in **HC1**, would you be willing to **leave** the small ruminant breeding business if you are paid _____**-Z EUR** per month for 2 years as social compensation?	1. Yes 2. No
HC3. If **NO** in **HC1**, would you be willing to **leave** the small ruminant breeding business if you are paid _____**+Z EUR** per month for 2 years as social compensation?	1. Yes 2. No

Table 24 presents the median (and average) values per small ruminant that farmers are willing to accept to increase their herd size. As can be seen from the table, Serbian farmers request the highest amount per small ruminant head, while Albanian farmers request the lowest. These differences can be explained by the support that farmers in each country get, which was discussed earlier. Albanian small ruminant farmers get the lowest amount of support from national subsidy schemes.

Table 24. Willingness to grow small ruminant business for payment per head/year

	Median	Lower bound	Upper bound	Truncated mean
Albania (EUR/small ruminant)	11.78	9.88	14.05	8.85
Bosnia and Herzegovina (EUR/small ruminant)	14.33	12.20	16.61	10.95
Serbia (EUR/small ruminant)	21.34	16.68	42.10	18.71
Montenegro (EUR/small ruminant)	12.35	9.29	15.13	12.03

Note: The lower and upper bound are of the median value.

Similar to the result on WTA for increasing the small ruminant herd size are the results in Table 25, which show the monthly value that small ruminant farmers are willing to accept for leaving their small ruminant businesses. Again, Serbian farmers request the most, and Albanian farmers the least. This value depends not only on support that is provided by the government, but also on how much "lock in" (how invested they are) they have in their business. It is obvious that Serbian and Montenegrin farmers are much more invested than those in Albania and Bosnia and Herzegovina. This might explain the large differences observed in Table 25. Another important factor is the amount of profit that the business generates. The assessment of profits in the different countries is outside the scope of this study, and it is assumed that on average, profits generated by the small ruminant business are similar. Therefore, the differences can be attributed to current support received, and the amount of investment in the business.

Table 25. Willingness to leave small ruminant business for a monthly payment

	Median	Lower bound	Upper bound	Truncated mean
Albania (EUR/per month)	414.65	373.10	496.76	369.80
Bosnia and Herzegovina (EUR/per month)	636.94	495.72	985.22	487.80
Serbia (EUR/per month)	1467.35	682.59	n/a	791.61
Montenegro (EUR/per month)	941.18	602.41	n/a	836.82

Note: The lower and upper bound are of the median value.

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7. Intervention strategies

Throughout this report, several issues have been pointed out that need to be addressed to improve the future prospects for the small ruminant sector in Western Balkan countries. These issues have been summarized in the SWOT analysis in Figure 92, showing how an intervention strategy aiming to develop the small ruminant sector in Western Balkan countries should use the strengths, and reduce the weaknesses by capitalizing on opportunities, lessening the negative effects of the threats. Nevertheless, it should be noted that there are no "magic bullet" intervention strategies that will solve every problem. They serve as guidance on future steps that might be taken by government institutions, small ruminant value chain actors and donor agencies, for improving the sector. First and foremost, the success of any strategy relies on the willingness of those implementing it.

7.1 Successful small ruminant business models

Instead of giving recommendations and steps to follow, as is common for such reports, a much more practical option would be to outline a successful business model that has been implemented. An intervention strategy might aim to replicate the same business model in different places, thus expanding the success story. The context for the business model should also be considered.

Thus, Box 5 and Box 6 provide two business models identified through interviews in Albania. This could provide a solution to the problems of low prices and avoid the need for farmers to engage in processing activities, which are costly and difficult to monitor by national food authorities.

Box 5 presents the case of a milk processor that pays fair prices to farmers based on supplied milk quality and secures fair profits for processing milk into high quality cheeses. The high quality cheeses create a high added value (that is, the product is sold at a high price), allowing the processor to secure good profits, and also share with the farmer part of that value added as an incentive to keep them in business and increase milk quantity and quality.

