

## Chapter 4

# Wooded Grasslands as Part of the European Agricultural Heritage

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**Abstract** Wooded grasslands have always played an important role in rural life with changing issues: They are of high importance for questions of biodiversity, soil, and water resources and in preserving agricultural heritage, but their maintenance is labor intensive. Abandoned wooded grasslands undergo succession, and food production alone does not support their survival. They require special attention

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and at the beginning a well-established subsidy system can help to contribute to their survival. Their sustainable use in the present-day landscapes can only be conceivable in complexity where food production, reintroduction of their cultural values, biodiversity and landscape protection, and ecotourism are playing an

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important role. This chapter gives an overview on the recent situation of wooded grasslands and their historical development, based on the work done by the Institute for Research on European Agricultural Landscapes ([www.eucalandnetwork.eu](http://www.eucalandnetwork.eu)). National pictures, definitions, history (including local names), threats, potentials, cultural values, spatial distributions, subtypes, and available databases have been collected, described, and analyzed. The main results of this survey are as follows: (1) Wooded grasslands are known to the public but mainly to local communities where they occur; (2) Many subtypes of wooded grasslands exist in various European countries; (3) Wooded grasslands underwent tremendous changes during the past centuries and lost their importance for various reasons; (4) There are many local and regional projects focusing on wooded grasslands, often as “lighthouse” projects to valorise cultural achievements.

**Keywords** Biodiversity · Rural countryside · Best-practice examples · Sustainable land use · Biocultural diversity

## 4.1 Introduction

Wooded grasslands belong to the richest and most beautiful landscapes in Europe (Alexander 1998; Fleming 2012; Rackham 1998, 2003, 2006, 2013; Rotherham 2013a, 2013b). They are, however, increasingly rare and under threat by modern farming and forestry (Green 2013). In this paper, an attempt is made to define and describe this landscape type, as well as to map its dispersal.

The paper is prepared by members of the EUCALAND Network<sup>1</sup> (European Culture Expressed in Agricultural Landscapes). EUCALAND is an expert network on the agricultural landscapes of Europe and their heritage (Printsmann et al. 2012; Pungetti and Kruse 2010). In 2010, the network published a glossary of 42 European agricultural landscape types and terms with translations into six languages (Kruse et al. 2010), aiming at future extension. In 2012, the Network organized a workshop on “wooded pasture,” the traditional landscapes that combine trees with grazing lands.

The main research questions were:

1. What types of wooded grasslands exist in Europe and what is their dispersal?
2. What are the cultural values of the agricultural landscapes of wooded grasslands?
3. How to maintain the cultural values of this cultural landscape type?

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<sup>1</sup>[www.eucalandnetwork.eu](http://www.eucalandnetwork.eu).

## 4.2 Definitions

The landscape we describe in this paper, and for which we use the umbrella term of ‘wooded grasslands,’ combines trees with grassland. Such landscapes can be found in different European regions.

Natural wooded grasslands are defined by various authors. White (1983) gives a good example: “Wooded grasslands are lands covered with grasses and other herbs with woody plants [trees ( $\geq 7$  m tall), bushes (3–7 m), dwarf trees, palm trees or shrubs ( $\leq 2$  m)] covering between 10 and 40 % of the ground. Woody plants nearly always occur scattered.”

Most definitions do not distinguish between man-made and natural wooded grasslands. Outside Europe, landscapes that combine grazing with trees are often described as ‘natural’ landscapes. Examples are the African savannas. In parts of Europe, there is an ongoing discussion on the ‘natural’ state of the landscape. Most authors take it for granted that, without human influence, most of temperate Europe would consist of mixed forest. Old ideas of natural open lands, such as Gradmann’s ‘Steppenheide’ theory, (Gradmann 1933) have been revived in recent decades, particularly by the Dutch ecologist Frans Vera who claims that the natural landscape in temperate Europe would be a half-open, park-like landscape. However, most authors see these half-open landscapes as man-made.

Man-made ‘wooded grasslands’ probably first appeared along with other types of man-made ‘grasslands’ (although there is little evidence for that). Secondary grassland that appeared clearly due to man-made deforestation (Dirkx 1998) started with the spread of Neolithic husbandry (Bredenkamp et al. 2002) and other land management activities like mowing, slash-and-burn agriculture, arable farming, etc. (Coupland 1979; Knapp 1979; Pott 1995; Jääts et al. 2011). According to Pott (1995), man-made grasslands were obviously in use and wide spread since the Pleistocene. However, Vera declares that the European Atlantic period (8000–5000 BP) is the period before the introduction of the livestock (Vera et al. 2006).

The main sources for the existence of former (man-made) wooded grasslands are soil characteristics and pollen. As the prevention of the wooded grassland from reverting to woodland required burnings, the signs of these burnings can be found in the soil, as coal beds with their attendant fossil pieces or thin layers of charcoal and fusain can prove that fire was part of ancient ecosystems (Cole 1986; Schaetzl 1986; Komarek et al. 1973; Kozłowski and Ahlgren 1974). This fossilized carbon does not tell us if it has a natural or man-made origin, but if it is historically proven that grasslands were in use as part of the agriculture in the given area, these signs can prove the possibility of existence of a wooded pasture, too.

In Europe, the other evidence of former open or partly open (not fully covered forest areas) grasslands is the presence of light-requiring plant species, e.g., shrub hazel (*Corylus avellana*), pedunculate oak (*Quercus robur*), and sessile oak (*Q. petraea*) (Vera 2002; Vera et al. 2006). The possibility of using light-requiring species as indicators of openness is also used in other continents, e.g., in the USA, where red maple (*Acer rubrum*), black birch (*Betula lenta*), and yellow birch

(*Betula alleghaniensis*) were such indicator species (Whitney 1984, 1990; Rooney 1995; Abrams et al. 2000, 2001).

