



EUROPEAN FORUM ON
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**Quantifying the abandonment of mountain hay
meadows in the Eastern Carpathians**

Authors: László Demeter, Alpár Kelemen

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Registered office:
97 Oakwell Court
Hamsterley Vale
Derwentside
County Durham
England NE17 7BE

1	Executive Summary	1
2	Introduction / Background.....	2
3	Methods	3
4	Results	5
4.1	Ownership and general land use patterns	5
4.2	Current amount of mown meadows.....	5
4.3	Buildings associated with hay production and shepherding.....	10
4.4	Reasons for abandonment of mountain hay meadows and conversion into pastures	13
4.5	Mountain hay meadows and the Natura 2000 system	15
5	Conclusions.....	17
6	References.....	18

1 Executive Summary

Starting in 2007, agri-environment payments have been introduced in Romania. Payment is available for farmers living in areas classified as High Nature Value Areas in two packages: HNV grasslands and non-mechanized farming. While the system is administratively functional, affecting hundreds of thousands of farmers and large areas of land, the biodiversity benefits are not fully understood. No distinction is made for example in the amount of payment for pastures and meadows, while the management criteria are clearly different.

In the mountainous areas of Transylvania, abandonment of grasslands is a serious threat to biodiversity. Another big change is the increase of sheep numbers and their appearance on formerly hay meadow areas. Our present study addresses this issue by studying the effect of two land use types: grazing and mowing, respectively abandonment on plant diversity.

Our results show clear differences in plant diversity patterns between hay meadows and pastures, hay meadows being richer. On the other hand, short term abandonment does not decrease diversity, but long term does.

Based on these, we recommend a separation of hay meadows and pastures on the basis of plant diversity patterns, as an ecological output of land management, i.e. higher payments for hay meadows. Otherwise there is a risk of conversion from hay meadows to pastures. On the other hand, the problem of abandonment should be specifically addressed by agri-environment policies. The logic of payments should be not so much compensation for loss, but prevention of abandonment.

Last but not least, several habitats that are listed in Annex 1 of the Habitat Directive are grasslands managed as hay meadows or pastures. Typical of such habitats are number 6170, 6210, 6230, 6510, 6520 (this latter is named Mountain Hay Meadows). These rely on regular management through grazing or mowing; otherwise they are invaded by woody vegetation. The Eastern Carpathians and Transylvania in general are very rich in such habitats, but these are highly vulnerable to abandonment. Our study area has been recently designated as a Natura 2000 site (ROSCI0323) (Demeter et al. 2011, Ministry Order nr. 2387/2011) especially to conserve these species-rich grassland habitats. In this sense, stopping abandonment and conversion of meadows into forest is a commitment under the Natura 2000 system too.

2 Introduction / Background

The hay meadows of the Eastern Carpathians have a huge natural, cultural and socio-economic value which should be preserved and used sustainably. They were created through centuries of extensive management. In the past decades rapid changes have occurred in the rural areas that have an effect on the state of hay meadows. From these, abandonment and conversion of land use are especially important.

There are EU-level agricultural and nature conservation policies at place to ensure sustainable land use and conservation of biodiversity and ecosystem services. In Romania the most relevant of these are the agri-environment subsidies and the Natura 2000 network.

It is important to monitor the effect of policies and measures to increase their efficiency. Our study aims at creating a Geographic Information System about the amount and spatial distribution of mown hay meadows in an area of the Eastern Carpathians with outstanding natural value.

The national agricultural payment agency (APIA) has a database about land use, the claims for subsidies, and a control mechanism that selects a certain amount of farmers randomly which are visited on the field. The amount and spatial distribution of actually mown meadows in a certain year is not measured by the agency.

Creating such a database is essential: it can be used to improve the efficiency of agricultural policies, to understand their effect, but also to monitor landscape change, understand the effect of land use on biodiversity and ecosystem services.

