



**CULTURE AND NATURE: THE EUROPEAN HERITAGE OF  
SHEEP FARMING AND PASTORAL LIFE**

**RESEARCH THEME: LANDSCAPE AND SHEEP**

**RESEARCH REPORT FOR ESTONIA**

**By Argo Peepson**

**Estonian University of Life Sciences**

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[www.emu.ee](http://www.emu.ee)

## **Introduction**

Written data about the sheep bred in the territory of today's Estonia date back to 1794. The author W. Friebe described the sheep kept in the Baltics and his description corresponds to the characteristics of the Estonian native sheep. Estonian native sheep are deemed to be sheep of Estonian origin, who match the historical description up to acknowledging it as an indigenous breed and have features characteristic of the indigenous breeds of our neighbouring countries located by the Baltic Sea (Eesti maalammas, 2011). The sheep is completely adapted to the rough climate and unfavourable farming conditions of Estonia (Mauring, 1979). The traces of the native sheep vanish in the mid-20<sup>th</sup> century, when farmers wanted to breed animals with better productivity. Since 1926, specific breeds began to be imported with the aim of breeding new ones. But before two certain breeding directions developed in the favour of the local breeds of sheep kept for their meat and wool, fine wool sheep (Merino sheep) and imported meat sheep breeds were raised on the initiative of manor owners. Because of that, the 1<sup>st</sup> half of the 19<sup>th</sup> century is referred to as the period of fine wool sheep, while the 2<sup>nd</sup> half is referred to as the period of meat sheep. The Estonian Blackhead sheep and the Estonian Whitehead sheep belong to the 2<sup>nd</sup> period (Tänavaots, 2011).

## **History of sheep farming**

Currently, sheep are being farmed in Estonia on a smaller scale than cattle and pigs. However, in the 19<sup>th</sup> century and in the 1<sup>st</sup> half of the 20<sup>th</sup> century, sheep farming played a noticeably greater role. The natural conditions of Estonia are favourable in terms of sheep farming, as there is enough suitable grassland.

Among other things, sheep farming has been and is even today an extremely significant part of forming and maintaining landscapes, as generally, sheep farming means extensive managing, where sheep are kept out on the pastures most of the time (or even throughout the year). In addition to grazing on a grassland, sheep have traditionally been given hay and leaf bundles made of bushes and tree twigs in the winter. In modern times, they are also given silage.

## **Area of agricultural land grazed by sheep, proportion of total agricultural land**

Grassland can be divided into:

- 1) semi-natural communities or heritage communities and
- 2) cultural communities or cultural grasslands.

Seeing that the terms are defined differently in various databases (PRIA, Statistics Estonia), the bases for presenting data differ and in places, more accurate data is lacking altogether, then in the following overview of grasslands it is impossible to separately indicate the area of cultural grasslands or the areas of semi-natural communities used to graze sheep.

A general overview of grasslands as a whole is provided, as is its percentage of agricultural land, its distribution by counties etc. In the case of semi-natural communities, general data on separate communities is also given. In addition, information related to maintaining semi-natural communities is provided; among other things, this also concerns grazing.

The *permanent grassland* (grassland excluded from crop rotation for 5 or more years) used in PRIA's data includes both natural and cultural grasslands. Additionally, grassland can be established on agricultural land, and it may be possible to graze animals there, for example. However, if grasslands like these are older than 5 years, they are taken to be agricultural land, not grassland. In addition to the aforementioned, the data of PRIA and Statistics Estonia also fail to overlap within the same term, as PRIA only considers land entered into PRIA's register, while Statistics Estonia takes total land use into account.

About half of the areas viewed as natural grasslands are semi-natural communities. The other half is made up of former cultural grasslands and fields or areas growing over with forests (Kukk, 2010). Thus, the term *natural grassland* certainly cannot be used synonymously with the term *semi-natural community*. *Semi-natural communities* are traditionally managed (mowed or grazed) bare meadows or (wooded) meadows with a tree and bush cover.

### **Permanent grassland and cultural grassland**

Until the middle of the previous century, animal feed was mainly gathered from semi-natural grasslands (PMM, 2011a). In connection with increased farming of dairy cattle, a shortage of feed started developing. Due to that reason, in the 1930s farmers began to intensively establish cultural grasslands. Often, grasslands were created in the former sites of traditional semi-natural communities (Kukk, 2010). Establishing cultural grasslands gained even more momentum after World War II in connection to the general Soviet-time intensification of agriculture, accompanied by extensive land improvement. Frequently, this resulted in the destruction of old traditional pasture fences and stone walls. In modern times, cultural grasslands are widely used in sheep farming – both for grazing and producing feed –

especially in mainland Estonia, where the area under semi-natural and natural grasslands is smaller.

According to the data of Statistics Estonia (2007), permanent grasslands<sup>1</sup> made up 30.1% of all agricultural land, while arable land made up 69.1% (Table 1). The percentage of unutilised agricultural land has been decreasing constantly – in 2001, it was 8.5% of all agricultural land; and in 2007, only 3.5% (Table 1).

**Table 1. The distribution and percentages of agricultural land in Estonia, 2001–2007**

	<b>Total agricultural land, ha</b>	<b>Arable land, ha</b>	<b>%</b>	<b>Permanent grassland, ha</b>	<b>%</b>	<b>Unutilised agricultural land, ha</b>	<b>%</b>
<b>2001</b>	871,213	591,910	67.9	264,068	30.3	73,961	8.5
<b>2003</b>	795,640	535,554	67.3	250,396	31.5	60,025	7.5
<b>2005</b>	828,926	584,412	70.5	237,077	28.6	45,647	5.5
<b>2007</b>	906,833	626,947	69.1	273,388	30.1	31,819	3.5

Source: Statistics Estonia

According to the data of PRIA (2010), the area of permanent grasslands is 268,436, which has been increasing constantly over the past few years. In addition, the percentage of permanent grasslands of total agricultural land has increased, reaching 29.9% in the year 2010 (Table 2).

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<sup>1</sup> Statistics Estonia presents that type of land use as “natural (permanent) grassland”.

