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REGIONAL MARKET ALLIANCES IN THE SOUTH CAUCASUS

ALLIANCES CAUCASUS 2

LIVESTOCK PRODUCERS AND BEEKEEPERS FOCUS GROUP SURVEY

NOVEMBER 2022

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INTRODUCTION

The *ALCP2 Livestock Producers and Beekeepers Focus Group Survey 2022* focussed on identifying livestock producers and beekeepers perceptions of climate change and the impacts they have experienced on their production. Forty-seven gender-disaggregated dairy farmers and beekeepers' focus groups were conducted in ALCP2 target regions. It revealed a significant change in weather patterns over the last ten years.

The majority of the interviewed female and male farmers are worrying about changes in weather patterns and the negative impacts that they occasion. Increased temperature, drought, dried-out grass, crops, hay and alfalfa and soil erosion were mentioned by dairy farmers as the most pressing climate change-related trends. Lack of watering, reduced livestock feed and increases in new weeds and parasites leading to decreased productivity are some of their main concerns. In beekeeping increased temperature, heat in summer, drought, and frequent rains leading to reduced nectar flow, weakened colonies and increased susceptibility to disease are among the key concerns of female and male beekeepers. One of the main negative effects of climate change on farming is unpredictability and the frequency of negative events which has meant that the majority of female and male livestock producers and beekeepers are unable to plan to counteract it. Lack of information, knowledge and finances as constraints to establishing new practices were named by dairy both farmers and beekeepers.

There are no discernible differences in perceptions of men and women concerning changes in weather patterns and their impacts. They also expressed similar perceptions toward coping mechanisms. However their needs and attitudes concerning the same subject do sometimes differ. For example, some of the interviewed women in all regions would like to have milking machines but lack the finances to purchase them whereas buying milking machines is not mentioned as a priority issue by the interviewed men. Also, there is a significant difference in women and men's attitudes regarding agri information. Women are far more interested in livestock and climate change-related information than men. Women reported that they want to learn more, and that they are actively searching for agri information. Amongst beekeepers, priorities differ on the same subject, both groups talked about the need for hive modification, but women highlighted the need for hives designed with a lighter weight to be easier to lift. Also, women are more likely to use probiotics for bee immunity.

The opinions of the Azerbaijani and Armenian groups concerning perceptions of climate changes and impacts on their livestock production and beekeeping were in line with the perceptions of the Georgian groups. Not knowing the Georgian language however is one of the biggest constraints for women and men in Azerbaijani and Armenian communities. Both groups emphasized that they have language barriers to accessing information from Georgian channels. They watch YouTube or Facebook in Armenian, Azerbaijani or Russian languages based on content not adapted to local circumstances. Trainings which are mainly in Georgian are not tailored to Armenian and Azerbaijani farmers. While social media is a key information platform for other beekeepers, it is not popular among Armenian and Azerbaijani beekeepers. These farmers do not participate in state grant programmes due to not knowing Georgian. Migration was mentioned more by Armenian and Azeri communities than Georgian communities. This migration limits Azeri and Armenian communities from increasing the number of cows.

METHODOLOGY

The programme wanted to find out how female and male livestock farmers and beekeepers in different parts of Georgia and from different ethnic communities perceive climate change in relation to their livestock and beekeeping husbandry. It also wanted to establish what changes in weather patterns they have observed during their lifetime, the kind of problems and challenges they are currently facing related to livestock and beekeeping husbandry, land management, crop management and production and processing and the kind of solutions they have applied to cope. The survey also ascertained where livestock producers and beekeepers currently obtained information regarding these subjects and what resources they felt they needed in order to apply solutions or coping mechanisms.

The study used mixed research methods to collect qualitative and quantitative information on these questions. The qualitative data was collected through focus groups and quantitative with a semi-structured spreadsheet/questionnaire which the moderator filled together with focus groups' participants. The study was conducted separately with livestock farmers and beekeepers. Overall, it unites 47 focus groups (22 female & 25 male) and 196 participants (76 female & 120 male).

Table 1 Regions, number of focus groups and participants' data

Regions	Number of focus groups	Female	Male
Samegrelo	11	17	25
Kvemo Kartli	6	9	10
Imereti	9	15	22
Samtskhe-Javakheti	7	13	28
Kakheti	6	8	16
Adjara	4	8	9
Racha	4	6	10
Total	**47**	**76**	**120**

Regarding livestock producers, 29 gender-disaggregated focus groups were held (14 females and 15 males) in seven focal regions for the ALCP2; Samegrelo, Kvemo Kartli, Imereti, Samtskhe-Javakheti, Kakheti, Adjara and Racha. 125 dairy farmers participated (51 female & 74 male). The participants had at least three milking cows and 0.25 ha of land mostly used for producing livestock feed. The minimum age of the participants was 18 and the oldest was 84.

Regarding beekeeping, 18 gender-disaggregated focus groups were held (8 females and 10 males) in six focal regions for the ALCP2 Imereti, Samegrelo, Kakheti, Samtskhe-Javakheti, Adjara and Racha. 71 beekeepers participated in it (25 female and 46 male). They owned more than thirty hives and some of them practice bee transhumance. The minimum age of the participants was 18 and the oldest was 80.

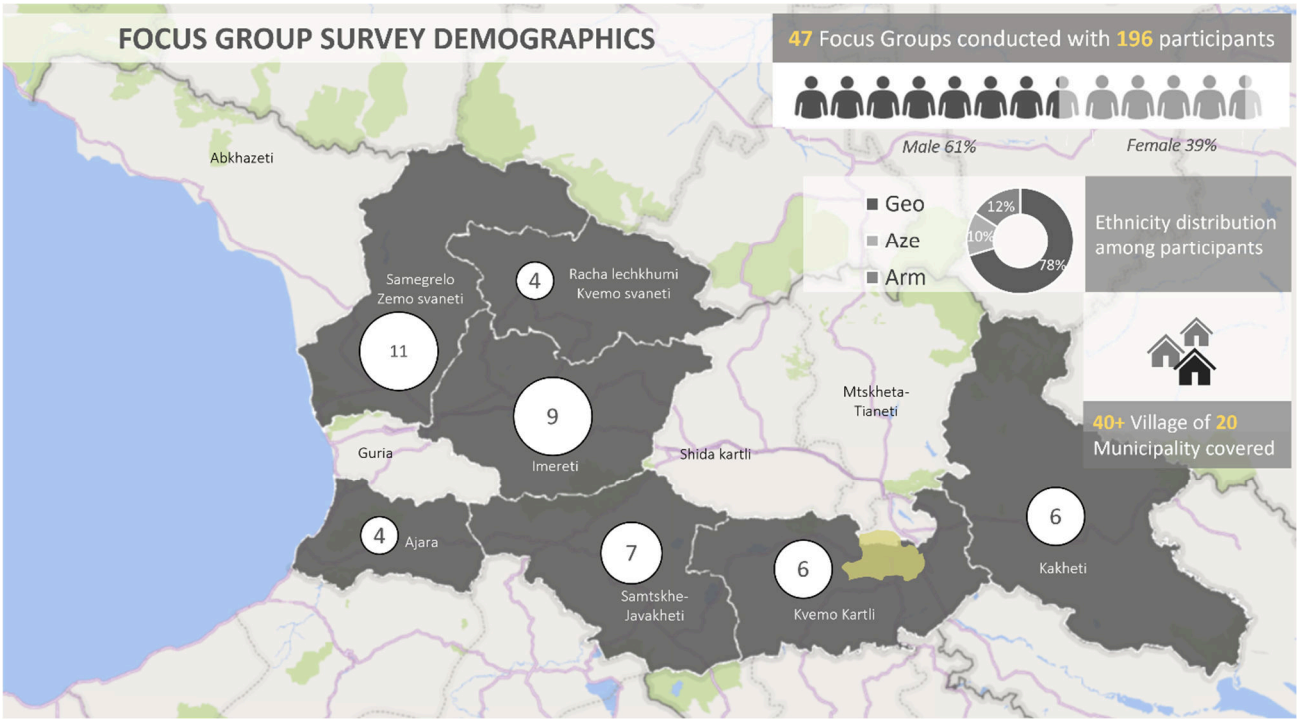

Figure 1 Focus Group Survey Demographics

GENDER AND LIVESTOCK

The focus groups showed that there are no discernible differences between male and female groups when it comes to perceiving changes in weather patterns. In both groups increased temperature, drought, dried-out grass, crops, hay and alfalfa, and lack of livestock feed were mentioned as the most pressing climate change trends and impacts. They also expressed similar attitudes towards possible coping mechanisms. However, they have different roles, responsibilities, and decision-making agency regarding some livestock-related activities.