3 Methods

Between 1 October and 10 December 2011 we mapped mown meadows on a roughly 60 km² area in the Csík Mountains. The studied area falls entirely in the Natura 2000 site ROSCI0323 (Csergő et al. 2011). Here, mountain hay meadows represented an essential part of local economy for at least 400 years. Some of the first records about the usage system of these mountain meadows dates from the 17th century (Garda 2002). Our survey covered the mountain meadows of 10 villages on the western side and two villages on the eastern side of the watershed, that administratively fall into five communes. Mown plots were identified on the field and mapped using a handheld GPS. Unmown meadows were mapped using aerial photographs from 2005.



Fig.1. The location of the studied area in Eastern Europe.

The study area covers two distinct landscapes and farming types. The Csík Basin (the central and Western part of the study area) is an open landscape with a longer history of human presence and a concentration of human communities into villages, a large amount of commonly managed and owned land (forests and pastures), and a more compact distribution of meadows and pastures, while Gyimes (the north-eastern part of the study area) is a landscape with deep and narrow valleys, with more dispersed communities along the valleys, very little common land, and a mosaic of pastures and meadows (Demeter et al. 2011). Until the 19th century, most of the land in Gyimes was owned by the villages in Csík, and large amounts of pastures and forests are still owned by these villages (Ilyés 2007).

