

**Traditional Farming Systems and Transition Pathways to Sustainable Agriculture:
A Comparative Analysis of Institutions and Cooperation in Romanian and Ukrainian
Rural Areas of the Carpathian Mountains**

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1. Introduction

There is an observation that traditional agriculture has provided – directly and indirectly – public goods such as biodiversity and landscapes (as prerequisites for ecosystem services) including natural, cultural, and societal values. The Romanian and Ukrainian parts of the Carpathians are still characterised to a certain and large extent by traditional farming as well as still exhibit high biodiversity (hot spots of biodiversity in Europe) and have partly intact landscapes; but often they have undergone and still undergo pronounced land use changes that negatively affect the stabilising effects of sound ecosystems and provision of ecosystem services and public goods. So we can say that the current state of farming and the farming system in the Carpathians is in a peculiar situation: on the one hand there is much speculation about reintroduction of sustainable farming, which in essence means high nature value farming (Beaufoy, 2007); on the other hand the existing low intensive, high nature value farming of the Carpathians is under threat of disappearance, because it is no longer conducive for a socioeconomic background given by the transition from a planned to market economy.

Even after periods of intensive land use during the communist era and the times of state farms which dominated in both, Ukrainian and Romanian parts of the Carpathians, the areas under study managed to maintain a system where a rather high degree of connectivity between local farming activities and biodiversity exists. This might be the consequence of the mixture of natural, social and economic conditions as well as a strong cultural identity which is present in both regions. This situation makes the post-socialist development in the research areas significantly different from many other transition countries, particularly, also from other regions of Ukraine and Romania, where rapid commercialization and intensification of agriculture are typical. It brings us to the question of the causes which trigger pathways of transition?

In the Carpathians, though we still find more elements of intact landscapes than in other parts of Europe and even as compared to other places in the world, the process of social and physical erosion of a conducive connectivity between farmer and field has started (Rusdea et al., 2005; Bühler et al., 2005). One of the finding is that young farmers are no longer interested in following traditional methods because of low value generation and better earnings from migration, including the fact that conservation of landscapes in particular is labour-intensive. Rather many farmers after the collapse of the collective system preferred to migrate, and because of labour shortages many fields and whole areas are abandoned.

Land abandonment in general can lead to various problems, but this paper focuses specifically on mountain grasslands, which are one of the most important habitat types for conservation interest in the area of the Carpathians and most of which are still managed using traditional practices. Especially the phenomenon of grassland abandonment and decrease of farming activity in the region of the Carpathians leads to the loss of meadow biodiversity. The reason for the fast loss of grassland species is that the meadows in the sub-alpine level of the Carpathian Mountains are the result of human activity and were converted from forest. As soon as farming activity is stopped, the forest steps in. This leads to several further problems:

- Unique meadow biodiversity which is typical for this region decreases and within time there is a threat of its complete disappearance. This biodiversity was created for centuries by joint influences of nature and human activities and it is providing locals with various important products like especially valuable fodder for livestock which is a prerequisite for the high quality and high yield of milk, medicinal herbs for people, etc.;
- The loss of sources for fodder which are based on the remaining livestock in the Carpathian Mountains could possibly lead to complete disappearance of farming in the region;
- Heterogeneous landscapes which are typical for the region and which are providing multi-functionality and diverse ecosystem functions for this area are under threat of disappearance and are endangered;
- Less tourists will be attracted by the homogeneous landscapes and such income source for locals as green tourism can disappear.

Biodiversity and landscape in the broader sense play a critical role in the region. Every household is managing its own land; but by doing so, the people are maintaining landscapes and certain level of biodiversity which have been created in this area for centuries. Individuals who are farming in this region usually do not have scientific knowledge about that; their practices are based on the traditional knowledge which is deeply embedded in the local culture. This traditional knowledge gives them an understanding that, if biodiversity and landscape are maintained properly, this influences their yields and consequently their welfare. We can argue that various traditional farming practices in the Carpathian mountains have influence at the wider scale, that means for the landscape and biodiversity on the whole. In this sense, traditional farming practices which are part of biodiversity and landscape management are regarded in this paper explicitly as a community activity. They are linking ecosystem services to landscape appearance and management of commons is pertinent.

The paper presents results of socioeconomic surveys carried out in rural areas of the Romanian and Ukrainian Carpathians. These results give a first overview on land use practices conducted by the local population to manage their mountain grasslands. This is done to trace back the land use change occurring in the region and to identify the main problems and drivers of this process and depict changes in management of the common resources in future. The second part of the paper deals with the theoretical framework which presents our vision of management of commons in general and specifically in the mountain areas under study. The methods used in the study and in data collection are documented in the third part of the paper. The conducted surveys are parts of two projects which are also presented in part three. This part also deals with the most important information about the study areas. The most interesting preliminary results of the surveys are that there are similarities as well as differences between the study areas in Romania and in Ukraine. They are described in part four. It is important to keep in mind that the surveys were only a part of the larger projects and that they will be incorporated into further work at the study sites. That is why the fifth part will present the implications for the envisaged broader research in the region of the Carpathian Mountains.

2. Theoretical framework and common management in mountains

It is always useful to have a theoretical background in mind if one investigates resource use, conservation and common property management as well as aims at improving income, livelihood and the environmental management (aiming at sustainability of a land use system and promotion of commons). For the case of the Carpathian Mountains it is a concept of identification of communities with their type of farming system (traditions), their landscape (beauty), and social coherence (common property management). This substitutes the triangle of sustainability for practical studies. It is important to have a concept that is capable to accommodate joint efforts of participants in conservation of landscapes and in particular biodiversity conservation.

Studying the ecology and economy of mountainous areas and looking at common property management regimes it is, by no coincidence, an interesting observation that some ecologists like Aldo Leopold and others have coined the word “mountain” (Leopold, 1949) as a synonym to describe the “will of a super-natural” entity (Flader, 1947) to which people devote efforts. “Mountain” could stand for ecology, identity, and common. The question remains what is it? We think that “mountain” stands for: (1) deep identification; (2) sharing of value of nature to be protected; but also (3) feasibility to design the environment according to natural laws; and (4) to sustain a desired livelihood in harmony with nature. Maybe these are not scientific terms in a strict sense, but as they are prevalent in peoples mind, we think that they are subjective elements of a user philosophy which is worth to be studied. This user philosophy also may be not strictly modern western style of thinking, but it prevails in other, traditional societies. For an eventual better phrasing there are similarities with the word “traditional thinking” (see Jenkins, 2002). In particular we see “mountain” as an institution that enables regulations of public good provision like eco-system services, as a matter of common understanding to work for the “good”. So we are of the opinion that citizens can attribute a value to it, but it needs their design of values (Norton, 1990).

Some researcher in ecological economics (Farber et al. 2002), for the purpose to manage an ecological and economic interacting system (which is based on the public good character of landscapes), would agree that finding the “value or will” of a system is beyond individual willingness to pay and it needs investigations into a common identification and eventual entity. In this respect we consider a “mountain” to be more than just a physical or geographical entity. We see it as identification metaphor for citizens living in an area, which is their “mountain”. “Mountain” is considered by us an integrating force (driver) for the maintenance of a certain landscape (traditional) and its nature (here High Nature Value, HNV, landscape and farming, Andersen et al. 2009). HNV offers identification and ideally the “will” to promote it. We see these things as integrating forces.

At the same time we are fully aware that, on the one hand, we can observe disintegration with modernization and look at forces and prescriptions for managing the common on the other hand. In reality there are disintegrating forces like outmigration (flight from the land), less interest of people in hard working traditional farming (mechanization), attempts to escape poverty by investments in modern farming or become dependent labourer (bigger herds, fields, and work for large investors’ farm instead of own small farm), etc. So how can things match with conservation of commons by using traditional practices or do proponents of common property management have a chance to conserve landscapes in the Carpathian Mountains? We investigate whether there are chances for a successful common property management in this area?

To answer the question we think mountainous areas are peculiar in their socioeconomics and “devise” internally (especially showed in the past) the need to do common property management. In particular:

(1) many times they prevailed as silvio-pastoral systems (Eichorn et al, 2006) which required coordination for things like transhumance, grazing in the forest, and common dates for harvest for wild fruits and hunting, etc.;

(2) these areas have still a stronger inclusion of nature element (frequently as natural pastures) than fertile lowlands and their affiliation to (need for) eco-system services is bigger than in low lands (Millennium Assessment, 2003);

(3) they are remote and disadvantaged which means that poverty and the danger of vicious cycles of underdevelopment could prevail (outmigration, loss of integration, etc. see for example “montes” in Spain: Domínguez García, 2007); but also for those who stay in the area the need to support each other is bigger than in more advantageous area;

(4.) many times they pertain special socioeconomic conditions (such as: they are labour oriented instead of mechanized);

(5) one can not use large machines, to a certain extent small-scale farming (HNV) is evident, farmers are subsistence oriented and do not have cash to invest in machinery; etc.;

(6) additionally by history mountains are areas for retreat and they are characterized frequently by ethical splits.