**Table 2. The area of agricultural land and permanent grasslands in Estonia, 2005–2010**

<b>Year</b>	<b>Total agricultural land, ha</b>	<b>Permanent grassland, ha</b>	<b>Percentage of permanent grassland of total agricultural land</b>
<b>2005</b>	846,556	223,081	26.4
<b>2006</b>	860,375	233,500	27.1
<b>2007</b>	860,803	230,917	26.8
<b>2008</b>	874,223	238,548	27.3
<b>2009</b>	882,061	251,565	28.5
<b>2010</b>	898,161	268,436	29.9

Source: PRIA

Grasslands cover different parts of Estonia quite unevenly. Some 50% of the whole area of grasslands is located in five Estonian counties (Lääne County, Lääne-Viru County, Rapla County, Pärnu County and Saare County), while 11.6% of all permanent grasslands in Estonia are situated in Pärnu County (Table 3).

**Table 3. Area of permanent grassland (ha) and its percentage (%) by counties (2007)**

<b>County</b>	<b>ha</b>	<b>%</b>
<b>Harju</b>	20,168	7.4
<b>Hiiu</b>	6,707	2.5
<b>East Viru</b>	11,230	4.1
<b>Jõgeva</b>	13,680	5.0
<b>Järva</b>	15,335	5.6

<b>Lääne</b>	20,393	7.5
<b>West Viru</b>	24,674	9.0
<b>Põlva</b>	10,370	3.8
<b>Pärnu</b>	31,828	11.6
<b>Rapla</b>	23,406	8.6
<b>Saare</b>	27,742	10.1
<b>Tartu</b>	16,859	6.2
<b>Valga</b>	12,805	4.7
<b>Viljandi</b>	19,540	7.1
<b>Võru</b>	18,650	6.8
<b>TOTAL</b>	<b>273,388</b>	100.0

Source: Statistics Estonia

To a great extent, the counties referred to are the same counties (Lääne, Pärnu and Saare) where the most support has been applied for in connection with the maintenance of semi-natural communities (Table 4). At the same time, the approximate portion of grazing in the area for which maintenance support is applied differs greatly in various counties, remaining between 0 and 90%. In the counties that have applied for more maintenance support of semi-natural communities, grazing is clearly the favoured choice for maintenance. This is explained by the fact that in these counties, the semi-natural communities mainly maintained by grazing (alvars, coastal meadows) make up a large percentage of the area. Read more about the support for the maintenance of semi-natural communities below.

**Table 4. Distribution of support for the maintenance of semi-natural communities by counties and the approximate percentage of grazing on the area maintained with the help of support (%) in 2010**

	<i>%</i>	<b>Approximate percentage of grazing of area maintained with the help of support</b>
HARJU COUNTY	<b>2.6</b>	70
HIIU COUNTY	<b>9.3</b>	90
IDA-VIRU COUNTY	<b>2.6</b>	0
JÕGEVA COUNTY	<b>0.1</b>	0
JÄRVA COUNTY	<b>0.4</b>	58
LÄÄNE COUNTY	<b>29.3</b>	57
LÄÄNE-VIRU COUNTY	<b>1.6</b>	25
PÕLVA COUNTY	<b>0.4</b>	70
PÄRNU COUNTY	<b>10.9</b>	53

RAPLA COUNTY	<b>1.9</b>	49
SAARE COUNTY	<b>27.4</b>	76
TARTU COUNTY	<b>4.9</b>	0
VALGA COUNTY	<b>3.9</b>	23
VILJANDI COUNTY	<b>3.0</b>	30
VÕRU COUNTY	<b>1.8</b>	33
<b>TOTAL</b>	<b>100.0</b>	

Source: on the basis of PMM, 2011b; PMK, 2011

### **Dynamics of sheep population (1900-2010, ten year step)**

**The most sheep** were kept in Estonia in 1922, when **745 thousand** sheep were counted (with the lambs born the same year). For example in 1938/39, 695,000 sheep were counted in Estonia (with the lambs born the same year). In the beginning of the 1990s, there were ca. 140,000 sheep, but the number of sheep left to live beyond the winter at the time is considered to have been around 41,500. The reason for the decrease is deemed to be a drop in the demand for mutton/lamb and wool. Many wool factories had closed their doors and no mutton/lamb could be found in stores. The reason for that lies in the general decline of agriculture prevalent in the 1990s and the low profitability of sheep farming (Tänavaots, 2011). The years 1999–2000 can be considered the greatest low-point (Table 1), when the number of sheep was merely 28.2 thousand. In addition to the ewe rearing premium paid out since 2001, the monetary agricultural aids of the European Union paid out since Estonia’s accession to the European Union have also helped to promote sheep keeping to a great extent. From 2000 to



2008, the number of sheep grew by 2.5 times (Tänavaots, 2010). The number of sheep exceeded the limit of 79,000 as early as in the year 2009.

**Table 1** Population of sheep and the output of sheep farming products in Estonia (population as of January 1)

<u>Year</u>	<u>Number of sheep and goats (thousands)</u>	<u>Number of sheep (thousands)</u>	<u>Sheep's wool produced (t)</u>
1938/1939	695.7*	-	1112.4
1992	142.8	-	311
1993	124.2	123.1	282
1994	83.3	82.2	241
1995	61.5	60.0	174
1996	49.8	48.15	159
1997	39.2	37.6	120
1998	35.6	33.9	82
1999	30.8	28.7	48
2000	30.9	28.2	71
2001	32.2	29.0	65
2002	32.4	28.8	70
2003	33.8	29.9	57
2004	34.3	30.8	82
2005	41.0	38.1	93

2006	52.4	49.6	120
2007	66.0	62.7	155
2008	76.4	72.4	-
2009	84.0	79.6	-

\* Number of sheep with the lambs born the same year as of 01.04

Source: Tänavaoits, 2011

[http://www.eau.ee/~alo/lambad/kasvatus/?Arvukus%2C saaduste tootmine](http://www.eau.ee/~alo/lambad/kasvatus/?Arvukus%2C%20saaduste%20tootmine)

82,842 sheep and 3,315 goats had been entered into the PRIA register as of 02.09.2011.