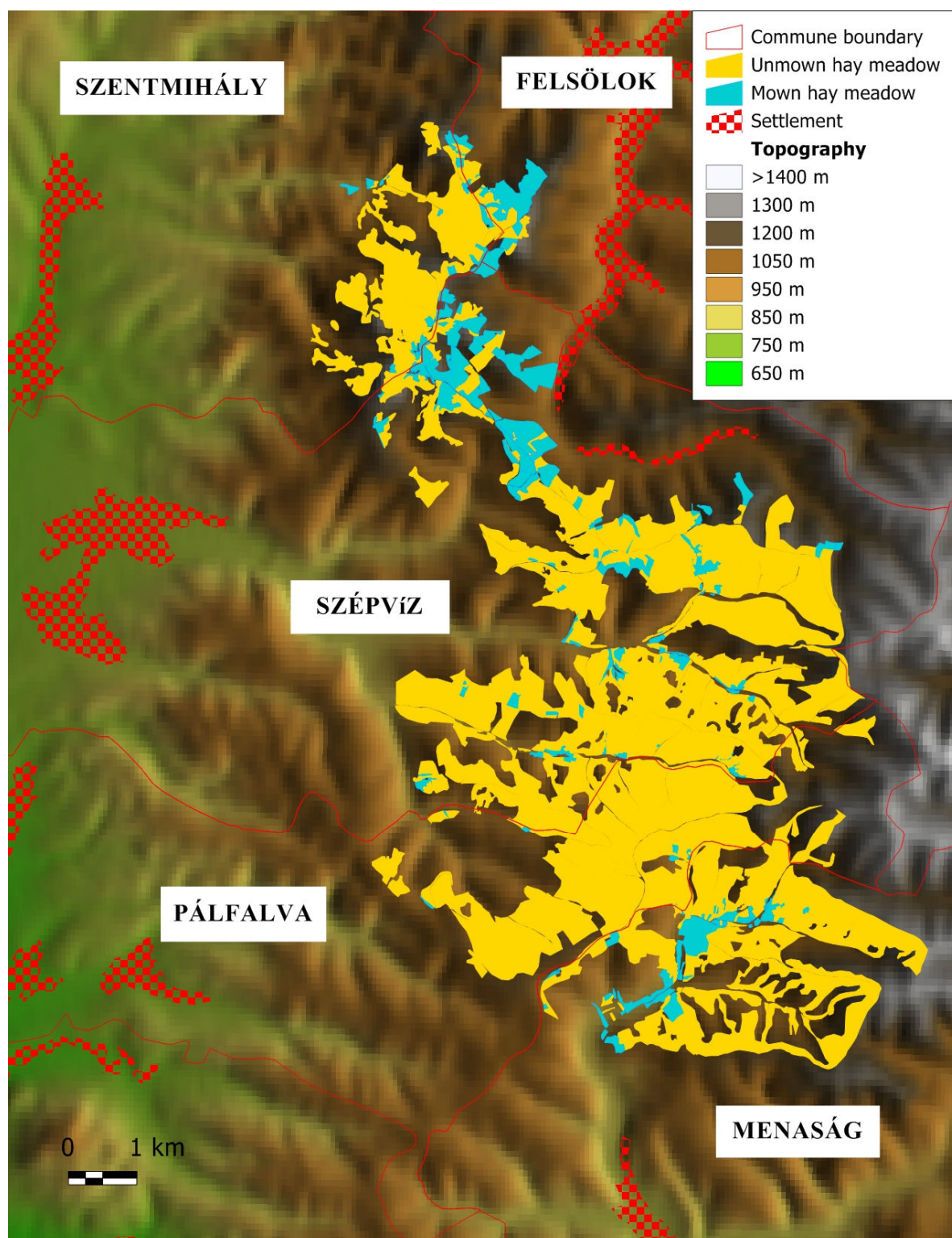


Fig. 2. The location of the mapped hay meadows in relation to topography and administrative boundaries.

4 Results

4.1 *Ownership and general land use patterns*

The general land use structure of the studied area is as follows: arable land is situated closest to the villages, on the lowest and flattest areas. Wet areas and former arable land in the surroundings of the villages are hay meadows. Steeper and rocky terrain up to several km distance from the village is cow pasture. Steep hillsides are forests. The flatter ridges past the steep valleys are mountain hay meadows. Where available, higher altitude areas are sheep pastures (above 1300 m). Because of the topography of the area, higher altitudes are restricted to a few spots (Fig. 2), and there are high concentrations of sheep from all neighbouring villages in these areas.

Changes compared to the pre-communist and communist time in land use are: the decrease of the amount of arable land, and conversion of arable terraces into hay meadows. The movement of some sheep onto the cow pastures, closer to the villages and the movement of some sheep onto the lowest altitude parts of the sheep pastures, respectively on the mountain hay meadows. Mountain hay meadows are currently either abandoned or grazed at different intensities with or without the permission of the land owners. "Pirate grazing" – grazing on areas other than the legal pasture is common.

Mountain hay meadows are all private property, divided into plots from 0.2-0.3 to more than 5 ha, as opposed to pastures that are mostly the property of compossessorates (Garda 2002). Before and during communist regime, meadows were grazed in the spring by cattle (until early May) and in the autumn by sheep (after end of September). Autumn grazing was used for fertilization (for the night the sheep are kept in an enclosure where their manure accumulates during several nights, and then the enclosure is moved) (Vámszer 1977). In a small number of cases, hay meadows have been purchased by farmers who use them permanently for grazing with goats or sheep.

4.2 *Current amount of mown meadows*

We mapped 34.2 km² of hay meadows, of which 11.85% (4.05 km²) have been mown in 2011 (Fig. 3). Szépvíz commune has the largest amount of mountain hay meadows, and largest amount of mown mountain meadows; Pálfalva commune has the smallest amount of mown meadows (about 1% of the meadows) while in Felsőlok the amount of mown meadows is 0.5% larger than that of the unmown meadows. Szépvíz and Pálfalva communes have the largest amount of unmown meadows (Fig. 4-8, 11).

As a general pattern, it can be observed that mowing is restricted to places with easier access – along main roads and valley bottoms. The main area of mowing is the surroundings of the Gyimes

Pass, a contact zone between the Csík and Gyimes areas, with different land use patterns (Ilyés 2007).

