INFORMATION ON LULUCF ACTIONS IN BELGIUM

REPORT UNDER ARTICLE 10 OF DECISION 529/2013/EU

of the European parliament and the Council on accounting rules on greenhouse gas emissions and removals resulting from activities relating to land use, land-use change and forestry and on information concerning actions relating to those activities

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1.1. Overview of the LULUCF sector

Forest land

Belgium has a temperate maritime climate, with moderate temperature variability, prevailing westerly winds, heavy cloud cover and regular rain.

Belgium adopted the following forest definition for use in accounting for its activities under the Convention, and Article 3.3 and 3.4 of the Kyoto Protocol:

Minimum tree crown cover: 20 %

Minimum land area: 0,5 ha

Minimum height at maturity: 5 m

These choices allow to use the result of the present and projected regional forest inventories (Wallonia and Flanders) to calculate the C stock of different pools (biomass, dead organic matter and mineral soil). This definition is fully consistent with the official FAO definition and is already reported in the 2010 Forest Resource Assessment.

The distribution of forests in Belgium is shown in table 1.1.

Geographic scope	Forest cover (%)	% of the total Belgian forest area
Wallonia	28,4%	75,4%
Flanders	13,1%	24,3%
Brussels Capital Region	12,3%	0,3%
Belgium	20,6%	100%

Table 1.1: Forest cover in Belgium (source: National Institute of Statistics and regional forest inventories)

Agricultural land

The land used for agriculture in 2019 covers 1 358 705 hectares or 47% of Belgium's surface[1]. In 2019, the number of agricultural and horticultural businesses amounted to 36 111. This number had dropped by 42% since 2000. The disappearing of small businesses being a general trend in the sector. Additionally in Flanders, this can be partly explained due to the subsidized cut down of the number of livestock. In 2001 and 2002 this was only the case for swine. In 2003 however an extension to bovine and poultry occurred. Nevertheless the land area used for agricultural purposes remained more or less the same during this period. In 2019 54% of the land used for agriculture was situated in Wallonia,

[1] https://statbel.fgov.be/sites/default/files/files/documents/landbouw/FR_kerncijfers_landbouw_2020_v19_avec_couverture_pour_web.pdf

while 65% of agricultural businesses were situated in Flanders. The land area used for farming is on average 26,7 ha per farm in the Flemish region and 57,6 ha per farm in the Walloon region.

Organic farming and the businesses in transition towards this type of farming represent 6,9% of the total area in 2019 (of which 76% in Wallonia, 24 % in Flanders). The evolution of the Belgian agricultural sector is directly related to the Common Agricultural Policy of the European Union.

	1990	**2000**	**2005**	**2010**	**2015**	**2016**	**2017**	**2018**
Number of businesses	86962	61705	51540	42854	36913	36910	35910	36158
Usable agricultural area (ha)	1357366	1394083	1385582	1358019	1344329	1354984	1329153	1356078
Cropland	760559	864076	842999	834388	908847	916960	835668	850455
Grains (ha) (without maize)	327226	277702	267975	276571	283076	284782	256428	250529
Wheat (ha)	205050	204022	204209	209532	201629	206284	184025	182954
Sugarbeet (ha)	107837	90858	85527	59303	52341	55504	62470	62696
Potatoes (ha)	49255	65845	64952	81760	78640	89163	92854	93331
Maize (ha)	140066	202120	218081	238844	231773	220664	220283	233732
Permanent Grassland (ha)	578626	506946	519096	499687	410884	477570	467837	479635

Table 1.2: Main types of cultivation in Belgium in 1990-2018 (http://statbel.fgov.be)

	1990	2000	2005	2010	2015	2016	2017	2018
Cattle	3248792	2993820	2664141	2627402	2509609	2515880	2433457	2421340
Dairy cattle	838697	581462	494743	464449	482714	486017	482298	492969
Non-dairy cattle	2410095	2412358	2169398	2162953	2026895	2029863	1951159	1928371
Sheep	192133	123943	118644	104705	118494	122456	128297	129990
Goats	8700	13226	24021	30880	47733	57010	64277	67745
Horses	19359	41437	43662	52571	63669	66113	66986	68298
Mules and asses	1971	4878	6539	8778	9401	9716	9814	10012
Swine	6700422	6895306	6161198	6626426	66344366	6455291	6390537	6343884
Poultry (total)	27166775	37034996	32173635	32676121	38996100	42049724	42677763	44656519
other	23745	76187	54884	64500	74584	67337	67975	56552

Table 1.3: Number of heads in the main livestock categories in Belgium in 1990-2018. (http://statbel.fgov.be)

Climate

With an average temperature of 11.5°C in 2019 (https://www.meteo.be/fr/climat/bilans-climatologiques/2019/annee), Belgium as a whole has a "warm temperate moist" climate according to IPCC 2006 guidelines (Volume 4, Chapter 3, Annex 3.A5).

Land use change

Belgium follows the methodology described in the IPCC 2006 Guidelines to establish the LULUCF inventory.

The LUC matrix has been determined by the Gembloux University (Gembloux Agro Bio Tech), a study conducted specifically for the LULUCF reporting in Belgium. The detailed methodology is described in the NIR (National Inventory Report, available here :

https://unfccc.int/sites/default/files/resource/bel-2020-nir-14apr20.zip).

The method adopted for monitoring of the land-use for Belgium is a grid of points (grid of reference) on which a diagnosis of occupation/land use is carried out for the various dates of reference. This method is in agreement with the coherent representation of the land use in the 2006 IPCC Guidelines. This method makes it possible to identify the activities of the size of the minimal surface of the forest chosen by Belgium (0,5 ha). It also makes it possible to avoid double counting and to facilitate obtaining

the uncertainty of the estimates of surface. With each point of the grid of reference is allocated one of the 6 categories of land use proposed by the IPCC (Forest land, cropland, grassland, wetlands, settlements and other land). A method of estimate of surface, by counting of points is then possible.

The diagnoses of occupation/land use are carried out following two types of information: vectorial cartographic layers or raster bearing on sets of themes related to the land use (example: Forest reference layer in Flanders, agricultural area data collected in the framework of the Common Agricultural Policy of the EU); layers images (orthophotoplans or images satellite with very high-resolution).

This study delivered a first estimate of the land-use change matrix during the 2010 submission at both the regional and national level. This first estimate was further refined in the next submissions. The matrix is now produced by the Regions.

		1990						Total 2018	
		F	**C**	**G**	**W**	**S**	**O**		
2018	**F**	**682.5**	3.1	18.4	0.6	1.6	0.0	**705.9**	**23.1%**
	C	1.4	**819.3**	137.3	0.2	1.7	0.0	**960.5**	**31.5%**
	G	8.4	87.4	**542.6**	3.4	5.7	0.0	**651.8**	**21.4%**
	W	1.1	1.3	1.3	**49.4**	0.6	0.0	**53.6**	**1.8%**
	S	12.0	49.7	58.6	1.7	**563.4**	0.0	**681.0**	**22.3%**
	O	0.0	0.0	0.0	0.0	0.0	**0.0**	**0.0**	**0.0%**
Total 1990	**Area (kha)**	**705.4**	**960.8**	**758.3**	**55.3**	**573.1**	**0.0**	**3053**	
		23.1%	**31.5%**	**24.8%**	**1.8%**	**18.8%**	**0.0%**		

Table 1.4: Land Use Change matrix in Belgium (1990 and 2018). In this table F= Forest Land, C= Cropland, G= Grassland, W = Wetlands, S= Settlements, O= Other land.

