



Agriculture

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Agriculture constitutes an important economic sector in the coastal zone¹ and is, from a historical perspective, responsible for land reclamation. Over the last few years, the importance of agriculture as an employer in the European coastal regions has gradually decreased. Agriculture in the coastal zone is under pressure, mainly due to urban expansion (*Balancing the future of Europe's coasts*, EEA 2013). Between 1990 and 2000, 2,000 km² of farming land disappeared in the European coastal areas (first 10 km). In Belgium, the agricultural area decreased by 1.85% (*European Environment Agency (EEA) 2006*). Nevertheless, as an integral part of the agro-nutritional system, agriculture remains of significant economic importance with a small increase in Flanders over the last 10 year (*Landbouwrapport 2014*). Agriculture also has an impact on the marine environment *inter alia* due to the supply of nutrients such as nitrogen and phosphorus which can cause eutrophication of the coastal waters. Eutrophication especially constitutes a problem in the southern part of the North Sea and the Channel. 60% of the effluent nitrate and 31% of the effluent phosphorus derives from agriculture (*OSPAR QSR 2010*). However, these nutrients originate from the entire country and not only from agriculture in the coastal zone. Measurements by the Flemish Environment agency (*VMM*) indicate a reduction of the nitrate and phosphorus concentration in the surface water in Flanders. A further reduction of these nutrients from all sources remains important in order to achieve a good status of the ground water, surface water and coastal waters (see theme **Nature and environment**) (*Voortgangsrapport Mestbank 2013*).

8.1 Policy context

An important part of the agricultural policy is determined at the European level by the Common Agricultural Policy (CAP) of the *directorate-general for Agriculture and Rural Development* of the European Commission (EC) (more information: *Brochure Europees Landbouwbeleid 2014*). For the period 2014-2020, the CAP is much more connected with and integrated into the overall EU 2020 Strategy. As in the previous period, the European agricultural policy is still embodied by two 'pillars': direct support and rural development (*Landbouwrapport 2014*).

At the Flemish level, the agricultural policy is developed by the Flemish minister of Agriculture and Fisheries (*beleidsnota Landbouw en Visserij 2014-2019*). The Agriculture and Fisheries department (*departement Landbouw en Visserij*) is responsible for the preparation, implementation and evaluation of the policy. The policy is supported by the Institute for Agricultural and Fisheries Research (*ILVO*), Flanders' Agricultural Marketing Board (*VLAM*) and the Strategic Advisory Council for Agriculture and Fisheries (*SALV*).

By means of research and information centres, the province plays an important role in the education and innovation with regard to agriculture. The provincial authorities also have 'indirect competences' concerning the permit policy, spatial planning and the maintenance of non-navigable waters of the 2nd category (*website Provincie West-Vlaanderen*). Furthermore, the agricultural policy is linked to other policy domains and authorities such as the Flemish environment and spatial policy and the Federal Agency for the Safety of the Food Chain (FASFC). The developments in the international/European and Flemish agricultural policy are discussed in detail in the following publication: *Landbouwrapport (2014)*. A broader overview of the legal context with regard to agriculture is provided in the *kustcodex thema landbouw*.

8.2 Spatial use

In Flanders, the areas reserved for agricultural purposes are registered in the Flemish spatial structure plan (*RSV*) as the 'agricultural structure'. The mandatory regulations of the RSV demand that the Flemish Region demarcates a specific area for agriculture (750,000 ha), as well as for nature and forest in the regional spatial structure plans or in the regional spatial implementation plans. Regional plans were reaffirmed when a consensus between the nature, forest and agriculture sector was present. In addition to the demarcation in the RSV and the reaffirmation of the agricultural area, it is possible to further refine this demarcation through the spatial implementation plans (RUPs). However, this process has a serious delay.

The process of the demarcation of the agricultural areas in the Coast-Polders-Westhoek region started in 2004. During this demarcation phase, a new integrated approach was used which took agriculture, nature and forest simultaneously into account. In consultation with the municipalities, provinces and stakeholders, a spatial vision (*ruimtelijke visie*) was

¹ Unless stated otherwise, the coastal zone consists of the 10 coastal municipalities (Blankenberge, Bruges, Knokke-Heist, Bredene, De Haan, Mid-delkerke, Ostend, De Panne, Koksijde and Nieuwpoort) and the 9 hinterland municipalities (Damme, Jabbeke, Zuienkerke, Diksmuide, Lo-Reninge, Gistel, Oudenburg, Alveringem and Veurne).