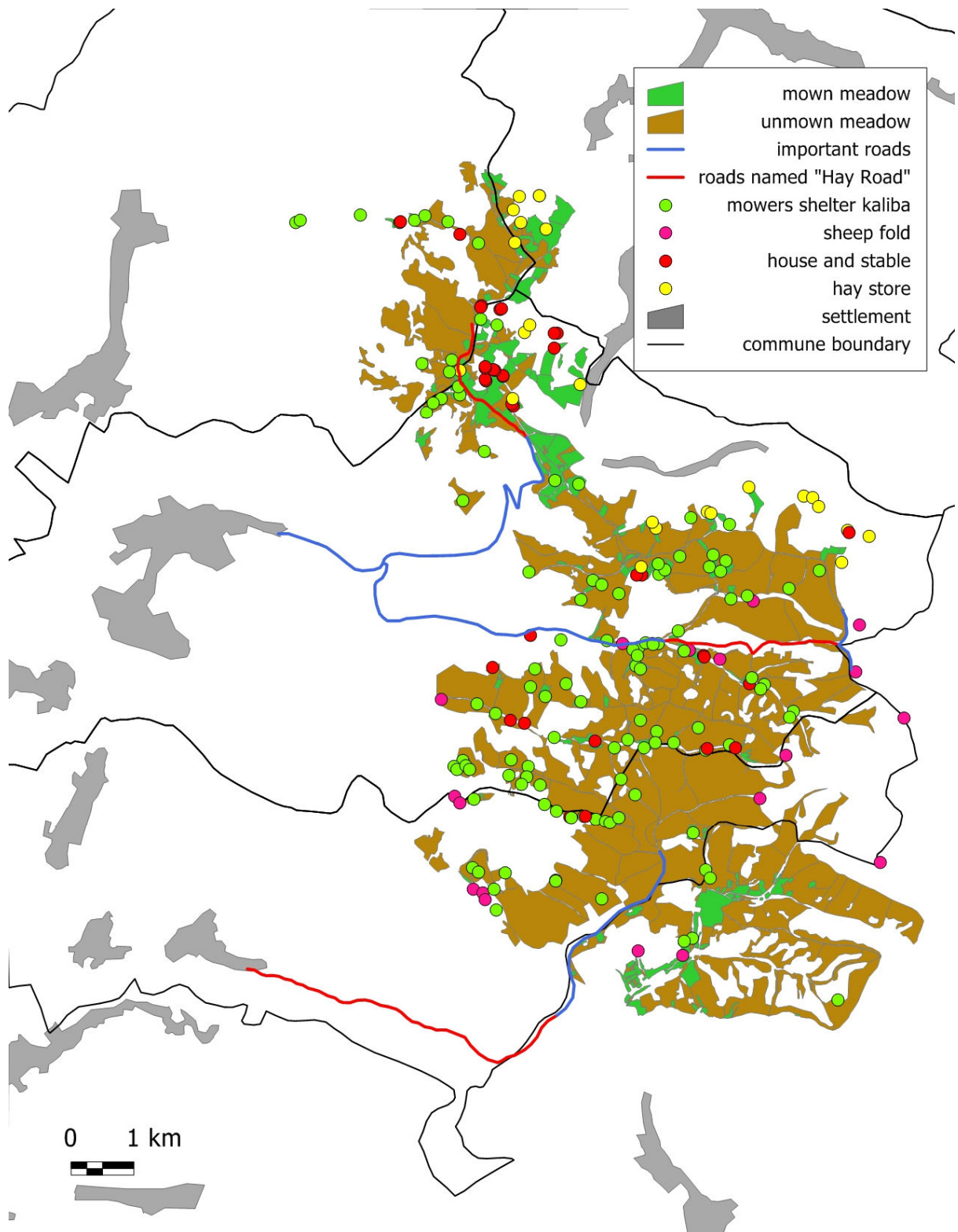


Figure 3. The distribution of mown/unmown meadows, different types of buildings related to farming and main roads named Hay Road.

