

DEFINITION OF REGULATORY AND SOCIAL CONTEXT LINKED TO DIFFERENT GRASSLAND USES

[Deliverable 1.2]

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Summary of GO-GRASS project:



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N°862674

GO-GRASS in a nutshell

GO-GRASS project (www.go-grass.eu) aims to create new business opportunities in rural areas based on grassland and green fodder and to support their replication throughout rural communities in the EU. The project develops, deploys and validates a set of small-scale demonstration sites (DEMOS) of a circular integrated agro-food system in four EU regions (Denmark, Germany, Sweden and the Netherlands). The project is expected to develop technologies from the current Technology Readiness Level (TRL) (between 5 and 6) to more advanced ones (8) successfully implemented under real conditions at the end of the project.

The DEMO in Denmark aims to develop a small-scale bio-refining technology to extract protein concentrates for monogastric animals from grassland situated in nitrate sensitive areas. In Germany the DEMO targets to produce biochar via Hydrothermal Carbonisation of grassland-cuttings from wetlands as supplement for soil improvement. In the Netherlands, it is to develop digester and fermentation technology to produce paper and carton products from road-side grass and nature or fauna grass. In Sweden, the aim is to establish briquetting technology at local and small-scale to produce climate-friendly and heat-treated animal bedding using reed canary grass. Beyond the development of the individual DEMOs, the project aims to integrate the technologies and business models across the DEMOs to create additional values and value chain nodes.

In order to realize and support its objectives, the project employs the principles of cumulativeness, innovation, replicability, inclusiveness, and circularity. The principles serve as guidelines and requirements for adapting and developing various tools, integrating circular economy in rural areas, ensuring successful demo implementation, creating favourable business environments and maximising the replication potential in other rural areas in EU.

The tools to be developed by the GO-GRASS project include: online tools for business case assessment and funding; a manual on how to get started and succeed; a tool kit for cluster and network development; training courses for existing and future entrepreneurs; and guidelines on creating favourable business environments.

GO-GRASS will contribute to a range of circular and sustainable business models with high replication potential that can be used by entrepreneurs, local authorities and other stakeholders. It will demonstrate innovative cost-effective technologies, processes and tools applicable within the diverse DEMO scenarios. This will enable to effectively use grassland and shrubs which are being left to decay after mowing causing costs and lost benefits for individuals and society.

To stay up to date with GO-GRASS project events and reports, follow us on Twitter (@GoGrassEU), LinkedIn (GO-GRASS) or visit www.go-grass.eu.



Summary

The main aim of Deliverable 1.2 is to analyse the current CAP measures that promote grasslands within the different International and EU strategies but also the CAP and link them to some socioeconomic aspects that have to be considered when new policies are established. The analysis of the CAP shows that permanent grassland is one of the most important types of land to be funded by the EU. Moreover, grazing activities are seen as key to maintain and enhance biodiversity and protect water. There are a lot of cases where under-grazing is a problem, meaning that an excess of pastures is present, that should be adequately maintained through grazing or mowing. Mowing could be carried out if the mowed herbaceous vegetation is utilised for bioeconomy activities. However, only Measure 16 relates the promotion of valued products from grassland, but in a very few RDPs this measure is established as such. Moreover, there is a lack of measures directly targeting knowledge transfer and adequate policies that promote permanent grasslands and bioeconomy at field level.

Three recommendations can be deployed from a bioeconomy and grassland point of view

- 1.- Establishment of adequate knowledge transfer systems including demonstration fields and extension services that allow farmers to understand the new products delivered from grasslands as part of the bioeconomy concept linked to Go-Grass
- 2.- Establishment of measures that promotes the establishment of farmers cooperatives, and adequate management through the development of operational groups linked to the EIP-Agri, to foster innovation in grasslands bioeconomy.
3. Supporting conversion of arable land into grassland in order to preserve environment (nutrient leaching), climate (soil carbon) and to support the delivery of resources for biorefineries that can produce both feed, food, materials and bioenergy.

Farming systems in Europe have increased the percentage of grassland share per farm, however, this is not linked to the increase of livestock use of these areas that provides an opportunity for grasslands areas to have grasslands for alternative uses such as biomass.

The alternative use of grasslands is associated to new forms of cropping and harvesting to provide the best raw material to be included in the biorefineries that will be probably difficult to implement in those areas with a large proportion of old farm holders and a low proportion of young farmers who are able to understand and change their techniques in a more faster way.

The ownership of the farms varies across Europe, which means that the policies promoting grassland alternative uses linked to bioeconomy has to consider this point



Spelling Guidelines

Standardised British Spelling (NOT Oxford Spelling!) should be used in all documents. Generic terms are spelt in lower case, specific terms and proper names are spelt with initial capitals. For metric tonnes use the term “tonnes” and NOT tons.

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Abbreviation

CAP	Common Agricultural Policy
CF	Cohesion Fund
EAGF	European Agricultural Guarantee Fund
EAP	Environment Action Programme
EAFRD	European Agricultural Fund for Rural Development
ECCP	European Climate Change Programme
ELP	Established Local Practices
EFA	Ecological Focus Areas
ERDF	European Regional Development Fund
ESF	European Social Fund
GAEC	Good Agricultural and Environmental Condition
LIFE	Programme for the Environment and Climate Action
LPIS	Land Parcel Identification System
LULUF	Land Use Change and Forest
MS	Member States
UNEP	UN Environment Programme
PES	Payment for Ecosystem services
RPD	Rural Development Program
SMR	Statutory Management Requirements
SPA	Special Protection Areas
SCI	Sites of community importance



1. Introduction

Deliverable 1.1 provides GO-GRASS the framework of the current situation of the permanent grasslands in Europe from an extent and use point of view, including livestock linked to those grasslands. Deliverable 1.2 aims at providing the social and policy framework to know what is currently promoted or not by the Common Agricultural Policy (CAP). The CAP is the major driver of the European farming systems as it funds mostly the different types of lands in Europe but also livestock animals as part of the coupled measures. The CAP consists of conditionality, the Pillar I and the Pillar II. The conditionality established a set of norms that has to be fulfilled by a farmer to get the funds of Pillar I and Pillar II. Payments in Pillar I are funded from the European Agricultural Guarantee Fund (EAGF), while Pillar II payments are partly-funded by national governments (between 50 and 85% depending on the country). Pillar I includes market-related expenditure, coupled direct aids (associated payments for livestock head in some countries), decoupled direct aids and greening. Pillar I direct payments also known as coupled direct aids has the largest amount of allocated budget and are associated to payment rights linked to three types of land use: arable crops, permanent grasslands and permanent crops. Pillar II measures are linked to a set of activities proposed by the Member states related to rural development promotion. The current CAP supports grasslands in both (i) Pillar I where direct payments and greening based on land use are established and (ii) Pillar II where payments allocated to rural development including land use, social and environmental aspects are the main aims to reach the funds.

2. Methodology

Deliverable 1.2 was based on both the use of information from EUROSTAT to determine the current social situation of farms in Europe and the metadata analysis conducted through mainly the Pillar II, because Pillar I is currently established in a similar form for all European countries. However, the description of how the Cross-Compliance and Pillar I payments are currently carried will be described in this document. Analysing Pillar II was based on an evaluation of all Rural Development Programmes available on the internet. We also used translation tools able to find the key-words associated with grasslands. From this work, we were able to find the most relevant activities linked to different measures developed in the current 118 Rural Development Programmes. Whenever possible, maps were built up based on the use of Q-GIS.

3. European Union policies

CAP is one of the most important European Union policies for grassland use in Europe as it supports most of the activities dealing with the adequate management of pastures to enhance the provision of the ecosystem services from grasslands that are classified as crops (temporary grasslands) and permanent grasslands. However, the provision of policies in



Europe is based on the commitments that have to be fulfilled with regard to different strategies that are established all over Europe.

It was only after the Cardiff Process in June 1998, that environmental concerns were integrated into EU agricultural policies, which increased the value of Permanent Grasslands. Within the 6th **Environment Action Programme** (EAP, 2002-2012), the environment was integrated into all policies to achieve the mentioned United Nation Sustainable Development Goals, following the signature of the previously mentioned global agreements. The 7th EAP will be guiding European environment policy until 2020 under the motto 'Living well, within the limits of our planet'.

The 7th EAP (EU 1386/2013/EU) lists nine priority objectives to be achieved by 2020. The priorities most relevant to permanent grasslands are: 1) *to protect, conserve and enhance the Union's natural capital*. This includes high value ecosystems such as wood pastures. 2) *to turn the Union into a resource-efficient, green, and competitive low-carbon economy*. Here permanent grasslands can improve resource capture and efficiency (due to multiple spatial and temporal levels) and provide renewable energy when it has woody perennials as part of it. 3) *to safeguard the Union's citizens from environment-related pressures and risks to health and wellbeing*. Here permanent/grasslands strips can reduce the levels of nitrate leaching, the level of pollutants in the soil and air, and net greenhouse gas emissions (GHG). 4) *to secure investment for environment and climate policy and account for the environmental costs of any societal activities, including expanding markets for environmental goods and services*. The promotion of permanent grasslands and extensive grazing label products would be helpful. 5) *to better integrate environmental concerns into other policy areas and ensure coherence when creating a new policy*. As outlined in this report, permanent grasslands can support a holistic approach at plot, farm and landscape level fulfilling and integrating many policy areas, and 6) *to help the Union address international environmental and climate challenges more effectively, as Sustainable Development Goals*.

The key European policies related to biodiversity are the Pan-European 2020 Strategy, the Strategic Plan for Biodiversity 2011-2020 and the related Aichi Biodiversity Targets, and the **EU Biodiversity Strategy to 2020** (UNEP 2015). The EU Biodiversity Strategy to 2020 aims to halt the deterioration and achieve measurable improvement in the status of all species and habitats covered by EU nature legislation. The strategy uses targets and actions to improve integration between and positive contributions from the agriculture, forest and fisheries sectors, for example, and it is anticipated that instruments within the CAP will contribute to biodiversity targets. The strategy also aims to develop green infrastructure and to improve connectivity between Natura 2000 sites (EC 2014).

The threats to biodiversity include habitat fragmentation, intensive agriculture, land abandonment, climate change, desertification and fires. Even within agriculture, almost half of European livestock breeds are at risk of extinction due to the industrialization of farming and the global trade in agricultural products and breeding stocks. Permanent grasslands, which integrates long term herbaceous/woody perennials in agriculture and forest areas improves water quality, are a useful technology to help preservation and promote biodiversity. Permanent grasslands enhance biodiversity by creating different ecological



niches for microorganisms, bryophytes, vascular plants, invertebrates and vertebrates. Rosa-García et al. (2012) reported that goats and sheep fed on different vegetation types (shrubs and herbaceous) had fewer health problems than when they only consume herbaceous vegetation and this management modified invertebrates biodiversity at plot, farm and landscape levels.

The **Natura 2000** network, created in 1994, included areas associated with the EU Birds Directive (79/409/CEE) on the conservation of wild bird species and the EU Habitats Directive (92/43/CEE) focused on the conservation of natural habitats and the wild flora and fauna. The Birds Directive aims to protect threatened species and habitats where they feed and nest. As most threatened species are associated with specific habitats, measures are needed to preserve selected habitats. Many of these habitats are composed of, at least partially, by woody vegetation, and therefore, often include silvopasture practices. Each member state of the EU has to identify the important areas and establish management plans combining long-term conservation and socio-economical activities. Across the EU, the Natura 2000 network accounts for 27,200 protected areas covering more than one hundred million hectares (788,000 ha terrestrial) of the EU territory (18.2%). The network consists of the so-called ‘special protection areas’ (SPA) designated to protect endangered bird species and ‘sites of community importance’ (SCI) established for the protection of habitat types and species listed in the Habitats Directive. However, it is argued that the current implementation will need to be strengthened if the union intends to achieve its 2020 biodiversity targets.

The Birds and Habitat Directives are linked to the “conditionality” or “cross-compliance” mechanism in the CAP Pillar I, supported by the agri-environmental measures within Pillar II, and are very important for protecting agricultural areas of high biodiversity, which are under a constant pressure and include for instance Fennoscandian wooded pastures and meadows, High Nature Value farmland (dehesas, montados, wetlands) and other extensive systems, and natural and semi-natural grasslands. Key farmland habitats and features that require preservation and maintenance include: hedgerows, copses or small woodlands, single trees and bushes in fields, trees and bushes traditionally used for pollarding and coppicing, large veteran trees in agricultural areas, orchards, olive groves, and nut groves with old mature trees (EC 2014), most of them linked to the presence of woody vegetation and therefore to silvopasture practices. Abandonment of extensive traditional farming practices is the most important pressure on key farmland habitats and species of Community interest, together with the intensification of other practices (EU guidance document Farming for Natura 2000).

The Natura 2000 sites are supported by Pillar I of the CAP (the European Agricultural Guarantee Fund (EAGF)) and Pillar II of the CAP (the European Agricultural Fund for Rural Development (EAFRD)). However, the Natura 2000 sites are also supported through the Programme for the Environment and Climate Action (LIFE). Other EU funds available are the European Structural Funds: Regional Development Fund (ERDF), Cohesion Fund (CF) and Social Fund (ESF) that are now integrated. Payments for Ecosystem Services (PES) schemes can also provide an incentive for the conservation and restoration of farmland biodiversity



and habitats in order to safeguard (or potentially increase) the provision of the ecosystem services they provide.

The broad objectives of the **European Strategy on Sustainable Development** cut across many sectors including agriculture and forestry. One of the sustainable development objectives is to manage natural resources in a responsible way, to protect habitats and ecosystems, and to halt the loss and then promote biodiversity. All of them are linked with permanent pastures and silvopasture as it was mentioned in previous sections.

The EU **Bioeconomy Strategy** (EC 2012) entitled ‘innovating for Sustainable Growth: A Bioeconomy for Europe’ proposes a comprehensive approach to address the ecological, environmental, energy, food supply and natural resource challenges faced by Europe and the world. It aims to improve the knowledge base and foster innovation to achieve productivity increases while ensuring sustainable resource use and alleviating stress on the environment. A successful bioeconomy has the potential to create economic growth and jobs, to reduce fossil fuel dependence, and to improve economic and environmental sustainability. A key bioeconomy concept is the circular economy where the “waste” from the creation of one product should be used as raw material for a second product. The strategy aims thus to support resource efficiency, sustainable use of natural resources, protection of biodiversity and habitats, as well as provision of ecosystem services. Grasslands can contribute to the circular economy as a primary and renewable source of products including food and biomass energy. Permanent grasslands can also support the Bioeconomy Strategy by enabling increased carbon sequestration on agricultural land.

The goal of the **European Climate Change Programme** (ECCP), launched in 2000, was to develop an EU strategy to implement the Kyoto Protocol. It comprised policy measures to reduce greenhouse gas emissions and improve energy efficiency. Even though the EU-28 reduced GHG emissions by 24% between 1990 and 2012, new policies are needed to meet the target of a 40% reduction below levels in 1990 by 2030 (EU 2016). Permanent grasslands are key to contribute to carbon sequestration, the reduction in the increase in the atmospheric concentration of greenhouse gases, and adaptation to climate change, mainly if silvopasture is implemented. Compared to other agricultural options, silvopasture will generally increase carbon storage per unit of area (Dixon et al. 1994; Nair et al. 2008; Upson et al. 2016). In addition, silvopasture is anticipated to reduce soil erosion (Palma et al. 2007) and reduce the airborne particulate matter in the air to allow better breathing of healthy air (Sili et al. 2015).

The EU indicative measures that may be included in the information on Land Use Change and Forest (LULUCF) actions submitted pursuant to Article 10(2)(d) (Decision 529/2013/EU) specifies that preventing grassland/cropland conversion to native vegetation, increasing productivity, improving nutrient management as well as introducing more appropriate species, in particular deep-rooted species are examples to improve grazing and pasture management with regard to climate change.



The **European Forestry Strategy** (EU 2013b) aims to ensure that the multifunctional potential of EU forests is managed in a sustainable and balanced way, enabling the “correct” functioning of ecosystem services. It highlights the contribution of forests to employment, well-being, the environment, and rural development. The Forest Strategy from 2013 specifically mentioned agroforestry and therefore silvopasture. It states: “Member States should use the opportunities given in the new Rural Development Regulation and prioritise investments in: (...) achieving nature and biodiversity objectives; adapting to climate change; conserving genetic resources; forest protection and information; and creating new woodland and agroforestry systems”.

Conclusions

There is a global and European recognition of the role that permanent pastures can play to provide products but also to deliver highly important ecosystem services.

4. The CAP as a whole

The current CAP includes requisites to be paid (Cross-compliance, also known as Conditionality) and the payments carried out by Pillar I if lands are eligible (Direct payments) and on a voluntary basis (greening) if the farmer fulfils some requisites. Therefore, Pillar I provides payments considering two main sections: Direct Payments and greening. It is important to highlight that eligibility depends on the conditions of the country (for example the established local practices selection by some countries, makes eligible permanent grassland areas that are not eligible in other countries to receive direct payments) and the amount of money received by farmers on the historic rights associated to the payments. Pillar II of the CAP, also known as the Rural Development Programme (RDP) payments, are paid based on the fulfilment of some requisites or actions that voluntarily are carried out by farmers usually linked with the rural development and environmental improvements. The Rural Development programmes are currently linked to 118 RDP at European scale, coming from 88 CAP RDPs from the period 2007-2013 as a result, for example, of France splitting their unique National RDP in several Regional RDP. The fact that the CAP is split in many RDPs is important to (i) perform the payments based on local activities, and (ii) to be more targeted. This favours the needed sustainability transition of farming systems in Europe, but complicates the joint analysis.

3.1. Cross-compliance

Those plots receiving CAP funds have to fulfil CAP provisions. Environment preservation is promoted in both Pillars through the “cross-compliance” or “conditionality” concept. Cross-compliance applies to Pillar I but also to most environmental payments forming part of the Rural Development policy (Pillar II) since CAP 2007-2013. From 2008, it applies also for certain wine sector payments. Farmers receiving these funds have to comply with 13 Statutory Management Requirements (SMR) and standards for maintaining the land in Good Agricultural and Environmental Condition (GAEC). Both, SMR and GAEC, are commonly known as cross-compliance or conditionality.



3.1.1. Statutory Management Requirements

At present, the European Commission identifies 13 Statutory Management Requirements (SMRs), that build on a number of European directives and regulations, after abolishing some from the previous CAP. Some of them can be linked with grassland or livestock production that is compulsory to be fulfilled if the CAP payments are carried out (Table 1).

Table 1. Current Statutory Management Requirements (SMR), former SMR number, Directives and Regulations linked and year of introduction.