SURFACE AND PERCENTAGE OF THE AGRICULTURAL AREA IN HA IN THE COASTAL AND HINTERLAND MUNICIPALITIES IN 2013

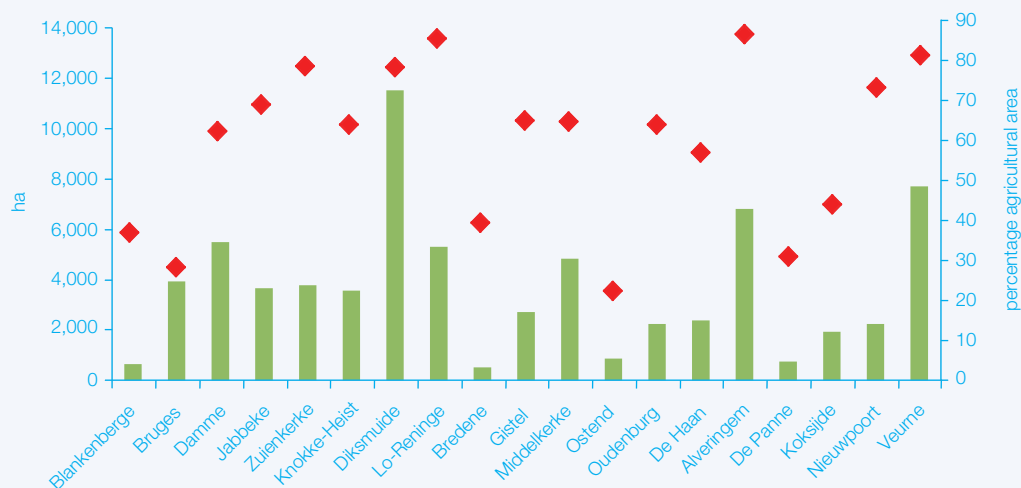


Figure 1. Surface of the agricultural area in the coastal and hinterland municipalities in ha in 2013 and the percentage of the agricultural area relative to the total area of the municipalities (Source: Agriculture and Fisheries department, based on FPS Economy – AD Statistiek).