In Sweden, wooded grasslands, called “leaves meadows,” are highly distinguished in a landscape change study where a 200-year period is examined and five principal land cover groups were made, one of which is “wooded grassland.” This must have played an important role in the Swedish countryside (Skånes and Bunce 1997) and was combined with animal husbandry. These enclosed leaves meadows, often close to the villages, served for keeping ill or pregnant animals. Today, it remains only as relics, e.g., on the island of Öland.

In Italy, wooded grasslands are mentioned for various areas, normally as wooded pastures. In the mountainous areas of the Alps, the most frequent species are larch (*Larix decidua*) and red fir (*Picea abies*); on the higher Apennines are beech (*Fagus sylvatica*) and turkey oak (*Quercus cerris*), and in the hills can be found pubescent oaks (*Quercus pubescens*). In Mediterranean areas, the mainly used trees are holm oak (*Quercus ilex*), cork oak (*Quercus suber*), and carob trees (*Ceratonia siliqua*) (Del Favero 2008). The wooded pastures of Salten (Alps of Trentino Alto Adige, Italy) have groups of larch trees (*L. decidua*) creating a beautiful landscape (Agnoletti 2013). Here we have to mention that Agnoletti (2013) does make a difference between wooded grasslands and wooded pastures. Another interesting point of Agnoletti (2013) is that he suggests with regard to the situation of Sardinia the attribute of “treed” instead of “wooded” for grasslands with trees that might be a considerable suggestion for future use.

As our research aimed at agricultural landscapes, we excluded sylvopastoral systems (this is why forest pastures are not listed here) and included only those landscapes where grasslands were created for using the grass for forage or other purposes and trees were left there (e.g., from forest clearing) or planted on purpose. On the other hand, it was important to include all landscape types that look physiognomically similar. This is the main driving rule for defining wooded grasslands: their appearance. This is the reason why all grasslands where any type of tree appears as an important landscape characteristic have been included. The reason of its creation was not the sole organizing rule for defining a particular landscape as wooded grassland; however, it was important that it was identified as a result of a human activity rather than a natural environment.

There are some similar landscape types (e.g., transhumance) that might look physiognomically similar to wooded grasslands, but differ by the purpose of the use. They were, in fact, created to be used as grasslands, but developed naturally by common succession processes.

### 4.3 Agricultural Landscapes as Heritage

Wooded grasslands are a part of the European heritage (Laszlovszky and Szabó 2003; Rackham 2003; Howard 2003). Heritage can best be defined as ‘those remains from the past that are seen as valuable for the present.’ Another definition

of heritage is “properties passed, according to law, from fathers and mothers to their children” (Choay 2005). It has been gradually expanded to become “a set of representations and attributes attached to a non-contemporary object (artwork, building (Ellenberg 1990), landscape, site, ...) which recognized significance requires a protection” (Lazzarotti 2003).

This notion of heritage covers a much broader field (Poulot 1998; Neyret 2004): “the range of meanings attached to this formerly precise legal term has recently undergone a quantum expansion to include almost any sort of intergenerational exchange or relationship [...] between societies as well as individuals” (Graham et al. 2000). It means that the broader notion includes immaterial elements (e.g., oral traditions, folklore, music, etc.), too.

We wish to follow this notion during the analyses and listing of the cultural heritage of the recently described agricultural landscape type: wooded grassland.

### 4.4 Materials and Methods

Country synopses were written using a standardized questionnaire (Fig. 4.1) with EUCALAND network members as key experts, collecting national perspectives on history, threats, potentials/chances, names, cultural values, spatial distributions, subtypes, other values (e.g., biodiversity, economy, etc.), key actors (history,

Description of Agricultural Landscape Types and Agricultural Landscape Elements – Questionnaire

**Description of Cultural Landscape Types (one per year)  
By the EUCALAND Network**

**Definition:**

<b>Theme 2013: Water meadows.</b>			
<b>That include</b>			
<b>That does not include</b>			
Question	Sources / References	Explanation How to do it	
If you need more space for your answer, use additional paper apart by naming the number of the question you are referring to			
1. Does it (or did it ever) exist in your country? <input type="checkbox"/> Yes <input type="checkbox"/> No		cross the right answer	
2. What is the used name in your country? _____ Describe it from your national perspective.		Give the national or regional name(s). Describe differences if any with the other, similar types in Europe. You can also describe the importance, meaning etc.	
3. Occurrence in a given cell raster (grid) <sup>1)</sup> : ◦It does not occur •It occurs •It occurs and is important •It is dominant /characteristic Describe the change in occurrence over time. (If you can fill in the same grid for a historical period, its fine)		Describe, as you know it from plants or animals, the occurrence. Try to be as precise as possible. In this way, we will receive the occurrence in Europe. You can produce several grids for different times in order to demonstrate the changes during time.	
4. How/why/by, whom was it created? Describe the genesis (history) of that landscape in your country. E.g.		Here you have the possibility to describe more in detail, what you know about the landscape type/element regarding your country. You can	

Fig. 4.1 Extract of the annual EUCALAND questionnaire for gathering country information

present) for cultivation and management of wooded grassland, recognition in science, and public media (references on national situation, bibliography).

The questionnaire was elaborated by the EUCALAND network members on various workshops and finalized at the 5th EUCALAND Workshop, which took place at Szent István University (Hungary) from 18 to 20 of April 2012. Results were introduced and discussed at the 6th EUCALAND Workshop at Utrecht University (The Netherlands), from 24 to 26 of April 2013.

## 4.5 Results

In the following text, selected results are presented. Data from ten European countries have been gathered: Estonia, France, Germany, Hungary, Italy, Norway, Slovakia, Spain, the Netherlands, and the United Kingdom. Considering the unequal importance and variety of wooded grasslands in these countries, the following country synopses differ in their length and detail. Nevertheless, this summary is only a first step toward a European description of the national situations which will follow later in the project of describing the European agricultural landscapes.