SMRs	Directives and Regulations that apply	Year of introduction
SMR 1 Protection of water against pollution caused by nitrates	Council Directive 91/676/EEC (Nitrates Directive)	2005
SMR 2 Conservation of wild birds	Directive 2009/147/EC of the European Parliament (Birds Directive)	2005
SMR 3 Conservation of natural habitats and of wild flora and fauna	Council Directive 1992/43/EEC (Habitats Directive)	2005
SMR 4 Food and feed law	Regulation (EC) No 178/2002 of the European Parliament Food Hygiene Regulations (EC) No's 852/2004 and 853/2004 Feed Hygiene Regulation (EC) No 183/2005 Regulation (EEC) No 2377/90 Regulation (EC) No 396/2005 Milk and egg producers have further specific hygiene standards in addition to the general requirements.	2006
SMR 5 Restrictions on the use of substances having hormonal or thyrostatic action and beta-agonists in farm animals	Council Directive 96/22/EC Council Directive 96/23/EC	2006
SMR 6 Pig identification and registration	Council Directive 2008/71/EC	2005
SMR 7 Cattle identification and registration	Regulation (EC) No 1760/2000 of the European Parliament and of the Council	2005
SMR 8 Sheep and goat identification and registration	Council Regulation 21/2004	2005
SMR 9 Prevention and control of transmissible spongiform encephalopathy's (TSEs)	Regulation (EC) No 999/2001 of the European Parliament and of the Council	2006
SMR 10 Plant protection products (PPPs)	Regulation (EC) No 1107/2009 of the European Parliament and of the Council	2006
SMR 11 Minimum Standards	Council Directive 2008/119/EC	2007



for the Protection of Calves		
SMR 12 Minimum Standards for the Protection of Pigs	Council Directive 2008/120/EC	2007
SMR 13 Protection of Animals kept for Farming Purposes	Council Directive 98/58/EC	2007

3.1.2. Good Agricultural and Environmental Conditions

In the CAP (2007-2013), each country had to identify its own **Good Agricultural and Environmental Conditions** (GAEC). Some standards were compulsory and some were voluntary. The conditions cover compulsory and voluntary measures to minimise soil erosion (e.g. minimum coverage, minimal management reflecting the specific local conditions, and terraces), maintain soil organic content (e.g. crop rotation, stubble management), maintain soil structure and to ensure minimum levels of maintenance on agricultural land (e.g. minimum livestock density, permanent pasture protection, maintenance of landscape characteristics such as hedges and trees in line, in groups, isolated, field margins, and preventing unwanted scrub encroachment on agricultural land) (**Error! Reference source not found.**).

Table 2. Good Agricultural and Environmental Conditions in CAP 2007-2013 (Annex 3 Regulation 73/2009)

Issue	Compulsory standards	Optional standards
Soil erosion: protect soil through appropriate measures	<ul style="list-style-type: none"> Minimum soil cover Minimum land management reflecting site-specific conditions 	<ul style="list-style-type: none"> Retain terraces
Soil organic matter: maintain soil organic matter levels through appropriate practices	<ul style="list-style-type: none"> Arable stubble management 	<ul style="list-style-type: none"> Standards for crop rotations
Soil structure: maintain soil structure through appropriate measures		<ul style="list-style-type: none"> Appropriate machinery use
Minimum level of maintenance: ensure a minimum level of maintenance and avoid deterioration of habitats	<ul style="list-style-type: none"> Retention of landscape features including, where appropriate, hedges, ponds, ditches, trees in line, in groups, or isolated and field margins Avoiding the encroachment of unwanted vegetation on agricultural land Protection of permanent pasture 	<ul style="list-style-type: none"> Minimum livestock stocking rates and/or appropriate regimes Establishment and/or retention of habitats Prohibition of the grubbing up of olive trees Maintenance of olive groves and vines in good condition
Protection and management of water: protect water against pollution and run-off, and manage the use of water	<ul style="list-style-type: none"> Establishment of buffer strips along with watercourses Where use of water for irrigation is subject to authorisation, compliance with authorisation procedures 	

Within the 2014-2020 CAP, GAEC activities relating to crop rotation or permanent pasture protection are included as a condition in Pillar I as part of the 'greening' payments at farm (crop rotation for those farms with large eligible areas) or at national level (permanent pastures). The retention of landscape features (hedges, trees in line, in group or isolated), from which some of them act as forage for livestock has been also included within the



Ecological Focus Area of Pillar I as well as buffer strips (Regulation 1307/2013). Therefore, current GAECs (3) are related to environment, climate change, and good agricultural condition land linked to (a) water (GAEC 1 to GAEC 3), (b) soil and carbon stock (GAEC 4 to GAEC 6) and (c) landscape, minimum level of maintenance (GAEC7).

Table 3. Good Agricultural and Environmental Conditions in the CAP 2014-2020 (Annex 2, Regulation 1306/2013)

Issue	Standards	
Water	GAEC 1	Establishment of buffer strips along with watercourses
	GAEC 2	Where use of water for irrigation is subject to authorisation, compliance with authorisation procedures
	GAEC 3	Protection of groundwater against pollution: prohibition of direct discharge into groundwater and measures to prevent indirect pollution of groundwater through discharge on the ground and percolation through the soil of dangerous substances, as listed in the Annex to Directive 80/68/EEC in its version in force on the last day of its validity, as far as it relates to agricultural activity
Soil and carbon stock	GAEC 4	Minimum soil cover
	GAEC 5	Minimum land management reflecting site-specific conditions to limit erosion
	GAEC 6	Maintenance of soil organic matter level through appropriate practices including ban on burning arable stubble, except for plant health reasons
Landscape, minimum level of maintenance Food safety	GAEC 7	Retention of landscape features, including where appropriate, hedges, ponds, ditches, trees in line, in group or isolated, field margins and terraces, and including a ban on cutting hedges and trees during the bird breeding and rearing season and, as an option, measures for avoiding invasive plant species

The presence of woody vegetation that is in a lot of cases associated to permanent grassland areas is known to help to minimize soil erosion, maintain and even steadily increase the amount of soil organic matter content, improve soil structure (Homar-Sánchez et al. 2014) and maintain the minimum agricultural land (by grazing for example). However, agroforestry was rarely mentioned within the 2007-2013 CAP. Instead of propose managing woody vegetation with the associated products and services they may deliver as highlights the bioeconomy premises that will avoid encroachment or the invasion of weeds (to maintain GAEC) what is usually promoted is the reduction of encroachment through ploughing and the destruction of vegetation without further use, therefore losing the enormous potential that this raw material has. Since 2009, activities related to maintenance of landscape characteristics have been compulsory, with specific mentions in Austria, Cyprus, the Czech Republic, Finland, Germany, Hungary, Ireland, Italy, Luxembourg, Malta, Slovakia, Portugal, Slovenia and Spain, but in some cases, no increase was allowed (Slovenia). As mentioned before, most of these activities are in line with the use of permanent grasslands that include woody perennials, as it is a demonstrated way to enhance flora and fauna biodiversity, increase resource use efficiency (therefore reducing nutrient leaching), reduce erosion, increase soil organic matter and reduce encroachment.



In spite of this, cross-compliance conditions for Pillar I have been criticized from both sides, some arguing that they are too lenient, while others arguing that they impose excessive administrative costs. The European Court of Auditors has recently concluded that there are major insufficiencies in cross-compliance conditions that result in rather ineffective conditionality (European Court of Auditors 2009). The main reason is the lack of effective control of the fulfilment of the GAEC due to the lack of means.

4.1. Pillar I

4.1.1. Direct Payments

There are three main types of lands that are “eligible” to get paid the direct payment of the CAP: arable lands, permanent grasslands and permanent crops. From those, only two are suitable to be considered as a “grassland land use” such as arable lands that includes temporary grasslands and Permanent grasslands that considers those temporary grasslands that are over 5 years old. Permanent crops are not considered as a source of forage for livestock (forage leaves for example) nowadays but they may be so in the future (Fernández et al. 2019). We will make this evaluation based on arable lands focussed on temporary grasslands and permanent grasslands.

4.1.1.1. Arable land

Arable land means “land cultivated for crop production or areas available for crop production but lying fallow, including areas set aside in accordance with previous regulations (1257/1999, 1698/2005 1305/2013)” and linked to different sectors (1308/2013). The word “crop” means:

- (a) a culture of any of the different genera defined in the botanical classification of crops;
- (b) a culture of any of the species in the case of Brassicaceae, Solanaceae, and Cucurbitaceae;
- (c) land lying fallow;
- (d) grasses or other herbaceous forage.

Once the concept of arable land is defined in 1307/2013, this eligible land has to fulfil the “cross-compliance” which includes maintenance of landscape features such as hedgerows, isolated trees and trees in lines or groups which are usually limited to 100 trees per hectare. However, that limit shall not apply in relation to the measures referred in Articles 28 and 30 of Regulation (EU) No 1305/2013, related to agri-environment and Nature 2000 and water framework directive payments, respectively, and that are linked to Pillar II. These constraints make it difficult for farmers to include trees on their arable land, particularly when they have small plots.

Therefore, temporary grasslands are included as part of the arable land.

4.1.1.2. Permanent grassland and permanent pasture

Following the definition given in the Regulation 1307/2013 Permanent grassland and permanent pasture (together referred to as “permanent grassland”) means *“land used to grow grasses or other herbaceous forage naturally (self-seeded) or through cultivation (sown) and that has not been included in the crop rotation of the holding for five years or more; it may include other species such as shrubs and/or trees which can be grazed provided that the grasses and other herbaceous forage remain predominant as well as, where*



Member States so decide, land which can be grazed and which forms part of established local practices where grasses and other herbaceous forage are traditionally not predominant in grazing areas". This definition recognizes all types of permanent grasslands across European biogeographic regions better than in the previous CAP. Thanks to the inclusion of the concepts of "self-seeded" (annual herbaceous species) and "grasses and other herbaceous forage are traditionally not predominant in grazing areas" ecological traits linked to a species' evolutionary strategy to surviving seasonal extremes (e.g. summer droughts) or disturbances are included. Therefore, the definition includes those ecosystems with plants that overcome summer droughts through the strategy of becoming a seed but that leaves land without vegetation during the summertime, as well as the "woody" dominated grassland vegetation as an ecological trait to overcome also the long summer period in southern European countries, with the advantage that soils are protected and organic carbon and fertility increased for the forthcoming uses of the land including arable. The "woody" ecological trait is also able to maintain vegetation cover throughout the year as permanent pasture and therefore making the ecosystem more resilient to heavy rains and heat, and avoiding erosion. Both should be recognized as excellent strategies to make the ecosystems more resilient to drought periods, mainly within the current global climate change framework. Both strategies - annual self-seeded species as well as woody vegetation - are of high interest to have livestock farms better adapted to climate change, which will have a higher impact in southern countries.

Declaring the whole area of permanent grassland eligible depends on whether the Member States (MS) decides to adopt the pro-rata system. When the pro-rata system is not adopted, then the rules linked to woody vegetation previously mentioned for landscape features in arable lands are compulsory in permanent grasslands (100 trees per hectare), unless the area is declared as land which can be grazed and which forms part of "established local practices" (ELP) where grasses and other herbaceous forage are traditionally not predominant in grazing areas, like for example the region of Asturias in Spain.

When a Member State decides to follow a pro-rata system, the choice should apply to all permanent grassland plots of the Member State (EU 2015). This choice means that ineligible areas below 1000 m² can be eligible, but this is provided at the parcel level and not on a hectare basis, and therefore affecting differently the area eligible of the farm size. However, within the pro-rata system, the areas with scattered trees which can be grazed, known as "grazable trees" are eligible. As indicated by the EU (2015) "grazable" trees on permanent grassland, which are considered as part of the eligible area, should thus not be counted to assess whether the parcel is below or above the maximum tree density. However, the concept of grazable tree for the commission was summarized as those features "which can be grazed" and *should be actually accessible to farm animals for grazing for their full area*. Therefore, the concept of grazable tree for the European Commission is linked to the fact that the animal can access food directly from the tree, making ineligible and therefore discounting those trees that provide fruit to animals when fruits fall down to the ground. This is compulsory even if the unique aim of the tree is to act as a forage tree in some ecosystems. These trees are essential to sustain the livestock in some ecosystems, such as the dehesas in Spain, but they are discounted if this rule is followed. Another aspect related to permanent grasslands is that they can still be ploughed and reseeded for conservation purposes that sometimes are broadly used, so losing the meaning of permanent in some cases (Table 5). As we mentioned before a key aspect for grassland eligibility is the declaration of "established local practices" (ELP) label mentioned in the EU Regulation 1307/2013. ELPs are defined as any of, or a combination of, the following practices: (a) practices for areas for livestock grazing which are traditional in character and are commonly



applied on the areas concerned and (b) practices which are important for the conservation of habitats listed in Annex I to Council Directive 92/43/EEC and of biotopes and habitats covered by Directive 2009/147/EC of the European Parliament and of the Council as defined by the Regulation 639/2014. The ELP meaning that permanent grasslands may include in their definition “grasses and other herbaceous forage are traditionally not predominant in grazing areas” should be activated by the Member States. Three countries initially activated both options (a and b) within their definition of permanent pasture, favouring, therefore, the existence of woody vegetation; they are Germany, Spain and Sweden and option (a) of ELP has been activated by Greece, France, Hungary, Italy, Cyprus, Portugal and the United Kingdom

Therefore the European Commission recognizes (EC 2019) that the ecological and agricultural value of some areas with extensive traditional pastoral/agricultural systems. Member States may decide to include in the category of permanent grasslands:

- a) Land which can be grazed even though grasses and other herbaceous forage are traditionally not predominant or are absent in grazing areas. This may be justified by “Established Local Practices”.

Ten Member States decided to identify areas under established local practices in their Land Parcel Identification System (LPIS) as shown in Table 4.

Table 4. Member states that extended the definition of Permanent grasslands (PG) as established local practices arguing traditional practices of conservation of habitats (EC, 2019)

Reason Countries	CY	DE	EL	ES	FR	IE	IT	PT	SE	UK
Traditional practices	X	X	X	X	X	X	X	X	X	x
Habitat conservation		X	X	X					X	

- b) The OMNIBUS Regulation (2018), which appeared as a result of the mid-term review of the current CAP specifies that land including shrubs and/or trees which produce animal feed, provided that the grasses and other herbaceous forage remain predominant can be also considered as permanent grassland. The OMNIBUS changes linked to Permanent Grasslands eligibility can be seen in Table 5.

Table 5. Member states that extended the definition of Permanent grasslands (PG) as established local practices arguing traditional practices of conservation of habitats (EC, 2019)

Reason Countries	BG	CY	DE	EL	ES	FR	HR	IT	LT	PT	SK	UK
If ploughed non permanent grassland	X	X	X	X	X		X	X	X		X	
PG may include shrubs/trees for animal feed if herbaceous remain				X	X	X				X		



dominant												
PG may include dominant woody perennials or absent in grazing areas*				X	X	X						X

*not limited to established local practices

4.1.2. Greening

Besides the direct payments, the other compulsory multipurpose payment established within the direct payments in the 2014-2020 period is the “Payment for agricultural practices beneficial for the climate and the environment” or the so-called “greening”. It represents 30% of the payments in a compulsory way for the member state and is paid *ipso facto* to the organic farmers. Greening can be fulfilled if crop diversification, maintenance of permanent grasslands and Ecological Focus Areas are implemented.

4.1.2.1. Crop diversification

Crop diversification affects farms with large cropland area. The presence of permanent grassland or crops linked to grasses or other herbaceous forage in a farm makes crop diversification already fulfilled. So, greening is not compulsory in those holdings a) where more than 75% of the arable land is used for the production of grasses or other herbaceous forage (selected by the MS), is land lying fallow, or is subject to a combination of these uses, provided that the arable area not covered by these uses does not exceed 30 hectares; (b) where more than 75% of the eligible agricultural area of a holding is permanent grassland, is used for the production of grasses or other herbaceous forage or for the cultivation of crops under water for a significant part of the year or for a significant part of the crop cycle, or is subject to a combination of these uses, provided that the arable area not covered by these uses does not exceed 30 hectares; (c) where more than 50% of the areas of arable land declared were not declared by the farmer in his aid application of the previous year and, where based on a comparison of the geospatial aid applications, all arable land is being cultivated with a different crop compared to that of the previous calendar year and (d) that are situated in areas north of 62nd parallel or certain adjacent areas. Attending to this, farms with high share of permanent grasslands fulfil the greening requirements.

4.1.2.2. Permanent Grassland

Permanent grasslands have a specific requirement for the greening payment at Member state level. Member States shall ensure that the ratio of areas of permanent grassland to the total agricultural area declared by the farmers will not decrease by more than 5% compared to a reference ratio established by Member States in 2015. This ratio may be applied at national or regional level, with most countries selecting the national level with the exception of Belgium, France, Germany and UK, which will ensure a better fulfilment at regional level. Nine MS designated all grassland in Natura 2000, but five and nine different MS designated the grassland between 50 to 100% and less than 50% of the grassland they have as part of in Natura 2000, respectively. Member States shall designate permanent grasslands which are in environmentally sensitive areas (Environmentally Sensitive Permanent Grasslands) covered by Directives 92/43/EEC or 2009/147/EC, including in peat and wetlands, which



need strict protection in order to meet the objectives of those Directives but also go beyond these areas. ESPG was also designated outside Natura 2000 (Czech Republic, Latvia, Luxembourg and Wales (UK)). Malta did not declare permanent grasslands. Due to the large area of permanent grasslands of Europe with woody vegetation, this measure is highly relevant for those grasslands areas linked to agroforestry, protecting the already existing agroforestry systems linked to silvopasture practices in both the south (i.e. dehesa) and the north (i.e. grazed orchards). However, this measure could include ploughing and reseeding, necessary for the correct maintenance of some permanent grassland, but that may be extended to those where this maintenance is not needed. Therefore, this measure may degrade permanent grasslands and not fulfil the concept of permanent pasture, which is the pasture that has not been included in the crop rotation of the holding for five years or more. However, in some areas ploughing is needed to maintain the good state of permanent grasslands. Countries fulfilling these specificities are shown in Table 5.

4.1.2.3. Ecological Focus Areas

Ecological focus areas (EFA) should be established occupying at least 5% of the arable area of the farms with a farm area larger than 15 hectares (excluding permanent grassland). Implementing the greening starts by the state's choice of one or more of 10 EFA options. The option 4 is related with “buffer strips, including buffer strips covered by permanent grassland, provided that these are distinct from adjacent eligible agricultural area”, measure that was initially selected by 17 MS out of 28 EU MS.

4.1.3. Conclusions

Grasslands are funded by the CAP in two types of eligible lands: arable crops allocated to temporary grasslands and permanent grasslands (those grasslands that are over 5 years old). The presence of grasslands is recognized in the different sections of the CAP as an activity that fulfils many ecosystem services when compared with purely croplands areas as shown by the greening requirements.

4.2. Pillar II: Rural Development Programmes

4.2.1. CAP Grassland Framework

4.2.1.1. CAP 2007-2013

The Rural Development Program (RDP) 2007-2013 was composed of 44 measures, of which 18 dealt with the first axis (improving the competitiveness of the agricultural and forestry sector), 13 with the second axis (improving the environment and the countryside), while only eight and five are related to the third (quality of life in rural areas and diversification of the rural economy) and fourth (implementation of the Leader approach) axes respectively

6). Grassland promotion can be linked to all of them as they are associated with land sustainable use, farm sustainability improvement and social enjoyment.



Before describing the most relevant policies linked to grasslands within the different axis of the RDP of 2007-2013, it is important to provide a general overview of the RDPs. Axis 2 is the most important, firstly from a budget point of view, as it received 45% of the budget, followed by Axis 1 (33%), Axis 3 (13%) and Axis 4 (6%). However there are country differences among MS: Axis 1 was relatively important in Belgium, Spain, Poland, Portugal, Hungary, Cyprus and Latvia with shares over 40%; in contrast Ireland (over 80%), the UK and Austria allocated resources mainly to Axis, while Axis 3 was relatively highly represented in Bulgaria, Malta, the Netherlands and Germany. As can be seen in **Error! Reference source not found.**, there were differences in the number of measures implemented per MS. There are some regions or countries like Ireland that activate a small number of measures and there are others like France that activated a large number of measures.

