



System Report: Wood Pasture in Hungary

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1 Context

The AGFORWARD research project (January 2014-December 2017), funded by the European Commission, is promoting agroforestry practices in Europe that will advance sustainable rural development. The project has four objectives:

1. to understand the context and extent of agroforestry in Europe,
2. to identify, develop and field-test innovations (through participatory research) to improve the benefits and viability of agroforestry systems in Europe,
3. to evaluate innovative agroforestry designs and practices at a field-, farm- and landscape scale, and
4. to promote the wider adoption of appropriate agroforestry systems in Europe through policy development and dissemination.

This report contributes to Objective 2, Deliverable 2.4: “Detailed system description of case study agroforestry systems”. The detailed system description includes the key inputs, flows, and outputs of the key ecosystem services of the studied system. It covers the agroecology of the site (climate, soil), the components (tree species, crop system, livestock, management system) and key ecosystem services (provisioning, regulating and cultural) and the associated economic values. The data included in this report will also inform the modelling activities which help to address Objective 3.

2 Background

Wood pastures and grazed forests as part of the silvopastoral systems have always been an integral part of land use in Hungary as demonstrated by a number of archive and historical sources. The economic and social value of such systems is hinted by the name “*Glandifera Pannonia*” (meaning ‘acorn bearing Pannonia’) to denominate Transdanubia in the Roman Age. The significance and operation of silvopastoral systems has reduced substantially in the past 100 years, and common ownership of pastures in forested areas has vanished almost entirely (Saláta et al. 2009a, 2009b, Varga and Bölöni 2009). It is estimated that there is currently only around 8000 ha (5500 ha with ancient trees) of used or abandoned wood pasture in Hungary; with a third in a protected area (Bölöni et al. 2008, 2014; Varga and Molnár 2014). Grazing in forests is prohibited in areas officially qualified as forests.

In recent years, agri-environment subsidies, nature conservation management practices, and the rising demand for organic food led to some formerly abandoned areas to be farmed again as wood pastures. However, in places this change is hindered by legal impediments such as complicated legal ownership structures. Benefits of silvopastoral systems can include high quality food products and the preservation and maintenance of high natural and cultural values. Hence when granting subsidies to tree planting, planting only and exclusively native tree species and local fruit varieties indigenous in the forestry landscape should be permitted, while preserving the natural values of the grassland (Varga 2014). The term agroforestry is not widely used in Hungary but there are traditional wood pasture and wood meadow systems that are traditional land use systems, preserving a number of archive and historical sources, and providing economic and social values. Although there is significant interest in the benefits of agroforestry, there is a lack of basic knowledge about agroforestry practice and little information about who has established systems or is engaged in agroforestry research. It is evident that there is a need for a national agroforestry network in Hungary to disseminate information and set the basis for cooperation between agroforestry stakeholders.

3 System description

Pannonian silvopastures of high nature value included both wood pastures and grazed forests finely intermixed and with rather diffuse transitions. They were traditionally grazed with local breeds of sheep, goats, cattle, buffalo, horses and pigs. Although the flocks grazing these silvopastures decreased enormously in the twentieth century (Varga et al. 2016), still some thousands of hectares are actively grazed around the country (Figure 1).

