Study on pasture management issues and their causality in the Republic of Armenia

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(Translation)

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This study was carried out by agriculture and rural development expert Viktorya Ayvazyan for the "Project Coordination Platform for Sustainable Management of RA Natural Grazing Lands – Pastures and Grasslands" and for the development of a Concept Paper on Sustainable Pasture Management in the Republic of Armenia.

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Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Agency for Development and Cooperation SDC

Strategic Development Agency
Strategies for Development

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List of acronyms

RECC	Real Estate Cadastre Committee
NSS	National Statistical Service
NSC	National Statistics Committee
MNP	Ministry of Environment
GIZ	German Development Cooperation Office
CARMC	Community Agricultural Resource Management and Competitiveness
LC	Large cattle
NGO	Non-Governmental Organization
RA	Republic of Armenia
UNDP	United Nations Development Program
UN	United Nations
SC	Small cattle
SDA	Strategic Development Agency
LSG	Local Self-Government
LSGB	Local Self-Government Body
TAD	Territorial Administration and Development

1. Executive summary

Agriculture is one of the main branches of the Armenian economy, and for many years public administration bodies have been promoting its development through various programs. Nonetheless, animal husbandry experiences a number of challenges today, the most significant of which is low volume of production, to be increased not solely by means of boosting the flock, but through increasing its productivity, while ensuring efficient care and proper feeding.

Provided pastures and grasslands are the main source of livestock fodder in the country, their (especially pastures') sustainable management is a pressing and an urgent issue.

Data from the Real Estate Cadastre Committee of the RA Government shows that over 68% of Armenian land is agricultural soils, with over half of them, or 1,172,576 hectares serving as natural grazing lands – pastures and grasslands. Pastures and grasslands are mostly used by animal farms, as over 50% of produced meat, over 70% of produced milk and almost 100% of wool is generated by consumption of pasture feed.

Distant and adjacent pastures are used with different intensity in different communities, depending on the size of flock in every farm, livestock varieties and the presence of necessary infrastructure on the pastureland, which directly impacts the ecological and economic conditions of the pastures.

The prevalent part of cattle farms in all regions (Marzes) of Armenia keeps large cattle that usually comprise the dominant livestock population in the rural communities. Meanwhile, a comparison of sizes of pastures and sizes of flocks proves that all regions, apart from Armavir and Yerevan underuse the full potential of own pastures.

Pastures and grasslands are unique ecosystems and bear environmental importance, apart from their agricultural value. They are a priceless source of biodiversity and play a substantial role in mitigation of global climate change effects. A pasture is a natural carbon storage that supresses carbon dioxide in the atmosphere.

While in state and community ownership, the pastures are managed and administered by local self-governments (LSGs). However, studies showed that LSGs were very passive in managing pastures, and the process is not well organized and pastures are not under regular control, but are considered only when signing contracts or other transactions.

Legally, the LSGs have to manage pastures, but only pastures and grasslands that are of state property under their administration; while community owned pastures' management is not mandatory. According to the law on local self-governance, community pasture management is among the ex officio competencies of the mayors.

Pasture management by LSGs supposes a number of functions, including the elaboration of the community pasture management plan. Nevertheless, not all communities or settlements have such plans, but only 231 of them, by January 2019. Meanwhile, presence of a plan does not mean it has to be implemented.

Estblishment of pasture management processes in the country may not be linked to LSGs only. It has to be an integrated activity with consideration of limitations in the present environment. In this respect, factors hampering the establishment of pasture management process in the country can be classified as follows:

1. structural problems
2. organizational problems
3. economic and social issues
4. natural and technical limitations
5. problems with absence of resources
6. problems with absence of infrastructure
7. legal factors
8. political and institutional problems

A barrier to integrated pasture management in Armenia is the non-profitability of animal husbandry, which is also a consequence of poor pasture management and wrong use. Sustainable pasture management also suffers from absence of sufficient resources and proper infrastructure. Incomplete infrastructure, limited professional and financial resources contribute to degradation of pastures, reduce the profitability of livestock husbandry and complicate proper pasture management or implementation of actions aimed at increasing the incomes of animal farms.

Meanwhile, weak institutional capacity in community and public administration, rule of law and implementation of agreements create additional complications for guaranteeing sustainable management of pastures.

2. Introduction

2.1. Background and reasons of the study

Agriculture is one of the main branches of Armenian economy, and for many years public administration bodies have been promoting its development through various programs. Nonetheless, animal husbandry experiences a number of challenges today, the most significant of which is increasing the volume of production, not solely by means of boosting the flock, but through increasing its productivity, while ensuring efficient care and proper feeding.

The main source of livestock feed in Armenia is the grazing lands – pastures and grasslands, contributing to the largest share in annual volume of livestock products. A comprehensive public policy is crucial in this context, as it may provide for proper management of grazing lands, especially pastures in the whole territory of the country, ensure rational use, reproduction and conservation of natural resources.

Currently, the pastures in Armenia are of public and community ownership, and are administered and managed by the local self-government bodies (LSGs). Nevertheless, the pasture management competencies and responsibilities of the LSGs are not completely defined, while their abilities and experience in pasture management are limited. Meanwhile, the current legislation makes a uniform pasture management approach for all communities impossible.

The "Project Coordination Platform for Sustainable Management of RA Natural Grazing Lands – Pastures and Grasslands" was established in Armenia in May 2018. Its founders were the Strategic Development Agency (SDA) NGO, German International Cooperation and Development Office (GIZ) and the second project of the former "Community Agricultural Resource Management and Competitiveness" of the Agricultural Development Fund. One of the main purposes of establishment of the platform was overcoming pasture management related problems in the country, including reforms in sector related and sector regulating legislation, establishment of conducive conditions for livestock farms and increase of environmental measures.

The first year of operation was marked by the development of the RA pasture management concept paper by the platform. It defined the main vectors and actions, aimed at sector development. The concept paper will stand as an integrated foundation for elaboration of effective sector policies and making substantial decisions.

The development of the concept paper supposes a number of processes, including:

- Identification and review of pasture management problems and their reasons;
- Review of local and international experience of pasture management, success stories and necessary toolkits;
- Development of possible solutions and instruments for overcoming pasture management problems and sustainable management in the sector;
- Development of a general vision for advancements in the pasture management sector of Armenia.

The coordination platform initiated this study for proper implementation of the aforementioned processes. It is aimed at identification and inventory of issues that hamper efficient pasture management and shall become an informational basis for the development of the concept paper for pasture management.

2.2. Objective and goals of the study

Pastures are an important part of the natural landscape and contain not only economic significance. They serve as a fodder source for cattle and play an environmental role, as they are the habitats for various animals and plants, ensuring their existence and reproduction. Pastures protect soils from erosion, regulate water flows and contribute to pollination. Moreover, pastures may be used for recreation and conserve a significant aesthetic value.

Global challenges that humanity faces today, e.g. population growth, climate change and its impact on agriculture, urbanization for the sake of agricultural lands and fast depletion of natural resources, will ultimately aggravate food security globally in the coming decades.

Food security is still a priority issue for the Republic of Armenia, while experience proves that national practices of using natural resources do not simply fail in solving this problem, but even aggravate it. Especially, according to the Ministry of Environment, in result of irrational use of land resources, including the pastures in the country, about 80% of them faced the threats of erosion and desertification; soil fertility and pasture productivity have also decreased. Naturally, ignoring these problems and acting in a manner that makes them worse, plus the absence of regulatory policies may cause irreversible consequences for the environment and result in serious economic, social and political threats, like less income from agricultural produce and trade, increase in poverty levels and higher vulnerability of the country in terms of food security.

In such circumstances the need for mitigation of negative anthropogenic impacts on natural grazing lands, especially pastures, for increasing and sustaining economic efficiency of

pastures makes the sustainable management crucial. Sustainable management supposes such a complex of actions that will ensure sustainable management of natural ecosystems, will reduce the vulnerability of pasture biodiversity and conserve the composition of the vegetative covers.

Sustainable pasture management should emanate from the sectoral policy, which in its turn, must be committed to preservation of pastures and establishment of favorable conditions and guarantees for their reproduction. Apart from that, sustainable management largely depends on localization of existing sustainable management mechanisms and their continuous implementation by public authorities.

Pasture management in the Republic of Armenia is mostly carried out on community level, because all pastures are in the administrative territories of the communities. Nonetheless, an active involvement of relevant stakeholders in this errand on national and regional levels is a must, as community administration bodies are not skilled enough yet and are missing the financial, technical and professional capacity to perform such a management.

This study **aims** at reviewing and classifying problems and their causes persisting in management of state or community owned pastures in Armenia, which will support the elaboration of a comprehensive concept paper on pasture management in the Republic of Armenia.

The main **objectives** of the study are:

- Review and classify pasture management problems and their causality.
- Describe the compliance among competencies and capacities of sector stakeholders in their effort to perform the sustainable pasture management.
- Find out the required legislative and procedural approaches, necessary for increasing the level of sustainability in state and community owned pasture management.

3. Methodology

For the purposes of getting a comprehensive and a complete picture of pasture management in the country and reviewing all the existing problems, the study was carried out based on a combination of a number of qualitative and quantitative methods and instruments of data collection, which allowed an optimal result in presence of objective limitations.

Issues of pasture management were observed on local, regional and national levels, with identification of all stakeholders and beneficiaries by target groups, that were involved in making and implementing decisions on pasture management, and were the impacted groups of such decisions, as well. The following were considered as the main sources of information for this study:

1. Pasture using farms[1],
2. Local self-government bodies,
3. Regional and national bodies of public administration,
4. Research organizations,
5. Local or international organizations that implement or have implemented projects related to pastures in Armenia.

Document review, focus-group discussions, questionnaire surveys and expert interviews were chosen as the main methods of information collection.

Document review

The document review covered laws and strategies, statistical reports, scientific articles and literature on pasture management, but also reports and materials issued by pasture related project implementing organizations in the RA.

Focus-group discussions

Focus-group discussions were organized for discovering problems in management of community and state owned pastures on the community level, for clarification of causality thereof, assessing the expediency of acting legislation and procedures, and for reviewing the skills of local authorities in sustainable pasture management, as well as the difficulties they faced.

[1]This group also included the members of cooperatives in the Pasture Users' Union.

Given animal husbandry is an important branch of agriculture in the regions of Armenia, focus-group discussions were held in all regions (Marzes) of Armenia, apart from Ararat and Armavir, where croplands and orchards prevailed.

The goal was to obtain comprehensive and detailed information through the focus-group discussions. Hence, three target groups were established in each Marz, and focus-group discussions were organized with them separately. The target groups identified for focus-group discussions were:

1. *LSG group, made of mayors, community council members, administrative representatives and secretaries*,
2. *Pasture users group, with representatives of livestock farms*,
3. *Specialists' group, made of agronomists in the rural communities, land planners, veterinarians, etc.*

Hence, 1-11 cattle-breeding settlements were chosen from the Marzes of Syunik, Vayots Dzor, Shirak, Gegharqunik, Lori, Tavush, Kotayk and Aragatsotn, to form the focus-groups. With the goals of pluralism and geographic representation, settlements were selected from consolidated and non-consolidated communities in consideration of a number of criteria, including the number of cattle, size of pastureland and geographic position.

26 focus-group discussions were held in total, with 246 participants from 46 settlements; and more than half of them were pasture users[2]. Settlements and the number of participants from every relevant target group that participated in focus-group discussions are presented in Table 1.

Table 1: Settlements and the number of representatives of target groups that participated in focus-group discussions, by Marzes

Marz	Number of settlements	Communities and settlements	Focus-groups		
			LSGs	Specialists	Pasture users
Syunik	5	Goris, Tatev, Tegh, Sisyan, Gorayk (consolidated communities)	11	10	14
Vayots Dzor	5	Zaritap, Vayk, Gladzor, Areni, Yeghegis (consolidated communities)	7	9	4
Shirak	6	Amasia, Arpi, Ashotsq, Sarapat, Ani (consolidated communities) and Saralanj settlement	17	7	6

[2]Certain LSG reprsentatives and specialists also acted as pasture users.

Lori	6	Lori-Berd, Gylaqarak, Stepanavan, Sarchapet, Tashir, Metsavan (consolidated communities)	11	12	14
Tavush	1	Berd (consolidated community)	4	-	-
Gegharqunik	10	Shoghakat, Tchambarak, Vardenis (consolidated communities) and Tsovak, Lchavan, Mets Masrik, Akhpradzor, Torfavan, Lusakunq, Khachaghbyur settlements	10	22	24
Aragatsotn	7	Nerqin Bazmaberd, Nor Amanos, Avan, Oshakan, Artashavan settlements and Aparan, Tsaghkahovit (consolidated communities)	10	15	8
Kotayk	6	Solak, Lernanist, Geghashen settlements, Akunq, Charentsavan, Yeghvard (consolidated communities)	9	9	13
Total number of communities and settlements: 46			**79**	**84**	**83**

There were two focus-group discussions organized in Kotayk, for the purposes of checking the questionnaire and the expediency of unifying the aforementioned target groups. One group was comprised of LSG representatives and specialists, and the other was made of representatives of pasture using farms. Separate discussions were held with every target group in every target Marz.

Guidelines were developed for holding the focus-group discussions. They include approaches to pasture management, the sector legislation, information on LSG activity in the sector, awareness and education of the farmers about it. Given the differencies in competencies of the selected target groups, two versions of the guidelines were developed for: (1) LSG representatives and specialists and (2) farmers. Each focus-group discussion lasted up to 2 hours, preceeded by general introduction on sustainable pasture management and sector regulation.

Questionnaire surveys

Questionnaire surveys allowed collection of primary community level data on the conditions of pastures, pasture management and use practices. We must consider that the collected data is not statistically representative of the whole country, as it is only related to 68 communites, out of 502 in the country. Nonetheless, data collected through the survey with the use of questionnaires allows outlining general trends and reflects the reality for communities that administer 56% of state and community owned pastures.

Questionnaire surveys were performed in two modes: filling of questionnaires at place by representatives of the communities participating in the focus-group discussions and online questionnaires. The latter worked for those communities of 10 Marzes of Armenia, the

representatives of which were not enrolled in the focus-groups and had higher than average indicators for rented out pastures by January 2018, according to the data from Ministry of Territorial Administration and Development.

Quantitative surveys were performed by standardized questionnaires. While considering the specificities of problems given to each target group, three versions of standardized questionnaires were developed: (1) for online completion by LSG representatives, (2) for completion by LSG representatives and specialists at the end focus-group discussions and (3) for completion by farmers.

Totally 225 focus-group discussion participants, from 46 communities (including 54 settlements in the consolidated communities) of 8 regions completed the questionnaires.

Online questionnaire completion requests were sent to only 73 settlements in 10 regions of Armenia, 24 of which were satisfied. See *Annex 1, Table 14.*

Quantitative surveys provided the opportunity to collect information from communities administering 13-91% of community and state owned rentable pastures in the country and from representatives of communities administering 15-84% of state and community onwed pasture lands. See Figure 1, below.

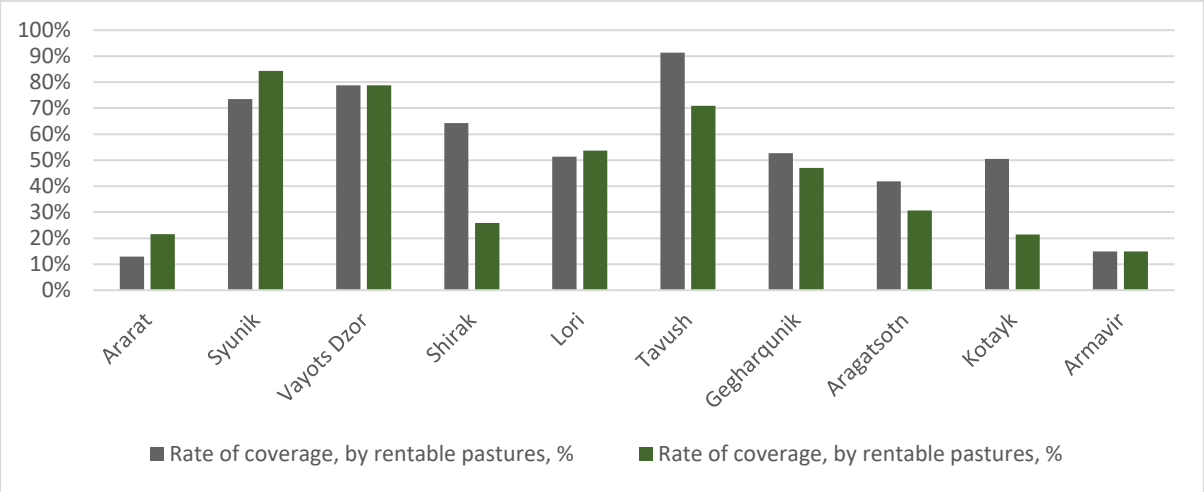


Figure 1: Involvement of communities in the study, by regions, by factually existing and rentable pasturelands (by 01.01.2018)

Communities with less pastures at disposal were from Armavir, Kotayk and Ararat Marzes, with representatives of communities administering 15, 21 and 22 percents of pastures, respectively, participating in the survey.

It is worth mentioning that almost in all regions of the country, rentable pastures were smaller than the total pasturelands in the administrative areas of the communities. See Figure 2. Larger are the differences among the Marzes of Tavush, Gegharqunik and Syunik,

which is also because pastures are close to borders and may not be safe for using, but also because small quantities of livestock in the communities and absence of infrastructure for pasture use, and respectively absence of favorable conditions of use, which make renting unrealistic.

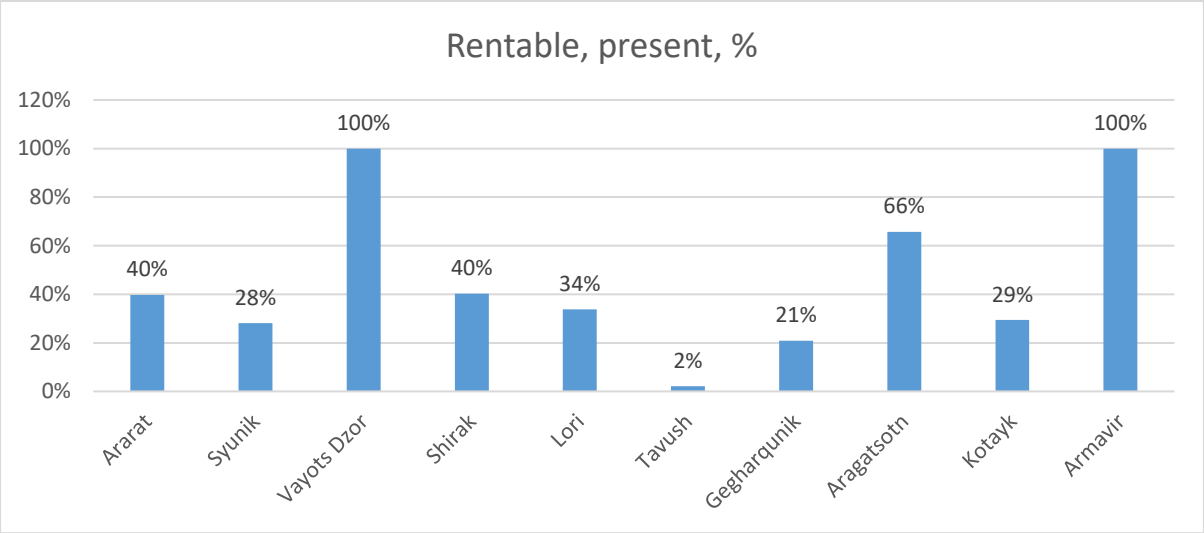


Figure 2: Ratio of existing and rentable pastures (by 01.01.2018)

Individual expert interviews

Expert interviews were carried out on national and regional levels to discuss the importance of national policy in pasture management, difficulties in its implementation and the sector development vision. The interviews were held with representatives of national and regional public administration bodies, local and international organizations whose professional activity was related to pastures and their management.

Additionally, expert interviews allowed for discussing the issues left open after document review, surveys and focus-group discussions on national and regional levels.

18 expert interviews were held through the survey, with application of a half-stadardized quiestionnaire. The list of respondents and the used questionnaire are presented in *Annex 2.*

4. The role of natural grazing lands – pastures and grasslands

4.1. Natural grazing lands

Armenia is a mountainous country, occupying 29.8 thousand square kilometers of area and located at an average altitude of 1700m. 9,9% of the area has an altitude of 1000m, 76,6% - 1000-2500m and 13,5% is above 2500m.

According to the Real Estate Cadastre Committee of the RA Government (RECC), over 68% of the lands of the country (or 2,044,464.8ha) are agricultural, and over half of them, 57% are natural grazing lands – pastures and grasslands. See Table 2.