Box 6. Sustainable business model for dairy processing plant

Business model

Prel Hasani has developed a very interesting and sustainable business model which allows him to be financially sustainable and pay good prices to supplying farmers.

- Value proposition: high quality dairy products from a specific geographical area.
- Customer segment: middle and upper-middle income strata.
- Channels: via hospitality sector and directly to consumers.
- Customer relationships: they deliver dairy products, mainly cheese, on demand. The ordered products are delivered to clients' homes. They also sell dairy products to high quality restaurants.
- Revenue stream: customers pay a relatively high price for high quality processed dairy products from a typical geographical area.

Box 6 *(Cont.)*. Sustainable business model for dairy processing plant

- Key resources: human resources – family business, father and his two sons deal with business; one of the sons has a degree in biotechnology and the other son in veterinary medicine. Processing plant, 100 goats (goats in total) in intensive system. Land cultivated: 2.5 ha in total, of which 1.8 ha is alfalfa and the rest other feed crops.
- Key partnerships: close relationships with milk supplying farmers, feed supplier in Shkoder area, and with clients.

Prices of cheese and milk

Milk prices paid to farmers by dairy processing plant

Type of milk	Price (ALL/kg)*		Increase in %
	Before 2022	Now	
Cow milk	35–40	55	147%
Sheep milk	80	120	150%
Goat milk	50–55	70–75	138%

Dairy processed product prices

Type of milk	Price (ALL/kg)		Increase in %
	Before 2022	Now	
Cow milk white cheese	500	700	140%
Sheep milk white cheese	750	900	120%
Goat milk white cheese	750	900	120%

Other milk processing plants producing low quality cheese sell at a price of ALL 450–500/kg of cheese, and pay farmers between ALL 45 and ALL 50 per litre of milk (field interview).

* As of 24 January 2023 the exchange rate of the lek (ALL) to the euro was: ALL 1 = EUR 0.00861

Source: interview with Prel Hasani, Malesia e Madhe.

Another business model that emerged from interviews is agrotourism, such as the case of Kulla Hupi, described in Box 6. This business model is especially relevant from the perspective of preservation of the rural social fabric, including small ruminant farmers and processors.

Box 7. Kulla Hupi, a growing agrotourism business using local resources

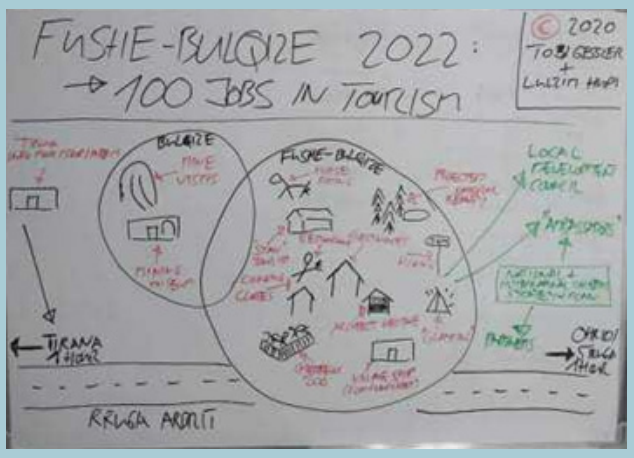
Business model

- Value proposition: "selling" cultural and natural resources, including local food products by being particularly hospitable.
- Customer segment: medium income strata, adventure tourists.
- Channels: use social media and other promotion events to reach customers.
- Customer relationships: dedicated service, quite personalized.
- Revenue stream: customers pay for simple accommodation and simple food at very reasonable prices.

Box 7 *(Cont.)*. Sustainable business model for dairy processing plant

- Key resources: young (35 years old), passionate manager, with skills in tourism management and old house renovation; cultural heritage: renovated 230 year old tower to use as accommodation (seven rooms with a hosting capacity for 21 guests); family and local staff hired.
- Key partnerships: close relationships with local farmers supplying food for guests; the total number of foreign tourists in 2021 was over 1000.

Hupi Tower renovated



Schematic impact of Hupi Tower agrotourism

Source: Interview with Lulzim Hupi, agrotourism business operator, Bulqize.