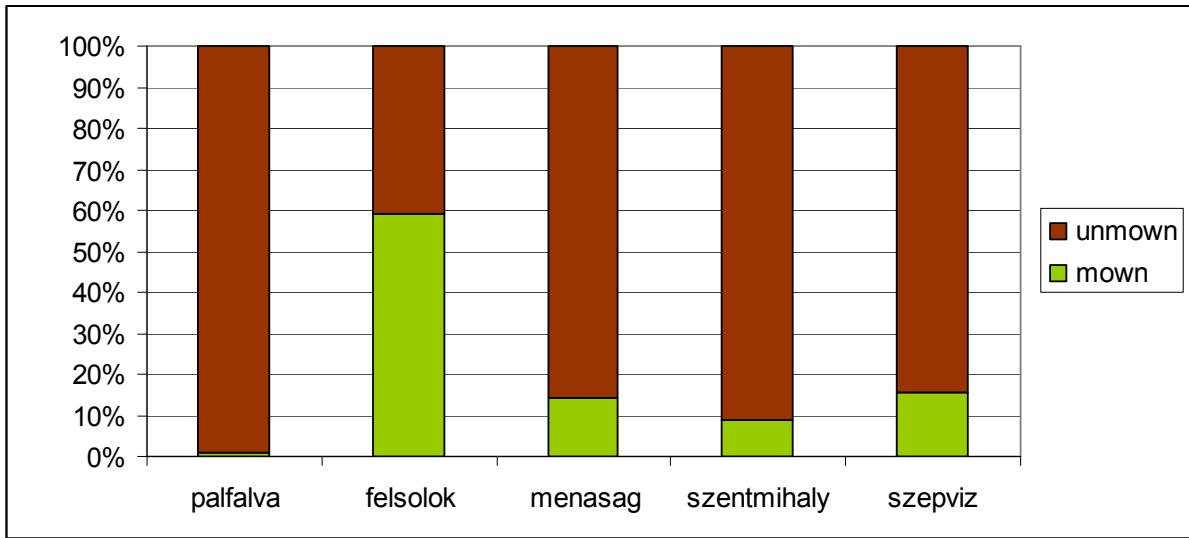


Figure 4. Mown versus unmown mountain meadows in four communes (percents).

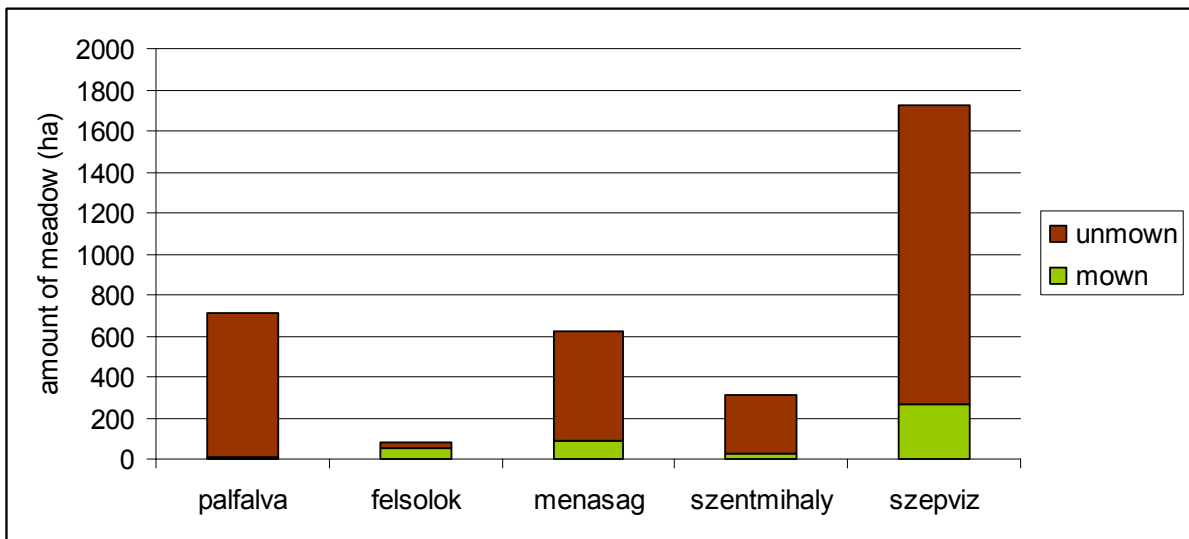


Figure 5. Mown versus unmown mountain meadows in four communes (absolute values).

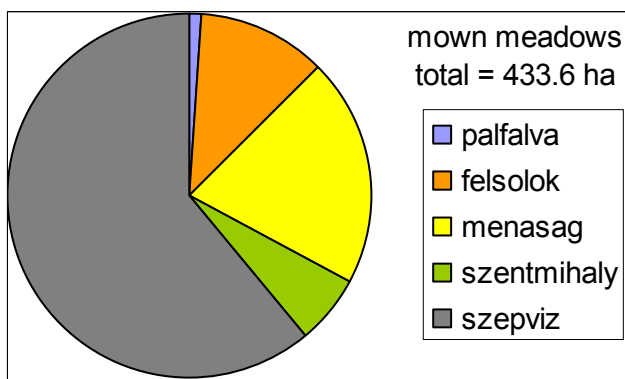


Figure 6. The distribution of mown meadows between the four communes.