### 4.5.1 Country Synopses

#### 4.5.1.1 Estonia

Although Estonia did not fill in a questionnaire, Kukk and Kull (1997) published a description of wooded meadows in Estonia. As in the present work we consider wooded meadows as a type of wooded grasslands, a description of wooded meadows is useful for getting closer to a European perspective.

Kukk and Kull (1997) described the wooded meadows where—besides mowing—branches and twigs of trees and shrubs were collected for winter leaf fodder. The authors state that there are large regional differences in the method of this collection. In Sweden, trees were pollarded when collecting twigs but they were coppiced in Estonia. According to Kukk and Kull (1997), the wooded meadows of Estonia were classified based on their soil conditions as follows:

- (a) meadows on calcium-rich soils (species rich);
- (b) on acidic soils (species poor);
- (c) on flooded river valleys (no specification on species richness added).

All types are divided to subtypes based on their moisture conditions (e.g., wet wooded meadows). It is interesting and gives a point to the European perspective that as there are breaks in regular mowing, there are a series of successive stages

between wooded meadows and forests. This should be the case in the majority of European wooded grasslands, too.

#### 4.5.1.2 France

Local name: *systèmes agro-sylvopastoraux méditerranéens, pâturage boisés*.<sup>2</sup>

The wooded grassland type exists in France in several different forms.

Type 1: The appearance is very much like the German “Streuobstwiesen” (see German national description), where the production of especially apples and pears plays an important role, e.g., in Normandy (north), Alsace, and Lorraine (east). In the Centre (center), the dominating trees are walnuts and peach.

Type 2: The agro-sylvopastoral system, e.g., in the Var region and in the Jura (both south-east), is a combination of crop production, meadows, and extensive forestry with the aim of acting against forest fires (Joffre et al. 1991). There exist four subtypes, depending on the coverage of trees. Many (or most) of them are located in mountain regions. We find it in many Mediterranean countries, especially where there are heavy problems with forest fire. The system exists since the end of land reclamation of the monarchy in the Middle Ages, although with the agricultural disconnection after World War II, the terrain was abandoned and/or reclaimed and the system declined. Only 15 years ago, it started to be promoted by the regional authorities (Conseil Général CG) of Var within the guideline of a sustainable forestry (DFCI: Défense de la Forêt contre les Incendies)—especially regarding forest fires. In the Var region, it is connected with the production of quality products (olive, chestnut, truffle, wine) and it also is a part of a know-how transmission of the ancestors. In the Jura the today’s awareness and protection of wooded grasslands results especially from their function for recreation and tourism. Another subtype does exist, e.g., in the Vosges (north-east): half-open areas. But here, the use of tree fruits does not play any role.

Three systems of breeding are connected to the timber (fire wood) cutting (type 2):

1. winter transhumance: the animals spend the summer in the mountains, and during winter they stay at the coastal zone;
2. reorganisational pastoralism: one tries to establish a local transhumance, while inviting local breeder to send their animals to the common fields. A well-known and only lately introduced example is in the Puy-de-Dôme region

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<sup>2</sup>The author thanks the students of the Master 1 “Dynamique des Territoires et nouvelles ruralités” (2012), Clermont Universités et VetAgro Sup, with their professor Yves Michelin (VetAgroSup et Laurent Rieurtort UBP Clermont) for providing information on the recent situation in France.



(Clermont-Ferrand, center), where sheep from the Parisian region spent their summer;

3. installation of sylvo-pastoralism: breeder sends their animals to the clearing zones in order to keep the animals there and the zone open.

Regarding our definition for wooded grasslands, we see that type 1 and 2 are at the edge of the definition. But as they nearly always include (intensive) fruit production and animal husbandry, they are considered as within our topic of wooded grasslands, although in France itself, they are considered as a kind of forestry.

Type 3: *Paysage autoritaire* (authoritarian landscapes). Here, the landscape is the fruit, at once, the result of its own and of human activity. There, where the landscape is managed and is receiving “help,” for its proper development, e.g., in the Jura Massif, it is determined for and by mankind: cutting and zoning (and protection) of the natural areas, clearings, etc.

The described systems, especially type 2, are of growing importance, developed by and with means of the public authorities. But the system depends completely on the financial support of the “Conseil Général” (CG).<sup>3</sup> The management is constantly developing, and among others there is research and consultancy done by CERPAM,<sup>4</sup> a research center in the department of the Mediterranean Alps. There are contracts with the animal producers. The national forest office (ONF) is one of the main important partners. Agro-sylvo-pastoralism is seen as *the* regional tool against the forest fires. It increases the worth and value of soil and regional products as it is the tool for forest fires prevention. Therefore, agro-sylvo-pastoralism can be considered having a double use. The system sets in relation to several agricultural activities: forestry, soil production and orchards, renewal of agricultural activities on former agricultural land (olive- and oil-production, truffle-, wine- and chestnut production, and others), alpine and pasture farming (sheep, goats), and crop production.

Only a few people know about the agro-sylvo-pastoralism in the Var region. But the CG communicates toward the inhabitants about the risks of fire and the measures that have been put in place. Other countries have taken notice of the program and are interested. Based on the Var experiences, a common Mediterranean project within the cadre of the European INCENDI program has been developed.

#### 4.5.1.3 Germany

Local name: Streuobstwiese (national), regional: Bongert, Bitz

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<sup>3</sup>This means the administration of a department, France has 101 departments.

<sup>4</sup>Centre d'études et de réalisations pastorales Alpes Méditerranée (CERPAM).

Wooded grasslands are very well known in Germany since the prehistory times, as already Stone Age people have used the fruits in order to enrich their nutrition. Planned or maintained, wooded grasslands are also very old. There are several records and examples for promotion by the Cistercian monks in the thirteenth century. New influences and cultivars have been (re-)introduced by the Huguenots in the sixteenth to seventeenth centuries. From the eighteenth to nineteenth centuries, Prussian kings promoted the planting of fruit trees by law (Kruse 1999).