Soil organic carbon in soils

The SOC evolution between 1990 and 2000 was estimated at 0.55t C/ha.yr in Wallonia and Brussels in the former submissions (Gembloux Agro Bio Tech, personal communication). This stock change was estimated from a study by Lettens based on 1960 and 2000 sampling plots. The drivers identified by Lettens were that forest was on average younger in 1960, containing less living biomass than in 2000, and that the biomass has increased between 1960 and 2000, leading to an increased amount of residues and progressive increase of SOC. Another driver could be the increase of below-ground biomass, leading to increased SOC from root mortality and C exudates .

These average stock change have been applied in the former inventory submissions, on the entire time series.

A new survey of SOC in forest has begun in Wallonia during the current forest inventory cycle, covering the same sampling plots as those cited above for 2004-2014. The aim of this survey is to verify whether SOC changes can be detected after 12 or 13 years on the inventory permanent

sampling plots. This survey should provide results on the carbon stock change in SOC for the recent years. The results of this survey are not available yet, as more sampling plots have to be analyzed. For the time being, preliminary results suggest no noticeable trend (Prof. Colinet G., pers com).

In Flanders, where the organic content in forest soils is generally lower than in Wallonia, the carbon stock in soil is estimated at 89.5 t c/ha in 2000 and the SOC variation was kept constant for the complete timeseries during this submission. This was one of the recommendations during the UNFCCC ICR5 in September 2018.

In Flanders, the current forest inventory cycle does not include soil carbon measurements. In the Brussels-Capital Region, a personal communication by the University of Ghent underlines indications of an increase in soil carbon stocks, but no quantified data are available. In Flanders, a study from 2009(13) also suggests an increase in soil carbon stocks. However, the number of samples is currently too limited and the uncertainty margin (95% confidence interval) too large to deliver significant results.

In this context, the UNFCCC review in 2018 also drew the attention to the fact that the carbon stock change applied for SOC appeared to be an outlier compared to other Parties. The consultation of the EU NIR confirms this assessment, as the SOC stock change reported by Belgium in the former submissions was the highest of all member states: 18 member States report no change in carbon stocks and the other present a very limited sink (or source for 2 MS). Only one Member State currently reports an annual change of the same order of magnitude.

As a consequence and considering that no recent information confirms that the drivers of the SOC change between 1960 and 2000 are applicable to the present forest, Belgium has revised its estimates for Soil carbon since the 2019 submission.

In the absence of complete updated values from the regional forest inventories, it is deemed that the currently available data and studies do not allow the application of the average carbon stock change factor from 1960-2000 to the recent years, as it appears likely to overestimate the actual carbon stock change. Hence, Belgium decides to apply Tier 1, assuming no change in carbon stock for this carbon pool, which is now reported as NO.

The average carbon stocks in 2000 are given in table 1.5

Carbon stocks in soil (t C/ha)	Wallonia & Brussels	Flanders
A. Forest Land	110	89,5
B. Cropland	49	54
C. Grassland	89	74
D. Wetland	100	100
E. Settlements	49	54

Table 1.5: Average carbon stocks in soils (t C/ha, 0-30 cm) in 2000.(NIR 2020)

1.2. Trend assessment

As seen in figure 1.1, forests in Belgium are the largest sink of carbon with a major impact on the trend on LULUCF sector. The level of this sink is related with some methodological aspects in carbon stock change (see 6.2.1.1). Grasslands are also a sink.

The area of settlements increased steadily since 1990. Increased urbanized areas explain this growth as the conversion from lands to settlements provoke emissions from carbon stock in soils.

The HWP pool shows a decrease of net removals, with significant impact on the overall trend. Cropland is an increasing net source of emissions since 1990. The overall trend is a decrease of net removals from the LULUCF sector.

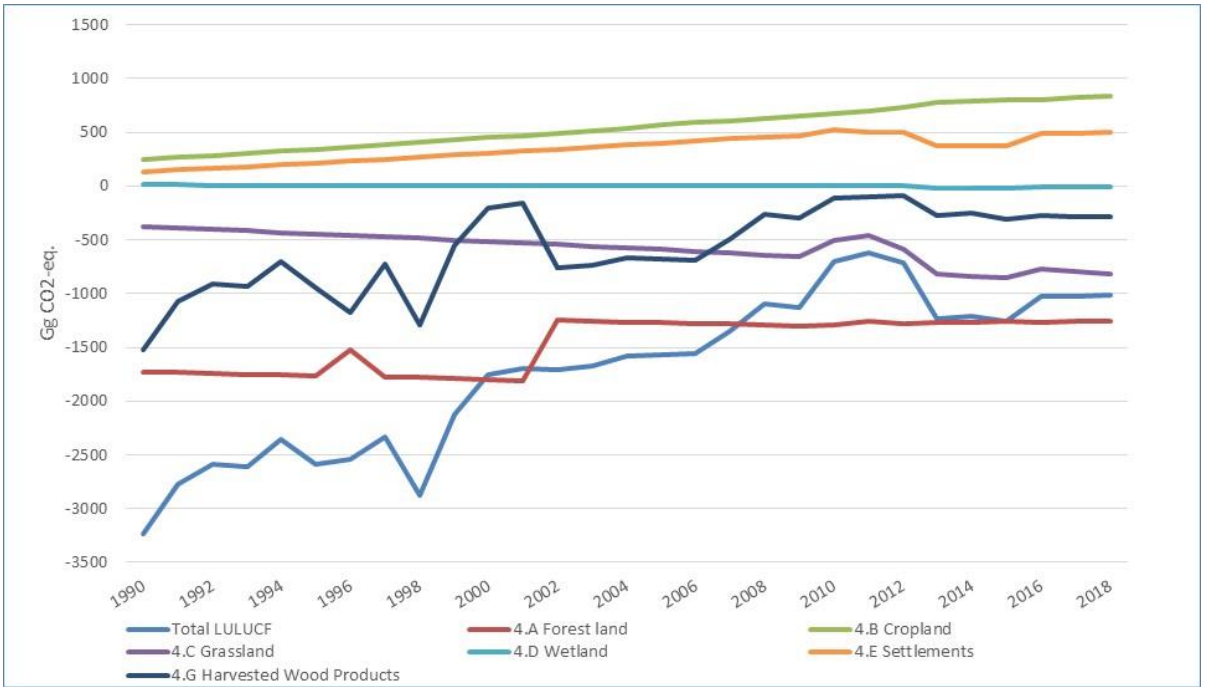

Figure 1.1: Emission and removal trends in LULUCF sector (2020 submission)

Emissions of N_2O and CH_4 increase steadily from 2-3% in 1990 to about 6% of total sector sources mainly because of Direct N_2O Emissions from N Mineralization/Immobilization (except in 1996 with 43% and 2011 with 8.5% due to fires).

2. Projections for emissions and removals

2.1. Cropland and grassland projections

The projected cropland and grassland areas were prepared in the context of the preparation of the new emissions ceilings under the NEC Directive[2], but should be updated according to the last available data.

Activity	Unit	2005	2010	2015	2020	2025	2030
Arable land	1000 ha	892,193	870,132	894,259	867,224	883,780	867,962
Grassland	1000 ha	522,806	516,798	500,121	501,547	480,972	480,341

Table 2.11: Projected areas under the NEC Directive (GAINS/CAPRI data, 2014)

Regarding carbon stocks in cropland and grassland, no projections are currently available.

2.2. LULUCF sector projections

For the time being, no recent global projections for the LULUCF sector are available at the Belgian level. Given the significant revisions in the sectors in the 2019 and 2020 GHG inventory submission, the former projections prepared by IIASA in 2011 are not relevant anymore.