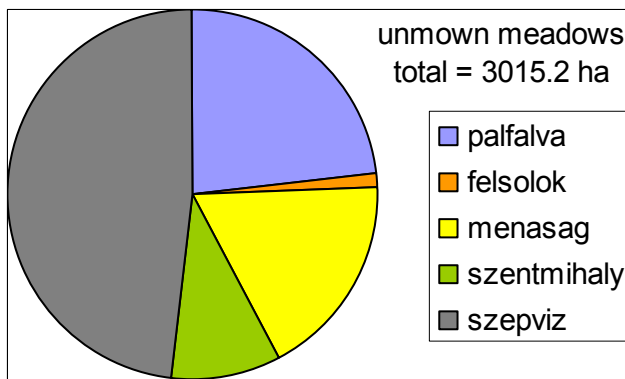


Figure 7. The distribution of unmown meadows between the four communes.

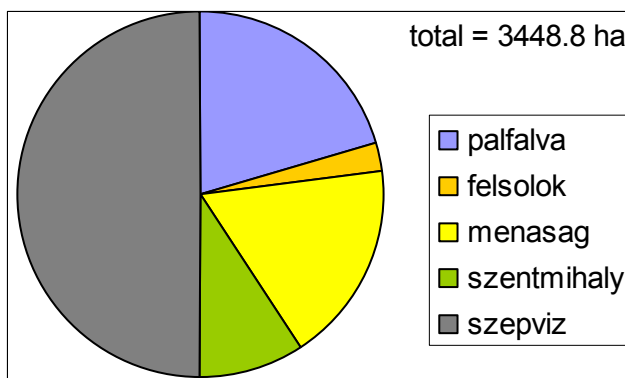



Figure 8. The distribution of all mapped mountain meadows between the four communes.

4.3 Buildings associated with hay production and shepherding

Because the mountain meadows are situated at larger distances from the villages, different types of buildings have been built to increase the comfort of people during hay making. These include temporary shelters made of tree branches and hay (named *kaliba* in Hungarian), small house-like structures with room for a bed and a fireplace (named *kaliba*, *burde* or *esztena* – not to be confused with sheep folds that are also called *esztena*) with an annex for the animals, to one room houses (*ház*) and barns with stables (*csűr*) (Vámszer 1977).

In the Gyimes area, hay produced on distant meadows is stored in hay barns (*szénatartó*), and it is carried down in the winter on sledge. In general *kaliba* types of buildings are typical for Csík and *szénatartó*-s are typical of Gyimes. The largest number of *kaliba*-s are found on the land of Szépvíz commune (Fig. 3, 9). Most of them are old and in different phases of degradation, but there are some new and maintained too. Sheep folds have characteristic buildings called *esztena*. Figure 10 shows new sheep folds that appeared close to or within the mountain hay meadow range.

	
<p>Kaliba in Szalonka valley</p>	<p>Kaliba in Fata valley</p>
	
<p>Several kaliba-s in Fata valley</p>	<p>Kaliba in Fata valley</p>

	
<p>Kaliba and small stable in Gozoru</p>	<p>New kaliba in Gozoru</p>
	
<p>Kaliba and collapsed stable in Kicsi Gozoru</p>	<p>Old kaliba in Szalonka</p>
	
<p>Kaliba in Kicsi Gozoru</p>	<p>New kaliba in Fata valley</p>

	
<p>Kaliba in Fata valley</p>	<p>Kaliba in Fata valley</p>
	
<p>Collapsed kaliba in Kicsi Gozoru</p>	<p>Kaliba and small stable in Fata valley</p>
	
<p>House and stable in Fata valley</p>	<p>Sheep fold (esztena) in Szalonka</p>



Fig. 9. A collection of pictures about two main building types associated with mowing and grazing in the study area. See also Fig. 3 for their spatial distribution.

4.4 *Reasons for abandonment of mountain hay meadows and conversion into pastures*

We interviewed more than 50 people regarding the changes in meadow usage. Their opinions provide a clear picture about the reasons of meadow abandonment. The most important reason is the conversion of a lot of former arable land in the surroundings of the villages into hay fields that provide a more easily accessible source of hay.

