REPUBLIC OF SLOVENIA
MINISTRY OF AGRICULTURE, FORESTRY AND FOOD

SLOVENIAN FORESTRY INSTITUTE

Progress Report on LULUCF Actions SLOVENIA

Submitted in accordance with Article 10 (4) of Decision 529/2013/EU of the European Parliament and of the Council of 21 May 2013 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

Ljubljana, 2021

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1. Introduction

According to Decision No 529/2013/EU of the European Parliament and of the Council of 21 May 2013 and Article 10 thereof, Member States shall draw up and transmit to the Commission information on their current and future LULUCF actions to limit or reduce emissions and maintain or increase removals resulting from the activities referred to in Article 3(1), (2) and (3) of the Decision. Member States shall also submit a report describing the progress in the implementation of their LULUCF actions by the date halfway through each accounting period, and by the end of each accounting period. The activities referred to in Article 3(1) are afforestation, reforestation, deforestation and forest management. Activities in Article 3(2) are cropland management and grazing land management, for which Member States shall prepare and maintain annual accounts. The accounting period for cropland management and grazing land management activities begins on 1 January 2021. Prior to 1 January 2022, Member States shall provide and submit to the Commission each year initial, preliminary and non-binding annual estimates of emissions and removals from cropland management and grazing land management. According to Article 3(3), Member States may also prepare and maintain accounts that accurately reflect emissions and removals resulting from revegetation and wetland drainage and rewetting. The accounts referred to in paragraphs 1, 2 and 3 of the Decision shall cover emissions and removals of greenhouse gases such as carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O).

The information on LULUCF actions covers the duration of the accounting period of 1 January 2013 to 31 December 2020 and includes the following information relating to the activities required in the Decision:

a) a description of past trends of emissions and removals including, where possible, historical trends, to the extent that they can reasonably be reconstructed;
b) projections for emissions and removals for the accounting period;
c) an analysis of the potential to limit or reduce emissions and to maintain or increase removals;
d) a list of the most appropriate measures to take into account national circumstances, including, as appropriate, but not limited to, the indicative measures specified in Annex IV of the Decision, that the Member State is planning or that are to be implemented in order to pursue the mitigation potential, where identified in accordance with the analysis referred to in point (c);
e) existing and planned policies to implement the measures referred to in point (d), including a quantitative or qualitative description of the expected effect of those measures on emissions and removals, taking into account other policies relating to the LULUCF sector;
f) indicative timetables for the adoption and implementation of the measures referred to in point (d).

The current progress report was compiled by the Ministry of Agriculture, Forestry and Food in cooperation with the Slovenian Forestry Institute (Dr. Boštjan Mali and Dr. Gal Kušar).

Contact person at the Ministry:
Dr. Simon Poljanšek
Undersecretary
Tel: +386 01 478 90 85
simon.poljansek@gov.si

2. Overview of national circumstances

Slovenia is located in Central Europe. The surface area of the territory is 20,271 km^2. In the period 2000-2020, the population of Slovenia increased slightly, from 1,990,272 to 2,094,060, primarily due to immigration. The population density is moderate. Three climate types are found in the territory of Slovenia: alpine, Mediterranean, and continental (Ogrin 1996).

2.1. Land use and land use changes

The predominant land use in Slovenia is forest land, which occupies almost 60% of the country's total area. Grassland and cropland are the second and third largest land use, with a total area of 690.1 kha or one third of the country's area. Cropland, settlements and other land have been subject to major changes over the last 30 years. The smallest changes have occurred in forest land and settlements and the largest in other land. In general, the area of forest land, grassland and settlements increased, while that of cropland, wetlands and other land decreased.

According to the land use change matrix (NIR 2020), the most frequent land use changes from 2006 to 2017 were conversions from cropland to grassland, from grassland to forest land and from grassland to cropland. The results show that 2.34% of the land area at the country level underwent land use change between 2006 and 2012 (i.e. 0.39% per year) and 2.51% during the period 2012-2017 (i.e. 0.5% per year). The trends in land use change are consistent with those found by Žiberna et al. (2013, 2018). In the period 2012-2017, land use change due to the conversion of arable land (i.e. annual cropland) to perennial cropland, overgrowth of meadows and conversion of arable land to meadows (i.e. annual grassland) was higher than that in the period 2006-2012.

2.2. Forestry

In 2019, the forest area of Slovenia was 1.207 kha, which is almost 60% of the country's total land area. Most Slovenian forests are located in beech, fir-beech and beech oak sites (70%), which have a relatively high production capacity. There are 71 indigenous tree species growing in Slovenia. The most important tree species are beech (*Fagus sylvatica*), spruce (*Picea abies*), silver fir (*Abies alba*), oak (*Quercus* sp.) and Scots pine (*Pinus sylvestris*), which together account for 80% of the total growing stock.

Forest management in Slovenia is carried out according to the principles of sustainability, the close-to-nature concept and the multipurpose forest concept, which ensure sustainable preservation of forests and all their functions. The main national policies related to forest management, which include priorities, strategies and measures to achieve the goals of sustainable forest development, are found in the National Forest Programme (NFP 2007), the Forest Act and the Rural Development Programme and are implemented by state and non-state forest organisations. The majority (79.7%) of forests in Slovenia are privately owned, and 20.3% of forests are owned by the state or local communities (SFS 2019). Larger and undivided forest properties belonging to the state enable good professional management. Private forest holdings are small, with an average area of only 3 ha, and even these are further fragmented into several separate parcels. For most of these properties, the forest is not of economic interest. Private forest ownership is becoming even more fragmented as the number of forest owners increases. According to the latest data, there are 314,000 forest properties in Slovenia and even more than 400,000 forest owners. The large fragmentation of forest

ownership and the number of forest owners and co-owners represent a serious obstacle to professional work in private forests, to optimal timber production and to the utilization of forest potential.

The area covered with forests in Slovenia has constantly been increasing for more than 130 years. According to the records of actual use of agricultural and forest land, forest area increased by 63% in the period 1875-2019. This trend is not evenly distributed across Slovenia. Forest area is increasing where there is a large amount of forest from the point of view of landscape diversity, while areas of intensive agriculture and suburban areas exert a strong pressure on forests, which gradually leads to the deforestation of the already scarce forest remnants, despite efforts to preserve forests.

The growing stock of Slovenian forests has been increasing for more than 50 years. The realisation of the allowable cut in 2019 was 87%, as stated in the forest management plans. The growing stock was 329.6 m^3 per hectare in 2018, and the increment (gross growth including ingrowth) was 7.86 m^3 per hectare per year for the period 2012-2018, as inventoried by the Forest and Forest Ecosystem Condition Survey (FECS). In recent years, felling in forests has increased from 3 to more than 6 million m^3 per year, of which 60% is coniferous and 40% deciduous. Currently, it is 87% of the allowable cut and 60% of the current increment. The annual consumption of wood of all species and forms for energy purposes increased by 32% in 2007-2012, amounting to 1.97 million tonnes, or 0.97 t per inhabitant, in 2012 (Kovač 2014).

In 2019 the value of forestry output amounted to 547.6 million EUR (Table 1), which was a 7% decrease compared to the previous year. The reason for the decrease was, despite the otherwise increased value of forestry goods output, much lower value of forestry services. Value of forestry goods output amounted to 495 million EUR in 2019, while the value of forestry services reached only 53 million EUR in the same year, which is approx. half less than in 2018.

Table 1: Forestry sector economic indicators (SORS, 2019)

Value of forestry output [million EUR]	547.6
Value of intermediate consumption of forestry activity [million EUR]	254.6
Gross value added per employee in forestry [EUR/PDM]	40,114.3
Factor income per employee in forestry activity [EUR/PDM]	29,183.2
Roundwood purchase [EUR]	54,268,175
Sawmill and veneer logs purchase [EUR]	3,530,584
Roundwood export [EUR]	1,919,392
Roundwood import [EUR]	616,160

2.3. Agriculture

Slovenian agriculture and its policies are largely disadvantaged due to specific natural conditions. Agricultural land covers less than 30% of the country, and about 75% of it is categorised as less suitable for agricultural production. The main limiting factors are the

varying relief (e.g. steep slopes), soil characteristics and high proportion of stoniness (e.g. outcrops).

Highly dispersed land ownership with typically small individual fields/plots further limits opportunities for intensive agricultural production (logistics, high transportation costs, mechanisation constraints, etc.). Most of the areas categorised with favourable natural conditions for agriculture are no exception. Approximately 37% of the country is under Natura 2000, which further limits the intensity and type of agricultural use in these areas. In 2013, an area of 148,714 ha was used for agriculture within Natura 2000. In addition, 12% (243,240 ha) of the country comprises national parks and other protected areas.

In terms of demographic conditions, a significant decline in the number of active farms has been observed over the past decade. From 2010 to 2013, the number of active farms decreased again by 3%. At the same time, it was observed that the remaining farms managed slightly larger plots of land (leases), but the total agricultural area decreased by 2.3% compared to 2010.

The total area of agricultural land in Slovenia in 2019 was 672,429 ha and was slightly higher (by 13,756 ha) compared to 2006, but the area of utilized agricultural area decreased by 19,113 ha in the same period. Both data must take into account changes in the methodology for capturing data in the Land Use database (Travnikar et al. 2020). In 2019, the total area of agricultural land was 1,001 ha smaller than in 2018, and the area of utilized agricultural area was 1,862 ha lower than in 2018. It is therefore still possible to detect a declining trend in utilized agricultural area also due to overgrowing and uncultivated agricultural land.

In 2019, 487,203 ha were registered in the LPIS, of which 487,064 ha of utilized agricultural area. Compared to 2006, the total declared utilized agricultural area increased by 5,898 ha or 1.2%, and compared to 2018 by 138 ha or 0.03%.