Similar to Kulla Hupi, one of the earliest establishments and initiators of agrotourism in Albania was Mrizi i Zanave (an agrotourism restaurant). One of the success factors of such a business is its close collaboration with the farmers operating in the village (or area close to the agrotourism). Most of the products from the area (including meat and milk from small ruminants) are sold in the restaurants that follow the slow food movement. This approach adds considerable value to the product, which is also shared with the local community. It should be noted that during the COVID 19 pandemic, Mrizi i Zanave, through its social media platforms, sold a considerable number of local products to the capital and main cities. This has provided invaluable support to the local community, which relies on agricultural activities.

The business models described here are especially important for smallholders and medium size farms. A suitable business model for larger farms is Lufra in Albania. Lufra is a leading milk processing company and one of the first established in the country. Based on discussions with Lufra supply managers, it seems that the company has restructured entirely its supply chain over the past three years. It has gone from 70 percent to 80 percent of milk supplies obtained from milk collectors, to securing 70 percent to 80 percent directly from farmers.

In doing so, the company provides technical assistance and financial support to its farm suppliers. This move to integrate directly with farmers was also a necessity to ensure higher milk quality and quantity. The company has employed veterinarians who support farmers with feed rationing, animal health, and milk quality standards. Each farmer that provides more than 100 L of milk per day gets a cooling tank installed on their farm. In case the farmer has problems with milk quality, Lufra personnel investigates each case and helps the farmer to get back on

track. Lufra also provides credit interest free for farmers who want to expand their herds – the farmer just has to pay back the principal, with loan installments deducted from the amount paid to the farmer for milk delivered.

As a result of this approach, Lufra can be said to be among the few milk processors selling ultra high temperature (UHT) milk (beside the other products), which is secured primarily from milk supplies coming from Albanian farmers. It should be noted that Lufra agrees contracts with farmers where the milk quantity and price are specified. In case one of the parties intends to change the price, they must inform the other party one month ahead. In addition, the farmer cannot reduce the annual milk quantity agreed by more than 5 percent, unless a major problem occurs on the farm. Otherwise, the farmer is sanctioned, and a lawsuit might be opened against him for not respecting the contract.

7.2 Interventions and entry points

The business models outlined earlier provide a potential entry point for any support intervention. Thus, government or donor agencies targeting the development of small ruminant milk value chains could use businesses such as these as entry points. The idea here is that these businesses already have a vested interest in developing the value chain themselves, because they are locked in by the investments that they have made. Consequently, to protect and further develop their investment, they work closely with their farm suppliers because ultimately these farmers are like the workers of their business, and without them the business cannot flourish. Thus, they (the processor or agrotourism) are highly likely to develop relationships with their farm suppliers, which is a key element for value chain development.

General intervention in small ruminant sector development focuses only on the farmer side, forgetting the importance of milk buyers (such as processors) in value chain development. In the author's view, milk buyers who have invested heavily in their businesses should be the first to initiate an intervention targeting small ruminant value chain development. In line with this, Xhoxhi et al. (2022) point out that large processors tend to share part of the created added value with the farmers, to incentivize their growth and quality standards compliance.

In this context, intervention to improve the small ruminant milk value chain could target both the processor (a business that sources milk from farmers with large investments) and his farm suppliers and organize with them, for example:

- Improved production capacities/efficiency/quality of small ruminant farms:
  - through training and extension;
  - the training could also be training of trainers, where trainees are staff of the milk buyer and public extension services;
  - the training could also be provided in a "farmers field school" format, where trainees can connect to the practical implementation of the theory part;
    - possible training subjects could include good farming practices, animal healthcare, agriculture extension organization, environment and CO2 reduction, milk collection practices, milk quality (acceptance) testing and food safety;
    - for larger farmers, training about business planning are of critical importance due to the many aspects that need to be considered.
- Improved systems/methodology of fresh milk procurement:
  - relationship building, market assurance, transparency;
  - food safety: traceability and quality control, monitoring.