In some countries, the 2007-2013 RDP was implemented at a regional level (e.g. Germany and Spain) and in some countries (e.g. France) the RDP was established for the whole country. The 17 RDPS in Spain potentially allow the application of the most relevant measures to the different environments of the Spanish regions, whilst a single RDP (such as in France) makes the implementation and evaluation of the impact of the different measures at national level easier (France subsequently developed several RDPs within the 2014-2020 CAP). The different measures involved as well as the implementation of them at different territorial scales make it difficult to evaluate the RDPs when a focus on the use of land and especially agroforestry is intended. Moreover, the differences in the EU territory also makes it difficult to carry out the evaluation at a European level, because the same measure may have a different impact depending on the biogeographic and social conditions of the area, where each specific measure is implemented. Socio-economic aspects of the different RDP regions of Europe have been summarized by the EU (2013). The evaluation of the RDP is also difficult because countries may intend to apply measures that are eventually not used or supported at a lower level than initially intended. Moreover, during the 2014-2020 CAP, measures can be open yearly.

Within the 2007-2013 CAP, the most popular measure of the four axes was the Measure 214 (agri-environment payments, 24%), followed by Measures 121 (modernisation of agricultural holdings, 12.1%), 212 (payments to farmers in areas with handicaps other than mountain areas, 6.9%) and 211 (natural handicap payments other than mountain areas, 6.9%).

Table 6. Measures of the Rural Development Programme Period 2007-2013.

Axis	Cluster	Measures
1. Improving the competitiveness of the agricultural and forestry sector	1.1. Measures aimed at promoting knowledge and improving human potential	111. Vocational training and information actions, including diffusion of scientific knowledge and innovative practices, for persons engaged in the agricultural, food and forestry sectors 112 Setting up of young farmers 113. Early retirement of farmers and farmworkers 114. Use of farm and forestry advisory services 115. Setting up of management, relief and advisory services
	1.2. Measures aimed at restructuring and developing physical potential and promoting innovation	121. Modernisation of agricultural holdings 122. Improving the economic value of forests 123. Adding value to agricultural and forestry products



		124. Cooperation for development of new products, processes and technologies in the agriculture and food sector and in the forestry sector 125. Infrastructure related to the development and adaptation of agriculture and forestry 126. Restoring agricultural production potential damaged by natural disasters and introducing appropriate prevention actions
	1.3. Measures aimed at improving the quality of agricultural production and products	131. Meeting standards based on Community legislation 132. Participation of farmers in food quality schemes 133. Information and promotion activities
	1.4. Transitional measures for the Czech Republic, Estonia, Cyprus, Latvia, Lithuania, Hungary, Malta, Poland, Slovenia and Slovakia	141. Supporting semi-subsistence agricultural holdings undergoing restructuring 142. Setting up of producer groups
2. Improving the environment and the countryside	2.1. Measures targeting the sustainable use of agricultural land	211. Natural handicap payments to farmers in mountain areas 212. Payments to farmers in areas with handicaps, other than mountain areas 213. Natura 2000 payments and payments linked to Directive 2000/60/EC 214. Agri-environment payments 215. Animal welfare payments 216. Support for non-productive investments
	2.2. Measures targeting the sustainable use of forestry land	221. First afforestation of agricultural land 222. First establishment of agroforestry systems on agricultural land 223. First afforestation of non-agricultural land 224. Natura 2000 Payments 225. Forest-environment payments 226. Restoring forestry potential and introducing prevention actions 227. Support for non-productive investments
3. Quality of life in rural areas and diversification of the rural economy	3.1. Measures to diversify the rural economy	311. Diversification into non-agricultural activities 312. Support for the creation and development of micro-enterprises 313. Encouragement of tourism activities
	3.2. Measures to improve the quality of life in rural areas	321. Basic services for the economy and rural population 322. Village renewal and development 323. Conservation and upgrading of the rural heritage
	3.3. Training and information	331 Training and information for economic actors operating in the field covered by Axis 3
	3.4. Skill acquisition, animation and implementation	341 Skills acquisition and animation with a view to preparing and implementing a local development strategy
4. Implementation of the Leader approach	4.1. Local development strategies	411 Local development strategies. Competitiveness. 412 Local development strategies. Environment/land management. 413 Local development strategies. Quality of life/diversification.
	4.2. Inter-territorial and transnational cooperation	421 Transnational and inter-regional cooperation
	4.3. Running the local action group, acquiring skills and animating the territory	431 Running the local action group, skills acquisition, animation



In 2007-2013, overall 37% of Axis 1 funding was allocated to Measure 121 (farm modernization), followed by 18% and 15% allocation to Measures 123 (adding value to agricultural and forestry products) and 125 (improving and developing infrastructure related to the development and adaptation of agriculture and forestry) respectively. In Axis 2, 53% of the money was allocated to Measure 214 (agri-environment) followed by Measures 212 (payments to farmers in areas with handicaps, other than mountain areas, 17%) and 211 (natural handicap payments to farmers in mountain areas, 15%). The allocation of money in Axis 3 is more evenly allocated with 28, 26, 16 and 10% allocated to Measures 321 (basic services for the economy and rural population), 322 (village renewals and development), 313 (encouragement of tourism activities) and 323 (conservation and upgrading of the rural heritage), respectively. In Axis 4, 67% of the budget was allocated to Measure 413 (local development strategies. Quality of life/diversification) followed by Measure 431 (running the local action group, skill acquisition, animation) with 17% of the share.

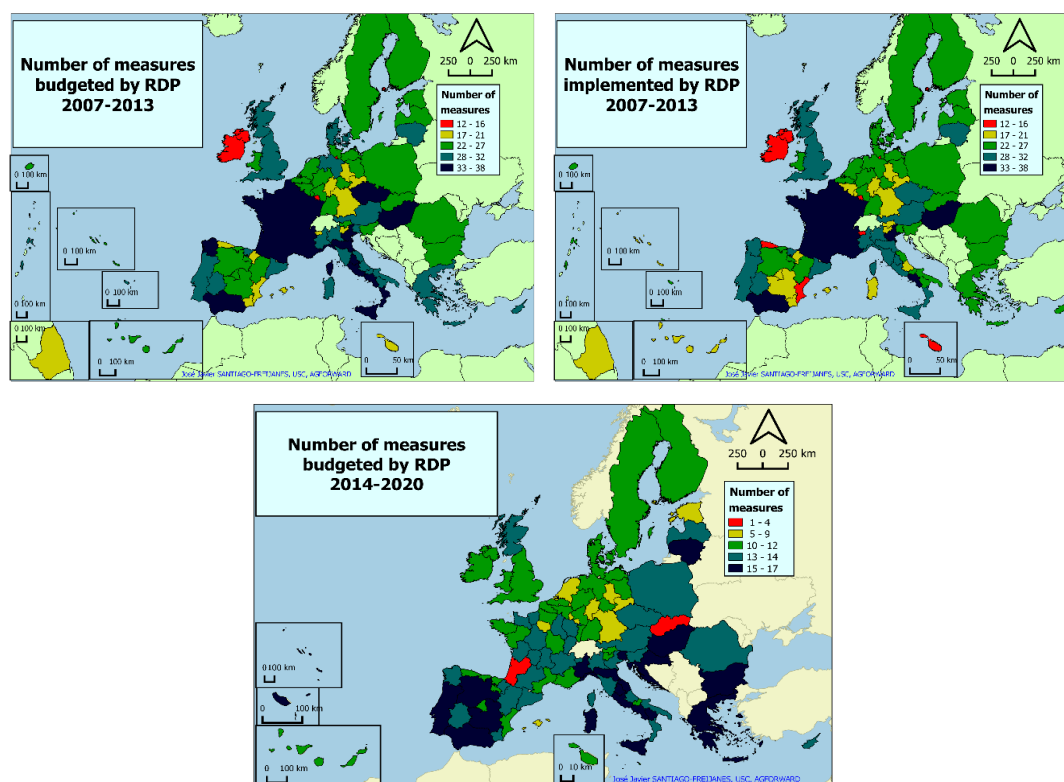


Figure 1. Number of measures budgeted and implemented in the 2007-2013 RDP and the number of measures budgeted in the 2014-2020 RDP

The maximum numbers of measures budgeted and implemented in an individual region and country in 2007-2013 were 37 and 38 respectively (**Error! Reference source not found.**). In 2007-2013, Ireland budgeted the lowest number of measures. France as well as Galicia, Andalucía, Hungary, the Czech Republic, Malta, Sicily, Calabria, Campania, Lazio, Umbria, Veneto and Emilia Romagna budgeted for the largest number of measures. Some regions, like Abruzzo, budgeted for a large number of measures.



Pillar II: CAP 2014-2020

Second Pillar of the CAP 2007-2012 is regulated by EU regulations 1303/2013 and 1305/2013. It consists of local Rural Development Program (RDP) founded not only by EU EAFRD but also by the MS. Officially, there are 118 RDPs but nine of them are general frames of some Member States which have more than one RDP-region. France made three frame programmes, while Germany, Italy and Spain made two. Other Member States with more than one RDP did not make framework programmes. In addition, France has five overseas regions, which are not evaluated in this study. Then we evaluated 104 regional RDPs from territories situated on the continent and the neighbouring islands (Figure 2 and 3).

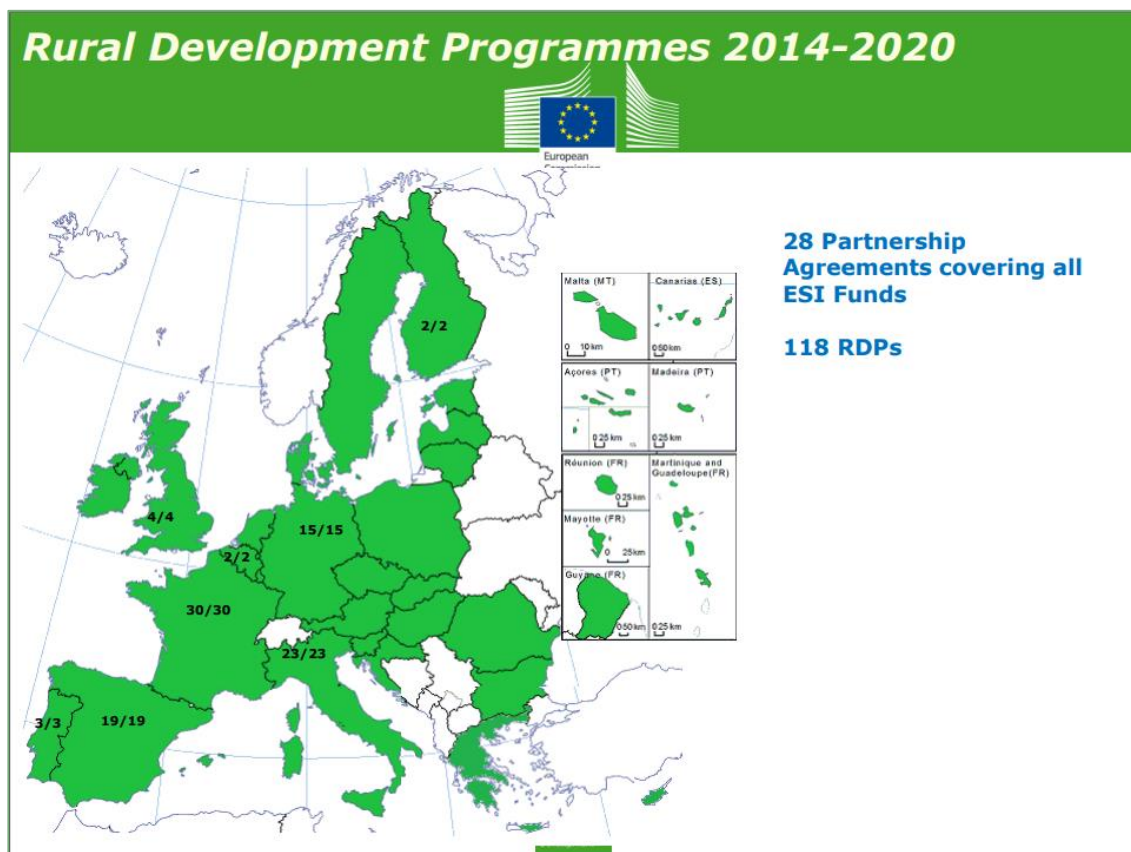


Figure 2. Number of RDPs in each country (Source https://ec.europa.eu/info/sites/info/files/food-farming-fisheries/key_policies/documents/rdp-2014-20-list_en.pdf)

In 2014-2020, the structure of the RDPs is different from the previous period as it is divided into measures and sub-measures that are split in more clearly defined operations (7). The understanding of how the operations are linked to land use has been improved. RDPs are organized in sixteen measures common to all Member States; each RDP may develop them or not, but the sixteen measures cannot be changed or new ones established during the whole 2014-2020 period. In turn, these measures have a variable number of sub-measures, also common to all programs. From there, each program designs several operations by themselves that imply a greater degree of concreteness than the sub-measures.



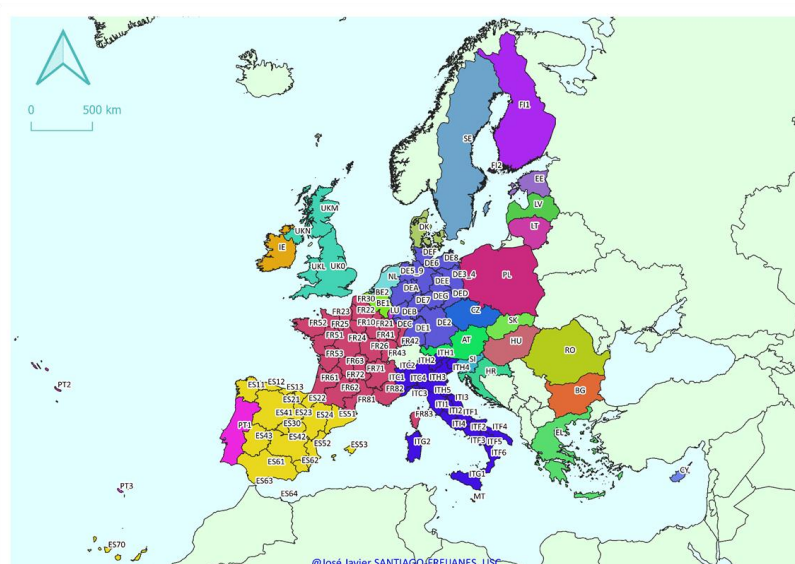


Figure 3. Location of every RDP

Table 7. Measures of the Rural Development Programme Period 2014-2020

Measure	Description	Article	Description
M01	Knowledge transfer and information actions	article 14	Knowledge transfer and information actions
M02	Advisory services, farm management and farm relief services	article 15	Advisory services, farm management and farm relief services
M03	Quality schemes for agricultural products, and foodstuffs	article 16	Quality schemes for agricultural products, and foodstuffs
M04	Investments in physical assets	Article 17	Investments in physical assets
M05	Restoring agricultural production potential damaged by natural disasters and catastrophic events and introduction of appropriate prevention actions	article 18	Restoring agricultural production potential damaged by natural disasters and catastrophic events and introduction of appropriate prevention actions
M06	Farm and business development	article 19	Farm and business development
M07	Basic services and village renewal in rural areas	article 20	Basic services and village renewal in rural areas
M08	Investments in forest area development and improvement of the viability of forests	article 21	Investments in forest area development and improvement of the viability of forests
		article 22	Afforestation and creation of woodland
		article 23	Establishment of agroforestry systems
		article 24	Prevention and restoration of damage to forests from forest fires and natural disasters and catastrophic events
		article 25	Investments improving the resilience and environmental value of forest ecosystems
		article 26	Investments in forestry technologies and in processing, in mobilising and in the marketing of forest products
M09	Setting-up of producer groups and organisations	article 27	Setting-up of producer groups and organisations
M10	Agri-environment-climate	article 28	Agri-environment-climate
M11	Organic farming	article 29	Organic farming
M12	Natura 2000 and Water Framework Directive payments	article 30	Natura 2000 and Water Framework Directive payments
M13	Payments to areas facing natural or other specific constraints	article 31	Payments to areas facing natural or other specific constraints
		article 32	Designation of areas facing natural and other specific constraints
M14	Animal welfare	article 33	Animal welfare
M15	Forest-environmental and climate services and forest conservation	article 34	Forest-environmental and climate services and forest conservation
M16	Co-operation	article 35	Co-operation
M17	Risk management	article 36	Risk management
M18	Crop, animal, and plant insurance	article 37	Crop, animal, and plant insurance
M19	Mutual funds for adverse climatic events, animal and plant diseases, pest infestations and environmental incidents	article 38	Mutual funds for adverse climatic events, animal and plant diseases, pest infestations and environmental incidents
		article 39	Income stabilisation tool



	article 40	Financing of complementary national direct payments for Croatia
	article 41	Rules on the implementation of the measures
	article 42	LEADER local action groups
	article 43	LEADER start-up kit
	article 44	LEADER co-operation activities
	article 45	Investments
	article 46	Investments in irrigation
	article 47	Rules for area related payments
	article 48	Revision clause
	article 49	Selection of operations
	article 50	Rural area definition
	article 51	Funding technical assistance
	article 52	European network for rural development
	article 53	European Innovation Partnership network
	article 54	National rural network

The whole analysis of the CAP 2014-2020 shows that a total number of 1,518 operations within the 16 measures were developed for the 28 EU countries as shown in Table 8.