However, from a point of view to formulate hypotheses on development pathways, mountain areas offer many chances for inductive research strategies. As been highlighted in many comparative studies, different mountain regions have undergone different pathways. For instance, in the Alps, e.g. mostly in the Western Alps, we can find areas that are now nearly depopulated (due to property rights problems) whereas other areas maintained population at the cost of intensifying agriculture and deteriorating landscapes (France and Italy vs. Austria: Bätzing, 2005). It is important to mention that, except of the ecological dimension, the process of modernization has also a special economic dimension of mountains, expressed in the need to overcome low income to survive on a small farms, and an institutional dimension which becomes evident through minor legal systems of field organization. But problems in land renting and heritage prevent larger scale farming. As a consequence of that the process of modernization is limited. It seems that there is no other choice than leaving mountain areas for some people: i.e. the rural exodus is considered “natural” and it delivers a selection of people willing to live there. But there may be also further dynamics. It is a hypothesis that the rural exodus negatively impacts on the landscape (degradation) and that degraded landscapes encourage further exodus. We must relate the question of exodus to landscape deterioration as feedback loop. A theoretical question is what are the determinants of this dynamics? And can we observe those already in the Carpathian?

For a study on the Carpathian Mountains it is very important to look in such processes which have taken place in other EU countries for decades. In Romania we see this process also: Traditional mixed systems of arable fields and (mountain) pastures (Rusdea, 2005 and Kuemmerle et al. 2008) are reported to vanish. This is driven by culture and values. We see it as a problem of lack of governance and community management.

Additionally, in the process of modernization, nature provision is understood frequently as hindrance (rather than chance) and many times the opposite prevails to what was envisaged (e.g. that farmers no longer care about nature though they are encouraged by agri-environmental policies). This had happened in many rural areas of the EU (Ploeg et al., 2002). People newly (have to) discover that nature provision is good and was traditionally intended; at the same time today landscapes still are converted to production units, which is the treat. Because the interactions between actors, governance and development are not well understood, rural development, landscape economics and modernization economics are still critical issues in most EU regions and they conflict to a large extent.

3. Methods and data

The areas chosen for the analysis in this research, which are located in Romania and Ukraine, possess various common features as well as differences. Our research areas of the Carpathian Mountains are famous for their unique hot-spots of biodiversity and marvelous heterogeneous landscapes. Although the regions under comparison are far away from each other, their natural and climatic conditions are quite comparable and have a strong influence on the way of life of people as well as on the regional development paths chosen. The areas belong to the group of disadvantageous areas and the natural conditions limit possible farming practices to a certain range of agricultural activities which are almost the same for both regions (like livestock breeding, limited use of arable land, hay mowing, etc.). Besides other features such as low income, which is also common for both countries, there is a strong cultural identity prevailing in these mountainous areas: both in the Romanian and in the Ukrainian Carpathians people are identifying themselves with the local culture, traditions (including traditional ways of farming), and history. The study area in Romania is associated with the Hungarian minority of Székely and Csángós and the research sites in Ukraine are linked to Hutsuls – one of the three ethnographic groups typical for the Ukrainian highlanders. So far this cultural identification may be regarded as a very important integrating force for these regions which could not be weakened even by the collectivization period.

The differences between the regions under study are new events like availability of EU CAP instruments for Romania, flight from the land, and different pathways for land distribution; they are also very important and can possibly explain some results of the comparison analysis.

The main habitat type of conservation interest in the Romanian and Ukrainian parts of the Carpathians is mountain hay meadows or mountain grasslands most of which are still managed using traditional practices. This defined the focus of the research. Our socioeconomic surveys on management of the mountain grasslands were parts of different research projects but they were prepared parallel in cooperation between the working groups responsible for Romania and Ukraine. The next part of the paper will present research projects, study areas and methods of the research as well as data collection relevant for this paper.

3.1. The project in the Romanian Carpathians

The hay meadow project in Romania is run by the Pogány-havas (Pagan Snow Cap) Association in the Eastern Carpathians of Romania. It aims to support the sustainable use of mountain hay meadows and thus to maintain high biodiversity; so it looks for important ecosystem services and healthy local communities. The working group commenced with the view point that the viability of local communities and the continuation of traditional practices are of key importance from both, cultural and nature conservation points of view. The overall objective is to document and preserve traditional knowledge on land management which is

important for many reasons: (1) this provides habitat and (2) landscape management on large scales, (3) it is a reservoir of knowledge and skills forgotten in most of Europe during the 20th century, (4) it provides healthy food and (6) high resilience against global challenges such as climate change and economic crises.

A first step is the understanding of the relationship between man and natural resources and find motives in planning of any kind of intervention in the local society. A pre-phase is to understand local economic and land use systems. The motivation for conducting a quick sociological survey was the creation of habitat management plans for two hay meadow sites (Biro et al. 2011). Therefore questions were focused on local grassland management and traditional agricultural methods.

3.1.1. Study areas

The project focuses on the management and biodiversity of two contrasting regions of hay meadow: the Torda Valley near the village of Delne, and the Jávárdi Valley in Hidegség. Delne (Delnița) lies in the Csík Basin (Depresiunea Ciucului) and is one of Csíkpálfalva (Păuleni Ciuc) municipality's three villages. The village is situated 5 km from the nearest town, Csíkszereda (Miercurea Ciuc). Hidegség (Valea Rece) is in Gyimesközéplök (Lunca de Jos) municipality which lies on the boundary of the Csík and Tarkó Mountains (Munții Ciucului, Munții Tarcău). These two villages have very distinct agricultural characteristics. The main difference is their geographical position and topography. Delne lies in a basin, with relatively large areas for cultivation with low slopes, at altitudes between 700-750 meters above sea level. Its lands are suitable for almost any kind of agricultural activity ranging from arable to livestock breeding. Hidegség is in a mountain landscape with steep slopes and with altitudes between 900-1400 meters which means that agriculture comprises with mainly livestock breeding. There are very small parcels of arable land where the terrain is flatter.

3.1.2. Data collection

During the research we questioned 60 householders who own a hay meadow in our study sites, 24 in Delne and 36 in Hidegség. The interviewees were chosen randomly from a list of landowners that we received from the mayors' offices, 137 for the Delne site and 165 for Hidegség.

3.2. The project in the Ukrainian Carpathians

The focus of this project is on the analysis of farming and grassland management in Ukraine in particular with consideration of production itself and the influence on the environment. The data collected from a socioeconomic survey and geo-botanic data related to every questioned household will allow us to create an economic-ecological model to analyze the efficiency of agricultural production and ecosystem situation. We have a concept with consideration of such things as a positive externality of HNV farming as maintenance of biodiversity. Although there is a certain amount of studies carried out in the region of the Ukrainian Carpathians (eg. Roth et al. 2008), most of them are either strictly ecological or economic.

3.2.1. Study areas

The study area is in the Ukrainian Carpathians. It is characterized by the prevalence of small farms, high labour intensity for the families, primitive technology in the field of plant cultivation and animal husbandry as well as mostly subsistence farming. However the agricultural landscapes are characterized by a high structural and species diversity.

Three administrative districts with some distinct features were chosen for this research in the Carpathian areas of Ukraine:

Kosiv region is the lowest region within the study sites, situated at the altitude between 350 and 850m above the sea level. A certain part of this region includes vast valleys and belongs to the Precarpathian region. In general this area has more arable land than other regions under study;

Verhovina region is situated at higher altitudes: our sites are between 600 to 1100 m above sea level. This region is characterized by higher altitudes, colder climate and less amount of arable land for growing grains or gardening. This makes the people keep livestock. Here a “Hutsul” type of farming and settlement becomes especially apparent. Historically the basic occupation of the Hutsuls is animal husbandry and their land is used for pastures and hayfields (common and private). Their homesteads are attached to their fields; hence, their settlements are scattered and extend to considerable altitudes in strip up the slopes;

Nadvirna region contains sites at the altitude between 500 to 900m above sea level. This region is characterized by even colder and wetter climate. In the part of the region where our study sites are situated tourism, especially in winter, is well-developed due to the close situation of such ski resorts as Yaremche and Bukovel. This gives on the one hand additional opportunities for off-farm employment for the local population, but on the other hand it attracts labour; additional sources of income in the form of green tourism are more spread than in other study areas.

Another feature important for the whole area of the Ukrainian Carpathians is the bad state of the infrastructure; especially roads are in a poor state with the exception of small parts leading to the most touristically developed centres. This situation is aggravated by the climate conditions with high amounts of precipitation (average 800- 1500 mm a year) and floods which are regularly destroying the local infrastructure.

3.2.2. Data collection

With regards to the special framework of the research in the Ukrainian Carpathians, we have tried to present the possibly full statistical variety of the farms/households types of the chosen regions. This is why (in contrast to the research in Romania) more distinct sites were chosen: Kosiv region was represented by 5 villages with a total number of 12 households; Verhovina region – by 4 villages with 10 households; and Nadvirna – by 4 villages with 11 households. Altogether 33 households were interviewed. The main prerequisite for choosing households for the survey was the ownership of high altitude grasslands (hay meadows or pastures). We also tried to consider different access options to machinery, income sources, different status, etc. to present possibly full picture of management types in the study regions.

3.3. Questionnaires

Our questionnaire included 42 questions. The main topics covered were: size of land owned

and cultivated at present and 10 years ago, the process of mowing, general details about meadow management (timing, productivity, management activities), motivation and future plans related to farming, creating income from selling agricultural products, descendants' attitude to farming and some other aspects including agro-tourism and subsidies.