An important driver for farmers to invest in their farming enterprise is having the certainty of a reliable buyer for their products, which is why an arrangement between processors and farmers is so important. Such an arrangement should preferably have a legal format, which

stipulates all the conditions that are applicable for both parties and are relevant to the supply and procurement of fresh milk – for example, duration, milk pricing, delivery and collection conditions, quality control sampling and testing, payment, and so on. An intervention can assist in this aspect, making expertise available and assisting in putting facilities and organization in place. Such a supply agreement will empower farmers, making clear when their milk is changing ownership and what the trajectory is concerning the milk quality analysis and payment terms.

7.3 Interventions supporting collective action development

The previous two sections assume that the buyer (such as processor, exporter) has an interest in the development of the small ruminant value chain as a mechanism to support their investment. This might not always be the case, especially in mountainous and remote areas, which in Western Balkan countries generally is where small ruminants are reared. In these areas, large investments from buyers is limited. Moreover, buyers that tend to buy products in these areas are more likely to be opportunistic because they do not have investments to protect and improve. They have a short-term focus and, in order to increase their profits, tend to "squeeze" farmers, which compromises their development.

In this context, an intervention strategy for small ruminant value chain development should focus on building collective action as a means to overcome market drawbacks (unfair product prices, limited access to information, services, technology and financial resources). Box 7 presents an innovative intervention approach, focusing on supporting farmers in mountainous (disadvantaged) areas with new technologies and services through a village development approach.

In these areas, family farms usually do not have access to services and modern technologies. Modernization of production on farms also implies technical equipment and knowledge. Moreover, as discussed previously, one of the key problems that farmers are facing is the lack of a labour force in villages. In this context, mechanization of farm activities is a potential instrument to overcome the labour constraints.

From an economic perspective, it is not efficient for small farms to purchase highly productive machines on small areas, which is unprofitable because of economies of scale – for a smallholder, the machines are necessary only for a few days during the year. Furthermore, tractors are not used at full capacity due to the insufficient number of attached machines that a farmer may possess. All of these, in addition to requiring large initial costs, increases production costs and reduces profitability – thus making access to mechanization and modernization for smallholders unfeasible.

One of the possible solutions to these problems is an intervention investing in machinery and equipment (like the example in Box 7), where farmers in disadvantaged areas can use them collectively. With good planning and organization, mechanization can be used more efficiently in a collective organization. In addition, such an initiative can provide services to agricultural producers (collective buying of inputs and sale of products, information, value addition activities such as processing), it will increase their annual engagement, leading to improved productivity, reduced mechanization costs and total production costs, and improvement of working conditions. The collective use of machineries by communities is also a way to solve the problem of cultivating smaller land areas owned by family farms in mountainous areas.

Box 8. Innovative approaches in supporting farmers in the municipality of Cajetina (Serbia)

The municipality of Cajetina, in Serbia, has formed an Agricultural Technical Centre from its own funds, within which modern machinery has been purchased for use by the farmers in a collective way. Moreover, the centre provides services to farmers who have limited access to services and technology. Farmers can use services they did not have before, and can apply advanced technologies.

The centre provides farmers with 32 services. In autumn 2022, the centre had seven tractors and 28 attachment machines. The total available engine power of all seven tractors is 554 kW, and the average engine power of the tractors is 79.14 kW. In one summer season, tractors were engaged for over 4 000 working hours. The machines are also used during the winter period.

The goal of the intervention was to make mechanization services available to most or every interested family farm operating in disadvantageous conditions and to facilitate the application of new technologies and practices. Agricultural producers have the opportunity to order by phone some of the services such as plowing, establishing sown lawns, sowing lawns, mowing, silage preparation, ensilaging and making hay, analysing the quality of hay, spreading lime, manure, and liquid manure. The centre enables the application of some measures that are currently not used or insufficiently used, and which are difficult for farms to implement due to the lack of labour and machinery.

In addition to the agricultural mechanization and provision of services to farmers, the centre also has machines and devices that will perform communal tasks – maintenance of local roads in winter, snow removal, arrangement of field roads, canals, removal of wild vegetation, and so on.