Table 8. Number of operations per measure and country of the Rural Development Programme Period 2014-2020

Rural Development Programs		M01	M02	M03	M04	M05	M06	M07	M08	M09	M10	M11	M12	M13	M14	M15	M16
AT	Austria	0	0	0	0	0	0	0	0	0	6	0	0	1	1	0	0
BE2	Flanders	0	0	0	0	0	0	0	1	0	16	2	0	0	0	0	0
BE3	Wallonia	0	0	0	0	0	0	1	0	0	9	0	3	2	0	0	0
BG	Bulgaria	0	0	0	1	0	0	0	0	0	3	2	0	0	1	0	0
CY	Cyprus	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0
CZ	Czech	0	0	0	0	0	0	0	1	0	4	1	0	1	2	0	0
DE1	Baden-Württemberg	0	0	0	0	0	0	0	0	0	14	0	0	0	1	0	0
DE2	Bayern	0	0	0	0	0	0	0	0	0	10	0	0	1	0	0	0
DE3_4	Berlin und Brandenburg	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0
DE5_9	Niedersachsen + Bremen	0	0	0	1	0	0	1	0	0	13	0	0	0	0	0	0
DE7	Hesse	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0
DE8	Mecklenburg-Vorpommern	0	0	0	0	0	0	0	0	0	4	0	0	0	1	0	0
DEA	Nordrhein-Westfalen	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0
DEB	Rheinland-Pfalz	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0
DEC	Saarland	0	0	0	0	0	0	0	1	0	2	0	1	2	0	0	0
DED	Sachsen	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0
DEE	Sachsen Anhalt	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0
DEF	Schleswig-Holstein	0	0	0	0	0	0	0	0	0	2	2	1	0	0	0	0
DEG	Thüringen	0	0	0	0	0	0	0	0	0	5	1	0	1	0	0	0
DK	Denmark	0	0	0	1	0	0	0	1	0	2	0	0	0	0	1	0
EE	Eesti	0	0	0	0	0	0	0	0	0	4	2	0	0	1	0	0
EL	Greece	0	0	0	1	0	0	0	1	0	2	2	0	0	0	0	1
ES11	Galicía	1	0	0	0	0	0	0	2	0	3	2	0	2	0	1	0
ES12	Asturias	0	0	0	2	0	0	0	2	0	1	2	0	2	0	0	0
ES13	Cantabria	0	0	0	2	0	0	0	2	0	1	1	0	2	0	0	0
ES21	Euskadi	0	0	0	1	0	0	0	2	0	3	0	0	0	0	0	0
ES22	Navarra	0	0	0	1	0	0	1	2	0	6	2	2	1	0	0	0
ES23	La Rioja	0	0	0	0	0	0	0	1	0	4	1	0	0	0	0	0
ES24	Aragón	0	0	0	2	0	0	0	3	0	4	1	1	0	0	0	0
ES30	Madrid	0	0	0	1	0	0	0	1	0	2	2	0	0	0	0	1
ES41	Castilla y Leon	0	0	0	0	0	0	1	1	0	4	2	0	0	0	0	0
ES42	Castilla-La Mancha	0	0	0	2	0	0	0	2	0	3	2	1	0	1	1	0
ES43	Extremadura	0	0	0	3	0	0	0	3	0	2	1	0	3	0	0	0
ES51	Cataluña	0	0	0	0	0	0	0	1	0	5	1	0	3	0	0	0
ES52	València	0	0	0	0	0	0	0	1	0	2	0	0	2	0	0	0
ES53	Illes Balears	0	0	0	1	0	0	0	1	0	0	1	0	2	0	0	0
ES61	Andalucía	1	1	0	2	0	0	0	4	0	2	2	0	3	0	0	0
ES62	Murcia	0	1	0	0	0	0	0	1	0	2	0	0	2	0	0	0
ES70	Canarias	0	0	0	0	0	0	0	2	0	10	2	0	0	0	0	0
FI1	Finland (Mainland)	0	0	0	1	0	0	0	0	0	4	1	0	1	2	0	0
FI2	Åland	0	1	0	0	0	0	0	0	0	6	2	0	0	0	0	0
FR10	Ile de France	0	0	0	0	0	1	0	1	0	24	2	0	0	0	0	0



FR21	Champagne-Ardenne	0	0	0	0	0	0	0	0	0	30	0	2	1	0	0	0
FR22	Picardie	0	0	0	0	0	0	0	2	0	28	2	2	0	0	0	0
FR23	Haute-Normandie	0	0	0	0	0	0	0	1	0	22	2	1	0	0	0	0
FR24	Centre - Val de Loire	0	0	0	0	0	0	0	0	0	26	2	1	0	0	0	0
FR25	Basse-Normandie	0	0	0	0	0	0	1	1	0	28	2	0	1	0	0	0
FR26	Bourgogne	0	0	0	0	0	0	0	0	0	32	2	2	2	0	0	0
FR30	Nord-Pas-de-Calais	0	0	0	2	0	1	0	1	0	27	2	2	0	0	0	0
FR41	Lorraine	0	0	0	0	0	1	3	1	0	33	2	2	2	0	0	0
FR42	Alsace	0	0	0	4	0	1	0	0	0	27	2	0	2	0	0	0
FR43	Franche Comte	0	0	0	0	0	0	2	0	0	28	2	1	2	0	0	0
FR51	Pays de la Loire	0	0	0	1	0	1	1	1	0	29	2	0	1	0	0	0
FR52	Bretagne	0	0	0	2	0	0	0	0	0	19	2	2	1	0	0	0
FR53	Poitou-Charentes	0	0	0	0	0	0	0	1	0	22	2	2	1	0	0	1
FR61	Aquitaine	0	0	0	0	0	0	1	0	0	29	2	2	1	0	0	0
FR62	Midi-Pyrenees	0	0	0	1	0	0	1	1	0	17	2	0	2	0	0	0
FR63	Limousin	0	0	0	1	0	0	3	1	0	24	2	0	2	0	0	0
FR71	Rhone Alpes	0	0	0	1	0	0	2	1	0	29	2	2	2	0	0	0
FR72	Auvergne	0	0	0	1	0	0	1	0	0	27	2	0	2	0	0	1
FR81	Languedoc-Roussillon	1	0	0	0	0	0	3	0	0	25	2	0	2	0	0	0
FR82	Provence-Alpes-Côte d'Azur	0	0	0	2	0	0	2	0	0	25	2	2	2	0	0	0
FR83	Corse	0	0	0	1	0	1	0	0	0	24	2	0	2	0	0	0
HR	Croatia	0	0	0	1	0	0	0	0	0	6	2	0	3	3	0	0
HU	Hungary	0	1	0	3	0	0	0	1	0	1	1	1	1	0	0	0
IE	Ireland	1	0	0	0	0	0	0	0	0	2	1	0	2	1	0	1
LT	Lithuania	0	0	0	1	0	0	0	1	0	9	0	1	1	0	0	0
ITC1	Piemonte	0	0	0	3	0	0	1	0	0	4	2	1	0	0	0	0
ITC2	Valle d'Aosta	0	0	0	0	0	0	1	0	0	4	2	1	1	0	0	0
ITC3	Liguria	0	0	0	1	0	0	0	1	0	2	2	1	1	0	0	0
ITC4	Lombardia	0	0	0	2	0	0	0	2	0	4	2	3	1	0	0	0
ITF1	Abruzzo	0	0	0	2	0	0	0	1	0	2	2	0	0	0	0	0
ITF2	Molise	0	0	0	1	0	0	0	0	0	2	2	0	1	0	0	0
ITF3	Campania	0	0	0	4	0	0	0	1	0	2	2	0	1	0	0	0
ITF4	Puglia	0	0	0	0	0	0	0	3	0	1	2	0	0	0	0	0
ITF5	Basilicata	0	0	0	0	0	0	0	2	0	1	0	1	0	0	0	0
ITF6	Calabria	0	0	0	0	0	0	0	1	0	8	2	0	0	0	0	0
ITG1	Sicilia	0	0	0	0	0	0	0	2	0	4	2	1	3	0	0	0
ITG2	Sardegna	0	0	0	1	0	0	0	0	0	3	0	0	2	0	0	0
ITH1	Bolzano	0	0	0	1	0	0	0	1	0	3	2	0	1	0	0	0
ITH2	Trento	0	0	0	2	0	0	0	0	0	2	0	0	1	0	0	1
ITH3	Veneto	0	0	0	3	0	0	0	2	0	4	2	0	1	0	0	0
ITH4	Friuli-Venezia Giulia	0	0	0	3	0	0	0	0	0	2	2	2	1	2	0	0
ITH5	Emilia-Romagna	0	0	0	0	0	0	0	0	0	3	0	1	2	0	0	0
ITI1	Toscana	0	0	0	3	0	0	0	2	0	2	2	0	0	0	0	0
ITI2	Umbria	0	0	0	2	0	0	0	1	0	1	2	1	0	1	0	0
ITI3	Marche	0	0	0	1	0	0	0	1	0	2	0	1	0	1	0	0
ITI4	Lazio	0	0	0	0	0	0	0	3	0	5	2	0	1	1	0	0
LU	Luxembourg	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0
LV	Latvia	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
MT	Malta	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
NL	Nederland	0	0	0	1	0	0	0	0	0	5	0	0	0	0	0	0
PL	Poland	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0
PT1	Portugal (Continente)	0	0	0	0	0	0	0	2	0	9	1	1	1	0	0	0
PT2	R. Autónoma dos Açores	0	0	0	0	0	0	0	1	0	4	2	0	0	0	0	0
PT3	Madeira	0	0	0	0	0	0	0	1	0	1	2	0	2	0	0	0
RO	România	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0
SE	Sweden	1	2	0	2	0	0	0	0	0	11	2	0	3	1	0	0
SI	Slovenia	0	0	0	1	0	0	0	0	0	11	2	0	1	0	0	0
SK	Slovakia	0	0	0	0	0	0	0	0	0	3	2	1	3	0	0	0
UK0	England	0	0	0	1	1	0	0	0	0	6	2	0	0	0	0	0
UKL	Wales	0	0	0	1	0	0	0	1	0	21	2	0	0	0	0	0
UKM	Scotland	1	0	0	3	0	0	0	2	0	29	1	0	1	0	1	1
UKN	Northern Ireland	0	0	0	0	0	0	0	1	0	38	2	0	0	0	0	0

Figure 4 shows the number of operations per measure established during the whole 2014-2020 period. Measure 10 also known as the “Agri-environment” measure is the most popular measure of the RDP. All regions used this measure to promote grasslands with the exception of Balearic Islands and Hesse. Measures 11 and 13 follow Measure 10 with regard to those operations within the RDP measures that promote grasslands



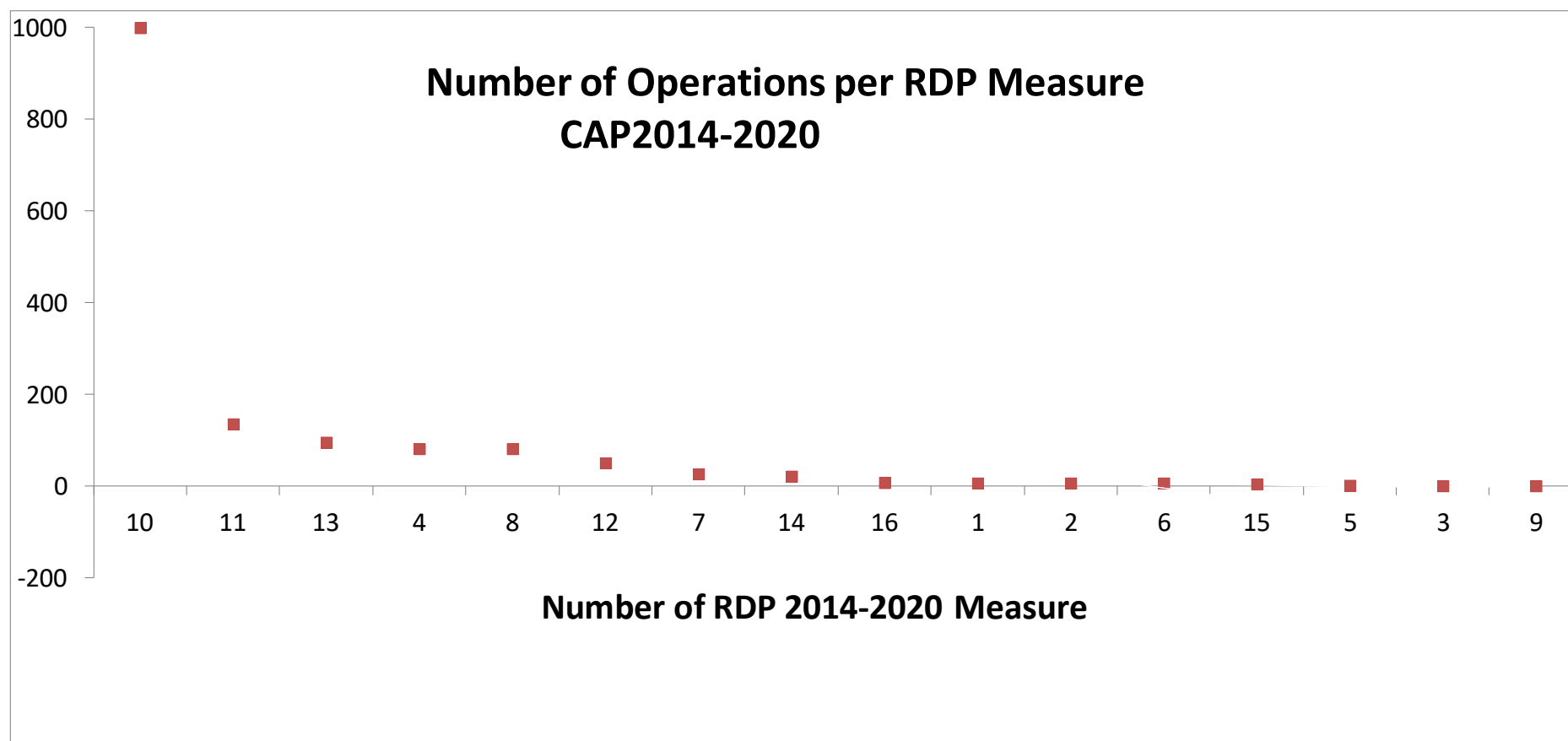


Figure 4. Number of Operations per RDP Measure



Figure 5 shows the number of operations related to grasslands linked per country. France and the UK are the RDP that have the largest amount of operations within the RDP 2014-2020 per country followed by Sweden, Belgium, Germany, Spain, Italy and Portugal. Small countries such as Malta, Latvia, Cyprus have the lowest number of operations implemented.



Number of Operations per country

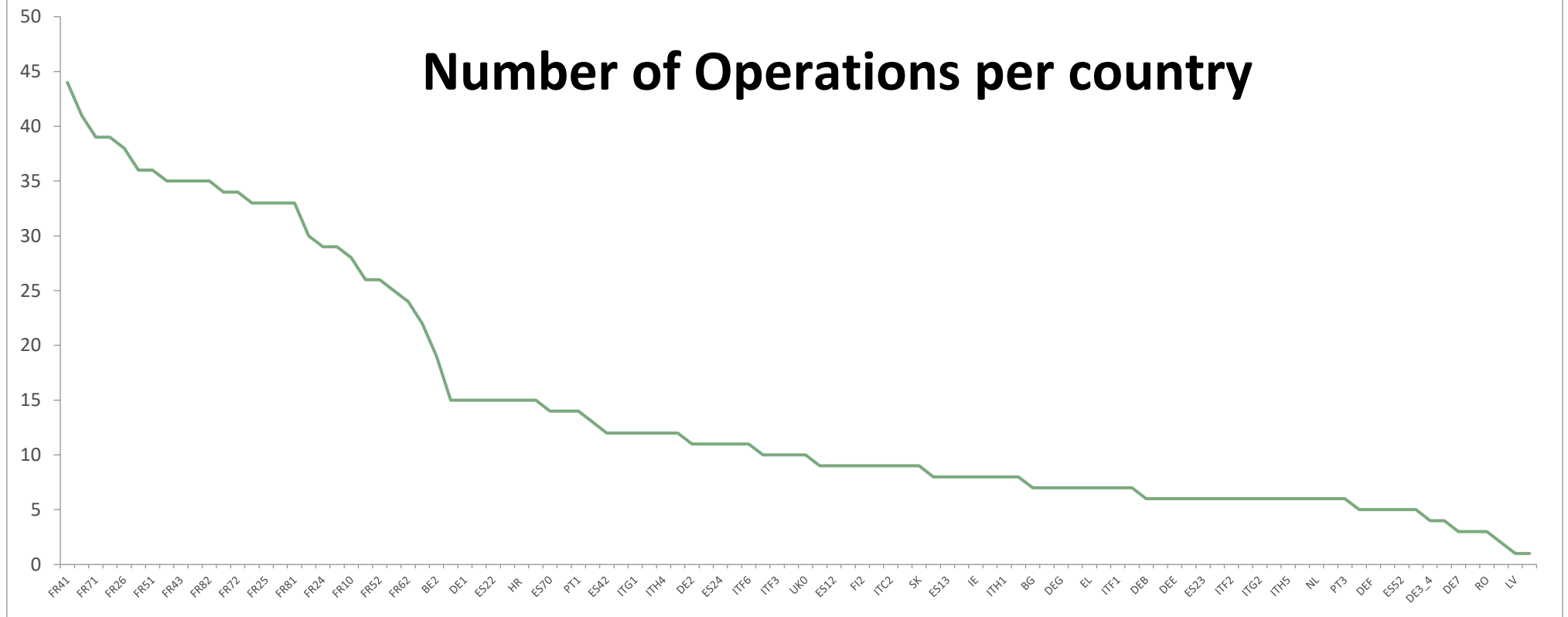


Figure 5. Number of Operations per RDP Measure



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The analysis of the type of operations linked to the promotion of grasslands will be evaluated by measure.

4.2.1.1.1. Measure 01. Knowledge transfer and information actions

The analysis of the type of operations linked to Measure 1 is linked to (i) support grassland vocational training and skill acquisition actions (1.1) in the Languedoc-Roussillon and Irish Republic, (ii) pasture demonstration and information actions (1.2) and (ii) grassland management issues (Scotland) and silvopasture systems to support for short-term farm and forest management exchange as well as farm and forest visits (1.3).

4.2.1.1.2. Measure 02. Advisory services, farm management and farm relief services

Grasslands are also supported by the promotion of the advisory service in different RDP or Europe. Sub-measure 2.1 supports advisory services for dehesas (silvopasture) in Andalucia, permanent pastures in Murcia, consulting services in Sweden and Aland Islands and help with the use of advisory services highlighting the NATURA 2000 grasslands environmental value in Hungary. Sub-measure 2.3 contributes to training advisors with regard to grasslands in Sweden.

4.2.1.1.3. Measure 04. Investments in physical assets

RDP supported investments in agricultural holdings (sub-measure 4.1) to structural elements linked to (i) grazing management in Alsace, Aragon, Campania, Friuli-Venezia Giulia, Marche, Sardinia and Slovenia, (ii) inter-crop grassing in Auvergne, Hungary and Provence-Alpes-Côte d'Azur, (iii) add-value and improve meadows and pastures in Bretagne, Nord-Pas-de-Calais, Pays de la Loire and Veneto (iv) animal welfare in Provence-Alpes-Côte d'Azur, (v) promote the extensive vocation of pastures at risk of abandonment in Cantabria (vi) build fences of farmland used for grazing in Liguria while Scotland supports the improvement on common grazing.

RDP implement sub-measure 4.3 (support for investments in infrastructure related to development, modernisation or adaptation of agriculture and forestry) to (i) construct and improve infrastructures for grazing livestock management in Asturias, Piemonte, Bretagne, Lombardia and Navarra, focusing on silvopasture (Veneto) or communal pastures in Cantabria, Corse and Euskadi, (ii) improve irrigation systems in Limousin, Rhone Alpes and Umbria) and (iii) access to grassland in Abruzzo, Asturias and Friuli-Venezia Giulia. In addition, for adaptation infrastructures, Aragon includes pastures between the forest resources and Castilla-La Mancha promotes property reorder.

Table 9. Number of operations related to grassland implemented by sub-measures (M04).

