

UNIVERSITY OF PÉCS

Biological and Sportbiological Doctoral School

**Landscape historical, ethnoecological and nature conservation
analysis of the Hungarian silvopastoral systems**

PhD thesis

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PÉCS, 2017

I. SCIENTIFIC BACKGROUND, OBJECTIVES SET

Biocultural diversity and cultured landscapes are of essential importance from the perspective of natural values in the world, therefore their protection and sustenance has become one of the key conservation goals of our days. In parallel to that a growing number of ecological research projects and studies deal with the functional features of and the role of man in these landscapes (Molnár et al. 2007, Rotherham 2015, Schmeller & Bridgewater 2016). Only the 5 % of the European Union's landscape is non-affected by the human land use (Agnolletti & Rotherham 2015). It was demonstrated with respect to the Natura 2000 indicator habitat types (Halada et al. 2011) that the conservation of the biodiversity in 63 of the 231 types depends on some kind of agricultural activities, mainly on grazing and hay cutting. These habitats and cultured landscapes including the natural and cultural diversity they contain are most threatened by the abandonment of the land use practices (Tárrega et al. 2009), the loss of the traditional ecological knowledge associated with them (Rotherham 2007) and the elimination of the resilient use of local resources in the land (Stoate et al. 2009, Fisher et al. 2012).

More and more frequently are interdisciplinary approaches applied to ecological studies in the past few decades. One of these schools is the ethno biological, ethno ecological approach. In the course of these studies ecological processes are frequently examined, ecological patterns understood in an indirect manner. Such a process is for instance when farmers, herders and conservationist with intimate knowledge of the land and its vegetation are interviewed and their ecological observations are interpreted and synthesized, or when the ethnographic sources of the history of husbandry is processed and reconsidered from the ecological perspective.

Quite a number of examples have shown during the recent period how traditional land use, traditional ecological knowledge (Ianni et al. 2015) or a more intimate relationship with the land (Celentano & Rousseau 2016) can be revitalised. Research exploring the history of the landscape (Foster et al. 2003, Cevalco et al. 2015) and traditional ecological knowledge (Hunn et al. 2003) can contribute to this end substantially. Experience from the past few ten years point out that the most effective way to achieve this is when all these research projects and conservation measures are accomplished with the active involvement of local inhabitants (for instance [http 1.](http://1.), Mihók et al. 2016). One of the central topic of IPBES, an inter-governmental programme launched in the past few years aiming at the evaluation and protection of biodiversity and ecosystem services is how you can empower local communities towards supporting and conserving their own biocultural values (Berkes 2004).

A key element of the new paradigm is that nature conservation can not and should not be built around natural scientific concepts only. On its central framework graph, IPBES identifies

“Mother Earth”, recognising knowledge systems and world views other than the Western scientific paradigm, reverberating the idea of Pál Juhász-Nagy (1993) calling upon the resacration of nature (Díaz et al. 2015, Schmeller & Bridgewater 2016).

Maybe the best and most beautiful examples of natural and cultural biodiversity based on traditional ecological knowledge are the wood pastures of outstanding natural and cultural conservation value which emerged as a result of combining pasturing animal husbandry with woody vegetation, and which have been a dominant feature in the forested areas of Europe for millennia (Rackham 1998, Vera 2000, Hartel et al. 2017). The most commonly used scientific English term for the identification of this pattern of land use practices is *silvopastoral systems* (meaning silvopastoralsystems), which includes all activities and habitats where woody vegetation and animal husbandry can be combined in any way. The issues related to silvopastoralsystems and in particular, wood pastures has been put to the forefront of the research interest of ecologists and conservationists only recently (Rois-Díaz et al. 2006, Agnolett 2007, Saláta et al. 2009, Rudolf et al. 2012, Varga et al. 2015, Hartel & Plieninger 2014, Jakobsson & Lindborg 2017, Gallé et al. 2017).