Regarding forest management, recent projections were established for the submission of the Forest Reference Level for 2021-2025 (FRL), as submitted in the National Forestry Accounting Plan[3]. Following the FRL scenario, the living biomass stock increases in 2021-2030 from a mean carbon stock of 60,560Tg in 2021-2025 to an average of 62,298Tg of carbon in 2026-2030. The sink of the Belgian forest is slightly increasing with an absorption of around 1.236 ktons of CO2-eq. The stem volume removed from the living biomass of the forest is slightly decreasing and close to 5,3 Mm^3.

Period	Annual carbon stock (kt C)	Average annual balance (negative values stand for removals) ($kt\ CO_2eq$)	Average annual stem volume harvested ($10^3\ m^3$)
2011-2015	57336	-960.0	5442
2016-2020	58873	-1293.8	5289
2021-2025	60560	-1235.6	5303
2026-2030	62298	-1327.6	5269

[2] NEC = National Emission Ceilings , see http://ec.europa.eu/environment/air/pollutants/ceilings.htm

[3] https://www.cnc-nkc.be/sites/default/files/report/file/national_forestry_accounting_plan_-_belgium_-_18122019_1.pdf

Table 2.11 : Mean value of the living biomass in the forest reference level scenario before and during the commitment period.

These projections are in the same order of magnitude as the 2016 version of the EU Reference scenario prepared for the Directorate-General for Energy, the Directorate-General for Climate Action and the Directorate-General for Mobility and Transport[4] for CO_2-emissions and sinks, where the LULUCF sink is estimated at -900 kt in 2025 and -1200 kt in 2030.

3. Potential to limit or reduce emissions and to maintain or increase removals

The potential of the policies and measures described in chapter 5 is not estimated, although qualitative assessment and indicators are provided for some measures.

4. List of the most appropriate measures

Many policies and measures related to the LULUCF sector can contribute to reduce emissions and increase removals :

- Maintain or increase carbon stocks in forest through sustainable management, afforestation, changes in sylvicultural practices, adaptation to climate change, protected areas, incentives for long-term use of wood in Harvested Wood Products
- Changes in agricultural practices to increase long-term carbon storage in soils or to reduce emissions from soils (reduced fertilisation and associated N_2O emissions)
- Replacement of fossil fuels and fossil-fuel based raw material by biomass from sustainable management

During the preparation of Flemish Climate Policy plan, sectoral stakeholder consultations have been organised. Several meetings were dedicated to agriculture (WG 1 Plants and soils, WG 2 Cattle and manure, WG 3 Energy, WG 4 General wrap-up of previous meetings, WG 5 Adaptation). Each meeting was organised as a working and discussion group. Numerous potential measures[5] were discussed during the meetings and the conclusions of these discussions will be kept in mind in future policy development (whether general agricultural policy or climate-related policy aimed at increasing GHG sinks/reducing sources in the sector). Following these consultations, an awareness-raising brochure was produced and broadly distributed among the farmers.

The existing and planned policies and measures are described in chapter 5.

[4] https://ec.europa.eu/energy/en/data-analysis/energy-modelling/eu-reference-scenario-2016

[5] Growing of multi-annual crops (fruit trees, short rotation woody crops, row or solitary trees, mixed grasses, lucerne growing, farm-scale composting, green cover sowing, conversion of cropland to grassland, energy crops,…)

5. Existing policies

5.1. Measures related to cropland management

In the agriculture sector, the bulk of the measures regarding LULUCF emissions concerns cultivation practices and decreasing inputs rather than energy consumption and are consequently based on the existing policies with regard to the sustainable nutrient management programme, the agri-environment and climate measures (AECM) and organic farming under Pillar 2 of the common agricultural policy (CAP) and the greening and cross-compliance under Pillar I of the CAP.

The Rural Development Plan in Wallonia has been approved in July 2015 and is presented here : https://agriculture.wallonie.be/programme-wallon-de-developpement-rural-2014-2020The Rural Development Programme of Flanders has been approved in February 2015 and can be consulted here:

http://lv.vlaanderen.be/nl/landbouwbeleid/plattelandsontwikkeling/publicaties

Cross compliance in the Common Agricultural Policy

'Cross compliance' is an essential element of the common agricultural policy since its introduction in 2005. Indeed, the payments of direct support and support for agri-environmental and climate measures or for organic farming depend on compliance with a number of conditions. These conditions relate to environment, public health, animal health and welfare, plant health, conservation of permanent grassland and preservation of cropland in good agricultural and environmental conditions (GAEC).

Different aspects of the cross compliance have or can have an impact on GHG emissions and carbon sinks. Minimum requirements for soil erosion and soil organic matter levels, as well as the obligation for farmers to maintain permanent grassland are illustrative for these impacts. Inter alia, the management requirements arising from the European directives prohibit the modification of certain vegetation and landscape elements and provide requirements for the storage and for the low-emission application of manure.

First Pillar: The Green Direct Payment as an element of the direct payments

Since the reform of the agricultural policy in 2014, 30% of the direct payments is linked to compliance with 3 practices contributing to a better management of natural resources and to improved climate action. This is referred to as the Green Direct Payment. Greening is mandatory for any farmer applying for basic payments, although exemptions do exist. The three practices mentioned before are: crop diversification, conservation of permanent grassland and providing ecological focus areas. All of these practices show some potential for carbon sequestration. For instance, different types of ecological focus areas (catch and cover crops, agroforestry, buffer strips, afforestation, small landscape elements, short rotation coppice) influence carbon sequestration and emissions.

Specific direct payments were provided by the Flemish government for the sowing of cover crops in some years of the previous period of the agricultural policy as well. Since 2015 more than 40.000 ha in Flanders are covered each year by catch crops due to their high or very high erosion risk. Besides farmers grow between 80.000 and 90.000 ha of catch crops to comply to the EFA obligation. Furthermore, the implementation of the Nitrate Directive gave rise to an extra catch crop area of 1.536 ha in 2016 up to 4.241 ha in 2018.

In Wallonia, the recent « Arrêté du Gouvernement wallon du 13 juin 2014 fixant les exigences et les normes de la conditionnalité en matière agricole» imposes winter cover in soils subject to erosion risk. Under the Nitrates Directive implementation (Programme de Gestion Durable de l'Azote), winter cover is also mandatory in the vulnerable zones, which are currently covering 69% of the total agricultural area in Wallonia. The cover crop must be sowed before 15th September if the harvest of the main crop occurred before 1st September.

Common Market Organisation (CMO) for fruits and vegetables: sowing green cover

Short description and objectives: Environmental actions have been included in the National Strategy for operational programs within CMO for fruits and vegetables. Producers organisations are required to include at least two environmental actions in their operational programs or to dedicate at least 10% of the funds of their operational programs to environmental actions.

One of the eligible actions in Flanders is the sowing of cover crops. The farmers applying for this support need to sow the cover crops (using certified seed) before 31st October and maintain them until at least 1st February. The measure aims at enhancing soil preservation (combat erosion and improve soil structure), increasing humus content and carbon sequestration, reducing nutrient leaching, environmentally friendly weed control, crop rotation, disease and pest protection and increasing agro-biodiversity.

In Flanders, the intermediate crop 2013/2014 green cover in the context of the CMO fruits and vegetables corresponds to an area of 1.528 ha. In 2018, 81.19 ha was requested for GMO fruit and vegetables for the sowing of green cover crops and in 2019 103.73 ha. For the 2018 campaign however the request was refused because it was already part of the collective application.