RDP		4.1	4.2	4.3	4.4
AT	Austria	0	0	0	0
BG	Bulgaria	0	0	0	1
DE5_9	Niedersachsen + Bremen	0	0	0	1
DK	Denmark	0	0	0	1



EL	Greece	0	0	0	1
ES12	Asturias	0	0	1	1
ES13	Cantabria	1	0	1	0
ES21	Euskadi	0	0	1	0
ES22	Navarra	0	0	1	0
ES24	Aragón	1	0	1	0
ES30	Madrid	0	0	0	1
ES42	Castilla-La Mancha	0	0	1	0
ES43	Extremadura	0	0	0	2
ES53	Illes Balears	0	0	0	1
ES61	Andalucía	0	0	0	2
FI1	Finland (Mainland)	0	0	0	1
FR30	Nord-Pas-de-Calais	1	0	0	1
FR42	Alsace	1	0	0	1
FR51	Pays de la Loire	1	0	0	0
FR52	Bretagne	1	0	1	0
FR62	Midi-Pyrenees	0	0	0	1
FR63	Limousin	0	0	1	0
FR71	Rhone Alpes	0	0	1	0
FR72	Auvergne	1	0	0	0
FR82	Provence-Alpes-Côte d'Azur	1	0	0	0
FR83	Corse	0	0	1	0
HR	Croatia	0	0	0	1
HU	Hungary	1	0	0	2
ITC1	Piemonte	0	0	1	1
ITC3	Liguria	1	0	0	0
ITC4	Lombardia	0	0	1	0
ITF1	Abruzzo	0	0	1	1
ITF2	Molise	0	0	0	1
ITF3	Campania	1	0	0	1
ITG2	Sardegna	1	0	0	0
ITH1	Bolzano	0	0	0	1
ITH2	Trento	0	0	0	2
ITH3	Veneto	1	0	1	1
ITH4	Friuli-Venezia Giulia	1	0	1	1
ITI1	Toscana	0	0	0	2
ITI2	Umbria	0	0	1	1
ITI3	Marche	1	0	0	0
LT	Lithuania	0	0	0	1
NL	Nederland	0	0	0	1
SE	Sweden	0	0	0	2
SI	Slovenia	1	0	0	0
UK0	England	0	0	0	1
UKL	Wales	0	0	0	1
UKM	Scotland	1	0	0	0

Sub-measure 4.4 (support for non-productive investment related to achievement agri-environment-climate objectives) was implemented to (i) maintain, improve and restore pastures and meadows in Abruzzo, Andalusia, Asturias, Extremadura, Finish Mainland, Madrid, Molise, Nord-Pas-de-Calais, Sweden, Toscana, Trento and Wales), (ii) promote water protection strips or wetland pastures in Alsace, Bulgaria, Denmark, England, Extremadura, Hungary and Midi-Pyrenees, (iii) promote biodiversity conservation or enhancement in Andalusia, Bolzano, Finish Mainland, Friuli-Venezia Giulia, Toscana and Umbria promote biodiversity conservation or enhancement in general, (iv) promote bird meadows in



Lithuania, Nederland, Niedersachsen + Bremen, (v) protect animals from large carnivores in Campania, Croatia, Extremadura, Finish Mainland, Piemonte, Trento and Sweden, (vi) promote Natura 2000 areas and high nature value farming systems in Hungary, and finally Rehabilitate and condition existing ethnological elements such as shepherd's huts in Illes Balears, (vii) fence private and public degraded pastures in Greece to promote enhanced vegetation development and prevent soil from erosion, and finally seed native herbaceous species in Veneto.

4.2.1.1.4. Measure 05. Restoring agricultural production potential damaged by natural disasters and introduction of appropriate prevention

The sub-measure 5.2 is only used by UK England to support the investments for the restoration of productive grassland.

4.2.1.1.5. Measure 06 Farm and business development

Business development is linked in some French RDP to support to young farmers (sub-measure 6.1) where grassland is eligible for this measure in the Ile de France and Corse and to grassland management in Nord-Pas-de-Calais and Lorraine. On the contrary, Pays de la Loire explicitly prohibits the beneficiaries to establish agroforestry systems in pastures.

4.2.1.1.6. Measure 07 Basic services and village renewal in rural areas

Sub-measures 7.1, 7.2 and mostly 7.6 are linked to pasture within the Measure 07.

Sub-measure 7.1 linked to the Support for the drawing up and updating of plans for the development of municipalities and villages in rural areas and their basic services and of protection and management plans related to Natura 2000 sites and other areas of high nature value allows Limousin farmers to add-value to silvopasture biodiversity in Limousin RDP.

Sub-measure 7.2 dealing with Support for investments in the creation improvement or expansion of all types of small-scale infrastructure, excluding investments in renewable energy and energy saving to re-orient pasture management.

Sub-measure 7.6 associated with the support for studies and investments for maintenance, restoration and upgrading of the cultural and natural heritage is the most popular measure 07 to be linked to pastures and meadows. Lorraine and Languedoc-Roussillon implement three actions with this sub-measure promoting pastures; other French regions (Franche Comte, Limousin, Rhone Alpes and Provence-Alpes-Côte d'Azur) and Niedersachsen & Bremen used this sub-measure in two actions and other nine regions (Wallonia, Navarra, Basse-Normandie, Pays de la Loire, Aquitaine, Midi-Pyrenees, Auvergne, Piemonte and Valle d'Aosta) promoted pasture with the 7.6 sub-measure in one action. The protection of grazing animals against predators is supported by sub-measure 7.6 in the French regions of Auvergne, Franche Comte, Rhone Alpes, Provence-Alpes-Côte d'Azur, Lorraine, and Languedoc-Roussillon, while silvopasture promotion is supported in Limousin, Languedoc-Roussillon and Provence-Alpes-Côte d'Azur by the same sub-measure. Pasture biodiversity



promotion is fostered through summer grazing in Languedoc-Roussillon, Midi-Pyrenees and Piemonte and typical pasture systems in the Alps in Piemonte, Valle d'Aosta, Franche Comte and Rhone Alpes by sub-measure 7.6.

4.2.1.1.7. Measure 08. Investments in forest area development and improvement of the viability of forests

Measure 08 is used for opposite activities in the different RDP with regard to grassland management. For example, ten Italian (Basilicata, Veneto, Picardie, Puglia, Toscana, Lazio, Abruzzo, Campania, Marche and Lombardia) and Lithuania RDPs forbid grasslands as eligible to afforestation, while 2 Spanish (Extremadura and Navarra) and Czech Republic allow afforestation of grassland areas. In addition, Castilla-La Mancha promotes grazing after the afforestation. These activities are mapped in Figure 6.

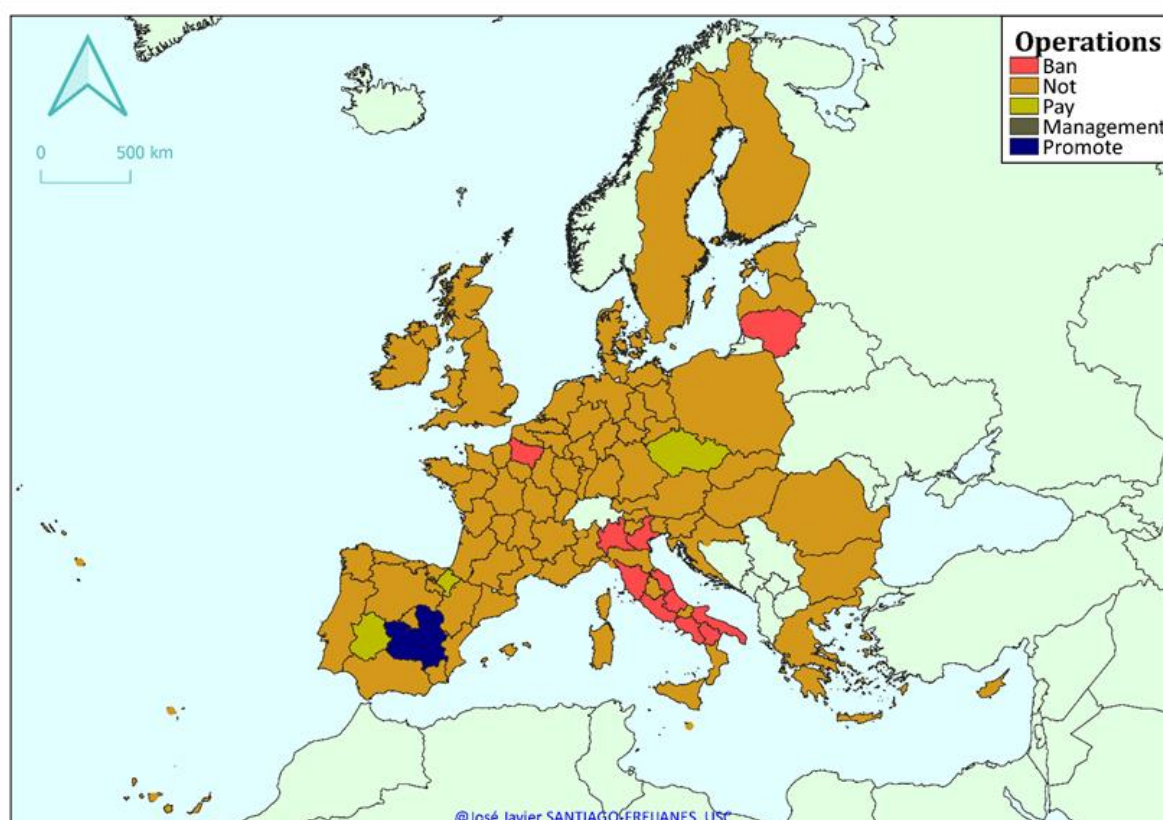


Figure 6. Relation between grassland and afforestation sub-measure (8.1). Ban meaning ban afforestation on permanent grassland. Not meaning not implementation of this sub-measure. Pay meaning compensation of cessation of activity and promote meaning encouragement of grassland.

The sub-measure 8.2 that supports the establishment and maintenance of agroforestry systems are used in twenty-eight RDP of Europe Hungary, Greece, Flanders, Northern Ireland, Scotland, Wales, Madeira, Os Açores, Portugal Continental, Umbria, Veneto, Basilicata, Puglia, Rhone Alpes, Limousin, Midi-Pyrenees, Poitou-Charentes, Pays de la Loire, Lorraine, Nord-Pas-de-Calais, Basse-Normandie, Haute-Normandie, Picardie, Ile de France, Andalucía, Euskadi, Asturias and Galicia to support agroforestry mainly silvopastoralism (Figure 7).

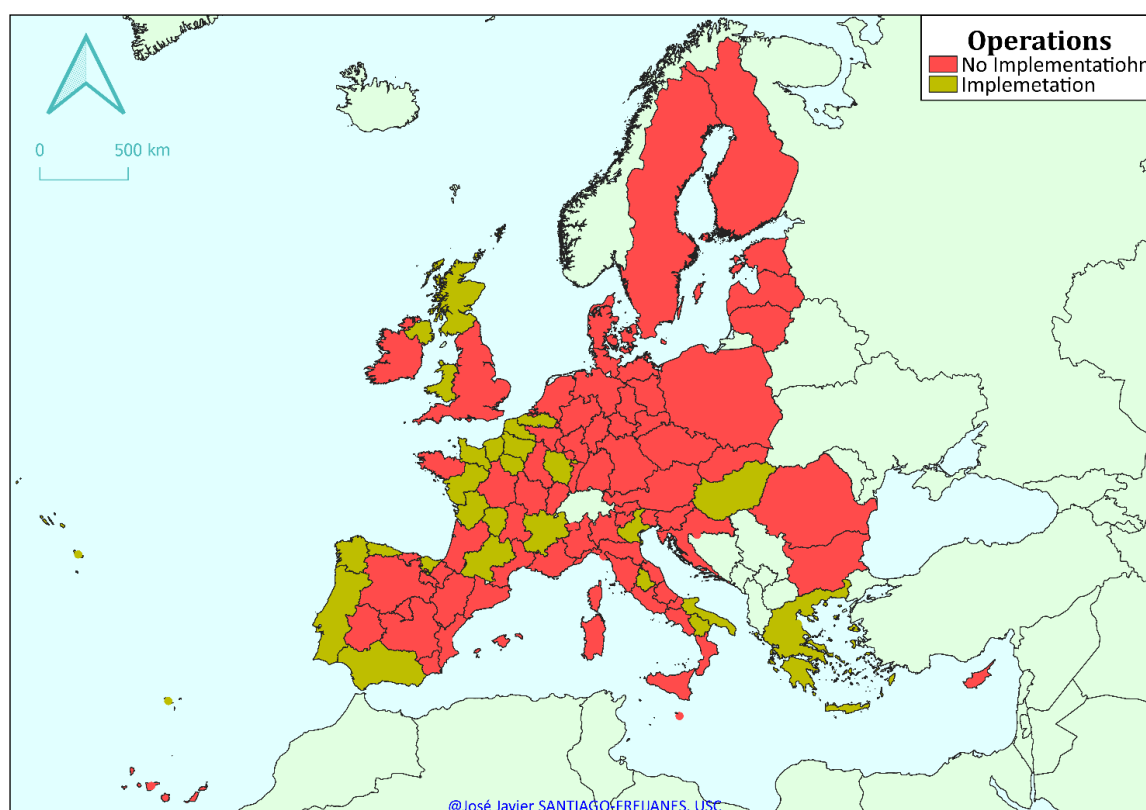


Figure 7. Sub-measure promoting silvopasture (8.2) implementation.

Sub-measure 8.3 promote grazing as a wildfire prevention practice in 15 out of 17 regions of Spain (Canarias, Murcia , Andalucía, Illes Balears, València, Castilla-La Mancha, Castilla y Leon, Madrid, Aragón, Navarra, Euskadi, Asturias, Galicia Extremadura, Cantabria), 4 Italian (Lazio, Sicilia, Calabria, Liguria) and Portugal (mainland).

Sub-measure 8.4 dealing with the support for restoration of damage to forests from forest fires and natural disasters and catastrophic events is used to promote grazing in Puglia, Canarias, Cataluña and Aragón as shown in Figure 8.

The sub-measure 8.5 aiming at supporting the investments to improve the resilience and environmental value of forest ecosystems promotes grazing in Denmark, Saarland, Scotland, Lazio, Toscana, Bolzano, Sicilia, Andalucía, Aragón and La Rioja.

Silvopasture was the main grassland related topic in the fifty RDP implementing some operation of measure 8. Only Czech Republic promoting afforestation on grassland and paying for compensation for the cessation of activity, and Lithuania, Marche, Campania and Abruzzo which banned afforestation in grasslands, are not relating grassland to forests through silvopastoralism.

Other issues related in RDP within this Measure and the grassland are those enhancing environments through water protection (Nord-Pas-de-Calais, Midi-Pyrenees and Denmark), biodiversity promotion (Nord-Pas-de-Calais, Midi-Pyrenees and Lorraine), environmental added-value (Denmark and Scotland) and erosion protection (Nord-Pas-de-Calais and Lorraine).

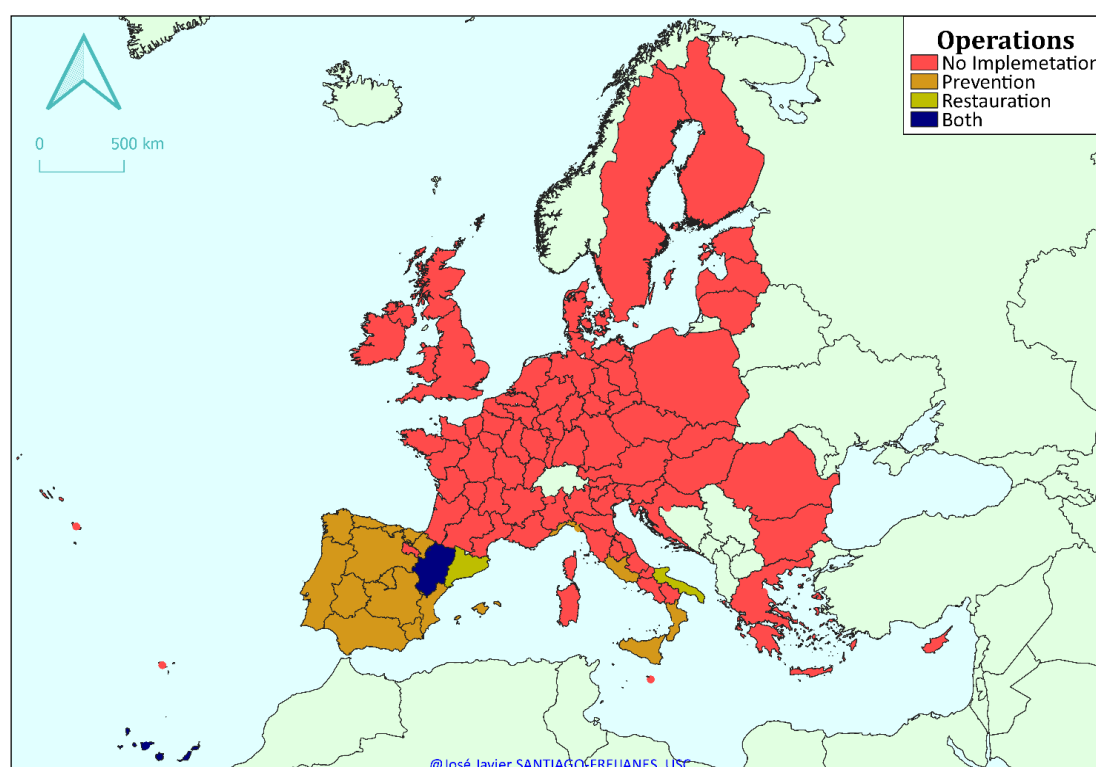


Figure 8. Silvopastoralism as Wildfire prevention or forest restoration (sub-measures 8.3 and 8.4)

4.2.1.1.8. Measure 10. Agri-environment- climate

Measure 10 is the most popular measure of all Rural Development Programmes promoting grazing and grasslands. In 999 out of 1518 measures, we have found grazing or grasslands as promoted activities or land use, respectively. Only two (Hesse and Illes Balears) do not mention specifically grasslands as part of the agri-environment and climate measure. Moreover, Basilicata RDP literally specifies that grassland is not part of this measure. Other RDPs also prohibited grassland in any operation of measure 10. Thus, Calabria forbids grazing on crops, Castilla and Leon did not allow grazing on unique landscapes, Lazio did not apply the operation of biodiversity conservation to grazing, Madrid and Scotland exclude grassland from areas committed to arable farming with steppe birds although La Rioja limits grazing temporarily for the same purpose. Sicily does not allow including grazing on eco-sustainable farms and Veneto excludes grassland in the promotion of techniques to reduce environmental impact. But these RDPs carried out other operations that allowed pasture eligibility and even promoted the creation of new pastures.

Most of the remaining operations (993) dealing with grassland within the M10 were implemented through the sub-measure 10.1 (payment for agri-environment-climate commitments). However, five RDPs related grassland with the support for conservation and sustainable use and development of genetic resources in agriculture (10.2): (i) Portugal (Continent) forced protected animal breeds to keep grazing while (ii) Galicia and Andalusia have valued the ability of these breeds for traditional silvopastoral and grazing practices, (iii) Canary Islands included permanent pasture as areas for the cultivation of plant varieties at risk of genetic erosion and finally, (iv) Poland required the preservation of all permanent



grassland and landscape features not used for agriculture, as they consider them as wildlife refuges in operations supporting the preservation of genetic resources, including both plant and animal.

Out of the 101 RDPs that have promoted the creation or maintenance of grassland since sub-measure 10.1, 64 highlights its environmental value but only 49 mentioned biodiversity as an ecosystem service, while fifty RDPs have promoted extensive practices and forty-eight silvopasture (Figure 9).