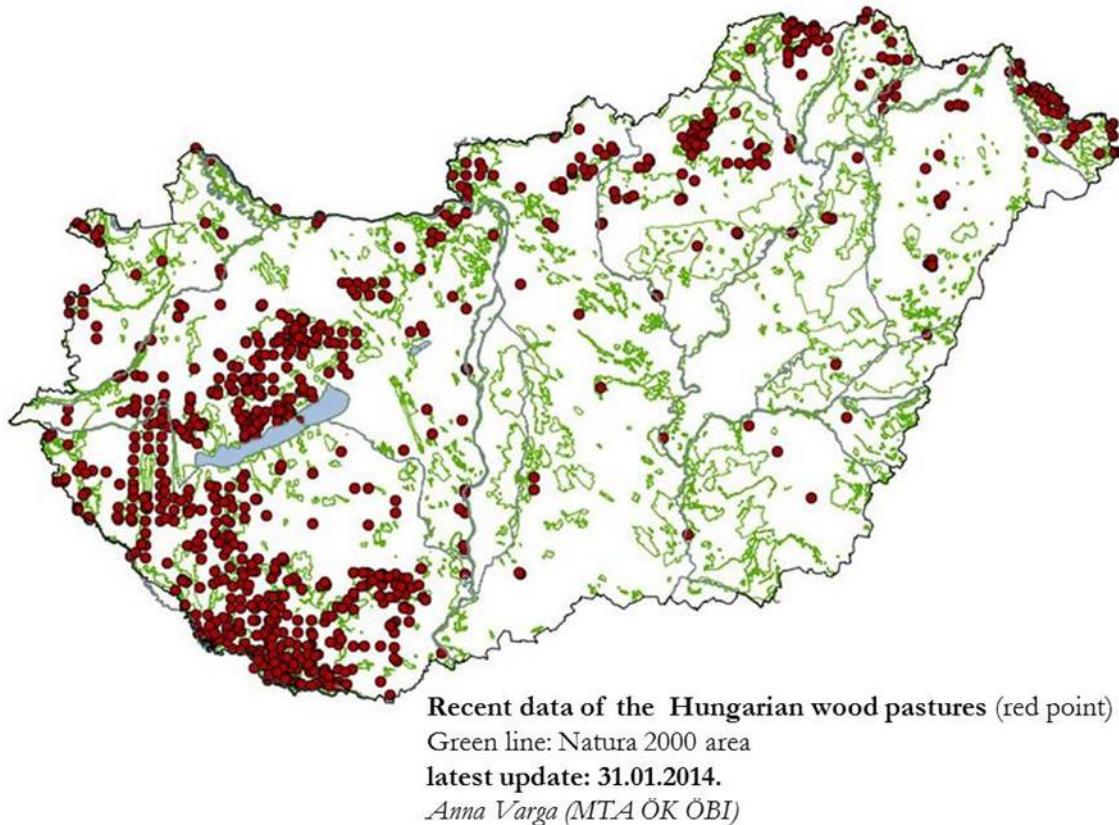


Figure 1. Presence of wood pastures in Hungary (Varga et al. 2014)

These systems combine natural grasslands with the presence of native hardwood (tree and tall shrubs) species that are used for fuelwood, fodder and wild fruits. These systems are also important for the provision of cheese, meat, spirits, jam, syrup, wool, and increasingly leisure (tourism). Some examples of this new economy can be found at www.mozsimajor.hu, www.faluhelymajor.hu, and www.facebook.com/marffyhas.marffyhas. Conservation on nature and cultural values are also of increased interest. Indeed a third of the total area of used or abandoned wood pastures are protected areas. Table 1 summarizes the main features of the Pannonian wood pastures and grazed forest of high nature and cultural value.

Table 1. General description of the wood pasture management in Hungary

General description of system	
Name of group	Wood pastures in Hungary
Contact	Anna Varga or Andrea Vityi
Work-package	2: High nature and cultural value agroforestry
Associated WP	Use of livestock
Geographical extent	Wood pastures are located throughout Hungary
Estimated area	A bout 8000 ha wood pasture, from this 5500 ha with ancient trees
Typical soil types	Rendzina and brown forest soils, sandy soils, alluvial soil
Description	Wood pastures and grazed forests were traditional land use systems in Hungary, preserving a number of archive and historical sources, and providing economic and social values. Nowadays, a third of the total area of used or abandoned wood pastures are protected areas. Grazing in forests is prohibited in areas officially qualified as forests.
Tree species	<i>Quercus robur</i> , <i>Quercus cerris</i> , <i>Fagus sylvatica</i> , <i>Pyrus pyraster</i> , <i>Carpinus betulus</i> , <i>Fraxinus angustifolia</i> , <i>Acer campestre</i> , <i>Tilia sp.</i> , <i>Sorbus torminalis</i> , <i>Salix sp.</i> , <i>Populus sp.</i>
Tree products	Fuelwood, fodder and wild fruits
Shrub species	<i>Crataegus monogyna</i> , <i>Prunus spinosa</i> , <i>Rosa caninia</i> , <i>Juniperus communis</i>
Shrub layer products	Wild fruits, herbs, fuelwood
Grass species	<i>Festuca sp.</i> , <i>Festuca rupicola</i> , <i>Stipa spp.</i> , <i>Chrysopogon gryllus</i> , <i>Poa nemoralis</i>
Grass layer products	Grazing, wild edible plants and herbs, mushrooms
Habitat services and biodiversity	Preserving ancient habitat type, open woodland-scape and many rare and protected species could be find on the wood pastures in Hungary (for example <i>Pulsatilla nigricans</i> , <i>P. grandis</i> , <i>Orchis morio</i> , <i>Carlina acaulis</i> , <i>Adonis vernalis</i> , <i>Osmoderma eremita</i> , and <i>Upupa epops</i>). Wood pastures provide the most important habitat for ancient trees.
Cultural services	Wood pasture management is both an ancient traditional land use practice and also a new possibility for sustainable land use management, livestock production and rural development. It offers important cultural services and creates employment for traditional herders. Therefore herders are able to continue their traditional livestock keeping and culture.
Current trends	Traditionally most of the wood pastures were owned and managed by communities. Now community management is rare, some families and small agriculture companies are restating abandoned wood pasture. A good example is the case of the Balaton-Felvidék National Park (www.nagybirtok.hu), Vácza-kő Major (http://bakonyexpo.hu/kiallitok/vacza-ko-major/) and Búrge Tanya farm (https://www.facebook.com/pages/B%C3%BCrge-tanya/134171863420811).