Third Rural Development Programme (RDP III): agri-environment-climate measure: production of (crop/ grain) legumes

Short description: Farmers can obtain subsidies by growing (crop/grain) legumes for five consecutive years on their land. The list of authorised legumes is defined by Flemish regulations.

Objective: This measure contributes to GHG mitigation. Crop/grain legumes are able to fix nitrogen in a biological way, hereby reducing the need for fertilizers, which in turn lowers the emission of nitrous oxide (N_2O) in the atmosphere. The Flemish authorities also developed this measure with the aim to diversify roughage production in the Flemish livestock farming as well as to stimulate local protein production to reduce the livestock farmers' dependency from certain imported protein sources, such as soy. Worldwide, soy production induces important emissions of carbon to the atmosphere through land use changes such as deforestation and changes from grassland to cropland.

The measure is applicable to the entire Flemish territory.

Implementation: A similar measure existed in the second RDP. 17million euros (European + Flemish budget) were spent in the framework of this measure between 2007 and 2015. In 2014 the cultivated area within the scope of this measure amounted to approximately 4.260 ha in Flanders. In the total period of 2007-2014 this measure was applied on a total area of about 12.000 ha.

The third RDP aims at an area of 9.450 ha by 2020 in Flanders and 4.250 ha in Wallonia for this measure. By the end of 2018, 12.724 ha were planted with legumes in Flanders, of which 96% for fodder purposes (measure AMKM 01). In 2019 this measure increased its coverage to 14.999 ha of legumes. Since 2014, the area covered with fodder legumes under this measure increased from 4.212 to 14.411 ha. In Wallonia, at the end of 2018, 907ha were achieved (measure MB6)

RDP III: agri-environment-climate measure: Cultivation of fibre flax and fibre hemp using reduced fertilization

Short description: The applicant can obtain a subsidy when cultivating fibre flax or fibre hemp during five consecutive years using reduced fertilization. To ensure that flax and hemp are effectively processed to fibres, and effectively sequester carbon, an additional processing contract or commitment is required.

Objective: The Flemish government uses this measure to reduce the use of nitrogen fertiliser and to improve the environmental sustainability as less N_2O is released into the atmosphere. These crops induce long term carbon sequestration in sustainable materials (textile products, insulation material, surfacer, fibre board, composite materials,…). Up to 10 tonnes of CO_2-equivalents can be sequestered per hectare.

This measure also promotes more sustainable crops: flax and hemp. The use of plant protection products for these crops is traditionally very limited. Moreover, these crops need less nutrients and plant protection, which warranties limited environmental burden and preserved biodiversity.

This is new measure (it did not exist in the second RDP II). By the end of the period, the target area is 1.050 ha in Flanders. In the period 2016 to 2019, the area covered by the fibre flax and fibre hemp production measure added up to 659 ha.

RDP III: agri-environment-climate measure: Agreements for the conservation of small landscape elements

Short description: These agreements support the conservation of small landscape elements (hedges, tree rows, …) through a conservation commitment of five years on a specific parcel.

Objective: The agreements result in carbon sequestration by aiming at the conservation and sound management of the small landscape elements. They also lead to the preservation of the rural landscapes and support local biodiversity.

Several sub-measures exist:

- Maintenance of hedges/coppice/shelterbelt/pollard trees following appropriate technical guidelines to enable their optimal development.

- Conversion management of shelterbelt. Apply appropriate technical guidelines to shelterbelts presenting invasive alien species and/or shelterbelts presenting arrears of maintenance to enable their renewed development.

These measures focus on areas in which their added value is the highest, the so-called management areas.

A similar measure existed in the previous period of the programme (RDP II). The agreements for the conservation of small landscape elements covered an area of 170 ha in 2014. In Flanders, 7,2 million euros (European + Flemish budget) were spent on these agreements in the period 2007-2014. In the whole period 2007-2014 300 ha was covered by this measure.

The target for the next period of the programme (RDP III) is to cover an area of 275 ha by 2020 in Flanders. In 2018 125 ha were covered by this conservation of small landscape elements measure and 113 ha in 2019.

In Wallonia, the conservation of hedges is supported by the RDP and a large % of the hedges are already included in the programme, namely 13.360 km in 2012. The objective was to cover 70 % of the current hedges, namely 13.500 km by 2020 in Wallonia + 155 000 isolated trees. At the end of 2018, 11.344 km of hedges were covered by the programme and 83.968 trees were planted.

RDP III: agri-environment-climate measure: Water quality agreements (Flanders)

Short description: The participants agree to farm low risk crops (low risk of nitrate leaching) on at least 90% of their cultivated area. This implies that a signatory will always grow a higher percentage of low-risk crops than the average of the farmers in the area. The agreement can be applied to different plots every year. The farmer must comply with his minimal contractual area every year of the agreement.

Objective: Stimulating farmers to grow crops presenting low-risks of nitrate leaching, while considering erosion risk and organic matter supply for the crops at the same time, will reduce nitrogen and other pollutants leaching to surface and ground water. By introducing organic matter in the evaluation of the environmental performance of the crops carbon storage in soils is stimulated as well, along with soil structure and soil biodiversity. It is expected that leaching of fertile soils through water erosion will be mitigated as well.

This measure is implemented using management areas. As the measure aims to quickly improve water quality, it primarily targets areas where the water quality standards are not met.

This is a new measure of RDP III. The objective is to reach an area of about 11.600 ha in Flanders by the end of the programme period. In 2018 the area covered under the water quality contracts was 4.203 ha.

RDP III: agri-environment-climate measure: Agreements for reduced fertilizer use in and in the vicinity of Natura 2000-areas (cropland) (Flanders)

Short description and objective: Fertilizers cannot be applied in any form in nor in the vicinity of Natura 2000-areas to create appropriate abiotic conditions to realise the Natura 2000 objectives. The agreements are 5-year commitments to be applied for 5 years on specific plots.

This measure is only applicable to areas located in or in the vicinity of Natura2000-areas.

This is a new measure. The aim is to apply the measure on an area of 500 ha cropland in Flanders by the end of the programme period. By the end of 2018, there has been no coverage of this type reported.

RDP III: Advisory services for starting and established farmers

Short description and objective: Advisory services for specific themes can apply for financial support. These themes can be categorized under the following modules: module 1 farm business plan, module 2 business advice, module 3 cross compliance, module 4 greening, module 5 biodiversity, module 6 climate, module 7 water, module 8 soil, module 9 safety at work and module 10 transformation of agricultural products.

Modules 3, 4, 5, 6 and 8 can have a direct or indirect impact on (changes in) land use and consequently on the carbon content of the agricultural land.

A similar measure existed in the previous programme period (RDP II). In Flanders, a total of 12 million euros were spent and more than 7.000 farmers benefitted from advisory services through this measure in the period 2007-2013. In 2014-2018, starting-up farmers signed in for 355 advisory services and established farmers requested for 1.933. In total, 1.169 unique farmers were advised. From the 1.933 advices to established farmers, 11% concerned 'Environment, climate change and good agricultural and environmental condition' (module 3), 11% on 'climate and environmentally friendly agricultural practices' (module 4), 16% on climate (module 6) and 2% on soil (module 8). As for the starting farmers, 16% of their advisory requests handled on climate (module 6). Overall, 9% of the advisory services concerned biodiversity (module 5).

In Wallonia, the objective regarding individual agro-environmental action plans for 2020 is to reach 200 businesses, corresponding to 20.000 ha. At the end of 2018, 135 businesses were engaged in these plans and 10.800 ha were covered by this measure.