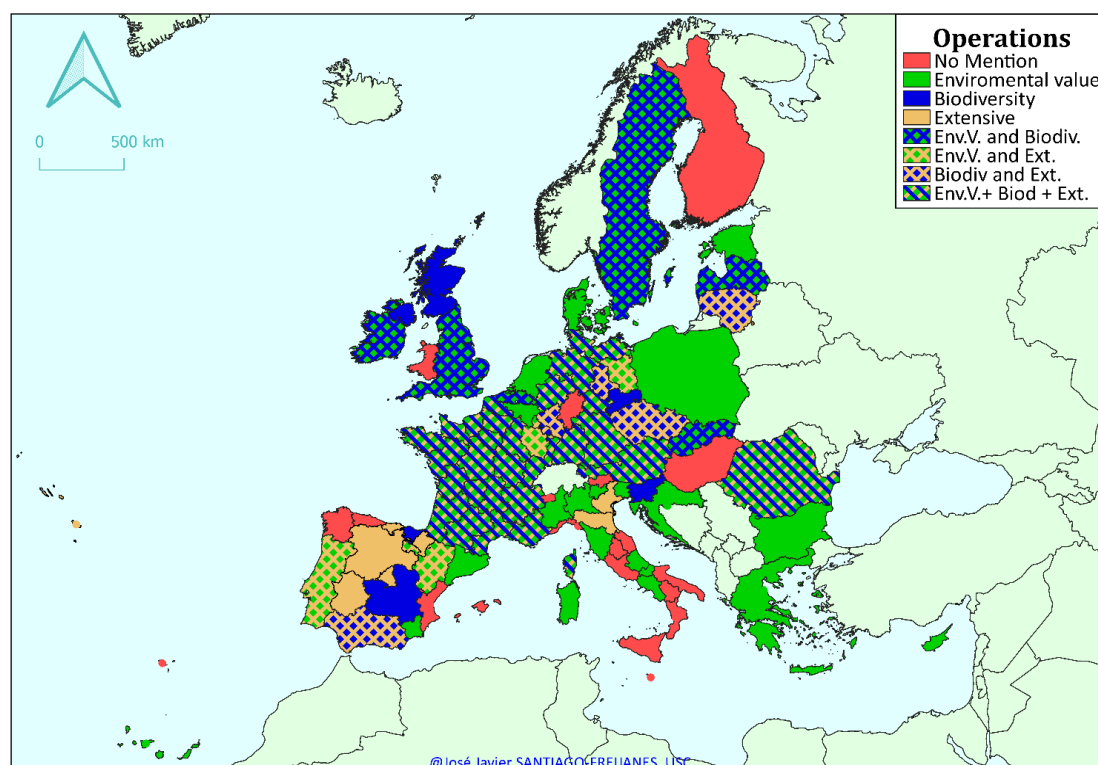


Figure 9. Environmental topics related to Measure 10.

With regard to the operations, the Measure 10 was included in sixty-three RDPs to promote protective herbaceous strips, of which forty-six aims to protect soil against erosion and thirty-six to protect water (**Error! Reference source not found.10**). Regarding the type of pasture, forty-one RDPs promoted permanent pasture while thirty-nine aimed to promote wetlands. Fifty RDPs aiming at enhancing mountain meadows conservation linked to tradition such as alpage/alpeggi (8 RDPs), transhumance (2 RDPs), or summer grazing (25 RDPs) or communal grasslands (1) as shown in **Error! Reference source not found.11**.



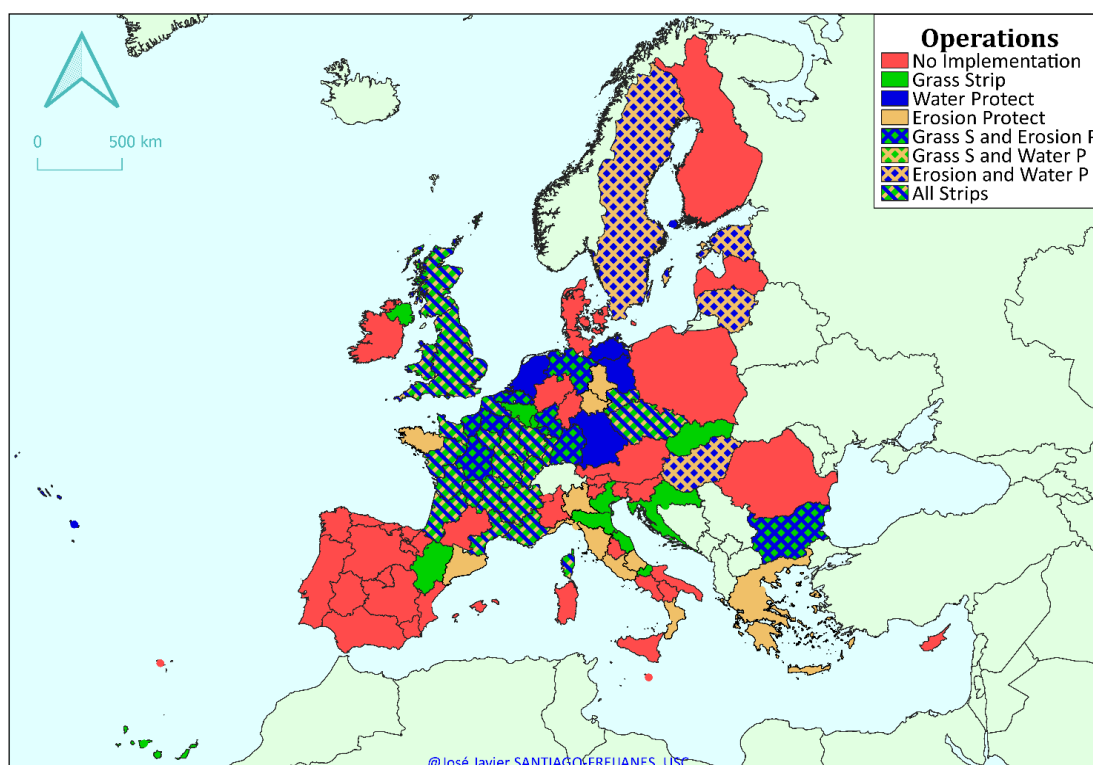


Figure 10. Promotion of Grass Strips in measure 10

With regard to the management to be promoted by Measure 10, around thirty-seven RDPs regulate the harvest, thirty-five deals with fertilization, mostly banning inorganic fertilization, thirty-five RDPs were concerned about overgrazing while twenty-seven limited grazing (banning in some areas or season) as shown in Figure 12.

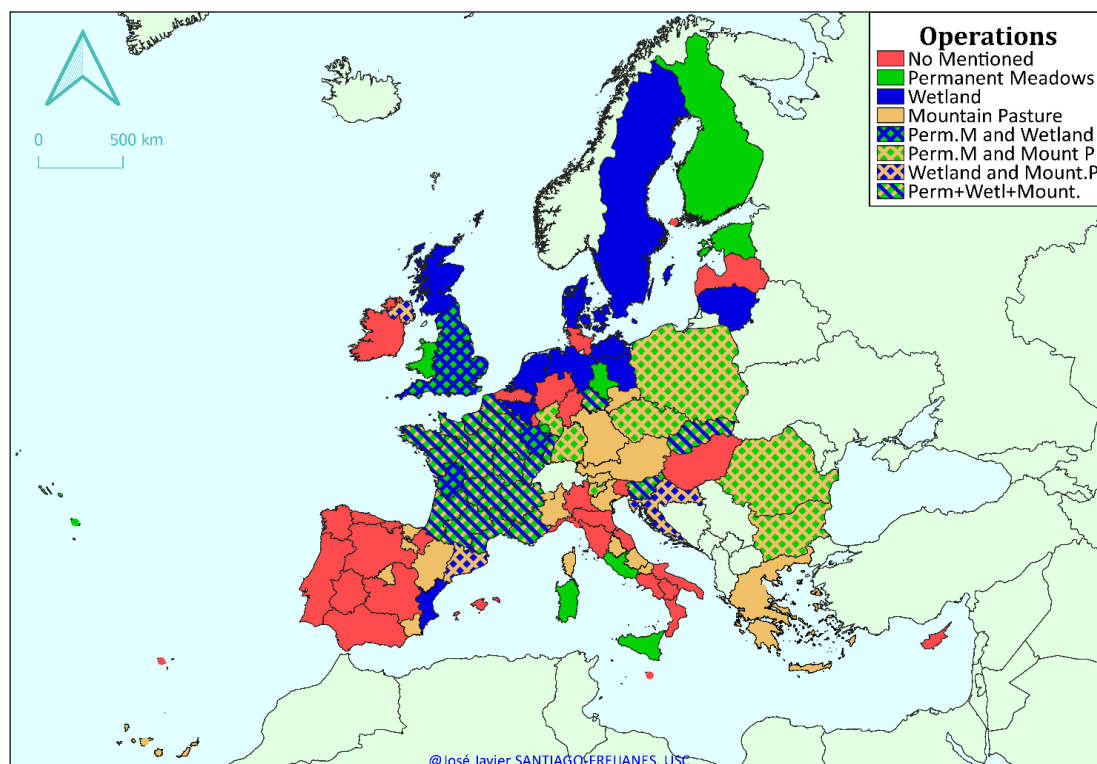


Figure 11. Operation of grassland types promoted in measure 10



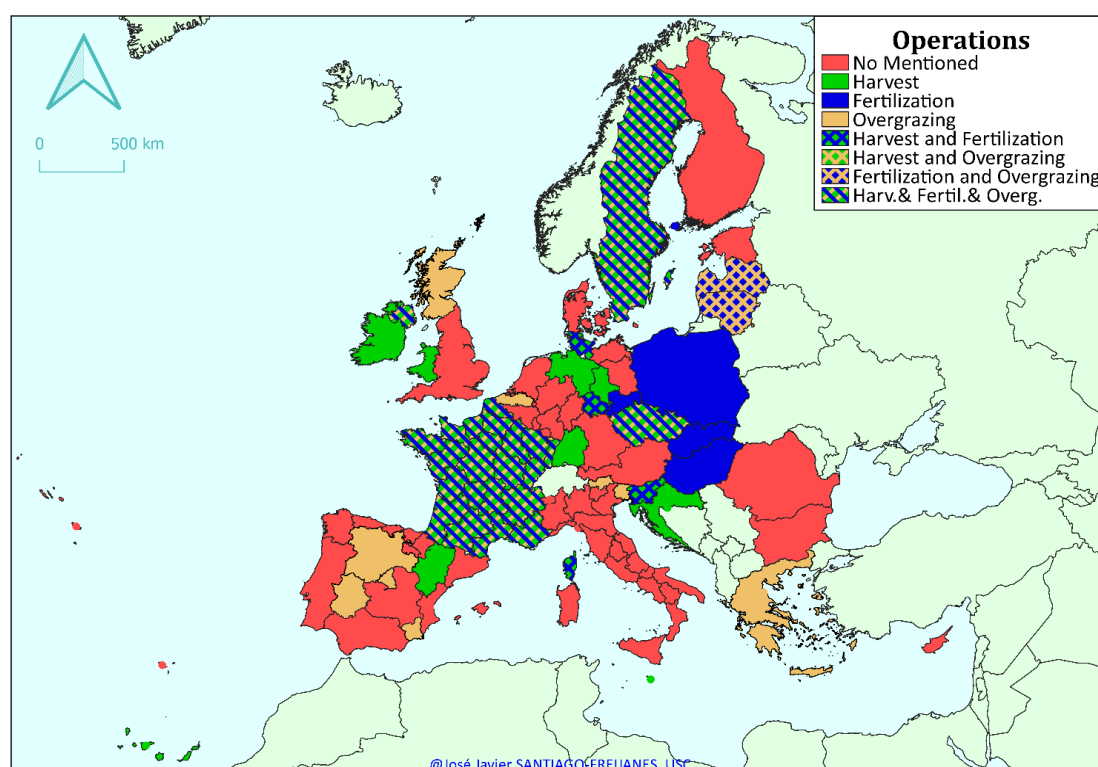


Figure 12. Grassland Management promoted in measure 10

4.2.1.1.9. Measure 11. Organic farming

Grassland is explicitly mentioned as eligible for any of the operations linked to organic farming in most of Southern and Western Europe, but not explicitly mentioned in most of the Northern and Eastern parts of Europe (Figure 13). Other RDPs promote pastures with actions focused on them (Balearic Islands) or as a requirement for actions supporting the implementation and/or maintenance of organic livestock (Cantabria and the Canary Islands); Bolzano and Valle d'Aosta took advantage of the sub-measures for the implementation and maintenance of organic agriculture to support the traditional pasture systems of Fondovalle and Alpeggio. Finally, Eesti included in the implementation (11.1) and maintenance (11.2) sub-measures linked to the obligation to maintain grassland for water support (Figure 12).

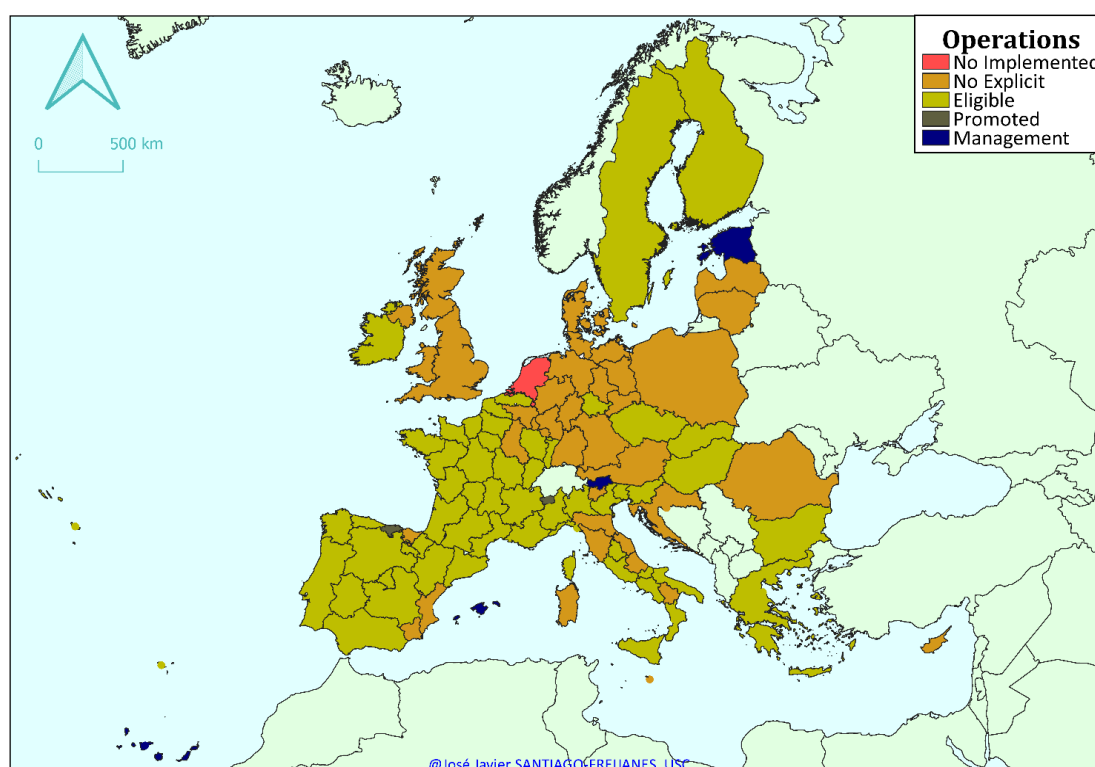


Figure 13. Grassland presence in M11 measure

4.2.1.1.10. Measure 12. Natura 2000 and Water Framework Directive payments

There are fifty operations related to Grassland under Measure 12. The majority (29) are linked to the Compensation payment for Natura 2000 agricultural areas (12.1), followed by those (16) associated to the Compensation payment for agricultural areas included in river basin management plans (12.3) while only two will compensate payment for Natura 2000 forest areas (12.2) as can be seen in Table 9.

Table 10. Number of operations by sub-measure in M12.

Rural Development Programs M12		12.1	12.2	12.3
BE3	Wallonia	3	0	0
CY	Cyprus	1	0	0
DEC	Saarland	1	0	0
DEF	Schleswig-Holstein	1	0	0
ES22	Navarra	1	1	0
ES24	Aragón	1	0	0
ES42	Castilla-La Mancha	0	1	0
FR21	Champagne-Ardenne	1	0	1
FR22	Picardie	0	0	0
FR23	Haute-Normandie	0	0	0
FR24	Centre - Val de Loire	0	0	1
FR26	Bourgogne	1	0	1
FR30	Nord-Pas-de-Calais	1	0	1
FR41	Lorraine	1	0	1



FR43	Franche Comte	0	0	1
FR52	Bretagne	1	0	1
FR53	Poitou-Charentes	1	0	1
FR61	Aquitaine	1	0	1
FR71	Rhone Alpes	1	0	1
FR82	Provence-Alpes-Côte d'Azur	1	0	1
HU	Hungary	0	0	1
ITC1	Piemonte	0	0	1
ITC2	Valle d'Aosta	1	0	0
ITC3	Liguria	0	0	1
ITC4	Lombardia	3	0	0
ITF5	Basilicata	0	0	1
ITG1	Sicilia	1	0	0
ITH4	Friuli-Venezia Giulia	2	0	0
ITH5	Emilia-Romagna	1	0	0
ITI2	Umbria	1	0	0
ITI3	Marche	0	0	1
LT	Lithuania	1	0	0
PT1	Portugal (Continente)	1	0	0
SK	Slovakia	1	0	0

Water protection is one of the aims linked to Measure 12. For example, Wallonia and the French regions of Champagne-Ardenne, Picardie, Haute-Normandie, Bourgogne, Nord-Pas-de-Calais, Lorraine, Franche Comte, Bretagne, Aquitaine, Poitou-Charentes, Provence-Alpes-Côte d'Azur, Rhone Alpes and Centre - Val de Loire takes measure 12 to support the protection of water resources, while Wallonia uses sub-measure 12.1 to encourage the installation of grassland strips and French regions dedicates 12.3 to compensate land use for pastures and other agricultural land included in the water district management plans.

Some RDPs, prohibited grazing in area of high environmental value such as Aragón and Cyprus RDPs implementation of sub-measure 12.1 dealing with the compensation for Natura 2000 agricultural areas that forbids grazing in spring and summer; Castilla-La Mancha implementation of sub-measure 12.2 associated to the Compensatory payments for forest areas in Natura 2000 that forbids grazing to restore forest areas after a catastrophic event; and Emilia-Romagna that implements sub-measure 12.1 linked to the Compensatory payment for limitations in the Natura 2000 agricultural area to preserve permanent pastures. Another region that also pays not to graze is Navarra, although it does so only in the pastures of the “Las Cañas” natural reserve by using the sub-measure 12.2, while it enables another action to compensate for the difficulties associated to sheep grazing in the Bardenas Reales (12.1).

Lombardia, Hungary and Schleswig-Holstein promote wildlife protection on grassland with the 12.1 sub-measure, being Schleswig-Holstein focuses on grassland birds.

Overgrazing prevention in Natura 2000 areas is also rewarded under sub-measure 12.1 in the Cyprus and Saarland RDPs. Finally, Basilicata, Sicilia, Friuli-Venezia Giulia, Umbria, Marche and Slovakia also support grasslands from 12.1 sub-measure with regard to different



management practices, while Valle d'Aosta, Piemonte, Liguria, Latvia and the Portugal Continental mentions grassland as eligible of M12.