There are several German names used to denominate wooded grasslands; however, “Streuobstwiese” or “Obstwiese” are the most frequent in comparison with regional names like “Obstgarten,” “Bitz,” or “Bongert.” The meaning of these names is meadow with fruits or simply fruit garden. The Streuobstwiese has a high importance, ecologically and for regional identity and is very well known. Nevertheless, there is an important decrease in its extent since the 1950s because of the industrialization of farming. A second reason for the loss of Streuobstwiesen is their location at the fringe of rural settlements, a favored place for the development of new residential estates. As many rural settlements, especially in Western Germany, have been growing massively since the 1950s, many Streuobstwiesen have been cut down for new building land.

In Germany there are many initiatives—local, regional, national—in order to protect and to reinvest in Streuobstwiesen. One aim is to keep or to re-plant high standard trees (instead of low or half standard trees), because they have a many times higher ecological value and meaning. There are many different cultivars and types. In order to keep this knowledge and also the seeds, a garden was created with public financial support by DBU (German Federal Environmental Federation), where traditional, regional sorts are cultivated, including a seedbank.

The common appearance is:

1. A mixed use of fruit productions and grass, haymaking, and/or pasturing (Fig. 4.2), often combined with beekeeping or extensive pony or cattle rising.
2. Grazed land, wet, close to floating water: Ash tree, wych elm, aspen, goat willow, small-leaved lime, oak, and birch: Trees often in a row/line.
3. Very little “forests” (*Gehölz*) within (in the middle) of grazed land: different species, often combined with wild fruit trees, with or without water in the middle.

In the later two types the fruits are normally not harvested. They are anyway at the edge of our definition.

*Streuobstwiesen* are endangered in Germany. This fact is well recognized. They are listed in the Red List of Biotope types of the German Ministry for Nature Conservation. Also, in several federal states, they are listed as a protected biotope, e.g., Saxony. At the same time, the recognition of their cultural, aesthetical (Fig. 4.3), and last but not least ecological values is very high, though is the awareness.

There are many protections and maintenance programs, but also successful and well-known social (regional) events (Fig. 4.4), brands, and marketing (see paragraph on “use of the wooded grasslands today”).



**Fig. 4.2** Pasturing of cherry orchard meadows in the Swabian Alb, Germany, June 2010 (*Photo Huber S.*)



**Fig. 4.3** Spring aspect of “Streuobstwiese” with flowering apple trees, April 2011 (*Photo Habeck J.*)

#### 4.5.1.4 Hungary

Hungarian name: fás legelő.

Wooded grassland habitat complexes were dominant management types across centuries known from the medieval times in Hungary (Bartha 2003; Szabó 2005; Varga and Bölöni 2009). In Hungary, we can state that wooded grasslands are recognized as wooded pastures and wooded meadows (Bölöni et al. 2008). Their maintenance is basic part of the traditional ecological knowledge (Varga and Molnár 2014). Because of abandonment derived from the change of agricultural

**Fig. 4.4** Teaching how to prune fruit trees on wooded grasslands as a mean of conservation, February 2008  
(Photo Habeck J.)



structure—mostly 50’–80’ in Hungary—and regulation (Saláta et al. 2009) the wooded pastures are in the 8th most endangered woody, semi-natural habitats (Molnár et al. 2008); moreover, no more than 5500 ha left from them (Bölöni et al. 2008). The abandonment is followed by large-scale reshuffling and self-reforestation (Szabó et al. 2007; Varga and Bölöni 2009, 2011; Varga et al. 2014). Still existing wooded grasslands are recognized as important landscape and nature conservation values (Márkus 1993; Haraszthy et al. 1997; Saláta et al. 2011; Vityi and Varga 2014). There are several conservation areas dedicated to wooded pastures (Varga et al. 2014). One of them is the Hollókő Landscape Protection District, a “UNESCO World Heritage Site” (Fig. 4.5), where the wooded pasture is part of the world heritage site as the surrounding of the village, bearing an important landscape value (Harmos 2013).

#### 4.5.1.5 Italy

Italian name: pascolo arborato, local names: salti, difese.

Wooded grasslands are widely used as wooded pastures in Italy. These can usually be found in areas with difficult climatic conditions and poor soils, where



**Fig. 4.5** Wooded grassland near by the castle of Hollókő after renovation of the abandoned wooded pasture (some of the trees were cut in order to create the state of the former look of the pasture, regardless the fact that there is no grazing on the area at the time of writing, 2014) (Photo Centeri Cs., 2013)

other cultivation is not possible. The first information about Italian wooded pastures date back to the sixteenth century, when these land uses were listed in some maps of central Apennines where there was a pastoral system based on grazing and on the leaves coming from the pollarding of the trees that grew on the pastures (Afan De Rivera 1842; Moreno and Poggi 1995; Palumbo 1912; Tondi 1821; Zanzi Sulli and Di Pasquale 1993). These pastures have an anthropic origin, related to the historical and economic situation of the local people that modified the surrounding environment to obtain services and food. They had few economic resources and so they created systems that were able to provide all the goods they needed, such as food, pastures for the animals, firewood, and fruits. These agro-sylvo-pastoral systems were ecologically and energetically sustainable. Due to the various climatic and geographic situations that can be found in Italy, different kinds of wooded pastures can be found throughout the country.

*Trentino Alto Adige:* In the Alps of Trentino, Alto Adige can be found one of the biggest wooded pastures with larches of Europe, in a place called Salten. This word comes from the Latin word *saltus*, used for describing a landscape characterized by open spaces with trees used for grazing in the middle of large woodlands. The fact that the name of this place reminds to such a Latin word means that this landscape dates back to 2000 years ago (Biasi 2010).