RDP III: Organic farming

Short description: This measure consists of (per hectare) support for the conversion from conventional to organic farming on the one hand and for the continuation of organic farming practices on the other hand. To obtain per hectare conversion support, the farmer commits for a duration of at least two years (3 years if the legal term amounts to 3 years, which is the case for non-forage perennial crops) for every converted plot. In case of continuation support, the farmer can obtain an annual premium when committing for a period of 5 years for every plot which already passed the legal conversion period.

Objective: The strategic plan for organic farming is a tool the Flemish government wants to use to stimulate organic production methods in several ways. One of the elements is the compensation of competitive disadvantage during and just after the transformation period. The measure contributes to the improvement of soil management and biodiversity in the cultivated area. Moreover organic farming leads to climate change mitigation by reducing the use of fossil fuels (for fertiliser and pesticides production, …) and by increasing the organic carbon content of farmed soils.

In the RDP III period Flanders allocated about 7,8 million euros (European + Flemish budget) was for this measure. This resulted in an surface increase for organic farming (area under conversion plus area under continued organic farming management) in Flanders from 5.065 ha in 2013 to 8.677 ha in 2019. In 2019 1.703 ha was under conversion and 6.974 ha was converted to organic farming. The organic

farming area in Flanders has been slowly growing up to 8.677 ha in 2019 (representing 1,4% of the total agricultural area). The number of organic farmers (562) has more than doubled over the past 10 years.

In Wallonia, organic farming is also supported by the authorities, including through financial incentives (arrêté du Gouvernement wallon du 06/11/03). The total area under organic farming increased from 580 ha in 1987 to 55.000 ha in 2012. The objective of the Walloon RDP towards 2020 was to have 14% of the agricultural area under organic farming. In 2019, 84.422 ha were under organic farming, representing 11,5 % of the total agricultural area. (https://statbel.fgov.be/fr/themes/agriculture-peche/agriculture-biologique#panel-12)

RDP III: non-productive investments

Short description and objective: This measure provides financial support for farmers doing investments targeted at soil or water management or at increased biodiversity or landscape value, without the purpose of economical benefits. The following types of investment form a part of a limitative list of eligible measures:

- The creation of small landscape elements, such as hedges, shelterbelts, tree rows with indigenous seedlings;
- The creation of pools
- The restoration of plantation along hollow roads and slow roads,
- Erosion dams
- Small scale water infrastructure (e.g. dikes, …)

This measure is new, as in the previous programming period, non-productive investments could be included in the agri-environment schemes.

The measure contributes to the realisation of objectives regarding environment, biodiversity, erosion prevention, water management, visual integration of agricultural buildings in the landscape etc. Additionally, the measure also mitigates ammonia emissions and increases carbon sequestration.

RDP III in Flanders foresees approximately 3,6 million euros (European + Flemish budget) for this measure for an expected total of about 2.875 projects. The non-productive investments measure was introduced in 2016 and resulted in 42 projects in the period 2016-2018.

Several agri-environment measures were applied in Wallonia during the previous RDP (2007-2013), such as the 'low stocking rate' measure, which had a direct impact on the organic nitrogen inputs, indirectly reflected in the inventories via the reduction in livestock, or the measures to reduce inputs in cereals, which also contribute to reducing inputs of mineral nitrogen.

5.2. Measures related to grazing land management and pasture improvement

Cross compliance in the Common Agricultural Policy

Cross compliance is an essential element of the common agricultural policy since its introduction in 2005. Indeed, the payment of direct support and support for agri-environmental-climate measures and for organic farming depend on compliance with a number of conditions. These conditions relate to environment, public health, animal health and welfare, plant health, conservation of permanent grassland and preservation of cropland in good agricultural and environmental conditions (GAEC).

Different aspects of cross compliance have or can have an impact on GHG emissions and carbon sinks. Minimum requirements for soil erosion and soil organic matter levels, as well as the obligation for farmers to maintain permanent grassland are illustrative for these impacts. Inter alia, the management requirements arising from the European directives prohibit the modification of vegetation and landscape elements and provide requirements for the storage and for the low-emission application of manure.

First Pillar: The Green Direct Payment as an element of the direct payments

Since the reform of the agricultural policy in 2014, 30% of the direct payments is linked to compliance with 3 practices contributing to a better management of natural resources and to improved climate action. This is referred to as the "Green Direct Payment". Greening is mandatory for any farmer applying for basic payments. The three practices mentioned before are: crop diversification, conservation of permanent grassland and supplying ecological focus area. All of these practices show some potential for carbon sequestration. For instance, different types of ecological focus area (catch/cover crops, agroforestry, buffer strips, afforestation, small landscape elements, short rotation coppice) influence carbon sequestration and emissions.

The greening measure 'maintaining permanent grassland' covered in Flanders 173.107 ha in 2015 and evolved to 170.234 ha in 2019. For the ecological fragile permanent grassland the greening measure covered 8.261 ha in 2015 and 11.675 ha in 2019. In 2018, 96.142 ha of arable land was accounted as ecological focus area (EFA).

RDP III: agri-environment-climate measure: Agreements on grassland or grass strips

Short description: These agreements involve commitments of five years on a specific parcel.

Objective: These agreements aim to stimulate the development of multifunctional grasslands or strips of land to combat erosion (soil management), protect water bodies or fragile small landscape elements, provide pollen/nectar producing crops and/or create an appropriate biotope for the fauna and flora related to the agricultural ecosystem. These measures also increase carbon sequestration.

In Flanders, several sub-measures within the agri-environment-climate scheme focus on grassland or grass strips the most relevant ones for LULUCF action are listed below:

- Develop and/or maintain species-rich grassland by excluding the use of fertilizers, soil improvers and pesticides and by adapting the mowing and grazing regime according to the advice of an expert.
- Develop and/or maintain an erosion strip: reducing soil washout on erosion prone plots by developing or maintaining a grass strip.

- Develop and/or maintain strategic grassland: reducing erosion at the source by creating and/or maintaining grassland on strategic locations.
- Develop and/or maintain a buffer strip: Protect fragile landscape elements by creating and/or maintaining a grass strip on which use of fertilizers, soil improvers and pesticides is prohibited. The mowing season of these strips is also postponed to 15th June.
- Develop and/or maintain fauna strips: Offer appropriate habitats to animal species related to specific landscapes by creating or maintaining herb-rich grass strips, adapting mowing practices and provide herb rich edges to allow a more structured vegetation in the winter period.
- Creation and maintenance of a flower strip: Provide pollinators with sufficient food supplies through the creation of a flower strip.
  These measures focus on areas in which their added value is the highest, the so-called management areas.

For this measure as a whole, the RDP III aims at a total covered area of 8.119 ha in Flanders by 2020. The measure to develop and/or maintain species-rich grassland (AECM BO1 and BO2) aimed at 876 ha by 2020 and reached 449 ha by 2019. The 2020 objective for installing (mixed) grass strips on arable land for erosion control, for buffering vulnerable landscape elements or for species protection was 6.156 ha (BO8, BO10 to BO16). By 2019 these measures covered 3.729 ha with grassland or (mixed) grass strips. In total 4.178 ha are covered by the above mentioned measures in 2019 (59,4% of the 2020 target).

Similar measures existed in the previous programme period (RDP II). During the whole programming period 2007-2013 The agreement on plot edges management covered 2.568 ha, the agreement on species protection covered 2.164 ha and the agreement on erosion prevention 7.255 ha. The total budget in RDP II spent on plot edge management amounts to 13,8 million euros, on species protection 4,7 million euros and on erosion prevention almost 8 million euros (European + Flemish budget).