Table 2: The RA land fund and distribution of pastures and grasslands by ownership, 2018

	Total, ha	**Total, %**
Total agricultural land	**2 044 464,8**	**100%**
Croplands	445 564,5	22%
Perennial plantations	35 348,3	2%
Grasslands, including:	121 040,1	6%
Community and state owned	*66 467,2*	*55%*
Privately owned	*54 572,9*	*45%*
Pastures, including:	1 051 536,5	51%
Community and state owned	*1 020 160,7*	*97%*
Privately owned	*31 375,9*	*3%*
Other lands	390 975,3	19%

Source: RA RECC, 2018

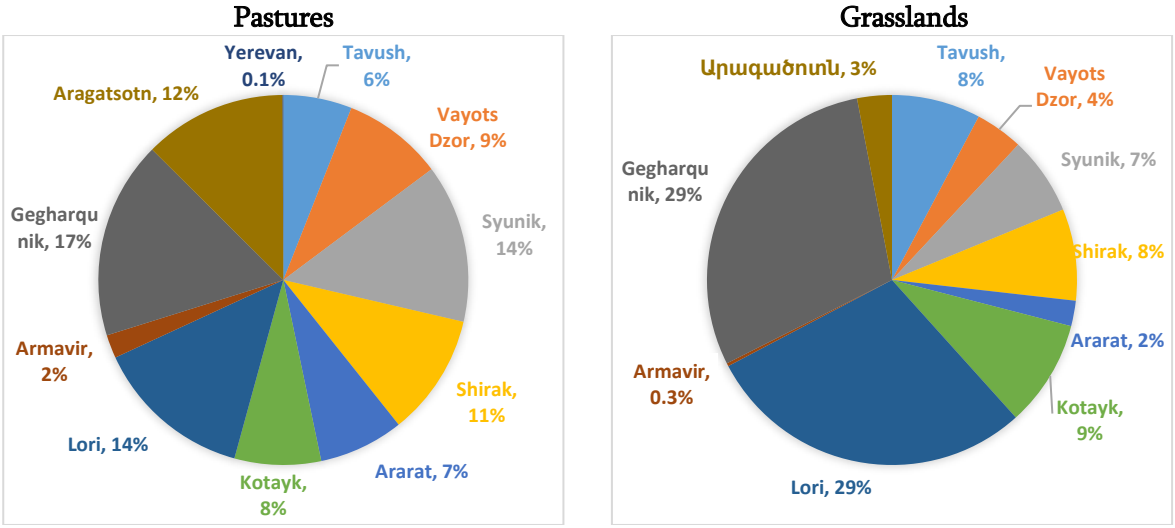
Theses proportions remained unchanged for the last 10 years, however, agricultural land decreased by 76 thousand hectares and pastures by 65 thousand hectares in the period of 2010-2018.

We may also add that in the period of 1998-2005 increase of agricultural land was recorded, mostly due to inclusion of lands from the category of "other lands" to the agricultural category. Hence, according to the 2nd paragraph of Article 9 of 2001 Land Code, other lands were categorized as agricultural in 2005, but they had not belonged to that category before and were considered as lands in reserve, or lands not used for agricultural purposes. Additionally, another redistribution happenned in 2005, which reduced the area of "other lands" by 238.8 thousand hectares and increased the area of pastures by 239.9 thousand hectares.

The main reason for the latter is that rocky pastures that belonged to "other lands" before became "pastures". It is worth mentioning that changes occurred in the land fund of the RA and in the categories of agricultural lands. The other agricultural soil types shrank,

moving into other purposes of use or categorized as higher value soils. Respectively, a part of pastures presented in Table 2 has all the good reasons not to be considered as useable. According to certain calculations, only 30% of pastures are being effectively used (MNP, 2014).

Both the pastures and the grasslands are not equally distributed through the country's territory, as most of them occur in the regions of Gegharqunik, Lori and Syunik, with 45% of pastures (17%, 14% and 14%, respectively) and grasslands 65% (29%, 29% and 7% respectively). The smallest pastures after Yerevan are in Armavir (2%, 21536ha) and Tavush (6%, 63064ha) regions, and the smallest grasslands are in Armavir (0,3% and 322ha) and Ararat (2% and 2 688ha) regions. See Figure 3.



Source: RA RECC, 2018

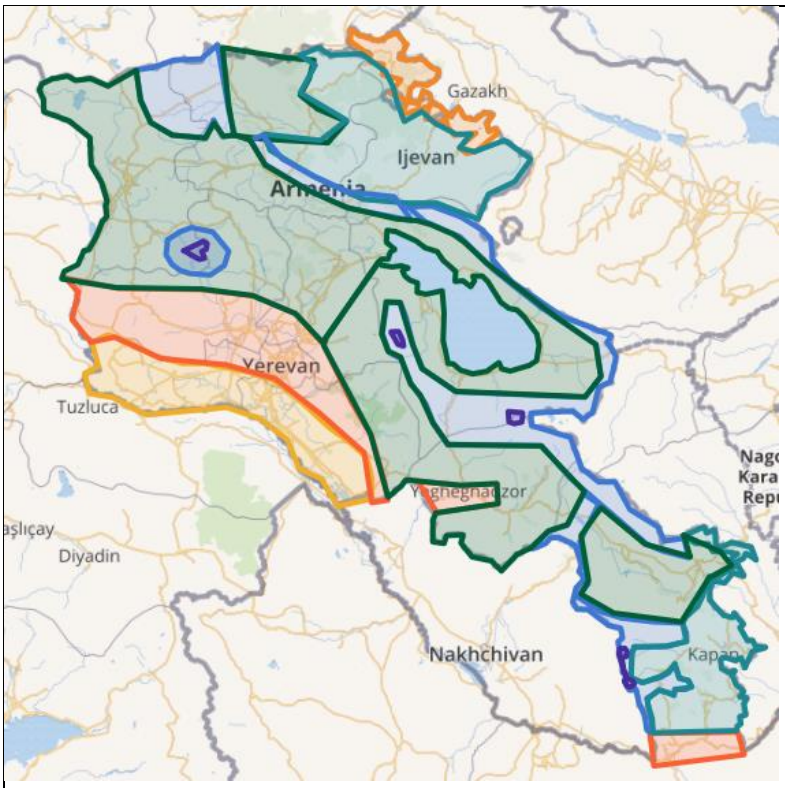
Figure 3: Distribution of pastures and grasslands in the RA Marzes, 2018

Climatewise there are 7 landscape zones in Armenia, dispersed along the vertical zoning. See Figure 4. Pastures in these zones are mostly located in mountain steppes, highland forests, peri-alpine and alpine zones, on altitudes of 1400-3500m.

Pastures and grasslands are mostly used by livestock farms and serve as the main source of fodder. Over 50% of meat, 70% of milk and almost 100% of wool are produced due to use of feed in pastures (MNP, 2014).

The pasture grazing season in Armenia starts in mid April and lasts till September-November. Initially pastures adjacent to the communities are used. Then, following the weather patterns, distant pastures are used. There are many cases, when especially small livestock farms pound their cattle towards pastures in vicinity, their own croplands and grasslands, because of severe deficiency in stored hay and fodder. A similar approach is

applied in Fall, when cattle does not reach pastures after harvest and feeds in privately owned lands.



The landscape zone of deserts and semi-deserts emerged due to dry, severely arid climate that was the consequence of concave landscape, persistent in Ararat and Vayk concaves, at altitudes of 700-1300m.

Mountain steppes in the RA enjoy the largest territory. They are mostly located at an altitude of 1500m, but also at 2000m in the North, 2400-2500m in the South. The climate is mild.

Dry mountain steppes extend through the foothills of Ararat and Vayk, up to 1800m of altitude. The climate is warm and arid. The precipitation is 300-400mm.

Peri-alpine and alpine zones in the North of Armenia start from altitudes of 1900-2000m, and 2400m in the South. They emerged in low temperatures and relatively high humidity conditions.

Mountain forests cover the northern and southern regions of Armenia, mostly the windy slopes of Caucasus Minor mountain chain.

Snowbound areas extend through apical lands, above 3300m (e.g. Aragats, Kaputjugh, etc). There is no vegetation here, fragments of rocks and sand everywhere. These are "primitive soils".

Source: Հայրապետյան, Է.Մ., 2000. Map link: https://maphub.net/tigranserobyan/hayastani-landshaftayin-gotiner

Figure 4: Landscape zones in the Republic of Armenia

Distant and nearby pastures are used with different intensity, depending on size of livestock in separate households, the type of animals (milch and non-milch) and the presence of necessary infrastructure in the pastureland. For example, if infrastructure is present, larger farms will almost always prefer the distant pastures, whereas the small farms with milch animals will mostly avoid distant pastures or return on the same day even if they decide to

go there. Households with small quantity of cattle will often send the non-milch animals to distant pastures.

The more extensive diagram of pasture use in Armenia by livestock farms of different size is presented on Figure 5.

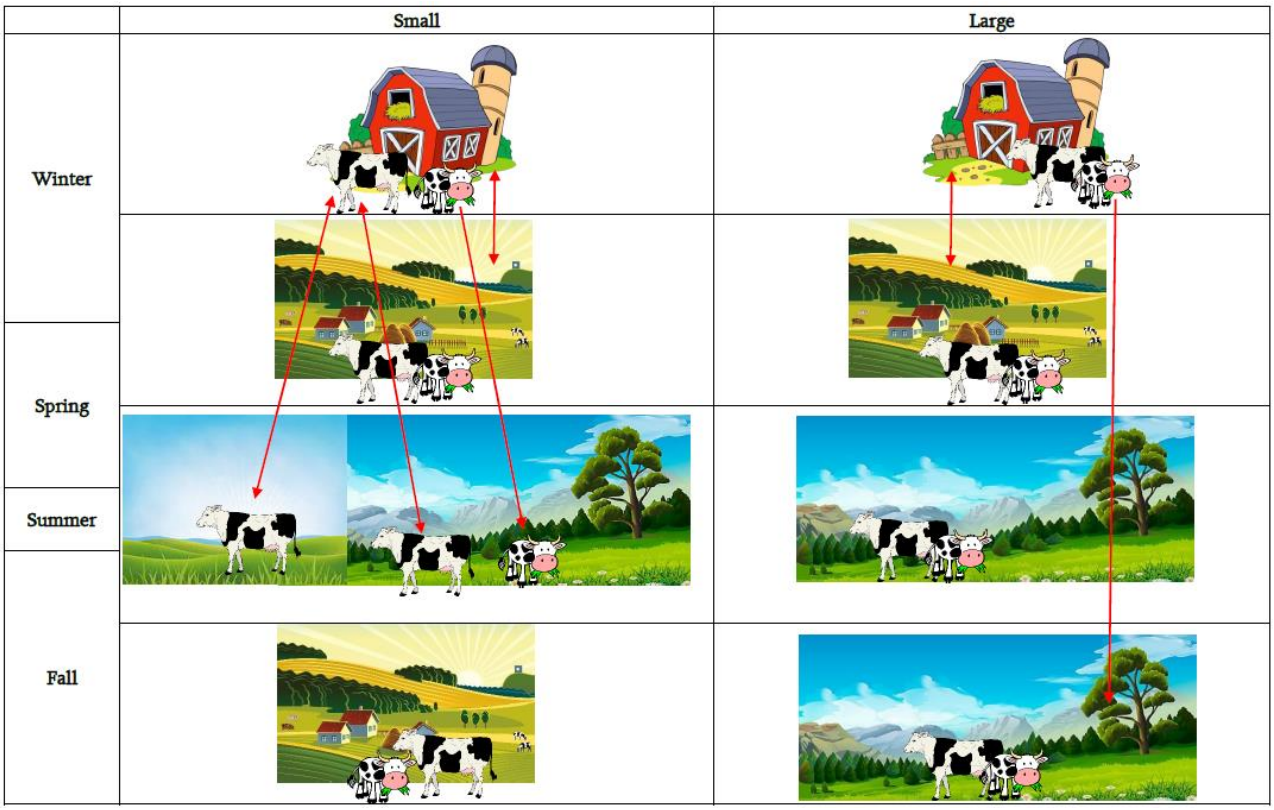


Figure 5: Annual pasture use scheme in Armenia

The vegetative cover of the grazing lands consists of vegetatively regenerating plants that can be grouped in the following four economic-botanical categories: (Tovmasyan, 2015)

1. **Gramineae**, the most widespread feed in nature, occupying over 70% of vegetative cover in arid climates and steppes.
2. **Papilionaceae**, growing in all natural zones, occupying 15-20% of the vegetative covers of meadow-steppes, forests, steppes and peri-alpine zones.
3. **Carex**, spread in all natural zones, from semi-deserts to highlands, alpine zones.
4. **Grasses,** comprising the main economic group of all natural grazing lands by their prevalence and abundance.

Low nutritional value weeds also grow in natural grazing lands – pastures and grasslands of Armenia. Weeds aggravate the quality of grasses in pastures and may even be harmful and toxic for grazing animals. (Tovmasyan, 2015)

There are no further quantitative data on prevalence or annual productivity of each economic-botanical group.

After independence was declared land reforms were carried out. In result, the former collectively and state owned agricultural lands, apart from pastures, were privatized. Today, only 3% of pastures are privately owned (see Table 2). 97% of pastures are owned and administered by the state or the communities and are legally available for use by renting agreements.

4.2. The significance of natural grazing lands for the Armenian economy

As any resource, natural grazing lands also have an economic value, which is not well studied in Armenia; and the environmental-economic value of natural grazing lands – pastures and grasslands has not yet been precisely evaluated. Additionally, there have been no complete studies and precise assessments of the environmental-economic conditions of natural grazing lands. There is no integrated data on infrastructure, conditions, flora and fauna compositions and the economic value of pastures in the regions.

Traditionally, the general public considers the pastures and grasslands as the main sources of livestock feeding, but underestimates their value for other branches of economy. Moreover, the role of the grazing lands is important for other branches of the Armenian economy, hence we will discuss some of the main ones.

Armenian pastures may be a source of biogas generation, as manure accumulating in the pasture after the grazing can be used to generate methane, whereas certain plants that grow in nature (e.g. sorghum, cane, straw) are sources of bioethanol[3] used as fuel for combustion engines. However, there is complete quantitative data on the volume of energy generated from this source in Armenia, and it is not possible to assess its real value and significance for the energy system of the country.

The potential and significance of natural grazing lands – pastures and grasslands for recreation and tourism are hard to underestimate. Grazing lands are attractive touristic locations in the whole world, because of their aesthetic value. Currently they serve as an attractive place for organizing recreation only for the local population, which uses them for short periods in summers, when deciding to spend weekends in the country. In these situations the pastures are especially attractive, as they are located far from settlements, closer to the nature and historical-cultural monuments.

[3]Renewable resources and energy efficiency fund of Armenia, https://bit.ly/2UIBlkG

Tour packages offered to tourists that visit Armenia are quite homogenous and mostly include visits to various historical and cultural monuments and sites. The touristic potential of grazing lands, and especially pastures, has yet remained unnoticed by tourism product developers, hence there is no touristic flow towards them. The development of touristic market will necessarily result in diversification of offered products, which will doubtlessly include ecotourism and rural tourism, focusing on summer pastures, as sources of leisure, harmony with nature and an opportunity to get closer to life at farms.

As it has numerously been mentioned, agriculture and especially animal husbandry largely depend on grazing lands – pastures and grasslands.

Animal husbandry is one of the main branches of Armenian agricultural sector; it has provided for 40% of gross agricultural product for the last decade. Even if the absolute size of the gross agricultural product fluctuated in the period of 2012-2017, going up and down, the gross product of livestock development has stably been growing since 2012. Additionaly, the share of animal husbandry in gross agricultural product has grown for the period of 2013-2017, reaching 48% from 38%. See Table 3.

Table 3: Gross agricultural product, bln. AMD

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total for Armenia	**634**	**628**	**552**	**637**	**795**	**842**	**919**	**983**	**945**	**879**	**908**
Crops	*430*	*406*	*347*	*393*	*465*	*516*	*573*	*595*	*550*	*487*	*469*
% in Armenia	68%	65%	63%	62%	59%	61%	62%	61%	58%	55%	52%
Livestock	*204*	*222*	*205*	*244*	*330*	*326*	*346*	*388*	*395*	*399*	*439*
% in Armenia	32%	35%	37%	38%	41%	39%	38%	39%	42%	45%	48%
Including:											
% by households	*91%*	*92%*	*92%*	*92%*	*93%*	*91%*	*93%*	*93%*	*94%*	*94%*	*94%*
% by commercial organizations	*9%*	*8%*	*8%*	*8%*	*7%*	*9%*	*7%*	*7%*	*6%*	*6%*	*6%*

Source: RA NSS/NSC, Statistical Directory of Armenia

Additionally, over 90% of gross product from animal husbandry comes from cattle breeding households, as they posess most of the livestock in Armenia. Hence, according to data by January 2019, about 99% of all domestic animals are kept at rural households. The exceptions are swine and poultry, with 89,2 and 51,9 percents of which sustained at household farms (NSC, 2019). It is also interesting that animal husbandry is less popular among rural households than crop husbandry. 4% of household farms are involved in cattle breeding only, 54% do both cattle breeding and crop cultivation, and 42% only grow crops.

Next to that, it must be mentioned that household farms are quite small in terms of land plots they cultivate or in terms of the number of cattle they breed, the products of which

are mostly used for their own needs. For example, according to the agricultural census (NSC, 2016), households with 1-4 cows comprise 83% of large cattle households in the country, whereas households with 20 or more LC heads are only 5%, households with 50 and more sheep are only 8%.

Table 4: Number of some types of cattle in household farms

Animals	1- 2 heads	3-4 heads	5-9 heads	10-19 heads	20 and more
LC	25%	28%	30%	12%	5%
Bovine	61%	22%	12%	4%	1%
Ovine	15%		28%	30%	26%
Caprine	59%		25%	11%	4%
Equine	98%		2%	0,3%	0,4%

Source: AC, NSS, 2016

Meanwhile, according to the NSC, 27% of LC are in farms that have up to 5 heads of LC total, 56% of cows are located at farms with up to 5 cows, 12% of sheep are at farms with up to 10 sheep and 56% of goats are at farms with up to 10 goats.

Table 5: Number of some types of cattle in household farms

Animals	Household farms		
	Up to 5 heads	Up to 10 heads	Up to 20 heads
LC	27%	53%	-
Bovine	56%	76%	-
Ovine	3%	12%	28%
Caprine	32%	56%	75%

Source: NSC clarification by April 2019

Most of the farms with 20 and more heads of large cattle are located in the regions of Shirak (16,8%), Aragatsotn (12,3%), Syunik (12,3%) and Gegharqunik (12,2%). Most of the farms with 20 and more cows are also in these regions, comprising 56.1% of farms with 20 and more cows. It is important to remember that 54% of pastures are also located in the same regions of Armenia. Larger ovine farms (50 and more heads) are located in the regions of Ararat, Syunik and Armavir (NSC, 2016).

It is also worth mentioning that animal husbandry in Armenia does not significantly differ by regions, and all regions, including Capital Yerevan are involved in it. There are no agricultural animals that are not present in any of the regions (NSC, 2019).

As it has already been mentioned, about 99% of agricultural animals that graze in pastures are located in household farms, the largest share of which breed them for own uses. Hence, all these farms prefer to keep milch cows, as the main source of milk and dairy products. Respectively, most of the household livestock farms in all regions of Armenia are invlolved

in large cattle breeding, and the main population of domestic animals in the regions is comprised of large cattle. 89% of the communities that participated in the survey mentioned large cattle breeding as the most popular agricultural activity of their communities.

67% of the respondents in the communities mentioned sheep breeding as the second most popular agricultural activity. Even though Armenian climate is favorable for sheep breeding and Iran Islamic Republic and other muslim countries actively buy live animals and mutton from Armenia, sheep breeding is less developed. Apart from existing technical difficulties, another reason for lower levels of development in this branch of animal husbandry is that compared to large cattle, sheep need more attention from the farmer.

The third most popular branch is comprised of swine farms and apiaries, involving respectively 17 and 12 percents of the communities. Caprine development is weakly developed in Armenia, even though it may be a perspective economic activity in the highlands, but is mostly located in Vayots Dzor region.

The distribution of livestock by regions tells the levels of specialization in them (Figure 6). Hence, most of the large cattle is located in Gegharqunik Marz (18%, 2019), Shirak Marz is on the second place (15%, 2019). About 1/5 of sheep and horses in the country are in the region of Syunik, and 22% of goats are in the region of Vayots Dzor. Surprisingly, the Armavir Marz, which is traditionally considered to be a crop husbandry region hosts 27, 16 and 13 percents of poultry, sheep and swine, respectively.