According to the background study of livestock grazing (2009), nearly 70% of all the grasslands of sheep and goat farmers are made up of natural and long-term grasslands<sup>2</sup>. At the same time, the portion of natural and long-term grasslands was a little below 50% in case of all producers belonging to the target group (see

[http://www.agri.ee/public/juurkataloog/MAAELU/UURINGUD/LOOMADE HEAOLU UU RING.pdf](http://www.agri.ee/public/juurkataloog/MAAELU/UURINGUD/LOOMADE_HEAOLU_UU_RING.pdf)). In the case of organic producers, for example, a greater percentage of natural and long-term grasslands can be expected.

### **Semi-natural communities**

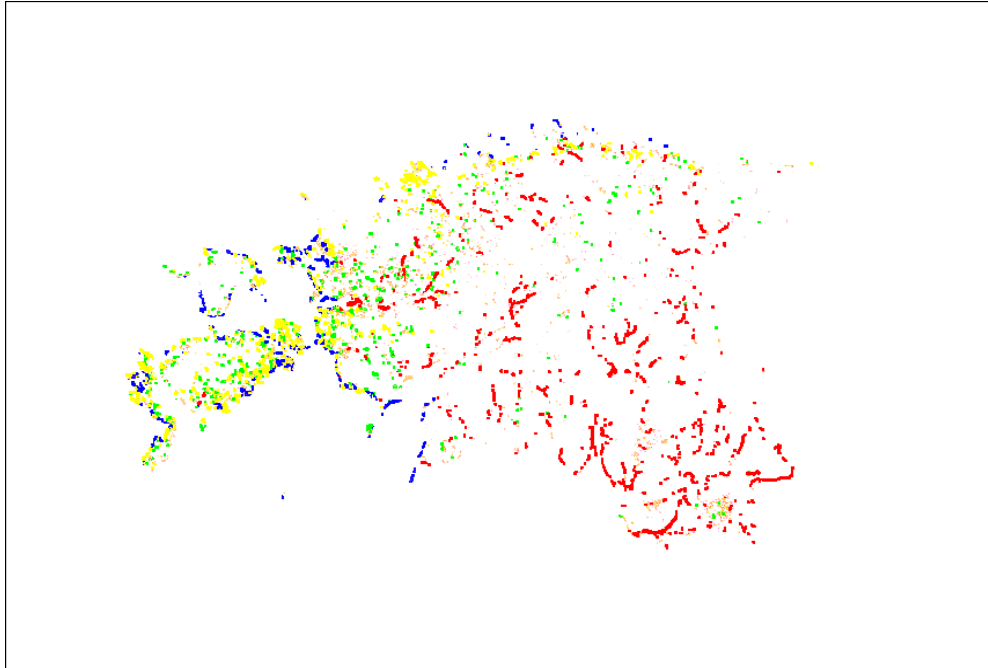
The semi-natural communities or heritage communities formed as a result of permanent mowing or grazing are:

- wooded meadows,
- alvars,
- coastal meadows,
- flooded meadows,
- grasslands on mineral soil,
- paludified meadows,
- wooded pastures

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<sup>2</sup> The specifics of the study were guided by the specifics of the livestock grazing support. Thus, the data presented only includes these stock farmers who were not organic producers, whose herd consisted of at least 2 livestock units and who were in possession of grasslands.

Semi-natural communities are mainly prevalent on coastal areas (Western and Northern Estonia) and on the islands (see Figure 1). Traditionally, the lands there (forests, juniper shrubberies and seaside areas) were unsuitable for agriculture and were used as pastures. The hay required to feed animals in the winter was also gathered from natural meadows (Talvi, 2001).



**Figure 1. Distribution chart of semi-natural communities. Source: Elle Meier, [www.tlu.ee/~emeier/IVA/Niidud.ppt](http://www.tlu.ee/~emeier/IVA/Niidud.ppt), original source PKÜ**

Of these, *alvars*, *coastal meadows* and *wooded pastures* are more important as regards sheep farming and especially grazing. Other types of semi-natural communities were (and are) important for making hay and leafy twig bundles. The following short overview of some semi-natural communities has been provided with the aim of considering their use for sheep grazing.

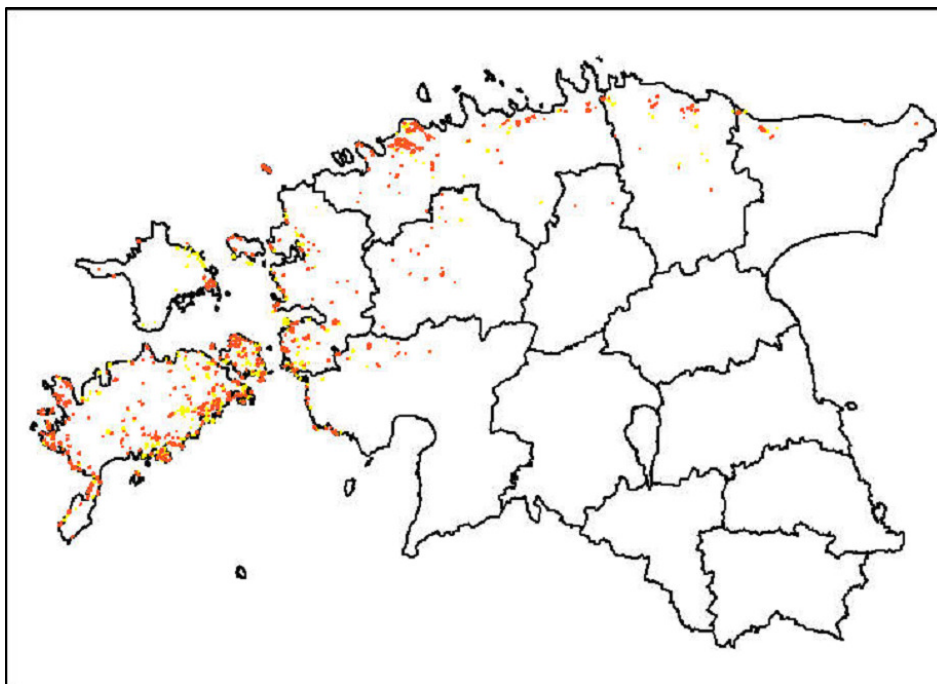
#### *Alvar*

Pavement barrens or calcareous grasslands or alvars are meadow communities prevalent on a base of limestone, on a thin (up to 20 cm) layer of calcareous soil in the woodland belts of the temperate climate zone. As juniper dominates these communities, they are often simply called *juniper shrublands* (Talvi, 2001; Kukk, 2004). According to the nature directive, a juniper

shrubland is still a separate habitat – in Estonia, that mainly means overgrown alvars (Kukk, 2010).