*Tuscany:* In the Tuscan Cadastral Registry of 1832, a lot of woods were classified as pasture woods, representing the 45 % of all the land used for grazing in the mountainous areas. Since the beginning of the twentieth century, the 90 % of the woods of Tuscany were regularly grazed, and they supported up to 50 % of the livestock of the farms (Pontecorvo 1933). In the 14 areas surveyed for the Tuscan landscape monitoring system, wooded pastures, due to the abandonment of

traditional activities, decreased by 88 % in the period 1832–2002. Most of the wooded pastures investigated (67 %) have been covered by shrubs and trees and became woodlands after they were no longer grazed, while 25 % were turned into cultivations. Traditionally, the trees founded on wooded pastures were oaks, pollarded at 2–3 m from the ground. This way of managing the trees allowed to keep the animals on the pastures, as they could not reach the new branches and leaves with their bite. The trees provided firewood, leaves, and acorns for the pigs that grazed on the pasture (De Ricci 1830; Merendi 1957; Pavari 1930), and they were about 8–10 m apart from each other so the ground could receive enough light from the sun (Gabbrielli 1980; Iacini 1801). This management system was already known among the ancient romans, as *silva fructifera* or *silva glandaria*, and it was also cited by Cato the Elder in 53 B.C. in his *De Agricultura* as the most important way to increase the benefits for a farm (Biblioteca degli scrittori latini 1846). Usually, these pastures were very common until the beginning of the twentieth century in different areas of Tuscany, but the average surface was small (Brilli 1992; Pavari 1934). The density of the trees was between 50 and 170 trees per hectare (Oliva 1924). Every year one or two plants per hectare were cut, chosen among those trees that showed signs of decline and lower acorns production (Del Noce 1849). The lack of natural renovation was remedied with the seeding; the new plants were usually protected from the livestock bite by shrubs with thorns (Gautieri 1813).

*Liguria*: In the Ligurian Apennines between the eighteenth and nineteenth centuries local communities used a 12-year cycle, where wooded pastures with grey Alder (*Alnus incana*) and other species were alternated to cultivations, in mountainous areas with very poor soils (Bertolotto and Cevasco 2000; Moreno 1990). First, the grey alders on the pastures were coppiced and some of them used as firewood by the local people. Then the remaining wood was burned on the pasture and the ashes were dispersed on the ground to fertilize it; the fire, covered by soil to protect the trees, was also used for clearing the ground from shrubs. The land was then cultivated for 2–5 years, while the alders grew, and finally, when the alders were grown enough and resistant against game animals, sheep and goats were allowed to graze.

*Central-southern Apennines*: In Abruzzo the *difese* were the wooded pastures on public lands used by the local population for breeding or for collecting firewood and acorns. Traditionally, the trees on the pastures were pollarded at 2.5–3 m for keeping new branches and leaves apart from the bite of the animals.

*Sardinia*: The *salti* of Sardinia were wooded pastures for public use. The Latin word *saltus* comes from the word used for “gap.” In fact it was used for open spaces used for grazing, in the middle of woods (Di Berenger 1859–1863). Since ancient times, the lands that legally belonged to the villages and that where close to it were used as agricultural areas (called *vidazzone*) or for the grazing of domestic livestock (called *paberile*). The public lands far from the villages were called *saltus*, and were used for the grazing of cattle or pigs and for collecting firewood (Beccu 2000), with the grazing that was allowed only when the acorns were on the ground (Alias et al. 2008; Beccu 2000).

*Sicily*: The wooded pastures in the Ragusa Province date back to the fourteenth century, when the lands of the *latifundio* were divided among the farmers. One of the main features of these wooded pastures is that there are circular dry stone walls surrounding the carob trees for protecting them from the animals (Fig. 4.6). Other dry stone walls are used for dividing the pastures. The trees are mainly used for the carob fruit as food for the cattle and for providing shade during the hot summer months.

Overall, the surface covered by wooded pastures in Italy has decreased during the last 150 years, mainly because of land abandonment. These land uses, in fact, were usually found in mountainous areas or in places with harsh climatic conditions and poor soils, and thus were the first places to be abandoned by local population after the World War II. The abandonment of pastures caused the increase of the forest areas and a loss of biodiversity at the landscape scale. Even if there are no specific statistics on this land use, pastures in Italy decreased from 6,113,000 to 3,346,951 ha in the period 1861–2010.

#### 4.5.1.6 Norway

Norwegian name: *hagemark* (with reservations (only certain pastures): *beiteskog*, *skogsbeite*, *innmarksbeite*).

The most typical wooded grassland in Norway is the so-called “hagemark (skog)” (Fig. 4.7). This term is used for grassland with scattered trees and, sometimes, bushes. “Hagemark” tends to be more open than simply grazed forest, although there is no well-defined threshold to separate the two. “Hagemark” can be divided into different types according to its use (e.g., grazed gardens, hay meadows with trees). “Hagemark” is located close to farms, where forests have been used for grazing and for production of firewood and timber. An important component of “hagemark” is pollarded trees whose tops and branches have been cut to provide fodder for domestic animals or for tanning. Ash trees, wych elm, aspen, goat



**Fig. 4.6** Wooded pasture with carob trees in Sicily, Italy (Photo Agnoletti M.)

**Fig. 4.7** “Hagemarkskog” in Norway (Photo Hofsten J. / NIBIO, August 2008)



willow, small-leaved lime, oak, and birch are the tree species that are most often dominant in this landscape type (Direktoratet for naturforvaltning 2007; Hauge and Austad 1999; Rekdal and Larsson 2005; Skog og landskap 2012).