In the survey we used open and closed questions as well as qualitative and quantitative questions.

Since all farmers, both in the Romanian and in the Ukrainian parts, mow two types of hay meadows we distinguished the inner hay meadow – the one that is close to the household – from the outer hay meadow which is far from the household, usually up in the mountains. The next part of this paper will present first descriptive statistics for the both regions under comparison and our elaborations on the results of the surveys conducted.

4. Results

4.1. The farm and farmer

The gender distribution of the interviewed people was approximately the same in Romania and in Ukraine. Amongst the people who participated in the survey in Romania 86.7% were men and 13.3% women and in Ukraine – 82% were men and 18% were women. Mean age of farmers was 55 years at the Romanian research sites and 51 at the Ukrainian sites. The average family both in Romania and in Ukraine had 3.8 members.

4.1.1. Land size

The distributions of farm sizes at the research sites in Romania are shown in figures 1-3 and for the sites in Ukraine – in figures 4-6.

The mean area of hay meadow owned per farm in Romania was 3.87 hectares. The maximum hay meadow holding was 9.3 ha in Delne, and 16 ha in Hidegség. The mean size of arable land was 1.34 hectares (Delne 2.86 ha, Hidegség 0.19 ha, n = 24 Delne, n = 32 Hidegség). The maximum arable holding was 25 ha in Delne and 0.6 ha in Hidegség. The difference between the two villages is due to the topography of the two areas, see 3.1.1. Pastures are privately owned only in Hidegség, but not in Delne; that is why only the farmers in Hidegség were asked how much pasture they have: 4.31 hectares on average; the maximum was 14 hectares (n = 15).

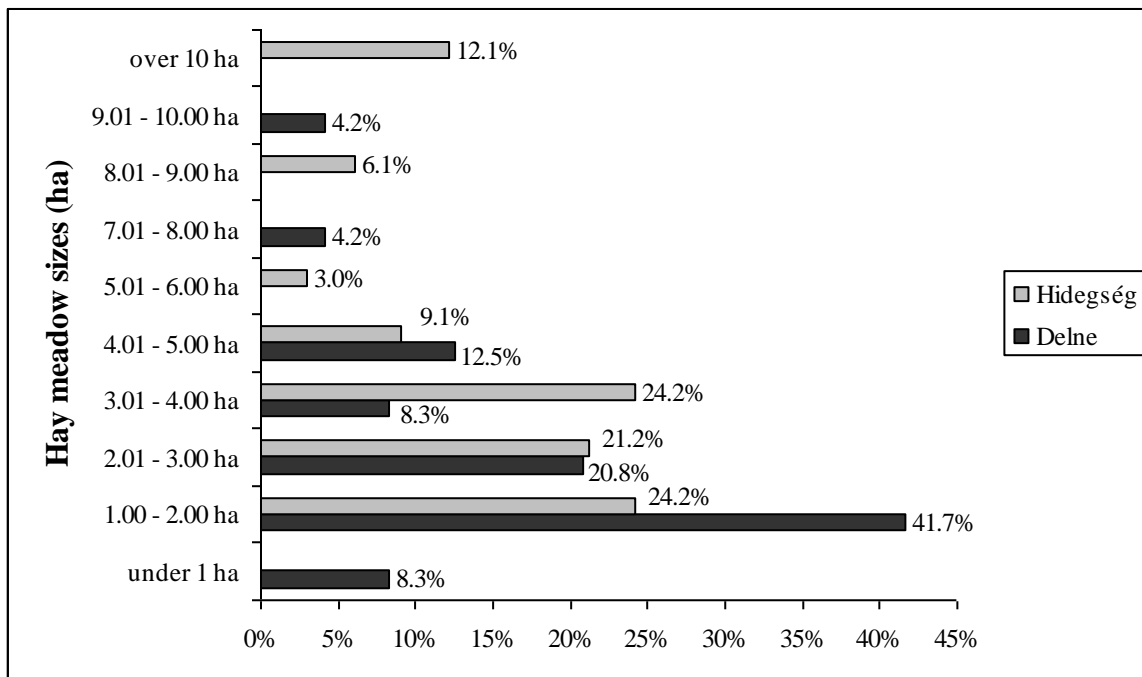


Fig. 1: The distribution of hay meadow sizes per farm in Romania in 2010.
n = 24 Delne, n = 33 Hidegség.

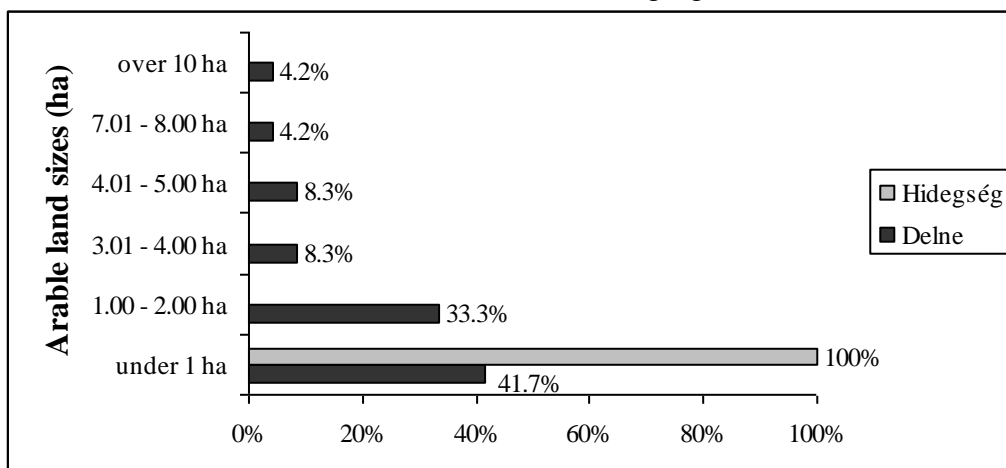


Fig. 2: The distribution of arable land size per farm in Romania in 2010.
n = 24 Delne, n = 32 Hidegség

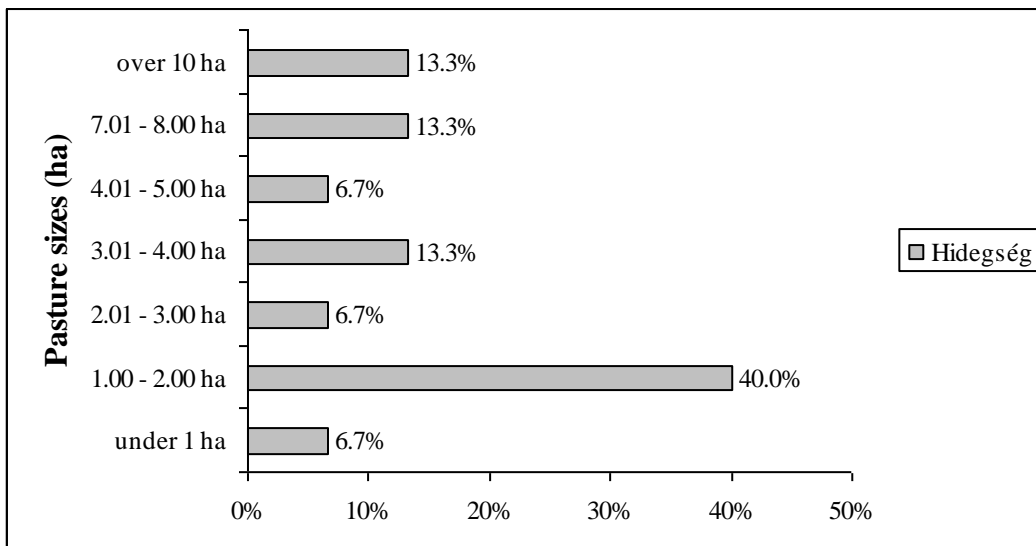


Fig. 3: The distribution of private pasture sizes per farm in Hidegség (in Romania) 2010.

n = 15

In the Ukrainian part only 16,7% of the interviewed people did not have any meadows in private ownership. For the rest it is typical to manage meadows. It is important to point out an interesting tendency: only 9,1% of the people who participated in the survey in Ukraine do not manage some parts of their meadows at all (usually far situated and hard accessible plots on the steep slopes), the rest either manage everything themselves or make special arrangements with the neighbours encouraging them to mow the hay and take it so that the meadows do not stay unmown. All the abandoned plots in this survey are situated in Kosiv region, where one can already notice the changes in the landscape: more and more meadows are slowly turning into forest.

The amount of arable land in private ownership is quite small within the group of the interviewed households in Ukraine: the majority of the people have less than 1 hectare which they use for the most important products like potato, corn, vegetables and additional fodder for the livestock.

The sizes of pasture in private use are going up to 3 hectares with exception of several farmers in Kosiv and Verhovina regions where they are renting large amount of land to run the system of seasonal pasturing partially using the livestock of the local people. At the same time quite a large amount of people do not have any pastures in property: this implies that they either do not have any livestock or use some other methods (participation in the common pasturing system of the village or usage of common pastures of villages). Many people also let their livestock animals graze at the hay meadows during certain periods.