When comparing data from the Land Use database and the LPIS, we observe two different trends. The Land Use database show a decreasing trend in the area of utilized agricultural area, while according to LPIS, there is an increse in the area of utilized agricultural area.

In Slovenia, agricultural production is subsidized to enable profitable domestic production and the survival of sustainable and multifunctional agriculture. In addition to the existing policy, there are also other scientific initiatives that emphasize the importance of protecting the best quality land. The Resolution on Strategic Guidance on the Development of Slovenian Agriculture and Food Production Sector Until 2020 forecasts a significant increase in national self-sufficiency, counting largely on abandoned agricultural land and land that has become overgrown due to poor or no management.

Most of Slovenia’s agricultural production depends on typical mineral soil types with relatively shallow depths and thin, organic-rich top horizons (typical SOM content around 4%). Larger SOM stocks are found in smaller bogs and peatlands, parts of which are typically used as grassland or cropland. Over the centuries, these ecosystems have accumulated large amounts of atmospheric carbon. Depending on weather conditions, these ecosystems naturally represent a net sink or a net source of emissions. The type and intensity of land use have a decisive influence on SOM balance and thus accelerate mineralisation processes. It is estimated that each year tillage on the Ljubljana Marshes causes the loss of 1 cm of organic-matter-rich topsoil due to the increased mineralization of SOM.

3. Description of past trends of emissions and removals

Total net emissions in 2019 in the LULUCF sector were -101 Gg CO_2 eq. The sector has been a net sink since the base year, except in the period 2014-2018 (Figure 1). The decrease in CO_2 removals during this period was due to large-scale disturbance events, such as an ice storm, bark beetle outbreaks and windthrows, requiring sanitation cutting and increased total harvest in forests. The largest removals from the LULUCF sector of -7,714 Gg CO_2 eq occurred in 2007, which accounted for 59% of total GHG emissions (without LULUCF) in Slovenia. In 2019, removals from this sector were reduced by 98% compared to 1986.

The most important land category is forest land, as it contributes the largest part of the sink in the sector. The largest sink in forests occurred during the 1986-2007 period, ranging from -4,758 to -7,405 Gg CO_2 eq. In addition to forests, net removals also came from grassland and HWP, which contributed -364 and -253 Gg CO_2 eq, respectively, in 2019.

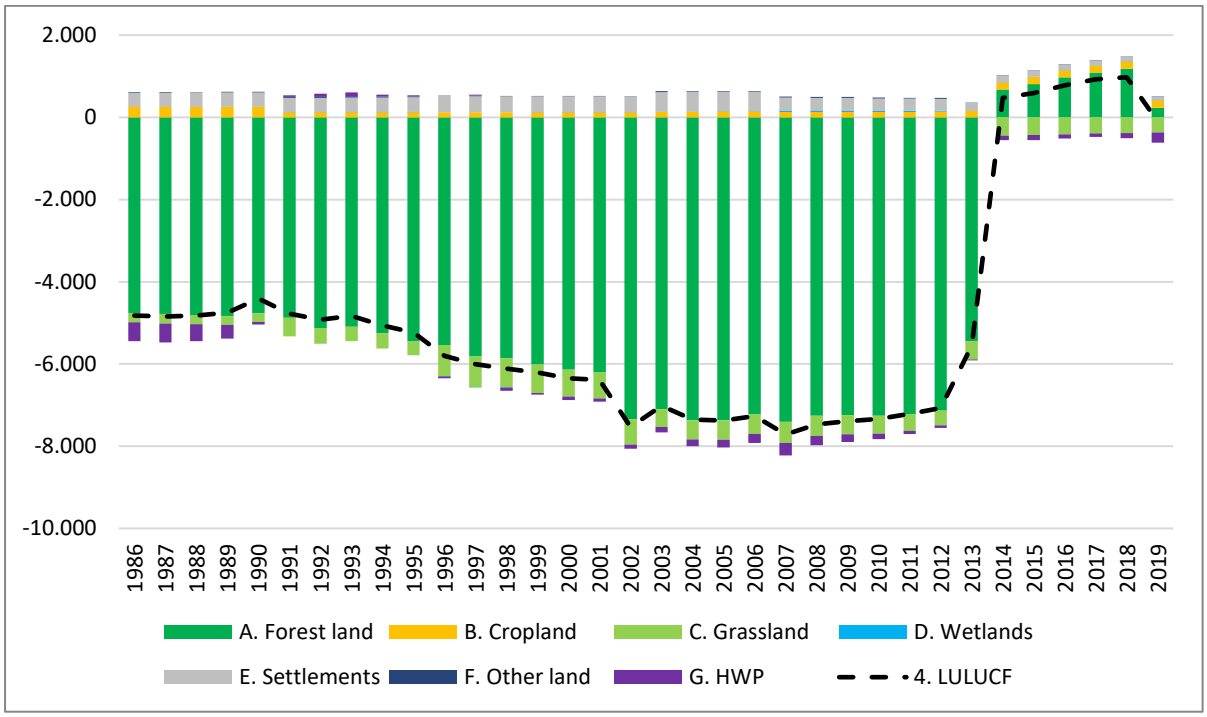

Figure 1: Net emissions and removals in the LULUCF sector in the period 1986-2019

All other categories, namely cropland, wetlands, settlements and other land were net sources of emissions during the 1986-2019 period. Until 2013, the majority of emissions came from settlements and cropland. However, emissions from settlements have shown a declining trend since 2003, while emissions in the other categories appear to be fairly stable. Emissions from cropland, settlements and other land were reduced by 31%, 73% and 65%, respectively, in 2019 compared to 1986. Removal from grassland increased by 50%, while removal from harvested wood products (HWP) decreased by 45% in 2019 compared to 1986.

Living biomass was by far the most important carbon pool until 2015, followed by dead organic matter, HWP and mineral soils (Table 2). The net removal as a result of carbon stock change in living biomass is mainly attributed to forest land. Due to increased timber harvesting in the last 5 years, living biomass has become a net source of emissions. Thus, dead organic matter

was the largest net sink, amounting to -905 Gg CO_2 eq in 2019. It should be noted that net removals from dead organic matter are considered underestimates because CO_2 estimates from dead wood and litter in forest land remaining forest land are not reported.

Table 2: Net emissions and removals in the LULUCF sector by main carbon pools and categories

Carbon pool/category	1986	1990	1995	2000	2005	2010	2015	2019
Living biomass	-4,018	-4,011	-4,694	-5,528	-6,537	-7,018	1,500	873
Dead organic matter	-341	-345	-489	-650	-645	-276	-950	-905
Mineral soils	-212	-212	-239	-233	-168	-52	31	55
Organic soils	77	77	77	77	81	84	92	86
Harvested wood products	-457	-67	28	-85	-185	-129	-129	-253
Biomass burning	72	88	23	20	24	9	9	14
4(III) Direct N_2O emissions	47	47	47	44	42	37	29	24
4(IV) Indirect N_2O emissions	11	11	11	10	10	9	7	5
Total	-4,821	-4,412	-5,236	-6,345	-7,378	-7,336	590	-101

The main improvements in the estimation of GHG emissions and removals in the past are due to the implementation of the National Forest Inventory and the monitoring of organic carbon in agricultural soils. Recalculations in the most recent annual submission to the UNFCCC included improvements in volume-to-biomass conversion (i.e. BCEF factors), estimation of losses from land converted to forest land, inclusion of the mass of available fuel for biomass burning, and improved stratification of perennial cropland remaining perennial cropland, including updating the corresponding emission factors.

Activities under Articles 3.3. and 3.4 of the Kyoto Protocol

In CP1 of the Kyoto Protocol (KP), Slovenia reported GHG emissions resulting from Deforestation, while emissions from Afforestation and Reforestation were not reported. For the last two activities, reporting is mandatory under Article 3.3 of the KP, but they do not occur in practice in Slovenia. Of the other Article 3.4 activities for which reporting in CP1 was voluntary, Slovenia elected Forest Management (FM) in accordance with paragraph 6 of the Annex to Decision 16/CMP.1. Slovenia has chosen to account for emissions and removals under Article 3, paragraphs 3 and 4 at the end of the commitment period.

In CP2 of the KP, Slovenia reported GHG emissions and removals from Deforestation, Forest Management, Cropland Management and Grazing Land Management in line with the KP and EU commitments. It should be noted that emissions and removals from Cropland Management and Grazing Land Management are initial, preliminary and non-binding and are estimated using a land-based approach. This approach assumes that the definitions of KP activities are consistent with the definitions of land-use categories under the UNFCCC. Therefore, land and corresponding emissions under Cropland were used to obtain activity data and annual emissions for Cropland Management, considering Tables 3 and 8 of the corresponding

guidance (Weiss et al. 2015). The same approach was used to estimate emissions from Grazing Land Management.

Considering the above data and assumptions, the net emissions for KP activities are presented in Table 3. Emissions from Deforestation ranged from 231.83 to 238.16 Gg CO_2 eq during the period 2013-2019. Net emissions from Forest Management were reduced by 109% over the same period and were 395.73 Gg CO_2 eq in 2019. Cropland Management was a net source of emissions, while Grazing Land Managemet was a net sink. Deforestation and Cropland Management show a fairly stable trend in emissions, while Grazing Land Management shows a slight downward trend in removals.