The interest of ecologists and conservationists was drawn first to the significance of silvopastoral systems in landscape ecology and nature conservation by various works, on landscape history and vegetation dynamics and the issue of the cultural landscape (Rackham 1998, Bartha 2003, Biró & Molnár 2009).

As opposed to silvopastoralsystems in other regions of Europe, their Hungarian counterparts were covered by ethnographic and historical sources only up to date (Szabadfalvi 1963, Petercsák 1977, Takács 1986, Andrásfalvy 2007). The low number of projects conducted with regard to wood pastures in Hungary dealt mostly with the botanical values of a specific site (Juhász 1994, Saláta et al. 2012), or with the inventory of wood pastures found in a specific region (Bank 1994, Haraszthy 1997, Dénes 2006, Sonnevend 2006, Saláta 2017).

I set the objective for my research activities connected to this doctoral dissertation to provide a comprehensive picture on the silvopastoralsystems in Hungary including their historical changes over time, and to take account of the current situation of wood pastures in terms of landscape ecology and nature conservation, as well as, in particular, of the related traditional ecological knowledge. I would also like to call the attention with my work to the fact that in order to better understand and preserve our natural vales the research related to landscape history and the traditional ecological knowledge, and cooperation with local communities were both indispensable ingredients.

My actual questions were formulated in the following four main topics:

1. *Habitat use by extensive grazing on a landscape scale between 1940 and 2014* (which types of habitats were grazed, what role woody habitat types play)
2. *The position of domestic wood pastures in terms of landscape ecology and nature conservation* (penetration, extension, vegetation structure, exploration level, protection level)
3. *The role of man in domestic silvopastoral systems throughout the past 200 years* (land use history, relationships between woody vegetation and animal husbandry, land management and land use components and the changes in all of them)
4. *Current traditional ecological knowledge and conservation, farming practices* (traditional ecological knowledge owned by farmers, herders and conservationists and the management of wood pastures)

II. MATERIALS AND METHODS

I started landscape historical, ethno ecological and conservation research of Hungarian wood pastures and grazing forests in the year of 2005. Most of the studies related to this doctoral dissertation were conducted in cooperation with others during the period between 2010 and 2016. I spent approximately 300 days with field work and nearly a hundred people shared their precious knowledge with me and my colleagues, and some 1000 written, published references were reviewed by me. The geographic focus of my research was Hungary (the Carpathian-basin in some cases).

1. Changes in the extensive grazing systems in the Carpathian-basin between 1940 and 2014

Habitat types used for extensive grazing of cattle, sheep and pigs and the changes in their use over time were revealed in 38 sites of 6 countries in the Carpathian-basin (147 semi-structured interviews). Habitat use was studied in a monthly breakdown for each landscape or region and in four historical periods (1940–1955, 1965–1980, 1992–2000, 2005–2014, respectively). The separation of the four distinct periods in landscape history per variable was tested by variance analysis in the course of the result evaluations (ANOVA). Separation of each month per variable was examined using the Tukey-HSD post-hoc test.

2. The set-up of the database of Hungarian wood pastures

The basis of the Hungarian wood pastures with outstanding natural and cultural values Geological Information System database consists of the results of the MÉTA survey concerning P45 type habitats (Bölöni et al. 2008), Haraszthy et al. (1997), Sonnevend (2006), Dénes 2006, Saláta 2017 and proprietary field data. The database contains the occurrence, extension,

potential and actual vegetation in the 1960s and 2010, land use patterns, conservation status and scientific exploration level (documentary sources).

The areas were marked out on the ArcGIS10.1. program BaseMap aerial photograph (ESRI 2012). During the demarcation process each and every data were cross checked using the military maps and open access aerial photo files (<http 2.>, <http 3.>).

A descriptive statistical evaluation was made during the analytical phase using Excel programme, and in order to explore the relationships between the variables, paired correlation calculation, cluster analysis and primary component analysis (PCA) were conducted.

