

Synthèses

# Grasslands and herbivore production in Europe and effects of common policies

Christian Huyghe, Alex De Vliegher, Bert van Gils, Alain Peeters, coord.



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# Contents

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<b>Executive summary</b> .....	7
<b>Introduction</b> .....	14
<b>Definitions and data</b> .....	15
Definitions .....	15
Data .....	19
<b>Chapter 1. Importance of the grassland area and grassland-based systems in Europe and their spatial distribution</b> .....	21
Present acreage of grasslands and annual forage crops in Europe .....	21
Spatial distribution .....	29
Grasslands in organic farming .....	33
Changes in grassland acreage in Europe .....	34
Biomass productivity from permanent and temporary grasslands .....	54
<b>Chapter 2. Importance and changes in grazing animal production operations in Europe and their spatial distribution</b> .....	57
Herbivore herds in Europe .....	57
Animal production .....	59
Changes in livestock populations .....	66
Changes in animal production and animal performance .....	73
<b>Chapter 3. Importance and changes in grassland-based systems</b> .....	83
Farm types .....	83
Changes in the number of animal holdings .....	83
Interviews with farmers and interactions between farmers and research	95
<b>Chapter 4. Grasslands for alternative production</b> .....	139
Energy production .....	139
Green biorefinery and biochemicals production .....	143

<b>Chapter 5. Grasslands and ecosystem services</b> .....	145
Introduction .....	145
Environmental issues related to grasslands .....	147
Grassland-based biodiversity issues .....	152
Landscape related issues .....	159
National case studies .....	159
<b>Chapter 6. Grasslands in the economic supply chain: related industries ..</b>	227
Forage seed industry .....	228
Interview with Beat Boller, Chairman of Eucarpia and senior forage breeder at Agroscope, Switzerland .....	235
<b>Chapter 7. Common Agricultural Policy: brief history, structure and influence on grasslands</b> .....	239
History .....	239
The two pillars of the CAP .....	241
Obligation of maintenance of the permanent grassland area .....	242
Agri-environmental scheme .....	243
Less Favoured Areas .....	244
Consequences of the abolition of the milk quotas .....	245
Other policies .....	246
CAP effect on grasslands and grassland farms .....	248
CAP: the way forward .....	254
Interview with Jean-François Louineau, Director of Administrative Services, Regional Council, Poitou-Charentes, France .....	259
<b>Conclusions</b> .....	263
Changes in the structure of the grassland area and grassland-based systems .....	263
Changes in production processes .....	264
Changes in the structure of animal production .....	265
Effect of scientific research, public and private farmer’s advisory services ...	266
Effect of professional teaching .....	266
Sociological driving forces .....	267
Economic driving forces .....	267
Political driving forces .....	268
<b>References</b> .....	273
<b>Annex 1</b> .....	285

The **Polish FADN** (Farm Accountancy Data Network) does not include farms under 2 European size units (ESU); such farms in Poland account for over 66% of the total number of farms (holdings). The farms from this region show little economic strength. About 89% of them were classed with an economic magnitude below 8 ESU, and as many as 69% of the farms have fewer than 10 ha of utilised agricultural area at their disposal.

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## Portugal

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Grasslands in Portugal encompass a wide range of heliophilous herbaceous vegetation usually dominated by Poaceae species. Poor permanent grasslands, such as rangelands, include numerous types of annual and perennial rough grazed grasslands. Meadows and the *Poa bulbosa*/*Trifolium subterraneum* Mediterranean swards have a more intensive management, are more productive and their biomass is more palatable and has a superior feed value compared to other grassland and rangeland types.

The oligotrophic poor annual grasslands (vegetation class *Helianthemetea*) inhabit clearings of pyrophytic low shrublands (e.g., *Cistus* and *Erica*) over leptosols, or recently disturbed nutrient poor soils. Their carrying capacity rarely exceeds

0.2 LU/ha and is correlated with late spring rains. Subnitrophilous Mediterranean grasslands (order *Thero-Brometalia*; e.g., *Bromus* sp.pl. or *Stipa capensis* communities) tend to occur in abandoned agricultural land or in intensively trampled and grazed areas, having a larger expression in dry to semi-arid territories. Mesoxerophilous oligotrophic poor perennial grasslands of *Agrostis* sp.pl. (classes *Nardetea* p.p. or *Stipo-Agrostietea castelanae*) prefer deep, well-drained, phosphorus deprived acid soils, and are likely to establish mosaics with *Ulex* sp.pl. or tall *Cytiseae* shrub communities. These rangelands are less diverse (although rich in endemics of *Armeria*, *Centaurea* sect. *Centaurea* and *Ornithogalum* species), more productive (ca. 0.6-0.7 LU/ha), and their biomass production peak is one to one and a half months after that of poor annual grasslands. Mosaics of mountain *Nardus stricta* (class *Nardetea* p.p.) grasslands with *Erica tetralix*/*Genista anglica* higrophilous heathlands—two Natura 2000 priority habitats—require moister soils. Less relevant for livestock grazing are the psammophilous communities of *Agrostis truncatula* subsp. pl. or *Corynephorus canescens*, the *Festuca* oligotrophic grasslands (e.g., *Festuca summilusitana*), and the deep-rooted tall grasslands of *Pseudarrhenatherum longifolium*, *Celtica* (*Stipa*) *gigantea*, *Stipa tenacissima* or *Hyparrhenia* sp.pl. calcicolous *Brachypodium phoenicoides* grasslands have a high nature conservation value even though they are uncommon in Portugal. With a few exceptions (e.g., orotemperate *Festuca henriquesii*/*Nardus stricta* grasslands) grazing can delay but not prevent secondary succession or the recurring use of fire, shrub shredding or soil disturbance to promote herbaceous vegetation in Portuguese rangelands.