Women are involved in all elements of livestock husbandry generally and women are responsible for milking and selling milk. The cleanliness and safety of milk as well as the equipment used for milk processing is the responsibility of women as well. Women are usually involved in diagnosing livestock ailments with men making decisions on obtaining veterinary services: vaccines and medical treatment. Men and women visit vet points almost equally where the services are easily accessible to the village however men are more mobile than women and therefore have more access to the predominantly urban-located pharmacies. Therefore, in the lower zone areas closer to the urban centers women have more access to vet pharmacies, when they come to the agricultural market, they buy vet drugs if needed. In the middle and upper zone areas women rarely visit towns because of the long distance from their villages. Women and men are both are responsible for feeding animals. Men are responsible for haymaking, buying livestock feed (hay, maize, combined feed) and buying utilizing and fertilizers and other nutrients for the soil. Lands are under male ownership and registered under male names Men do ploughing and women do planting. See Gender Matrix Table 2 and Table 3.

Table 2 Gender division of roles and responsibilities in livestock production and inputs

List of activities	Samegrelo & Imereti			Ajara			Racha			Kakheti			Kvemo Kartli		
Livestock husbandry	W	M	B	W	M	B	W	M	B	W	M	B	W	M	B
Improving milk quality	x			X					X			x			X
Ensuring milk is clean	x			X			X			x			x		
Increasing milk yield			X	X		x			X		x				X
Identifying diseases, infections, parasites	x			X		x			X			x			X
Milking	x			X			X					x	x		
Renovation of cow-shed			X		X			x			x			x	
Giving water to cows						x			X			x	x		
Using milking machines	X			X			X				X		x		
Treatment (diseases, infections, parasites, etc.)			x			x	X				X				X
Buying vet drugs			x		X				X			x		x	
Communicating with a vet			X			x	X				X			x	
Giving micronutrients, vitamins to a cow	x					x			X			x			X
Giving feed			x			x			X			x			X
Getting information about livestock husbandry practices			x			x	X					x			X
Having information about climate smart inputs			X			x			X		X			x	
Attending trainings/courses in livestock husbandry			x		X	x	X					x	x		
Is interested in milking machines (already bought or is going to)	X			X			X				x		x		
Producing crops for livestock		x				x		X			x				X
Hay making		x			X				X		x			x	
Buying livestock feed (hay, maize, combined)		x			X			X			x			x	
Transporting own produced feed		x			X			X			x			x	
Selling milk	x			X			X					x	x		
Land management	W	M	B	W	M	B	W	M	B	W	M	B	W	M	B
Land cultivation			x		X				X		x				
Using organic practices			X			X			X		x				X
Buying fertilizers and other nutrients for soil			x		X			X			x			x	X
Using fertilizers			x		X			X			x			x	
Improving soil quality		X			X				X		x			X	
Arrangement of water storage		X			X			X			x			x	
Ploughing			x		X			X			x			X	
Planting			x			X	X				x			X	
Sowing	x					x	X				x		x		
Harvesting of hay		X			X				X		x		x		
Harvesting of crops			x			x			X			x		X	

Table 3 Gender division of access and agency, decision making ability, in livestock production and inputs

	Samegrelo & Imereti				Ajara				Racha				Kakheti				Kvemo Kartli			
Resources	**Access**		**Agency**		**Access**		**Agency**		**Access**		**Agency**		**Access**		**Agency**		**Access**		**Agency**	
	W	**M**	**W**	**M**	**W**	**M**	**W**	**M**	**W**	**M**	**W**	**M**	**W**	**M**	**W**	**M**	**W**	**M**	**W**	**M**
Online information (social media, online platforms, etc.)	X	x	x	x	x	X	x	X	x	x	x		X	x	x	x	x	x	x	X
TV programmes	X	x	x	x	x	X	x	X	x	x	x		X	x	x	x	x	x	x	X
Trainings/courses in livestock husbandry	X	x	x	x	x	x		X	x		x		X	x	x	x	x		x	
Donor grants	x	x	x	x	x	x	x	X	x	x		x	x	x	x	x		x		x
Bank loans	x	x	x	x	x	x		X	x	x	x	x	x	x	x	x		x		X
Governmental grants	x	x	x	x	x	x		X	x	x	x	x	x	x	x	x		x		x
Applying for grants/loans	x	x	x	x	x	x	x	X	x	x	x	x	x	x	x	x		x		X
Vet drugs	X	x		x	x	x	x	X	x	x	x	x	x	x		x		x		X
Cow-shed renovation	x	x		x		x		X		x			x	x		x		x		X
Bio vet drugs	x	x	x	x	x	x	x	X		x		x		x		x		x		X
Land cultivation inputs		x		x		x		X		x		x		x		x		x		X
Machinery		x		x		x		X		x		x		x		x		x		X
Irrigation	x	x		x	x	x		X	x	x	x	x		x		x		x		X
Income from selling milk	X		x	x	x	x	X		x		x		x	x	x	x	x		x	X

GENDER AND BEEKEEPING

Unlike livestock production, beekeeping in Georgia is regarded as a male-dominated sector. It is traditionally considered a man's job, requiring strength for the loading and transportation of beehives during transhumance and in honey extraction. Women who identify themselves as beekeepers represent 10% of beekeepers in Georgia. Reasons that these women have become beekeepers include beekeeping being a family activity and women taking up the role after a father or husband has passed away, support from NGOs which has seen women-based cooperatives formed and women given training, funding and beehives and women adopting more control over the business where it is an additional source of income linked to food production and rural tourism.

For the 90% who identify themselves as male beekeepers, beekeeping mostly remains a household activity and women still play an important role in beekeeping, the women take care of beehives, treat bees, negotiate with customers and sell honey. Men are responsible for bee transhumance, honey extraction/ packaging, and buying vet medicines and inputs.

Beekeeping requires specific knowledge. Unlike livestock husbandry, where roles and responsibilities have some distinct division, in beekeeping, the one with beekeeping knowledge leads. Other family members,

mostly, the wife or husband, provide help, when necessary, for example, during lifting/moving hives, taking apiary to transhumance, honey extraction and marketing. See Gender Matrix Table 4 and Table 5.

The focus groups showed that there are no discernible differences between men and women groups when it comes to perceiving changes in weather patterns and the impact on beekeeping of these changes. Increased temperature levels, drought, prolonged or heavy rainfall and unpredictable weather were named as the most concerning issues, which directly affect beekeeping activities.

Female and male beekeepers have almost similar opinions about coping strategies. Both groups talked about the need for hive modification, however, women highlighted the need for hives designed with a lighter weight, so it is easier for them to lift. Also, women are more likely to use probiotics for bee immunity. Limited markets were mentioned by both groups, which makes it risky to invest in beekeeping.

Social media is the main information source for beekeeping; however, female beekeepers see the need for training and an increase in access to information about new beekeeping practices locally within their respective regions.