3. Role of man in the domestic silvopastoral systems throughout the past 200 years

Historical documentary evidence on wood pastures and grazing systems was studied in the National Széchényi Library, the Library of the Sopron University and the catalogues of the Agricultural Library, mainly in the period between 2006 and 2008, with some supplementary queries made in 2016. References deemed to be relevant were collected in the course of the research work by typing in the key words “forest grazing”, “grazing forest”, “wood pasture”, “pannage” in the electronic catalogues of the library in question and by searching for the names of better known specialist authors.

Relevant forestry and agrarian manuals (25 volumes), and specialist periodicals (Erdészeti Lapok, Magyar Mezőgazdaság, Agrártörténeti Szemle) were reviewed during the work. Articles published in the Erdészeti Lapok (Forestry Papers) were examined more in details.

Semi structured interviews on the landscape history of silvopastoralist systems and the ecological memories (Babai et al. 2016) were prepared between 2010 and 2016 in the communities of Olaszfalu, Dörgicse, Csesznek, Bakonyszentkirály, Bakonybél, Lovas, Szentgál (Veszprém county), Zalaszántó (Zala county), Csokonyavisonta, Drávaszentes (Somogy county), Lónya, Gelénes, Márokpapi (Szabolcs-Szatmár-Bereg county), Bogyiszló (Tolna county) and Mezőszilas (Fejér county).

In the course of my work articles on wood pastures were looked for in the eight volume synthetic work entitled Hungarian Ethnography, and in the Table of Contents of the journals entitled Néprajzi Értesítő and Etnographia, then, having reviewed the list of references attached to the publications and the bibliography of the authors the papers published in the topic were collected, making honest efforts to be complete. A total of 63 items from the literature was processed in relation to this, originating from 40 different ethnographic research scientists. Information found in the ethnographic references was summarised on the basis of the key components of silvopastoral systems, determined following the work of Mosquera-Losada et al. (2009), McAdam et al. (2009) and Hartel & Plieninger (2014). They are as follows: people,

who do the grazing; the grazing animals; the landscape, vegetation and pasturing relationship; extensive grazing and free ranging husbandry; use of tree buds, mistletoe, foliage-leaf, moss, litter, wild fruits and acorns; pannage and forest grazing system.

4. Current traditional ecological knowledge and conservation, farming practices

4.1 Traditional ecological knowledge of the herders and farmers about wood pasture management

Farmers and herders grazing on wood pastures, dealing with animal keeping, active at the time and at the time being were visited between 2010 and 2016 in the Bakony, the Balaton-Highlands, Inner-Somogy, the Bereg-plain, the Bükk mountains, between the Danube and the Tisza, in the Zselic and Sárköz, based in 35 communities. Taken all together, 52 persons were interviewed in semi-structured interviews: 17 farmers, 35 herders. Their age varied between 28 and 91, with an average of 54 years.

Most of the interviews lasted for 1.5-2 hours (Newing et al. 2011). The interviews covered the concept, use, wildlife, values, benefits and difficulties of maintenance of wood pastures, the various ways and details how the necessary knowledge for their maintenance can be obtained. Participatory observation was conducted wherever possible (a total of 60 days), during which time I joined the grazing activities and wood pasture management works as an observer, or an active participant just as well. The interviews were recorded with the consent of the respondents using a dictaphone and later typed. Written notes and pictures were also taken during participatory observation. Interview texts and my notes were qualitatively analysed and encoded as set forth above.

The following villages and town and their area were visited during the research: Bakonyszentkirály, Bogyiszló, Cserépfalu, Csesznek, Csokonyavisonta, Dörgicse, Drávaszentes, Gelénes, Homokszentgyörgy, Kunbaracs, Kunpeszér, Lovas, Lónya, Marcali, Márokpapi, Mártély, Mátranovák, Nagyesztergár, Nyárlőrinc, Nyirád, Olaszfalu, Pénzesgyőr, Pusztakovácsi, Sáska, Soltszentimre, Somogyfajsz, Somogysárd, Somogyvár, Szenna, Szentgál, Szulok, Tiszaalpár, Tótvázsony, Vámosatya, Visnyeszéplak.