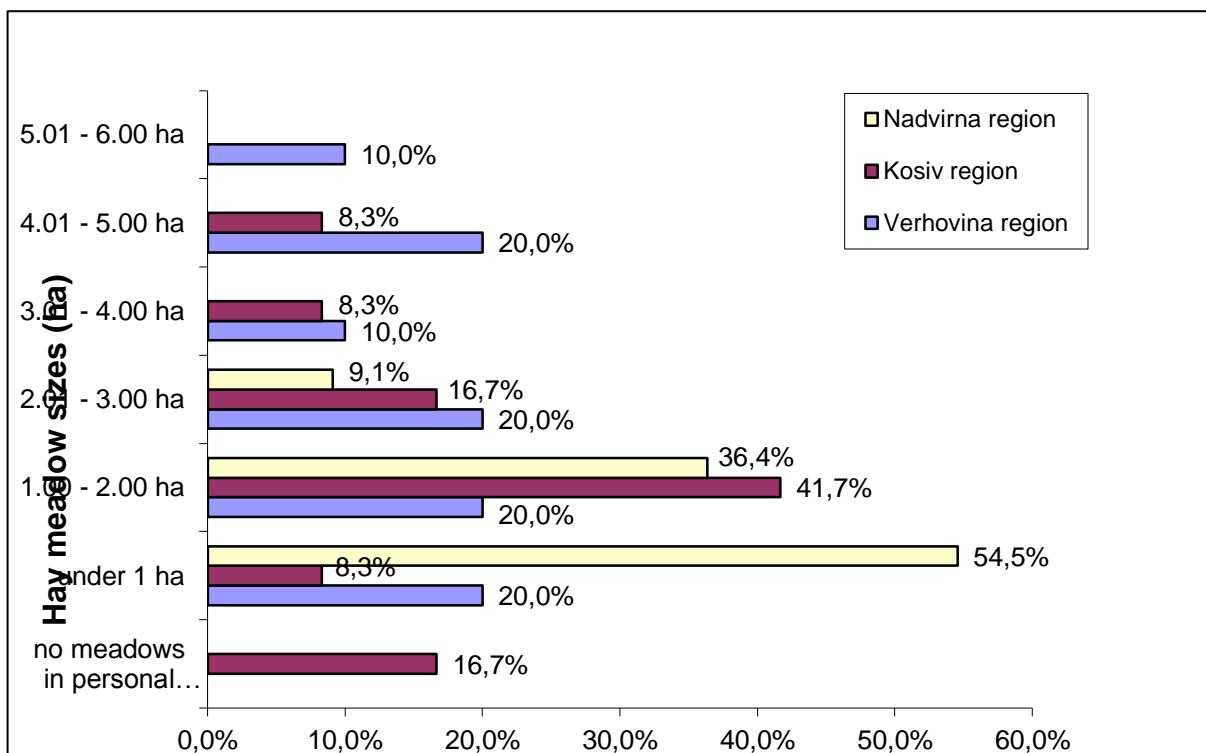


Fig. 4: The distribution of hay meadow sizes per farm in Ukraine in 2010-2011. n = 11 Nadvirna region, n = 12 Kosiv region, n = 10 Verhovina region.

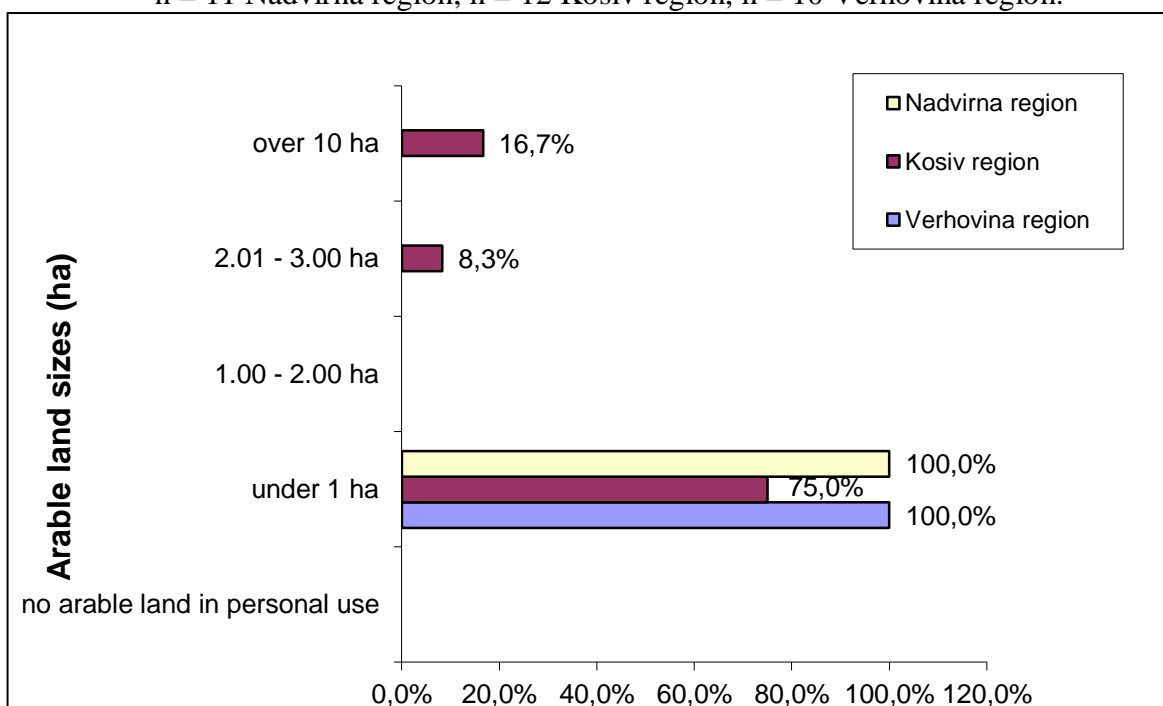


Fig. 5: The distribution of arable land per farm in Ukraine in 2010-2011. n = 11 Nadvirna region, n = 12 Kosiv region, n = 10 Verhovina region.

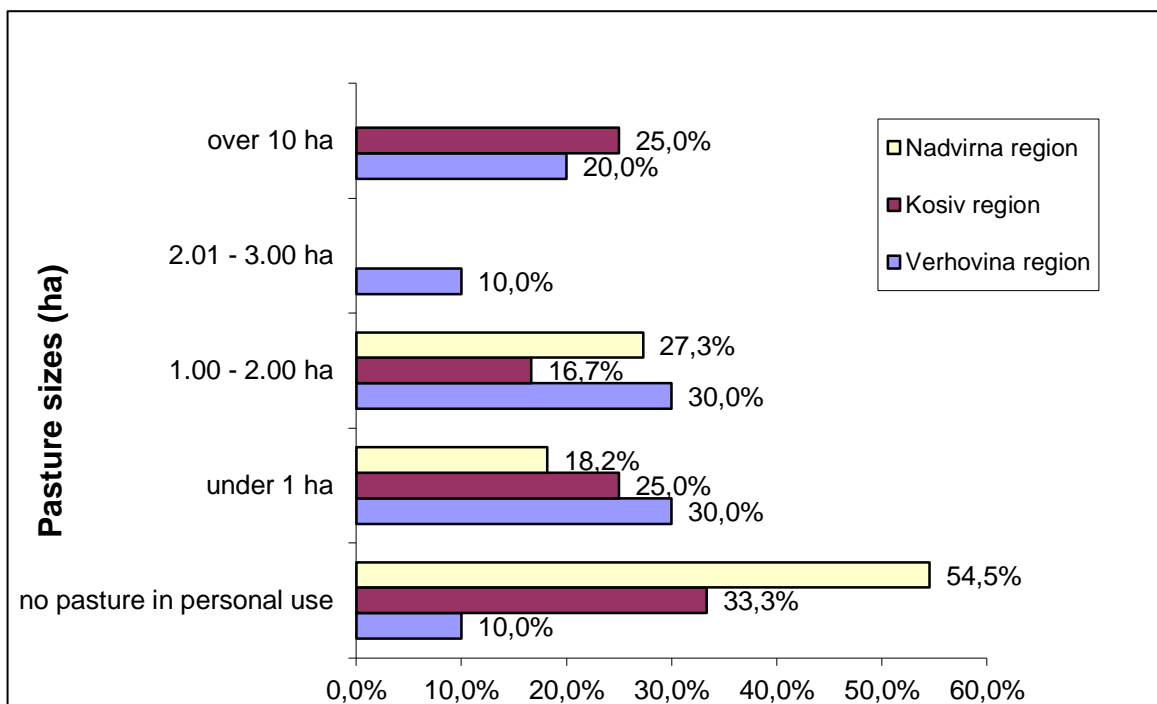


Fig. 6: The distribution of pasture sizes per farm in Ukraine in 2010-2011.
n = 11 Nadvirna region, n = 12 Kosiv region, n = 10 Verhovina region.

4.1.2. Livestock

Mean number of cows per farm is 3.9 (Delne 1.5, Hidegség 5.5, n = 23 Delne, n = 33 Hidegség). This average includes the eight farms in Delne which do not have a cow at all. As shown in Fig. 4 most farms in Hidegség have between 3 and 4 cows, but in Delne 1, 2 or none.