Table 4 Gender division of roles and responsibilities in beekeeping

List of activities	Women identify themselves as a female beekeeper			Men identify themselves as a male beekeeper		
Taking care of beehives	W	M	Both	W	M	Both
Apiary check up	X				X	
Diagnosing of bee diseases	X				X	
Treatment of bees	X	x	x	x	X	X
Buying drugs	X		x		X	
Feeding bees	X	x	x	x	X	X
Beehives smoking	X	x	x	x	X	X
Making and using of traditional remedies for bee treatment	X				X	
Making additional feed to bees	X		x		x	**X**
Mending beehives		X			x	
Transhumance						
Transportation			x		x	
Loading beehives		X	x		x	
Preparation of beehives: cleaning, sorting, placing planks	X		x		x	
Taking care of beehives in pastures	X				x	
Honey harvest						
Extraction of honey	X		x		x	X
Placing beeswax in frames	X				x	
Packaging			x		x	X
Producing other bee products						
Royal jelly	X			x	x	X
Pollen	X				x	
Propolis	X			x	x	X
Venom	X				x	

Beeswax			x		x	
Queen bee breeding	X				x	
Sale						
Sales management	X		x		x	X
Negotiation with clients	X	x	x		x	X
Marketing	X				x	X

Table 5 Gender division of access and agency, decision making ability, in beekeeping

	Female beekeeper				Male beekeeper			
Resources	**Access**		**Agency**		**Access**		**Agency**	
	W	**M**	**W**	**M**	**W**	**M**	**W**	**M**
Online information (social media, online platforms, etc.)	X	x	X	x	x	x	x	X
TV programmes	X		X			x		X
Trainings / courses in beekeeping	X		X			x		X
Donor grants	X		X			x		X
Bank loans	x	x	X	x	x	x	x	X
Governmental grants	x		X			x		X
Vet drugs	x	x	x			x		X
Bio vet drugs	x	x	x			x		X
Beehives	X	x	x			x		X
Income from selling honey	X		x			x		X

ETHNICITY

According to the 2014 census, 13% of the Georgian population are ethnic minorities, out of which 6% are ethnic Azerbaijanis and 5% ethnic Armenians. Not knowing the Georgian language is one of the biggest constraints for ethnic minorities. This constraint was mentioned by both livestock farmers and beekeepers. See Table 6.

Opinions concerning climate changes and impacts on their livestock production and beekeeping were in line with the perceptions of Georgian groups. However ethnic minorities emphasized that they have language barriers to accessing information from Georgian channels. They watch YouTube videos or use Facebook in Armenian or Russian languages. These farmers cannot participate in state programmes to get grants due to not knowing Georgian. This problem is even worse in villages as the farmers have to go to towns to find somebody to help them with writing in Georgian or collecting documents. Language barriers exist in the Azeri communities as well. Migration was mentioned by Armenian and Azeri communities more than Georgian communities. *'About 80% of male family members are abroad which makes it difficult for women to visit the town, as they do not have cars and public transport does not work'* - one female farmer noted in Ninotsminda. Due to migration, women are doing all the livestock-related activities. Migration and the consequent reduction in the HH workforce limits Azeri and Armenians in these HH's from increasing the number of cows.

Table 6 Demography according to ethnic groups and knowledge of the language, Census 2014, Geostat

	Population	Ethnic Minority	Not Fluent in Georgian
Georgia	**3,713,804**	**13%**	**7%**
Samtskhe-Javakheti	160,504	52%	36%
Kvemo Kartli	423,986	49%	38%
Kakheti	318,583	15%	8%
Tbilisi	1,108,717	10%	1%
Mtskheta Mtianeti	94,573	6%	0%
Shida Kartli	263,382	5%	0%
Adjara	333,953	4%	1%
Guria	113,350	2%	0%
Imereti	533,906	1%	0%
Samegrelo & Zemo Svaneti	330,761	1%	0%
Racha-Lechkhumi & Kvemo Svaneti	32,089	0%	0%

During the beekeeping focus groups, ethnic minorities also emphasized that they have language barriers to accessing information from Georgian channels. Azerbaijani and Armenian beekeepers lack information on the proper use of vet drugs, bee diseases and treatment. Their knowledge about bio/sustainable beekeeping is also limited. Those beekeepers are not members of any cooperative. Some of them mentioned membership in associations but could not name which.

Beekeeping training which is mainly in Georgian is not tailored to Armenian and Azeri beekeepers, who mostly speak and understand Russian along with their native language. The majority had not attended any beekeeping trainings for ten years. Some of them were invited to trainings but left soon as they could not understand Georgian. Beekeepers also complained about the irrelevant information transferred. *'Beekeeping information is not adapted to the local climate. We have fewer problems with humidity in hives but suffer from cold and lasting winter. Thus, our beekeeping practices are different from other parts of the country'* – said a male beekeeper from Akhalkalaki. If available, all the interviewed beekeepers, want to attend trainings and learn more about new beekeeping practices.

While the GBU and Facebook page *Georgian Bee* administered by the GBU's chairman is a key information platform for Georgian beekeepers, it is not popular for the beekeepers in ethnic minorities, who named the language barrier for not using these resources. They watch Russian (or Armenian or Azeri) language content, are also members of non-Georgian speaking discussion FB groups, which do not provide them with the information tailored to the region and their beekeeping practices.

SECTION 1: LIVESTOCK HUSBANDRY

CLIMATE CHANGES AND LIVESTOCK

Both female and male focus group participants have observed a significant change in weather patterns over the last ten years. They relate extreme and unpredictable weather events. The most frequently observed climate change patterns are related to increased temperature, heat, and drought. In this regard, women and men have very similar perspectives.

Drought in summer has been observed in every region, but the duration differs per region: for instance, in Khulo and Tsalka drought lasts for about one month, in Kvemo Kartli, Samtskhe Javakheti, Imereti, Samegrelo and Racha for two months and in Kakheti for three months.

The participants also noticed that the timing and duration of seasons have changed dramatically during the last ten years. The duration of spring has shortened: '*We have winter and then summer starts immediately: we do not have spring anymore'*, participants complained. Also, they mentioned that there was less snow in winter even in the mountainous areas in Tsalka, Khulo and Racha in the last years. Heavy and prolonged rainfalls were mentioned in Racha, Imereti and Samegrelo, however as farmers explained it was rarely related to increased floods. More hail was mentioned only by Kakhetian farmers.

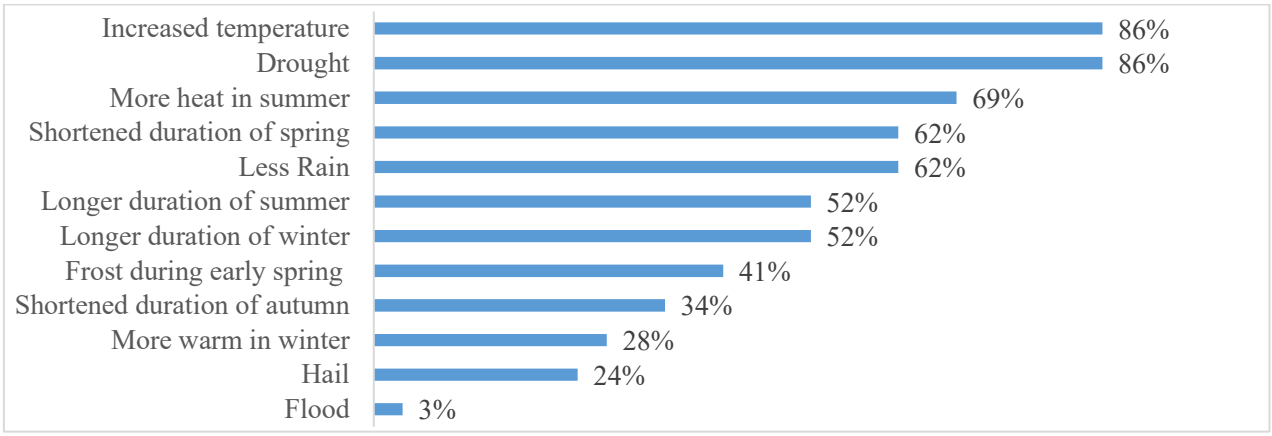

Figure 2 Most widely observed climate change trends among dairy farmers during the last 10 years

IMPACT ON THE LIVESTOCK-RELATED ENVIRONMENT

These changes in weather patterns have created new challenges for dairy farmers and these challenges were similarly perceived by female and male participants. Firstly, most of them are worrying about the availability of grass (76%), decreased quality/quantity of crops (69%), hay and alfalfa (66%). As they explained, these issues were related to drought which has damaged the quality of grass and crops. *'Hay has dried out, and consequently, milk yield has reduced, and pastures have dried out*, farmers complained. This issue was more strongly emphasized in Kvemo Kartli, Kakheti, Imereti and Samegrelo, where farmers reported more heat and less rain. They estimated that crop production was reduced by around 40%.