In Wallonia, measures such as ‘grass strips’ and ‘extensive field strips’ also exist and currently cover respectively 2.942 km and 1.200 km (1.800 ha). The aim is to apply the measure in Wallonia on an area of 2.650 ha cropland under “Tournière enherbée”(Grass strip), 1.000 ha under “Parcelle aménagée” and 3.250 ha under “Bande aménagée” by the end of the programme period. At the end of 2018, the measure “tournières enherbrées were covering 2.245 ha (84,7% of the target) , “parcelled aménagée” were covering 83 ha (8.3% of the target) and “bande aménagée” were covering 1.264 ha (58% of the target)[6].

RDP III: agri-environment-climate measure: Agreements for reduced fertilizer use in and in the vicinity of Natura 2000-areas (grassland)

Short description and objective: In Flanders, fertilizers cannot be applied in any form in nor in the vicinity of Natura 2000-areas to create appropriate abiotic conditions to realise the Natura 2000 objectives. The agreements are 5-year commitments to be applied for 5 years on specific plots.

This measure is only applicable to areas located in or in the vicinity of Natura2000-areas.

[6] http://etat.environnement.wallonie.be/contents/indicatorsheets/AGRI%2010.html

This is a new measure. The aim is to apply the measure on an area of 500 ha grassland in Flanders by the end of the programme period. By the end of 2018, there has been no coverage of this type reported.

In Wallonia, similar support is proposed by the new RDP: for grasslands under Natura 2000 with "strong constraints", including reduced use of fertiliser, an annual area of 6.035 ha is foreseen for the period 2014-2020.

5.3. Measures to prevent drainage and to incentivize rewetting of wetlands.

In Wallonia, the Forest Code (Decree of 15 July 2008) has introduced a certain number of constraints in favor of forest conservation and the maintenance of ligneous materials and carbon, including the limitation on drainage (which encourages maintenance of organic matter).

In Flanders a whole range of vegetations are protected by law. Several of these vegetations can be considered wetlands: fens, heaths, marshes, salt marshes, mudflats and certain dune vegetation and deciduous forests. The protection of grasslands depends on the type and the area involved. The protection generally includes all damaging activities (not related to typical maintenance of the vegetation) including drainage. In certain cases exemption against this rule can be granted.

An elaborate system of management planning for natural areas with a grant scheme attached support the maintenance and / or restoration of among other wetlands. Large scale restoration of wetlands is a priority, e.g. in execution of Natura 2000.

Many wetlands were protected though the establishment of a network of protected areas (Natura 2000) by the three Regions, and at Federal level for the marine environment. 234 special protection areas have been designated for the purposes of the Birds Directive and 280 special conservation areas for the purposes of the Habitats Directive, making a total of 458 Natura 2000 sites and corresponding to a total surface area of 5.136 km^2
(http://ec.europa.eu/environment/nature/natura2000/barometer/index_en.htm – 2011)

The Flemish government plans to expand the wetland area by 2050 with a minimum of 8.900 hectares and a maximum of 13.000 hectares.

5.4. Measures related to forestry activities

In Wallonia, the Forest Code (Decree of 15 July 2008) has introduced a certain number of constraints in favour of forest conservation and the maintenance of ligneous materials and carbon, including:

- the abolition of inheritance duties on the stumpage value, which encourages more ecological forestry choices (maintaining the material, greater possibility to choose species with a long life cycle and to apply continuous cover, etc.);

- the restriction of clear-cutting;
- the obligation to plant species suited to the site, which contributes to limiting the risks of blowdown and dieback and improves resistance to climate change;
- the creation of integral reserves;
- the limitation on drainage (which encourages maintenance of organic matter);
- incentives for production of high quality wood and therefore use of wood in long-term applications with gains in CO_2 linked to substitution by other materials.
- thinning standard in even-sized spruce stands of 2009. This new standard is part of more dynamic forestry than that practised in many places. The aim behind the desire for renewed dynamism in forestry regarding the main coniferous species existing in Wallonia is mainly to produce timber in stable, healthy stands, with higher biodiversity and a shorter life-cycle. In the context of global warming, these advantages linked to the dynamism of the clearings can only be beneficial to production, by limiting the disadvantages suffered from pronounced droughts or more numerous beetle populations, for example.[7] In addition, increasing the dynamism of forestry of both coniferous and deciduous trees contributes to increasing the proportion of wood in long-term uses and therefore storage in wood products.

The designation of 1.500 km^2 of forests in Natura 2000 under special fixed rules of management also contributes to these various objectives.

In the Brussels Capital Region, the Forêt de Soignes/Zoniënwoud is protected (no deforestation allowed). Its management is FSC certified and aims to ensure ecological stability and a long-term balance in the distribution of forest age. In addition to ensuring the ability to regenerate, biodiversity and ecological and social aspects are taken into account. A whole web-platform is dedicated to the Forêt de Soignes : http://www.sonianforest.be/.

In Flanders forestry activities and forest management and protection in general are regulated by the Forest Decree[8] since 1990. This decree has seen some changes and is at the moment slowly being integrated in the general Nature Decree[9] to create synergy and address contradictions. These decrees are further elaborated by several Decisions of the Flemish Government. The Flemish forest regulations include:

- the different functions of forests (economic, ecological, social,…);
- general protective measures and prohibition of deforestation;
- a system for the management of public forests;
- general rules for forest management;
- a system of management planning including criteria for sustainable management;
- a grant scheme supporting sustainable management and ecological and social objectives;

[7] de Potter B., 2011. Prise en compte des changements globaux pour la gestion des pessières en Wallonie [Taking into account global changes in the management of spruce in Wallonia]. Forêt Wallonne 114: 17-25

[8] Bosdecreet of 13 June 1990

[9] Decreet van 21 oktober 10997 betreffende het natuurbehoud en het natuurlijk milieu

- education.

In 2020 the Flemish government launched a forest expansion programme 'Meer bos in Vlaanderen' to create 10.000 ha of additional forest by 2030, of which 4.000 ha by 2024. An integrated approach has been set up with the collaboration of a variety of stakeholders and will be implemented with financial, advisory and practical services for foresters.

Reforestation (Wallonia)

A new measure was adopted in Wallonia in September 2016[10] : a subsidy for plantation after harvest is granted to small private forest owners (area less than 5ha), for areas between 0,4 and 3 ha. This was decided after noticing that those small properties are often left without plantation. The system was originally applied in the Luxembourg province of Wallonia, but will be extended to the whole region.

RDP III: Afforestation (Flanders)

Short description: This measure includes a plant subsidy, a maintenance subsidy and a compensation for income losses. A subsidy is provided for afforestation using indigenous species or poplars with an indigenous understorey. Compensations for wildlife protection (construction of game fences or individual shelters) are also provided. In the case of replantation, the use of seedlings from recommended species is compensated as well. For 12 years after the conversion farmers receive a subsidy as a compensation for their income losses due to the conversion of agricultural land into forest land as well as a subsidy for the maintenance of forest land.

Objective: This measure is aimed at the expansion of the forest area considering the realisation of the conservation targets for Natura 2000. The purpose is to minimize the impact of the Natura 2000 conservation targets on the agricultural sector. Every forest expansion realised through this measure lowers the need to directly involve farmers to reach the Natura 2000 conservation targets. Moreover stimulating these good forestry practices (including wood production) has beneficial effects on carbon sequestration.