Most alvars have been formed from forests and shrubberies with the help of human activity (predominantly grazing, but also cutting down trees and bushes). Alvars are indeed mainly used to graze sheep, as sheep are not very demanding and manage to feed themselves on the sparse vegetation characteristic of alvars. In addition, sheep trim bushes, which is also important from the point of view of maintaining an alvar. Landscape-wise, alvars as communities are certainly the most typical of Estonian coastal areas and islands.

Alvars occur rather infrequently in the world. Apart from Estonia, other European countries where alvars can be found are Sweden and Russia. Estonian alvars are prevalent in Western and Northern Estonia, and to a lesser extent also in Pärnu and Rapla counties (Figure 2). However, the majority of alvars are situated on Muhu and Saaremaa islands (Kukk, 2004).



**Figure 2. Distribution of alvars. Source: Tsipe Aavik,**  
<http://www.botany.ut.ee/lectures/poollooduslikud1.pdf>

The area of alvars, like other semi-natural communities, has decreased drastically over the past century (from ca. 50,000 ha in the year 1900 to ca. 15,000 ha in 2010), see more in the chapter “Changes in landscape character types associated with sheep farming during the last century”.

The more common plant species growing on an alvar are e.g. sheep’s fescue, meadow oat-grass, meadow saxifrage and reflexed stonecrop (Talvi, 2001), see more in the chapter “Ecological values of landscapes associated with and created or maintained by sheep grazing”.

### *Coastal meadow*

*Coastal meadows*, which are found on coastal areas, are flooded meadows that are influenced by sea. Coastal meadows are one of the oldest semi-natural communities, which were formed when people started to graze animals on areas located by sea. As the main way of managing coastal meadows is grazing, then these communities are also called *coastal pastures* or *coastal grasslands* (Talvi, 2001; KKM, 2005). Towards inland, coastal meadows usually change into alvars, wooded meadows or forests, but sometimes also into fields or pastures.

Coastal meadows are also rare communities. In Europe, they are only found in countries located by the Baltic Sea (in addition to Estonia, also Sweden, Finland and Latvia) (KKM, 2005). In Estonia, coastal meadows are distributed along the coast. The largest of the meadows can be found on Saaremaa and Hiiumaa islands and in Lääne and Pärnu counties. An exceptional abundance of coastal meadows is present in Lääne County, on the territory of Matsalu National Park (Talvi, 2001).

The area of coastal meadows has also decreased considerably. Around the year 1900, their area was an estimated 30-35,000 ha. However, according to the latest data, coastal meadows are now distributed on a mere 18,000 ha (see more in the chapter “Changes in landscape character types associated with sheep farming during the last century”).

The plant species more commonly found on coastal meadows are e.g. sea milkwort, sea plantain and slender spike-rush. In certain places, where the soil is saline, halophilic plants such as the glasswort are also distinctive of coastal meadows (Talvi, 2001, see more in the chapter “Ecological values of landscapes associated with and created or maintained by sheep grazing”).

### *Wooded pasture*

*Wooded pastures*, also called wooded grasslands, are regularly grazed communities with a sparse forest stand (Talvi, 2001). Wooded pastures are similar to (and sometimes overlapping with) wooded meadows, the difference being in the way they are managed. If a community is mowed, it is a wooded meadow; if it is grazed, it is a wooded pasture. Although in reality, cattle often graze on wooded meadows in autumns, and on the other hand, on some years the wooded meadows are not mowed. *Grazed forests*, however, are very similar to wooded pastures – which are especially abundant in Western Estonia and on the islands. They are differentiated from wooded pastures according to the vegetation (wooded pastures are dominated by meadow plants) (Kukk, 2004). Often, former wooded meadows are now grazed (wooded pastures).

The area of wooded pastures has also decreased significantly. In the 1950s, they were estimated to be prevalent on 200,000 ha, but in 2010, they are preserved on only ca. 4,000 ha (see more in the chapter “Changes in landscape character types associated with sheep farming during the last century”).

In case of suitable managing, the biodiversity of wooded pastures is smaller than that of wooded meadows. However, it is still sufficiently varied, especially in connection with the activities of animals – there are plenty of parasitic and manure-dependent species (Talvi, 2001).

Other types of meadows – *wooded meadows*, *flooded meadows*, *grasslands on mineral soil* and *paludified meadows* – have been used in sheep husbandry mainly to gather hay to feed the animals in the winter and make twig bundles. For example, hay from wooded meadows is considered excellent for feeding sheep. Wooded meadows, just like grasslands on mineral soil, have also been grazed after making hay (Talvi, 2001). Paludified meadows are not suitable for grazing sheep, but hay from these meadows can be used for sheep fodder.

## Landscape elements and features connected with sheep husbandry

Several landscape elements are associated with keeping sheep, especially grazing.

Naturally, various *fences* are related to sheep husbandry the most. Different fences made of natural materials (diverse wooden fences, but also stone walls) have traditionally been used in connection with grazing sheep.

Of course, *sheep sheds* are also related to sheep husbandry, as are different *shelters* and other (traditional) objects such as *hay storage barns*, *herding tracks*, *winter tracks*, *grazing wells* and *haystack frames*.

### *Fences*

Traditionally, sheep fences have been made of wood. In turn, there have been different types of wooden sheep fences, depending on the material used for construction and the manner of construction. The following could be highlighted as the more common types of wooden fences:

- roundpole fence,
- split-rail fence,
- rod fence,
- twig fence,
- plank fence,
- stone wall.

In case of a *roundpole fence*, sticks or thicker tree limbs are placed between posts joined up with twigs. The sticks generally come from either fir or pine trees or junipers and are positioned between the posts at an angle.