Table 3: Emissions and removals from activities in the LULUCF sector, in Gg CO_2 eq

Source of emissions and removals	2013	2014	2015	2016	2017	2018	2019
Afforestation, Reforestation	NO	NO	NO	NO	NO	NO	NO
Deforestation	231.83	232.12	232.80	234.02	235.72	236.61	238.16
Forest Management	-4,436.63	1,495.92	1,510.34	1,596.79	1,625.62	1,579.58	395.73
Cropland Management*	167.92	173.24	173.62	173.49	175.08	176.15	172.69
Grazing Land Management*	-385.21	-389.65	-385.30	-375.77	-356.14	-354.50	-341.12
Revegetation	NA	NA	NA	NA	NA	NA	NA

*Note: annual estimates of emissions and removals from CM and GM in line with Article 3(2b) of the EU LULUCF Decision. Source: 2021 submission to the KP and EU.

4. Projections for GHG emissions and removals

4.1. LULUCF sector

The first report on LULUCF actions in Slovenia considered future projections for emissions and removals from Forest Management and Deforestation and developed two scenarios (i.e. with measures – WM, with additional measures – WAM) for Forest Management and one scenario (WM) for Deforestation. The WM scenario for FM projected that the felling rate would increase to 6.5 million m^3 $year^{-1}$ by 2020, while the WAM scenario considered the impact of different national policies to implement measures in the LULUCF sector. However, sinks in forests were expected to be larger than emissions by 2040.

Two different projections for the LULUCF sector were prepared for the National Energy and Climate Plan (NECP), namely "EM", which corresponds to the scenario with existing measures, and "NEPN", which represents the scenario with additional measures. According to the latter, net emissions from the sector are projected be -2,353 Gg CO_2 eq in the EM scenario and -4,155 Gg CO_2 in the NEPN scenario by 2040.

Another projection for the LULUCF sector was developed in Slovenia's long-term climate strategy 2050. Under the "DUA" scanario, which considers ambitious additional measures, it is assumed that net emissions could be increased to -3,118 Gg CO_2 eq by 2040 and to -3,524 CO_2 eq by 2050. This scenario demonstrates that emissions could be reduced by preventing deforestation due to urbanization and recognizes that the highest mitigation potential could be achieved by improving sustainable forest management, such as optimizing forest age structure, adapting tree species composition and rotation period, and implementing timely silvicultural measures. In addition, the scenario foresees that most of the wood from the domestic harvest will be processed in Slovenia, which will contribute to carbon storage in wood products (i.e. HWP).

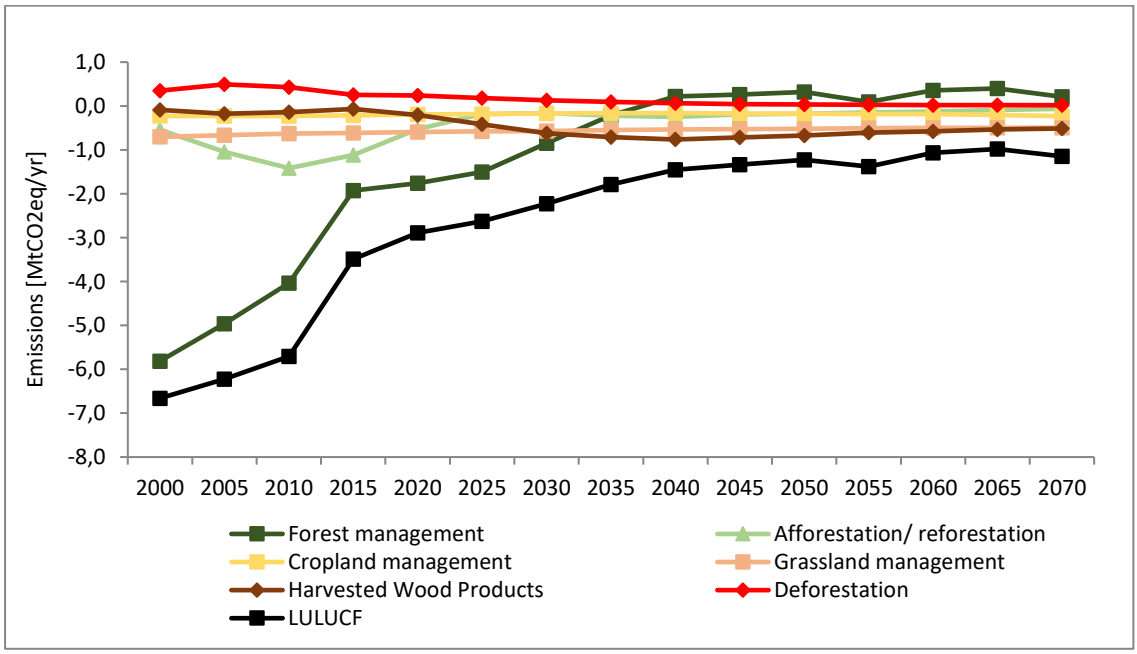

Figure 2: Projections of emissions and removals in the LULUCF sector (Reference 2020)

The projections emissions and removals for the LULUCF sector were also developed in the reference scenario (Reference 2020) using the G4M and GLOBIOM models. The long-term projections for the LULUCF sector show a decreasing trend in net emissions by 2070, ranging from -2,892 to -2,227 Gg CO_2 eq, or from 2.9 to 2.2 Mt CO_2 eq, from 2020 to 2030 (Figure 2).

4.2. Forest land

Projections of emissions and removals from forest land have recently been made by the CBM model (Jevšenak et al. 2020). The following five scenarios were defined to evaluate the effects of timber harvest on forest carbon sink dynamics: 1) business as usual (BAU), 2) harvesting in line with current forest management plans (PLAN), 3) more frequent natural hazards (HAZ), 4) high harvest (HH) and 5) low harvest (LH). The projections show that forests remain a net sink under all scenarios, with the exception of the HH and HAZ scenarios in some years. However, the sink in forests is projected to be reduced to -2,895 Gg CO_2 in 2030 and to -1,405 Gg CO_2 in 2040, when increased harvest rates are taken into account (Figure 3).

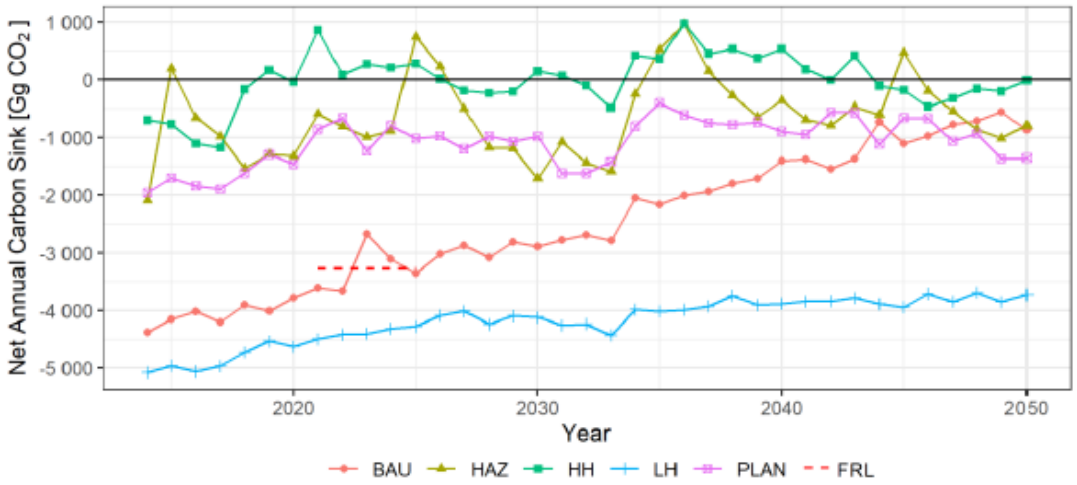

Figure 3: Net removals in forests until 2050 according to five harvesting scenarios

Considering the most recent estimate, forest land was a net source of 235 Gg CO_2 emissions in 2019 (Table 4). According to the Reference 2020 scenario, the removal of forest land will amount to -2,045 Gg CO_2 in 2020 and -874 Gg CO_2 in 2030 (Figure 2, Table 4). This is consistent with the BAU and PLAN scenarios, which assume an increase in future harvest rates to improve the age structure distribution needed to increase forest resilience and long-term carbon sequestration.

Table 4: Reported and projected emissions and removals from forest land in Gg CO_2

Forest land	2013	2014	2015	2016	2017	2018	2019	2020	2030
Reported	-5,442	679	811	973	1,088	1,187	235		
Projected (BAU)								-3,786	-2,895
Projected (PLAN)								-1,463	-985
Reference 2020								-2,045	-874

Note: Figures in 4 are rounded. The source of reported figures is CRF 2021, whereas the projected figures are according to the BAU scenario of draft long-term climate strategy (Slovenia's long-term ... 2020) and the EU reference scenario (Reference 2020).

4.3. Cropland

Following the recommendation of the ERT, the latest estimates for cropland were improved significantly, which resulted in recalculation of the reported emissions and removals from cropland. Net emissions in the second commitment period range from 161 to 176 Gg CO_2 (Table 5). Cropland remaining cropland and land converted to cropland are key categories according to level and trend, respectively. In recent years, both categories have contributed about 50% to the total emissions from cropland.

There were no particular projections of GHG emissions and removals prepared by models for cropland at the national level. However, figures were estimated for the purpose of preparing the draft long-term climate strategy using moving averages and the trend of reported past emissions. Moreover, net emissions from cropland were projected by the GLOBIOM model to prepare the Reference 2020 scenario. Estimated and simulated figures show that cropland will be a net sink in the period 2020-2030 (Table 5).

Table 5: Reported and projected emissions and removals from cropland in Gg CO_2

Cropland	2013	2014	2015	2016	2017	2018	2019	2020	2030
Reported	161	169	172	173	176	178	176		
Projected (BAU)								-159	-159
Reference 2020								-193	-168

Note: Figures in Table 5 are rounded. The source of reported figures is CRF 2021, whereas the projected figures are according to the BAU scenario of draft long-term climate strategy (Slovenia's long-term ... 2020) and the EU reference scenario (Reference 2020).