Observations show that farmer interest in the agrotechnical centre in Cajetina is high. The model is a successful example of how to solve the problem of limited mechanization and technical support in a cost-effective manner. The model creates the conditions and environment in which farmers are able to modernize their production technically and technologically, and thereby increase productivity and income

Source: Dragan Terzić.

7.4 Interventions supporting alignment with European Union Green Deal

All the Western Balkan countries included in the study are in the process of integration with the European Union, so they need to align with and fulfil EU standards. In this context, interventions should also consider this alignment process. The Green Deal is the European Union's main growth strategy to transition the EU economy to a sustainable economic model. Presented in December 2019, the overarching objective of the Green Deal is for Europe to become the first climate neutral continent by 2050, resulting in a cleaner environment, more affordable energy, smarter transport, new jobs, and an overall better quality of life[5]. Its main policy areas are:

1. Biodiversity.
2. Farm to Fork.

[5] https://www.nortonrosefulbright.com/en/knowledge/publications/c50c4cd9/the-eu-green-deal-explained

3. Sustainable agriculture.
4. Clean energy.
5. Sustainable industry.
6. Buildings and renovations.
7. Sustainable mobility.
8. Eliminating pollution.
9. Climate action.

In the following paragraphs, some interventions are presented that will support the small ruminant sector in Western Balkan countries align with the Green Deal.

Supporting agrobiodiversity

The decline of the traditional ecopastoral socioeconomic system and lack of investment in pastures is leading to a general decline in breeding of small ruminants, which also translates into a reduction in the numbers of most autochthonous breeds, in favour of a few most popular breeds and imported ones. Interventions should provide incentives for endangered autochthonous breeds, which should be confirmed and possibly extended to all autochthonous breeds, not only endangered ones.

In particular, it can be useful to draw upon the experiences of preserving and giving value to biodiversity through market mechanisms; these experiences were implemented in different international development projects, where quality schemes were linked to biodiversity-based products (such as Has Goat products, now protected by a geographical indication)[6] or to a mix of specific breeds and traditional breeding systems (such as the "Ionian lamb" quality scheme). Thus, interventions could support animal products (from small ruminants) obtained within the framework of quality schemes, which also include biodiversity-based products.

Optimize the use of inputs, including feeds, and veterinary medicines

Animal feed costs heavily contribute to the competitiveness of the small ruminant sector. The reconsideration of the whole supply chain to optimize the use of inputs (from fertilizers and plant protection products used for forage cultivation to water, veterinary medicines, and so on), the increased attention to animal health and animal welfare and the use of locally available by products as components for feeds, and the introduction of a control system along the whole production chain (for example, automated feed dispenser), are all elements which contribute both to production efficiency and to the achievement of the Green Deal Farm to Fork objectives. Moreover, much improvement can be achieved through counselling and advisory services on optimal use of inputs, animal welfare, and production system controls, regardless of investments in equipment, farm machinery and fixed assets. Thus, interventions could provide these specialized advisory services which are focused on improving sustainability of the sector.

Drive to more complex, energy intensive processing activities

Improving quality along the milk supply chain and the establishment of larger and more competitive farms requires increasing quantities of energy, especially in primary production (farm machinery, milking stations, cooling system, different in-stable equipment). The overall energy balance in the milk processing industry is quasi-neutral, as a larger and more complex processing plant requires much more energy than a traditional plant (which only needs some heat and does not treat the effluents); but a single modern dairy plant replaces several informal or semi-formal dairy units whose energy efficiency per output unit is lower. A significant consumption of inputs and energy (direct and indirect) is related to packaging.