Photographic example: [http://www.roigasaed.ee/t\\_roigasaed.html](http://www.roigasaed.ee/t_roigasaed.html)

In case of a *split-rail fence*, the material (sticks or poles) between the posts is positioned horizontally. The material is usually identical to the material used for stick fences.

Photographic example: <https://sites.google.com/site/eestimaalmmas/time-tracker/lambaaed>

In case of a *rod fence*, (fir) branches are entwined between horizontal poles. This results in a thick fence. As making such a fence takes a lot of time, is it probably used less in fencing sheep pastures than the other types of enclosures mentioned above.

Photographic example: [http://www.roigasaed.ee/t\\_varbaed.html](http://www.roigasaed.ee/t_varbaed.html)

*Twig fence* is an old type of fence. It is easy to construct, e.g. during brush-cutting, when heaps of cut-down trees and brushes are placed between trees or posts installed for the purpose. In addition to being a practical barrier, a twig fence is undoubtedly a fitting habitat for birds, amphibians and various insects. Apart from that, the slowly rotting wood suits moss and lichen.

Photographic example: <https://sites.google.com/site/eestimaalammas/time-tracker/lambaaed>

*Plank fences* have been used traditionally, but are still widely used even today. A plank fence is made of planks positioned between posts. In connection with the more widespread use of barbed wire, some barbed wire has often been added between and above planks to make the fence higher. Such a habit was especially prevalent during Soviet times.

Photographic example: <https://sites.google.com/site/eestimaalammas/time-tracker/lambaaed>

*Stone walls* have traditionally been used to fence pastures especially in the coastal areas and islands of Estonia. Generally, stone walls as pasture barriers have been used with a wooden elevation, as sheep simply jump over lower walls. In order to raise the wall, some poles were positioned in the wall, and rods were attached to the poles. Since the mid-20<sup>th</sup> century, barbed wire has also been used to make the walls higher.

First and foremost, stone walls have been used to fence forest pastures. Since many former forest pastures have overgrown by now, old stone walls can also be stumbled upon in the woods.

*Gates* or *holes* were left in stone walls. The holes were used in case of walls surrounding fields, pastures and hayfields in order to be able to pass through the walls with animals. Rods that could be pushed away or lifted up were used as gates (Lukas and Rennu, 2005).

Photographic example: <http://www.agri.ee/public/juurkataloog/MAAELU/MAK/buklett5.pdf>



*Hay barn, herding track, winter track, grazing well, haystack frame*

Apart from an assortment of fences, other cultural heritage objects such as *hay barns, herding tracks, winter tracks, grazing wells* and *haystack frames* are associated with semi-natural communities.

Light hay barns, which were generally made of logs (but there are also more stationary barns made of limestone slabs) and equipped with a roof made of thatch, straw or shingles, were built on hayfields located further away from farmsteads. The hay made in the summer was stored in the barns and the *winter tracks* were used to collect the hay in the winter.

*Herding tracks* were bordered with a roundpole fence or a stone wall and led to a forest or wooded pasture. A *grazing well* was a well established on a forest meadow both for the animals and the haymakers.

*Haystack frames* were rod-and-roundpole installations of up to a meter high, built to keep high water from ruining the hay. Permanent haystack frames made of hay were constructed primarily on coastal grasslands and have been preserved to this day (Tarang *et al.*, 2007).

In order to maintain former *manor parks*, it is recommended to graze sheep in the park's meadows or the territory of the whole park (KKM, 2002). This recommendation has been successfully implemented in quite a few places, such as on Saaremaa Island, in the Tumala manor park ([www.saartemaal.ee](http://www.saartemaal.ee)).

In addition to the aforementioned, several specific spots in the landscape that were used to wash sheep are related to sheep husbandry. These are usually natural water bodies – the sea, lakes, ponds, rivers or creeks. There has been an instance of a stone wall being built in a river in order to facilitate sheep-washing (Rennu, 2011).

*Sheepfolds and other installations used in modern times*

In modern times, permanent electrified fences made of wire or wire mesh are chiefly used to fence sheep in. Electric fences with 1–3 wires are also widely used as a temporary solution.

Apart from fences, *sheds* are also connected with sheep farming, as are special *shelters*, which are usually simple wooden structures. Shelters have been and are still used for animals who are kept outside throughout the year, but also in case of flocks kept in sheds in the winter.

Photographic example: <https://sites.google.com/site/eestimaalammas/time-tracker/lambalaut>

According to the data from the agricultural census of 1939, farms possessed 2.7 million hectares of agricultural land. 60% (1,620,000 ha) of utilised agricultural land was natural grassland, the rest was arable land. In 1939, cultural grasslands made up a mere 3% of the whole area under grasslands (PMM, 2011a).

Based on the data from the 2001 census, farms only used approximately a third (871 000 ha) of pre-war agricultural land. Permanent grasslands took up a total of 259,200 ha, which was less than 20% of the area under natural grasslands in 1939 (Valdvee, 2010).