Another important factor is the decrease of stock numbers, respectively its concentration to fewer owners with a more intensive type of production (no grazing on pastures, high energy fodder, silage).

A third factor is the larger distance of the mountain meadows from the settlement, often more difficult access and way of transporting hay down the mountain considering the ageing of the rural population.

A fourth factor is unauthorized grazing by sheep that trample the grass, decrease yield and ultimately destroy the hay crop.

It is important to emphasize that what we term “abandonment” is not a permanent abandonment, because many families count on these lands as part of their property. For example they consider that in dry years, the hay crop of these areas is not so much affected as that of the lower meadows. At present, these areas have low value, but agricultural subsidies added somewhat to it. However, there are many plots where ownership is not clarified, because for example the inheritors emigrated from the village to urban areas.

Conversion of meadows into pastures is favored by the different labor distribution required for meadow and pasture management and logistics, but also by recent agri-environment subsidies. Agri-environment subsidies offer the same amount of payment for meadows and pastures, and the requirements for pastures are clearly easier to fulfill. The payment agency (APIA) allows reporting the meadow as pasture but applies fines in case of lack of use, respectively exempts owners from fines in case of trampling damage caused by sheep. On the other hand, total conversion into sheep pasture is made difficult by the fragmented ownership and the will of some owners to continue using their plots as meadows.