4.4. Grassland

GHG emissions and removals from grassland ranged from -447 to -364 Gg CO_2 in the period 2013-2019 (Table 6). The main sources of emissions in grassland are conversions from forest land to grassland. Woody biomass and soil data in grassland remaining grassland were recently improved, which resulted in an update of corresponding emission factors and recalculations. Grassland remaining grassland and land converted are both key categories.

It is expected that grassland will be a net sink until 2030. However, it seems that removals will slightly decrease, depending on the rate of land-use conversions from and to grassland. Net emissions from cropland are projected to decrease to -567 Gg CO_2 by 2030 according to the Reference 2020 scenario. Much depends on the future common agricultural policy, as the measures implemented under the rural development programme and direct payments are the main driving force behind agricultural land activities.

Table 6: Reported and projected emissions and removals from grassland in Gg CO_2

Grassland	2013	2014	2015	2016	2017	2018	2019	2020	2030
Reported	-447	-442	-428	-414	-389	-382	-364		
Projected (BAU)								-361	-361
Reference 2020								-595	-567

Note: Figures in Table 6 are rounded. The source of reported figures is CRF 2021, whereas the projected figures are according to the BAU scenario of draft long-term climate strategy (Slovenia's long-term ... 2020) and the EU reference scenario (Reference 2020).

4.5. Harvested wood products

In 2019, the production of forest wood products amounted to 4.7 million m^3, which includes roundwood, wood for pulp and panels, other industrial roundwood and fuelwood. The production of broadleaves was 15% higher and the production of conifers 19% lower than that in 2018. Slovenia is a significant exporter of unprocessed roundwood. Exports of roundwood in 2019 decreased by 28% compared to the previous year and amounted to 1.91 million m^3. The main importing countries for unprocessed roundwood from Slovenia in 2019 were Austria (46%) and Italy (37%), which account for 83% of the total amount of roundwood exported from Slovenia. Imports of unprocessed roundwood to Slovenia have been growing since 2016 and in 2019 exceeded 0.6 million m^3.

The production of harvested wood products (HWP) from the domestic harvest was around 1.2 million m^3 in 2019. The majority or around 80% of the domestic harvest was used for the production of sawnwood, and 20% was used for the production of wood-based panels and pulp. Net removals from HWP ranged from -25 to -253 Gg CO2 in the period 2013-2019 (Table 7).

Table 7: Reported and projected emissions and removals from HWP in Gg CO_2

HWP	2013	2014	2015	2016	2017	2018	2019	2020	2030
Reported	-25	-113	-129	-102	-86	-126	-253		
Projected (BAU)								-208	-255
Reference 2020								-206	-621

Note: Figures in Table 7 are rounded. The source of reported figures is CRF 2021, whereas the projected figures are according to the BAU scenario of draft long-term climate strategy (Slovenia's long-term ... 2020) and the EU reference scenario (Reference 2020).

In 2019, net removals from HWP increased by 912% and 101% compared to 2013 and 2018, respectively. It is expected that net removals will continue to increase until 2040, as projected by the Reference 2020 scenario. Nevertheless, the contribution of HWP to sinks in the total balance depends on the amount of domestic harvest, future capacities of sawmills and the wood processing industry, and the rate of export of unprocessed roundwood.

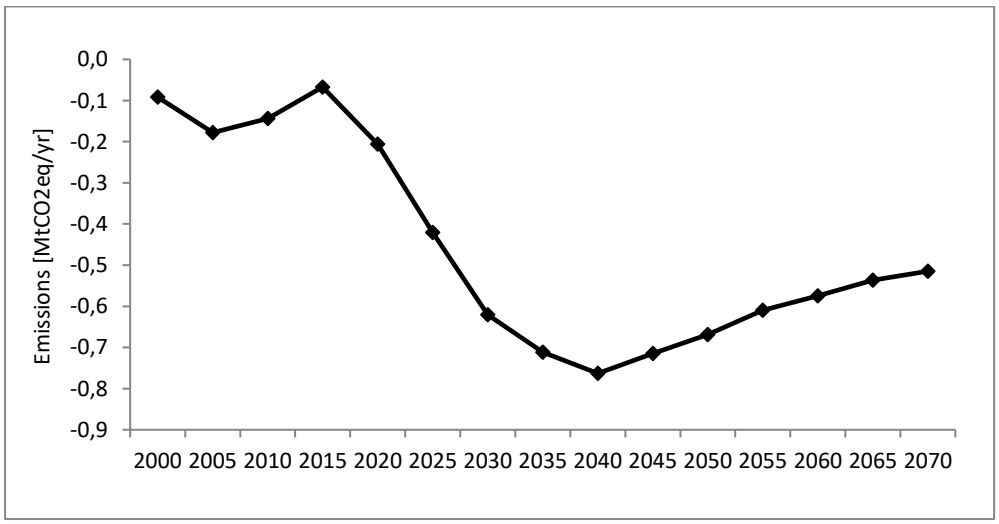

Figure 4: Net emissions from harvested wood products (Reference 2020)

5. Identification of mitigation potential

The technical potential to reduce GHG emissions and increase sinks in the LULUCF sector was assessed for 18 measures, namely 9 forestry and 9 agricultural measures. The technical potential of all measures is 9,059 kt CO_2 eq per year. The absolute technical potential of forestry measures is significantly higher compared to agricultural measures. This is in line with the Impact Assessment (2016), which recognized that the potential of agricultural measures to reduce emissions in the LULUCF sector is limited. Similarly, there is low mitigation potential of measures on other land categories, with the exception of measures to improve the management of organic soils.

5.1. Mitigation potential of forestry measures

The technical potential of forestry measures is 8,256 kt CO_2 eq per year. The greatest technical potential on forest land is the increase in carbon stock in living biomass, which represents as much as 57% of the potential of all measures in the LULUCF sector. An increase in soil carbon stocks represents 20% of the technical potential of forestry measures. If we add to this the increase in the carbon stock in dead wood and litter, then together they represent 32% of forestry measures. The increase in the carbon stock in harvested wood products contributes 3.6% to the potential of forestry measures, while the technical potential of other measures on forest land is less important (Figure 5).

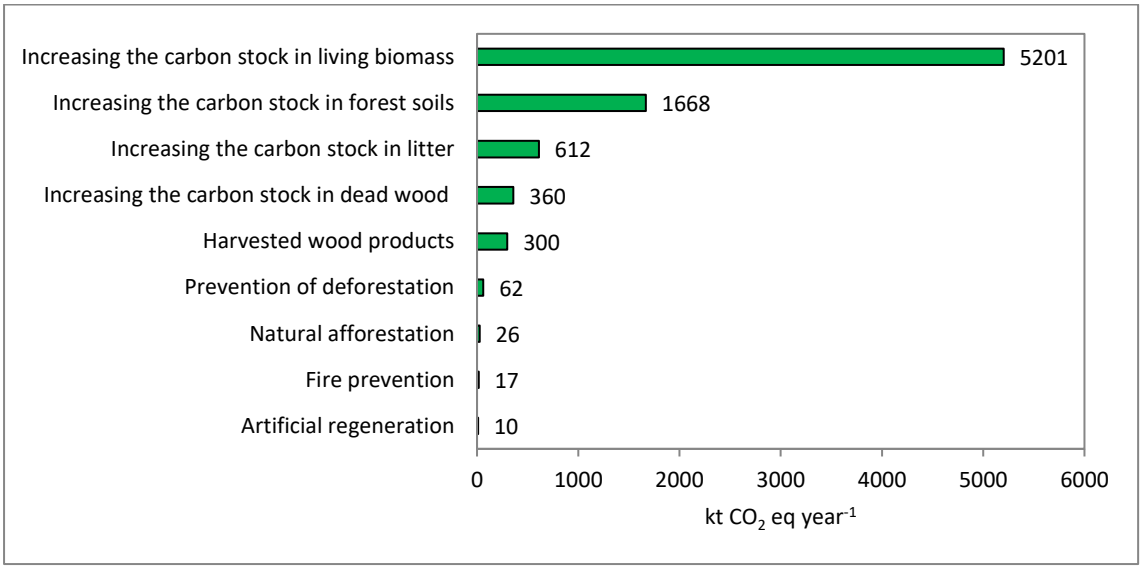

Figure 5: Technical mitigation potential of forestry measures

It should be emphasized that increasing the carbon stock in living biomass can only be achieved by limiting the harvest in forests. Theoretically, the technical potential to increase carbon stocks in living biomass could be equal to the increment in the absence of harvesting. Such an example is actually primeval forests, but this type of forest management is not sustainable in the long term, as it does not meet the objectives of all forest functions or forest ecosystem services. In assessing the technical potential of this measure, we therefore assumed that the lower threshold of harvesting intensity would be 43% of the increment in the period 2020-2030. Based on this assumption, the technical potential is estimated to be 4.66 t CO_2 eq ha^{-1} $year^{-1}$, which deviates significantly from the potential calculated for Slovenia on

the basis of the reference scenario (Paquel et al. 2017), which in this case can be considered the achievable potential (Figure 6).