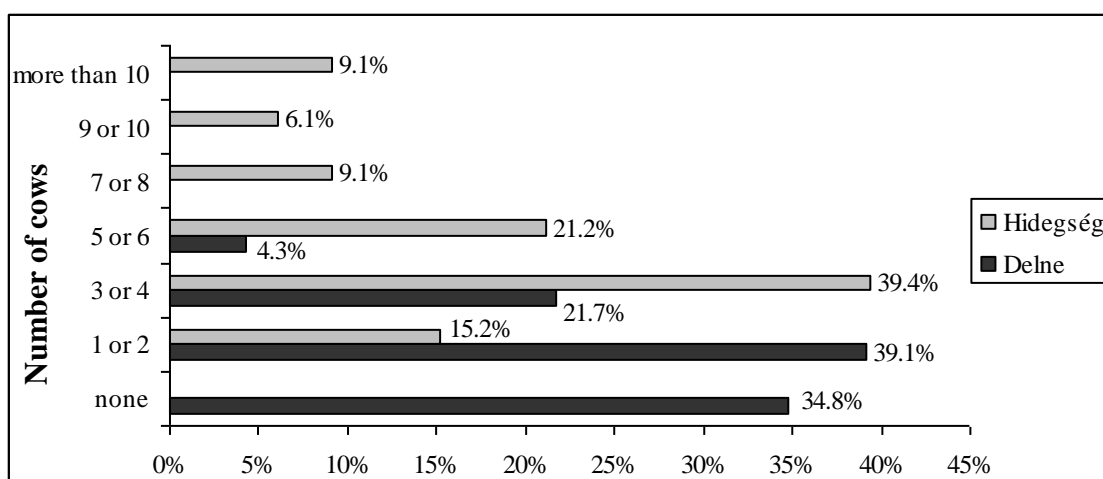


Fig. 7: Distribution of the number of cows per farm in Romania 2010.
n = 23 Delne, n = 33 Hidegség

If we do not take into consideration two relatively large livestock producers in Kosiv region of Ukraine which are representing quite an outstanding type of farms in comparison to other households, then the mean for Ukraine makes up only 1,7 cows per farm. The majority of people have only 1-2 cows.

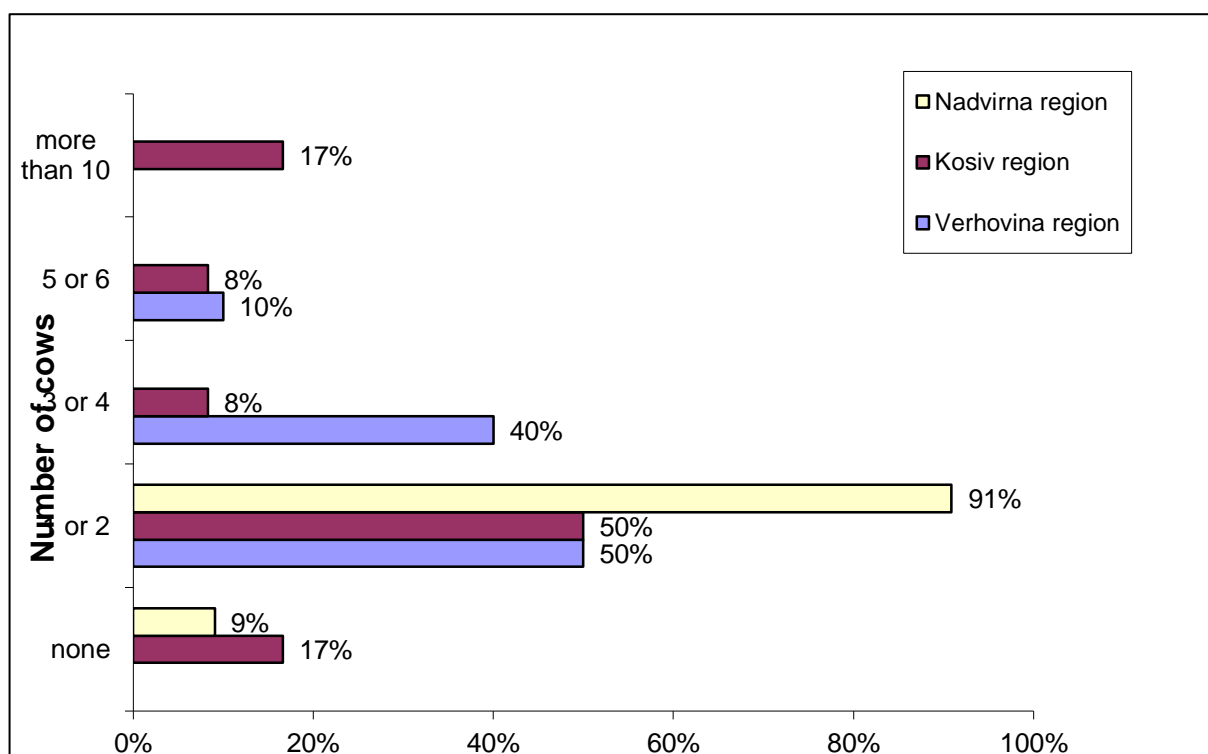


Fig. 8: Distribution of number of cows per farm in Ukraine in 2010-2011.
n = 11 Nadvirna region, n = 12 Kosiv region, n = 10 Verhovina region.

Although cows are the most economically important animal in both regions, in Romania and in Ukraine, our data show that most farms keep a wide variety of animals, mainly for domestic use.

4.1.3. Employment

In Romanian case fourteen people had paid employment outside their household at the time of the research, meaning that they were practicing farming outside working hours (Delne 6, Hidegség 8, n = 21 Delne, n = 25 Hidegség). Most (23 both, 14 Delne, 9 Hidegség) of the interviewees said that they are retired or without a job. Nine people identified themselves only as farmers, even if they had another job or a pension.

The situation is slightly different in Ukraine. Quite a large number of farmers (42,4%) had a paid off-farm employment. People do not see the opportunity to survive without off-farm income. Usually people have such an income either from the off-farm job or from pensions (27,3% in our case) or other transfer payments. The majority of the households (97%) had at least one family member who had sources of income other than farming. 24,2% of the interviewed people identified themselves only as farmers. A specific trait for every region in the Ukrainian part of the Carpathians was that there is a certain number of people who are working abroad to support their families by remittances (in 12,1% of the interviewed households).

4.2. Farm management

4.2.1. Mowing

In the Romanian part 85% of households cut the grass twice on the inner hay meadow and 97% of them mow only once on the outer hay meadow.

In most cases (73.5% of the total, n = 49) the first cut on the inner hay meadow is done in June and is finished by July. On the outer hay meadow the hay is made between July and September, but because of the climate and altitude, and because these outer meadows are rarely manured, there is no chance for a second good quality cut.

There is an obvious difference between the two villages. Fewer farmers start mowing in June in Hidegség, the second mow is done mainly in August and on the outer hay meadows some mow even in September (Table 1). The reason is a difference in climate and altitude, and the difference in the proportion of the inner and outer hay meadows. In Delne the inner hay meadows are larger sized and lower altitude (inner meadows 700-750 m, outer meadows 1000-1100 m, while in Hidegség the inner meadows are at 850-950 m, the outer meadows between 950-1300 m.

	Delne		Hidegség	
	Inner hay meadow	Outer hay meadow	Inner hay meadow	Outer hay meadow
June	87.00%		61.50%	
July	13.00%	60.00%	34.60%	34.50%
August		40.00%	3.90%	58.60%
September				6.90%
Total	100.00%	100.00%	100.0%	100.00%
	n = 23	n = 10	n = 26	n = 29

Table 1: Mowing periods on the inner and outer hay meadows in the two villages in Romania

In Ukraine 69,7% of the interviewed farmers have outer meadows and 78,3% of them are mowing there once. 75,8% of those who have hay meadows are mowing twice in the inner meadows situated closer or very near to their houses.

Table 2 presents the time when the mowing is usually started in the regions of Ukraine. The majority of the farmers start the first mowing at the inner meadow in June. Relative large percent of those who start the mowing already in May in Kosiv region can be explained by quite low altitudes of the inner meadows and by warmer climate in this area. The outer hay meadows are usually mown between July and August; this allows the various plant species to reproduce enough seeds for the next season.

	Verhovina region		Kosiv region		Nadvirna region	
	Inner meadow	Outer meadow	Inner meadow	Outer meadow	Inner meadow	Outer meadow
May	10.0%		20.0%		9.1%	
May-June	20.0%				18.2%	
June	60.0%		70.0%		63.6%	
June-July				28.6%		14.3%
July		22.2%	10.0%	28.6%		57.1%
July-August		11.1%		14.3%	9.1%	28.6%
August	10.0%	66.7%		28.6%		
Total	100.0% n=10	100.0% n=9	100.0% n=10	100.0% n=7	100.0% n=11	100.0% n=7

Table 2: Mowing periods on the inner and outer hay meadows in three regions of Ukraine

In the Romanian part mowing methods are relevant to the agri-environment subsidy available for those who manage meadows without machinery. From all the farmers, 35% mow using hand scythes exclusively, 36% a mowing machine and the rest use both methods. There is a big difference between the two villages (see fig. 9). In Delne 65.2% use a mowing machine, 17.4% hand scythe and 17.4% both methods, whereas in Hidegség only 16.7% use only mowing machinery, 47.2% hand scythes and 36.1% both methods combined. Again, the differences in the proportion of methods used can largely be explained by terrain. In the case of Delne, a larger proportion of the available land lies on a flatter surface, which makes the usage of machinery much easier, be it a large tractor or a small mower, whereas in Hidegség steep slopes make this in many cases impossible, although in recent years small mechanical hand mowers became widespread in this area too.