Drought has negatively affected the availability of water for livestock (52%). *'We need more watering points on the pastures, some of them dried out because of the heat',* farmers complained in Kakheti. Shortage of water was a big issue, especially in mountainous areas and in those villages where there is no river near the pastures. During hot summer days, cattle are under heat stress, and they need more water. Otherwise, thirsty cattle eat less and livestock productivity decreases. For instance, participants confirmed that due to heat stress milk yield decreased by on average 40%. *'Sometimes we call a vet who does injections to increase the appetite of cattle',* a farmer noted in Aspindza.

Drought is also related to soil erosion (55%). Most participants noted soil compaction, loss of soil structure, poor internal drainage, salinization, and soil acidity problems. *'The soil is like clay'*, a female farmer noted in Kakheti, *'our pumpkins have a sour taste due to poor soil, herbs cannot grow anymore'*, another farmer complained in Samtkhe-Javakheti, and interviewed farmers mentioned in Ajara that *'potatoes change the colour due to the dry soil'*.

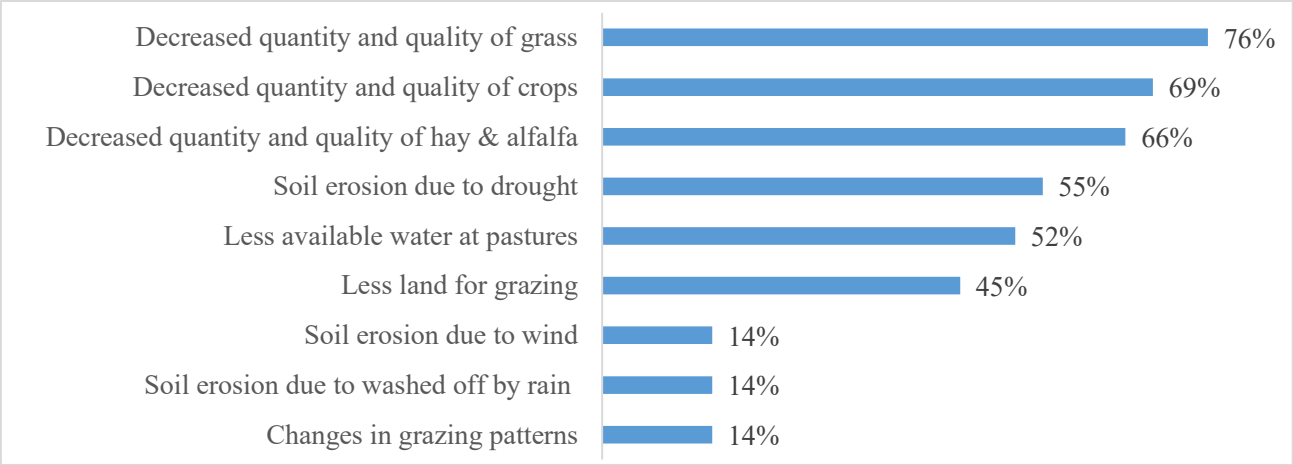

Figure 3 How climate change affected dairy farming

The participants have also observed increased harmful insects/weeds (31%), more external and internal parasites (24% and 17%, respectively) and newly appeared livestock diseases (17%).

The issue of newly appeared livestock diseases was severe in Aspindza. Farmers talked about *Congo* fever (a kind of livestock disease) in Samtskhe-Javakheti which has even caused human deaths over the last three years *'It was not an issue before'*, they claimed.

Some participants (24%) reported an increase in external parasites/ticks due to the heat, causing mastitis and diarrhoea. *'Even vets cannot understand what kinds of ticks or diseases livestock have',* female farmers complained in Imereti and Khulo. Mastitis is an issue in almost every region. Diarrhoea has been caused by harmful weeds which have newly appeared in pastures. These harmful weeds spoil milk as well *'only Ambrosia (a kind of weed) can survive in drought, however, it makes the milk smell'*, farmers mentioned in Dedoplistskato.

Apart from livestock diseases, all the participants indicated that they had to use more pesticides and spray trees and plants more often due to newly appeared harmful insects and worms *'I spray four times a year, while 10 years ago I did once or twice a year'*, explained a woman in Aspindza.

The focus groups indicated positive changes related to Brucellosis, Anthrax, and Foot and Mouth. These diseases are not an issue anymore, though they were main livestock diseases captured by the ALCP focus groups in 2011-2014-2017. This is due to the systematic vaccination and improved animal disease notification and control programmes and structure in Georgia.

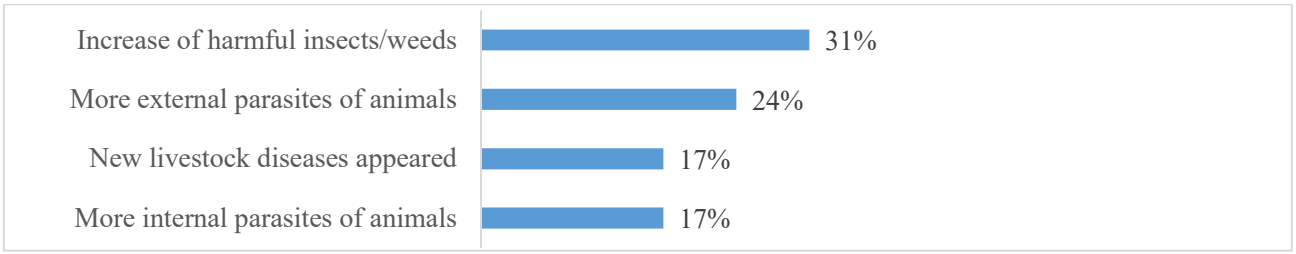

Figure 4 How climate change affected livestock diseases

FARMERS COPING PRACTICES

Most of the participants have changed some of their traditional livestock practices due to climate change. Female and male farmers might have different roles and responsibilities while implementing new practices, however, decisions are made together on the household level.

These changes are mostly related to animal feed production and feeding practices. For example, 69% of the participants mow hay much earlier than before. *'If you do not mow hay till August drought will definitely dry up grass, and then livestock will starve during the winter, nobody can afford to buy enough hay because prices are skyrocketing'*, a farmer from Khulo. However, mowing hay on time requires access to a timely hay-making machinery service which is not always available, especially in mountains. *'While we are waiting for a machinery service grass is drying up and the quality of hay becomes poor'*, said a respondent from Samegrelo.

The same is true for other crops as well and farmers are trying to adapt to these changes, they have started buying climate adapted seeds which help them with getting earlier harvests (55%) and ploughing (31%) and planting (41%) earlier.