4.2.1.1.11. Measure 13. Payments to areas facing natural or other specific constraints

Most of the PDRs that link this measure to Grassland do so through sub-measure 13.1 (compensation payment in mountain areas), which aims to compensate farmers affected by the constrained conditions in mountain areas. Only Ireland, Wallonia, Saarland, Hungary, Austria, Champagne-Ardenne, Basse-Normandie, Pays de la Loire, Bretagne, Poitou-Charentes, Scotland, Latvia, Thüringen, Illes Balears, Campania and mainland Portugal do not choose the pastureland affected by the mountain areas as part of this measure. For Bourgogne, Lorraine, Midi-Pyrenees, Latvia, Ireland, Wallonia, Saarland, Trento, Bolzano, Molise, Bayern and Hungary Grassland is both eligible and paid when specific management is carried out. Moreover, Hesse, Ireland, Wallonia and Saarland relate Grassland to sub-measure 13.2 linked to the compensation payment for other areas facing significant natural constraints and 13.3 associated to compensation payment to other areas affected by specific constraints. However, the RDPs of Hungary, Austria, Champagne-Ardenne, Basse-Normandie, Pays de la Loire, Bretagne, Poitou-Charentes and Scotland associated grasslands only to sub-measure 13.2 while Latvia, Thüringen, Balearic Islands, Campania and Portugal continental link grasslands to sub-measure 13.3. Alsace, Auvergne, Bourgogne, Corse, Franche Comte, Galicia, Languedoc-Roussillon, Lorraine, Midi-Pyrenees, Murcia, Provence-Alpes-Côte d'Azur, Rhone Alpes, Sardinia and Valencia related sub-measures 13.1 and 13.2 to grassland, while Czech and Madeira related sub-measures 13.1 and 13.3. **Finally, Andalusia, Cantabria, Catalonia, Croatia, Extremadura, Sicily, Slovakia and Sweden relate grasslands to the before-mentioned three sub-measures.**

Some RDPs used this measure to avoid overgrazing (Bolzano, Catalonia, Extremadura and Trento). Others promoted extensive grazing (Ireland and Trento) and permanent pastures (Ireland and Molise).

A summary of the operations selected under this measure can be seen in Figure 14.



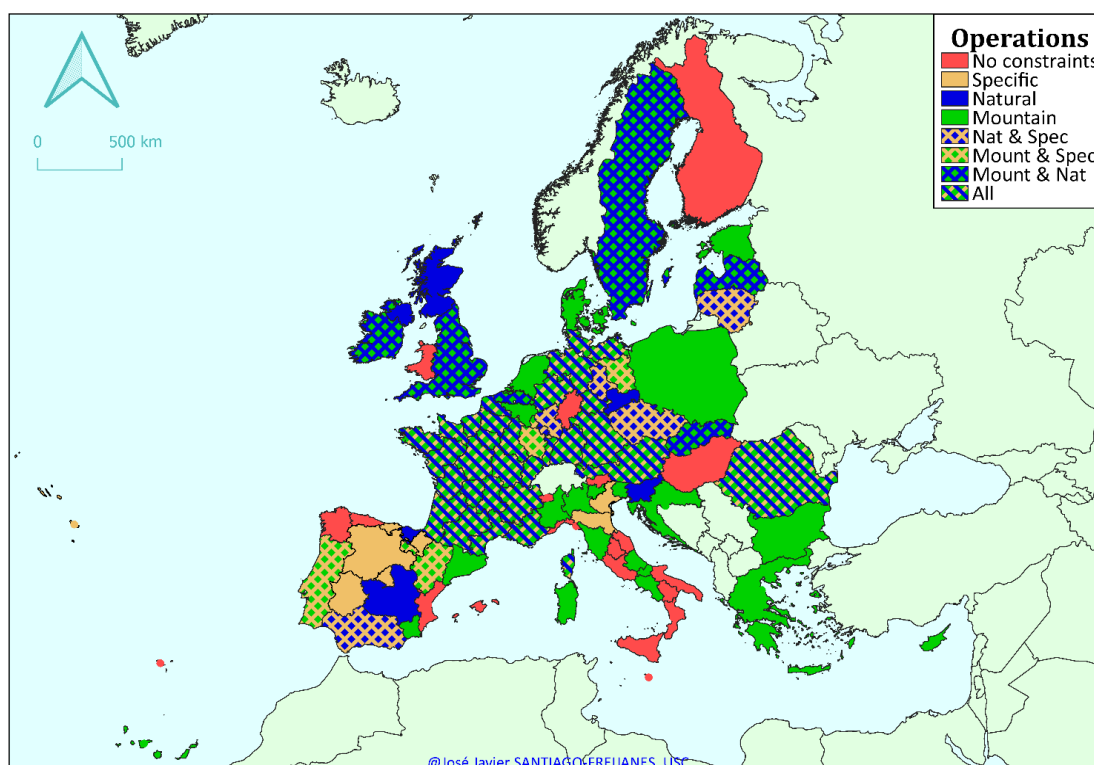


Figure 14. Compensations to grassland with different constraints described by the M13 sub-measures.

4.2.1.1.12. Measure 14. Animal welfare

Measure 14 was not broadly implemented in Europe (Figure 15). Baden-Württemberg, Bulgaria, Castilla-La Mancha, Croatia, Czech, Eesti, Friuli-Venezia Giulia, Ireland, Lazio, Mainland, Marche, Mecklenburg-Vorpommern, Nordrhein-Westfalen, Austria, Sweden and Umbria promoted grassland to enhance animal welfare and management practices as extensive meadows, silvopasture, summer grazing or traditional methods as Alpeggi.

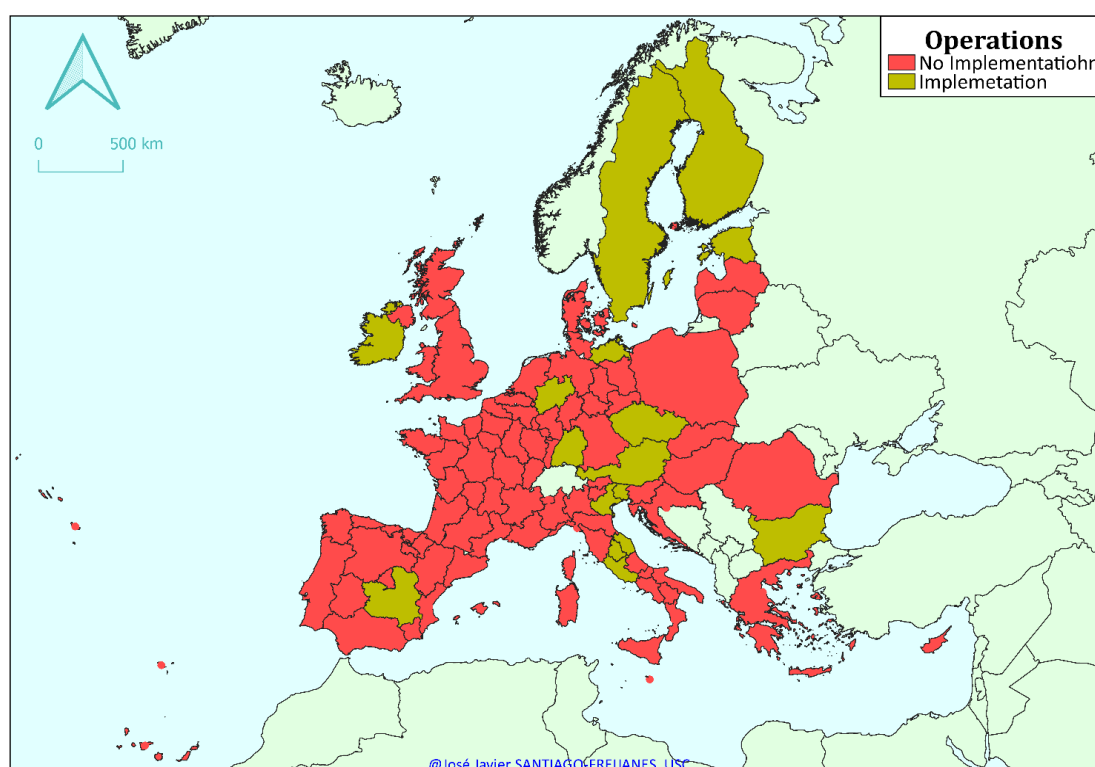


Figure 15. Grassland and animal welfare relationship through Measure 14.

4.2.1.1.13. Measure 15. Forest-environmental and climate services and forest conservation

Only Castilla-La Mancha, Denmark, Galicia and Scotland pays environmental and climate commitments in forest pastures through sub-measure 15.1. Castilla-La Mancha payments are related to the grassland environmental value while those from Galicia are concerned about wetlands. Denmark used silvopastoralism to protect water and Scotland promotes the absence of grazing to encourage biodiversity and wildlife survival.

4.2.1.1.14. Measure 16. Cooperation

Auvergne and Madrid are the unique RDPs that links grassland's eligibility to support pilot projects and for the development of new products, practices, processes and technologies (16.2). Greece and Ireland supported the establishment and operation of operational groups of the EIP for agricultural productivity and sustainability (16.1) with actions to improve grassland and livestock management (trying to solve problems like overgrazing). Poitou-Charentes promote the operational groups to implement multipurpose cultural systems and approaches as the agro-silvo-pastoralism and the wood valorization in farming systems. Greece also supported this action to mitigate or adapt to climate change (16.5). From this interest and sub-measure, Trento promotes the creation of non-cultivated buffer strips and/or mowing and preserve grazing with local breed sheep and goats or cattle. Finally, Scotland chose sub-measure 16.10 (other) to support the maintenance of common pastures.



4.2.2. Pillar II conclusions

Only 8 out of the 118 RDP mentioning grasslands activates Measures 1 and 2 as part of the improvement of knowledge transfer with regard to information actions and advisory services linked to grasslands in Europe. Therefore, there are only few actions that are linked to grassland knowledge transfer and exchange. This is highly relevant for the dissemination of the outputs of Go-Grass with regard to the grassland management linked to the new uses of grass through the promotion of the bioeconomy.

The investment in physical assets (M04) is associated with investments related to structural elements (4.1), modernization and adaptation of agriculture and forestry (4.3) and to non-productive investments related to environment-climate objectives. Main activities are related to structural elements establishment (e.g. fencing, irrigation) to favour grazing, restore pastures from under- and over-grazing considering social aspects as fostering common grazing, silvopasture and property re-order to facilitate the improvement of grazing for increase production from a grassland and animal welfare point of view. Grassland social and environment-related aspects are also promoted by different RDP in the sub-measure 4.3 linked to meadow restoration (e.g. seeding, fencing...), biodiversity conservation, water protection strips, erosion protection, bird meadows, carnivores attacks, Nature 2000, ethnological elements.

Measures 5, 6 and 7 are related to the enhancement of the resilience, business development and community services improvement, respectively. Measures 5 and 6 are only used to promote grassland action by a few numbers of RDP while Measure 7 to enhance energy saving to re-orient pasture management and enhance the cultural and natural heritage of pastures and meadows including silvopasture, mountain and summer pasture to promote biodiversity and the grazing animals' protection against predators.

Measure 8 associates grazing and grassland promotion in forest areas in the vast majority of the PDR that uses this measure, being the most popular the measure 8.2 linked to the use of silvopasture, an agroforestry practice, to reduce forest fires.

Measure 10 is one of the most important measures with regard to pasture management linked to the use of this type of land use to enhance ecosystem services (biodiversity, erosion...) but also to improve management being this related with over- or under-grazing and promote grazing to maintain high-value farming systems.

Measure 11 promotes grazing system within organic farming related to establishment and maintenance but also linked to the water quality support. Measure 12 was also linked to grassland management to improve water quality, fostering grassland preservation and compensate difficulties of grazing and protect biodiversity (birds). Measure 13 is linked to the payment of grasslands associated to natural constrains areas but some of the RDPs used this measure to promote extensive grazing and avoid overgrazing. Measure 13 is related with animal welfare payments in extensive farming systems. Measure 15 promotes silvopastoralism in forest areas. Finally, the unique measure that links somehow grasslands to bioeconomy is the measure 16 of cooperation where products are valorized when related



with grasslands. Also, Measure 16 promotes the creation of areas that are mowed or not cultivated that may be used for the purpose of Go-grass.



5. Socioeconomy of Grassland Farms

Figure 16 shows the share of permanent grasslands in farms from 2000 to 2016. It can be seen that the share of permanent grasslands in the different EU farms has been clearly decreased until 2007 with a progressive increase after 2016, mainly in UK, Sweden, Northwest of Spain and France, which is indicative of high availability of grasslands for alternative uses linked to the bioeconomy concept.

Figure 17 shows the evolution of the farms and land with livestock. We can observe that both the land with livestock and the farm with livestock has been reduced, which means that the increase of grassland shown in Figure 15 is not associated with the use of grasslands to feed animals.

Both Figures 18 and 19 shows that the holders' age is high as a consequence of the population ageing. Countries like Portugal, England and Rumania have a large proportion of farms managed by old people, while this is least relevant in the central part of Europe, where the dead age of the people is lower. The opposite can be seen in Figure 18 where young people (below 35 years old) is found in South of Europe and a large change can be seen also in the northern countries where people below 35 years old were between 10 and 30% until 2013 and went to 5.7% in 2016. Figure 20 shows that female holders were increased in the last years, but they are still far away from the desirable equity of managing farms.

Finally, Figure 21 shows that there are two different types of farmers that have to be taking into account when bioeconomy alternatives for grasslands are proposed, the ownership type of the farms. Tenancy is mainly associated with the Central European countries while in the south or in the north most of the farms are owned by the farmers.



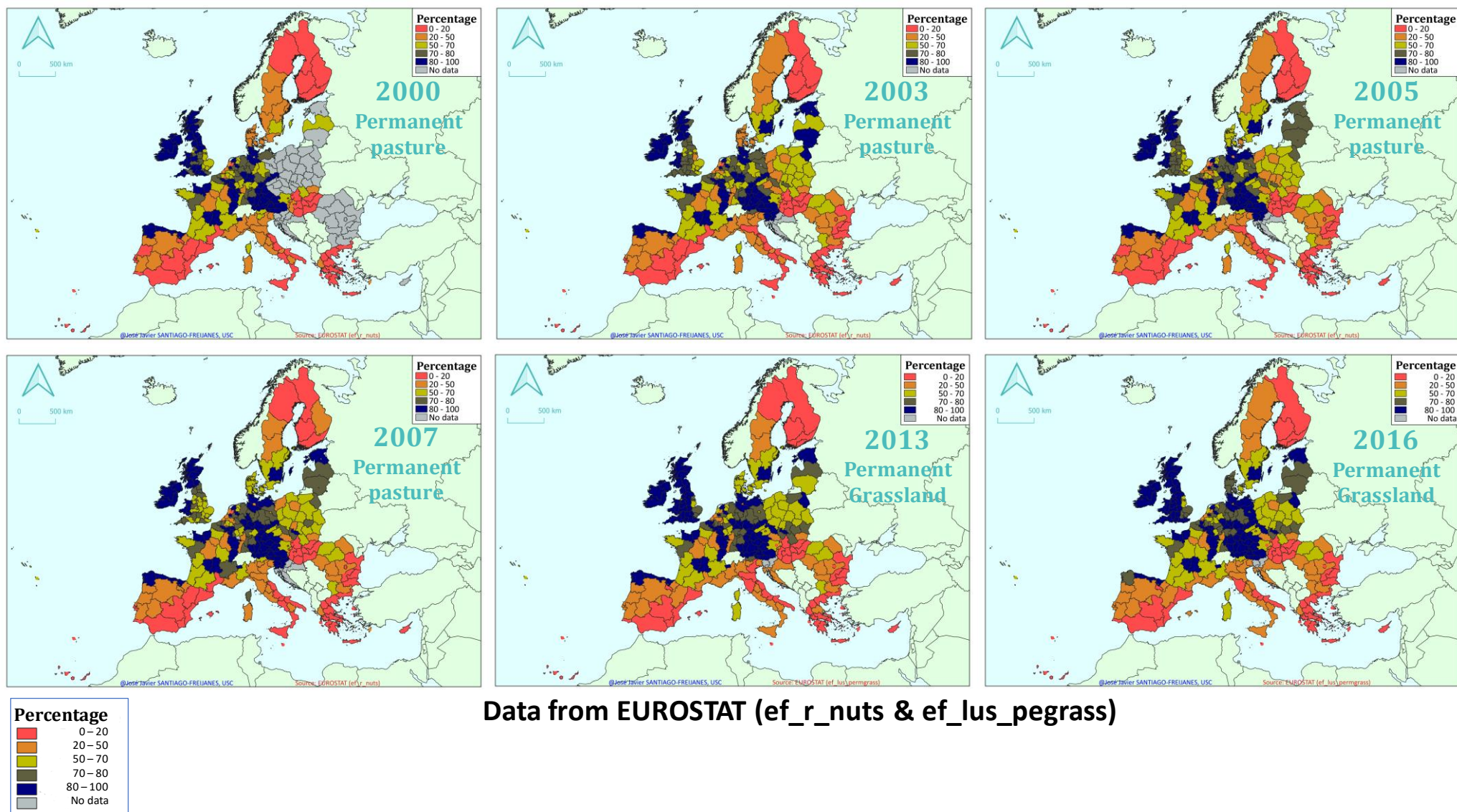


Figure 16. Evolution of Farm with Permanent pasture ratio (2000-2007) and Evolution of Farm with Permanent grassland (2013-2016).