AGRICULTURAL AREA IN THE COASTAL ZONE

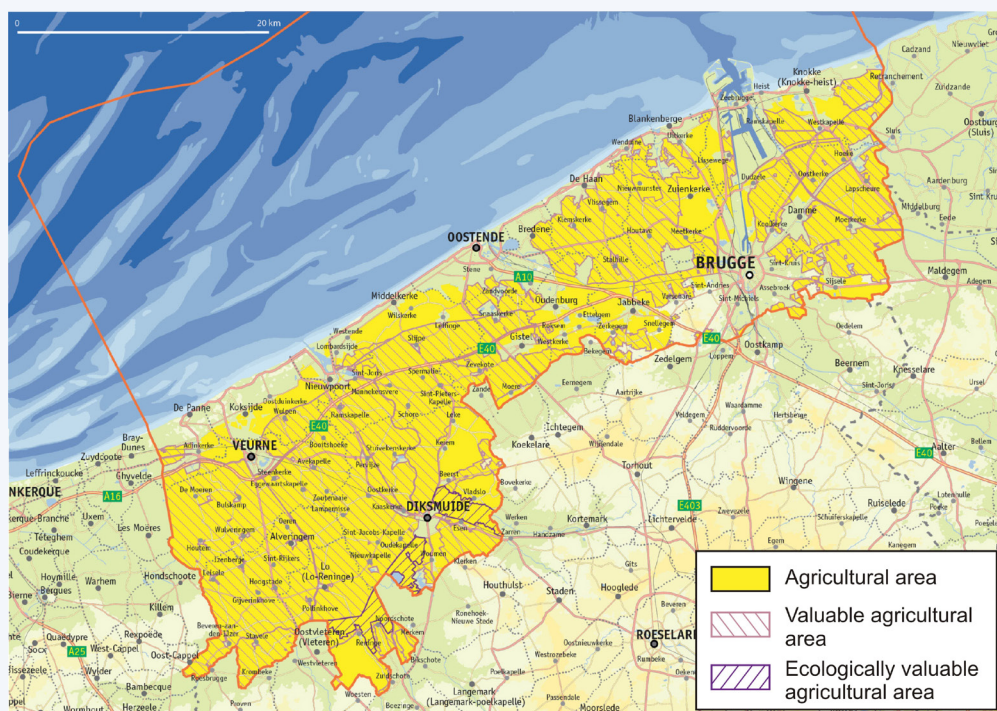


Figure 2. The agricultural area in the coastal zone (*Coastal Atlas*).

drafted which indicates the most important structures: connected areas prohibited for agriculture, valleys for nature development, etc. The consultation process finally resulted in 95,100 ha of reaffirmed agricultural area in the Coast-Polders-Westhoek region ([Danckaert 2013](#)). The regional spatial implementation plans (GRUPs) for agriculture, nature and forest in this region can be consulted on the website of the RSV ([ruimtelijk structuurplan Vlaanderen](#)). Besides the further implementation of the Flemish spatial structure plan, the Flemish government is also preparing a new policy *Beleidsplan Ruimte* that *inter alia* discusses food production (see also [Groenboek. Vlaanderen in 2050: mensenmaat in een metropool? Beleidsplan ruimte Vlaanderen \(2012\)](#))

Parts of the agricultural structure are described in the spatial structure plan of the province of West Flanders ([PRS-WV](#)). For this publication, the eastern and western polder area (parts of the spatial structure in the PRS-WV) are important for the agricultural structure. Few agricultural activities are still present in the coastal zone (*Kustruimte*, *Westkustruimte*, *Oostendse ruimte* and a part of *Brugse ruimte*) due to the strong urban pressure, the economic developments (e.g. harbour of Zeebrugge) and the increased nature protection.

The instrument of land exchange consolidation has been developed to achieve a solid agricultural structure, as described in the spatial planning (see above). In Flanders, the Flemish Land agency ([VLM](#)) is responsible for these land exchange consolidation projects. The purpose of this instrument is to improve the economic exploitation of the agricultural enterprises as well as to improve the areas for nature and recreational purposes. An overview of all development projects (general projects, rural projects, land planning projects, land exchange consolidation projects and nature development projects) is given in the [project database](#) of the VLM-website.

The agricultural area in the coastal zone constitutes a total surface of 71,154 ha (figures 1 and 2). This corresponds to 11.4% of the total agricultural area in Flanders (Source: Agriculture and Fisheries department based on the FPS Economy – AD Statistiek). All parcels registered by the Agriculture and Fisheries department, and their cultivation can be downloaded in GIS format on the Geopunt website ([www.geopunt.be](#)).

8.3 Societal interest

In 2013, 4,294 persons (3,130 full-time employees) were employed in 2,163 agricultural enterprises in the coastal and hinterland municipalities. This figure corresponds to 8.3% of all employees in agriculture and 8.7% of all agricultural enterprises in Flanders. Within the coastal area, agriculture represents about 2.5% of the workforce (source: [RESOC-dataset 2014](#) on [www.pomwvl.be](#)). The majority of the enterprises and employment in the coastal zone is located in the hinterland municipalities (see figure 3). The specialization of these enterprises, based on the standard output (more info: [Danckaert et al. 2009](#)), concerns primarily the cultivation of crops and the rearing of cattle, pigs and poultry (table 1) (Source: Agriculture and Fisheries department, based on FPS Economy – ADSEI, see also the specific theme agriculture and horticulture in the publication: [West-Vlaanderen ontcijferd 2014](#)).

The agricultural enterprises in the coastal zone account for 140,465 cows (figure of 2013), 696,485 pigs (figure of 2013), 9,597 sheep (figure of 2011), 2,760 goats (figure of 2011) and 1,809,905 heads of poultry (figure of 2011) (Source: Agriculture and Fisheries department, based on FPS Economy – AD Statistiek).