4.2 Nature conservationist knowledge and perceptions about wood pasture and the management

Thirty nine conservation rangers in charge of wood pasture management were questioned in semi structured interviews between 2010 and 2017 about the values of wood pastures, benefits and difficulties of their use and the potential innovative solutions. Participatory observation was conducted wherever possible. During the year of 2014 the depth of traditional ecological

knowledge owned by the conservation experts related to wood pastures was assessed by quantitative methods as well. A total of 18 white collar conservationists 19 rangers and 12 herders were interviewed. The conservation specialists represented all 10 national parks in this country, the herders worked in the territory of the Balaton-Highlands, Danube-Drava, Danube-Ipoly, Kiskunság and Aggtelek National Park Directorate. The fifty questions put in the course of the semi-structured interview documented the four components of traditional ecological knowledge (TEK). The answers given were scored on a scaled of 0-3, and the number of scores were added up for each four TEK components. Each of the questions were evaluated and the scores related to the four TEK elements were summed for a total value. For the purposes of evaluation, TEK documented during previous research (Molnár 2014; Varga & Molnár 2014) and ethnographic studies (e.g. Hegyi 1978, Takács 1986; Andrásfalvy 2007) served as a basis for comparison. Descriptive statistics were used to analyse the variables for the three stakeholder groups, scores of the four TEK elements and the total TEK score.

III. RESULTS AND DISCUSSION

Changes in the extensive grazing systems in the Carpathian-basin between 1940 and 2014

A dominant feature of the near-natural vegetation of the Carpathian-basin is still up to date the grazing of wood pastures, just like in many other forested parts in Europe (Vera 2000, Rois-Díaz et al. 2006, Andrásfalvy 2007). In such a system grazing adapted to the natural vegetation of the region concerned and the possibilities offered from the weather at all times, livestock was used to utilise almost the entire environs, and as a result vegetation dynamics was influenced on the regional scale (Meuret and Provenza, 2014). Even though this form of farming has been suppressed to a great extent, yet it still prevails in relatively large areas up to date, in particular on conservation land. Our results point to the fact that beside conventional grazing lands (dry and fresh grasslands) marshlands, fallow lands, forests and forest fringes, shrubberies has always played an important role in traditional animal farming (cf. Vera 2000, Andrásfalvy 2007, Mérő et al. 2015).

The database of Hungarian wood pastures

According to our assessment currently approximately 33 000 hectares of P45 category wood pastures can be found in Hungary. This figure is significantly higher than the 5500 hectares identified by the MÉTA survey (Bölöni et al. 2008), which accounts not so much for the substantial increased of the land under wood pasture management but much rather the methodological differences between the two surveys. Plieninger et al. (2015) estimated the size

of domestic wood pastures to be as big as 216 600 hectares, based on the LUCAS Geological Information System database. The difference here might have been the result of the wider interpretation of the wood pasture category and the fact that the area of silvopastoralist systems has grown in Hungary since 2010 to a large extent. The diversity of the Hungarian wood pastures is demonstrated by the outcome of the cluster analysis and the findings of the PCA analysis, which point out, among others, that further investigation was necessary for the more exact identification of the different types of wood pastures. The two major diverging groups were provided by the abandoned wood pastures and those explored from the nature conservation perspective. The differentiation between these two types might be justified by the fact that many do not consider abandoned and afforesting wood pastures as such, in other words they do not study them from this perspective.