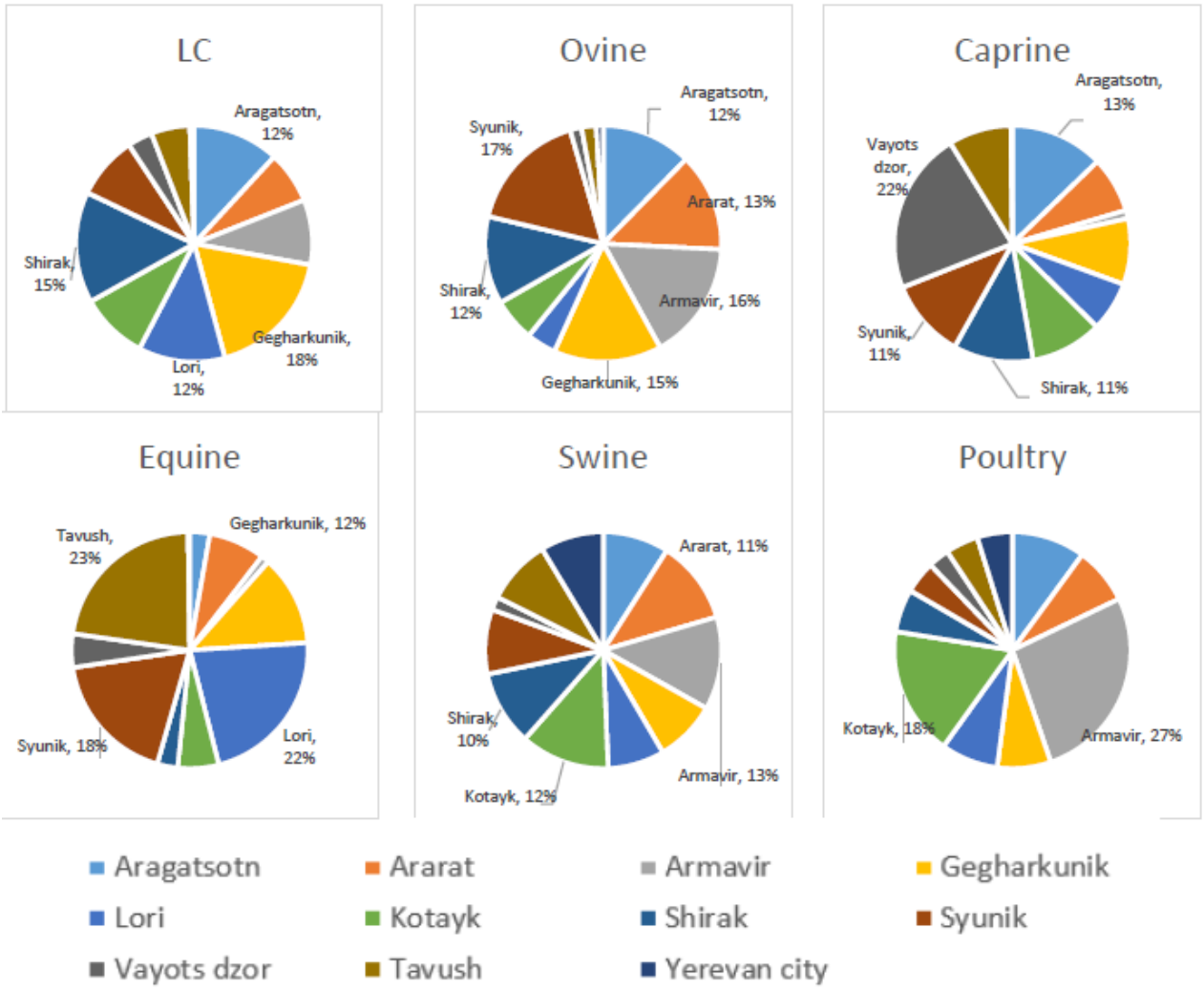


Figure 6: Distribution of cattle by regions, January 2019, NSC

By January 2019, there were 572 thousand heads of large cattle registered in Armenia, of which 254 thousand cows, also 638 thousand sheep and goats, 11 thousand horses (Table 6). It is also worth mentioning that the presence of markets, industrial and administrative conditions will multiply the quantity of livestock several times.

Table 6: Change of livestock quantities for the period of 1985-2018, by the end of year, 1000 heads

	1985	1995	2005	2015	2018	2017/1985
LC, thousand heads	860,7	507,5	592,1	701,5	571,8	-34%
Including cows	*319,3*	*276,8*	*297,1*	*318,6*	*253,9*	*-20%*
Sheep and goats	1 902,8	603,7	*591,6*	778,1	638,3	-66%

Source: NSS/NSC, Statistical directories

It is also worth mentioning that quantitative comparison of pastures and livestock (provisionally large cattle) in different regions, proves that all Marzes apart from Armavir and Yerevan, do not use the full potential of their pastures, or otherwise the existing

pastures are 1.2 – 4.5 larger than it is required for sustaining the same quantity of livestock they have (NSC, 2019; ԱԳԿԿ, 2018). Nevertheless, it must be noted that degraded pastures and pastures without infrastructure, as well as limitations they create were not taken into account in this calculation.

Changes in time in the quantity of livestock that grazes on pastures are presented in Figure 7. In the period of 2010-2015, the quantity of livestock, apart from goats and horses, continuously grew, however, in the period of 2015-2017, the quantity of all agricultural animals decreased, compared to every previous year. In 2018, the quantities of cows and sheep also decreased continuously. It has to be noted that often changes in the quantity of livestock directly depend on the prices for animal products and process of fodder. Changes in quantity of cattle are directly comparable to the volume of animal products. It means that changes in the volume of products directly depends on changes in livestock quantities.

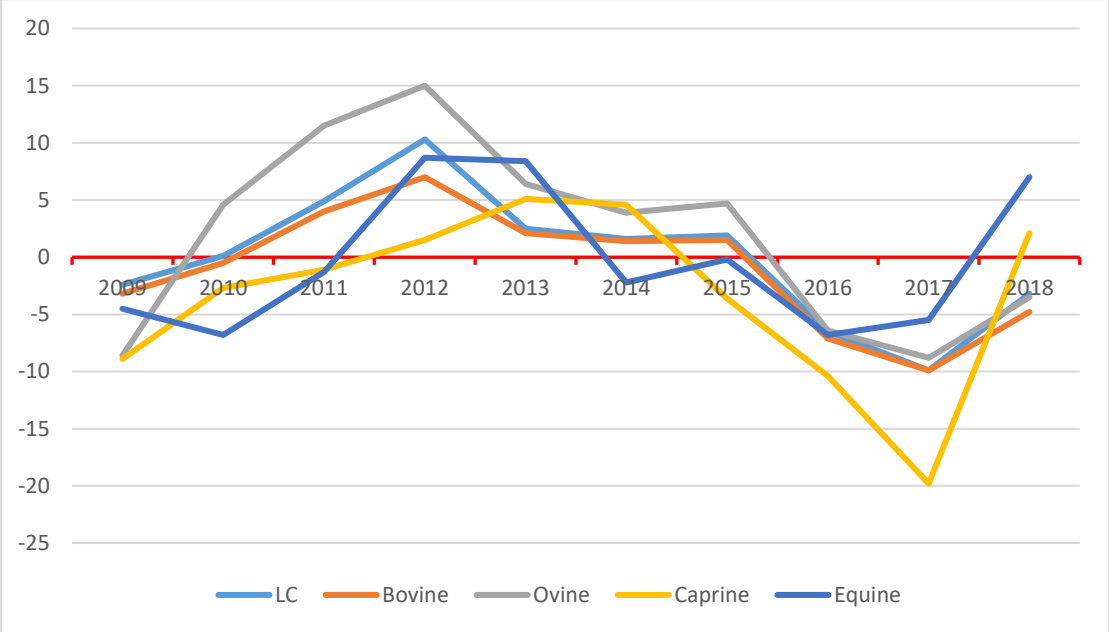


Figure 7: Change in the quantity of agricultural animals that graze on pastures compared to the previous years, %

A good example is the change in the quantity of cows for the period of 2008-2017, when compared to the volume of milk produced and with prices. Figure 8 shows that change in the volume of milk, produced in the period of 2008-2016, directly depended on change in the quantity of livestock. That trend has started to improve since 2014, when small changes in the quantity of cattle resulted in relatively significant change in quantity of milk. It means that since 2014 some animals were replaced with higher productivity ones. Moreover, a negative trend was observed first time in 2017, when decrease in the quantity of livestock resulted in increase in the volume of produced milk. Nevertheless, it must be

noted that data from 2017 is the most recent data published by the NSC and can still be changed.

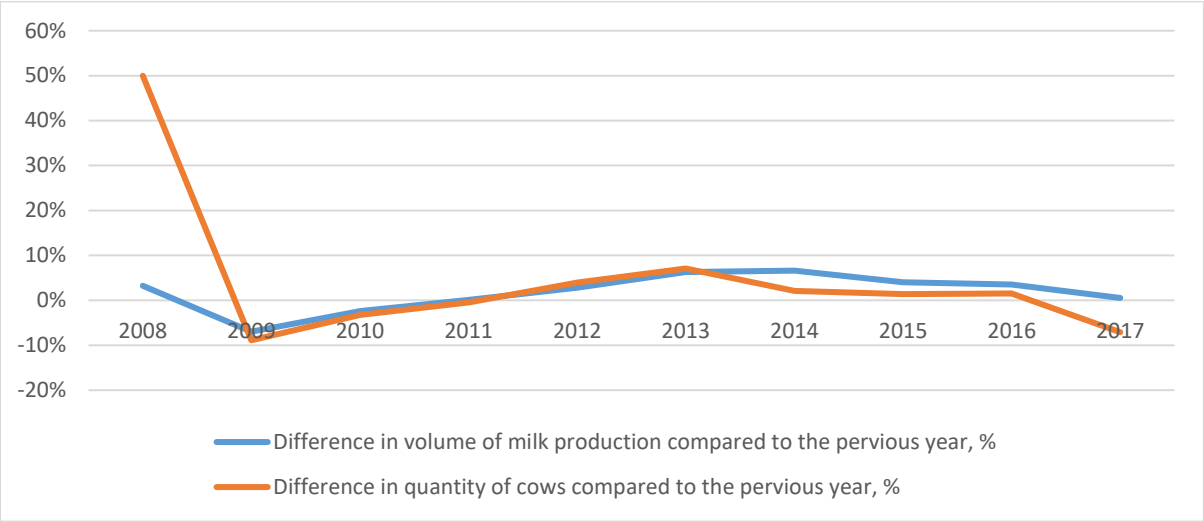


Figure 8: Change in the quantity of cows and volume of milk in 2008-2017, in % comparison to the previous years

The issue of ensuring sufficient feed for the agricultural animals in the country is solved by natural grazing lands, but as well by annual and perennial plants and combined feed. There is no complete data on local production or import of all types of feed used as fodder. Data on local production is related only to annual volumes of corn, edible root, annual and perennial plants and hay from natural grasslands (Figure 9). Available data on import of feed (Table 7) are not enough to classify imported or exported feed by types and significance.

However, according to expert assessments, Armenia imports only combined fodder, the local production of which, according to the Ministry of Agriculture does not exceed 20 000-30 000 tones annually. By the way, combined fodder is the only animal feed that is being currently produced by specialized companies and individuals. Local production of other types of animal feed is spontaneous and not well organized, yet carried out by various farms to their capacity and need.

Table 7: Import of products to Armenia used for feeding animals, tones[4]

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Import	6 293	7 565	7 256	8 562	11 553	13 116	12 790	11 780	12 384	12 022	13 379
Export	10	11	17	19	22	14	15	5	11	45	1
Balance	**6 283**	**7 554**	**7 239**	**8 543**	**11 531**	**13 102**	**12 775**	**11 775**	**12 373**	**11 977**	**13 378**

[4] This indicator includes commodities in the category of Animal feed, under code 2309 90 in the Classification of Commodities by Commodity Nomenclature of Foreign Economic Activity, with the exeption of cat and dog foot, sold in retail. No more details are available.

Source: ICT Trade Map data warehouse

According to NSC data, lands cultivated with fodder crops in 2017 comprised 76,3ha, with 5 500 tones of corn, 13 700 tones of edible roots and 975,6 thousand tones of grass and green feed. It is worth noting that Armenia has sufficient natural resources to expand the production of fodder crops. For the sake of comparison we can analyze Figure 9, which shows the volume of production of fodder crops in Armenia since 1985.

Noticeable changes have taken place after declaration of independence and privatization of agricultural production assets in the volume and structure of production of fodder crops. Hence, before 1990 significant volumes of corn, annual and perennial plants, edible roots were produced together with fodder from grasslands, but after 1990 grassland fodder and perennial plants prevailed. Moreover, since 2000 growth observed in the production of fodder crops occurred predominantly due to increase in the volume of fodder from grasslands, i.e. qualitative changes have not occurred in the structure of feed.

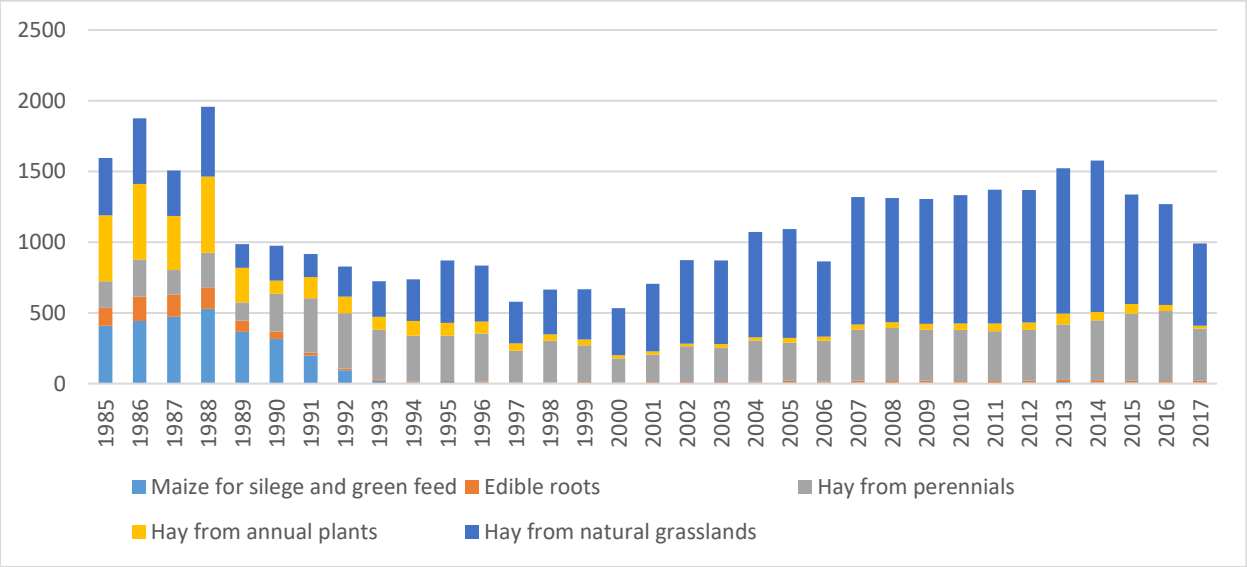


Figure 9: Production of fodder crops in the territory of Armenia in the period of 1985-2017, 1000t

Proper animal feeding requires provision of high water content (silage, roots) and combined feed that may have direct influence on the productivity of animals. By the way, provided different feed may have different impact on productivity, the feeding of animals has to also be diversified through the year. However, such a structure of production of fodder crops and insufficient import of feed compared to the quantity of livestock, makes it clear that livestock in Armenia suffers defficiency in animal feed that results in lower milk production and worse milk quality.

For example, if we provisionally consider the total number of cows, sheep and goats, registered in 1985-2017 as the total number of large cattle in the country and compare that

figure to the volume of animal feed produced in the same period (less the combined feed), then we will see that provisionally 1 LC in 2017 received 0,017kg of corn (0,022 p.f.u.) and 0,803kg (1.076 p.f.u.) of corn in 1985. It means, currently 1 LC receives provisionally 47 times less corn than before.

The table below shows the comparison for the period of 1985-2017 in presence of some types of feed for animals mostly grazing on pastures (per provisionally 1 LC).

Table 8: Presence of some types of feed for animals for the period of 1985-2017 (per provisionally 1 LC)

Year	Corn for silage and green feed	Edible roots	Hay from perennial plants	Hay from annual plants	Hay from natural grasslands
2017	0,017	0,041	1,108	0,061	1,754
1985	0,803	0,251	0,368	0,911	0,798

Source: NSS, statistical directories, own calculations

As it has already been mentioned, a larger share of livestock products in the whole territory of Armenia are produced in the grazing period, hence pastures are an affordable feeding source, against payments levied (or not levied) for the use.

Prices for other main animal feed are presented in Table 9.

Table 9: Prices for main animal feed types, dram/kg

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Combined feed	98	84	89	110	127	127	159	131	133	132	123
Annual plants	32	29	27	28	28	42	50	54	48	35	45
Perrenial plants	34	35	32	36	42	67	70	62	53	40	50

Source: NSS/NSC, prices and tariffs

4.3. Environmental significance of natural grazing lands

It has already been mentioned that pastures and grasslands are unique natural ecosystems and bear environmental significance, apart from their agricultural functions; they specifically:

- Serve as natural habitats for various animals, plants and micro-organisms, while ensuring sustainable biodiversity development and preserving the genetic resources of wild relatives of crops;
- Prevent soil erosion, mitigate landslides, floods and droughts, regulate the microclimate,
- Ensure the circulation of nutrients in nature,

- Ensure pollination for orchards and cultivated crops, restrain the growth in agricultural pests' populations,
- Serve as a natural storage of carbon and other greenhouse gases.

Natural grazing lands are a priceless source of biodiversity. Grazing lands and especially pastures are a conducive media for medicinal herbs, edible plants and mushrooms, honey plants, plants used for producing dyes and essential oils. They are also home for many living creatures: birds, insects (butterflies and bees), rodents, reptiles and worms. The role of such biodiversity is important for existence of pastures as ecosystems, but also for the existence and proper activity of other systems that are not directly related to pastures.

According to the Ministry of Environment (2015) wheat, chickpeas, lenthil and grapes originated in central Anterior Asia, to which the lands of Armenia also belong. A rich gene pool of wild relatives of crops is present here and may serve as a source of genetic material that can be used for generating new varieties of medicinal significance, with higher ability of adaptation, with higher resistance to droughts and cold and other properties.

Pastures also regulate the flow of waters in nature and provide for self-purification of waterways. Fast water flows on the surface results in a number of problems: floods, droughts and soil erosion. Depending on soil types (compositions) and the vegetation, pastures may accumulate and preserve more water than any other agricultural land. Additionally, with dense system of roots, pastures prevent the penetration of various harmful substances (heavy metals, large volumes of nitrogen, phosphorus, etc) to the ground water aquifers and limit the outflow of nutrients from soil. (Bengtsson, 2019, ETC/BD, 2011, Jankowska-Huflejt, 2006)

The role of pastures is significant in mitigation of global climate change. Pastures, serving as the natural storages of carbon, reduce the quantity of carbon dioxide in the atmosphere. According to evaluations by UN FAO, the total carbon accumulated in the pastures of the world is about 50% more than the carbon accumulated in the forests (FAO, 2010).

Meanwhile, the carbon storing capacity of the pastures largely depends on how correctly one manages them. According to certain studies, various measures aimed at improving the conditions of pastures resulted in average annual carbon storing capacity of 540kg per 1ha (Conant, 2001).

4.4. Impact of anthropogenic factors and climate change on environmental-economic conditions of natural grazing lands

According to 2014 Fifth Annual Report of the Republic of Armenia on Implementation of the UN Convention on Biological Diversity, the biological and economic conditions of natural grazing lands in Armenia were far from being called satisfactory. According to the studies, about 57% of pastures in Armenia are degraded, eroded, trampled and deteriorating. Moreover, there are about 150 thousand hactares of natural grazing lands in the country, that are not being used.

Fragmented landscape, steep slopes and other natural conditions have permanently exposed Armenian grazing lands to the threat of degradation. Nevertheless, unstable socio-economic conditions that emerged after the declaration of independence in Armenia severely impacted the natural grazing lands – pastures and grasslands, as anthropogenic pressures on them grew more intensive. Weak institutional capacity of the authorities and prevailing poverty in the country contributed to illegal exploitation and widespread abuse of natural resources, gradual deterioration of pasture infrastructure that was not ready to serve small household farms. Additionally, the climate change and many years of insufficient attention towards the sector by the public authorities (absence of state policies) resulted in many problems, e.g. lower level of use of pastures and grasslands and more disproportionate uses. Today, almost all community adjacent pastures in Armenia are overloaded, and the distant pastures are either underloaded or not used at all.

Meanwhile, it is worth mentioning that negative changes occur in pastures both when they are overused and underused. Changes in ecosystems occur in pastures when they are undergrazed, specifically the alpine carpets turn into alpine meadows, and sub-alpine weeds actively invade the alpine ecosystems. Overgrazing on adjacent pastures changes in vegetative cover and degradation take place, erosion spots occur, landslides and mudflows become more intensive, marshes thrive. Moreover, certain species from the Red Book of Armenia are threatened. (2014 Fifth Annual Report of the Republic of Armenia on Implementation of the UN Convention on Biological Diversity)

In addition to the aforementioned, early spring and late autumn grazing, so popular in the communities, are not less dangerous for the ecological and economic conditions of the pastures. They also contribute to the degradation of pastures and lower productivity thereof, as the vegetative cover alters and depletes when non-edible, thorny and bush-like plants replace the high-value fodder crops.

It is worth mentioning that the reason for early spring and late autumn grazing is not only the weak institutional capacity of pasture management authorities, but the socio-economic

conditions of the communities. It means we have to deal with a vicious cycle to a certain extent, when because of socio-economic conditions the household livestock farms are not able to provide for the necessary quantity of feed for their animals and send the animals to pastures in early spring or late autumn, which reduces the current and future benefits of livestock development for those very farmers and limits the size of investments they make into it.

In the framework of our study, the participants of the questionnaire surveys assessed the conditions of adjacent and distant pastures that belonged to their communities. Hence, according to the subjective opinions thereof, distant pastures were in better conditions. 14,8% of the respondents stated that their distant pastures were in bad conditions, and 34.7% of the respondents said the same about their adjacent pastures. See figure 10.