4 Objective of research

In the context of the AGFORWARD project, a research protocol was established to promote Hungarian wood pastures. The research protocol is based on initial surveys performed during stakeholder meetings and consultations with farmers on innovations of wood pastures (Vityi and Varga 2014). The challenges and innovations that were expressed by the stakeholders and expected to contribute to more effective system management are listed in Table 2.

Table 2. Initiatives identified by stakeholders to increase the resilience of Hungarian wood pastures

1. Best practices for establishing and managing high nature and cultural value wood-pasture
<p>A. System design and management/ tree layer management / renewing wood pastures</p> <ul style="list-style-type: none"> • What are the best practices and steps to renew an abandoned and infilled wood pasture? • How it influence the renewing management of the vegetation in a wood pasture? • Why is it worth to renew or establish a wood pasture (<i>products, goods and other values</i>)?
<p>B. Tree protection and regeneration/ cost-efficient protection of saplings</p> <ul style="list-style-type: none"> • What are the best practices for protection of sapling?
<p>C. Grazing schemes and cost efficient herding</p> <ul style="list-style-type: none"> • More efficient and even use of extensive forage resources / Best use of pannage • Cost-efficient herding including the use of technology • What are the best practices for cost-efficient herding and pannage?
<p>D. Pasture quality and carbon measurement</p> <ul style="list-style-type: none"> • How do soil carbon levels differ under tree and on open grassland?
<p>E. Nature and biodiversity conservation</p> <ul style="list-style-type: none"> • How does different livestock grazing effect on the vegetation structure and biodiversity?
2. Increase awareness of the nature and cultural values of Hungarian wood pastures
<p>F. Farm profit and branding of products from agroforestry of high nature and cultural value (HNCV)</p> <ul style="list-style-type: none"> • What kind of products are related to HNCV agroforestry in Hungary? • Where could customers buy HNCV agroforestry products in Hungary? • Why customer are not buying HNCV agroforestry products? • What are the best branding and marketing methods to improve knowledge of customer?
<p>G. Local community responses to value and protect ancient trees on wood pastures</p> <ul style="list-style-type: none"> • What the local community know about the ancient trees of the closest wood pasture? • What are the values of the ancient trees for the local community? • What are the best methods to improve their awareness of the ancient trees on wood pastures?

The research and development for the wood pastures in Hungary is carried out at three levels: **country, regional and local level**. The **country and regional** levels can be addressed through on-line and social media forums and different food, agricultural, forestry or nature conservation markets and festivals.


At the local level, research is taking place at two field sites. The first is the **Tűzkövesbörc Wood Pasture Farm** (Table 3) near Pénzesgyőr village, Veszprém county. This area was a community pastureland. It was started to become abandoned at the end of the 1980s. During nearly 20 years of lacking management the wood pasture infilled with woody vegetation. Today the area is a mosaic of open grassland, renewed wood pasture with ancient trees and young trees, grazed closed canopy wood pasture and not grazed forest. Since 2007, the current owner and farmer has started to renew and manage this area as a high nature value wood pasture system. Now, they live on a farm in the wood pasture and keep only traditional breeds for the Carpathian-basin. The owner, Tibor Nagy, took part at the stakeholder meeting in Fajsz (Vityi and Varga 2014). At the meeting he shared his experiences about renewing abandoned wood pasture and branding, selling wood pasture products at local food market.



Figure 1. Rural tourism: tourist visits the Tűzkövesbörc tanya where they can eat fresh lamb from the wood pasture.