Table 1. Number of enterprises in the coastal area in 2013, broken down by specialisation (Source: Agriculture and Fisheries department, based on FPS Economy – AD Statistiek).

SPECIALISATION	NUMBER OF ENTERPRISES IN THE COASTAL ZONE (2013)
Agriculture	465
Horticulture	87
Milk production	236
Beef production	318
Mixed cattle breeding	207
Other grazing livestock (sheep, etc.)	115
Pigs and poultry	341
Mixed enterprises	394
Total of enterprises	2,163

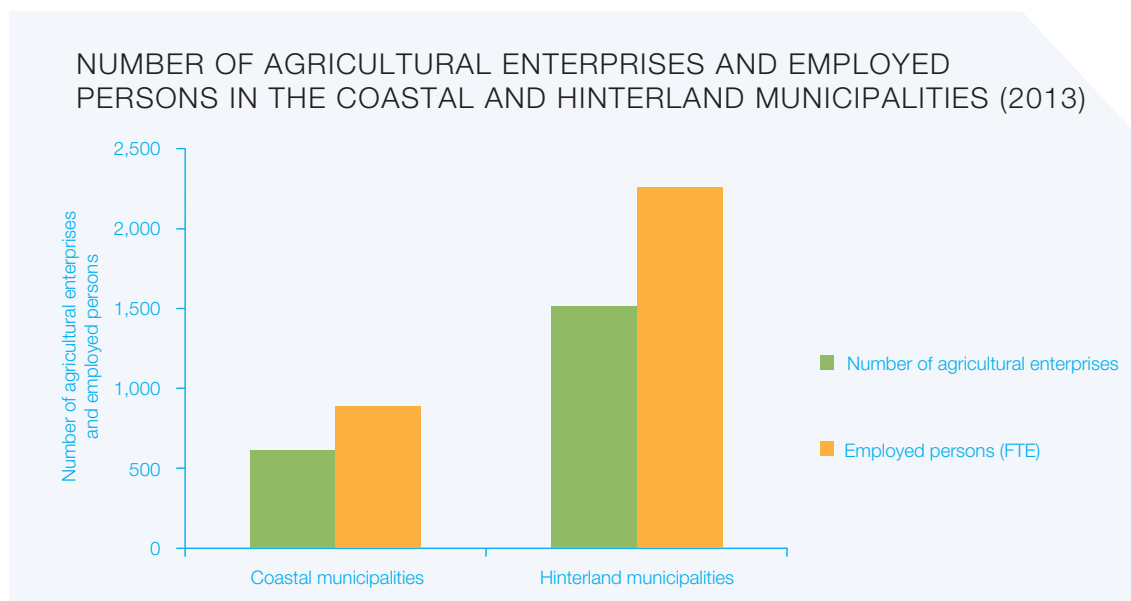


Figure 3. Number of agricultural enterprises and employed persons in the coastal and hinterland municipalities in 2013 (Source: Agriculture and Fisheries department, based on FPS Economy – AD Statistiek).

Besides the economic importance, agriculture also contributes to landscape creation, the management of open space (see also theme **Nature and environment**) and certain ecosystem services (e.g. water regulation, recharge of ground water, etc.) in the coastal zone.

8.4 Impact

In the section 'impact', the (general) effects of agricultural activities on the ecosystem are discussed, as well as the indirect effects of these activities on the marine environment (eutrophication). In addition, the phenomenon of salinisation is discussed. Although salinisation is mainly caused by other human activities, it has a considerable effect on the agricultural activities in the coastal zone.

8.4.1 Effects on the ecosystem

The different effects of the agricultural activities on the environment in Flanders (not specific for the coastal area) are listed in the publications [Wustenberg et al. \(2009\)](#), [Van Steertegem \(2012\)](#) and [Landbouwrapport \(2014\)](#). A description of the ecosystem of the polder area is discussed in the theme **Nature and environment**. The effects on the ecosystem are *inter alia*:

- The use of chemical products for crop protection (more information: [Lenders et al. 2013](#), [Van Esch et al. 2012](#));
- The use of water (more information: **salinisation of the coastal area**, [Lenders et al. 2013](#));
- The use of energy (more information: [Lenders et al. 2013](#));
- The impact on the soil quality and erosion sensitivity;
- Fertilisation (more information: **eutrophication of the coastal waters**, [Voortgangsrapport Mestbank 2013](#), [Overloop et al. 2011](#), [Overloop 2013](#));
- Acidifying emissions;
- The emission of particulates;
- Waste production;
- The impact on the spatial use.