Issue of pasture management

The lack of investment and decline of traditional ecopastoral systems has contributed to the loss and degradation of pasture resources, especially summer pastures in highlands. The decline of traditional socioeconomic patterns in mountainous and inner areas is leading to an alteration of the whole ecosystem, which, among other effects, leads to increased soil erosion, loss of biodiversity, and further negative impacts on the local economy. The reduction

[6] A biodiversity-based product is a product whose main characterization and/or marketing point of strength is linked to biodiversity and use as a leverage the marketing concept that the more a good is scarce, the higher the price is to be paid; biodiversity-based products are rather common in the wine and meat sector (quality schemes related to specific and rare cultivars or breeds) and niche food products (e.g. some "superfood" which can be found only in some eco-systems). The support to development of biodiversity products through geographical indications was the core concept of the FFEM BiodivBalkans project.

in quantity and quality of pasture resources, and depopulation of inner areas, has negative effects in several sectors — small ruminants' breeding (milk and meat), wild medicinal and aromatic plants collection.

With specific reference to milk-oriented small ruminant breeding, the decline of the economy of transhumance (small ruminants' transhumance to summer pastures, seasonal dairy processing units in highlands) has been replaced by a different system, with the resulting reorientation of small ruminant breeding towards meat production and the overall stagnation of the activity.

There is a need to invest again in pastures, which can be the focus of future interventions. For example, pastures can be supported through inclusion in local development plans.

Issue of plastic packaging

Compared to traditional and informal supply chains, supply chains ensuring safety controls use much larger quantities of mono-use plastic and aseptic packaging, which must be recycled in specialized plants.

For food industries such as milk and dairy, the Green Deal empathizes recycling and use of bioplastics rather than the reintroduction of schemes for recyclable packaging rotation (for example, glass bottles), but in Western Balkan countries bioplastics are not used, and few types of plastic can be recycled.

Increasing plastic packaging recovery is part of the Green Deal's recycling component (mobilizing industry for a clean and circular economy), therefore these actions could be included in future interventions.

7.5 Other potential interventions

The intervention strategy section, to a certain extent, has not discussed potential interventions targeting large small ruminant farmers focusing on meat production — the reason being that there is limited evidence of the existence of such business in the Western Balkans. However, if the target of the intervention is the export market, such business models need to be developed. The establishment of such an initiative would require the creation of large small ruminant farmers in order to consolidate the production, enhance quality consistency and volume supply, and have the capacities to implement the required standards by the importing countries. Moreover, large investment would be needed to modernize abattoirs and laboratories. To achieve this level, first it will be necessary to enforce the laws on quality and safety standards within each country.

To conclude, the role of any intervention should be to foster an enabling environment where business models, such as those discussed here, can flourish. However, it should be noted that if there is no will from the agents involved in the businesses to further develop, no matter the support, in the long run these businesses are destined to fail. Therefore, one way that national government schemes can support the future development of small ruminant farmers would be to provide at least direct payment per head (as the most requested policy support). Furthermore, considering farmers' willingness to invest in the expansion of herd size, grant provision to support their investment is another approach that can further boost sector development. Finally, any support provided should be subject to cross compliance — such as the fulfilment of safety standards, insurance, and adherence to other administrative and legal requirements.

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Annex

Table A1. Results of contigent valuation: factors explaining farmers' willingness to accept leaving small ruminant business for a monthly payment of social compensation (programme for two years)

	Albania		Bosnia and Herzegovina	
Variable	**Est.**	**Std. Err**	**Est.**	**Std. Err**
(Intercept)	4.67**	1.58	-2.62.	1.38
Age	-0.01	0.01	0.04**	0.01
Education	0.01	0.09	0.03	0.08
Family members above 14 years	-0.29*	0.14	0.11	0.12
Land cultivated animal feed	0	0.00	0	0.00
Number of small ruminants	0	0.00	-0.01*	0.00
Hired shepherd (binary)	-0.12	0.43	0.42	0.32
Breed orientation (meat vs milk)	-0.47	0.62		
Breed orientation (combined vs milk)	-0.37	0.47		
Small ruminant income to total family income	-0.03***	0.01	0	0.01
Household well-being vs fellow villagers	-0.06	0.17	-0.25	0.16
Designation of farm successor (binary)	-1.03*	0.40	0.2	0.34
log(400/bid)	**-3.77*** **	**0.44**	**-1.65*** **	**0.23**
Log-likelihood value	-173.93		-174.78	
AIC	373.85		371.55	

Note: Est – estimate; Std. Err – standard error; AIC – Akaike Information Criterion; "logistic" error distribution of the model; significant. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1.