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N°862674

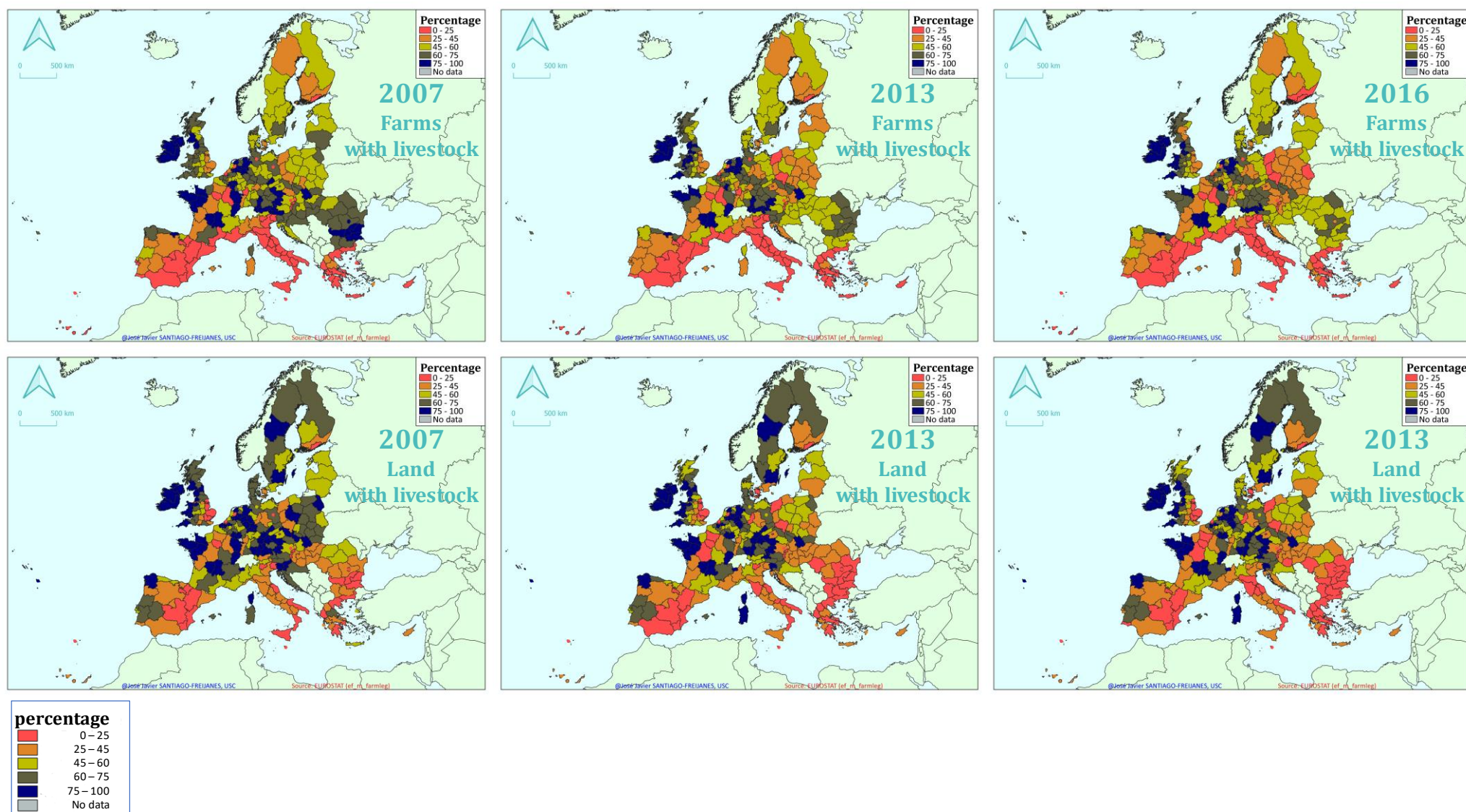


Figure 17. Evolution of farms with livestock (2007-2016). Percentage of farms (up) and Percentage of land (bottom).



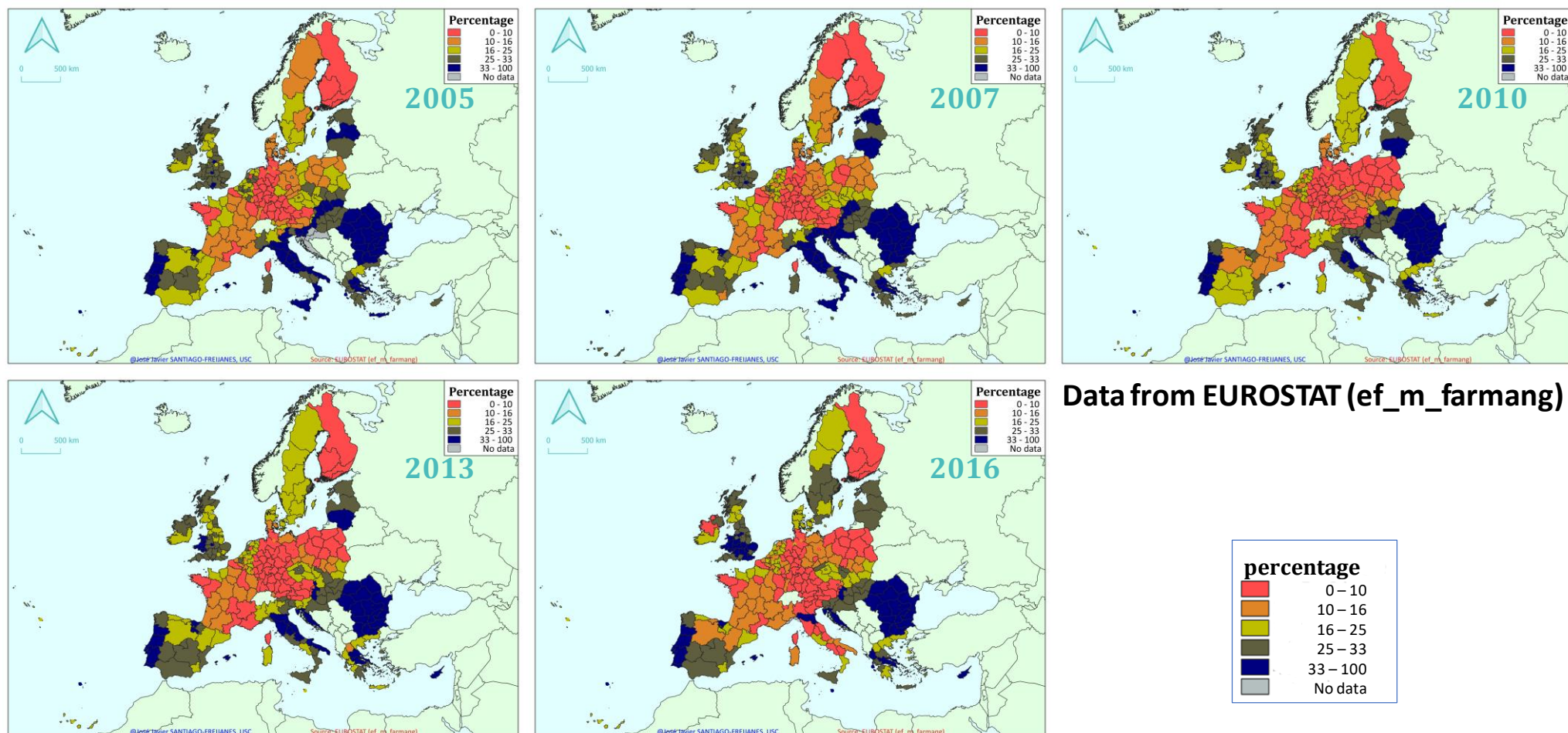


Figure 18. Percentage of older holder (65 years old and older).



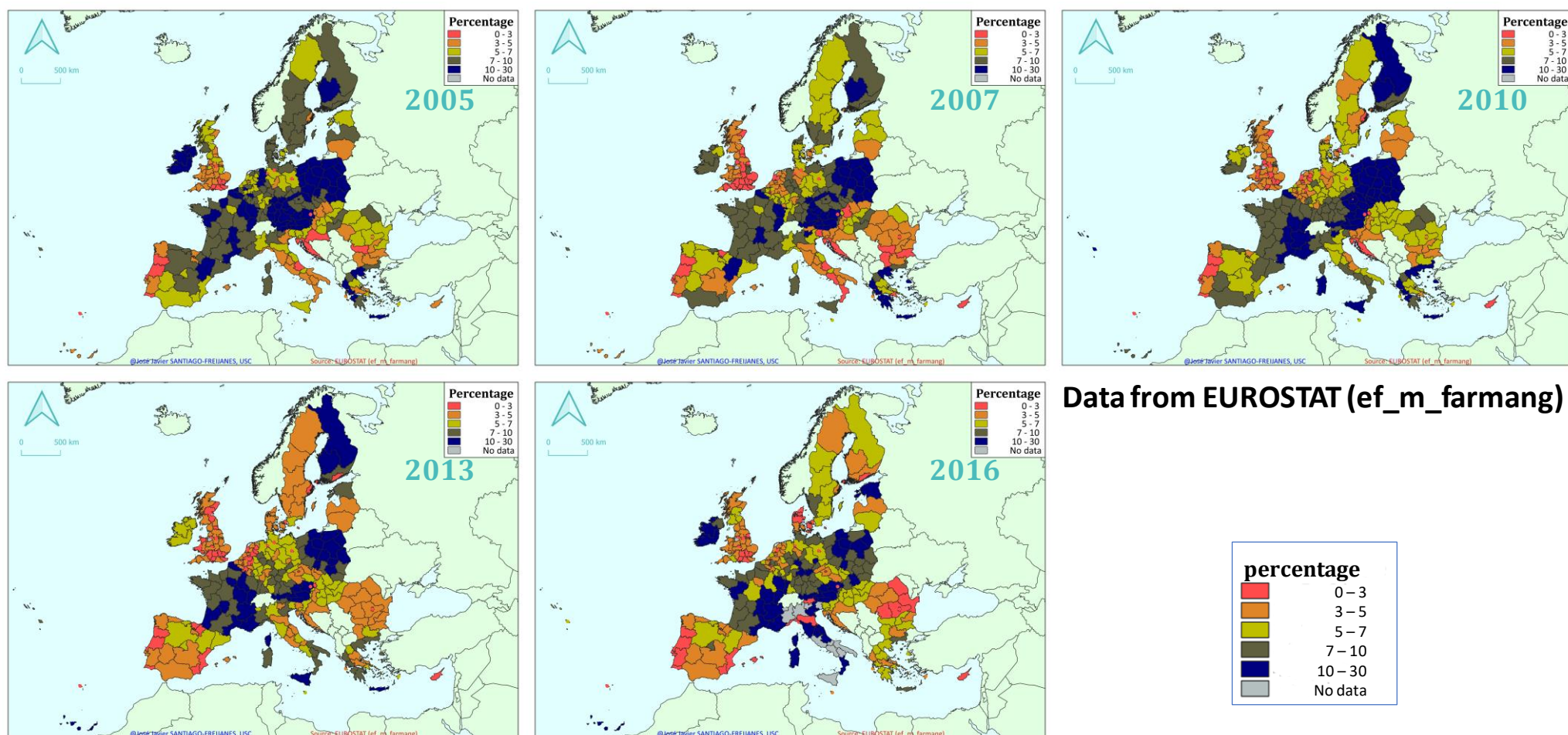


Figure 19. Percentage of younger holder less than 35 years old).



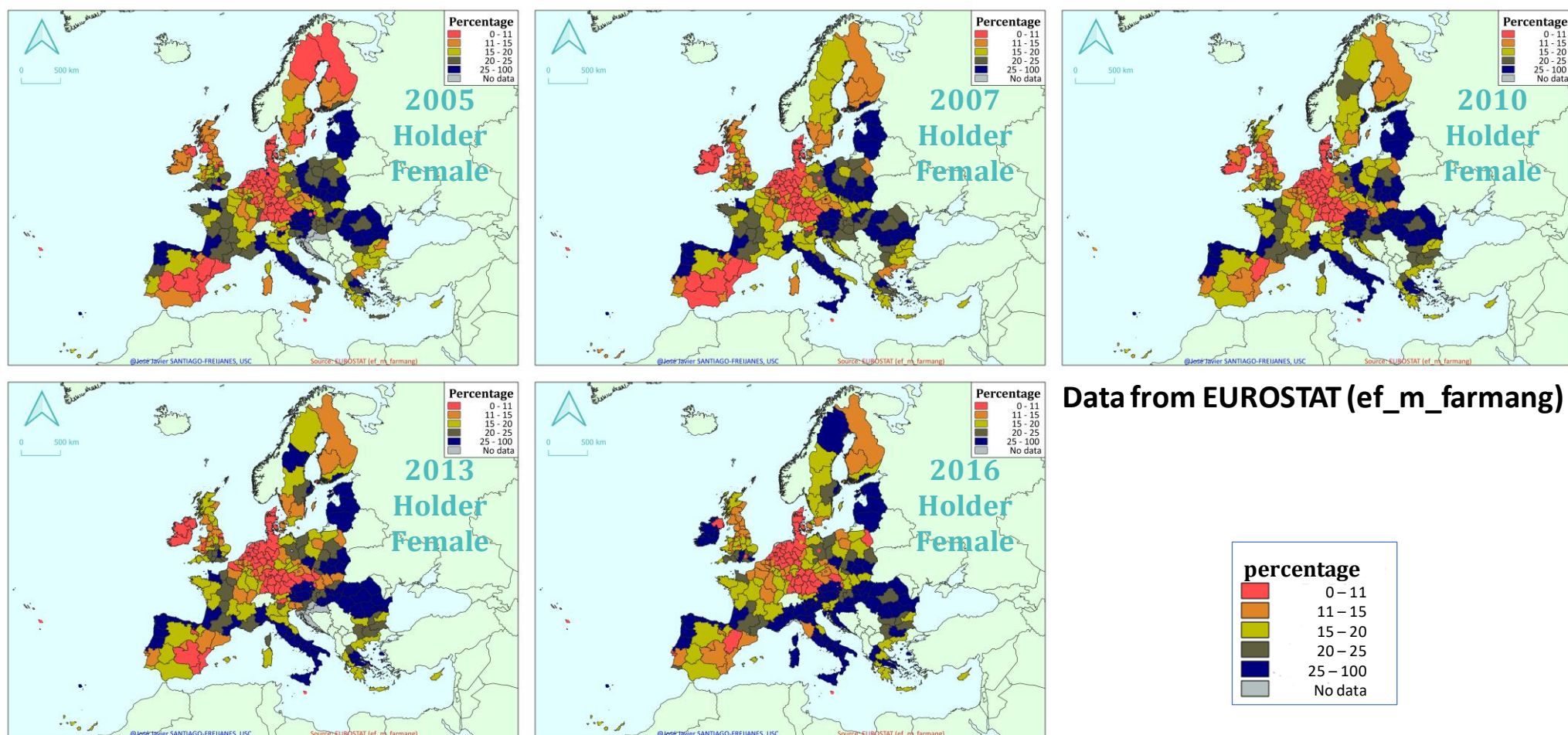


Figure 20. Female percentage of livestock farm holder.



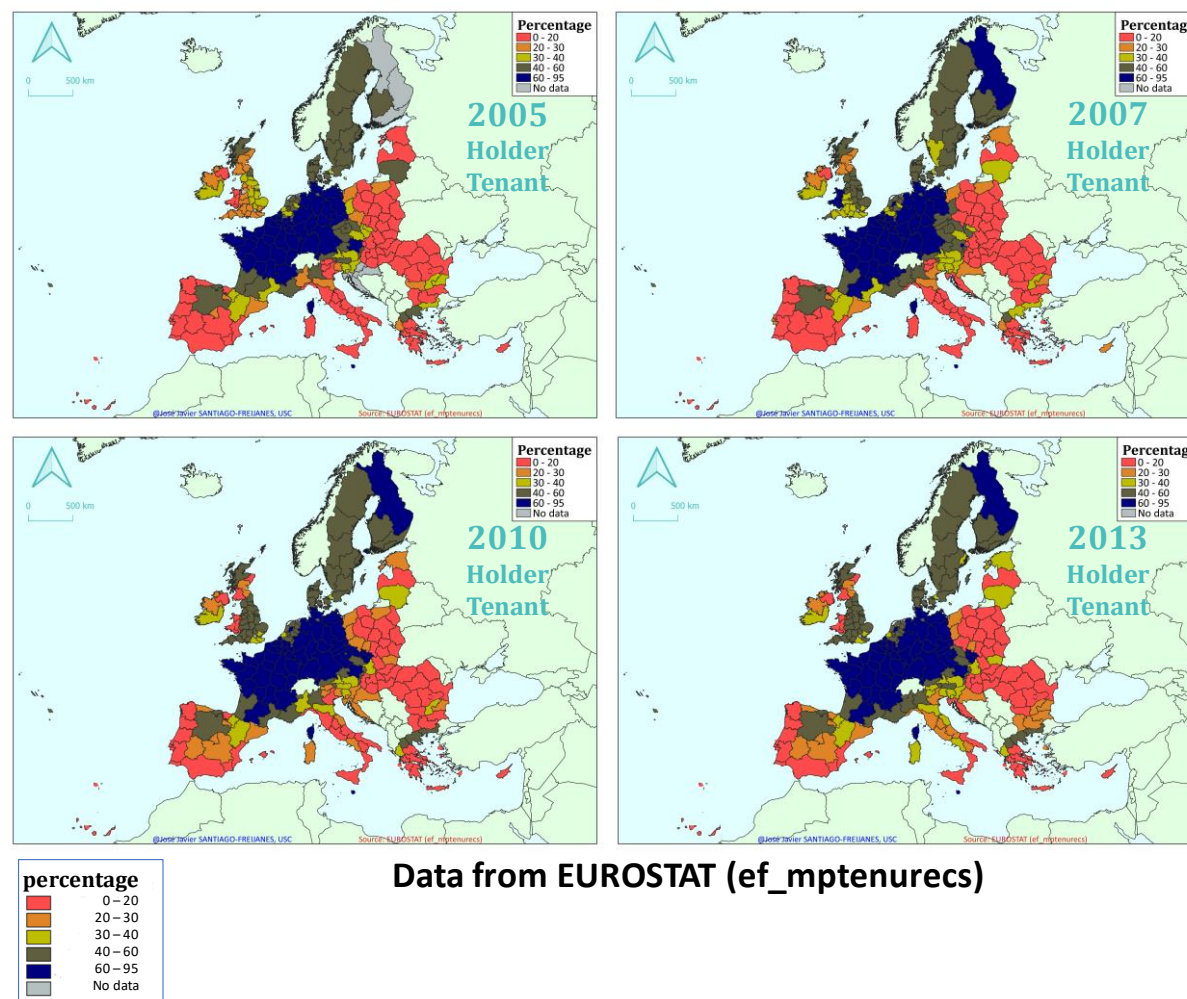


Figure 21. Evolution of holder tenant ratio (2005-2013).



6. Conclusion and Recommendations

The analysis of the CAP shows that permanent grassland is one of the most important types of land to be funded by the EU not only due to the large surface it occupies but also because of the large number of ecosystem services it provides, such as carbon sequestration. Moreover, grazing activities are seen as key to maintain and enhance biodiversity and protect water. Under-grazing is also a problem, meaning that an excess of pasture is present, that should be adequately maintained through grazing or mowing. Mowing could be carried out if the mowed herbaceous vegetation is utilised for bioeconomy activities. However, only Measure 16 relates the promotion of valued products from grassland, but in a very few RDPs this measure is established as such. Moreover, there is a lack of measures directly targeting knowledge transfer and adequate policies that promote permanent grasslands and bioeconomy at field level.

Three recommendations can be deployed from a bioeconomy and grassland point of view

- 1.- Establishment of adequate knowledge transfer systems including demonstration fields and extension services that allow farmers to understand the new products delivered from grasslands as part of the bioeconomy concept linked to Go-Grass
- 2.- Implementation of measures that promotes the establishment of farmers cooperatives, and adequate management through the development of operational groups linked to the EIP-Agri, to foster innovation in grasslands bioeconomy.
3. Supporting conversion of arable land into grassland in order to preserve environment (nutrient leaching), climate (soil carbon) and to support the delivery of resources for biorefineries that can produce both feed, food, materials and bioenergy.

Farming systems in Europe has increased the percentage of grassland share per farm, however, this is not linked to the increase of livestock use of these areas that provides an opportunity for grasslands areas to have grasslands for alternative uses such as biomass.

The alternative use of grasslands is associated to new forms of cropping and harvesting to provide the best raw material to be included in the biorefineries that will be probably difficult to implement in those areas with a large proportion of old farm holders and a low proportion of young farmers who are able to understand and change their techniques in a more faster way.

The ownership of the farms varies across Europe, which means that the policies promoting grassland alternative uses linked to bioeconomy has to consider this point



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