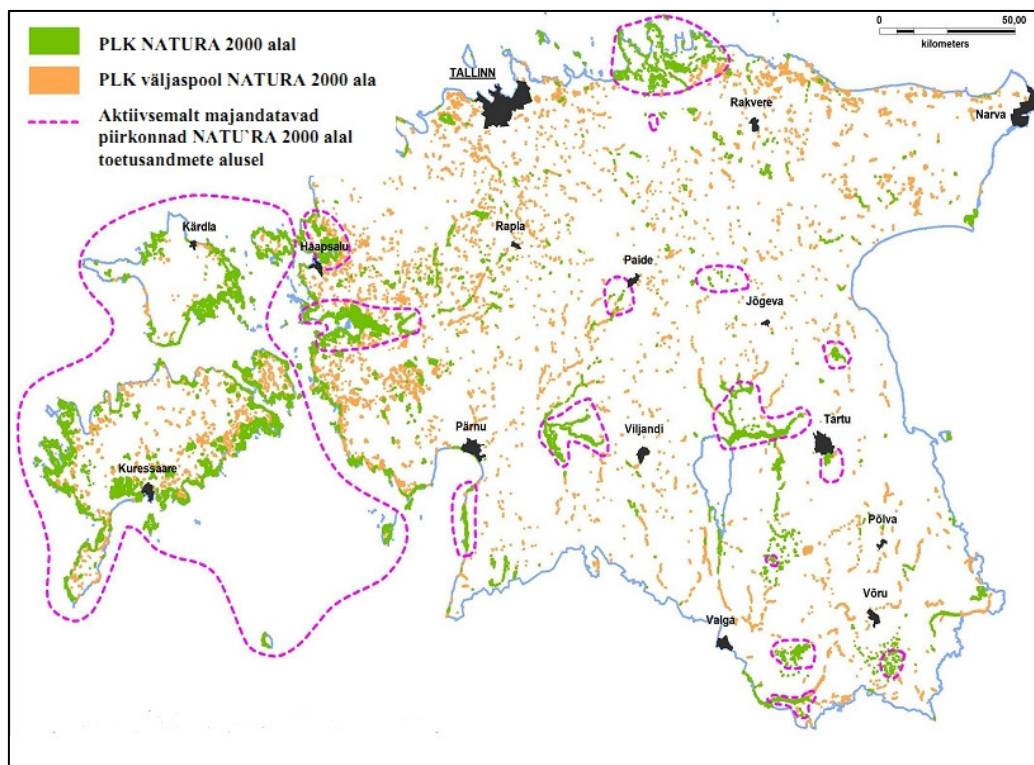
The formation and preservation of semi-natural communities is mainly related to mowing and grazing. Managing areas like this, however, required a great deal of manual labour. Compared to cultural grasslands, their productivity was lower as well, which is why these communities were discarded (grew over with bushes and trees) more and more, were turned into cultural grasslands or were afforested once agricultural production became more intense and animal husbandry more prevalent. Semi-natural communities started to disappear especially fast during the middle of the previous century due to World War II, collectivisation and the general intensification of agriculture.

Semi-natural communities have largely been inventoried during the past decade. Various databases (grassland database of the Estonian Seminatural Community Conservation Association or ESCCA; Natura 2000 database of the Ministry of the Environment) have been created, but despite it, the data are deficient and the data from different databases fail to overlap. As there is little data and often, they can be interpreted in numerous ways, assessments frequently vary by many times (Kukk, 2010). Another issue is the methodical aspects of categorising different communities (communities have been classified under various categories).

The data provided here mainly consist of expert evaluations, which is why the increase of areas seen in the comparison of 2001 and 2010 data given in Table 5 can be explained by the specification of data and the difference in evaluations, not an actual increase in the areas of communities. However, it can be said that thanks to various aids, predominantly nature conservation support and support for the management of semi-natural communities, many grasslands have been restored and managed (see more in the chapter “Support system for sheep farming and grazing”).

The area of semi-natural communities has drastically decreased over the past century. Their area in Estonia was the largest at the end of the 19<sup>th</sup> and at the beginning of the 20<sup>th</sup> century – almost 1,800,000 hectares (see Table 5). At the moment, their total area is estimated to be around 130,000 hectares (Kukk, 2010). A significant drop has occurred in all types of communities, but the greatest can be seen in the area of wooded meadows, which has decreased by more than a hundred times (see also Figures 4 and 5).

It is estimated that in Estonia (as of 2010), there are approximately 15,000 ha of alvars, 18,000 ha of coastal meadows, 20,000 ha of flooded meadows, 8,000 of wooded meadows and 4,000 ha of wooded pastures, plus other types of semi-natural communities (Figure 3).



**Figure 3. Semi-natural communities in Estonia. Source: PMK, [http://pmk.agri.ee/pkt/files/f26/PLK\\_29-30.pdf](http://pmk.agri.ee/pkt/files/f26/PLK_29-30.pdf)**

The types that are mainly grazed are alvars, coastal meadows and wooded pastures, which means that generally speaking, there could be a total of approximately 37,000 hectares of

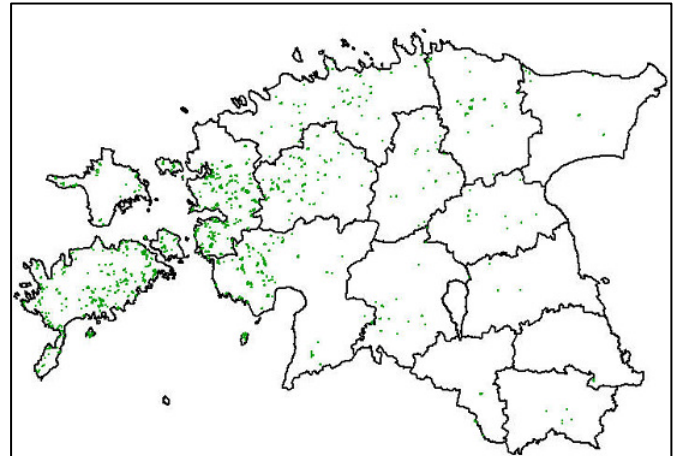
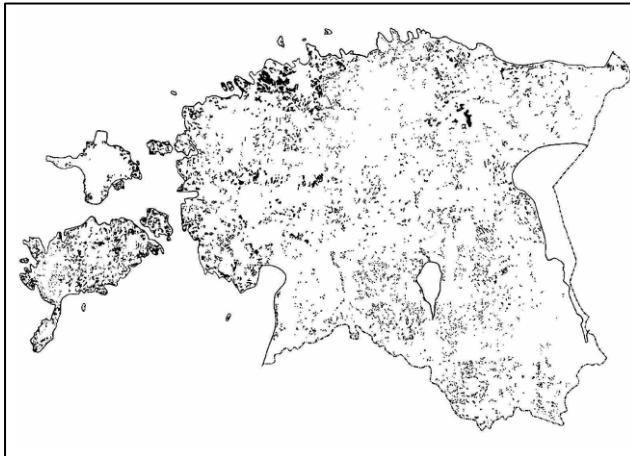
grazed communities in Estonia. However, some of them are certainly mowed, not grazed, and some communities that are primarily mowed could (also) be grazed. The cases where only one species of animal is grazed on a specific community are by and large rarer – mostly, several species are still grazed together.