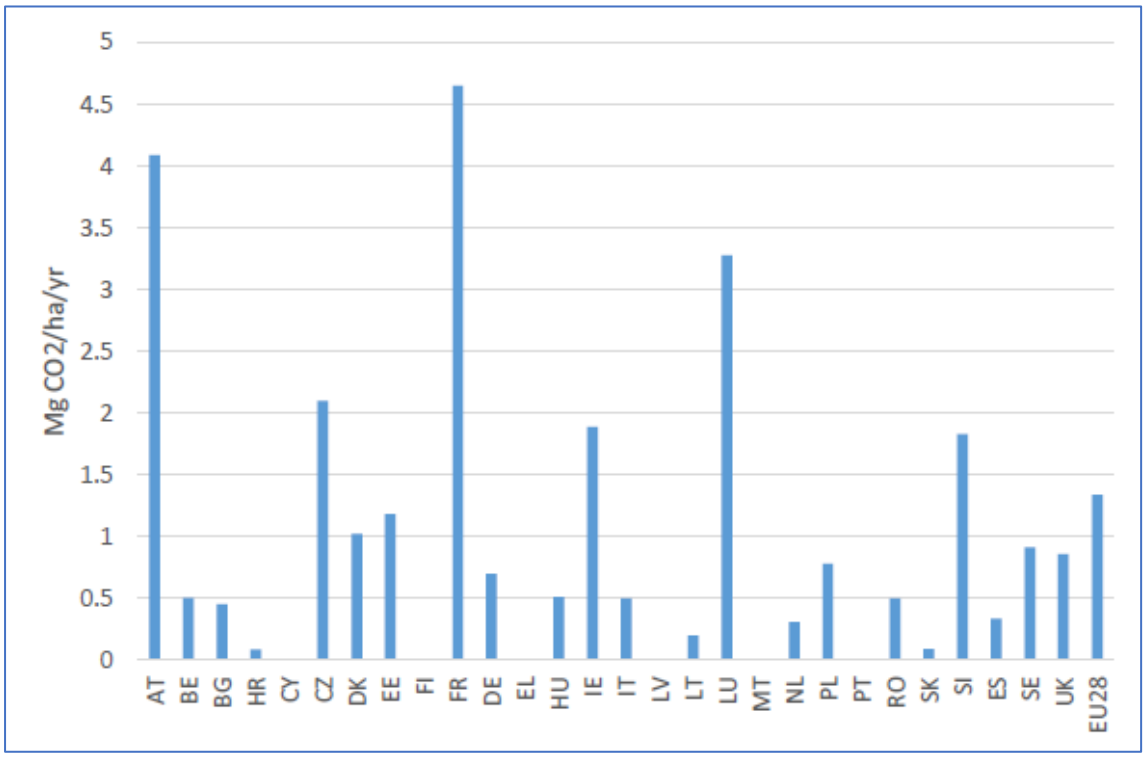

Figure 6: Mitigation potential in the EU28 due to optimization of carbon stocks in forests

The potential for the enhancement of sinks due to an increase in carbon stocks in litter and organic carbon in the mineral part of forest soils was estimated exclusively on the assumptions of data on sequestration rates per unit area from France and Germany (Grüneberg et al. 2014; Wellbrock et al. 2017; Jonard et al. 2017). Based on these data, the potential of forest soils to increase sinks appears to be about 3.5 times higher compared to the potential of agricultural soils. If, in addition to the mineral part, we also take into account the organic part of the forest soil (i.e. litter), then this potential is on average 5 times higher. In any case, the absolute annual potential of forest soils is large, about 2 times higher than the absolute potential of all agricultural measures combined, which was estimated.

With respect to the technical potential of harvested wood products, it should be emphasized that it refers exclusively to the increase in carbon stocks, namely in categories such as paper, wood panels and sawnwood. All other wood intended for energy use is not taken into account in this sector, so we have not assessed the potential for it. In addition, we have not assessed the potential use of wood in terms of replacing other energy-intensive materials.

5.2. Mitigation potential of agricultural measures

The total technical potential of agricultural measures is 803 kt CO_2 eq per year, which represents only 9% of all sectoral measures. Diversification and extended crop rotation represent by far the greatest technical potential (Figure 7), which together with the fertilization of meadows represent the majority of the potential (69%) for reducing emissions on agricultural land. Other agricultural measures together therefore represent just under a third

of the potential in the agricultural part of this sector. In assessing the mitigation potential of agricultural land, we used data from the literature (e.g. Smith et al. 2008; Domingo et al. 2014; Powlsen et al., 2014; Poeplau and Don, 2015; Conant et al. 2017), giving priority to those data obtained in European countries. The absolute technical potential of agricultural land can be increased by increasing the areas on which measures are implemented. Although the potential for measures to reduce emissions from agricultural land is limited, they need to be viewed holistically, which brings other added benefits in addition to food security. It should be emphasized that for measures on agricultural land, we have assessed the potential for reducing emissions which are directly related to land use. Therefore, we did not take into account the reduction of emissions due to the tillage method itself. For example, the measure of direct sowing contributes to the reduction of fuel consumption of machinery, as it requires a lower number of operations.

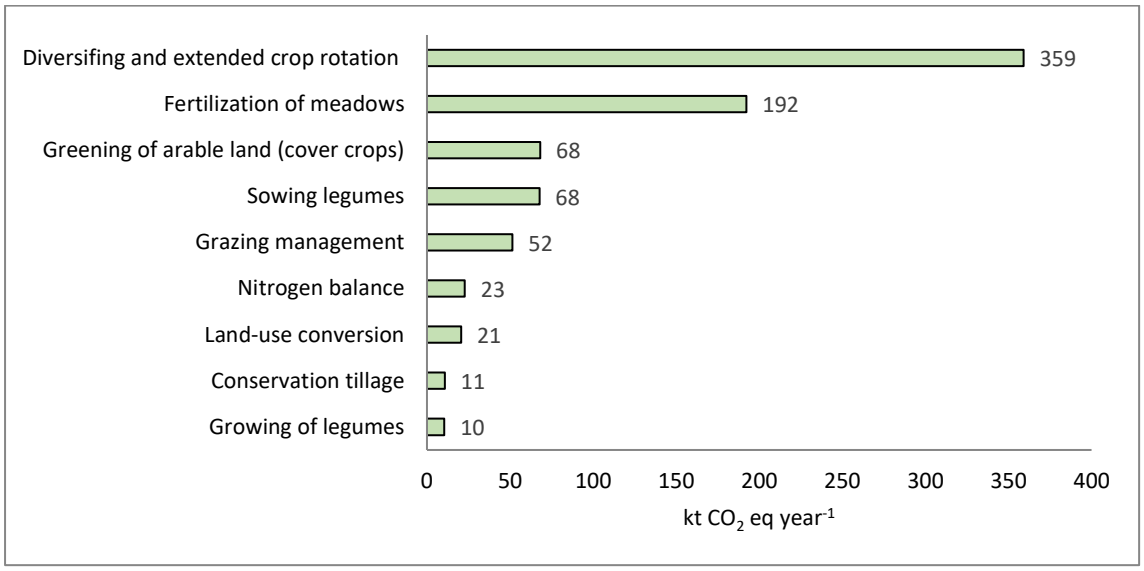

Figure 7: Technical mitigation potential of agricultural measures

6. Identification of appropriate measures

To date, most of the below-listed measures have started to be implemented in the framework of different existing and planned policies that are related to LULUCF. There are no new measures included in the list that might significantly contribute to the reduction of emissions and/or mitigation of climate change effects in LULUCF. The updated information focuses on the implementation and the activities related to the selected measures.

6.1. Forestry

6.1.1. Investments in the forest area development and improvement of the viability of forests (M08)

The objective of the measure is to enhance the ecological function of the forest while regenerating forests damaged by natural disasters such as the ice storm and a bark beetle outbreaks. The measure is implemented in the framework of the Rural Development Programme 2014-2020 (hereinafter RDP), which contributes to the reduction of GHG emissions through the sub-measure “Support for restoration of damage to forests from forest fires and natural disasters and catastrophic events” (M08.4). Two operations are planned under sub-measure M08.4, namely i) Remedying of damage and restoration of forests after a natural disaster and ii) Arrangement of skid trails required for forest restoration. By the end of October 2020, 4,675,367 EUR was spent in total: 4,046,788 EUR under the first operation, including the purchase of forest tree seedlings and restoration works in damaged forests, and 628,578.66 EUR under the second operation.

Forest owners were able to benefit from RDP funds to restore forests that were damaged by natural disasters (ice storm, bark beetle outbreaks). However, funds could only be allocated to severely damaged forests. In other words, a forest area was considered eligible if it could be proven that the growth potential was reduced by 20% or more. The total area for forest restoration eligible for funding from the RDP was 160,920 ha (red-coloured area in Figure 5).

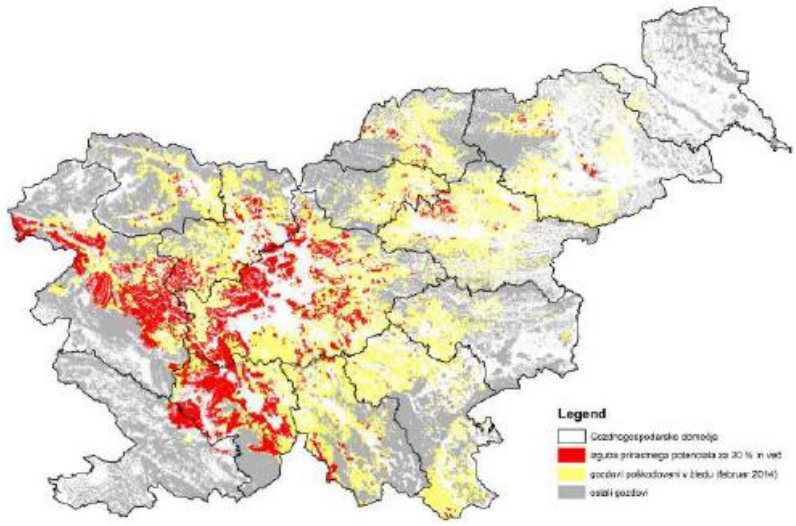

Figure 8: Forest area with growth potential reduced by 20% or more

6.1.2. Promotion of forest regeneration in forests damaged by natural disasters

The objective of the measure is to support the regeneration of forests to accelerate the restoration process after disasters when spontaneous (natural) afforestation is assumed to be unsuccessful or too slow. This is a regular measure that is implemented every year based on the provisions of the Forest Act and the rules on financing and co-financing forest investments. Forest owners are eligible for co-financing investments in forests for works that are planned in the forest management plans and also in the public interest. The state provides full funding of subsidies for the implementation of planned forest operations in protective forests and along stream banks, materials for silvicultural and protection forest works, seedlings and seed materials for forest restoration, implementation of forest fire prevention measures, etc. Other forest works are eligible for co-financing, for example for the restoration of forests that have been damaged by fires or other natural disasters. The measures are included in the Annual Program of Investment in Forests, which is a prerequisite for granting forest subsidies prepared by the Slovenia Forest Service.