8.4.2 Eutrophication of the coastal waters

Along with other factors, the use of fertilisers in agriculture has played an important role in the increase of nutrient concentrations (nitrogen N, phosphorus P) in aquatic ecosystems (*State of Europe's Seas 2015*). An excessive supply of nutrients or 'eutrophication' amplifies the production of phytoplankton. A phytoplankton bloom can subsequently lead to changes in the structure of the ecosystems, habitat destruction and a decrease in biodiversity (*André et al. 2010*). Over the last 20 years, phosphorus concentrations have decreased in the sea water of the BNS, whereas nitrate concentrations have varied strongly and without any clear trend (*Goffin et al. 2007*). Besides the transport of nutrients by rivers, there is an increased awareness with regard to the atmospheric supply (*OSPAR QSR 2010*). The eutrophication of the coastal waters has been comprehensively studied in the *AMORE* (*AMORE project BELSPO*), *AMORE II* (*AMORE II project BELSPO*) and *AMORE III* projects (*AMORE III project phase 1* and *phase 2 BELSPO project*) (more information: *Lancelot & Rousseau 2004*, *Rousseau et al. 2006*, *Lancelot et al. 2007*, *Lancelot et al. 2009*). The *ISECA project* aggregates the knowledge and information about the eutrophication in the southern part of the North Sea.

8.4.3 Salinisation of the coastal area

Salinisation has a considerable impact on agriculture in the coastal area. During this process, brackish or salt ground water can penetrate in the root layer of the soil. This causes an accumulation of salts (*Peeters 2013a*, *Peeters 2013b*). Naturally, there is a distribution of fresh and salt/brackish water in the coastal area. This distribution between fresh and salt water is the result of a complex history, influenced by human activities such as water extraction, infrastructure works (e.g. harbour expansion, tunnels, drainage, etc.) and interventions in the water management. These hydrological interventions in coastal areas may result in changes of the fresh-salt water distribution in the short or long term, possibly leading to salinisation (*Vanleberghe & Vanhoutte 2001*, *Van Houtte 2002*, *Vandenbohede et al. 2009*, *Vandenbohede et al. 2010*, *Vandenbohede et al. 2012*, river basin management plan for the Scheldt 2016-2021 - in preparation). Furthermore, sea level rise increases the salt pressure towards shallow groundwater and surface water. The fresh water lens in the dunes acts as a buffer against the intrusion of salt sea water in the hinterland (*Van den Eynde et al. 2011* (CLIMAR project *phase 1* and *phase 2 BELSPO*) and the *CLIWAT project*).

8.5 Sustainable use

The international (WTO, climate conference of Copenhagen 2009, conference about sustainability in New York 2009, etc.) and European policy (the Treaty of Lisbon, the EU 2020 Strategy, the CAP, etc.) to maintain a sustainable agriculture is discussed in *Landbouwrapport (2014)*. In the report, several interlinked sustainability themes in agriculture are discussed such as water management, manure management plan (*mestactieplan*), biodiversity, bio-economy, etc. Furthermore, recommendations and measures to reduce the environmental impact of agriculture in Flanders are listed in *Wustenberghe et al. (2009)*, *Van Steertegem (2009)* and *Van Steertegem (2012)*. *Gobin et al. (2008)* discusses the possibilities for the Flemish agriculture with regard to adaptations to climate change, whereas *Mathijs et al. (2012)* focuses more broadly on the sustainability of food production and consumption from a transition perspective. Furthermore, several studies have been conducted by the Agriculture and Fisheries department focusing on sustainable agriculture (*website Agriculture and Fisheries department*). These include *Bergen (2013)* (Agro ecology), *Danckaert et al. (2013)* (Food footprint), *Dumez et al. (2014)* (new perspectives with regard to agriculture and policy) and *Bergen et al. (2014)* (Challenges for the Flemish agriculture).