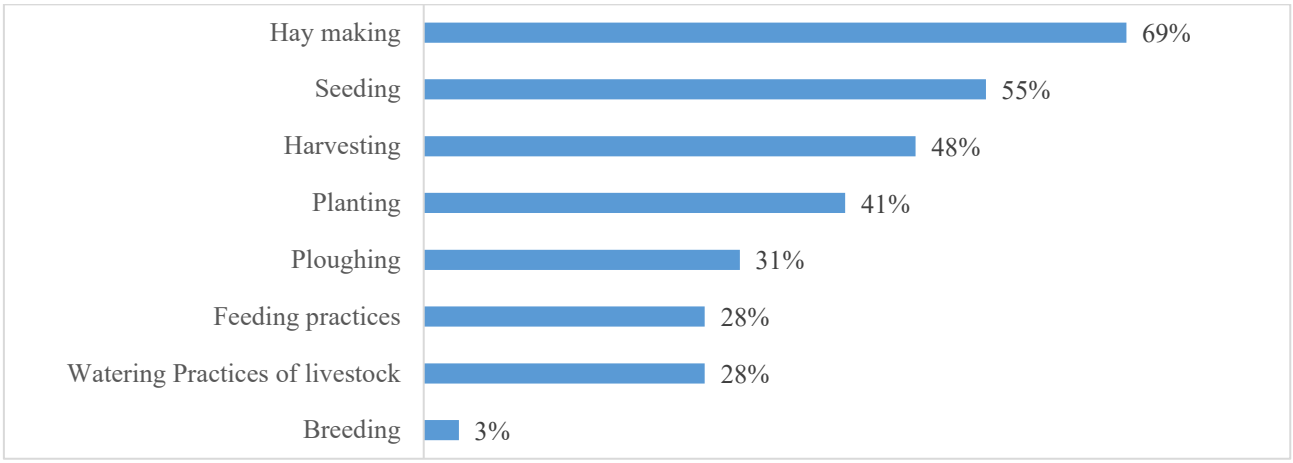

Figure 5 What traditional agricultural practices have changed because of climate change?

The participants often complained that they found it more difficult to cultivate/harvest enough feed for their livestock and they could not afford additional animal nutrition because prices have gone up. A few farmers in Imereti, Samegrelo, Aspindza and Kakheti mentioned that they brought silage for feeding livestock and farmers found it difficult to afford silage. Beetroots are also used for livestock feed in Aspindza and Tsalka. Buying climate-adapted seeds of maize was mentioned by a few men in Kakheti and they expressed satisfaction due to the quality and quantity they harvested. A few men in Aspindza buy maize in Shida Kartli. They stopped growing maize themselves due to a lack of irrigation. *Sorghum Sudanese* (a kind of grass) is also mentioned in Kakheti, as climate-adapted grass used for livestock feed. In Aspindza and Khulo some farmers are using Agro Trading's combined feed.

NEW PRACTICES TO COPE WITH CLIMATE CHANGE

Around a third of female and male farmers have applied new technologies to deal with climate change. 34% of the participants have used organic or biofertilizers, 31% have bought climate-adapted seeds and diversified crop rotations and 31% have updated irrigation systems, but it should be notified that drip irrigation is not used for producing livestock feed but for cash crops, vegetables and fruit. For example, in the Azeri community in Kvemo Kartli drip irrigation is a well-known and used practice for vegetables and plants. Instead of potatoes, some farmers in Khulo and Aspindza have started growing raspberries and they are using drip irrigation. Drip irrigation for vegetables was mentioned by some farmers in Tsalka and for strawberries in Kakheti.

The majority of the participants are aware of the need for vitamins and minerals for cattle, but they have given them when a cow is sick or when it is hot, depending on vet requirements. They have mostly given salt to their cattle, and they are using feed choppers for better digestion and better nutritional value. A few farmers have also used *Rumifos* (a kind of probiotic) in Kakheti.

Everyone is aware of the benefits of solar panels, but no one has them, due to a lack of finance. They perceive solar panels as luxurious and unaffordable inputs.

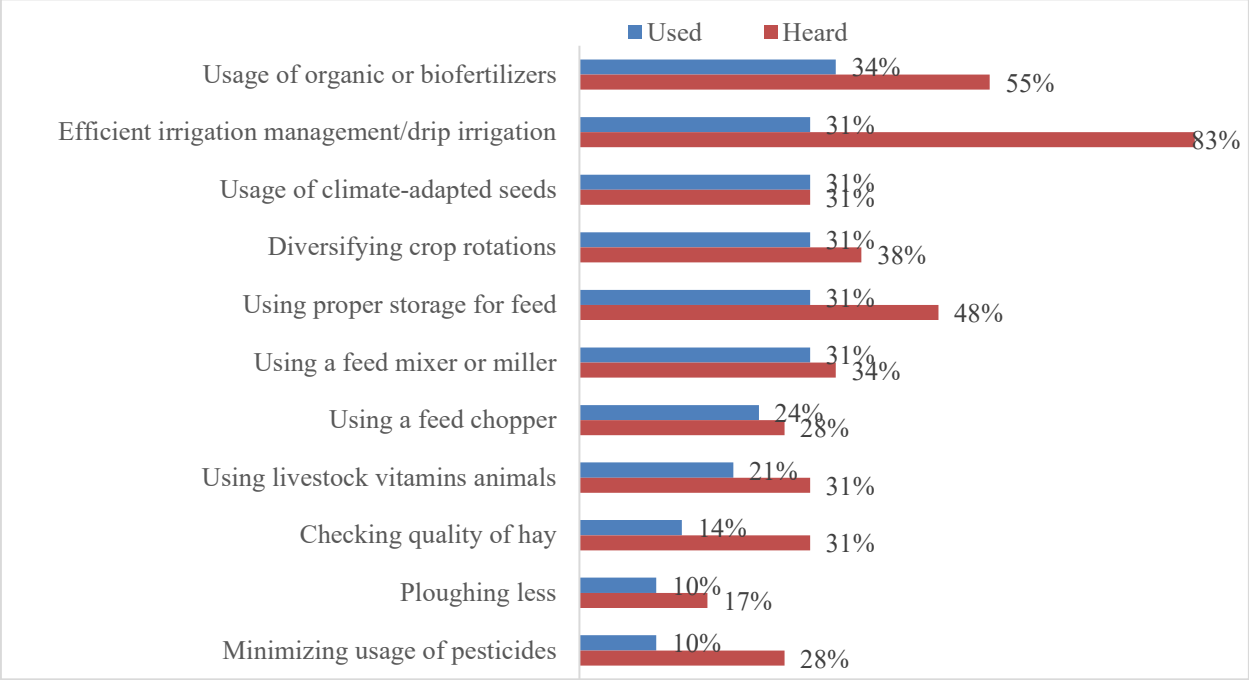

Figure 6 New practices to cope with climate change

Remarkably, on average, there is less than a 14% difference between knowing and applying the new practices. It seems that if farmers have proper information and knowledge regarding coping mechanisms, there is a high probability that they will try to apply new practices. It underlines the importance of disseminating agri information related to climate change and coping practices especially when 90% of the female and male farmers reported that they want to know more about climate change and related coping strategies. Information is also important to reduce the use of harmful practices such as burning soil after harvesting, cutting down windbreak lines, or overusing pesticides.

However, one should also take into consideration the affordability and accessibility of new technologies. Those who have not applied new practices state that the main obstacles are related to finance (79%) and perceived costs (38%).

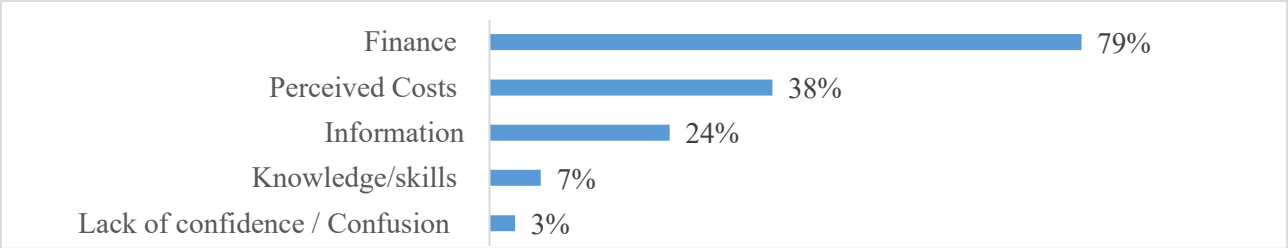

Figure 7 Obstacles to implementing new practices

TRADITIONAL PRACTICES

Traditionally, most farmers use manure for fertilizing the soil: this practice is widespread in highlands and lowlands.