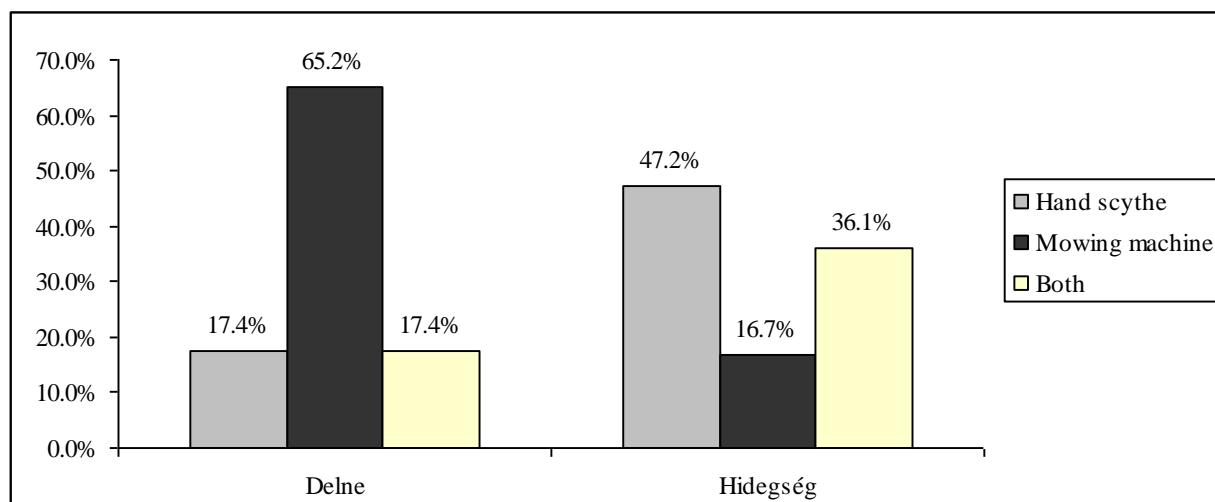


Fig. 9: Mowing methods used in Romania (n = 23 Delne, n = 36 Hidegség)

The results received for the Ukrainian part of the Carpathians are quite similar to the data collected in Romania: altogether 57, 6% of the interviewed farmers mow using just hand scythe; 18,2% mow with the mowing machine and 24, 2% use both methods depending on the type of the meadow. There is however certain difference between the regions (Fig. 10). The results for Nadvirna region where all the farmers are mowing only by hand can be explained by relatively small hay meadow sizes available for the interviewed farmers in this region.

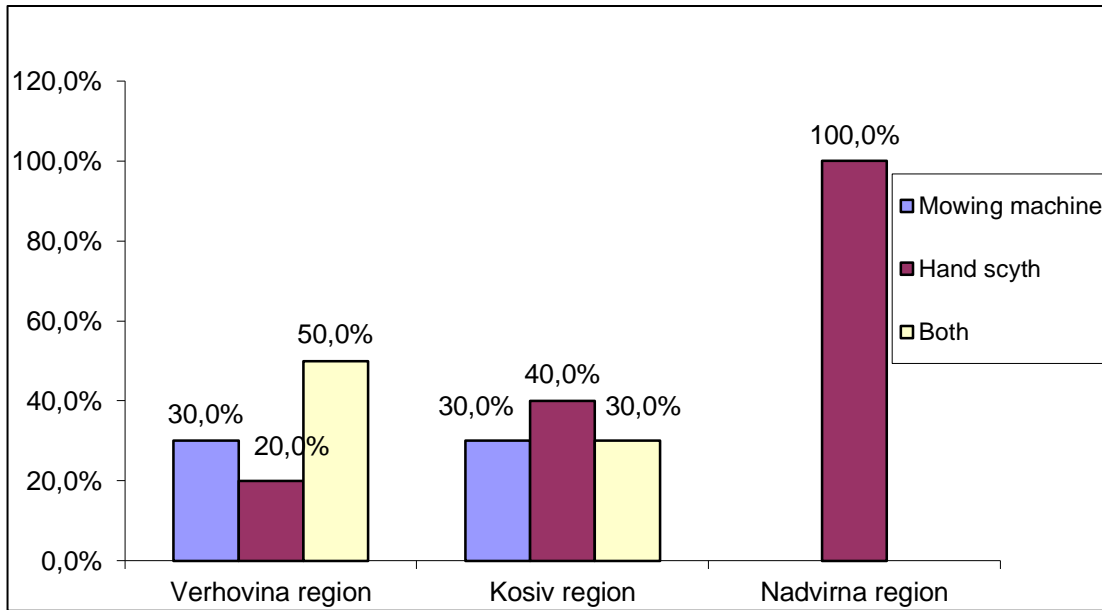


Fig.

10: Mowing methods used in Ukraine
(n = 10 Verhovina region, n = 10 Kosiv region, n = 11 Nadvirna region).

In Romania as well as in Ukraine most of the work is done by the family. Very few farmers pay day labourers to mow (Fig. 11 and 12).

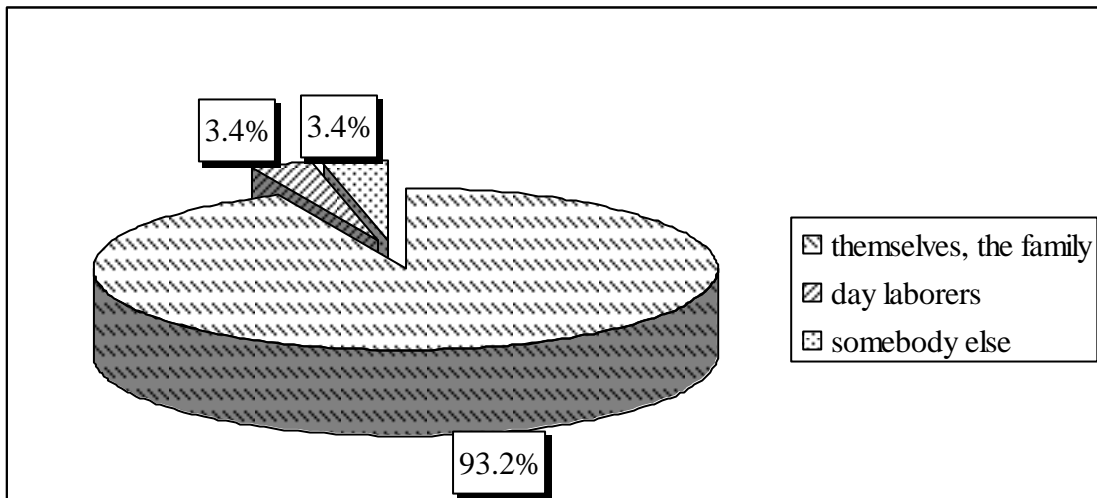


Fig. 11: Who does the mowing in Romania?

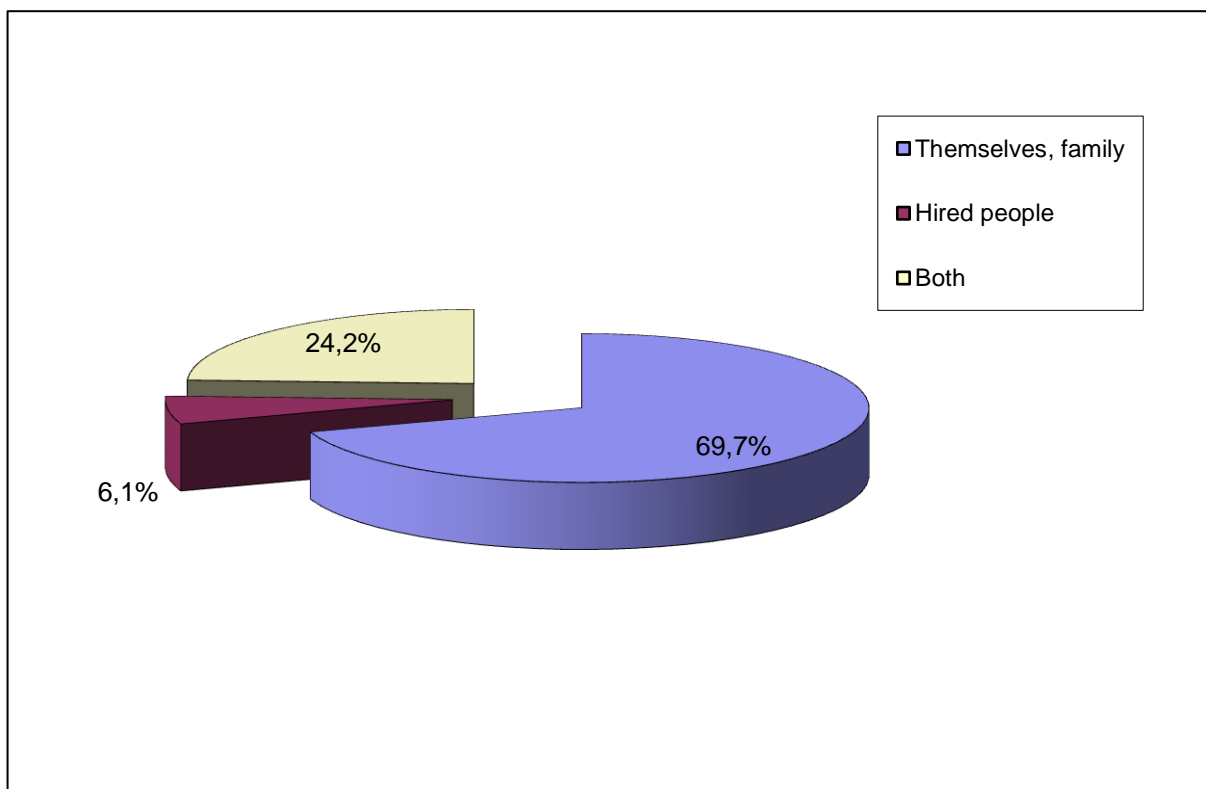


Fig. 12: Who does the mowing in Ukraine?