The sustainable compatibility of several user functions in the coastal area (housing, tourism, recreation, agriculture, industry, nature, etc.) is discussed within the European recommendation for integrated coastal zone management (ICZM) (COM (2002) 413). The compatibility of different sectors in the polders is discussed in a case study of the *Uitkerkse polder* (Blankenberge) (*Bogaert et al. 2002*).

Measures and regulations for certain effects linked to agricultural activities that are of specific importance to the coastal zone are discussed below.

8.5.1 Measures against eutrophication

In the Northeast Atlantic Ocean, OSPAR has created a [common procedure \(2013\)](#) for the identification of the eutrophication status ([Eutrophication Status of the OSPAR Maritime Area, 2008](#)). This procedure serves as a framework to identify the actions described in the [OSPAR Strategy \(2010\)](#). This strategy includes a [eutrophication monitoring programme \(2005 – updated 2013\)](#) (see also [OSPAR website](#)).

At the European level, the issue of eutrophication is covered by several directives. The Nitrates Directive (91/676/EC) aims to reduce the leaching of nitrates from agriculture ([Goffin et al. 2007](#)). The Nitrates Directive is part of the Water Framework Directive (WFD) (2000/60/EC), which imposes an obligation to reach a good status of the surface and ground waters by 2015. In this context, the key chemicals contributing to eutrophication, such as nitrogen and phosphorus, have been included in the list of most important pollutants. There is also a link with eutrophication in other directives under the umbrella of the WFD, such as directive 91/271/EC on urban waste water and directive 2008/1/EC concerning integrated pollution prevention and pollution control. In the Marine Strategy Framework Directive (MSFD) (2008/56/EC), eutrophication is included as one of the descriptors for the environmental status of the marine environment. The criteria and methodological standards to determine this environmental status are described in [Ferreira et al. \(2010\)](#).

On the Flemish level, the Nitrates Directive is implemented by the decree of 22 December 2006. This decree was originally approved on 23 January 1991 and was repeatedly modified afterwards. The decree of 22 December 2006 came into force on 1 January 2007. This associated fifth manure management plan (MAP-V) applies to the period 2015-2018 (for implementing decisions and modifications: [website VLM](#)). The WFD has been implemented on the Flemish level in the decree of 18 July 2003 on integrated water management (for implementing decisions and modifications: [website Coordination Committee on Integrated Water Policy](#)) and on the federal level in the royal decree of 23 June 2010 concerning the good status of surface waters (see [FOD Volksgezondheid, Veiligheid van de Voedselketen en Leefmilieu 2009](#)). Furthermore, the MSFD has been incorporated in Belgian legislation by the royal decree of 23 June 2010 concerning the marine strategy for the BNS.

On 23 April 2014, the Flemish Government decided to establish a programmatic approach to address nitrogen depositions ([PAS](#)). PAS is a programme that aims to tackle the issue of nitrogen depositions in the special areas of conservation of the European Habitats Directive (92/43/EC) by means of source-oriented (at the emission side) and effect-oriented measures. A number of steps are anticipated in the implementation of this programme: a transition phase (2014-2015), a provisional PAS (2015-2019) and a final PAS (from 2019 onwards).

[VMM](#) disposes of a monitoring network for the water quality that was expanded in 1999 with specific measuring points for agriculture (see water quality [geoportal](#)). In [Lancelot et al. \(2011\)](#) the costs and ecological efficiency of measures to prevent eutrophication in the Southern Bight of the North Sea have been modelled (see also AMORE III project [phase 1](#) and [phase 2](#) of the BELSPO project, and [TIMOTHY BELSPO project](#)).

8.5.2 Measures against salinisation

In COM (2012) 046 an overview is given of the implementation of the thematic strategy for soil protection since the establishment in COM (2006) 231. This strategy would be *inter alia* focused on the prevention of soil damage due to salinisation. Furthermore, intrusions of salt water have also been included in the WFD (2000/60/EC) as parameters for the quantitative status of ground water.