Respondents in 6% of the communities found it difficult to say what the contions of their distant pastures were, which apparently means that those pastures were not used. Additionally, there is a problem with LSG capacity in that regard, and there is no system of pasture monitoring operating in the country.

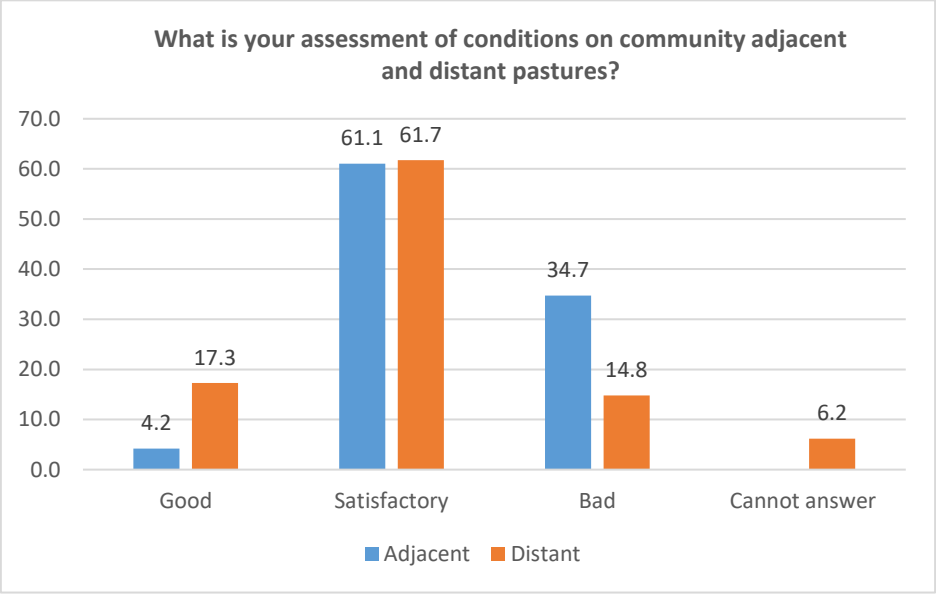


Figure 10: Conditions of adjacent and distant pastures, according the respondents, in communities that participated in the survey

Community representatives also got the opportunity to evaluate the changes in adjacent and distant pastures for the last 10-20 years.

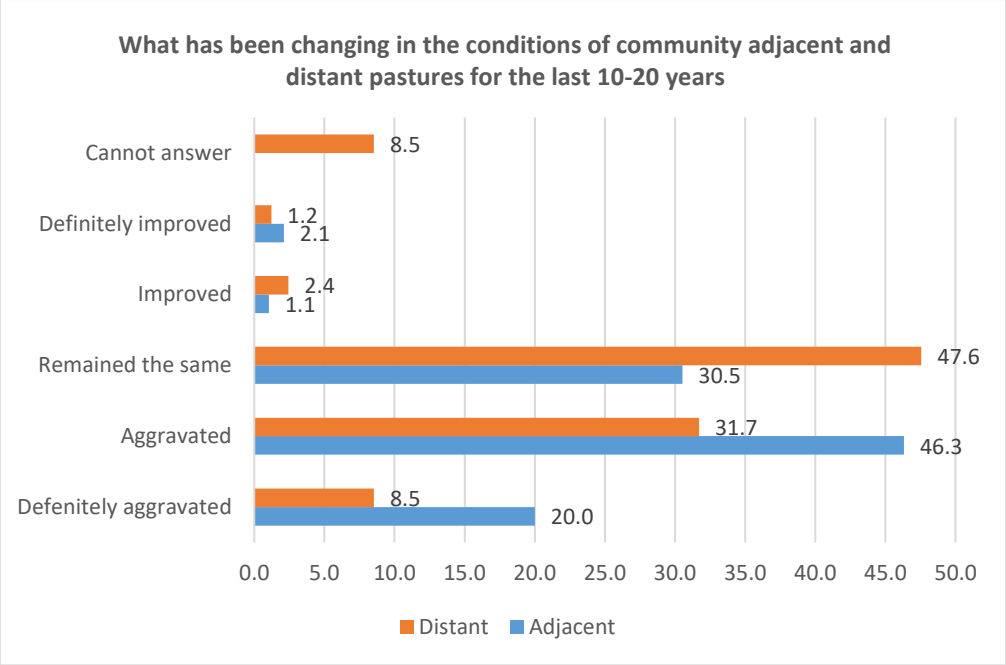


Figure 11: Changes in adjacent and distant pastures for the last 10-20 years, according to the representatives of the communities

In case of distant pastures, most of the communities, 47.6% mentioned that the conditions remained unchanged. As regards the adjacent pastures, 46.3 and 20.0 percents of the communities considered them *deteriorating* and *definitely deteriorating*, respectively. See Figure 11.

Positive shifts in the conditions of pastures were observed in significantly smaller number of communities that participated in the survey. The conditions of distant and adjacent pastures had improved only in 3,6% and 3,3% of cases, respectively.

It is expected that the condition of pastures will further worsen, especially with effects of climate change, and if the current practices of pasture use and management persist. Meanwhile, it is worth noting that climate change will mostly impact vulnerable groups of population involved in agricultural activity, as they have less opportunity of investing in measures aimed at mitigating the negative consequences of climate change.

According to the Third National Communication of the Republic of Armenia on Implementation of UN Convention on Climate Change (2015), climate change brings expansion of arid landscape zones, reduction in the territories covered by forests, alpine and sub-alpine zones and higher vulnerability of forests in Armenia.

According to the same source, it is expected that by 2100 the average annual temperature in Armenia will increase by 3,3-4,7˚C. The annual precipitation quantity will increase, but in summers it may drop by up to 13%. According to forecasts, vertical movement of borders

of the main agro-climatic zones will take place in accordance with highland landscapes, in the coming 80 years by 200-400 meters.

The abovementioned will bring significant changes in natural ecosystems, including extinction of certain animal and plant species and development of others. It is expected that changes in the ecosystems will seriously impact 238 plant species, but the conditions for 140 other plant species will noticeably improve.

In result of natural movement, the areas of alpine and sub-alpine zones, so favorable for grazing, will shrink by 19 and 22 percents, respectively. Meanwhile, increase in semi-dessert and arid steppe areas will increase the area of less productive pastures in the country by 23%.

Temperature increase and less precipitation will result in more evaporation and soil humidity will drop by 10-30%. All these will not simply reduce the production of crops (including fodder crops), but will intensify degradation of pastures, reduce their productivity. Protection of pastures will need irrigation in certain areas. In result, according to forecasts, the area of pastures in Armenia by 2030 will shrink by 9%.

We may also add that current works on conservation, maintenance, improvement and restoration of pastures, implemented throughout the country are spontaneous and take place mostly in the framework of various projects. For example, works on building and restoration of roads, watering points, stations and shelters took place only on pastures that belonged to 3 out of all surveyed communities. Only some of the mentioned works were carried out in the remaning communities.

If we leave aside the communities where such infrastructure was missing (see Figure 18, Chapter 5.1), then works on building and restoration of pasture watering points were carried out in 2/3 of surveyed communities. The remaining works, e.g. measures on improvement and restoration of pastures, building and reconstruction of roads, building or repair of shelters for shepherds were performed in 1/3 of the surveyed communities. See Figure 12, below.

It must taken into account that the assessment tried to find out whether such works had ever been implemented in the given community, hence the data received does not include works on the whole territory of pastures.

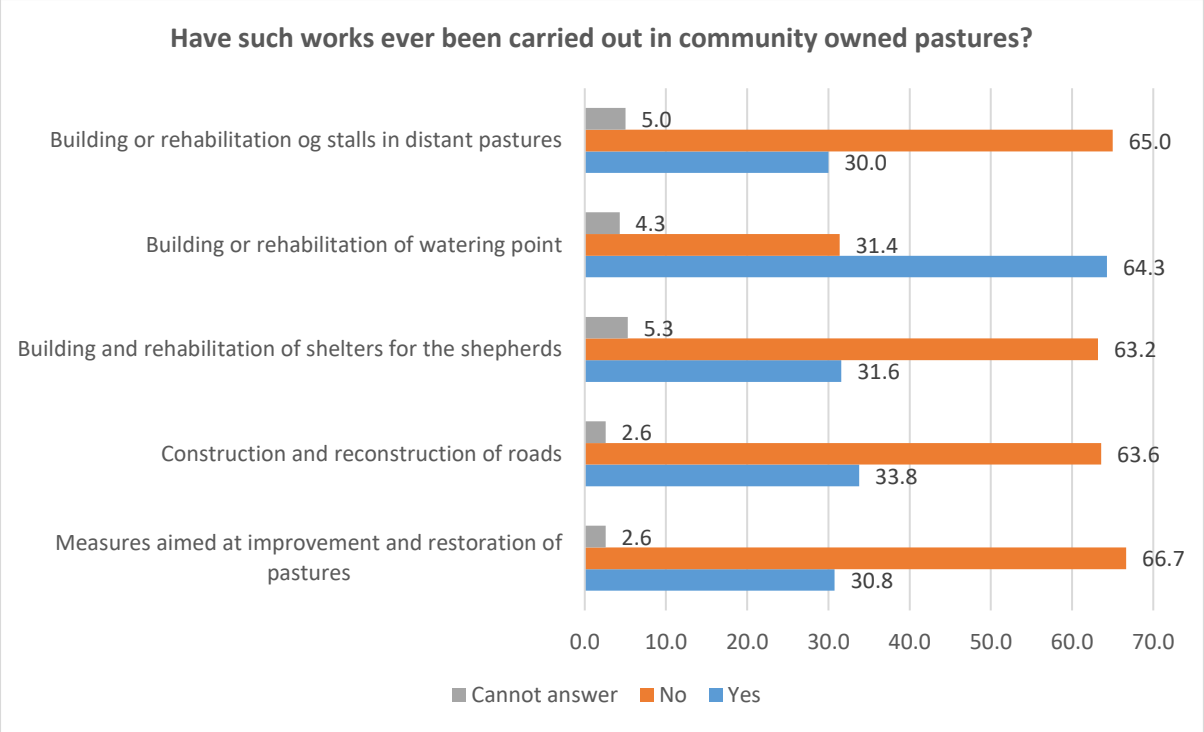


Figure 12: Implementation of works on restoration or improvement of pastures or their infrastructure in the surveyed communities

It must be noted that the use of pastures and the alterations in pastures occurring in time as the result of their use are not being monitored in Armenia. All this, together with climate change brings significant impact on the conditions of pastures and grasslands, as well as on economic effectiveness of their use.

Given the socio-economic conditions of Armenia, we can state that environmental issues are not yet a priority for the country and are on the second place if compared with socio-economic problems. Nonetheless, it is worth mentioning a non-contestable fact, which is that even partial restoration of natural ecosystems requires more work and investments than implementation of measures aimed at their maintenance.

5. Pasture management

5.1. Main approaches to pasture use and issues

Efficient and sustainable use of pastures supposes permanent protection of rich vegetation and high nutritional value plants (productivity), as well as establishment of favorable conditions for future natural improvement. (Tovmasyan, 2017)

As it has already been mentioned, pastures are being used by commercial and non-commercial, large and small cattle farms, equine farms and apiaries of different sizes, as well as for leisure, recreation and other purposes (hunting, wild collection).

If we let aside the fires occurring in pastures because of negligence of the users, the biggest impact on the productivity of pastures comes from grazing animals. The impact occurs in result of grazing, trampling and dispersing the seeds, but also by processing the nutritional elements (Kyle, 2015). Hence, when saying sustainable pasture management, we mostly mean the correct organization of movement and grazing of cattle on the pasture, which is essential for ensuring the protection and reproduction of pastures. Starting from this chapter of the study, phrases like "pasture management" or "pasture use" will be used only in the aforementioned connotation.

Pasture management and administration are the responsibilities of the local self-governance bodies, provided pastures are of state or community ownership[5]. Respectively, the LSGs shall carry out certain functions in order to provide for proper use, restoration and protection of pastures as the community resource, based upon the interests of the community. Considering the weather conditions, every year the LSGs must:

- Define the opening and closure of the pasture season,
- Regulate the ways of pasture use in the community (e.g. free, in shifts or by plots[6]), but also
    - calcuate the permissible load on pastures, define the quantity of cattle grazing on it and decide the durations of use of separate plots and the number of shifts on each plot, in case of application of such a regime,
- define pasture restoration periods, by prohibiting grazing,
- implement control over the compliance to terms and rules by the pasture users.

[5] See the RA Land Code, Articles 3 and 56; the RA Law on LSG and RA Government Resolution N389-N.
[6] The essence of shifts in pasture use and plots of use is that pastures are devided into sections and are used in turns for a certain period of time that can repeat (Tovmasyan, 2017).

In-depth interviews, focus-group discussions and analysis of quantitative data collectd from the target communities show that LSGs are very passive in pasture management and the process per ce is not well organized. In fact, pasture management is chaotic and often spontaneously organized by various related persons, including the shepherds, livestock farmers, community elders and others.

30% of the survey respondents mentioned that pasture management was not controlled by the LSG bodies of their communities. By the way, 41% of farmers answered the same, as well as 25% of LSG representatives and specialists. Only 11% of the respondents thought that management of their pastures was fully controlled by the LSG bodies. Most of the survey participants mentioned that management of their pastures was only partially controlled. See Figure 13 for details.

Similarly, the trends remain the same when segregating data by communities[7] and target regions. In all surveyed communities and target regions (Marzes), only the fewest thought that pasture management was fully controlled by the LSG bodies.

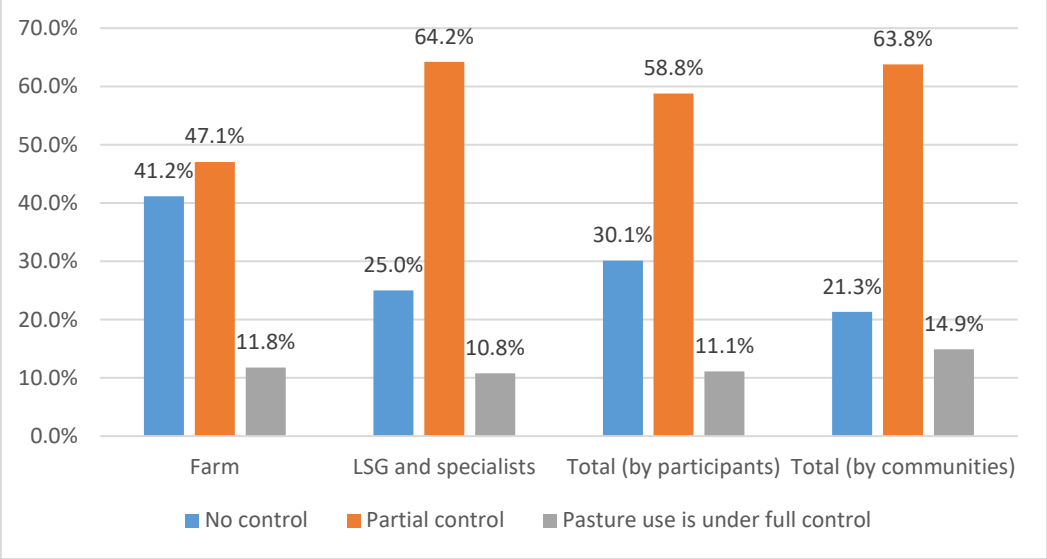


Figure 13: Pasture use control by the LSG bodies

Another issue connected with quantitative surveys was also connected with LSG pasture use procedures and pasture management. The participants evaluated backstopping on pasture management issues provided by the LSGs to the users of the pastures. In result, 39% of the survey participants mentioned that LSG did not provide backstopping (Table 10).

[7] From no on, when surveys are performed by communities, data obtained through online questionnaires and data collected by the end of FGDs will be considered. By the way, if answers of the community respondents were inconsistent, then the preference was given to more positive answers. In cases with multiple answers to the same question, all the aswers were considered.

The main type of professional backstopping on pasture management mentioned by the respondents (47%) was defining the opening and closure of the pasture season.

Table 10: Professional backstopping provided by the LSGs to the pasture using farms

Options	% total	% backstopping
No backstopping	39,3%	-
Defining the opening and closure of the pasture season	29,4%	47,0%
Deciding the directions of livestock movement	14,2%	22,7%
Defining the duratiuons of pasture use, e.g. how many days on each pasture	4,7%	7,6%
Defining the shifts for use of different pastures	6,2%	9,8%
Developing pasture use schedules	0,9%	1,5%
Developing pasture use maps and pasture turnover schemes	7,1%	11,4%

Functions that constitute the system of sustainable pasture management, e.g. organizing the pasture turnover, development of pasture use schedules are more seldom in the communities. Their magnitudes are also different in different communities. Their establishment and use in the communities is a result of how LSGs perceive their own roles and responsibilities, but also depends on the level of knowledge on pasture management, on presence of funds in the community budgets that can be used for organization of necessary technical and professional measures, aimed at sustainable management.

The presence of stakeholders that support the establishment of sustainable pasture management in the communities is crucial. They can provide extension services and develop the capacities of the LSGs in implementing the sustainable pasture management practices. The professional skills of the LSGs on pasture management will grow in this case, together with the perception of the necessity to carry out sustainable management. Additionally, if a supporting agency organizes works on improvement of pasture infrastructure of the communities, then usually communities cofund such activity, which improves the feeling of ownership towards the pastures and their protection.

Control over the conditions of pastures and reaction to changes in them, are also among not regulated functions of the LSGs. Pasture control is not performed or performed only when necessary, e.g. in presence of renting agreements, etc. If there is an agronomist in the community, then he is supposed to carry out such control, but if there is no agronomist in the community, then the mayor or the administrative representatives will take over. It is worth mentioning also that apart from the need to ensure regulation and presence of professional staff, technical and financial difficulties also hamper any control over the condition of pastures. For example, bad roads or their absence and also the absence of any transportation do not allow the communities to carry out complete assessments of pasture conditions.

LSGs know the need to manage their pastures and theoretically understand what it supposes and what actions are required.

"Pasture monitoring manual, Armenia" and "Guidelines on development and implementation of plans on sustainable management of pastures and grasslands" were developed with the support of GIZ, in 2015. These documents contain profound information on increasing the effectiveness, on protection and restoration of natural grazing lands in Armenian conditions. The main goal of developing manuals was to provide support to the RA Government, especially the Ministry of Territorial Administration and Development[8] (MTAD) on management of natural grazing lands. Manuals developed by the MTAD were presented to communities, so that the latter would organize the pasture management processes locally. Moreover, the Ministry has no quantitative assessments of the levels of implementation of the manuals by the communities.

LSGs are bound by the law to manage their pastures, according to the RA Government Resolution of 2011 "On Approval of the Procedure on Use of Pastures and Grasslands in the Republic of Armenia". However, this resolution covers only pastures and grasslands of state ownership. The procedure described in this resolution defines the terms of management and effective use of pastures, which is essentially the foundation for the development of pasture management plans. For example, the procedure envisages *pasture turnover*, as well as *development of pasture use* plans with consideration of the quantity of grazing animals and the productivity of pastures, which is essentially the same as the pasture management plans.

Management of community owned pastures by the LSG bodies is a direct responsibility enshrined by the Law on Local Self-Government (to be discussed in Chapter 6.2), in the framework of land use competencies of the community mayor. According to the law, the mayor shall develop annual and five-year management plans for the community owned lands.

It must also be mentioned that, according to the findings of our study, not all the communities have pasture management plans and five-year development plans of the communities do not always contain annual and five-year plans for management of community owned lands. According to the answers of respondents, only 31% of the surveyed communities had pasture management plans.

[8] In 2015 the Ministry was called the Ministry of Territorial Administration and Emergencies.

Apart from that, reviews of developed documents showed that certain communities had adopted pasture use procedures at the assemblies of the community councils. However, that procedure is simply the reflection of the aforementioned Government resolution[9]. Pasture use procedures adopted by the communities are abstract documents by nature, as there are no actions or operational procedures, competencies or responsibility envisaged for their implementation.

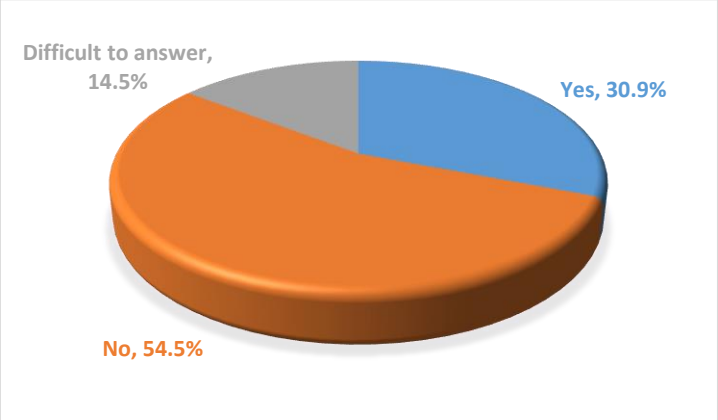


Figure 14: The presence of a pasture management plan in the surveyed communities, according to the opinions of the community representatives (by communities)

In this respect, special attention is given to those communities of Armenia, where projects aimed at increasing the efficiency in use and management of natural resources or livestock development were implemented. Often, projects implemented during the last decade, focused on the development and implementation of community pasture management plans. By January 2019, such plans were developed for 231 communities/settlements of the country, with the support of different organizations[10].