Alvars are mostly grazed by sheep, but partially also by cattle or horses or cattle/sheep and horses/sheep. Coastal meadows are mainly grazed by cattle and sheep. We are lacking more detailed data about the area of communities that are grazed specifically by sheep, as such data are not collected.

**Table 5. Area of semi-natural communities in 1900–2010**

<b>Community</b>	<b>Year, hectares</b>			
	<b>1900</b>	<b>1950</b>	<b>2001</b>	<b>2010*</b>
alvars	50,000	44,000	7–10,000	15,000
coastal meadows	30–35,000	29,000	6–8,000	18,000
flooded meadows	...	97,400	15,000	20,000
wooded meadows	850,000	470,000	4,000	8,000
wooded pastures	...	200,000**	3,000**	4,000
<b>All semi-natural communities</b>	<b>1,781,000</b>	<b>1,554,000</b>	<b>~ 64,000</b>	<b>~130,000</b>

Source: Luhamaa *et al.*, 2001; \* based on Kukk, 2010 and \*\* PMM, 2011a

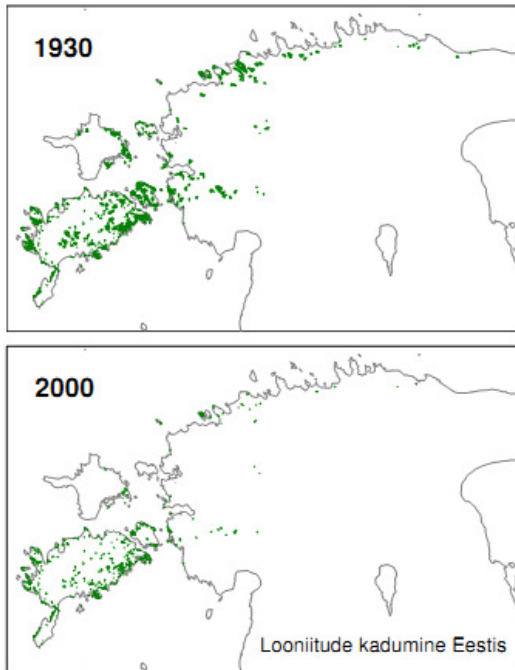


**Figure 4. Grasslands on mineral soil in Estonia in the 1950s. Source: Toomas Kukk, [www.zbi.ee/~tomkukk/rohumaa/parand1.pdf](http://www.zbi.ee/~tomkukk/rohumaa/parand1.pdf); Figure 5. True grasslands on mineral soil in the 2000s. Source: Tsipe Aavik, <http://www.botany.ut.ee/lectures/poollooduslikud1.pdf>**

Although the areas of all semi-natural communities in Estonia have decreased, their changes have also been studied by regions, by communities and within communities. For example, the area of alvars has, compared to the 1930s, decreased more in Northern Estonia and the inland in general, while alvars have been preserved more on Saaremaa (Figure 6; Pärtel, 2003).

If a semi-natural community grows over, the biodiversity of the community will be preserved for some time to come – 20 years after an alvar has overgrown, its composition of species does not differ from a maintained alvar in any way (Pärtel *et al.*, 1999; Pärtel, 2003). In the longer run, the changes in the composition of species are of course quite remarkable. From 1923 to 2008, the Northern Estonian alvars studied lost nearly a third of the vascular plant species characteristic of the community (Saar *et al.*, 2008).

Should a semi-natural community grow over with bushes, its species would be preserved for quite a while.



**Figure 6. Disappearance of alvars in Estonia from 1930 to 2000. Source: Pärtel, 2003.**

### **Support system for sheep farming and grazing**

Several different grants are paid out in Estonia to support sheep farming. Sheep husbandry is supported within direct aid (additional direct aid for raising ewes), but various grants of the Estonian Rural Development Plan (ERDP) also support (or have supported) keeping sheep – especially by paying out support for managing grasslands, but also for making investments (ERDP 2007–2013 measure “Investments in livestock buildings”, ERDP 2004–2006 measure “Support for meeting water protection requirements established for manure storages”).

The following support may be applied for sheep farming and related activities:

- Direct aid/state aid
  - Additional direct aid for raising ewes
  - Nature conservation support
- ERDP supports
  - Support for grazing animals
  - Support for the maintenance of semi-natural habitats
  - Support for organic production

- Support for environmentally friendly management
- Support for investments in livestock buildings
- Support for the establishment and restoration of stone walls

In addition to the abovementioned, sheep farming is also indirectly supported by other means, such as the development support of farm animals. Naturally, sheep farmers can also apply for all general agricultural supports, above all the single area payment and the additional direct aid of agricultural crop. Restoration and maintenance of semi-natural communities and building fences is additionally supported from the state budget within the nature conservation support.

The following is a short overview of the principal supports one can apply for, having specifically sheep farming in mind.

#### *Ewe premium*

Ewe premium, which is meant to support sheep farming, has been paid out in Estonia since the year 1999, when all the funds required came entirely from the state budget. After Estonia's accession to the European Union (EU) in 2004, the premium has been paid out in the framework of the EU support system.

The premium can be applied for by a producer who has at least 10 ewes of at least one year of age. 947 additional direct aid applications for raising ewes were accepted in 2010. Premiums were allocated for 45,329 ewes in the total sum of 460,429 euros (PRIA, 2011).

#### *Support for grazing animals*

Estonia supported the grazing of animals in the framework of ERDP 2004–2006, where grazing was one of the numerous requirements. The grazing of animals is supported in the framework of ERDP2007–2013 by prioritising the wellbeing of the animals.

The applicants of the support are subjected to a 5-year commitment period: every year, they must graze at least 2 livestock units of animals (cattle, sheep, goats and horses) at least from 1

June to 31 August (PMM, 2011a). In 2010, grazing support was paid out for grazing a total of 25,043 sheep (PRIA, 2011).