In 2018, the Government adopted a law on the prevention of the spread and control of overpopulated insect populations and the restoration of damaged forests (Act Regulating ... 2018). This law provides for additional measures for remedying the damage due to overpopulation of beetle populations to help affected forest owners. An overpopulation of bark beetles according to the law occurs when more than 400,000 m^3 of trees must be cut down due to bark beetle damage in a single calendar year, and the estimated damage is equal to or greater than the threshold for a natural disaster defined by regulations governing the field of natural disasters. In addition, in 2019, the Government adopted several additional measures for more efficient remediation of forests after natural disasters (Decree on measures ... 2018, Decree amending ... 2019). Basic information on co-financing, construction, preparation and reconstruction of skidding trails, and measures under restoration plans are shown below in Tables 8, 9, and 10.

Table 8: Co-financing of forest restoration under restoration plans

Restoration plan	Plan	Realization	
	EUR	EUR	%
Ice storm and bark beetles (2014-2020)	13,030,700	6,559,695	50
Windstorm 2017	3,650,791	986,967	27
Windstorm 2018	385,715	15,000	4
Total	17,067,206	7,561,662	44

Table 9: Construction, preparation and reconstruction of skidding trails under restoration plans for the ice storm and bark beetles (2014-2020) and wind storms (2017, 2018)

Measure	Value
Preparation of skidding trails (km)	304.4
Construction of skidding trails (km)	480.3
Reconstruction of skidding trails (km)	123.2

Table 10: Measures under restoration plans for the ice storm and bark beetles (2014-2020) and wind storms (2017, 2018)

Measure	Assessment from the Restoration Plan	Realisation			Realisation/ Plan (%)
		Finished	In progress	Total	
Preparation of the stand for restoration - felling of trees (ha)	5,009	1,373	365	1,738	35
Restoration by planting (ha)	2,229	1,142	394	1,537	69
Tending of restored areas and damaged young growth (ha)	7,999	1,758	-	1,758	22
Protection of young growth on restored areas (ha)	4,818	1,234	247	1,480	31
Removal of trees from protective forests (m^3)	41,785	20,016	-	20,016	48
Seedlings (pieces)	3,916,500	1,720,710	1,122,865	2,843,575	73

6.1.3. Conservation of carbon in existing forests

The measure is guided by the National Forest Programme (NFP) with the main objective of providing CO_2 sinks in forests. The measure relates to activities to achieve optimal growing stock while taking into account economic, environmental and social aspects with sufficient accumulation of annual wood increment for maintaining carbon sequestration in forests. Given the value of FRL for Slovenia as set out in annex to Commission Delegated Regulation (2020), the harvesting should be around 6 million m^3 per year, if neutrality is to be achieved after the application of accounting rule for managed forest land (Jevešenak et al. 2020).

6.1.4. Enhancing production in existing forests

The measure includes activities which improve the utilization of the production potential in forests, with an emphasis on increasing the growing stock and forest increment, increasing the realization of possible timber removal, increasing the quality of wood assortments with cultivation of forests and the timely renewal of forest stands, providing cultivation works to accelerate the development of overgrowing land and its transformation into profitable commercial forests, and increasing the economic value of the forests of the Slovenian coast by accelerating site-adequate and economically interesting tree species. According to data of the National Forest Inventory in 2018, the growing stock was 330 m^3 ha^{-1} which is around the optimal level as defined in the NFP. It is expected that harvest of coniferous tree species, especially spruce, will increase. When renewing forest management plans, it is therefore crucial to set appropriate targets for tree composition over the next 10-year period.

6.1.5. Increasing the harvested wood products pool

The measure includes activities to promote the use of wood in further processing, the use of harvested wood products, the use of wood with a longer lifetime, as well as the use of lower-quality wood. However, the export of roundwood is increasing because of the growing gap between the increasing harvest and limited capacity for wood processing.

Due to the imbalance between annual production and consumption in Slovenia, the foreign trade surplus in all categories of roundwood increased for more than a decade before 2018, and the largest was recorded in the period 2015-2018 (over 2 million m^3 for roundwood in total). Foreign surplus data indicate that the production of round wood exceeds the consumption. Exports in 2019 decreased by 38% compared to 2016 (422,584 m^3) and reached record levels in 2016 (3,061,796 m^3) and amounted to 1,910,392 m^3. The export of industrial roundwood (logs, pulpwood and other industrial roundwood) represented almost 90% of total roundwood exports in 2019. Coniferous logs have accounted for around 65% of exports in recent years.

6.1.6. Increasing forest openness with forest roads and improving the equipment of forest owners for forest work

The measure includes the promotion of investments in the purchase of new machinery for the implementation of timber harvesting and improvement of forest openness through the financing of forest infrastructure. The measure is implemented through the Action Plan for Increasing the Competitiveness of the Forest-Wood Chain in Slovenia by the Year 2020, whereas funding is provided by the RDP.

In the previous program period of the RDP (2007-2013), the measure was called “Increasing the Economic Value of Forests”, for which investments in forest infrastructure were supported, including the construction and reconstruction of forest road networks and skidding trails, the purchase of new forest mechanization, and equipment for logging and harvesting of wood. The total value of the funds paid was 5.9 million EUR for investments in the forest road network and 17.14 million EUR in forest mechanization and equipment.

In the RDP 2014-2020, two operations are planned to support the uptake of the measure within the following two sub-measures: “Support for investments in infrastructure related to the development, modernisation or adaptation of agriculture and forestry” (sub-measure 4.3) and “Investments in forestry technology and processing and mobilization of wood” (sub-measure 8.6). In total, 6.8 million EUR is earmarked for the first operation and 17.3 million EUR is earmarked for the second operation. By the end of October 2020, 9,670,068 EUR was spent in total: 1,939,181 EUR under the first operation and 7,730,886 EUR under the second operation.

The beneficiaries of the first operation are forest owners, who can receive up to 50% of the eligible funds. The beneficiaries of the second operation are legal and natural persons who are owners of forests and enterprises engaged in forestry activity. They can apply to public tenders and receive up to 40% of the eligible funds.

6.1.7. Enhancing forest management, including through optimised species composition, tending and thinning, and soil conservation

The measure supports activities through which the ability of the key tree species and stands to adjust to climate change should be studied, the resistance of forests to extreme climate conditions should be provided with adequate structure of species and stands, and the frequency of storms should be considered to optimize construction of forest roads. The objective of the measure is to adjust forest management to climate change and is being guided by the NFP.

The age structure and distribution of developmental phases show a pronounced dominant share of older forests. The structure of the forest has not significantly changed in the period 2012-2018, and the trend clearly indicates that the planned amount of regeneration has not been achieved. However, it is assumed that forests still resist the effect of climate change through their capacity to sequester CO_2 from the atmosphere, maintain biodiversity and protect the soil on slopes and land as well as buildings lying beneath.

6.1.8. Preventing deforestation

In Slovenia, no action plan or programme defines the measures related to preventing deforestation. Nevertheless, the national legislation on deforestation is relatively strict. Therefore, there are several legal acts that regulate issues relating to deforestation activities in the country. Any deforestation activity should be approved by the Slovenia Forest Service (Forest Act 1993). Deforestation for agricultural purposes is not allowed if the forest holds a special status, such as a forest reserve, a protection forest or a forest with a special purpose. Deforestation of forest stands and shrubby vegetation is not allowed on steep slopes due to the danger of landslides (Water Act 2002). Moreover, deforestation is generally prohibited in cultural landscapes where forest cover is low, i.e. less than 10% (Decree on Spatial ...2004). There is no further information to provide an update to this measure.

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

Regarding the measure “Investments in Forest Area Development and Improvement of the Viability of Forests” specified in the RDP 2014-2020 and based on the State Administration Act and the Rules on the Protection of Forests, the Ministry of Agriculture and the Environment issued a decision on the restoration of forests damaged by the ice storm which occurred between 30 January and 10 February 2014.

The decision confirms the Plan for the Restoration of Forests and defines the activities for its implementation, including adaptations of forest silvicultural plans needed for the execution of the restoration measures. To execute the restoration plan, a total of EUR 1.156 million is to be provided by the integral national budget fund of LULUCF reporting under decision 529/2013/EU 32 to the Republic of Slovenia for the period 2014-2020, while the measures in the plan are complementary to those of the RDP.

Several measures for strengthening the prevention of and protection against natural disturbances are also ensured by the national budget continuously (each year) in accordance with Article 48 of the Forest Act, while the activities in the Programme of Investment in Forests are defined by the Order on the Financing and Co-financing of Investments in Forests from the Budget of the Republic of Slovenia.