The RDP III aims at an area of 1.400 ha and 7,6 million euros (European + Flemish budget) will be provided for current and future contracts. From 2014 until 2019 97 afforestation projects (143 ha) were financed for in total 625.069 EUR. These grants include planting, early maintenance and income compensation. In 2019 277 beneficiaries received a maintenance grant or income compensation of in total 53.000 EUR.

The RDP I and II allocated about 2 million euros to a similar measure, which resulted in the conversion of 281 ha of agricultural land into forest land in the period 2007-2013.

[10] http://www.province.luxembourg.be/servlet/Repository/prime-plantation-reglement-2017.pdf

RDP III: Development of an Agroforestry system

Short description: In Flanders, this measure offers the possibility for a lasting coexistence and reinforcement of agriculture (cropland or grassland) and forestry in the long-term. The farmer can obtain a subsidy for the creation of an agroforestry system if this system is maintained for at least 10 years.

Objective: The sequestration of carbon is increased and the emission of CO_2 is reduced through the creation of the tree rows. Firstly, carbon is sequestered in the woody mass and in the soils through the development of extensive roots, falling leaves and the absence of tillage of the tree row. Secondly, the N_2O emissions are lowered through reduced tillage. Apart from reducing erosion risk, the deep roots of the tree rows improve the soil structure and water management system, which is beneficial from both agricultural and environmental points of view.

In Flanders, this measure was initiated during the RDP II as from 2012. In this period about 75.000 euros (European + Flemish budget) were spent on 17 requests covering an area of 38 ha.

The measure is extended in RDP III and a target area of 150 ha of agroforestry has been set, which should be reached thanks to a 500.000 euros budget. During the period 2014-2018, 67 ha of agroforestry were installed, involving 24 owners.

In Wallonia, agroforestry is promoted by the AWAF (awaf.be), which is leading many projects for the development of agroforestry (demonstrations, information on subventions, etc..).

RDP III: Reforestation (Flanders)

Short description: Subsidies are granted to reforestation projects of at least 0,5 ha. These projects are performed through the replantation of several indigenous and geographically adapted species or by rejuvenation projects using indigenous species (non-exclusive). Compensations for wildlife protection (construction of game fences or individual shelters) are also provided. In the case of replantation, the use of seedlings from recommended species is compensated as well.

Objective: The measure aims to ecologically improve existing forests and forest structures. It also aims to increase the share of indigenous species. These reforestations using indigenous species contribute to the realization of the preservation targets for Natura2000 areas. Moreover stimulating these good forestry practices (including wood production) has beneficial effects on carbon sequestration.

A target area of 1.900 ha has been defined and a budget of about 5.5 million euros (European + Flemish budget) will be allocated to support these projects. From 2014 until 2019 353 reforestation projects were financed covering nearly 470 ha for 826.120 euro.

A similar measure was provided in the previous programme RDP II where 3,8 million euros (European + Flemish budget) were paid to 950 forest managers.

5.5. Preventing deforestation.

In Wallonia, any deforestation is subject to a permit, granted under conditions, as specified in the Code of Territorial Development[11] For example deforestation is completely prohibited in Natura 2000 areas and other nature conservation areas, and in the case of deforestation for agricultural activities, reforestation (with species adapted to the specific site conditions) is mandatory when the agriculture is stopped.

Flanders has strict rules regarding deforestation[12]. As a general rule, deforestation is prohibited. There are a few of exceptions, but a permit is required in each case and this permit will be granted only in exchange for compensation. The obligation for compensation consists of the planting of a forest of equal size or larger at another location. The compensation can also be financial in the form of a forest maintenance contribution to the Forests Compensation Fund.

5.6. Strengthening protection against natural disturbances such as fire, pests, and storms.

5.6.1. Fires

Both in Wallonia and Flanders, post-logging burning of harvest residues is banned by the Forest code see http://wallex.wallonie.be/index.php?doc=11597, and

http://www.natuurenbos.be/nl-BE/Natuurbeleid/Bos/Wetgeving_en_vergunning/Bosdecreet.aspx.

Areas affected by wildfires in Belgium are extremely variable from one year to another. On average, the occurrence of fires is very low, given the usually wet and cool Belgian climate. Fires do not occur every year.

5.6.2. Pests

In Wallonia, the Walloon Forest Health Observatory (OWSF), inaugurated in April 2011, is a powerful tool for the evaluation and phytosanitary monitoring of the Walloon forests in the short and long term. In the specific context of global warming and conserving biodiversity, the OWSF intervenes by proposing rapid solutions in the case of health problems, disasters, proliferation of parasites or pathogens or any other problem likely to affect the Walloon forests. Health monitoring is the basic principle of phytosanitary forest observation since it enables a problem to be registered as soon as it

[11] http://lampspw.wallonie.be/dgo4/tinymvc/apps/amenagement/views/documents/juridique/codt/codt.pdf

[12] (Forest Decree of 13 June 1990 and Decree of 18 May 1999 concerning the organization of spatial planning and Decision of the Flemish Government on 16 February 2001 to clarify the rules concerning compensation and deforestation and exemption from the ban on deforestation)

is observed. Forest health is obviously considered throughout the territory and covers both public and private forests. The OWSF publishes regular newsletters[13]

In 2020, a decree was adopted in Wallonia regarding proliferation of bark beetle : any forest owner has to cut and evacuate the infested trees within 15 days[14],

In Flanders, the Research Institute Nature and Forests annually makes an inventory of the health status of Flemish forests. The institute does this on the basis of a fixed number of test areas of the forest vitality measuring network. This monitoring is part of an international forest health monitoring program (ICP Forests / Level 1). The monitoring network was established in Flanders in 1987. With the help of the annual crown assessments, the evolution of forest vitality in Flanders is monitored. The percentage of damaged (forest) trees is one of the nature indicators for forest quality.

Via the "Diagnosis Centre for Trees", research institute provides practical and scientifically based advice on trees and tree problems in both urban and non-urban environments in Flanders. The centre's activities comprises among other the determination of infestations by diseases and damage by insects (wood rot fungi, parasites), estimations of tree condition and the provision of advice and possible solutions. Table 5.X refers to the volume of wood sold from public forests (approximately 41% of the total forest area in Flanders) as a result of sanitary cuts.

Tree damage	2013	2014	2015	2016	2017	2018	2019	2020*
Sanitairy cut	5.691.556	143.950	392.125	122.411	120.428	1.113.054	7.019.328	1.774.972

** Data for 2020 limited from January until August*

Table 5.X Volume of wood sold after sanitary cuts (public forests in Flanders)

5.6.3. Storms, droughts and heat waves

The new Forest Code[15] in Wallonia (approved on 15 July 2008 by the Walloon Parliament) advocates a mixed-species, mixed-age forest, adapted to climate change and able to mitigate certain effects. Forestry practices must therefore try to favour the species best adapted to (present-day) local conditions, which constitutes a first step towards adaptation to future changes.

Species diversification and conservation of ecosystems that have remained relatively unaltered by human activity also enhance the forests' capacity to adapt to changes [6]. Among the measures outlined within the new Forest Code are the retention of dead or fallen trees, the retention of at least one tree of biological interest per 2-hectare area and the introduction of integrated forest reserves in broad-leaved stands. Moreover, in order to improve the resilience of the forest ecosystem, we should encourage complex forest structures, ensure that soil fertility is maintained, manage water resources optimally (enhance soil and groundwater recharge by maintaining good soil structure and limiting the water consumption of the ecosystem through our choice of species and forestry practices), monitoring

[13] http://owsf.environnement.wallonie.be/fr/index.html?IDC=5636

[14] https://wallex.wallonie.be/contents/acts/33/33677.html

[15] Decree of 15 July 2008 relating to the Forest Code (Belgian Official Journal of 12.09.2008), amended by a Walloon Government Decree of 12 December 2008 relating to the date of effect of Article 6 of the Decree of 15 July 2008 concerning the Forest Code and the operations of the Conseil Supérieur Wallon des Forêts et de la Filière Bois (Walloon Higher Council for Forestry and Timber Industry) (Belgian Official Journal of. 13.01.2009), [23]

the density of game populations and correcting imbalances by means of amendments to situations requiring a response. Such provisions also apply in the Brussels-Capital Region.