*Support for the maintenance of semi-natural habitats/nature conservation support*

Support for the maintenance of semi-natural habitats has been paid out in Estonia since the year 2001. In 2005, for example, 17,500 ha of semi-natural communities were maintained and 1,900 ha restored within the framework of the nature conservation support, and 165,000 meters of fences were also built (PMM, 2011a). Support was paid out from the state budget. In the case of ERDP 2007–2013, support for semi-natural communities is paid for semi-natural communities entered into the register and located on a Natura 2000 territory.

The support applicant must take on a 5-year commitment. The support paid per a hectare of a wooded meadow amounts to 238.07 euros, while the sum for maintaining other communities is 185.98 euros a year. A total of 885 support applications for 23,500 hectares were submitted in 2010 (Table 6, PRIA, 2011). The greatest volumes of land covered by applications were located in Lääne County (6,876 ha), Saare County (6,445 ha), Pärnu County (2,563 ha) and Hiiu County (2,179 ha).

**Table 6. Applying for support for the maintenance of semi-natural habitats by counties in 2010 (ha)**

	<b>Other communities</b>	<b>Wooded meadow</b>	<b>TOTAL</b>
HARJU COUNTY	589.7	9.8	<b>599.6</b>
HIIU COUNTY	2,135.3	44.1	<b>2,179.4</b>
IDA-VIRU COUNTY	612.1	7.9	<b>620.1</b>
JÕGEVA	21.3	0.0	<b>21.3</b>



COUNTY			
JÄRVA COUNTY	88.6	4.6	<b>93.2</b>
LÄÄNE COUNTY	6,781.4	94.9	<b>6,876.3</b>
LÄÄNE-VIRU COUNTY	317.4	52.6	<b>370.0</b>
PÕLVA COUNTY	93.2	0.0	<b>93.2</b>
PÄRNU COUNTY	2,361.1	201.8	<b>2,562.9</b>
RAPLA COUNTY	396.2	46.5	<b>442.7</b>
SAARE COUNTY	6,178.8	266.6	<b>6,445.4</b>
TARTU COUNTY	1,162.1	0.0	<b>1,162.1</b>
VALGA COUNTY	892.5	12.6	<b>905.1</b>
VILJANDI COUNTY	700.4	3.3	<b>703.6</b>
VÕRU COUNTY	425.6	0.0	<b>425.6</b>
<b>TOTAL</b>	<b>22,755.7</b>	<b>744.7</b>	<b>23,500.4</b>

Source: PMM, 2011b

*Nature conservation support* is paid via the Environmental Board for performing the works needed for the preservation of the semi-natural communities of protected areas, special conservation areas or species protection sites. In case of nature conservation support, the support rates are differentiated: they depend on the community. The total volume of nature conservation support is approximately 1.2 million euros a year.

### *Support for organic production*

The support for organic production has been paid across the state of Estonia from the year 2000. Since then, the volume of agricultural land used for organic production and the number of organic producers has increased quickly. In 2002, there were 583 organic producers and 30,550 ha of organic land in Estonia; in 2010, the number of producers applying for support within ERDP 2007–2013 was 1,268 and the total area for which support was applied for amounted to 106,098 hectares (PMM, 2011a; PRIA, 2011). Over 80% of the land managed organically is under grasslands (PMM, 2011a).

Depending on the crop group, the support for organic farming paid within ERDP 2007–2013 ranges from 76.69 euros/ha to 349.60 euros/ha per year. Support is paid for grasslands only then, if at least 0.2 LU of organic animals are raised per a hectare of the grassland. In addition to land, support is also paid for animals.

Over half of all Estonian sheep are kept organically. More than 300 enterprises are active in sheep farming (2010). The largest number of organic sheep is raised in Saare County (more than 9,000) and Valga County ([www.maheklubi.ee](http://www.maheklubi.ee)).

Some other ERDP 2007–2013 supports – support for investments in livestock buildings and support for environmentally friendly management – promote sheep farming indirectly, as either general area-based support or in the form of investments related to the necessary livestock buildings or establishing a stone wall as a suitable fence for the herd.

### **Ecological values of landscapes associated with and created or maintained by sheep grazing**

In addition to having aesthetical and cultural value, grasslands have high ecological value. This is especially true of semi-natural communities, but cultural grasslands are important as habitats as well, as an open landscape offers nesting opportunities for many bird species, such

as the northern lapwing or the corn crake. However, many other bird species are dependent on grazing and the insects associated with it, such as the common starling, the barn swallow, the white wagtail, the yellow wagtail and many more.

Semi-natural communities are of especially high ecological value, because they are: a) biologically diverse, b) endangered and uncommon and c) provide a habitat for many rare species.

Compared to other areas north of the 57<sup>th</sup> parallel, the biodiversity of Estonian semi-natural communities is one of the greatest in the whole world (PMM, 2011a). The most varied plant community of Northern Europe can be found in Lääne County, on the Laelatu wooded meadow – there, 76 species of vascular plants have been counted on a square meter. On the Vahenurme wooded meadow in Pärnu County, 74 species have been found on a square meter (Kukk, 2010).

More than 600 taxa of vascular plants have been found on Estonian wooded meadows, while 56 endangered species grow on wooded meadows (30% of all protected species). In addition, there are numerous insects and butterflies. The biodiversity of alvars is also extremely great: it is thought that over 260 species of vascular plants grow on alvars, including ca. 30 that are rare and protected. The main range of several alvar plants is elsewhere – in steppes (such as the rock wormwood, the spring cinquefoil, the mountain clover etc) or the subarctic (alpine chickweed, alpine meadow-grass, alpine cinquefoil) (Kukk, 2004). Nearly 290 species of vascular plants grow on coastal meadows, and many of them are also rare. The number of communities of semi-natural meadows is also high – for example, there are 12 different plant communities on wooded meadows (Kukk, 2004).

Among birds, alvars are preferred by e.g. the chats (whinchat, stonechat) (Talvi, 2001).

Coastal meadows are important breeding places for the northern lapwing, the oysterscratcher, the dunlin and other sandpipers. Of the rarer species, the ruff and the pied avocet nest on coastal meadows. Coastal meadows are extremely significant breeding and feeding grounds for migratory birds, in particular for anseriformes, such as the greylag goose and the barnacle goose. The rare amphibian natterjack toad also prefers coastal meadows (Talvi, 2001).

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