The landscape history of the silvopastoral systems in the past 200 years

European silvopastoral systems have been subject to substantial changes in the past 200 years due to the social and economic processes triggered by industrialisation globally, regionally and locally alike (Vera 2000, Plieninger & Hartel 2014, Hartel et al. 2015). Besides the changes, however, it is also important to stress that the relationship of woody vegetation itself with animal keeping – as manifested in practical terms – has undergone hardly any changes (Rackham 1998, Oellerer 2014).

The three most important historical turns on the national level in the case of the Hungarian silvopastoral systems were as follows: 1) separation of forests and grazing land (pursuant to the Act of 1853), 2) abandonment of husbandry methods (second half of the 20th century), and 3) putting the areas to use again (mostly in the past 10 years). These events are similar to European trends, but in our country they happened later or in more moderate way (Costa et al. 2014, Plieninger & Hartel 2014, Hartel et al. 2015, Forejt et al. 2016).

The consequence of discontinued grazing and abandonment of pasture management in vegetation dynamics is the shrubbery overgrowth and afforestation of wood pastures, with the gradual elimination of the mosaic groove type properties (Plieninger et al. 2003, Oheimb & Brunet 2007, Chételat et al. 2013, Varga et al. 2015). In the last ten years a new chapter opened up in the history of the Hungarian wood pastures, characterised by the repeated use of abandoned lands and also the development of brand new wood pastures. Both the process and the role of agrarian subsidies are similar in Estonia (Roellig et al. 2016), and personal motivation and the presence of commitment bear absolute significance in this case just as well. You can reckon with a further growth in the use of silvopastoral systems in the near future, since

the European Union assists and promotes those who intend to farm in a silvopastoral system as part of an agroforestry system (AGFORWARD ([http 4.](http://4)), AFINET ([http 5.](http://5)), Smith 2010, Borovics et al. 2017, Herder et al. 2017, Moreno et al. 2017). Since September 2017 – observing the required limitations – you can again graze in forested land in our country as well (Magyar Közlöny 75, 2017).

The effect of the use of silvopastoral systems on the vegetation in the past

Domestic ethnographic documentary evidence shows that in the period lasting from the 18th century up to the first half of the 20th century husbandry methods very similar to the silvopastoralist systems practiced in the deciduous zone of Europe then and now were also common in Hungary. Such practices include extensive grazing, pannage operated in an organised and stringent system, gathering litter, collecting fodder by coppicing and pruning foliage from the trees, the exploitation of the sun shading ability of trees and gathering wild fruits (Rackham 1998, Vera 2000, Slotte 2001, Bürgi & Gimmi 2007, Smith 2010, Szabó 2012).

In spite of the rich ethnographic material little information is available on the practical implementation of grazing, the impact of this land use type on wildlife and the traditional ecological knowledge related to all this. Unfortunately, it must be concluded that the sources processed were not fit to reconstruct the effect of these activities on the vegetation exactly. In spite of this it is important to emphasise that the knowledge of the historical and in most part ethnographic sources is indispensable to better understand the functioning of the landscape at the time and its properties (Molnár 2007, Szabó & Hédl 2011).

Current traditional ecological knowledge related to wood pastures

Interviews conducted with herders putting livestock to graze then and now demonstrate that a still alive traditional ecological knowledge can be discovered in Hungary which relates to wood pastures. Herders across the world play an important role in not only maintaining wooded pastures, but also in the preservation and handing down of traditional ecological knowledge and the associated lifestyles (Roué & Molnár 2017, Kis et al. 2016, Roturier & Roué 2009, Roturier 2011, Fernández-Giménez & Estaque 2012, Molnár 2012). The underlying foundation of traditional ecological knowledge is provided by thinking with the ‘head of the livestock’, and by loving nature and animals. This is a fundamental core value in the case of herders living and grazing their livestock in any other place of the world (pl. Meuret & Provenza 2014).

Operators of traditional land use patterns frequently do not make a clear distinction between wooded and treeless range lands and pastures, they mainly do not even know the term of wood pasture or other, relevant official technical terms related to the topic. Rois-Diáz et al. (2017)

found similar attitudes when conducting a Europe level research project exploring the familiarity with the concept of agro-forestry systems.