It is worth noting also that development of pasture management plans considers the presence of infrastructure, the vegetation, the quantity of livestock and a number of other

[9]Syunik Marz, Tatev community pasture use procedure, adopted on February 10, 2017, by Community Council Resolution N06-N: http://tatevhamaynq.am/Pages/DocFlow/Default.aspx?a=v&g=9bd0e5b6-656d-4211-8cb4-6892c54cfc6d, Aragatsotn Marz, Aparan community pasture use procedure, adopted on March 7, 2018, by Community Council Resolution N16-A: http://aparan.am/Pages/DocFlow/Default.aspx?a=v&g=66bcd481-24d8-4d69-b9d1-39e624f55b3e, Vayots Dzor Marz, Yeghegis community pasture use procedure, adopted on June 5, 2018, by Community Council Resolution N47-N: http://vdzor.mtad.am/files/comm_docs/10/777/67678.pdf, Tavush Marz, Berd community pasture use procedure, adopted on February 28, 2018, by Community Council Resolution N21-A: http://www.berdcity.am/Pages/DocFlow/Default.aspx?a=v&g=cf16f6b5-2529-424e-8935-46bae099cedb,

[10] In the framework of two projects on "Management and competitiveness of community agricultural resources" (MCCAR) pasture management and livestock development plans were developed for 174 communities/settlements, SDA NGO developed pasture management plans for 92 communities/settlements, UNDP funded projects developed pasture management plans for 5 communities/settlements.
About 40 rural communities and settlements were repeated in the projects implemented by the SDA and MCCAR, which resulted in revisions of the respective management plans.

conditions in the community pastures, which are not static in time and suppose regular update and revision of the plans, which is not properly implemented by the communities.

The LSG representatives of those communities, who participated in the focus-group discussions in the communities with pasture management plans, mentioned that pasture management plans were updated verbally, which means that the existing document is adjusted based on theoretical observations. A management plan, as a document is usually not being updated, because of absence of human resources and professional skills.

It is also worth mentioning that the presence of a management plan does not suppose its implementation, and many community representatives consider its implementation problematic, hard and sometimes impossible.

Cattle grazing process is performed differently in different communities; it is not related to any traditions or regional specificities, but rather to the presence of a shepherd in that community and the level of specialization of community residents in livestock development.

Implemented surveys showed that several grazing methods are simultaneously used in almost all communities. However, most of the surveyed communities used hearding services for their cattle, rendered according to the knowledge every shepherd had, see Figure 15. The next most popular method of grazing is grazing in turns, when several farms bring their animals together and according to the total quantity of heads they get the turn for the time and duration of grazing. 41% of the survey respondents mentioned that grazing in their communities was performed exactly by that method. If we summarize the mentioned indicator by communities, we will get 54%. It means that half of the surveyed communities use the “turns” for grazing.

The second most popular grazing method, according to participants of the survey and to the communities, is the free, non-regulated grazing. This grazing method supposes absence or minimum of control over the grazing area. Such grazing takes place in 50% of the surveyed communities.

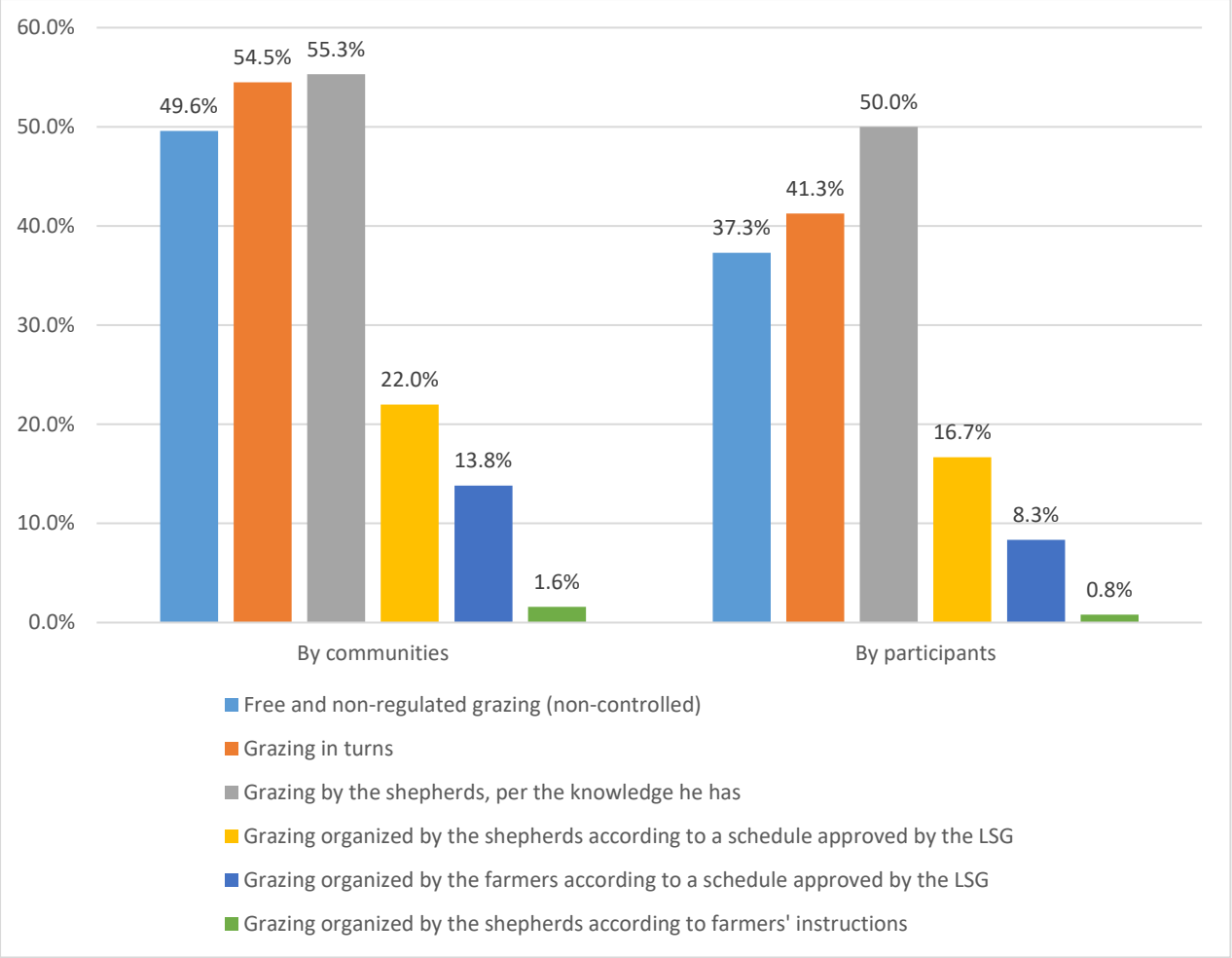


Figure 15: Pasture methods used in the communities according to the surveyed respondents, individually and by communities

Hence, given the aforementioned, we may note that most of the grazing in the country takes place through the non-regulated methods, and grazing in turns and assigned plots takes place in very few. Grazing in turns and assigned plots, additionally to a number of conditions, supposes grazing by a schedule that was approved by the LSG, which is true only 35.8% of the surveyed communities. However, as it has been mentioned, certain communities apply different grazing methods simultaneously. For example, in communities where grazing is organized according to an LSG approved schedule, shepherds simultaneously graze their flocks according to the knowledge they have in 55% of the surveyed communities, and 48% of the communities do not regulate their grazing.

It is worth noting, by the way, that compared to free, non-regulated grazing the grazing in turns ensures high productivity of pastures and proper conditions of vegetation. It supposes division of the patureland into plots and their use in turns, in a certain period of time, repeatedly (Tovmasyan, 2017), and this method of grazing is considered to be the best in the world in terms of pasture management (MacPhail, Kyle, 2012).

As it has already been mentioned, pastures under community disposal are used to different degrees and their accessibility is also problematic sometimes. The results of fieldwork also prove the presence of these problems. Respectively, if in 80 percent and more cases with surveyed communities, over 50% of the adjacent community pastures are used for grazing, then over 82% of the surveyed communities use less than 50% of the distant pastures. See Figure 11.

Table 11: Assessment of accessibility and useability of distant and adjacent pastures, according to the communities

	Adjacent pastures	Distant pastures
Useability		
Up to 30%	5,4%	56,2%
31-50%	9,7%	26,0%
51-80%	47,3%	13,7%
81% and more	37,6%	4,1%
Accessibility		
Accessible	38,3%	13.2%
Partially accessible	38,3%	75.5%
Not accessible	23,3%	11.3%
Missing	-	*12,5%*

Surveyed pasture-using farms also had the oportunity to assess the accessibility of their own pastures in terms of technical-economic criteria. In result, distant pastures were considered as fully accessible only by 13% of the communities, and 38% mentioned that the adjacent pastures were fully available. According to the surveyed representatives of the communities, 12% of the communities they represented did not have distant pastures.

According to the community representatives, the main factors limiting the accessibility of the pastures were deficiency or lack of drinking water for the livestock in 73% of the communities, deteriorated and impassable roads towards the pastures – by 69.6% and the landscape of the pastures – by 43.5% of the communities. Only 29.6% of the communities mentioned degradation as the main factor reducing the accessibility of pastures. This question had multiple answers, hence the specific weight of every option of an answer was considered in each question, which correspond to the relevance of each aforementioned impediment, see Figure 16.

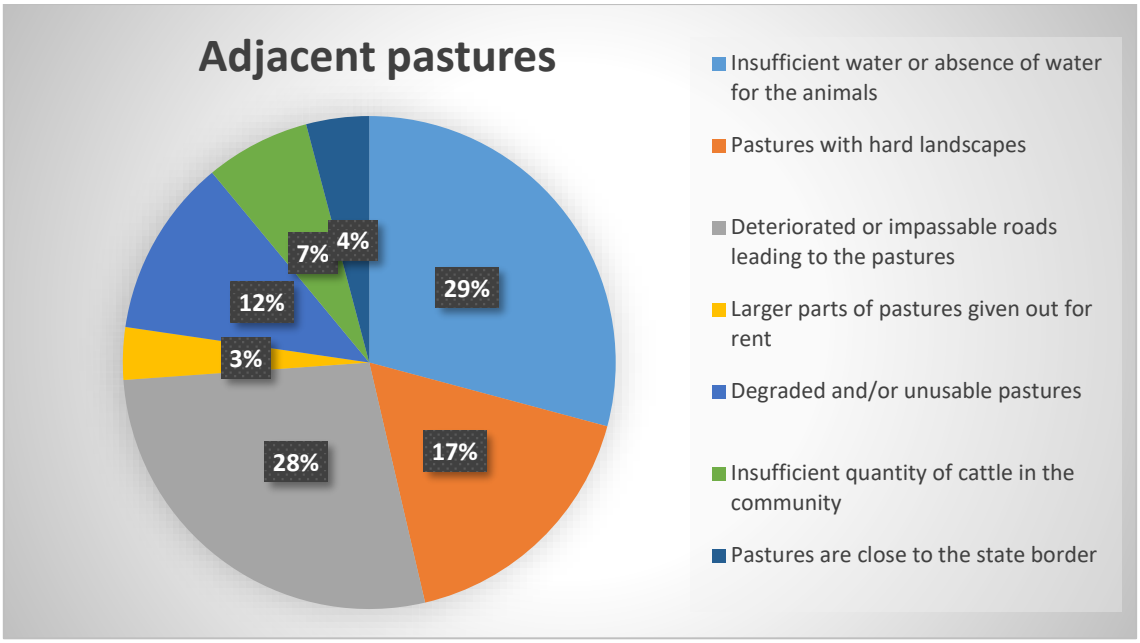


Figure 16: Factors limiting the accesibility of adjacent pastures, in proportional representation (by communities)

According to the participants of the survey, the main reason for low accessibility of their distant pastures was the deteriorated and heavily passable roads in 74.5% of the communities, comprising 21.8% of all answers (see Figure 17). The next weighty factor limiting the accessibility of distant pastures is the desolated condition or absence of pasture shelter and accomodation infrastructure (e.g. stalls, shelters, watering points (66%)) and no or little opportunities for milking, milk processing or transporting it to the community (67,0%).

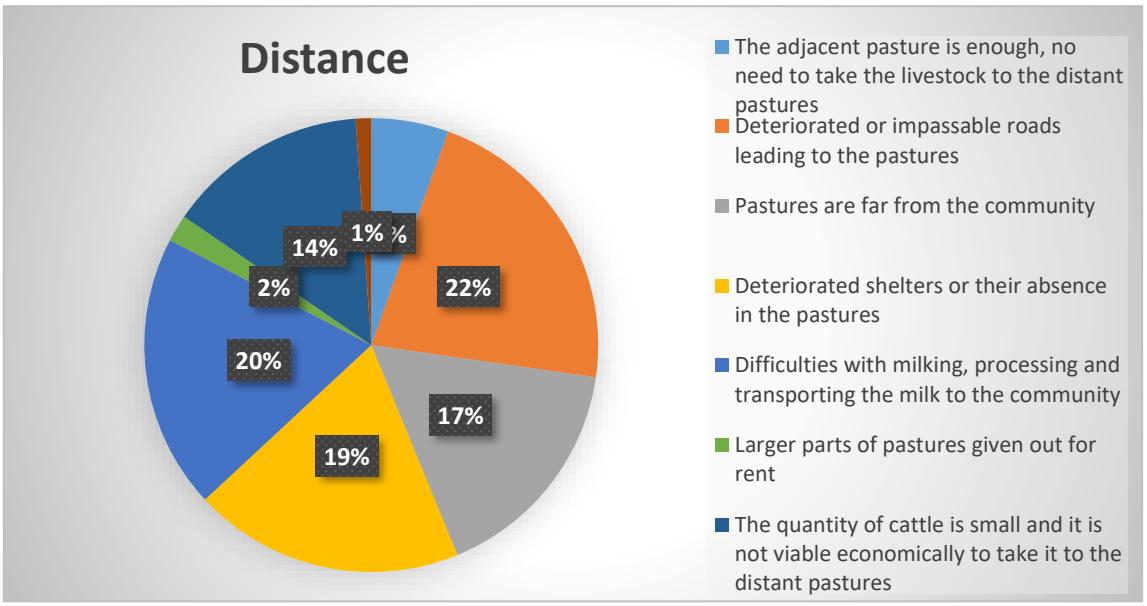


Figure 17: Factors limiting the accesibility of distant pastures, in proportional representation (by communities)

56.6 and 49.1 percents of the communities mentioned that the problems were, respectively, the distance of the pastures from the community and the low economic feasibility of sending animals to distant pastures for small livestock farms.

The conditions of pasture use infrastructure also differ from one community to another; however, we may note that there were no surveyed communities that mentioned absence of problems. The participants of the survey could also evaluate the conditoins of infrastructure in their pastures. See Figure 18.

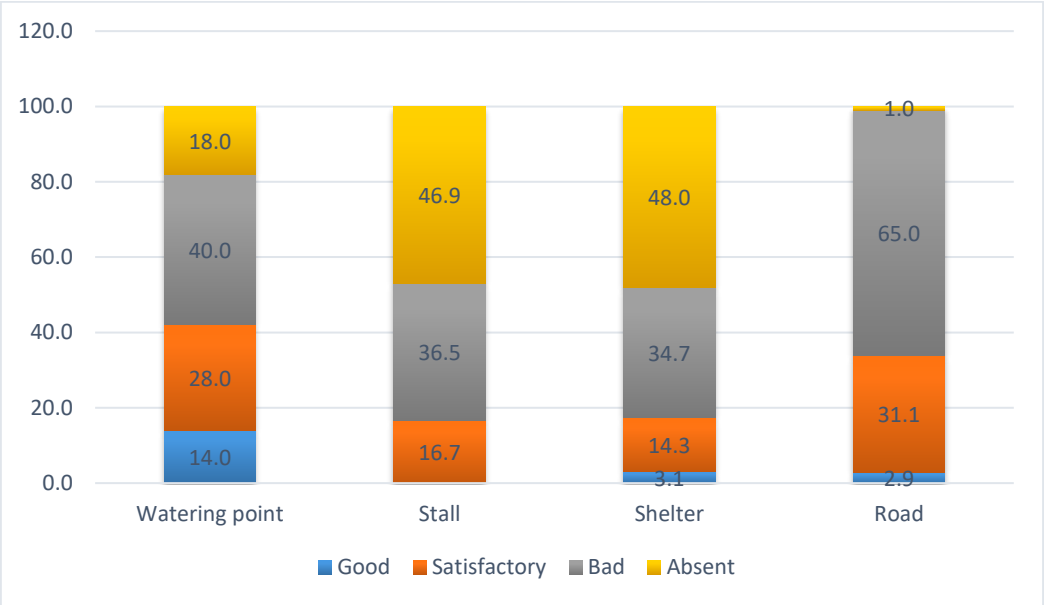


Figure 18: Conditions of pasture use infrastructures in the surveyed communities

As you can see, watering points and roads are in relatively better conditions, as regards the stalls and shelters for the shepherds, they are either in bad conditons or simply missing in respectively 83.3 and 82.7 percents of the surveyed communities. Meanwhile, if we remove the share of absent infrastructure from the formula, then the worse conditions among the mentioned infratrsuctural units are at shelters (67%) and roads (66%).

Apart from the aforementioned, certain communities separately delivered detailed information on the conditions of the watering point and roads in adjacent and distant pastures. Specifically, we may state that roads and watering points in the adjacent pastures are in better conditions than the ones of the distant pastures. For example, 58% of the surveyed communities mentioned that the roads to adjacent pastures were in bad conditions, and 77% of the communities said the same about the roads to their distant pastures. The watering points were either in satisfactory or good conditions in the adjacent pastures, according to 47% of the surveyed communities, and 35% of the surveyed communities said the same about the distant pastures.

The study had also taken into account the proportions of the liverstock quantities to the area of pastures. Hence, in 52% of the surveyed communities, according to the representatives thereof, the pastures were sufficient for the recorded quantity of livestock, in 18% of the communities they were not (see Figure 19). By the way, in about 20% of these there is no possibility to make use of pastures that belong to other communities.

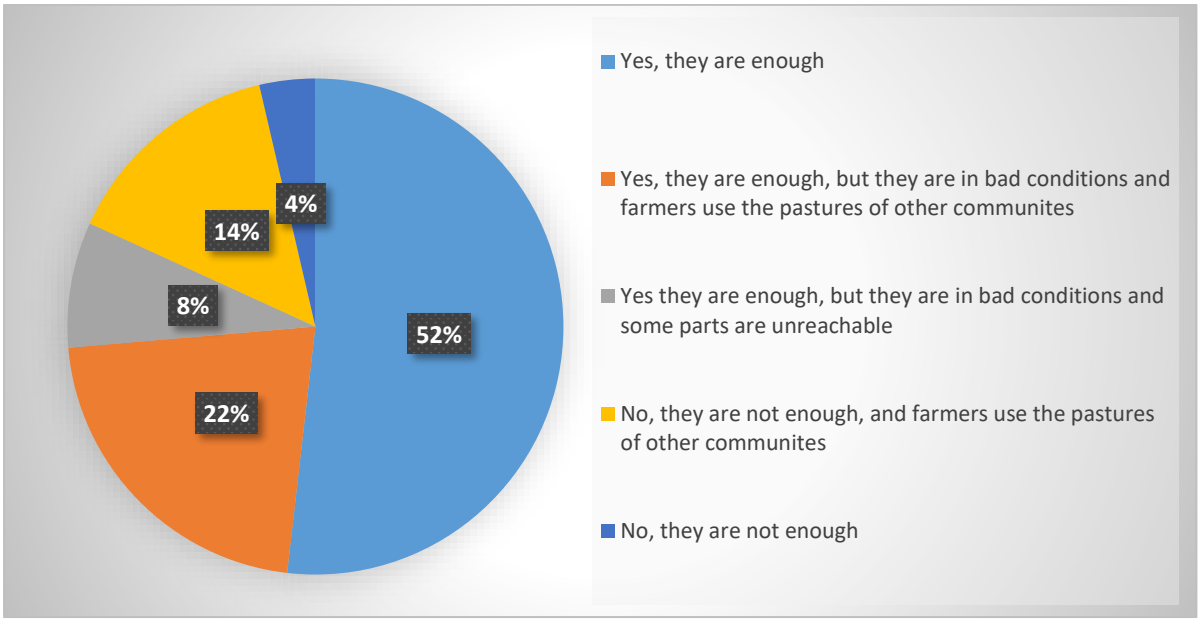


Figure 19: Correspondence of livestock quantity to the area of pastures, according to the respondents

30% of the surveyed communities mentioned insatisfactory conditions of pastures even in case of good proportions in livestock and pasture area. 70% of these communities used the pastures of the neighboring communities, but the remaining 30% did not have that opportunity.

It was also interesting to learn of the information and knowledge needs among the community pasture management stakeholders. The respondents were offered a choice of the mentioned topics by the level of knowledge they had of them. In result, 50-53% of all interviewed needed knowledge on all of the mentioned topics. The suggested topics are presented in Table 12, below.