4.2.2. Fertilization

In 98.3% of households in Romania, farmers use only animal manure as fertilizer on the hay meadows (Delne 95.7% animal manure, 4.3% mixed, n = 23, Hidegség 100% animal manure, n = 26). In almost all cases farmers don't use chemical fertilizers on hay meadows, because they consider that in the long term it has negative effect on grass quality and quantity.

In Ukraine the tendency is that the fertilization is mostly used only for the inner meadow, the less accessible outer meadows are situated further and are usually left without fertilization which, according to the preliminary data, is leading to the larger amount of plant species and is positively influencing the plant biodiversity at such plots. The majority of farmers in Ukraine (74,2%) is also using solely organic fertilizers; 9,7% of households are using mixed methods of fertilization; 6,5% use chemical substances. Some farmers (6,5%) do not use fertilization at all.

4.3. Problems

In both surveys, in Romania and in Ukraine, a special emphasis was put on listening and collecting the problems of each farmer. Below is the table (Table 3) with the most important problems mentioned by the Ukrainian farmers. The problems mentioned in the Romanian part of the Carpathians are mostly repeating this wording reflecting the similar state of things.

Main problems faced by farmers in Ukraine	Number of responses
low prices for agricultural products	33.3%
lack of machinery and necessary equipment	33.3%
weather and climate conditions	27.3%
absence of subsidies and state support	18.2%
problem of transportation in difficult mountain conditions	12.1%
selling of products (absence of necessary sale infrastructure)	9.1%
lack of time for farming due to the off-farm job	9.1%
expensive inputs (eg. Fuel, additional fodder for livestock)	6.1%
registration of contracts for land lending	6.1%
old age and bad health	6.1%
stocking of hay	3.0%
bad access to water	3.0%
lack of work force	3.0%
expensive fire wood	3.0%
poverty	3.0%
expensive off-farm products	3.0%

Table 3. Difficulties and problems mentioned by the farmers in Ukraine.

The general perception of people about farming is that it is very hard work and the revenues are small if any. We can presume that this perception is a main force that drives young people from farming towards higher education or alternative employment, leaving them to consider farming only as a “last resort”.

As it is seen from the Table 3, one of the problems for farmers in Ukraine is the absence of subsidies or insufficient state support (no farmers in Ukraine reported receipt of any kinds of agricultural subsidies). This is the point where the biggest difference between the two countries under comparison steps in. Romania being the European Union member from 2007 is a recipient of EU agricultural subsidies and of agri-environmental subsidies specifically. However the survey in Romania showed that absorption of the agri-environment scheme is very low (12.5% for Delne and 16.7% for Hidegség). It was obvious from the interviews and talks with people that they are not familiar with the available schemes; they don't understand the reason for receiving these payments and simply accept the recommendation of the officers from the Local Council.

Two other very important problems mentioned were the low prices for the agricultural produce and difficulties with sale of products. The results of the survey are confirming these data.

Very few farmers have the chance to sell the excess of hay at a reasonable price in Romania. Only the farms in Delne sold any hay (6 farms). The hay market is local in Delne and regional in Hidegség (farmers from Moldavia come to buy hay), and it is a very fluctuating market. In Ukraine only 9,1% of all famers are selling hay and they sell it only to neighbours who have more livestock and are not producing enough hay themselves.

Almost all Romanian farmers sell milk, however there is an overall decrease in milk sales over the past years (Fig. 13).

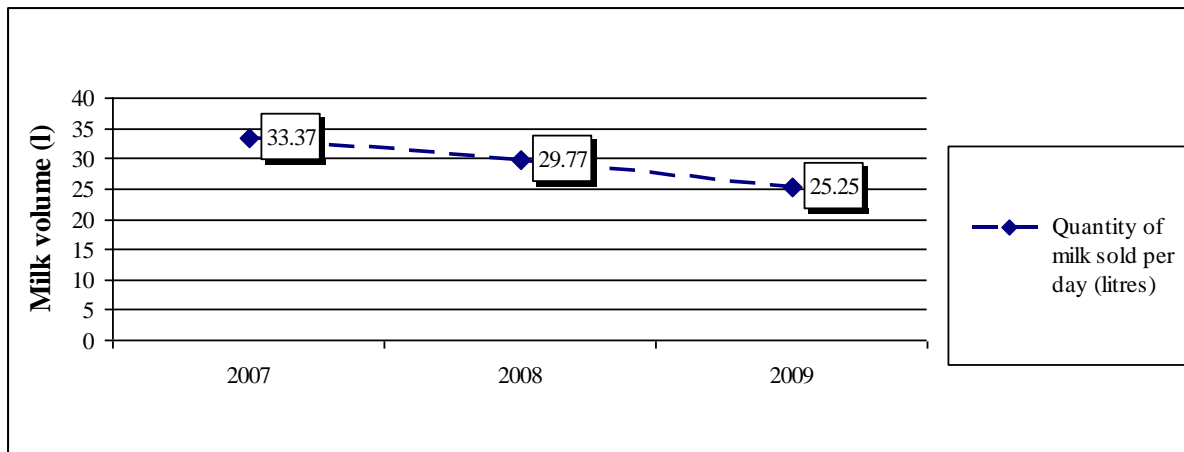


Fig. 13: Variations in milk volume sold per day in the past years in Romanian villages.
n=21 Delne, n= 36 Hidegség

In Ukraine only 21,2% of the interviewed farmers sell the excess amounts of milk. The most often used channels of sale are neighbours, processing companies, tourists.

Besides milk and hay the farms in our survey produce a long list of other products. In theory they could create income by selling these products, but our results show that few of them do.

The farmers at the research sites were also asked if they would be willing to sell products if there was a demand for them. More than 62% of respondents in Romania said that they would like to sell products and 37.7% said that they would not simply because their family consumes everything. In Ukraine 72,7% of farmers mentioned that they would like to sell self-produced products if the market for them exists and the prices allow at least to cover the production costs.

4.4. Attitude, motivation and future of farming

The farmers in the survey were asked if they think it is important to work on land and why. All of them said that land is very important. Most of farmers in Romania said it is because it is their only source of living (Fig. 14). Also, over one third claimed that they have to keep farming, because it is a tradition, this is how they grew up and this is what they learned from their parents and grandparents. Several claimed that farming is a good source of income. Almost 10% answered that by farming their family can reduce everyday expenses and a couple of farmers responded that their work can only be considered as a hobby.

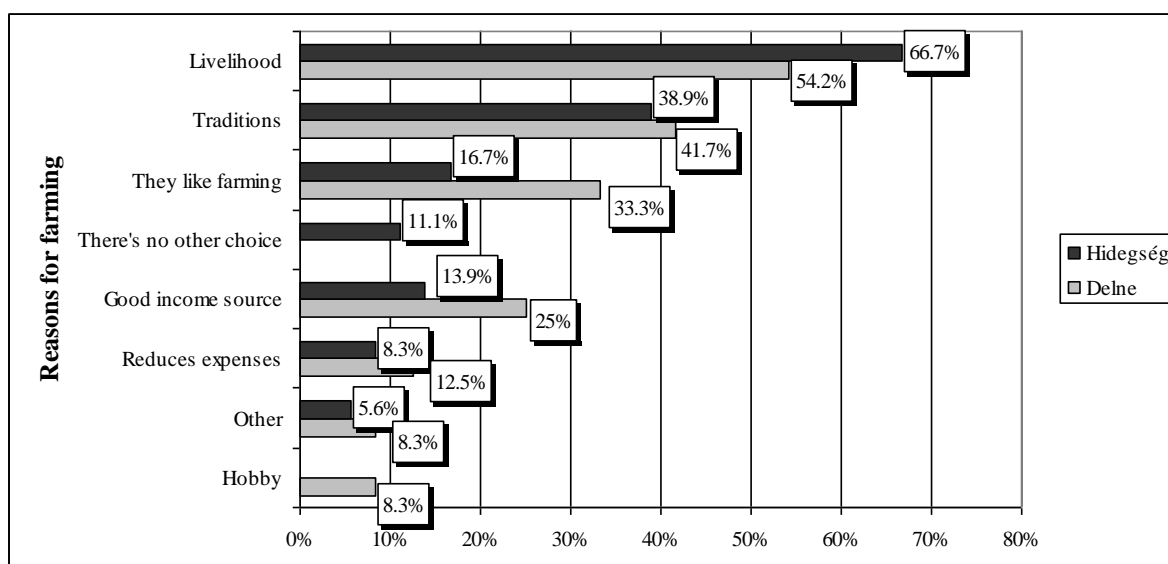


Fig. 14: Reasons for farming in Romania. n=24 Delne, n=36 Hidegség

Table 4 presents the most often answers to the same question in Ukraine.