Our results on the role of the practical elements of traditional ecological knowledge in wood pasture management confirmed the findings of Rackham (1998) who claimed that wood pastures are habitat types consciously and deliberately set up and maintained by humans. Land users create a mosaic pattern habitat type consisting of woody and herbaceous plants when they set up and maintain wood pastures based mainly on animal welfare considerations and the intention of long term preservation of the grazing land.

Unfortunately, these days the survival of the herders' world is getting to be more and more questionable with the underlying deterioration of the material and moral terms of the respect associated with this vocation. In certain regions of Europe, such as Great Britain, traditional ecological knowledge is lost by now, meaning not only the devastation of cultural values but meaning difficulties in preserving natural values (Rotherham 2007).

It's not an issue any more from the conservation perspective that the most precious wood pastures must be reconverted, with part of the shrubbery cut down, but the promotion and development of pasturing grazing practices is still does not seem to be not obvious everywhere. A solution to this problem was suggested jointly earlier on in the form of training and employment of so called 'conservation herders' by herders, conservationists and research scientists (Molnár et al. 2016, [http 6.](#)).

The „traditional ecological knowledge” of conservation experts

When the position of wood pastures in the nature conservation administration was explored, we had to face the situation that beside herders and farmers conservation experts also have information which belong to the scope of traditional ecological knowledge. This comes partly from their own management experiences, but they also learn from herders both consciously and passively. According to the comparison made the knowledge of conservationists focused mainly on biodiversity, while herders had a more holistic view centred around the 'stock' (cf. Roba and Oba 2009, Knapp & Fernández-Giménez 2009). It was surprising, however, to find clearly distinguishable clusters among conservation experts based on their TEK. The familiarity of rangers working mainly in the field was an intermediate between herders and white collar conservationists doing mostly office work. Openness to and needs for TEK of rangers was also reinforced by their daily encounters and communication with the local inhabitants, including herders. Among the conservation experts the level of traditional ecological knowledge – both that learnt from the herders and that experienced by themselves – was the highest among those persons who had childhood memories just like the herders, of animal stocking, or maybe who

themselves keep grazing livestock still at present, and who ask elderly herders and farmers about management issues related to wood pastures, not only their direct conservationist fellow-employees.

A mentor-disciple connection between herders and conservationists holding traditional ecological knowledge does not only facilitate the learning of TEK and experiencing the local world view and scale of values. It may also improve communication between locals and nature conservation (Smith 2001, Demeter 2017). Additionally, it may also promote local bottom-up initiatives and hence, the commitment of locals to nature conservation (Reed et al. 2008, Bohensky & Maru 2011, de Snoo et al. 2013, Fazey et al. 2013). There are a number of examples of successful cooperation between the nature conservation administration and locals with respect to conservation management and the sustenance of a specific area (Borrini-Feyerabend et al. 2004, Bohensky & Maru 2011, Berkes 2008, Robinson & Wallington 2012, Molnár et al. 2016).

Conservation issues of wood pastures

Based on the collected views and field findings it can be established that the most important problems in this country with respect to the preservation of wood pastures are as follows: 1) overgrowth with shrubbery and afforestation following and originating from the abandonment of the land use practices, 2) legal obstacles, partly arising from the same, 3) lack of herders with holding the appropriate knowledge, and 4) disregarding landscape and habitat conditions in the provisions and legal regulations governing agriculture subsidies. Plieninger et al. (2015) outlined a picture similar to the Hungarian one on the European level, highlighting that special natural and cultural heritage and husbandry needs of wood pastures ought to be taken into account more intensively when agricultural aids are regulated. Nevertheless, and our results also support this notion, the single most important task is to strengthen and reinforce the commitment of local communities and farmers towards wood pastures, who are in the position to take actions for the preservation of these areas on a daily basis (Takács-Sánta 2009, de Snoo et al. 2013, Molnár et al. 2017).