Table 12: Assessment of the surveyed communities per presence or absence of needs for knowledge and information on certain topics related to pastures and animal husbandry

	Yes	No	DtA
• *Sustainable pasture management*			
Agriculture	38,5%	50,0%	11,5%
LSG/Specialists	57,5%	24,5%	17,9%
Total	51,3%	32,9%	15,8%
• *Development of pasture management plan*			
Agriculture	37,5%	50,0%	12,5%

	Yes	No	DtA
LSG/Specialists	57,1%	19,4%	23,5%
Total	50,7%	29,5%	19,9%
• *Effective organization of calf management and feeding*			
Agriculture	42,6%	57,4%	0,0%
LSG/Specialists	58,0%	28,0%	14,0%
Total	53,1%	37,4%	9,5%
• *Organization of effective grazing*			
Agriculture	42,9%	57,1%	0,0%
LSG/Specialists	53,9%	27,5%	18,6%
Total	50,3%	37,1%	12,6%

It is interesting that compared to the representatives of household farms, a larger part of LSG representatives and specialists who participated in the survey mentioned that they did not need knowledge on the mentioned topics. This fact underlines the need for improving the knowledge among pasture management stakeholders and points to their readiness of getting new knowledge on the one side, and on the other side proves that household farmers are less inclined to change their ways, because they are sure that they have all the necessary knowledge and skills to use their pastures sustainably and ensure the necessary behaviour of the livestock.

5.2. Current conditions and issues of pasture management

The goal of sustainable pasture management is to organize the use of pastures in a way that will maximize the benefits of such use for the farms, while ensuring the high productivity and reproduction of the pastures, as natural ecosystems.

As it has already been mentioned, the process of pasture management is not properly organized in Armenia. The LSG bodies are bound directly by the law to define, organize and implement the pasture management, but they fail to perform accordingly. The involvement of the LSGs in the pasture management is mostly limited to renting the pastures out through signing agreements and informing the community farmers on the opening and closure of the pasture grazing seasons. LSGs are even less involved in other measures that suppose sustainable pasture management, see Table 10 (Chapter 5.1).

Nevertheless, the establishment of a pasture management process in the country may not be linked to the LSGs only and shall be observed in a complex of issues and the existing limitations.

In this respect, the main factors that impede the establishment of pasture management process in Armenia can be classified as follows:

1. **Structural issues**, occurring because of small sizes of farms and low level of professionalism.
2. **Organizational issues,** occurring because of low level of cooperation.
3. **Economic and social issues**, these may include the financial conditions of the LSGs, the socio-economic conditions of the residents and the profitability of animal husbandry as such.
4. **Natural and technical limitations**, as the geographic location of the pasture, presence of conducive conditions for the grazing, climate.
5. **Problems because of lack of resources**, e.g. absence of human resources, knowledge on pastures, limited opportunities to get information.
6. **Problems emerging because of absence of infrastructure**, e.g. issues related to roads, stalls, watering points and shelters.
7. **Legal factors,** presence of laws and procedures and their implementation, contractual relations and their value.
8. **Political and institutional issues**, among which are the institutional capacity of the LSGs and public administration bodies, but also the public policies' implementation on local level.

Before speaking about any of the mentioned afore, it is necessary to mention that they are not only connected in a clearly expressed causality, but are parts of a closed cycle, in which one problem brings the other and every next problem aggravates the previous one.

Below we will discuss each of the mentioned problems separately.

Structural and organizational problems

Most of the livestock farms in the country are small (See Tables 4 and 5, Chapter 4.2), and their main activity is not animal husbandry. Keeping large or small cattle is natural for those who live in rural settlements, as livestock is a source of quality and affordable food for the family needs, it is also a source of income.

Livestock farms in Armenia do not have sufficient professional knowledge. According to the NSC, only 4% of the rural household farms in Armenia does only livestock, and 54% of the farms combines livestock with crop husbandry.

Small quantity of cattle and low level of professional knowledge give birth to a situation, when increasing the income from livestock development, investment in livestock development or implementation of additional work aimed at livestock development are less important for the farmer. Livestock is not a source of income for them, but a means to survive.

"90% of our people do not expect inome from animal husbandry. They keep the animals, traditionally to get milk and yogurt in homes and only for that" ***Kotayk***

In result, almost all communities in Armenia have similar problems in pasture management, the adjacent pastures are overloaded, but the distant pastures are underloaded. Most of the community livestock belongs in small farms, which prefer the adjacent pastures and consider the use of distant pastures inexpedient.

"Small farmers very rarely bring their cattle together, to send it to the distant pastures. They mainly use the community adjacent pastures that degrade very quickly". ***Sisyan***

This approach is justified; for a farm with 1-2 heads of large cattle distant pasture grazing is neither technically nor economically justified, because going to distant pastures means staying apart from the family, losing other job opportunities, spending time and money, which is never profitable with only 2 cows, or when animal husbandry is not the main income generating activity and the products from those animals comprise only a part of the daily menu. It is worth reminding that 40.8% of the respondents pronounced grazing on distant pastures economically unjustified, because of the small quantity of cattle in separate household farms.

The problem can be solved by establishing organizational mechanisms and development of various cooperation mechanisms among the small farms, for example non-formal cooperation groups or cooperatives, which would establish fair terms of collaboration for the members of the groups and will allow the livestock farm owners to organize the grazing of the cattle in the distant pastures in less time, with less labor and costs and get additional income due to more livestock products.

Such informal cooperation mechanisms are now being used in the community, but only in relation to non-milch animals. They are all moved by the shepherds to the distant pastures. However, sending the milch animals to the distant pastures in the same manner is problematic in the communities now, not only because of organizational issues, but because of lack of trust among the farmers, and not only among the farmers, but among the farmers and other involved persons. There is no trust among the farmers either in proper animal care, in milking, in recording the correct volume of milk from each cow or in providing the right volume of milk or dairy products to the farmers.

« - If a farmer milks the animals with a milking machine and gets a tone of milk, but says that he got 600 litres, as he used the machine only after milking the remaining quantity by hand.

- Even if he milks only with the machine and shows the whole quantity, you will never know that your ewe delivered two or three lambs, and not one, as you were told. The situation with calves is even worse. It means we have to hire someone to check it.

- We are not at that level of intellectual maturity, yet" ***Vardenis***

The issue of small sizes and fragmentation of privatized agricultural land plots also belongs in the category of structural issues, as it negatively impacts the production of feed by the farmers and aggravates the problem of insufficient fodder.

Economic and social problems

The economic and social issues impeding pasture management in the communities are mostly related to the LSGs and may also emanate from lack of financial resources among the livestock farmers.

The study has shown that almost always LSGs have insufficient financial resources; it is one of the reasons for absence of measures aimed at necessary restoration, improvement or infrastructure building that will contribute to sustainable pasture management. As it has already been mentioned, in all the surveyed communities such works were implemented only through the cofunding of the LSGs, as most of the required funding was provided by other agencies.

"The community does not have the sufficient potential to carry out infrastructure building projects on its own, however, some works are performed: waterworks are installed for supplying water to livestock watering points." ***Sisyan***

«The mayor has no money…"
"The community administration has no money to keep staff…"
"The mayor would not even want to at least grade the community roads…"
"The Government pays subsidies to them, without subsidies only the larger settlements of of our community will survive, as the smaller ones will not make it" ***Ashtarak***

Absence of necessary specialists and staff for the organization of pasture management is because of poor community budgets. By the way, this opinion is seconded by the LSG representatives and representatives of households.

According to the law on LSGs, the LSG budget consists of tax and other mandatory payments, duties, other revenues, including community owned lands, state onwed lands in the administrative territory of the communities (including pastures), the rent, allocations in form of grants (subsidies, subventions) and other entries.

Meanwhile, according to the RA Law on Budget, the LSG budgets have clearly defined expenditures for the implementation of own functions, but the pastures are not among them. However, such expenditures can be included in the Articles on *agriculture, forest enterprises, water systems and fisheries*.

Table 13 shows the share of payments for the use of pastures to the community budget in 2018, compared to the total amount of budget entries, by regions and for the same period of time, as well as the share of expenditures of the communities on *"agriculture, forest enterprises, water systems and fisheries"* compared to total expenditures of the budget.

Even though the revenues from pasture use mostly comprise small shares of the budgets and in average for the country and per every region they do not exceed 4.6% of the total budgets, the total expenditures on *agriculture, forest enterprises, water systems and fisheries* in average for the regions comprised only 1.4% of the total budgets of the communities.

Table 13: Share of revenues from and expenditure on pastures in the revenue and expenditure articles of the Armenian communities, 2018

Region	% land use payments / share in the total revenue	Agriculture, forest enterprises, hunting and fishing / share in total expenditure
Aragatsotn	2,6%	0,9%
Ararat	2,1%	0,6%
Armavir	1,8%	0,8%
Gegharqunik	4,0%	3,4%
Lori	3,4%	0,6%
Kotayk	2,2%	0,7%
Shirak	3,7%	1,2%
Syunik	6,8%	1,0%
Vayots Dzor	17,0%	3,1%
Tavush	2,2%	1,2%
In average:	**4,6%**	**1,4%**

Source: MTAD, Budgetary expenditures and revenues of the RA communities, 2019

As regards the revenues from the use of pastures, Vayots Dzor and Syunik regions are the leaders in the country, with the communities of Zaritap, Jermuk and Gorayk; respectively, 46, 40 and 75 percents of their budgets for 2018 (452 mln. AMD in total) were comprised of payments for renting state owned lands in the administrative territory of the communities. It means that in presence of natural conditions and in result of proper policies implemented by the LSGs it may be possible to create significant measures that can be aimed at pasture management and restoration. By the way, 41 million Armenian Drams

were spent in the mentioned three communities, in the same period of time under the Article *agriculture, forest enterprises, water systems and fisheries*.

Apart from revenues from other sources, the economic capacity of the pasture users mostly depends on income from animal husbandry, i.e. the prices for meat and milk. According to the NSC publications[11] for the period of 2007-2017, the prices for milk and meat have increased. In 2017 the average annual price for milk and meat sold by the producers comprised 145 AMD/liter for milk, and 2 157 AMD/kg for meat, whereas the price for lamb comprised 2 309 AMD/kg. Additionally, livestock farmers involved in the survey complained about the prices and mentioned that livestock development was not profitable with those prices.

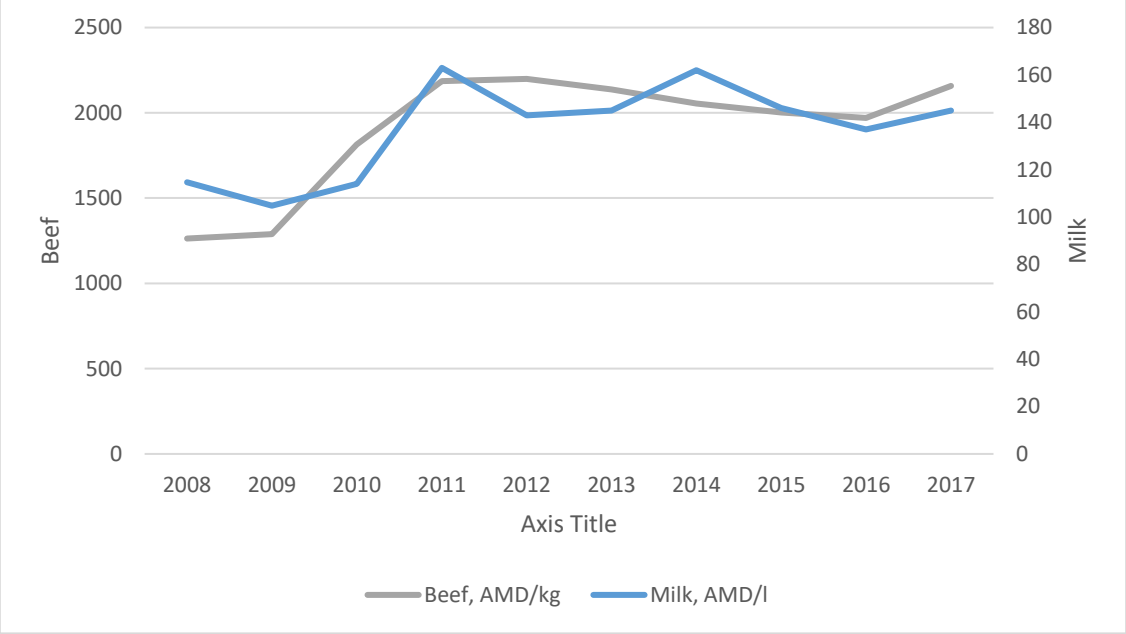


Figure 20: Average annual price for meat and milk sold by the producers

Low profitability of animal husbandry brings disappointment and weakens the interest towards the sector and the pastures that ensure the existence of the sector. Disappointment in the sector also results in ruthless wasting of the main resources and creates the desire to avoid paying for their use.

"If one sees profit in the sector, he would manage better and get more income than anyone else would. If I am a farmer and I have a lot of animals, and I want to get profit from what I do, then I will ask or persuade the pasture users to use it carefully. Take half of it and leave the other half to me. If I do not care for the profit from this, then I do not care who takes it. Why should I critisize and take that creadit on me. Its just two cows, they will find the feed". ***Vardenis***

[11]Prices and price indexes in the RA

For the sake of fairness it is worth mentioning that low profitability of animal husbandry does not depend on low retail prices only, but also on low productivity of the animals, which is a consequence of improper care and insufficient feed, but in certain cases also a result of loss of breed characteristics.

As it has already been mentioned, small farms comprise a larger share of livestock farms in the communities. They keep the animals not for gaining financial profit, but only for providing food to their families. Pasture use methods of this group may sometimes be devastating for the environmental-economic conditions of the pastures, because mostly the pasture users of this group avoid taking their animals to the distant pastures, as they leave the animals for free and irregular grazing in the adjacent community pastures, they do not conclude pasture use contracts and do not pay for such uses, etc.

Any attempt to regulate pasture use methods by the LSGs for this specific group of users will result in aggravation of social problems in the community, which is highly undesirable given the emmigration from the rural communities and 26.8% poverty.

"No one has the right to prohibit pasture use, because of the inability to pay for it. How is that ever possible?" ***Nor Gyugh***

"The community may not demand payments for the use of pastures, no, no... They have no money, they say let the animals graze and they will pay when they have it". ***Ashtarak***

Meanwhile, it is worth mentioning that double standards regarding pasture use by large and small livestock farms, especially related to collecting the rent create problems in certain communities, as larger farms refrain from paying anymore. The reasoning is clear:

"I have 70 cows, I have rented 50ha of land. I open the door of the stall at 6 am and my cattle grazes where it wants, while in the evening it returns to the stall and stays there. Another farmer from the village ran 150 heads of his to the same place where I am. He opened the stall gates and his cattle mixed with mine, drank the water and left in the evening. I rented it for three years, but now I understand that the 25000 drams that I pay for cn be easily spent for my children. Why should I give it out without a reason?"

Nor Gyugh

Nonetheless, we cannot say that small livestock farms never pay for using pastures.

Natural and technical limitations

Organization of pasture management is also influenced by climatic conditions and technical limitations.

There are many pastures in Armenia located by the state border. In certain situations the access to pastures is limited, because the border troops organize drills or technical works in the area, but there are situations when using the pasture is simply dangerous, as they are within the reach of enemy's fire.

In other communities the access to pastures is problematic because of absence of roads, or when the road passes through a forest, a reservation, croplands or even a town or a touristic center. Additonally, large areas of pastures are not accessible because of their landscape.

One of the limitations related to natural conditions is the scarcity or absence of water sources or their irregular flow on pastures, which does not allow for effective planning of pasture use.

«- We cannot avoid those lands when moving the cattle to the fields. It is the same when we move it back. The watering points are not working, as there is no water by us to build watering points, we water them at the Lake.
- I mean, there are no springs even to build watering points over.
- No drinking water for men, we take the animals to the Lake. And again, they can fine us barehanded" ***Tchambarak***

Some distant pastures are also limited, as spending that much time on such altitudes is harmful for health; and the shepherds or farmers would avoid them.

There are pastures with very dry climate and when grazing is organized in turns, the pastures that remain "idle" may catch fire. Moreover, there are pastures with poor vegetation, because of scarce precipitation, and it is not possible to organize the pasture use as planned.

Problems because of absence of resources and infrastructure

A stagnant issue of concern with the pastures is infrastructure, in terms of its presence or absence, or the useability.

As it has already been discussed above, problems with infrastructure existed in all surveyed communities (see Figures 16 and 17). Issues related to watering points, roads, shelters on distant pastures, milking, milk processing and preserving were of priority.

Livestock needs much time and energy to reach the pastures and return from them, because of absence of roads or their bad conditions. On the other hand, such problems hamper the transportation of produced milk, the communication with the shepherds, rapid response in emergencies, etc.

Absence of watering points on pastures, makes the summer grazing on the pastures impossible. Additionally, degradation occurs on pastures with watering points, as they are overloaded with most of the livestock.

Absence of infrastructure impedes sustainable pasture management, turns community adjacent pastures into non-useable land and limits the livestock development opportunities for the communities.

It is worth adding that absence of infrastructure and lower income from pastures as a consequence of that directly influence the collection of payments for use, because if the livestock farmers do not get the expected result, they may refuse to pay for use.

"If animals return hungry from the field and I have to feed them at the farm, then pastures make no benefit, and then why should I pay for them…" ***Vardenis***

Human resources and awareness level are not less important for pasture management. As it has already been mentioned, LSGs do not have many specialists or paid positions for planning, implementing and monitoring pasture management.

LSGs do not necessarily need agronomists or any other specialist or staff in charge of pasture use and management. Hence, if there is such a position in the community staff, then in the best scenario it is occupied by an agriculturist with professional education, who is not able to provide for sustainable pasture management alone, because that process needs permanent control, especially in the beginning. Some communities have field wardens, whose main task is to prevent the penetration of livestock from other communities into the lands or into the private lands of the community.

Absence of shepherds is also a human resources related problem in the communities. There are several reasons for it. First of all, the work of a shepherd supposes high sence of responsibility. It can be dangerous and labor intensive, but the payment for it is rather disproportionate. Respectively, there is no infrastructure in the pastures, attractive for the shepherds: no shelter, no power supply, no communication. Moreover, there is a psychological problem, emanating from the social realities. It is the complex of "not being in service to someone", as they do not want to be the subsurvients of their neighbours.

The high demand for shepherds, results in artificial overrating and abuse, which often complicates pasture management, because any offer that is not in the best interests of the shepherd leads to a conflict and is rejected without consequences for the latter.

"Those three are the only ones. We have to persuade them to take our cattle for grazing. I doubt they would agree to graze the animals in turns". ***Gyumri***

"They will do it for 10 days, and then if they get stuck somewhere, it is hard to make them go back. If you try to make them do it, they will refuse for good" ***Gyumri***

There are certain communities that have no shepherds, as livestock farmers do not want additional costs and will prefer assigning that "errand" to their family members. The latter works in small farms, when the main purpose of cattle breeding is producing milk for the family needs. They avoid additional expenditures, especially when many family members are unemployed.

"The reason we do not have shepherds is because people cannot afford paying them 15000 in Fall. Hence, they have to send one of their family members". ***Nor Gyugh***

It is important to mention that relations with the shepherd are mostly not formal, and the cooperation is based on moral values.

The second important resource for sustainable pasture managemement is knowledge. Neither the pasture users or shepherds, nor the LSG representatives have sufficient skills, knowledge or education on pasture management, the need for it, its economic justification or its implementation and solutions for problems occurring through it.

The main reason of low profit from livestock development is the lack of knowledge or professional skills. The respondents asserted of that:

"There is a Yezidi in Zovuni, he herds animals, cows. He left, so now our farmers go there to keep animals by themselves. They get more income there than in our village, We cannot make it work". ***Ashtarak***

Low awareness makes pasture management impossible, as the users of pastures do not understand the reason of their "sacrifice".

On the other hand, the need for new knowledge differs among pasture users. Some think that there is no need for extension services at all. See Table 12, Chapter 5.1.

Legal factors

Another barrier to pasture management is the imperfect legal framework.

In fact, there are two forms of pasture related legal relations existing simultaneously: formal and informal. In both cases the pasture users get the same opportunities, while operating under different legal and financial responsibilities. Such a disparity in pasture use terms threatens the existence of any formal relations in the sector.

On the one hand, there are defined rules and requirements for the use of state owned pastures in the territory of the communities, and on the other hand there are no such rules or requirements for the pastures owned by the communities.

In result, a pasture use (or rent) contract is the mandatory basis for the use of pastures owned by the state and located in the territory of the communities. In the absence of a contract the pasture user may bear responsibility. At the same time, there are no legal requirements for giving out the community owned pastures for rent or use. Hence, there may be cases when a community council makes a decision to exempt the pastures users from paying rent and permit free grazing per the livestock of the community residents.

Dubious approaches to pasture use doubtlessly hamper the implementation of integrated pasture use mechanisms and negatively impact the environmental-economic conditions of pastures. Use of pastures without a contract (or agreement) does not regulate the quantity of livestock and its movement on the pasture, hence increasing the overloadedness thereof.