*Poa bulbosa*/*Trifolium subterraneum* (class *Poetea bulbosae*) Mediterranean summer-dry, mat or cushion-like grazed swards attain their ecological optimum in meso-Mediterranean acid rock-derived soils, in the southern Portugal 'montado' parkland. Meadow vegetation (class *Molinio-Arrhenatheretea*) is extraordinarily diverse in Portugal. The water and nutrient requirements, both in Mediterranean and in temperate environments, relegates meadows to concave physiographies with wet, thick, mesoeutrophic regosols or fluvisols. The most valued meadows (alliances *Cynosurion* and *Arrhenatherion*) are grazed with cattle and cut for hay. Wet meadows (order *Molinietalia caeruleae*; e.g., *Juncus effusus*/*J. acutiflorus* communities), Mediterranean meadows (order *Holoschoenetalia vulgaris*; e.g., *Scirpoides holoschoenus* communities) and river bed summer green C3 (e.g., with *Festuca ampla*) and C4 grasslands (with *Cynodon dactylon* or *Paspalum* sp.pl.) are extensively grazed. The mountain meadows of northern and central Portugal and the *Poetea bulbosae* pastures of the montados are discussed in the presented case studies.

In twenty years, between 1989, just after EU adhesion, and the 2009 'Surveys on the Structure of Agricultural Holdings and on Agricultural Production Methods', there was a reduction in the number of agricultural holdings and in the UAA in Portugal of 50% and 8.7%, respectively. The foremost changes in land use were a drop in the arable land area (from 2 330 365 ha to 1 134 497 ha) and the expansion of permanent grasslands (from 736 651 ha to 1 721 578 ha; 19.5% of the area of continental Portugal in 2009), through the spreading of rangeland indigenous vegetation to formerly cultivated land. On the contrary, temporary grasslands lose relevance (from 73 920 to 31 652 ha). Poor permanent grasslands are now the principal component of the Portuguese UAA. Between 1989 and 2009 there was a slight increase in the number of cattle (2.1%; 1 430 285 animals in 2009), and a considerable decrease in the number of sheep (24.2%;

2 219 639 animals in 2009) and goats (41.6%; 420 711 animals in 2009). This decline in small ruminant numbers has led to greater extensification in rangeland grazing, mainly in the central and northern Portugal mountains. However, this trend cannot be generalised to the montado grasslands.

## Grasslands of the wooded parkland of the South of Portugal, the 'montado'

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A specific type of grazed wooded parkland, named 'montado' in Portuguese and 'dehesa' in Spanish, attains, in Portugal, over a million hectares according to the 2006 Portuguese Forest Inventory. These are more or less sparsely wooded lands, either of live- or cork-oak (*Quercus rotundifolia* and *Q. suber*, respectively) (Photo 20, Plate CS14) where an extensive agricultural system with fallow land was established from the Middle Ages, with the largest historical expression since the 19th century. A fairly dense mono-specific tree-layer of oaks was inherited from a former dense natural forest that was either burnt or cleared, increasing the proportion of clearings typically to more than 40% of the area, among even-spaced trees. Tree species other than live- or cork-oaks were eliminated, as well as the shrub, climber and herb-layers. Successional evolution to a meta-stable zoo-anthropic permanent grassland developing underneath the canopy was carried out with sheep grazing, fitted in a cereal-based long and low soil disturbance rotation system. Even-spaced *Quercus* trees produced large quantities of acorns, between 400 and 700 (1000) kg/ha-1, that were used in pig fattening. In addition, such parklands were managed to produce forest products such as cork, charcoal (from tree pruning), game and more recently, wildlife and ecosystem services associated with biodiversity, leisure and aesthetics.

Live-oak parklands are more frequent in the southern half of Portugal, away from the sea, in dry (rainfall  $\leftarrow$  500 mm per year) continental (meso-Mediterranean bioclimate) climate areas, either in silicate- (sandstone, granite and schist, excluding loose sands) or limestone-derived soils. Cork-oak parks mainly occur in the littoral half of southern Portugal (Figure CS5), which experiences higher rainfall ( $\rightarrow$  500 mm per year) and a hotter and mild frost climate (thermo-Mediterranean and lower meso-Mediterranean bioclimates), in diversified substrata (including pleistocenic loose sands), except in limestone-derived soils. Both systems include high-scrub seral stages (e.g., *Quercus coccifera*, and *Arbutus unedo*) and low shrub stages dominated by *Cistus*, *Ulex* and/or *Erica*. The shrub vegetation is regularly eliminated, in general with heavy disk harrows, as it competes with pasture, increases the risk of wildfire and fosters barking (cork extraction) and tree pruning.

The actual grasslands of the montado system can be broadly categorised into four main types. Among the most frequent species in the Mediterranean *P. bulbosa*/*T. subterraneum* swards (class *Poetea bulbosae*) are *Astragalus cymbaearpos*, *Bellis annua* subsp. pl., *B. sylvestris*, *Carex divisa*, *Erodium botrys*, *Hypochaeris radicata*, *Leontodon tuberosus*, *Onobrychis humilis*, *Plantago serraria*, *Poa bulbosa*, *Ranunculus bullatus*, *Trifolium subterraneum* subsp. pl., *T. nigrescens*, *T. suffocatum* and *T. tomentosum*. In pre-industrial pastoral systems, *Poetea bulbosae* grasslands were grazed by large transhumant sheep flocks from the first autumn rains until the end of April or early May. This type of grassland has two biomass productivity maxima, in autumn and in spring, and can achieve 0.75 LU/ha.