6.1.10. Promotion of timber production in private forests for improving the market of harvested wood products and the introduction of an organisation for forestry operations

The measure includes the promotion of the establishment of organizations which produce forest wood products with activities related to organizing forest production, the purchase and sale of forest wood products from private forests, and networking within a production chain with primary processing. The measure is implemented through the Action Plan to Increase the Competitiveness of the Forest-Wood Chain in Slovenia by the Year 2020. The objective of the measure is to increase timber production and implementation of tending operations in

Slovenian forests, particularly in private forests in accordance with the existing forest management plans. The total amount of EUR 3 Million is planned for the implementation of this measure.

6.1.11. Promotion of efficient use of woody biomass and its use to improve ambient air quality, support to energy advising and training and development

The measure includes the promotion of energy advising and raising awareness among citizens regarding sound energy management, the utilization of renewable energy resources and support for the promotion of the efficient use of woody biomass for energy purposes. The objective of the measure is to increase public awareness regarding the efficient use of woody biomass for energy.

6.1.12. Promotion of the use of energy from biomass

The objective of the measure is to increase the use of renewable biomass for energy. Alongside hydropower, biomass is the most important renewable energy source in Slovenia. Increased biomass use in modern individual, communal and industrial heating appliances for heating, processing heat and generating electricity is important for Slovenia since it can improve the reliability and competitiveness of its energy supply, reduce greenhouse gas emissions and protect the environment.

The NECP (2020) states that based on the data on possible logging of poor-quality wood (excluding round wood) and on the estimated needs for poor quality roundwood, it was estimated that 2,300,000 m^3 of forest biomass could be used in 2020, including 1,800,000 m^3 of deciduous wood and 500,000 m^3 of coniferous wood. The estimated quantities are more than 70% higher than estimated in the Renewable Energy Action Plan (NREAP 2010), which calculates that, in 2020, the direct supply of wood biomass from forests will be 1,338,000 m^3, only about 20,000 m^3 more than in 2006. The potential to generate energy from forest biomass is estimated at 6,598 GWh of heat and 326 GWh of electricity. This would contribute most of the heat (over 90%) and about a third of the electricity from agriculture and forestry. Annual biomass consumption for the production of heat and electricity in large thermal power plants fluctuates and reached 96 kt in 2017, generating up to 190 GWh of thermal energy and up to 50 GWh of electricity.

The consumption of electricity produced from wood and wood residues fluctuated between 21,686 TJ and 24,423 TJ in in the period 2013-2017. This is less than previously envisaged in the “Wood is Beautiful” action plan, according to which primary energy production from biomass should increase by 30% by 2020.

Based on the data of the Eco Fund grants to households for the substitution of inefficient heating devices with modern wood stoves, it was concluded in the Report that energy efficiency has increased considerably while offering business opportunities in the forest sector and beyond.

6.1.13. Green public procurement

The Decree on Green Public Procurement (2017) regulates green public procurement and provides requirements for the inclusion of green criteria in public procurement proceedings. Appendices to the Decree were intended to provide basic and additional requirements for certain public procurement procedures for the following product groups: electricity, personal

and transport vehicles, office IT, office paper, appliances and other energy labelled products, construction and renovation of buildings, construction and renovation of public lighting systems, furniture, cleaning products and services, and food and catering.

Despite the efforts to ensure its implementation, the decree faces implementation gaps, such as personnel shortage, lack of relevant skills, poor awareness of public contracting authorities about the benefits of green procurement of goods and services and the insignificant role of green procurement as the potential for the reduction of greenhouse gas emissions.

The decree stipulates that at least 30% of wood must be installed in buildings of general social interest. During the period in force, the decree had positive effects on increasing the number of manufacturers of wooden buildings. However, in 2018 the Ministry of the Environment and Spatial Planning limited the use of wood to commercial and administrative buildings only, which led to a significant drop in orders to manufacturers of wooden buildings. The reintroduction of the requirement in the decree is important, as wooden construction contribute to reduction of greenhouse gas emissions through carbon storage and the substitution effect.

6.2. Agriculture

The most important measures in agriculture are implemented in the RDP 2014-2020. In total, 300.534 million EUR was allocated, 289.059 million EUR was approved and 231.352 million EUR was paid through the RDP 2014-2020 for the selected measures (Table 11).

Table 11: Overview of the RDP 2014-2020 funds

Code	Measure	Allocated	Approved	Paid	Approved/ available	Paid/ available
		EUR	EUR	EUR		
M01	Knowledge transfer and information actions	1,875,000.00	666,201.60	620,110.14	35.5%	33.1%
		625,000.00	67,570.68	58,945.61	10.8%	9.4%
		2,218,750.00	759,429.39	517,209.17	34.2%	23.3%
		2,500,000.00	1,288,148.25	604,959.14	51.5%	24.2%
	M01 SUM	7,218,750.00	2,781,349.92	1,801,224.06	38.5%	25.0%
M10	Agri - environment - climate	207,127,386.67	207,116,697.66	173,429,905.56	100.0%	83.7%
M11	Organic farming	66,131,000.00	65,506,691.13	54,978,920.06	99.1%	83.1%
M16	Co-operation	8,767,312.50	8,265,064.30	605,142.84	94.3%	6.9%
		3,771,750.00	679,845.85	76,253.56	18.0%	2.0%
		5,617,500.00	3,060,579.08	347,581.61	54.5%	6.2%
		1,905,937.50	1,649,078.12	113,334.56	86.5%	5.9%
	M16 SUM	20,062,500.00	13,654,567.35	1,142,312.57	68.1%	5.7%

6.2.1. Knowledge transfer and information actions (M01)

The measure aims to increase the level of competence of target groups through different forms of knowledge transfer. With improved competence, the target groups will be able to enhance their competitiveness, use resources more efficiently, improve environmental efficiency and contribute to sustainable development in rural areas. The measure has been implemented in the framework of the RDP since 2015. There are no substantial problems with the implementation of the measure; however, a lengthy procedure for individual public procurement sometimes causes difficulties. By December 2020, 7.219 million EUR was allocated, 38.5% of which was approved and 25% of which was paid in total for this measure.

6.2.2. Agri-environment-climate (M10)

The situation analysis of the RDP shows that it is necessary to establish a balance between the need to produce food and environmental protection, and to encourage agricultural holdings to manage agricultural land in a way that reduces the impact of farming on the environment, contributes to the mitigation and agricultural adjustments needed because of climate change, and ensures the implementation of socially important services and intangible public assets.

The measure supports agriculture in its environmental function and is intended to encourage above-standard sustainable agricultural practices which are aimed at the following focus areas of measures: preserving biodiversity and the landscape, appropriate water and soil management, and mitigating and adapting farming to climate change. The measure is implemented through the following 19 operations of the RDP:

1. Arable farming and vegetable cultivation,
2. Hop growing,
3. Fruit growing,
4. Wine growing,
5. Permanent grassland I,
6. Permanent grassland II,
7. Special grassland habitats,
8. Grassland habitats of butterflies,
9. Habitats of birds of humid extensive meadows,
10. Litter meadows,
11. Water sources,
12. Conservation of steep meadow habitats,
13. Hummocky meadows,
14. Livestock rearing in the area of the occurrence of large carnivores,
15. Mountain pasture,
16. High-trunk meadow orchards,
17. Preservation of hedgerows,
18. Breeding of local breeds in danger of being lost to farming,
19. Preserving plant genetic resources under threat of genetic erosion.

All operations, except the Preservation of Hedgerows operation, entered into force in the period 2015–2016. Since 2017, no entry is possible into operations 1, 2, 3, 4, 5, 6 and 18. However, entry into other operations is still possible until the end of the programme period (i.e. by 2020). The Preservation of Hedgerows operation started in 2017. By December 2020, 207.127 million EUR was allocated, 100.0% of which was approved and 83.7% of which was already paid in total for this measure.

6.2.3. Organic farming (M11)

The purpose of the organic farming measure is to encourage farmers to pursue environmentally-friendly farming, which not only means prohibiting the use of chemically synthesized plant protection products and mineral fertilizers but also a) preserving soil fertility; b) improving the nutrient cycle within the farm; c) improving soil quality and the health of plants, animals and humans; d) adjusting animal breeding technologies to the needs of specific species and categories; e) producing healthy, quality and safe food products; f) protecting natural living resources (soil–water–air); g) actively protecting the environment and biodiversity; and h) sustainably managing non-renewable natural resources. This measure has been implemented in the framework of the RDP since 2015 through two sub-measures, namely “Payments for the conversion to organic farming practices and methods” and “Payments for the preservation of organic farming practices and methods”. By December 2020, 66.131 million EUR was allocated, 99.1% of which was approved and 83.1% of which was already paid in total for this measure.

6.2.4. Co-operation (M16)

This measure supports various forms of cooperation with stakeholders to overcome economic, environmental and other constraints caused by fragmentation and poor connectivity. The measure aims at promoting cooperation projects whose objectives are focused on better productivity and sustainability in agriculture. It focuses on the promotion of technological development and reduction of the negative environmental impacts of agriculture, particularly on biodiversity and the quality of surface and groundwater.

The aim of the measure is to accelerate the transfer of knowledge and innovation from the research sphere to agricultural practice. By the end of 2019, 92 cooperation operations had been approved, of which 29 were EIP projects. Most of them are multi-year projects lasting up to three years, the first disbursements were in February 2020.

The first two short-chain sub-tenders for food supply and farm diversification were carried out in the first half of 2017. Sub-measures of new technologies and environmental practices were implemented in the second half of 2017. By December 2020, 20.063 million EUR was allocated, 68.1% of which was approved and only 5.7% of which was already paid in total for this measure.