The carried out studies showed that pasture use contracts are mostly signed for distant pastures, and only with comparably larger livestock farms or farmers from the neighboring communities. There are no pasture use contracts in 51% of surveyed communities.

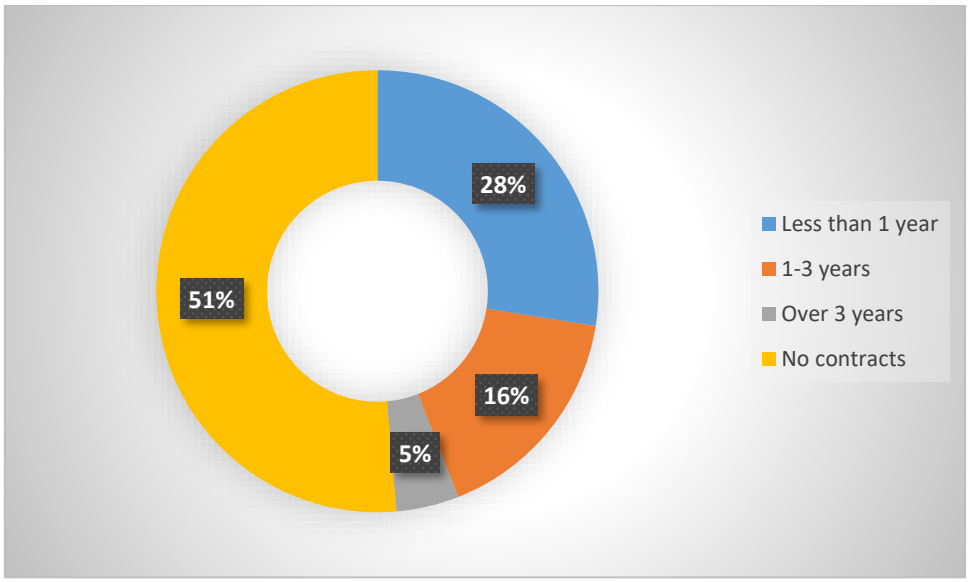


Figure 21: Presence of pasture use/rent contracts and their durations in the surveyed communities

Pasture use contracts are mostly signed in accordance with the exemplary form defined by the "Procedure on Use of Pastures and Grasslands", the provisions of which are mostly acceptable for the parties. However, it is worth mentioning that there is no practical control over the implementation of these provisions.

As regards the defined rates for the rent, they are also generally acceptable for the pasture users, as their size decides the choice to pay or not to pay. It is also worth mentioning that there are communities where the rates for renting state owned pastures do not comply with the quality of the pastures rented out.

We must add that concluding a pasture use contract and successful collection of the rent strongly depend on the level of professional development of the LSGs and their work in the communities. There are communities with aforementioned social, economic and infrastructural problems, however they fully collect the payments for the use of their pastures.

Among the legal issues in the sector is the absence of regulations on implementation of procedures on movement of livestock belonging to different communities. In the absence of defined procedures and criteria, the process is currently organized at the discretion of the person moving the cattle. In result, movement of large number of cattle from one community to another very negatively impacts the pastures and pasture infrastructure on their way and contributes to possible outbreaks of various diseases.

Political and institutional issues

As it has numerously been mentioned, LSGs fail to perform pasture management related obligations properly and in necessary volume, as well as functions emanating from those obligations.

One of the main reasons for this is the weak institutional capacity of the LSGs, in the presence of which the LSG does not understand the responsibilities it has taken and does not carry out measures for their implementation, while expecting the livestock owners or the state to manage the pastures, repair the watering points.

Additionally, as an elected self-government body, LSGs may be re-elected. Hence, given numerous problems persisting in most of the rural communities of Armenia, e.g. lack of drinking water or the quality theoreof, deteriorated and impassable roads, absence of public transport and waste collection, street lights and similar problems that impact the whole population of the community; pasture management, protection or restoration are not priorities for the communities.

In result, the LSGs are not consistent and fail in the organization of grazing seasons and development and control over the implementation of procedures for sustainable use of pastures.

On the other hand, the LSGs do not have technical, professional or financial means and opportunities to offer good quality service to the communities, including those related to organization and implementation of pasture management. There are almost no paid positions in the LSG staff for specialists of pasture management and use, whereas the presence of an agronomist field warden is crucial for ensuring sustainable pasture management. In most of the surveyed communities there are no appointed responsible persons or specialists to implement pasture management and ensure control over the use of pastures. In such cases, the only instance, ex officio responsible for pasture management, organization, implementation and control is the the mayor or her deputy, which practically makes the pasture management impossible.

The community consolidation process, ongoing in Armenia these years, has the ability to increase the accessibility of pastures for the users. The unification of pastures of the consolidated communities will allow organizing pasture use in a more optimal way. Larger budgets of the consolidated communities will allow involving specialists and implementing relatively bigger projects aimed at improving pastures.

Additionally, consolidation in the process of pasture use has not yet been fully perceived by the residents of the consolidated communities, and they mostly keep up to the older borders of community pastures. It is mostly the case with adjacent pastures, when the residents of one settlement of the community do not allow the cattle from the other settlement enter "their" pastures. This also proves the weak institutional capacity of the LSGs and the low level of operations by them.

"Settlements and communities have their own lands. It is true that mayors have contracted their lands significantly, but the village still persists, the community holds its pastures and will never abandon them. Our water canals must come from Aragats to Kuchak, but it lasted 2 years, as they did not let that happen when we were united. No, this is ours and fullstop. They are right, nothing else is given" ***Ashtarak***

Institutionally, there is no cooperation among the communities in managing and using pastures jointly. There are communities with less livestock than available pastures; there is also the opposite situation with other communities. Hence, intercommunity cooperation on that matter is extremely important and expedient, either for the communities (ensuring optimal use of their pastures), or the livestock farms in the communities (as they use the community pastures on the one hand and ensure the productivity of the pastures, on the other).

The survey respondents mentioned that apart from other problems, there is insufficient information on rentable pastures for the whole country. Pasture users are not aware of

sources of such information. Respectively, intercommunity cooperation will noticeably reduce transaction costs for the users.

The work done by the LSGs, for the purpose of improving the educational level and awareness of the pasture users on sustainable management and use of pastures, is not less important. Only one of the surveyed communities mentioned that they were planning to organize trainings for the pasture users.

Regional entities of public administration or local self-governance are related to pasture management only when implementing certain control functions (see Chapter 6.2), mostly of administrative character.

By now there has been no pasture inventory carried out in the country, which is an institutional objective for public administration. There are 1051536.5 hectares of pastureland in Armenia, but it is not clear which part of it is used as a pasture for grazing and which part is degraded, stony, with fragmented landscape, steeper and with what infrastructure and in what conditions.

6. Current state policies and legislative framework for pasture management

6.1. Public policy and programs

There is separate public policy document on natural grazing lands in the Republic of Armenia. However, there are many sectoral strategies that partially cover natural grazing lands – pastures and grasslands, for example, the RA Strategy for Sustainable Rural and Agricultural Development 2010-2020, RA State Program and Action Plan for Biodiversity Conservation, Use and Reproduction and the RA Development Strategy for 2014-2025.

The RA Strategy for Sustainable Rural and Agricultural Development 2010-2020 (SSRAD) is the main strategic document in Armenia that outlines the public policy in the agricultural sector. Pastures in this document are mostly considered as sources for livestock development, increase in efficiency of crop husbandry and improvement of land relations in the country.

Especially in terms of increasing efficiency in crop husbandry and improving land relations, the SSRAD envisages:

- Implementation of a comprehensive study of fodder production at natural grazing lands (pastures, grasslands) and development of measures aimed at increasing their productivity,
- Development and participatory implementation of long-term programs for management and use of adjacent and distant pastures and grasslands of highland and alpine communities,
- Promotion of leng-term renting of pastures,
- Implementation of programs on pasture improvement and building of watering points with the support of the Government and the donor community.

In the context of livestock development, the SSRAD envisages:

- Promotion of long-term renting and privatization of the pastures,
- Establishment of mechanisms contributing to efficient use of distant pastures,
- Provision of technical assistance and advice for implementation of measures by pasture owners and tenants, aimed at improvement of pastures,
- Implementation of mechanisms for efficient use of highland pastures, aimed at full use of capacity for production of fodder,
- Evaluation of highland pasture degradation levels and development of measures aimed at their improvement.

SSRAD also signifies the presence of alpine and sub-alpine pastures for producing organic food of animal origin in the country, but also pays attention ton the possibility of increasing the volume of produced and exported swiss cheeses in case of improvements in alpine pastures.

The Strategy of the Republic of Armenia on Conservation, Protection, Reproduction and Use of Biological Diversity RA Biodiversity and the Action Program were developed by the RA Ministry of Nature Protection in 2015 and naturally pastures in these documents were considered in terms of ensuring biodiversity.

The Strategy points out the vulnerability of the pastures to the agricultural activity in the country, specifically in terms disproportionate distribution of loads on pasture ecosystems, which resulted in overuse of natural resources and alteration of the environment.

By the way, the Action Program envisaged the inclusion of prices for biodiversity and ecosystem services in the pasture and grassland management plans. However, we have not found a single practical action (measure) in this direction by far.

The 2014-2025 Armenian Development Strategy (ADS) also states that there are difficulties with coordinated and purposeful use of natural grazing lands – pastures and grasslands in Armenia.

The ADS envisages the following actions for effective solution of the issue of purposeful and efficient use of pastures and grasslands:

- Continuation of programs on increase of efficiency of use of natural grazing lands,
- Implementation of coordinated and efficient pasture and grassland use schemes,
- Implementation of publicly supported programs on watering of pastures and ensuring their accessibility,
- Promotion of establishment of pasture use cooperatives and support to their operations.

The RA Government Program for 2019, envisaged for the coming five years, does not envisage any specific measures related to livestock or pastures. However, efficient management of land resources, development and implementation of policies for prevention of soil contamination and degradation are mentioned as priorities in the chapter on environmental actions.

Another strategic document, directly related to pastures, is the RA strategy on combatting desertification (2015), which focuses on anthropogenic factors, including the overgrazing of pastures, as the main contributors to Desertification in the country.

Apart from the state strategies, it is worth mentioning that Armenia is a member of a number of international conventions and agreements and has taken the commitment to implement measures aimed at improving pastures.

Respectively, in 2015, the Republic of Armenia, as a member of the United Nations (UN), took the commitment to support the implementation of the UN Sustainable Development Goals (SDG) by 2030. The 15th goal of the SDGs states: "Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, halt and reverse land degradation and halt biodiversity loss". This goal includes 14 global indicators, some of which are directly related to pastures, for example:

- 15.3.1: share of degraded lands in the total land fund,
- 15.4.2: index of green cover of mountains,
- 15.a.1 and 15.b.1: official development support and public expenditures on biodiversity, protection and sustainable use of the ecosystems.

Armenia reports only for 15.3.1, out of the mentioned indicators.

Armenia also members the European Landscape Convention (2000), the 5th Article of which requires every party of the Convention to develop and implement landscape policies that are aimed at planning, protection and management of the landscape.

Apart from the aforementioned, Armenia is also a member of the Biodiversity Convention (1993), according to which the abovementioned Strategy of the Republic of Armenia on Conservation, Protection, Reproduction and Use of Biological Diversity RA Biodiversity and the Action Program was developed. Armenia is also a member of the UN Convention on Combatting Desertification (1996). Certain articles of the latter are reflected in the RA Strategy on Combatting Desertification and in the RA Government Program, above.

6.2. Pasture management legislation and regulations

Pastures in Armenia are regulated by a number of legislative acts, and there is no integrated legal document on direct regulation of pasture relations.

There are two RA Government resolutions (2010 and 2011) that can be called absolutely related to pasture regulation: "Procedure on Using Pastures and Grasslands" (2010) and "Procedure on Using Pastures and Grasslands" (2011).

Due to the Procedure on Using Pastures and Grasslands, since 2010, the procedure for using state owned pastures was simplified. Before, the use of state owned pastures supposed a contract approved by a notary and some additional costs. However, after the resolution was

signed into force, state owned pastures may be rented out for a 3-year contract, without approval by a notary. The resolution also contains a contract template that has to be used when concluding such contracts.

According to the Resolution, the payment rate for the use of state owned pastures is defined according to the property tax paid for that land. This creates a problem in practice, because it limits the possibility of regulating the pasture users by the LSGs, by means of increasing or decreasing the rates. Additionally, the cadastre prices for the lands under pastures were revisited in 2007 the latest[12] and there are cases, when rates defined in accordance with property tax do not comply with the real price of the pasture that depends on its actual conditions.

As the title prompts the "Procedure on Using Pastures and Grasslands" defines the procedure for using pastures and grasslands, but is only related to state owned pastures and grasslands.

The procedure described in the Resolution defines the terms for pasture management and efficient use. It envisages the shifts for use of pastures, development of plans, definition of dates for opening and closure of the pasture season, as well as definition of guiding criteria for organization of management and use of pastures, before the use starts.

There are no direct legal regulations, standards or procedures for management or use of community owned pastures. Below we will discuss various sectoral laws and resolutions that are to certain extent related to issues of pasture management.

There is no specific reference to pastures in the RA Law "On Local Self-Governance", however, Article 43 of the Law defines the competencies of community mayor in the sector of land use. Bullet 2 of Paragraph 1 of this Article states that the community mayor shall *plan and develop the annual and five-year programs for* ***managing community owned pastures*** *that comprise the non-vendible part of the community development program and are submitted for approval by the community council.*

According to the 4th bullet of the same paragraph, the community mayor shall *in accordance with the legal procedure, implement control over* ***purposeful use*** *of lands in the administrative territory of the community, and over ensuring the requirements of the Land Code by the land users* (own functions).

[12] Resolution N 403-N, dated April 11, 2019 on approving cadastre prices for purposes of use of lands of the Land Fund of the RA Goveenment. See: https://www.arlis.am/DocumentView.aspx?DocID=129771

According to the 5th bullet of the same paragraph, the mayor shall prevent, revoke and terminate illegal use of land. According to the 6th bullet, he shall perform works aimed at improvement of community lands.

It is worth noting that the abovementioned are the own authorities of the community mayor, aimed at solution of the compulsory community problems. By the way, the LSGs, according to the law, are obliged to ensure the implementation of own authorities for solving the compulsory problems of the community.

There are certain references to the pastures also in the RA Land Code.

According to Article 9 of the RA Land Code, the procedure for use of agricultural lands, including pastures shall be defined by the owners thereof. Hence, every community shall decide on its own what the pasture use procedure should look like.

Additionally, Article 60 of the Land Code (Point 10) prohibits the transfer of entitlement by physical and legal persons on state and community owned land plots that are **occupied by pastures of general use located beyond the administrative territories of the communities**, but also by livestock passages, springs, and other infrastructure as per the decrees of the LSGs.

However, it is also worth mentioning here that the RA Government Resolution N 1873-N (2005) on "Approval of procedure on inclusion of lands that belong to various categories and are not located in community territory into the administrative borders of the community" gave the start to the process of inclusion of state owned lands into the administrative borders of the communities. These works ended in 2015, hence there are no state owned lands located beyond the community administrative borders and the abovementioned definition of the RA Land Code is obsolete, as the state and community owned pastures may be transferred as property of the RA citizens, legal persons and persons with special residence stati.

In 2008, the National Assembly of the Republic of Armenia adopted the RA Law on "Land use and protection control", according to which, control had to be implemented ex officio over use and protection of all lands in the country and in three levels:

1) Supreme body of professional oversight, according to the RA Law on "Local Self-Government", i.e. RA Urban Development, Technical and Fire Safety Inspectorate[13]
2) The Marzpet (Governor) (in Yerevan it is the mayor) and

[13] RA Prime-Minister's Decree on Approval of the Charter of the Urban Development Technical and Fire Safety Inspectorate, https://www.arlis.am/DocumentView.aspx?DocID=124381

3) The community mayors.

The RA Urban Development, Technical and Fire Safety Inspectorate oversees the purposeful use of the land fund, implementation of the requirements of the Land Code, implementation of land management related functions of the Marzpets, etc. The Inspectorate is in power to demand payment of fines when identifying inconsistencies, for example, unauthorized use of pastures.

The Marzpets are indirectly involved in overseeing community pasture use. They act in accordance with a joint decree[14], signed in 2014 by the RA Prime-Minister, Minister of Territorial Administration and the Chairman of Real Estate Cadastre Committee of the RA Government, according to which Marzpets shall carry out administrative control in the sector of land use. Administrative control supposes evaluation of the mayor's operations in the sector of land use, according to a predefined questionnaire[15].

The RA law on flora (1999, HO-22) also regulated pastures, but as areas covered with vegetation. According to this law, the user of fauna shall ensure the protection of fauna objects at his disposal, shall not violate the integrity of plant coexistancies in nature, shall implement the necessary measures for reproduction and conservation of flora, etc. Additionally the law envisages the need for state registration and state cadastre, in order to identify the plant species and coexistancies, quantitative and qualitative changes in their habitats. According to the law, the state registration of flora shall be carried out regularly, not later than once in 10 years.

6.3. Sectoral projects implemented by stakeholder organizations

Pasture management related projects were implemented in Armenia by a few organizations. Below are the projects implemented by sectoral stakeholder organizations.

RA Government, Ministry of Agriculture

By far there are only two projects worth mentioning, implemented by the Government and aimed at increasing the effeciency of pasture use: first and second projects on "Community agricultural resources management and competitiveness" (CARMC). The total project value

[14]RA Deputy Prime-Minister, joint decree of the RA Minister of Territorial Administration (05 February 2014) and the Chairman of the State Real Estate Cadastre (N 9-N) on approving the questionnaire for adminisytrative control implemented in the sector of land use by the RA Governors https://www.arlis.am/DocumentView.aspx?DocID=88823

[15]Decree N 87-N (13 April 2015) of the State Real Estate Cadastre Committee of the RA Government on Approving the Methodical Guidelines for Criteria of Assessment of Actions by the RA Governors in the sector of Land Use.

is USD 64 million, 48,67 of which are loans provided by the World Bank and organizations of the World Bank Group.

The CARMC project was implemented in 2011-2016. The main goal was to improve the productivity and sustainability of pastures and livestock systems of 55 communities in the regions of Aragatsotn, Lori, Shirak, Gegharqunik, Tavush and Syunik.

The project established "Community pasture management and livestock development" committees and consumer cooperatives called the "Community pastures users unions" in 90 communities of the mentoned regions. In 83 communities, "Community pasture management and livestock development" plans were developed, watering points were built at about 115000ha of previously non-used or partially used pastures, also an assessment of conditions of degraded adjacent pastures was carried out for 79 communities. Measures for their restoration were also developed.

Based on success in the first project, the second CARMC project started in 2014, the main goal of which was to (a) improve the productivity and sustainability of pastures and livestock systems and (b) increase the volume of products from selected livestock farm and high-value agricultural chains.

According to the last report on implemented projects, published on the WB website, by November 1, 2017, "Community pasture management and livestock development" plans were being developed for 109 additional "Community pasture use union" cooperatives.

Strategic Development Agency (SDA) NGO (ongoing programs)

SDA has been working in the pasture sector since 2008, implementing different projects.

Since 2017, SDA has been implementing the project of "Livestock development Armenia, South-North", which is funded by the Austrian Development Agency and Swiss Development and Cooperation Agency. One of the three goals of the project is to increase the income of livestock farms in the northern regions of Armenia, through sustainable management of natural resources. Efficient pasture management trainings are organized in the target communities of the project, skills of the communities on development of pasture management plans are improved, works on improvement of pasture infrastructure are carried out for the aforementioned purposes.

The program targeted 88 rural settlements with total population of 85000, in the Marzes of Shirak, Lori, Tavush and Gegharqunik.

Another ongoing SDA implemented project is "Livestock development in the South of Armenia" (2014–2020). The goal of the project is increasing the income and improving economic opportunities for livestock farms in 100 rural settlements in the Marzes of Syunik and Vayots Dzor.

Support is also being provided for increasing the production of fodder in the target communities; abandoned unuseable pastures are being restored, pasture infrastructure is being built, pasture management plans are being developed with participation of the communities, thematic trainings are held on implementation of procedures on monitoring, effecient use and sustainable management of pastures. It is planned to establish veterinary stations in a number of communities.

The project is funded by the Swiss Development and Cooperation Agency (SDC).

United Nations Development Program (UNDP) (completed and ongoing projects)

Climate East pilot project was implemented in Armenia in 2013-2017 with the funding of the European Union and the support of UNDP. Works on restoring degraded highland pastures and forests, as well as on promoting economic benefits through sustainable use of lands in the target communities were carried out in the framework of the project.

Infrastructure of distant pastures was improved, especially in target communities. Improvements were implemented in degraded adjacent pastures of the communities. Plans for grazing in turns were developed for five communities, and trainings were held for implementation of those plans. The developed plans shell be used to improve management in 7500ha of pastures.

The project was implemented for the communities (currently settlements) of Karchaghbyur, Tsovak, Lchavan, Tsapatagh, Makenis, Pambak and Daranak in Vardenis county of Gegharqunik Marz.

There is another project implemented by UNDP, "Mainstreaming Sustainable Land and Forest Management in Mountain Landscapes of North-Eastern Armenia". It started in 2016 and aims at mitigating the forest dependence in communities located in the vicinity of forests.