In the Walloon region, a group of experts is studying the impacts of climate change in forest ecosystems. This group has produced a document containing recommendations for policy makers and a good practice guide for forest managers. As stated above, the spruce a tree widespread in Wallonia is highly vulnerable according to the climatic projections. Consequently, a new norm has been approved in 2009 to adapt the forestry practices of this species related to global changes (including climate change).

The Walloon "Ecological file of species" and "Afforestation Guide" are the two main tools available for the forest manager to ensure the selection of appropriate tree species, depending on site characteristics and climate conditions, with a view to increase their resilience. These guidebooks are currently being revised and a new division of the territory was performed on the basis of updated climatic data and the current state of the art regarding species autoecology[16].

In the Brussels-Capital Region, the Forêt de Soignes/Zoniënwoud is particularly vulnerable to climate change, considering that its main varieties (beech tree and summer oak) are particularly sensitive to droughts. The prospects for their preservation are not optimistic. The forest is a particularly interesting case due to its proximity to a large city that generates specific disturbances (intensity of atmospheric pollution, density of human visitors, etc.). The evolution of its beech trees and oaks is monitored thanks to a permanent inventory of their condition. The first inventory revealed signs that the forest was dying. The Region has adopted a forest management plan in 2003 to preserve or improve its regenerative capacity and adaptation to environmental change. In the framework of the new management plan, adaptation to climate change will be integrated. This objective is to maintain or improve the regeneration capacity and the adaptation of the forest heritage to the climate change[17].

In 2003 the criteria for sustainable forest management were introduced[18]. These criteria can be considered as the central guidelines for forest policy and management in Flanders. This approach combines management based on natural processes, nature conservation measures and forest use (e.g. harvesting) that does not exceed the carrying capacity of the ecosystem. This approach is summarized as the mosaic cycle concept:

- All development phases of a forest are important;
- Aiming for forests with a sufficiently large surface area (at least 50 ha and preferably larger).
- In large forests, a structure is strived for where all development phases (including open phase) are present;
- Time dimension: accept waiting and responding to evolution, including natural rejuvenation.

[16] https://www.foretwallonne.be/images/stories/pdffolder/FO135-47-58.pdf

[17] See action 123 of the Air-Climat-Energy Plan of the Brussels-Capital Region

[18] Besluit van de Vlaamse Regering van 27 juni 2003 tot vaststelling van de criteria voor duurzaam bosbeheer voor bossen gelegen in het Vlaamse Gewest

In October 2017 the criteria for sustainable forest management were replaced by the criteria for integrated nature management[19], but basic principles are still valid.

Comparison of RFI1 and RFI2 show the results of the forest policy. They are becoming more diverse in composition, structure and diversity. Trees grow older and larger, although the detected changes are not always meaningful (yet). Therefore Flemish forests change in a direction desired for resilience to storm, drought and heat waves.

5.6.4. Forest certification

Measures are being taken to preserve the ecological stability of the forests by reinforcing the concept of sustainable management of the forests in forestry practices. This may take the form, for example, of promotion of systems of forest certification.

On 18 November 2005, the Federal Government concluded an agreement relating to a circular on sustainable wood (also see OB-A01). This circular required that as of March 2006 under their procurement policy, the federal authorities may only buy certified wood coming from forests under sustainable management. For this purpose, the circular sets criteria which must be satisfied under the wood certification systems. A number of actions have been taken by the Federal Government to prevent importing and marketing of wood felled illegally and to strengthen the controls and penalties imposed on this trade.

The Walloon Region is committed to PEFC certification of sustainable forest management. Certification is a tool to permanently improve management at the regional level and the practices on the ground. It makes it possible for the diverse interested actors to meet and form a consensus on forest management: owners, industrialists, scientists, environmentalists and users. Certification also makes it possible to provide a guarantee to the consumer that use of the wood goes hand in hand with good management of the forest. At present (situation 2018), about 307.000 ha of the Walloon forest area are PEFC certified (more than 90% of the publicly-owned forests managed by the Department of Nature and Forests are PEFC certified).

In the Brussels Capital Region, the management of the Forêt de Soignes/Zoniënwoud is FSC certified and aims to ensure ecological stability. In addition to ensuring the ability to regenerate, biodiversity and ecological and social aspects are taken into account.

The Flemish authorities have developed various instruments to ensure biodiversity and sustainable use of natural resources (protection of vegetation and landscapes). Group certification under the FSC system has existed in Flanders since 2008, which is open to all forest owners who have a detailed forest management plan according to the criteria set by the Flemish Government for sustainable forest management. Table 5.X details the evolution of FSC certified forests in the Flemish region.

Year	2014	2015	2016	2017	2018	2019	2020*
Surface (ha)	21.605	21.605	21.605	22.177	23.858	26.471	26.844

* Data for 2020 limited from January until September

Table 5.X Evolution of FSC certified forests in the Flemish region

[19] Besluit van de Vlaamse Regering van 14 juli 2017 houdende vaststelling van de criteria voor geïntegreerd natuurbeheer

5.7. Measures to substitute greenhouse gas intensive energy feedstocks and materials with harvested wood products.

In the Walloon Region, there has been a Wood-Energy Plan since 2001. It aims at setting up about ten projects for automatic heating systems using wood, gas generators or other technologies modified to make use of the energy value of wood on the Walloon territory. This plan affects essentially municipalities and local governments.

By 2020, the Plan had supported 185 projects of public heating, of which 105 are already installed[20]

In Flanders by a variety of private and public stakeholders signed a Green Deal on domestic woodheating for the period 2018-2022 with a triple purpose: an emission reduction to improve in- and outdoor air quality (in line with the National Air Pollution Control Programmes (NAPCPs), initiate innovations for sustainable and environmental friendly wood stoves and the development of a vision 2030-2050 on the position of domestic wood heating within the optimal use of wood streams and in line with policies on renewable energy, climate and housing renovation strategy.

[20] https://www.frw.be/pbe.html

6. Indicative timetables

The measures related to the Rural Development Plan and Common Agricultural Policy should be implemented during the period 2014-2020. In Wallonia, the Rural development Plan has been officially approved in July 2015 and launched in September 2015. In Flanders the Rural Development Programme was officially approved in February 2015; some measures were implemented very shortly after that, other measures started later in 2015 or 2016.

The monitoring of the Agri-environmental and climate measures is summarized here for Wallonia : http://etat.environnement.wallonie.be/contents/indicatorsheets/AGRI%2010.html. Information on the Rural Development Programme in Flanders is provided here: https://lv.vlaanderen.be/en/node/4957#Brochure%20PDPO%20III

References

- de Regt E., Reyns K. & Dumez L. (2019) Programma voor plattelandsontwikkeling Vlaanderen 2014-2020 (PDPO III) – jaarverslag 2018, Departement Landbouw en Visserij, Brussel
- Timmermans I. & Van Bellegem L. (2020) *De biologische landbouw in 2019*, Departement Landbouw en Visserij, Brussel.
-