Water storage: The practice storing rain or snow melt is not being used in the interviewed villages. Only in Shiraki pastures (Kakheti), is the practice well-known and has been used since Soviet times. Putting ash on the soil to decrease the acidity of soil was mentioned in Aspindza (SJ) by a few women. The usage of apple vinegar in the feed a month before giving birth to avoid mastitis was mentioned by some women in Sachkhere (Imereti region).

INFORMATION

The main source of information regarding climate change-related technologies and practices is other farmers (86%), social media (59%) and TV (55%). It is a trend in Georgia that slowly, but steadily social media is overtaking traditional media as the main means of accessing information. According to GeoStat, in 2022 82% of rural households have access to the internet either through computers or smartphones: the same figure in 2016 was 57%. On this note, it is understandable, that as the farmers stated they often watched agricultural TV programmes not on TV, but on Facebook and other social media platforms.

Also, there is a significant difference in how women and men get agri information: the gender analysis shows that women are far more interested in livestock and climate change-related information than men. Women reported that they want to learn more, and they are actively looking for agri information, whether it would be TV programme or social media content.

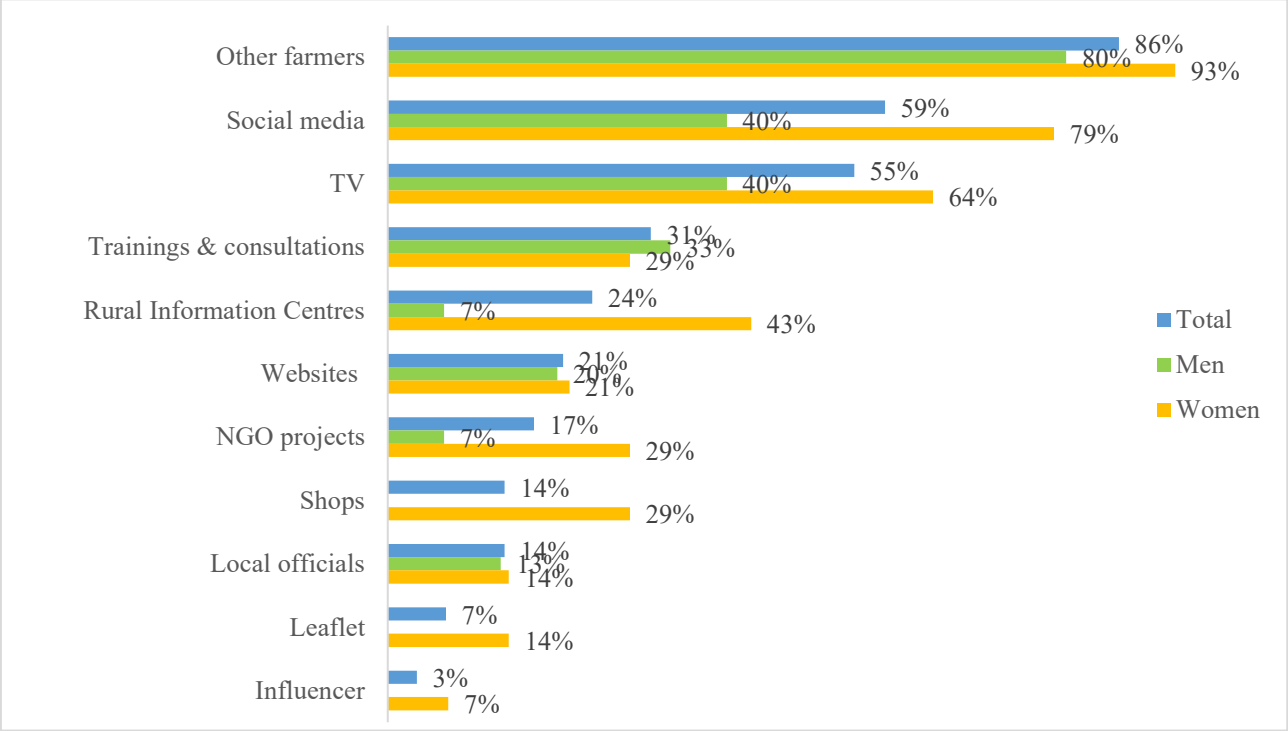

Figure 8 Main source of information on livestock

GOVERNANCE

The majority of both groups of interviewed farmers complained about the availability of pastures in Kvemo Kartli, Samtskhe-Javakheti, Kakheti, Imereti and Samegrelo. They would like to be informed by their local governments about decisions related to sales or rental of pasture. Some respondents mentioned that some people are renting village pastures from the Ministry of Economy and farmers need to then pay them for using their village pastures. These farmers think that village pastures should be available to locals for free. During these focus groups only in Aspindza was there a positive example where farmers with the help of their village representative protected their pastures from being privatized, and the village now has 170 ha of their own pastures and 200 ha of pastures rented from the government.

In Kulari Village, Marneuli interviewed male farmers noted that a gravel factory is damaging their pastures and agricultural lands near the Khrami river, as the factory is taking gravel from the river. Interviewed women in Kulari Village, Marneuli noted that there is an unfair distribution of irrigation water between large farmers and small and medium farmers, who own many hectares of land they have more privileges in using irrigation water. Farmers in Ninotsminda need the local self-government's help to get water to their pastures. In the soviet era, they had water-saving pools pumped from a river.

SECTION 2: BEEKEEPING

CLIMATE CHANGE FROM BEEKEEPERS' PERSPECTIVE

Unpredictable weather patterns have been observed by beekeepers during the last five years with notable severity in 2022. Increased temperature (83%), heat in summer (78%), drought (78%), and frequent rains (44%) are among the key factors observed by female and male beekeepers which are affecting their beekeeping practices and honey production. This year, the onset of nectar flow in spring was accompanied by frequent rains. In July and August, there was less rain than usual. The duration of and sudden shifts between the seasons have become more evident – *'there was a kind of jump between winter and summer, from cold we quickly moved to summer heat, which is unusual'* – said a female beekeeper from Ajara. Both male and female beekeepers in Samtskhe-Javakheti talked about hail occurring in spring, which destroyed fruit flowers. Warmer winters were mentioned by male and female beekeepers in Samegrelo, while male beekeepers in Imereti and Kakheti noted strong winds.

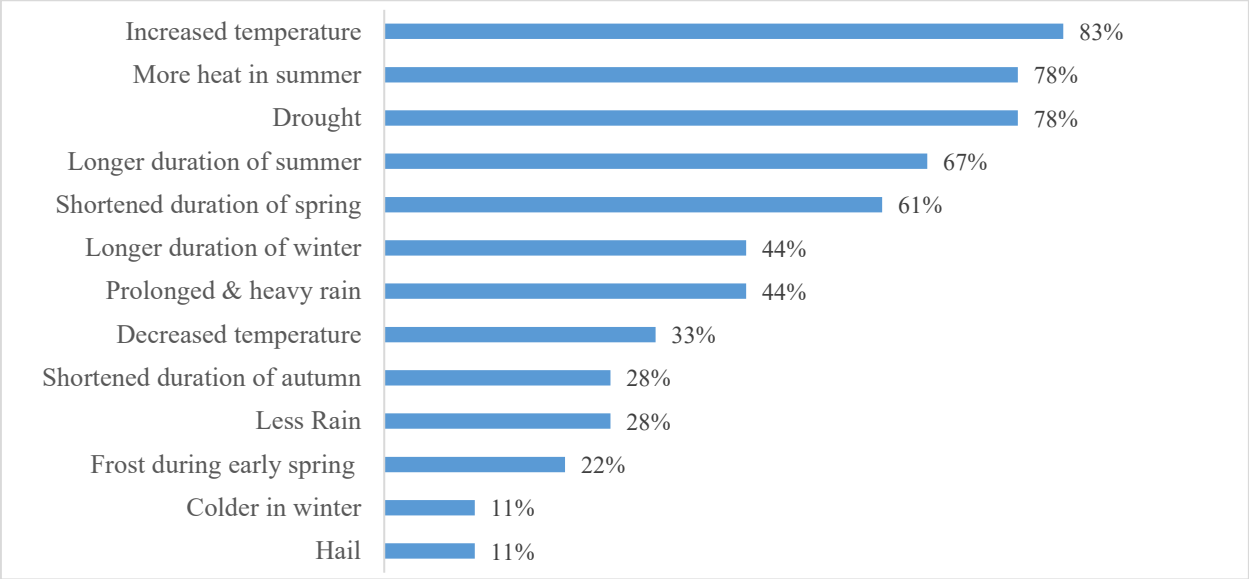

Figure 9 Most widely observed climate change trends among beekeepers during the last 10 years

IMPACT ON BEEKEEPING

The mentioned changes in weather have created several challenges for the interviewed beekeepers, as beekeeping is highly dependent on climate.