The project is being implemented in the Marzes of Tavush and Lori and as regards the pasture related activity it plans restoration of 90 hectares of pastures and cultivation of fodder crops in about 140 hectares of land, which will improve livestock feeding in the target communities and reduce the pressure on pastures occurring because of early spring

grazing, when the plants have not grown sufficiently. Training sessions are also organized in the framework of the project.

German International Cooperatoin (GIZ) (completed and ongoing projects)

In the framework of technical cooperation with the Republic of Armenia Since 2015 (and till November 2019) GIZ has been supporting the "Integrated Biodiversity Management South Caucasus" (IBiS) regional project in Armenia, Georgia and Azerbaijan.

The project contributes to integrated and intersectoral management of biodiversity and ecosystems and operates in the following four directions:

- Support to pilot initiatives and coordination of processes aimed at sustainable management on the local level,
- Capacity building and awareness raising for public administration bodies at local and national levels,
- Public awareness on importance of biodiversity management and ecosystem services, and
- Promotion of professional experience exchange and cooperation onm international level related to biodiversity and ecosystem services.

The IbiS project, together with its partner organizations also:

- Supports the development of strategies, intersectoral policies and regulations on sustainable biodiversity management and ecosystem services,
- Contributes to the development of a monitoring system for biodiversity and ecosystem services and facilitation of interagency (interministerial dialogue).

The IbiS project is the continuation of the GIZ Sustainable Biodiversity Management Project (2009-2015), in the framework of which the "Pasture Monitoring Manual, Armenia" and "Guidelines on Development and Implementation of Pasture and Grassland Sustainable Management Plans" were developed, but also in the period of 2013-2015:

- 24 communities were trained on development and implementation of pasture monitoring and pasture management plans,
- Pasture monitoring was carried out in 24 communities, and
- Pasture management plans were developed in 19 communites.

7. Conclusions and recommendations

7.1. Conclusions

Difficulties with implementation of sustainable pasture management in Armenia arise from various circumstances, and the solutions are at different levels.

Presence of infrastructure, correct assesement of pasture productivity and planning of livestock movement and pasture loadedness based on that, involvement of pasture users in the development of the plans and legal oversight over the implementation of the plans are the necessary conditions for sustainable pasture management. Apart from these, there are also indispensable conditions, e.g. economic expedience of manifesting such a behaviour that is in strict compliance with the pasture management plan or involvement of all livestock owners in the process of implementation of the plan, hence excluding any possibility of pasture use that is not envisaged by the plan.

Hence, the proper and consistent implementation of management functions is not the only requirement for ensuring sustainable management, but also the overall environment that is partially influenced or not influenced by the LSG (the manager). The environment may cover the legislative framework and the rule of law, the political and economic situation, social issues, institutional operability of the existing agencies, the conditions of the infrastructure, the level of education and the socio-cultural perceptions of the population, the environment and the natural conditions, the demand for pastures (depending on increase or decrease in the number of livestock).

Some of the issues, for example, connected with natural conditions, cannot be solved, some others may be regulated through improved legislative framework, as well as those depending on perceptions and the level of understanding, hence long lasting work is required. Some issues need the attention and sponsorship of the Government not only in legislative or institutional fields, but in terms of financial contributions, related to collection and dissemination of complete information on environmental and economic conditions of the pastures, building and maintenance of infrastructure and restoration of pastures.

Pastures are vital for the environment and the economy of Armenia, however they are abandoned by the state. Their management and administration are the responsibilities of the LSGs, but the latter lack necessary financial, technical or human resources to ensure the minimal management of pastures.

Meanwhile, the role of pasture users in the pasture management system is underestimated. They are considered only as consumers, which is because of their weak interest with the sector and the low level of awareness about own rights. The consequence is that pasture users do not understand the reasoning behind decisions and do not feel any responsibility for their implementation.

Cooperation among pasture users is poor, which is expressed not only by difficulties in joint organization of livestock management on distant pastures, but also by abusing income from pastures that belongs to future generations.

The causality of pasture management related problems in Armenia may be described by a diagram (Figure 22), where the main reason for incomplete pasture management practices is the non-profitability of animal husbandry, which is also the consequence of improper management and incorrect use of pastures. Meanwhile, sustainable pasture management needs infrastructure and resources. Incomplete infrastructure and limited professional and financial resources of the LSGs (managers) contribute to pasture degradation, reduce the profitability of animal husbandry and prevent the implementation of measures aimed at correct use of pastures, understanding the need for their management and increase in profitability of animal husbandry.

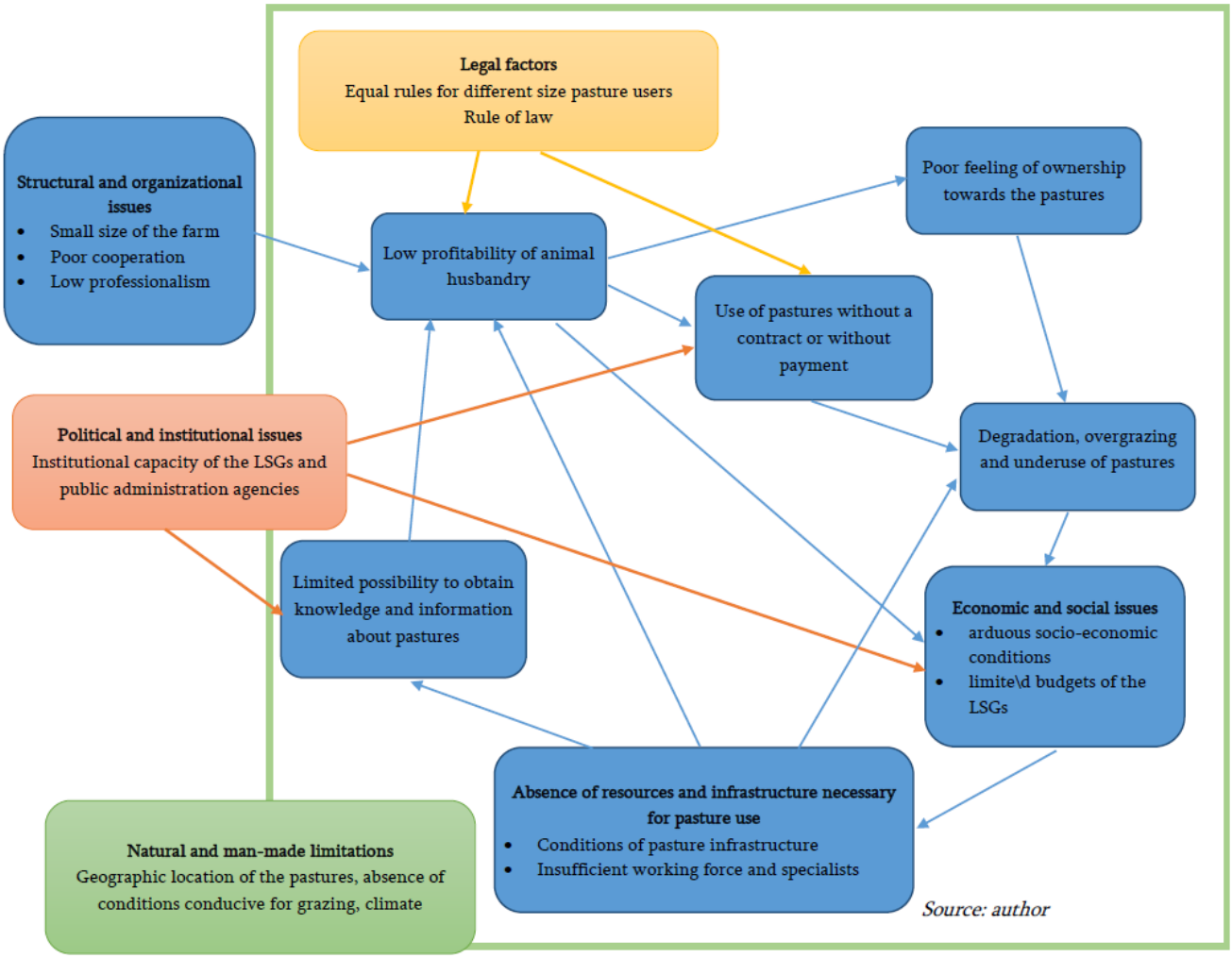


Figure 22: Causality of pasture management related problems

Additionally, weak institutional capacity of communities and public administration bodies, the rule of law and implementation of contracts also create impediments for implementation of sustainable pasture management.

The community consolidation process that has gained momentum in the recent years also had influence on efficiency of pasture management in Armenia. It has not yet been fully understood by the population of the consolidated rural communities, hence the former borders of the former community pastures are practically still being maintained in most of the cases. Additionally, if in case of consolidation there is an opportunity to make investments in restoration, improvement, higher accessibility and efficient use of pasturelands, then in other cases these opportunities have shrunk or earmarked for the improvements and development in other sectors.

The chapter below will discuss the economic bases for pasture management and expediency of their establishment in the RA.

Economic bases for pasture management and the Armenia experience

The theory of nature use economy widely uses the concept of "tragedy of the commons"[16], according to which individual users, acting independently according to their own self-interest, behave contrary to the common good of all users, by depleting or spoiling the shared resource through their collective action.

This situation is very similar to what we can observe in pastures of Armenia now. Community and state owned pastures are considered by the community population as common property, i.e. when pasturelands belong to everyone and to no one at the same time and use of pastures is confined to only individual interests. The examples of these phenomena are: overloading pastures with a larger number of cattle than a pasture may feed, preferring pastures in the vicinity of the community instead of the distant ones, overgrazing of higher quality pastures, etc. "Tragedy of the commons" is a consequence of poor cooperation, and when personal gain overrides the common interest.

The "Tragedy of the commons" was long considered one of the fundamental concepts of nature use, and there are two probable ways of preventing it: (1) regulation of the resources through intervention of the Government, including the internalization of external impacts and (2) privatization of the natural resources.

Both of these approaches have been applied in Armenia. The acting legislation of Armenia does not prohibit privatization of pastures and attempts to regulate the use of pastures in the framework of adopted resolutions. Additionally, payment for the use of pastures is used to internalize external impacts. However, as we can see, the administered approach is not effective and there are degraded pastures throughout the whole territory of Armenia.

There is another approach gaining momentum through the last twenty years. It denies the regulatiry ways of "tragedy of the commons". The author of this approach is a 2009 Nobel Prize winner Elinor Ostrom, whose theory is based on the idea of making the communities so cooperative that they can become one, which acts in the best interests of the common.

According to Ostrom's theory, the commons may avoid "the tragedy" without the need to be regulated by the Government, but in presence of certain conditions, as follows:

1. **Definite borders:** the borders of the resource and the right holders for using that resource are clearly defined. Provided the borders are not clear yet, it is not known what we manage and for whose sake.
2. **Compliance:** the rules of using resources must reflect the local conditions and standards.
3. **Collective selection mechanisms:** there are mechanisms for the impacted community groups to take part in the decision-making on the rules of regulation.
4. **Monitoring:** ensure the monitoring of the conditions and use of resources. By the way, those implementing the monitoring must be the ones using it or the ones serving the users.
5. **Sanctions:** violations identified through the monitoring, i.e. incompliance with the rules defined by the users must be punished by the users or officials appointed by them, or by both, depending on the severity of the violation.
6. **Fast and fair dispute resolution:** supposedly, there have to be fast and inexpensive mechanisms for resolving disputes among the users, or between users and public officials.
7. **Sovereignty:** rules defined by the users' groups shall be accepted by the officials and may not be influenced by officials.
8. **Multi-tier management:** resource management shall be performed through several layers of interconnected management levers (community, county, Marz, etc.).

As we can see, the sine qua non rule of Ostrom's approach is the presence of cooperation among the users.

[16]William Foster Lloyd, 1833: Garrett Hardin, 1968, Tragedy of the Commons, Science.162:1243-1248.

7.2. Recommendations

A number of measures are envisaged for promoting the process of pasture management and the implementation of established management plans in the RA. The measures are envisaged by the RA Government, Local Self-Government bodies and local and international stakeholder organizations working in Armenia.

The recommended measures include:

- Support to livestock development in Armenia, in consideration of presence of skills, pastures and their conditions in various regions. The implementing agency – *RA Government and stakeholders*.
- Promote the cooperation among the pasture users and between pasture users and the LSGs, by means of involving pasture users in the process of organizing pasture management and in discussions. Support any cooperative initiative (formally or informally) implemented in the communities. The implementing agency – *LSGs.*
- Create pasture data warehouse that will accumulate local, regional and national layers of data on pasturelands, their vegetation levels, biodiversity, roads, natural springs, watering points and other pasture infrastructure and its conditions. The implementing agency – *RA Government and stakeholders.*
- Improve competition for the purpose of promoting livestock development. Ensure proper labeling of products that contain milk powder, also urge the businesses to mention the whether the animals that produced the milk were kept in feedlots or grazed on pastures. The implementing agency – *RA Government.*
- Improve and restore pasture use infrastructure, by means of prioritizing the livestock on pasture, the expediency of livestock development in the given community and the opportunities of generating income from use of pastures. The establishment of infrastructure will not only increase the income generated from the use of pastures, but will also promote the involvement of youth and women in the sector. The implementing agency – *RA Government, LSGs and stakeholder organizations*.
- Create a joint pasture use promotion platform for the communities. It will allow reducing the transaction costs of individual pasture users, prevent incorrect pasture use and increase the level of optimal use of pastures. The implementing agency – *RA Government, LSGs and stakeholder organizations*.

- Organize trainings on pasture management and its economic significance and environmental impact for the LSG representatives, shepherds and representatives of pasture using farms. The implementing agency – *RA Government and stakeholder organizations*.

- Add a separate line in the LSG budget on pasture restoration, improvement and implementation of management measures (including the reqruitment of specialists). Define a minimal threshold (i.e. 50%) for revenues accrued to the LSG budget from use of pastures and their rent, which has to be earmarked for the implementation of works envisaged by that new line. Targeted use of rent paid for the use of pastures will promote the collection of rent and generate positive impact on conservation of pastures in the country. The implementing agency - *RA Government*.

- Envisage positions of agronomists with functions of pasture management in the staff of the LSG bodies in communities with larger pasturelands (above the average area) in the country, for the purpose of increasing the efficiency of pasture management. The implementing agency – *RA Government*.

- Develop a uniform legislative framework for the management of local and state owned pastures. It will protect the economic and social interests of small and large livestock farms on the one hand, and on the other hand it will create prerequisites and guarantees for establishment of opportunities for pasture conservation and natural reproduction and development of functions of sustainable management of pastures. The implementing agency – *RA Government*.

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Annexes

Annex 1

Table 14: Communities selected for the online survey

Marz	Average indicator per Marz	Communities
Aragatsotn	1 140 ha	Artashavan, Ushi, Byurakan, Lernarot, Avan*, V. Sasunik, Tegher, Orgov, Alagyaz**, Tsaghkahovit*, Aparan*, Aragatsavan, Tatul, Verin Bazmaberd, Zovasar, Irind**, Dashtadem**
Ararat	655 ha	Dashtaqar, Zangakatun**, P. Sevak, Lusashogh, Urtsadzor, v. Ararat, Yeraskh, Verin Dvin, Narek**, Norashen, Getazat, Dvin**, Qaghtsrashen
Armavir	175 ha	Maisyan**, v. Arshaluis, Haytagh, Norakert, Argina, Bagaran**, Yervandashat**, Lernagog, Koghbavan, Vanand, Qarakert
Gegharqunik	738 ha	Gavar**, Artsvanist, V. Getashen, Tsovasar**, Lichq, Chambarak*, Shoghakat*, Vardenis***, Geghamasar**, Akunq
Lori	890 ha	Bazum, Halavar, Stepanavan*, Gyulagarak*, Lori Berd*, Alaverdi**, Tumanyan**, Odzun, Tashir*, Metsavan*, Sarchapet*, Spitak, Arevashogh**, Lernavan**, Katnajur**, Mets Parni, Nor Khachakap**, Sarahart
Kotayk	740 ha	Solak*, Qaghsi, Garni, Akunq*, Meghradzor, Charentsavan*, Yeghvard*, Goght
Shirak	2 665 ha	Akhuryan, Marmashen, Harich, Mets Mantash, Ani*, Ashotsq*, Sarapat*, Amasia*, Arpi*
Syunik	5 115 ha	Kapan**, Qajaran, Sisyan***
Vayots Dzor	11 383 ha	Zaritap*, Yeghegis**, Areni*, Jermuk
Tavush	131 ha	Dilijan**, Noyemberyan**

* - *Participated in focus-group discussions and filled the questionnaires at place.*

**- *Answers received*

Table 15: Community groups of focus-group discussions

Groups	Communities involved in the group
Group 1	Goris, Tatev and Tegh consolidated communities of Syunik Marz
Group 2	Sisyan, Gorayk and Zaritap consolidated communities of Syunik and Vayots Dzor Marzes
Group 3	Vaik, Gladzor and Areni consolidated communities of Vayots Dzor Marz

Group 4	Amasia, Arpi, Ashotsq, Sarapat and Ani consolidated communities of Shirak Marz and Saralanj community of Artik county
Group 5	Lori-Berd, Gyulagarak, Stepanavan, Sarchapet, Tashir and Metsavan consolidated communities of Lori Marz.
Group 6	Berd consolidated community in Tavush Marz and Shoghakat, Chambarak consolidated communities of Gegharqunik Marz.
Group 7	Vardenis consolidated community of Gegharqunik Marz and Akhpradzor, Lchavan, Tsovak, Karchaghbyur, Lusakunq, Mets Masrik, Khachaghbyur, Torfavan communities.
Group 8	Nerqin Bazmaberd, Avan, Artashavan, Nor Amanos and Oshakan communities of Aragatsotn Marz and consolidated communities of Aparan and Tsaghkahovit.
Group 9	Solak, Lernanist communities of Kotayk Marz and Akunq, Charentsavan and Yeghvard consolidated communities.

Annex 2

Semi-standardized questionnaire of the expert interviews

1. To what extent is sustainable pasture management established in Armenia and what are the impediments to it, in Your opinion?
2. What is Your evaluation of conditions on the pastures of the country or Your community.
3. What is ther main reason for that, in Your opinion (economic, structural, social, etc.).
4. How important are pastures, as a source of feed for the country's regions? Are there regional/Marz specificities. In average, which percentage of gained weight or milk is produced during the pasture grazing season?
5. Which are the main fodder crops cultivated in Armenia and to what extent may the nationally harvested crops (in their diversity/composition or quantity) satisfy the fodder needs of livestock?
6. How can the acting legislation and the state policies support improvements in the sector? To what extent do they hamper improvements in the sector?
7. What support is needed by community leaders or pasture users in order to implement the sustainable pasture management?
8. What is Your opinion on scientific research and its weight in pasture management sector? Which directions are more important? Which directions or topics in scientific research need more attention in order to improve the profitability of livestock farms, according to You?
9. What is Your evaluation of the quality of pasture management specialists and their presence?
10. Presence of a coordinated data base on the conditions of pastures. Cooperation among the communities.
11. What new technologies do You know that may be useful for sustainable pasture management?

12. The expediency of community and state ownership of pastures.
13. How justified is it that communities are the only responsibles for pasture management, given the economic, social and environmental conditions thereof?
14. Main environmental challenges and the possibility/ability to resist.

Table 16: List of participants in expert interviews

	Name/Surname	Agency
1	Gagik Khachatryan	Syunik Marzpetaran, Acting Head of Agricultural and Environmental Department
2	Gohar Khachatryan	Vayots Dzor Marzpetaran, Senior Specialist at Agricultural and Environmental Department
3	Mher Yeghiazaryan	Kotayk Marzpetaran, Head of Agricultural and Environmental Department
4	Vagharshak Suqoyan	Tavush Marzpetaran, Head of Agricultural and Environmental Department
5	Armen Gasparyan	Lori Marzpetaran, Leading Specialist of Agricultural Division
6	Yura Azatyan	Aragatsotn Marzpetaran, Head of Agricultural and Environmental Department
7	Martin Petrosyan	Gegharqunik Marzpetaran, Head of Agricultural Division
8	Movses Manukyan	Shirak Marzpetaran, Head of Agricultural and Environmental Department
9	Andreas Melikyan	ANAU, Head of Department of Plants and Vegetables
10	Razmik Sahakyan	Scientific Center for Food Safety Assessment SNCO, Head of food production division
11	Ashot Giloyan	Ministry of Territorial Administration and Development, Head of Local Self-Government Department
12	Artur Baghdasaryan	Ministry of Agriculture, Head of Department of Land Use and Amelioration
13	Rudik Nazaryan	Ministry of Agriculture, Head of Department of Crop Husbandry and Plant Protection
14	Artiom Tarzyan	Ministry of Nature Protection, Head of Department of Bioresources
15	Ashot Vardevanyan	Ministry of Nature Protection, Deputy Head of Bioresources Agency
16	Hovik Sayadyan	UNDP, Technical Task Leader on "Establishment of sustainable management of lands and forests in the North-Eastern Mountain Landscapes of Armenia"
17	Aram Ter-Zaqaryan	UNDP, Technical Task Leader of "Climate East"
18	Gagik Tovmasyan	Natural Grazing Lands' Management Expert