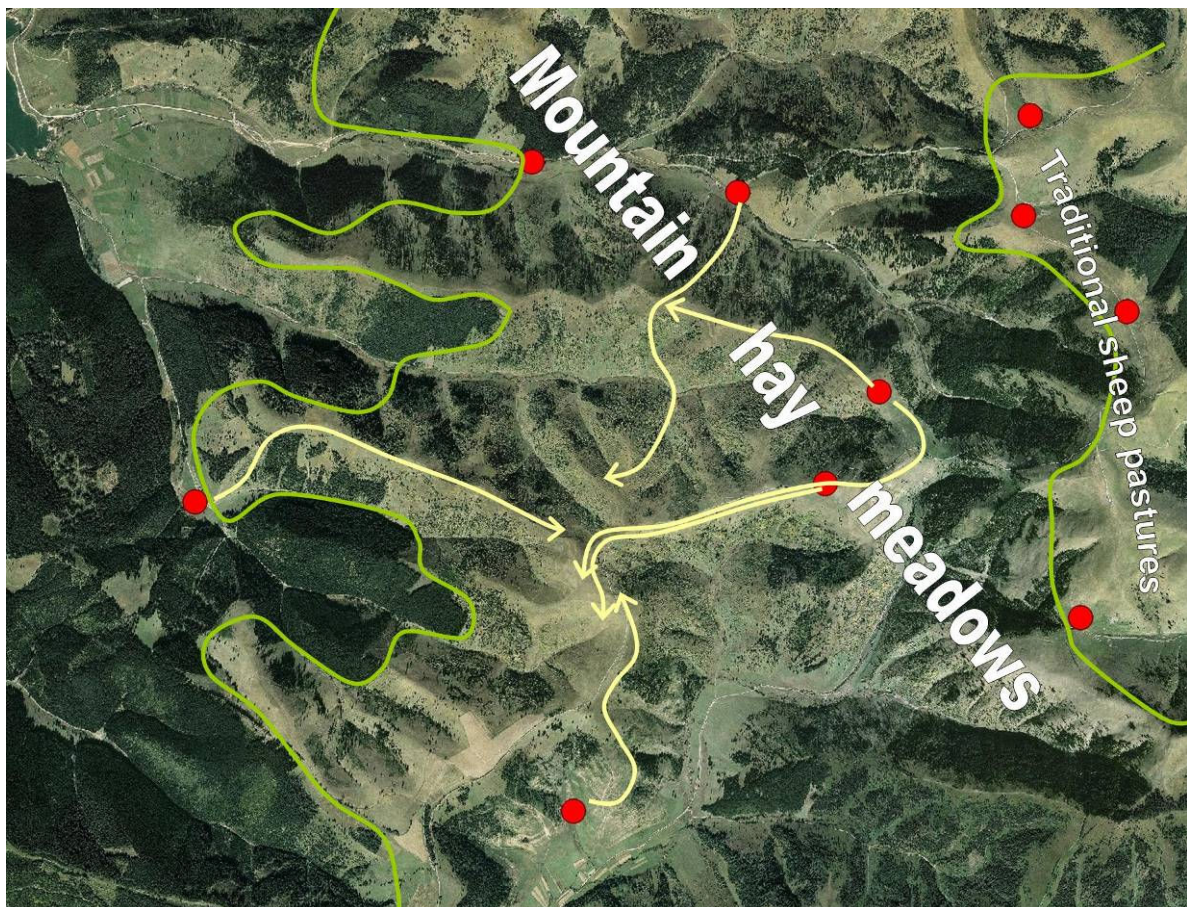


Fig. 10. Location of active sheep folds in 2011 and the movement routes of some of them, grazing on mountain hay meadows. The area between the green lines represent the mountain hay meadow range. East to it are the traditional sheep pastures. Sheep folds appeared in the mountain hay meadow range in the past 20 years.





	
<p>View in the studied area (Pálos)</p>	<p>Plot abandoned for several years with young spruces (Magyarós teteje)</p>
	
<p>Mown plot on the left, unmown plot with many anthills on the right in Fata valley</p>	<p>Unmown plot overgrown by spruce in Fata valley</p>

Fig. 11. Pictures about abandonment in the studied area.

4.5 Mountain hay meadows and the Natura 2000 system

In 2011, the whole study area became part of a new Site of Conservation Interest, coded ROSCI0323 Muntii Ciucului (Ministry Order nr. 2387/2011). The reason for proposing the area as a Natura 2000 site was exactly the presence of species-rich grasslands associated with traditional agriculture. At present, the site has no separate administrative body, and as such, it is monitored by the Environment Protection Agency of Harghita County. There is no management plan yet for this area either,

The future management plan of this site has to make a close link between local agriculture and nature conservation. The large extent of species-rich grasslands in the area makes any active management very expensive without the collaboration of local communities. The Natura 2000 status

should be used as an incentive for non-intensive agriculture through product marketing, ecotourism and subsidies.

5 Conclusions

Mountain hay meadows in the studied area face multiple threats that will affect their biodiversity and ecosystem services in the long term. Their maintenance would be a desirable goal both for agriculture and biodiversity.

Two threats can be distinguished: (1) conversion of grassland types of vegetation into shrub and forest through abandonment and (2) conversion of meadows into pastures. Both land uses are inferior to traditional mowing regarding plant diversity (see Csörgő and Demeter 2012).

Although the degree of mowing was very small in 2011, with a general average of 14% and close to 0 in one village, the cause of the mountain hay meadows is not lost. In the studied area, rural communities are still viable, ageing is not as a large problem as in many other parts of rural Transylvania. For many farmers, mountain hay meadows represent a safety in case of unfavorable seasons (dry summers with little hay crop in the lower meadows). Total conversion into pastures is prevented at the moment by traditional thinking regarding land use (hay meadows are superior to pastures) and the fragmented ownership.

The situation could be improved by carefully planned agri-environment policies. There should be a clear distinction in the policy between hay meadows and pastures, with larger amounts of payments for the meadows, especially the mountain hay meadows. Also, current practices from the side of the payment agency that favor grazing (e.g. allowing the reporting of hay meadows as pastures, applying fines for not mowing but not applying fines if meadows were trampled) should be changed.

Local communities who try to “make order” regarding grazing of sheep should receive help from the authorities (Police, APIA).

Community initiatives that build on traditions, history and local pride could be also locally very efficient.

While markets continue to play the most important role in directing land use patterns, subsidies contribute significantly to sustainable land use. The possibility of selling meat and milk is of key importance, and policies should aim to protect small producers and create opportunities to sell products.

In the same time, as species-rich mountain hay meadows are in the same time priority habitats in the Natura 2000 system, the studied area being designated as a Site of Community Interest, it is the responsibility of the state to ensure that these habitats are not lost. This can be achieved only in close collaboration with local farmer communities.

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