It is assumed that forests have been used for grazing since the beginning of agricultural land use in the Stone Age, but at least for 2000 years. Forests have also been utilized for hunting, firewood, timber, and production of tar and charcoal. The forests' function as grazing areas for domestic animals has probably been the most important one, at least until the start of coal mining in the 1500–1600s. Grazed forests have decreased or disappeared locally because of the increase of timber production, but have been common at least until World War II. Forests were used as grazing areas mainly during spring and autumn, whereas alpine pastures have been used in the summer months. Besides the development from forests through high grazing pressure, wooded pastures in Norway may also have developed from grasslands and meadows, whose use has changed from, for instance, hay production to grazing purposes (Hauge and Austad 1999; Kielland-Lund 1999; Kvamme 1999).

Wooded pastures occur in areas with animal husbandry where environmental conditions allow the growth of trees, and with vegetation that is of grazing value. They are not restricted to certain altitudes, neither to a specific substrate, slope, or aspect. The link between wooded pastures and certain environmental conditions is rather indirect. Their occurrence depends more directly on habitats comprising vegetation with high grazing potential, whose distribution is controlled by environmental conditions. Nutrient-rich and productive habitats with scattered trees are areas of high potential for grazing (Frislid 1999; Losvik and Hjelle n.d. b; Skog og landskap 2012).

Forests have historically been used for grazing by all kinds of domestic animals (sheep, goats, cattle, pigs, and horses). Today, sheep grazing dominates, changing the combined grazing by several grazer species to more selective grazing. As for cattle grazing, the trend today is that only young animals are out for grazing, whereas other cattle are kept indoors for milk production. Wooded pastures have decreased over time as farms have been abandoned, with regrowth of shrubs and trees as a consequence. This is due to changes in land-use policies and economy.



For instance, small farms with sheep have increasingly become abandoned, whereas bigger farms have increased livestock numbers and, hence, grazing intensity (Frislid 1999; Kielland-Lund 1999).

Wooded grasslands are historically often connected with small storage barns. Storage close to the area of fodder collection saved time during the short and busy summer, and transport back to the farm which might have even been easier in the snowy winter months, when sledges could be used. More recently, abandoned outfields in the vicinity of infields and abandoned hay meadows have increasingly been used as pastures, especially for cattle. This is due to government regulations stipulating that farm animals must be outdoors during the summer months. Locally, implementing new and modern technology may maintain or increase grazing. This applies to areas where the use of newer, larger machines is not practicable, such as steep slopes or dense forests. Grazing animals may make use of areas that are not accessible for mechanical operations (Losvik and Hjelle n.d. a).

Wooded pastures are important for different reasons, including both economic (e.g., milk and meat production) and ecological (e.g., specific biodiversity of endangered species) (Direktoratet for naturforvaltning 2007). They also have a high value as a semi-natural system that contributes to better health and welfare of domestic animals (e.g., exercise, fresh air, variation in forage plants), which may also be reflected in better quality of meat and milk (Sickel 2009). Moreover, open forests with scattered trees have an aesthetical and nostalgic value that is closely connected to pre-industrial farming (Skog og landskap 2012). They are depicted in paintings and photographs, although this may be due to their occurrence close to alpine summer farms, which play an important role in Norwegian history, rather than due to the interest of the painter for the particular landscape type. Nevertheless, wooded grasslands are rather little known by the general public compared with other landscapes.

#### 4.5.1.7 The Netherlands

Dutch name: hoogstamboomgaarden and bosweide (relict)

The only type of wood pasture that still exists in the Netherlands is traditional orchards (*hoogstamboomgaarden*, with high trees), particularly in two regions (the riverine region and south Limburg). During the last half century, most of these orchards have been replaced by large-scale orchards, dominated by low fruit trees and no longer grazed. Remains of the old orchards are preserved by local initiatives, often with government grants.

Other systems of wood pasture (*bosweide*) have all but disappeared. However, since the 1980s, a number of ecologists claim that landscapes that are half-open by the effects of grazing animals are in fact the original natural landscapes. Therefore, such landscapes have been reintroduced. In practice, they need intensive management, proving their character as man-made landscapes.

#### 4.5.1.8 Slovakia

Slovakian name: pasienkový les (grazing forest)

Grass-covered mosaics originally tended toward mixed system. We can distinguish two types of the grass-covered mosaics:

- Grass-covered former mosaics of arable lands, grasslands, orchards (sometimes vineyards) with or without balks, with or without fruit trees on balks. They occur in areas of dispersed settlements (mostly without balks in hilly country of moderate relief) or in highlands of steeper relief, mostly with various balks (terraces, mounds, heaps, etc.). From the natural condition point of view, they were uninteresting for intensive cultivation by socialistic cooperative farms. From the biodiversity viewpoint, its focuses are on the balks (many species of invertebrates and vertebrates, vegetation—besides herbs and greens, there are rosa, blackthorn, juniper, spruce, fir, beech, hawthorn, oak, hornbeam, etc., from the fruit trees there are cherry woods, apple trees, pear, nut trees, plum trees, raspberry, etc.) as well as on the grasses arable land.
- Grass-covered former mosaics of arable lands and grasslands with balks (terraces, mounds, heaps, etc.). They occur in mountain areas of higher altitude and steeper relief. The orchards and the fruit trees on the balks have not been found because of unsuitable climatic conditions.

Further wooded grasslands can be found on today abandoned former more intense utilized grasslands (meadows, pastures). They were originally intensively utilized large block grasslands used as meadows or pasture. From the wooded vegetation, there are individuals or groups of rosa, blackthorn, juniper, beech, spruce, fir, hawthorn, oak, hornbeam, etc. Here too, it is possible to distinguish two types:

- Wooded grasslands as a result of recultivation of former mosaics. They originated in socialism time as in mountain areas in moderate natural condition suitable for heavy agricultural machinery and cultivated by cooperative farms. After 1990 due to changes of political and economic systems, many of them were abandoned or less utilized. From the biodiversity point of view, they are poorer compared with grass-covered mosaics or residue of original grasslands (next type).
- Wooded grasslands as residua of original traditional meadows and pastures. They occur in highlands and they are situated above mosaics or arable lands as part of closed agricultural system in the past. Their biodiversity is high because of long-time cultivation as grasslands.