The effect of climate changes on nectar flow (83%) and bee productivity is evident (83%) highlighted by both male and female beekeepers. *'Even a few days shift of nectar flow makes a huge difference and affects bees' productivity and health'* – said a female beekeeper from Imereti. Nectar flow usually starts in early spring when bees start to collect nectar to increase swarms and strengthen colonies. However, this year, prolonged and heavy rainfall in early spring hampered bees from collecting nectar, as bees cannot work efficiently during rain, and they are not attracted to some honey flowers as they should be as their nectar becomes diluted. Thus, in an active nectar flow period of dominant honey flowers, like acacia, at the end of April or beginning of May, bees

were weak, and some portion of the acacia nectar collected was used for strengthening rather than for making honey. This caused a drop in the acacia honey harvest by about 50% in Western Georgia.

Prolonged and heavy rainfall continued during June and the beginning of July when chestnut blooms. Both, male and female beekeepers in Western Georgia mentioned that this year the chestnut honey harvest has decreased massively, dropping by 80%. Some male and female beekeepers have increased the use of additional feed (syrup, candy) to give to the bees (33%). The low temperature in early spring caused *Chalkbrood* disease in Imereti, which is an infection affecting weak colonies. Unpredictable weather impacts bee transhumance (50%), *'I took apiary to the mountains in Svaneti to collect chestnut honey, however, it was raining the whole month and bees could not harvest any honey there'*- a female beekeeper from Samegrelo. It should be noted that only in Racha both male and female beekeepers highlighted that prolonged rain in early spring did not affect honey harvest, drought was not an issue either, so they are satisfied with the amount of honey harvested.

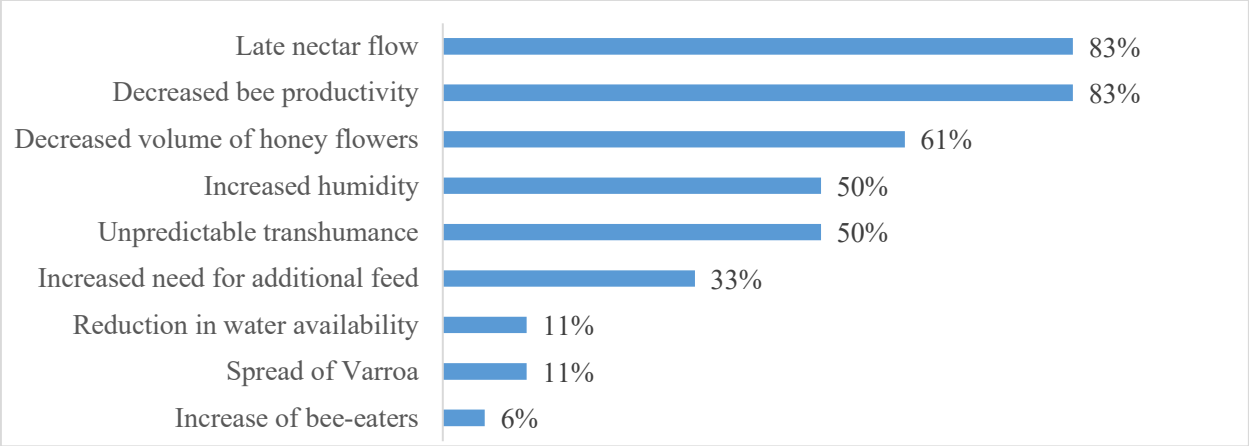

Figure 10 How climate change has affected beekeeping

According to some interviewed male and female beekeepers, higher temperature seemed to reduce the efficacy of beekeeping drugs. Warmer winters increased humidity in the hive provoking *Varroa* in Samegrelo. Uncontrolled use of pesticides and herbicides[1] which affects bees is a problem in Ajara, Imereti, Kakheti and Samtskhe-Javakheti regions. Usually, farmers are spraying during the day, when bees are out of hives to collect nectar. These farmers do not properly communicate with beekeepers to prevent any risks. Wild animal attacks (bears and wolves) on hives have become more frequent in Ajara and Samegrelo, which beekeepers link to drought. Both male and female beekeepers in western Georgia also mentioned the chestnut tree disease destroying the plant.

[1] Pesticide is used to eliminate pests, while herbicides are a type of pesticide that specifically targets weeds and other unwanted plants.

COPING STRATEGIES

Different strategies are being used by the interviewed male and female beekeepers to minimize the damage caused by unpredictable weather conditions. The health of bees is a priority in these conditions. 89% of both male and female beekeepers continued or started using acids (Oxalic Acid, Formic Acid, etc.) to ensure bees are strong with high resistance to diseases (such as Varroa) and unfavourable weather conditions. In general, the use of bio vet drugs is preferred by 83% of both male and female beekeepers rather than the use of commonly used chemical substance drugs, like *Varocom or Varostop*.

Misconception about the benefits of the use of antibiotics seems to be finally diminishing amongst beekeepers, as now both male and female beekeepers are aware of the harmful impact of antibiotics, and they avoid any use of them (83% for both male and female beekeepers). Previously it was one of the main constraints for selling honey captured by the ALCP in FG surveys in 2014 and 2017. This is due to systematic information campaigns[2] and improved control of antibiotics in Georgia.

Most of the female and male beekeepers mentioned the importance of beehives. 39% have already modified their hives by adding additional ventilation to avoid humidity during high temperatures or prolonged and heavy rainfall. Beekeepers complained about the quality of the hives, *'sometimes hives are made from wood material that is not dry enough, also they are in a poor built quality'*, noted a beekeeper in Samegrelo. While male beekeepers complained about the quality of the hives, female beekeepers also emphasized the need for beehives with lighter weights, that will be easier for them to use. Also, Armenian beekeepers from Akhalkalaki would like to have access to hives adapted to severe cold conditions.

The use of probiotics (28%) was named mainly by women in Zugdidi, Akhaltsikhe and Racha who use them to increase bee immunity. While considering the shifting time of nectar flow, it is vital to take bees for transhumance (22%). However, it is related to increased costs, places are limited. The number of hives is not properly managed, and many hives are placed in the same place which increases the risk of disease spread. In Samegrelo, some beekeepers are taking their hives for transhumance and putting them just along the highway, because it is easier and cheaper to do, compared to taking them to the upper zones, with poor road conditions and increased related costs. But it affects honey quality, which might be contaminated by car emissions, high voltage wires and noise. This year, because of the extreme drought In Kakheti, beekeepers kept apiaries on pastures for a longer period.

Maintaining extra bee colonies (17%) is another strategy suggested by mainly male beekeepers to use to counteract climate-related production decreases. However, it requires having additional beehives which are costly[3]. 11% of beekeepers have diversified production of bee by-products. The women respondents in Ajara and Samegrelo named the production of Queen Bees and propolis.

A new useful practice of Queen Bee caging to artificially create a broodless period was also mentioned. Male and female beekeepers who used it by recommendation from the Georgian Beekeepers Union (GBU) are satisfied with the result. This practice allows for treatment with acids and prevention of Varroa.

Some male beekeepers highlighted that in some cases the use of acids caused fungus in hives. As it was revealed poor knowledge on how to use acids is an issue, because in high/low temperature conditions, a beekeeper

[2] A major ALCP intervention.

[3] A price ranges between 120-150 Gel/per hive.

should use certain acids in different dosages to ensure its efficacy. Female beekeepers in Racha mentioned about a traditional practice of putting salty water near the hives to prevent bees in taking water from open sewage system.