The second site is the **Bogyiszlói Wood Pasture** (*Akasztói ancient oak woods*) (Table 4), near Bogyiszló village, Tolna county. It was the community pastureland of Bogyiszló village. The extent of the pasture has been larger than it is now when it is managed by a local agricultural company (the Bogyiszló Production and Sales Cooperative). The greatest part of the pastureland is grazed by sheep; other parts are grazed by cattle. The pastureland is a parkland habitat type with large, ancient oak and pear trees without significant shrub layer. The regeneration of the oak trees is currently unsuccessful. Local people visit the area and some of them collect wild pears for eating and making brandy.

Table 3. Description of Tűzkövesbörç Wood Pasture Farm site, with soil, tree, understory, livestock, and climate characteristics

Specific description of site	
Area	120 ha
Co-ordinates	47°12'47.55"N 17°47'28.93"W
Site contact	Anna Varga
Site contact email	varga.anna@gmail.com
Site info at the web	www.nagybirtok.hu , Facebook page: Tűzkövesbörç Tanya
Photo of system	
	
Figure 2. Sheep flock grazing over the snow in the Tűzkövesbörç Wood Pasture Farm	
Soil type	
Soil type	WRB classification: Cambisol, Leptosols
Tree characteristics	
Tree species	<i>Quercus petraea</i> , <i>Fagus sylvatica</i> , <i>Pyrus pyraeaster</i> , <i>Carpinus betulus</i> , <i>Prunus avium</i> , <i>Acer campestre</i> , <i>Fraxinus spp.</i> , <i>Sorbus spp.</i>
Shrub species	<i>Pyrus pyraeaster</i> , <i>Prunus spinosa</i> , <i>Cornus mas</i> , <i>Crataegus spp.</i> , <i>Rosa spp.</i>
Tree products	Fuelwood for their own purpose. Edible wild food and fruit products, as syrup and jam from rosehips and mulberry.
Other provisioning services	Possibility of using tree prunings as fodder. Rural tourism.
Regulating services	Trees can provide shade for the livestock in summer, and shelter in the winter. The livestock can promote nutrient cycling. The livestock, by eating falling leaves, can remove a refuge for fungi infections. The trees will increase carbon storage (especially in aboveground biomass).
Habitat services and biodiversity	Maintaining open landscape and parkland structure in closed forests. Conserving ancient trees.

	Habitats for rare birds, bats and insects. Protecting ancient, traditional livestock breeds of the Carpathian-basin.
Cultural services	Ancient, old trees. Community building in abandoned rural region. Renewing traditional livestock keeping and lifestyle. Traditional knowledge transmission for children about livestock keeping, nature conservation, traditional crafts.
Crop/understorey characteristics	
System	Renewed and abandoned wood pasture mosaic
Species	<i>Anthyllido-Festucetum rubrae</i> is the dominant herb layer (217 species, Saláta et al. 2007)
Livestock characteristics	
Species	Hungarian great grey cattle, Hucul horse, Racka sheep, Cikta sheep, Cigája sheep, buffalos, and goats (only traditional breeds of the Carpathian-basin)
Animal products	Cattle, sheep and horses are sold as breeding animals, mainly for Hungarian customers. Cattle and sheep are sold for meat, mainly for Hungarian customers. Sheep wool is sold to a small traditional handcraft group.
	
	Figure 3. Hungarian Grey Cattle stew tin from Tűzkövesbörck Farm, Bakony, Veszprém county, which is available at the local food market and local food shops in Zirc-Akli.
Available sources	
Land use history Botanical survey before 2007	Saláta et al. 2009b; Szabó et al. 2007 see end of report

Table 4. Description of the Bogyiszlói Wood Pasture (*Akasztói ancient oak woods*) site, with soil, tree, understory, livestock, and climate characteristics.

Specific description of site	
Area	87 ha
Co-ordinates	46°23'34.11"N 18°51'50.88"W
Site contact	Anna Varga
Site contact email	varga.anna@gmail.com
Site info at the web	www.bogyiszlo.hu
Photograph of system	
	
Figure 4. Image of the Bogyiszlói Wood Pasture	
Climate characteristics	
Mean annual temperature	10.7 °C
Mean annual precipitation	600 (± 50 SD) mm
Soil type	
Soil type	WRB classification: Gleysols, alluvial soil
Tree characteristics	
System	Renewed and abandoned wood pasture mosaic
Tree species	<i>Quercus robur</i> , <i>Pyrus pyraster</i> , <i>Salix alba</i> , <i>Populus</i> spp.
Shrub species	<i>Pyrus pyraster</i> , <i>Prunus spinosa</i> , <i>Crataegus</i> spp., <i>Rosa</i> spp.
Tree and other products	Fuelwood. Collecting edible wild food and mushrooms, wild fruit products, wild pear brandy.
Other provisioning services	Possibility of using tree pruning as fodder. Rural tourism. The area is part of long distance horse-riding track.