IV. CLOSING REMARKS

The latter considerations go back to the original question raised by my doctoral thesis. It was stressed there that for the purposes of conservation of the natural values we do and will need to strengthen and re-interpret the relationship between the land and man, an urgent move which is further underlined by the IPBES evaluation currently in progress and a number of scientific research projects (Berkes et al. 2000, Plieninger et al. 2006). All the foregoing are also

connected and in harmony with the thought of the ecologist Pál Juhász-Nagy: “... *Re-sacration of nature (let's say, in the spirit of a more modern interpretation of 'existential democracy' in the sense of Saint Francis) represents an unavoidable programme*”.

V. SUMMARY OF THE NEW SCIENTIFIC ACHIEVEMENTS

1. It has been determined that wood pastures, shrubberies, forests and forest edges played a significant role in cattle, sheep and pig farming as major habitat types used for traditional pastoralism in the Carpathian-basin during the period between 1940 and 2014. Grazing wood pastures and forests, forest edges dominated this activity typically in the period between May and August, and during late in the Autumn or in Winter, in the case of sheep early in the Springtime, respectively.
2. A GIS database for the currently existing wood pastures in Hungary was prepared and as part of the work, known wood pastures were identified and characterised one by one. At the time being, 33 318 ha of land is registered as wood pastures, 88% of which has been wood pasture already fifty years ago and more detailed ecological, land use and conservation information is available in the case of some 26% of this area.
3. It was revealed that woody, forested grazing practices have played an essential role in land use patterns forest and grassland management in the past 200 years nationwide. It was demonstrated that conscious efforts and attempts were commenced to resilient adaptation of wooded-forested grazing systems as long as at least 150 years ago. The impact of these innovative approaches can still be felt in the structure of the landscape and in the nature of the vegetation on wood pastures.
4. It was established that three major historical turns occurred at the national level in the life of wooded-forested pasturing systems at the national level: (1) the separation of grazing land from forested areas, (2) abandonment, and (3) renewed utilisation of such areas.
5. Based on the ethnographic and historical sources related to wooded-forested pasturing systems it was established that available data describe the practical significance and systematic application of husbandry in details, but they are not suitable to reconstruct exactly the impacts such activities exerted on the vegetation. One of the underlying causes is that the use of the terms wood pasture and grazing forest are mixed up, they can be differentiated with difficulties only and traditional land use operators do not make any distinction between the two concepts.

6. Relying upon the collection of the still existing traditional ecological knowledge (TEK) and the analysis of historical sources in landscape history it was revealed in details what determining impact by „human use” as specified in the P45 Á-NÉR definition actually means in the case of the wood pastures. The most important impacts include (1) preference given to oak and wild fruit trees, (2) individual management of trees (plantation, nursery, coppicing, truncating), (3) and the harmonisation of cutting versus saving of shrubbery in order to protect seedlings and the grass layer.
7. It was demonstrated that traditional ecological knowledge applicable to wood pastures is a surviving form of vernacular information up to date, held and handed down mainly by traditional herders. A quantified assessment showed that conservation rangers quite catch up with the knowledge owned by herders in terms of practical elements of such information. All these findings point to the fact that revitalisation of abandoned land use methods and practices, such as the use of wood pastures may have a key role in solving the single most important issue of contemporary nature conservation, the long term maintenance and handing down of traditional ecological knowledge.

The issues related to the preservation of wood pastures were explored both nationally and locally. Key problems were identified as follows: (1) abandonment of traditional land use practices and the resulting encroachment of shrubbery and forests, which partly lead to (2) legal barriers and policy issues, (3) lack of herders holding the necessary knowledge, and (4) disregarding the local landscape and habitat specific conditions in the regulations associated with agrarian subsidies.

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