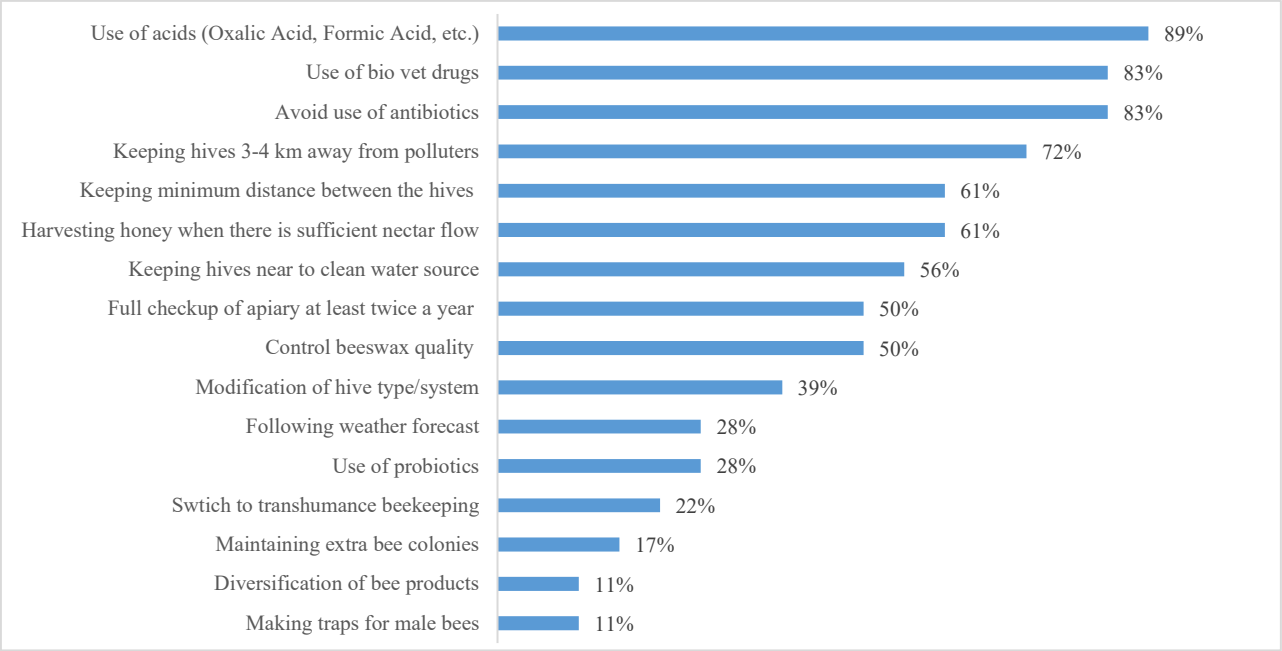

Figure 11 Practices used to cope with climate changes and impacts

The majority of all the beekeepers named lack of information, knowledge and finances as the constraints for establishing new beekeeping practices. They are worrying about limited and unstable honey market, which makes it hard to make planned investments in beekeeping. Some of them suggested planting honey flowers in lower zones to enrich the bee feed base. The importance of planting honey flowers was also named by the Armenian beekeepers in Akhalkalaki, where potatoes are the dominant crop taking a large portion of land. Both male and female beekeepers see the need for and are willing to pay for a full check-up for the apiary at least twice a year by a qualified specialist to ensure bee health.

INFORMATION

Social media works well in beekeeping, as named by both male and female beekeepers. 72% named the Chairman of the GBU as an influencer and the key contact person for consultation and information. The live sessions led by the GBU's official Face Book page are of high importance and have become one of the main information sources for the beekeepers, they know the time and watch it every Saturday, where they can ask questions and have direct communication with the field experienced people. It became particularly useful for female beekeepers, because their communication with other beekeepers, who are usually men, seems to be limited. During live sessions, women are able to engage and get the information they need. The majority of the beekeepers are the members of Georgian Bee GB group, also administered by the GBU's chairman. 94% mentioned other beekeepers as well.

It is notable that male and female beekeepers in Ajara, Imereti and Samtskhe-Javakheti do not feel confident about the knowledge they have. Beekeepers in Samtskhe-Javakheti and female beekeepers in Imereti talked about the lack of training and information meetings where they could get information about beekeeping practices. *'There are not many trainings or meetings with the beekeepers. It will be good to have a kind of an extension service locally that we can rely on',* a female beekeeper from Imereti.

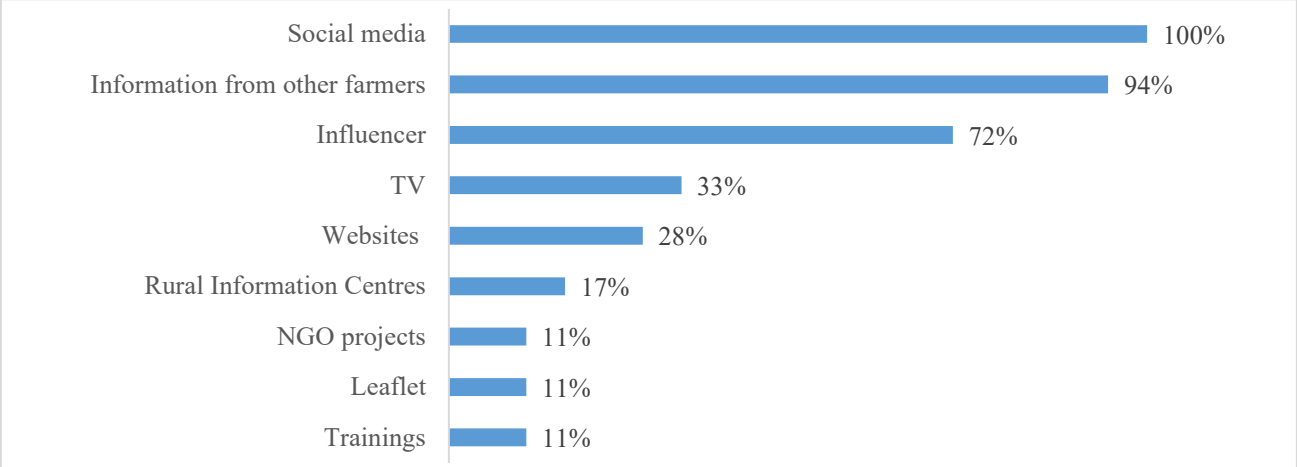

Figure 12 Main sources of information on beekeeping

GOVERNANCE

The majority of both male and female beekeepers complained about unhealthy competition created by falsified (or sugar-added) honey, which is cheaper (on average 4-6 Gel less/per kg). This is particularly problematic for beekeepers in Ajara, Imereti and Kakheti, where falsified honey is being sold at tourist attractions damaging the honey image. The interviewed beekeepers think that the adoption of related regulations, enhanced control and access to laboratory testing locally are possible solutions to prove honey quality.

Due to unpredictable weather and sudden shifts in nectar flow, bee transhumance is becoming a necessity to ensure sufficient honey volume. Poor road conditions were named as one of the main constraints for accessing pastures. Another issue is a lack of management in terms of hives placement in specific pasture lands, a high number of hives are placed in one place and nectar flow is not enough to meet increased demand. Also, this increases the risk of disease spread from one apiary to another.

Both male and female beekeepers are also concerned about the increasing number of small beekeepers, who lack knowledge of bee treatment and provoke disease outbreaks. This issue highlights the need for hive identification and registration. Interviewed beekeepers in Ajara, Imereti and Kakheti mentioned uncontrolled cutting down of trees. For example, the dominant honey flower acacia wood is widely used for vineyards.

Female beekeepers in Kakheti said that they know some places near their villages where the local government, beekeepers' cooperatives, or associations should start planting trees and plants for bees. While the interviewed male beekeepers said that there are lots of unused valleys and local government should help them with building road infrastructure to get there.