Table A2. Results of contigent valuation: factors explaining farmers' willingness to accept leaving small ruminant business for a monthly payment of social compensation (programme for two years

	Serbia		Montenegro	
Variable	**Est.**	**Std. Err**	**Est.**	**Std. Err**
(Intercept)	4.67**	1.58	-2.62.	1.38
Age	0.00	0.02	0.04.	0.02
Education	-0.03	0.09	0.06	0.10
Family members above 14 years	-0.17	0.15	-0.15	0.18
Land cultivated animal feed	0.03	0.03	0.00	0.07
Number of small ruminants	-0.01	0.01	-0.01*	0.01
Hired shepherd (binary)	0.50	0.63	-8.61	44.91
Breed orientation (meat vs milk)	-0.37	0.81	12.54	470.40
Breed orientation (combined vs milk)	-0.63	0.85	12.06	470.40
Small ruminant income to total family income	-0.02	0.01	-0.02	0.01
Household well-being vs fellow villagers	-0.34	0.22	-0.19	0.21
Designation of farm successor (binary)	-0.21	0.48	0.63	0.55
400/bid	**-1.97*** **	**0.35**	**-3.74*** **	**0.66**
Log-likelihood value	-110.12		-81.00	
AIC	246.24		188.00	

Table B1. Results of contigent valuation: factors explaining farmers' willingness to increase small ruminant business for a payment per head/year for small ruminants

	Albania		Bosnia and Herzegovina	
Variable	**Est.**	**Std. Err**	**Est.**	**Std. Err**
(Intercept)	-0.62	1.27	3.51**	1.13
Age	-0.03*	0.01	-0.04***	0.01
Education	0.02	0.08	-0.17**	0.06
Family members above 14 years	0.3**	0.12	0.02	0.10
Land cultivated animal feed	0	0.00	0	0.00
Number of small ruminants	0*	0.00	0	0.00
Hired shepherd (binary)	-0.06	0.31	0.04	0.26
Breed orientation (meat vs milk)	0.74	0.51		
Breed orientation (combined vs milk)	0.49	0.37		
Small ruminant income to total family income	0.02***	0.01	0	0.01
Household well-being vs fellow villagers	-0.06	0.15	0.24.	0.13
Designation of farm successor (binary)	0.26	0.31	0.08	0.29
log(20/bid)	**-1.69*** **	**0.16**	**-1.82*** **	**0.16**
Log-likelihood value	-261.09		-256.66	
AIC	548.17		535.32	

Table B2. Results of contigent valuation: factors explaining farmers' willingness to increase small ruminant business for a payment per head/year for small ruminants

	Serbia		Montenegro	
Variable	**Est.**	**Std. Err**	**Est.**	**Std. Err**
(Intercept)	0.26	1.92	10.24	99.96
Age	-0.02	0.02	-0.02	0.02
Education	0.14.	0.08	0.05	0.08
Family members above 14 years	-0.34**	0.12	0.25.	0.15
Land cultivated animal feed	-0.01	0.02	0.08	0.07
Number of small ruminants	0.00	0.00	0.00	0.00
Hired shepherd (binary)	0.44	0.53	0.50	0.79
Breed orientation (meat vs milk)	2.24*	0.92	-8.38	99.94
Breed orientation (combined vs milk)	2.14*	0.92	-8.81	99.94
small ruminant income to total family income	0.02*	0.01	-0.01	0.01
Household well-being vs fellow villagers	-0.34.	0.19	0.18	0.16
Designation of farm successor (binary)	1.10**	0.41	-0.08	0.40
(20/bid)	**-1.54*** **	**0.21**	**-1.42*** **	**0.20**
Log-likelihood value	-178.01		-145.03	
AIC	382.02		316.07	

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