They exist mostly in highlands up to higher altitude (about 1000 m and more) generally on poor soil conditions (more stony and shallower cambisols, rankers, and rendzinas), steeper slopes, climate of longer winter with snow, less sunny days, and more rainfalls. Because Slovakia is a country of very heterogeneous substratum and relief conditions, it is difficult to state natural conditions more specifically at this stage.

**Fig. 4.8** Wooded grassland (*dehesa*) in Spain (Photo Cañas I.)



Within original meadows and pastures we can find log hay barns. Parts of some grassed mosaics are isolated groups of traditional residence and farm buildings within dispersed settlements as well as isolated stone cellars and log cellars for agricultural products storage, coming from the period of existence of arable land, and old country roads with traditional crosses and chapels can be found within grassed mosaics.

Some areas of grassed mosaics with sheep grazing are typical for the production of special sheep cheese *bryndza*, of the drink *žinčica* and production of wood products from pastoral tradition: *valaška* (small wood axe), *črpák* (wood pot for drinking), etc.

#### 4.5.1.9 Spain

Spanish name: *dehesa* (Ferrer et al. 1997).

*Dehesa* (Fig. 4.8), the most extensive wood pastures in Mediterranean Europe (Marañón and Ojeda 1998), is a traditional agro-forestry system that simultaneously has extensive (or semi-extensive) livestock grazing, forestry, and even agricultural production, maintaining high values of biodiversity (García Tejero et al. 2013). The tree component is made of different oak species: cork oak (*Q. suber*), holm oak (*Q. ilex*), quejigo oak (*Quercus canariensis*), melojo oak (*Quercus pyrenaica*), etc. Shrub pasture and orchards pasture are also very common, as a consequence of the human transformation of Mediterranean forests in Spain (López-Pintor et al. 2006). The *dehesa* is derived from progressive thinning-out of the Mediterranean forest ecosystem, and it is a traditional management practiced over centuries (Marañón and Ojeda 1998). The *dehesa* has important social and economic values in Spain, and plays an important role in maintaining rural population levels.<sup>5</sup>

<sup>5</sup><http://sigpac.mapa.es/fega/visor/>.

#### 4.5.1.10 United Kingdom

In the United Kingdom, wooded grasslands exist since many centuries, and they played an important role in the life of farmers and thus in the formation of the landscape in the countryside (Hooke 2012, 2013). We can consider wood pasture as an ancient system of management that developed as a multifunctional landscape in a period when woodland was plentiful and where there was very little need for formal coppice. The latter is a very intensive and well-managed system, intended to provide vital supplies of timber in a resource-limited landscape. Due to the decrease of the traditional use of these landscapes, between the nineteenth and twentieth centuries, they have gone through major changes regarding the structure of the trees and the overall appearance. Usually, in the wood pastures and in the Royal forests, the cover of the tree has increased, as a consequence of the decrease of the ungulates and of the cattle. Nowadays, their importance is mainly linked to the presence of monumental trees.

#### 4.5.2 *Types and Subtypes of Wooded Grasslands*

Using information compiled from the literature review, the questionnaire analyses, and the EUCALAND workshops, we can conclude that there is a huge variety of subtypes of man-made wooded grasslands. Some examples where land use and plant species determine the cultural value of these subtypes are (related cultural background, traditional knowledge, etc. are different and determinative for the type and subtype):

1. Wooded pasture: grassland with trees, established predominantly for grazing. Different subtypes exist where the physical appearance and the cultural value differ by the animal grazed on the pasture:
  - 1a: cattle;
  - 1b: sheep;
  - 1c: horse;
  - 1d: goat;
  - 1e: pig, etc. (e.g., mix of sheep and goat).
2. Wooded meadow: grassland with trees, established predominantly for hay cutting/forage production. Here any kind of tree appears, according to region, location, biogeographical preconditions. It can be fruit trees for human use or for animal use only (Bargioni 1998).
3. Wooded grassland with “(mixed) fruit trees”: wooded grassland, established predominantly for fruit production (can be used for grazing and/or hay cutting, too). Certain subtypes exist determined by the tree species used:
  - 3a: mixed fruit trees (e.g., apple, pear, plum, peach, etc.)—this is an extensive production type;

3b: mono fruit tree production (more intensive, less extensive but no plantation), grasslands with:

3ba: olive trees;

3bb: oak trees (cork oak, holm oak, turkey oak, pubescent oak, etc.);

3bc: chestnut;

3bd: walnut.

3c: other trees (e.g., Robinia groves in Slovakia were described by Šikrová-Bodnárová 1954).

All of these are cultural landscapes with a long history of human influence.

### 4.5.3 *Common Cultural Values of Wooded Grasslands of Europe*

Based on the research conducted so far, we can conclude that the main common cultural value of the wooded grasslands of Europe is the traditional knowledge related to these wooded grasslands, formulated over centuries, taught by a chain of local people in time (verbal communication between former and later land users, farmers, shepherds, etc.). This knowledge is the common umbrella over the physical appearance of cultural values, such as buildings (e.g., buildings for animal husbandry (Fig. 4.9), buildings for shepherds, etc.) and man-made artifacts (including stone walls to protect a single tree and the soil around its trunk in a harsh environment, clothing, tools, cooking facilities, traditional food and drink, etc.).



**Fig. 4.9** Wooded grassland with protection stone walls and wooden gate for controlling animal movement, Hydra Island, Greece, 2013 (Photo Centeri Cs.)

#### ***4.5.4 Identification of the Threats that Wooded Grasslands Are Facing***

The biggest threat to systems of combined land use is, on one side, the growing specialization in agriculture (Bergmeier et al. 2010) and, on the other side, the abandonment of traditional practices linked to animal husbandry.