Regulating services	Trees can provide shade for the livestock in summer, and shelter in the winter. The livestock can promote nutrient cycling. The livestock, by eating falling leaves, can remove a refuge for fungi infections. The trees will increase carbon storage (especially in aboveground biomass).
Habitat services and biodiversity	Maintaining open landscape and parkland structure in a closed forest region. Conserving ancient trees. Habitats for rare birds, bats and insects. Protecting ancient, traditional livestock breeds of the Carpathian-basin. At the floodplain region the grazing management is essential against the invasive species, for example <i>Acer negundo</i> , <i>Amorpha fruticosa</i> .
Cultural services	Ancient, old trees can be a focus for tourism and recreation. Traditional knowledge transmission for children about livestock keeping, nature conservation, traditional crafts.
Crop/understorey characteristics	
Habitat type	Mesotrophic wet meadows, and uncharacteristic semi-dry grassland and mesic meadow communities
Species	No data available (survey starts in 2016)
Livestock characteristics	
Species	Merino sheep and cattle
Animal products	Sheep (lamb) and cattle sell for meat, mainly for export.

5 Measurements

Field measurements described in the research and development protocol are shown in Table 5. The vegetation survey method is based on previous field work on abandoned and used wood pastures and other woodland vegetation surveys (Varga et al. 2015). We collect data of the tree-stand structure and herb layer composition (Ádám et al. 2013). The field measurements of the vegetation at both sites started in 2015 autumn; it is anticipated that the field research will continue until June 2016. The research and experiment of tree protection and regeneration in Bogyzsló will start with the plantation of the young trees in December 2015.

Landscape and land use history analyses is being conducted using the methodology by Biró (2006), Puri (2011), Biró et al. (2013), and Bürgi et al. (2013), with interviews that analyse the features of the past and current grazing regimes and practices, quantitative and qualitative data of past vegetation type and cover, and traditional ecological knowledge of wood pasture management. Additionally, it is planned to use questionnaires based on the methodology of Newing et al. (2011), that includes on-line interviews to explore social issues, such as traditional ecological knowledge of farmers and their opinion on the best practices (Varga and Molnár 2014). We have contacted 36 livestock farmers who are willing to share their knowledge about wood-pasture management. The data collection is planned for spring 2016. We have also developed a virtual platform for the farmers, who are interested in silvopastoral management and wood-pastures. It is based on a Facebook page ([Wood pastures in Hungary](#)).

Table 5. List of measurements to be taken in the two study sites (Tasks coded as Table 2)

Task		Level of measurement /Locality of system	Methods
A	Renewing encroached or abandoned wood pastures	Local: Pénzesgyőr	Vegetation survey, landscape history, interviews with local farmer and herders , and at the local food market
B	Reconciling grazing with trees (cost-efficient protection of samplings)	Local: Bogyiszló	Testing of different field protection practices, interview with herders: nursery shrubs, artificial thorny protectors
C	Cost efficient herding and pannage	Local: Pénzesgyőr and Bogyiszló	Interview with farmers, herders in Pénezsgyőr and Bogyiszló
		National: online	Online questionnaire for mangalica (extensive pig) keepers about pannage management
D	Carbon measurement	Local: Bogyiszló	Soil measurement under six trees: under the canopy and outside
E	Effects of different livestock on the vegetation structure and biodiversity	Local: Pénzesgyőr, Bogyiszló	Vegetation surveys, landscape history, and interviews with local farmer and herders
F	Branding HNCV AF product. Trademark. Valuing product / Improved knowledge of customer and tax payer interest	Local: Pénzesgyőr and Bogyiszló,	Interview with farmers, producers and consumer at local food market and festival,
		Regional and national: on-line	Online questionnaire Database of products
G	Protection of ancient trees Testing the openness of local communities to value/protect ancient trees on wood pastures	Local: Bogyiszló	Participatory methods, collaboration with the local school, interviews with different age groups of the local people. Establish a model project for local school.

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