The WFD has been translated into Flemish legislation by the decree of 18 July 2003 concerning integrated water management ([website Coordination Committee on Integrated Water Policy](#)). In the river basin management plan for the Scheldt 2016-2021 (in preparation), a number of measures have been included to prevent further salinisation. Furthermore, the WFD is also partially implemented in Belgian legislation by the royal decree of 23 June 2010 concerning the good status of surface waters. The quality of the surface and ground water is monitored by [VMM](#) (more information: [Vandenbohede et al. 2010](#), the legislation is listed in the [coastal codex theme ground water extraction](#)).

In the study [ontwerpogaven van Metropolaan Kustlandschap 2100](#) two different development scenarios have been proposed for water management in the coastal polder (one integrated water system or partitioning). Within this context, the adaptation of agriculture to the increased saline seepage that may occur in the future is discussed.

8.5.3 Protection of Historical Permanent Grasslands (HPGs)

In the coastal polders, historical permanent grasslands (HPGs) are present which are used for agricultural purposes but are valuable from an ecological point of view as well. The HPGs are defined in the decree of 21 October 1997 as “*a semi-natural vegetation consisting of grassland characterized by long term use as grazing pasture or hay meadows with either cultural/historic value or a species-rich vegetation of herbs and grasses where the environment is characterised by the presence of ditches, streams, pools, prominent micro relief, springs or seepages*”. The decree mentioned above and the subsequent implementation decisions stipulate that HPGs are subject to a prohibition on, or require authorization for, the modification of the vegetation and physical features (relief and small landscape elements, such as pools and streams) depending on their destination status in spatial planning.

In order to achieve an effective protection of the grasslands, an inventory has been made with the exact location of the HPGs ([De Saeger et al. 2013](#)). In the Flemish coalition agreement (2014-2019), the government has committed itself to initiate a protection programme based on a map subsequent to a public inquiry. In 2015, the Flemish government decided to protect 8,000 of the 12,000 acres of grasslands. A part will be protected by means of nature legislation whereas another part will be covered by the European agricultural policy.

Legislation reference list

Table with European legislation. The consolidated version of this legislation is available on [Eurllex](#).

EUROPEAN LEGISLATION			
Abbreviations (if available)	Title	Year	Number
European Treaty			
	Treaty of Lisbon	2007	
Directives			
	Council Directive concerning urban waste-water treatment	1991	271
Nitrates Directive	Council Directive concerning the protection of waters against pollution caused by nitrates from agricultural sources	1991	676
Habitats Directive	Council Directive on the conservation of natural habitats and of wild fauna and flora	1992	43
Water Framework Directive	Directive 2000/60/EC establishing a framework for Community action in the field of water policy	2000	60
	Directive concerning integrated pollution prevention and control	2008	1
Marine Strategy Framework Directive	Directive 2008/56/EC establishing a framework for community action in the field of marine environmental policy	2008	56
Other (Decisions, Communications, White Papers, etc.)			
	Recommendation of the European Parliament and of the Council of 30 May 2002 concerning the implementation of Integrated Coastal Zone Management in Europe	2002	413
	Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions - Thematic Strategy for Soil Protection	2006	231
	Report of the Commission (COM): The implementation of the Soil Thematic Strategy and ongoing activities	2012	46

Table with Belgian and Flemish legislation. The consolidated version of this legislation is available on [Belgisch staatsblad](#) and the [Justel-databases](#).

BELGIAN AND FLEMISH LEGISLATION		
Date	Title	File number
Royal Decrees		
KB van 23 juni 2010	Koninklijk besluit betreffende de vaststelling van een kader voor het bereiken van een goede oppervlaktewatertoestand	2010-06-23/04
KB van 23 juni 2010	Koninklijk besluit betreffende de mariene strategie voor de Belgische zeegebieden	2010-06-23/05
Decrees		
Decreet van 21 oktober 1997	Decreet betreffende het natuurbehoud en het natuurlijk milieu	1997-10-21/40
Decreet van 18 juli 2003	Decreet betreffende het integraal waterbeleid	2003-07-18/72
Decreet van 22 december 2006	Decreet houdende de bescherming van water tegen de verontreiniging door nitraten uit agrarische bronnen	2006-12-22/32