Reasons to continue farming in Ukraine	Number of responses
to survive	29.6%
traditional way of life	22.2%
food of own production	14.8%
to feed the family	11.1%
to save land for next generations	7.4%
no other job	3.7%

Table 4. Why is it important to continue managing the land in Ukraine?

62.3% of the Romanian farmers responded that they want to continue farming as long as they live or as long as their health makes it possible. 84.8% of farmers in Ukraine are going to continue what they are doing now more than 5 years and most of them replied that they would also like to farm as long as they live.

Regarding farmer's opinion about descendants' attitude to farming, we found that 56% of respondents in Romania believe their children and grandchildren will continue farming, while 36% say that their descendants will not farm at all (n = 50). In Ukraine the situation is slightly different: 78,8% of farmers think that their children will continue farming, whereas only 21,2% think that their descendants will stop any agricultural activity. At the same time many Ukrainian farmers mentioned that the generation of their grandchildren will most likely stop managing the land in this area.

5. Conclusions and discussion: implementation for further research

The main conclusion that we can draw out of the survey results presented in this paper is that at least for the life time of next generation there is a hope that farming will not disappear from the Carpathians in Ukraine and in Romania. Many people pointed out that it is important to continue to manage the land in order to feed and support the family in the conditions of the Carpathians, where the opportunities for other sources of income are quite limited and salaries are often only enough to buy just most necessary products. This importance of farming

activities for the local people gives a slight hope that farming in this area will not disappear completely. However it is obvious that situation is going to change with time. Since very few young rural dwellers see opportunities in both countries, labour intensive agriculture is limited to subsistence of the elderly; but it is a subsistence which is losing its basic resource which is labour. The maintenance of pastures and meadows is under threat. So we have to look at other avenues to promote well-being of farmers and conservation of nature in the context of existing threats, external driving forces and poverty. These avenues should contain a strong vision for the local common good: biodiversity; i.e. the prevailing biodiversity and cultural landscape are to be considered community assets and are fundamental for environmental sustainability.

At the same time we can say that there is a certain system of farming practices based on traditions and common knowledge and understanding of local people. This system allows the people in the Carpathians to maintain the landscape and biodiversity which they inherited from the previous generations. For example, there is understanding that it is not good if meadows stay abandoned: so if people still stay on their land, they try to find a way to continue managing it even if this is very hard and completely unprofitable for them (arrangements with neighbours, selling of the excess hay, etc.). The methods of grassland management are still very traditional and labour intensive. Moreover lack of income in the study areas complicates the access of the locals to machinery or chemical fertilizers which makes the traditional practices the only possible way to manage the land. Underdeveloped sales infrastructure impedes the income generation by selling self-produced products such as milk, cheese, meat, etc. So it is quite obvious that the traditional system which still exists in the Carpathians cannot stay stable for a long time since too many various factors are influencing it. That is why a challenge is to develop future perspectives for sustainable rural development in these areas.

The Carpathians are still (due to a certain remoteness) an excellent area for studying (as an on-going process) the path dependency of linkages which have been finalized in other mountain areas of Western Europe. This situation gives very good opportunities for in depth research on scenarios and alternative development options which would be possible for the region. To research the question of promoting an, at least, semi-traditional, though still high nature value farming, a reference to alternative developments and scenarios has to be found, constructed and evaluated. Gaining insight through scenarios will allow us to detect triggers by which we might redirect a development which is not sustainable. Here we want to do in depth research on alternatives.

Taking into consideration the complexity of the main research questions, an interdisciplinary project is the most promising option for the study of the pathways to sustainable agriculture in the Carpathians. Hence the project has the following main objectives:

First of all it aims at finding a new way of amalgamating traditional ways of farming with new options for high nature value (HNV) farming. We believe that moderate changes of the traditional farming system could be beneficial and would not harm the environment too much.

In order to find pathways for this process, it is important to study driving forces for structural and landscape change, to detect triggers which might redirect developments which are not sustainable, and to find instruments which increase the relatedness or connectivity between economic activity and biodiversity. The major research question in this respect is how gains from ecosystem services which are based on a diverse environment can be connected to investments in the ecosystem.

Another aim is to investigate the institutional environment supportive of high nature value agriculture, and the possibilities for the localized economy to direct developments. It is important to find alternatives in the form of local solutions which would not be dependent on outside aid only.

Among institutional alternatives which need to be “designed” and tested it should be possible to identify some with a strong self-governance as we think this is most promising. The research on these alternatives may help to detect possibilities to invent incentive schemes for local populations to maintain the local biodiversity while enabling a transition from a traditional farming (which is environmentally sustainable) to farming which is sustainable ecologically, economically and culturally in a globalised economy.

6. References:

Andersen, E., Baldock, D., Bennett, H., Beaufoy, G., Bignal, E., Brouwer, F., Elbersen, B., Eiden, G., Godeschalk, F., Jones, G., McCracken, D.I., Nieuwenhuizen, W., van Eupen, M., Hennekens, S. & Zervas, G., 2003. Developing a high nature value indicator. Report for the European Environment Agency, Copenhagen. Reference on <http://www.efncp.org/>

Bätzing, W. (2005): Les Alpes. Un foyer de civilisation au coeur de l'Europe. Traduction et adaptation en français par Henri Rougier, Editions Loisirs et Pédagogie/LEP, Le-Mont-sur-Lausanne, Suisse

Beaufoy, G. (2007): HNV Farming – Explaining the Concept and Interpreting EU and National Policy Commitments. European Forum on Nature Conservation and Pastoralism. <http://www.efncp.org/high-nature-value-farmland/bibliography/>

Biró, R., Demeter, L. and Knowles, B. (2011). Farming and management of hay meadows in Csík and Gyimes – experiences from a sociological research. <http://www.mountainhaymeadows.eu/>

Eichhorn, M.P., Paris, P., Herzog, F., Incoll, L.D., Liagre, F., Mantzanass, K., Mayus, M., Moreno, G., Papanastasis, V.P., Pilbeam, D.J., Pisanelli, A., Dupraz, C. (2006): Silvoarable Systems in Europe – Past, Present and Future Prospects. *Agroforestry Systems*, 67, 29-50

Farber, S.C., Constanza, R., Wilson, M., A., 2002, Economic and ecological concepts for valuing ecosystem services SPECIAL ISSUE: The Dynamics and Value of Ecosystem Services: Integrating Economic and Ecological Perspectives *Ecological Economics* 41.375–392

Flader, S.S., 1974, Thinking like a mountain: Aldo Leopold and the evolution of an ecological attitude towards Deer, Wolves and Forests.

Hagedorn, K. (2008): Particular requirements for institutional analysis in nature related sectors. *European Review of Agricultural Economics*, 35, 3, 357-384

Hatfield-Dotts, S (2006). The catchment care principle: A new equity principle for environmental policy, with advantages for efficiency and adaptive governance. *Ecological Economics* 56, pp. 373 – 385.

Jenkins, T.N., 2002, Chinese traditional thought and practice: lessons for an ecological economics worldview *Ecological Economics* 40 (2002) 39–52

Kuemmerle, T., Hostert, P., Radeloff, v.C., van der Linden, S., Perzanowski, K., Kruhlov, i., (2008): Cross-border Comparison of Postsocialist Farmland Abandonment in the Carpathians. *Ecosystems*, 11, pp. 614–628

Leopold, Aldo, 1949. *A Sand County Almanac*. Oxford University Press, New York.

Millennium Ecosystem Assessment, 2003: *Ecosystems and their services*. Chapter 2 in *Ecosystems and human well-being: a framework for assessment*, Island Press, Washington, D.C., USA

Norton, B., 1990. Commentary: Context and hierarchy in aldo leopold's theory of environmental management. *Ecological Economics*. 2, pp. 119- 127

Ploeg, J.D., van der, Long, A., Banks, J. (2002): *Rural Development: from practice and policies towards theory*. In: Ploeg, J.D. van der, Banks, J. (eds.): *Living countrysides. Rural development processes in Europe. State of the Art*, Elsevier B.I., Doetinchem

Roth, M., Nobis, R., Stetsiuk, V., Kruhlov, I. (eds.) 2008. *Transformation processes in the Western Ukraine. Concepts for a sustainable land use*. Berlin, Weißensee Verlag.

Rusdea, E., Reif, A., Povara, I., Konold, W. (2005): *Perspektiven für eine traditionelle Kulturlandschaft in Osteuropa*. *Alterra 34*, Schriftenreihe des Instituts für Landschaftspflege der Albert Ludwigs Universität Freiburg