6.2.5. Maintenance of permanent grassland

The maintenance of permanent grassland at the level of the agricultural holding is implemented by protecting permanent grassland through a ban on ploughing and conversion in the environmentally most sensitive areas in Natura 2000 covered by Directives 92/43/EEC and 2009/147/EC. The measure is furthermore applied at the national and regional levels as a more general safeguard, based on the ratio of permanent grassland to the conversion of permanent grassland to other uses. The measure has been implemented since 2015 within the green component of direct payments from Pillar 1 of the CAP. There are no substantial problems with its implementation because the ratio between permanent grasslands and arable lands is rather stable and does not exceed the prescribed threshold of reducing the ratio to the detriment of permanent grasslands.

7. Existing and planned policies to implement measures

Generally, all key policies identified in the first report on the LULUCF actions are implemented in line with expectations. For some strategic documents it is difficult to assess their impact on overall emissions, uptake of the planned measures and how the implementation has progressed because there are no tangible criteria or quantitative indicators available. Nevertheless, there are a few good reports that provide information on the state of policy implementation. For example, these reports refer to the OP GHG-2020, NFP, NREAP, RDP, and APOF, which are believed to have a strong impact on LULUCF greenhouse gas emissions. In the following paragraph, some of the main messages highlight the status of the implementation of the key policies from these reports, while expert assessment was carried out for all identified policies (Table 12).

The main messages on the implementation of the key policies:

OP GHG-2020: The report identifies three specific measures specifically related to LULUCF, such as the need to upgrade and implement the national forest inventory, the development of methodology for GHG monitoring, and further inclusion of measures into the sectorial policy. The report recognizes that these themes were covered by the application of the LIFE C4C project that was applied to the LIFE 2015 call and that it will be co-financed, if confirmed by the EC.

NFP: The findings of the analysis of the data and comments collected in an open dialogue with governmental and non-governmental stakeholders in forests and forestry show that NFP policies are mainly implemented. Slovenia will continue to manage forests based on SFM criteria and ensure appropriate forest measures in compliance with other sectors. Slovenian forests fulfil most of the objectives and guidelines of the NFP. However, the implementation of some guidelines will need to be improved as circumstances have changed since 2007 (e.g. the forest health condition of certain areas damaged by extreme weather events, such as ice break, bark beetle outbreaks and windthrows; age structure distribution; fragmentation and cooperation of private forest estates and business; evaluation of non-wood forest services; transparency in the timber market).

NREAP: Slovenia's goal is to achieve a 25% share of renewables in its gross final energy consumption by 2020. In 2013, the share of RES in the gross final energy consumption in the Republic of Slovenia was 21.5% and as such 5.5 percentage points higher than in 2005. The target of 2020 should increase the share of RES by another 3.5 percentage points. The report states that Slovenia's progress in achieving the target is comparable to the EU average and trends in more developed countries.

RDP: According to the findings of the last annual report, the implementation of the program has been successful. Compared to other Member States, the absorption of EAFRD funds is above the EU average. By the end of 2019 or by 31 March 2020, the Republic of Slovenia had reached all the milestones of the performance framework within the RDP 2014-2020. Thus, the program was allocated a performance reserve of 6% of EAFRD funds or more than EUR 50 million.

APOF: Based on the analysis and findings of the expert group in 2012, it was found that the goals of the APOF were not fully realized by 2015. The main problems have to do with organizing and linking producers, under-production and processing, especially with respect to fruit and vegetables, and the fields of education and counselling. The potential for further development is still considerable. However, the recent report noted that the area in the

"Organic Farming" measure is increasing, exceeds indicative annual target values and is approaching the target values for 2020. A new APOF is in progress and should be finished by the end of February 2021.

In addition, the "Slovenian Smart Specialization Strategy – S4" was added to the list of existing policies. One of the objectives relevant for LULUCF is inter-sectoral networking and integration of the wood chain in the design of homes and the working environment of the future by promoting research and innovation deriving from traditional knowledge and skills related to the use of wood and wood-compatible natural materials. In this respect and based on the Action Plan to Increase the Competitiveness of the Forest-Wood Chain in Slovenia by the Year 2020, the Public Agency of the Republic of Slovenia for the Promotion of Entrepreneurship, Internationalization, Foreign Investments and Technology will continue with the implementation of the organized promotion of wood and wood products and raise public awareness on the advantages of wood use. To promote the wood industry, a total of EUR 450,000 was planned in 2016 and another EUR 600,000 was planned in 2017.

NECP: The Integrated National Energy and Climate Plan of the Republic of Slovenia is a strategic document that sets goals, policies and actions up to 2030 (with an outlook to the year 2040) for the five dimensions of the Energy Union, the first dimension being decarbonisation (greenhouse gas (GHG) emissions and renewable energy sources (RES)). One of the key objectives in this dimension is to ensure that LULUCF sectors will not produce net emissions by 2030 (after applying accounting rules), i.e. emissions in the LULUCF sector will not exceed sinks.

DPS: In 2020, the Slovenia's long-term climate strategy 2050 was drafted. With the DPS, Slovenia has set a clear goal to achieve net zero emissions by 2050. With the set climate goal, DPS sets a goal for other sectors and their sectoral policies to achieve (total) net zero emissions by 2050. It also sets strategic sectoral targets for 2050 (and 2040), which individual sectors must strictly adhere to and incorporate into their sectoral documents and plans.

CAP SP: The Ministry of Agriculture, Forestry and Food (MAFF) is intensively preparing the Strategic Plan of the Common Agricultural Policy (CAP) for the period 2023-2027. The first draft of the strategic plan was prepared in December last year and contains identified needs, proposals for interventions, financial resources and impact and result indicators. This year, the ministry, together with the participation of stakeholders and the general public, will form a final set of interventions, which will be made according to the available financial resources, prioritization, goals and expected results. The strategic plan is expected to be formally submitted to the European Commission at the end of this year.

Table 12: Updated information on existing and planned policies relevant for LULUCF

Policy document / instrument	Link to EU legislation	Impact on LULUCF GHG	Uptake of measures	Progress of implementation
Operational Programme of measures for Reducing GHG Emissions until 2020 (OP GHG-2020)	Decision 406/2009/EC	++	++	++
National Forest Programme (NFP)		++	+	++

Forest Act		+++	++	++
Agricultural Act		+	+	+
National Renewable Energy Action Plan 2010–2020 (NREAP)	Directive 2009/28/EC	++	+	++
Action Plan to Increase the Competitiveness of the Forest-Wood Chain in Slovenia by the Year 2020		++	++	++
Strategy of Adaptation of Slovenian Agriculture and Forestry to Climate Change		+	+	+
Resolution on strategic guidance on development of Slovenian agriculture and food production sector until 2020		+	+	+
Baseline for a debate on common EU agricultural policy after 2013	CAP	+	+	+
Action Plan for Organic Farming in Slovenia Until 2015 - APOF	Council Regulation (EC) 834/2007, CAP	+	+	++
Action plan for the development of organic farming until 2027	CAP			in progress
Rural Development Programme of the Republic of Slovenia 2014-2020	CAP	+++	+++	+++
Direct Payments 2015-2020	Regulation (EU) 1307/2013, CAP	+	+	+++
Strategy on the Use of Biomass from Forestry and Agriculture for Energy Purposes		+	+	++
Strategy for the implementation of the Resolution on the Strategic Orientation of Slovenian Agriculture and Agri-Food Sectors by 2020		++	++	++
Slovenian Smart Specialization Strategy - S4		+	+	+
Integrated National Energy and Climate Plan of the Republic of Slovenia (NEPN)	Regulation (EU) 2018/1999	+++	+	+
CAP Strategic Plan (2023-2027)	CAP			in progress
Long-term climate strategy for Slovenia 2050	Regulation (EU) 2018/1999			in progress

8. Indicative timetable for the adoption and implementation of measures

There are no major delays or changes in the timeline of the implementation of the selected measures, Table 13.

Table 13: Indicative timetable of the selected measures

No	Measure	Source	Adoption	Implementation
1	Investments in forest area development and improvement of the viability of forests	Rural Development Programme 2014–2020	2014	2014-2020
2	Promotion of forest regeneration in forests damaged by natural disasters	Forest Act	1993	continuously
3	Conservation of carbon in existing forests	National Forest Programme	2007	continuously
4	Enhancing production in existing forests	National Forest Programme	2007	continuously
5	Increasing the harvested wood products pool	National Forest Programme	2007	continuously
6	Increasing forest openness and improving the equipment of forest owners for forest work	Action Plan to Increase the Competitiveness of the Forest-Wood Chain in Slovenia by the Year 2020	2012	2014-2020
7	Enhancing forest management, including through optimized species composition, tending and thinning, and soil conservation	National Forest Programme	2007	continuously
8	Promotion of timber production in private forests for improving the market of harvested wood products and introduction of the organization for forestry operations	Action Plan to Increase the Competitiveness of the Forest-Wood Chain in Slovenia by the Year 2020	2012	2012-2020
9	Promotion of the efficient use of woody biomass and its use to improve ambient air quality, support for energy advising and training and development	Action Plan to Increase the Competitiveness of the Forest-Wood Chain in Slovenia by the Year 2020	2013	continuously from 2013 onwards
10	Promotion of the use of energy from biomass	National Renewable Energy Action Plan 2010–2020	2010	2010-2020

11	Knowledge transfer and information actions	Rural Development Programme 2014–2020	2014	2014-2020
12	Agri-environment-climate	Rural Development Programme 2014–2020	2014	2014-2020
13	Organic farming	Rural Development Programme 2014–2020	2014	2014-2020
14	Co-operation	Rural Development Programme 2014–2020	2014	2014-2020
15	Maintenance of permanent grassland	CAP Direct Payments 2015–2020	2014	2015-2020
16	Green public procurement	Public procurement	2014	continuously

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