The survival of the wooded grasslands greatly depends on the land users and on policy makers. Since wooded grasslands include grassy areas, their mowing or grazing is vital. Being extensive in most of the cases, management mostly includes handmade grass cutting or requires a shepherd for animal husbandry. These management activities are not really inviting in recent days.

### **4.6 Discussion**

A well-organized subsidy system might help in motivating local people. It is extremely important to include locals in the maintenance. They have to be involved, otherwise they will not feel its importance, and the sustainable management of the wooded grasslands will be neglected after subsidy is ceased. If it is important to save these landscape types, land users have to be convinced that it is good for them and this kind of understanding has to be economical as well.

The evolution of human-induced extensive landscape types—like wooded grasslands—is a good example of people living in cooperation with nature, using the best practice to gain products from the land. A man-made extensive—low input—landscape type is normally following the given natural conditions, taking away as many resources from nature as is sustainable. This is one of the greatest messages of wooded grasslands, be they used only for pasture where single tree mainly provides shade during summertime, or also for other productions, such as fruit trees, olive, cork oak, etc. The evolution of a given landscape type is a learning process of local people. They learn how to use their land the best practical way to produce meat, fruits, forage, and other goods.

The evolution of wooded grasslands is variable, depending on the local geographical conditions and on the cultural background of the people creating them. People's understanding of the wooded grasslands is often contradictory. Some people, particularly those who are mapping them (e.g., botanists), know exactly what they are, while others do not even call them wooded, regardless of the visible trees, because there have always been trees in these places where a given land user (e.g., shepherd) has worked (cit. personal communication with Hungarian shepherds).

All landscape types are continuously evolving (Bender and Winer 2001) and wooded grasslands do as well. This is the reason of their vulnerability. Their evolution is open-ended so their presence is volatile (Bender and Winer 2001).

Future development of wooded grassland is complicated because they are all labor-intensive land uses, invented to achieve risk minimization by diversification of cultivation. Thus the discussion of its functions and meaning may become an important part of resilience discourse, especially regarding:

- Social aspects: voluntary landscape management, social work programs, young farmers programs;
- Sustainable food planning: local food, slow-food, farm-to-table movement, community engagement in food production;
- CAP: subsidy distribution.

Cultural values of agricultural landscapes are rooted in agricultural production, evolved as part of land management by people living in a specific area, and in an optimal process a climax can be reached where people find a way to live in symbiosis with their land.

Reaching this stage means sustainable use of natural resources that is economically viable, while at the same time people take good care of the land and do not create overuse. This sustainable and economically viable land use is already an important message for the present-day human society, suffering from unemployment, lost identity, uncertain future, etc.

Extensive landscapes are multifunctional landscapes where coexistence and integration of different uses and ecosystem services allow the balance between human activities and nature, and thus the sustainability of the socioecological landscape system.

Wooded grasslands are cultural landscapes whose existence is guaranteed by the perpetuation of managing human activity according to traditional techniques which allow land users living in harmony with the environment and preserving the identity of the people. The persistence of these landscapes will measure how alive are relationship between community and its own territory, and how alive are their sense of belonging.

The existence of categories of wooded grasslands around Europe described by a series of specific subtypes at local level shows how the diversity imposed by environmental and geographical constraints found in the way of resource utilization by humans an expression of the common cultural heritage for European communities.

## 4.7 Added Values of Wooded Grasslands

Wooded grasslands have faced a lot of attention from various aspects, e.g., biodiversity protection (Rackham 2000), provision of ecosystem services, socio-economic aspects, tourism, and agricultural added values (Hæggeström 1998).

One of the major concerns is related to nature conservation (e.g., some of the wooded grasslands are part of the Hungarian national nature conservation area system which means that their value has been recognized by the Hungarian authorities). In Germany they are listed among the landscapes which have to be protected (by law).<sup>6</sup> Nature conservation value of wooded grasslands is also mentioned in connection with high natural value (HNV) areas, where Iberian wooded grasslands are cited to have 135 plant species on a square meter compared with as few as one or two plant species on intensively managed grasslands.<sup>7</sup>

Specific landscape types with specific purpose, history, biodiversity, nature conservation value, and economical importance have evolved over time, thanks to the human activities. Landscape diversity, also appreciated by ELC, faces similar global threats (climate change, globalization of agriculture, and others).

## 4.8 Conclusions

We can state that wooded grasslands played in Europe in former times a more important role in many local landscapes than they play nowadays. Many sources prove that they have already a long history, with summit of their importance in the nineteenth and first 60–70 years of the twentieth centuries. Based on the literature review and the questionnaires, we can state that wooded grasslands are in use in the largest extent in Southern Spain.

Wooded grasslands throughout Europe face similar problems (decline, abandonment) regardless of their location, origin, situation, and subtypes. As they have common, typical problem, a comparable approach by policy, planning, and decision-makers has to be applied. Their exact coverage in Europe is not known and thus the risk of losing them, along with their cultural, biological, and agricultural values, is increasing. Mapping—at least the most valuable ones (mapping of hot-spots)—is needed in order to provide information about their presence for those who want to save them. There are different types and subtypes of wooded grasslands and their comparability and cultural heritage values have not been sufficiently discussed and investigated from a Pan-European point of view. Local studies and studies about single subtypes do exist. However, outlook and research are desirable.

Wooded grasslands can only be protected if they remain in use. Based on the discussions with experts, local people, scientists, and the examined questionnaires, we can state that single, short-time efforts for their renovation are not enough for their long-term preservation.

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<sup>6</sup>[http://www.bfn.de/0311\\_schutzw\\_landsch.html](http://www.bfn.de/0311_schutzw_landsch.html).

<sup>7</sup>[http://www.birdlife.org/eu/pdfs/HNV\\_Policy\\_document\\_proof6\\_010910.pdf](http://www.birdlife.org/eu/pdfs/HNV_Policy_document_proof6_010910.pdf).



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