Pārskats par II etapa darba uzdevumu izpildi

Contents

Tables and Figures

1. REPORTING ON A NATIONAL SYSTEM FOR POLICIES AND MEASURES AND PROJECTIONS

Ministry of Agriculture (MoA)

Until 1 August, every second year prepare agriculture and land use, land use change and forestry sector activity data projections.

Latvian State Forest Research Institute "Silava"

In collaboration with Ministry of Agriculture is responsible for preparation of projection of GHG emission and CO2 removals in LULUCF sector.

Data suppliers for LULUCF sector

- Central Statistical Bureau –main data supplier of historical statistical data;

- National forest inventory (main supplier of data for LULUCF sector);

- State forest service (information on forest fires);

- State fire and rescue service of Latvia (information on wildfires outside forest lands).

2. INFORMATION ON POLICIES AND MEASURES

2.1. LULUCF sector

About 50 % of Latvia is covered by forest. The most of the remaining area is cropland and grassland. More than 16 % of the country area is covered by organic soils. Timber industry and agriculture are the most important producing sectors in the country with considerable development potential. Latvia is one of the leader in production of wood pellets in EU and one of the biggest EU producers of peat used in horticulture. Forestry, agriculture and peat industry are targeted to export and depends from global economic processes having impact on the GHG emissions and CO_2 removals in LULUCF sector at national and EU prospective.

There are a numerous EU policies implemented nationally and having impact on GHG emissions and CO_2 removals in LULUCF sector (Figure 1), although the impact is usually indirect and not associated with specific measures. The Common Agricultural Policy is an exception having direct impact on the GHG emissions and CO_2 removals in LULUCF sector.

The main LULUCF policy instrument at EU level is the LULUCF Decision (529/2013/EU). It outlines reporting obligations, as well as the processes for the development and improvement of national reporting systems. The directive is driving force for improvement of the national reporting and projection systems in LULUCF sector.
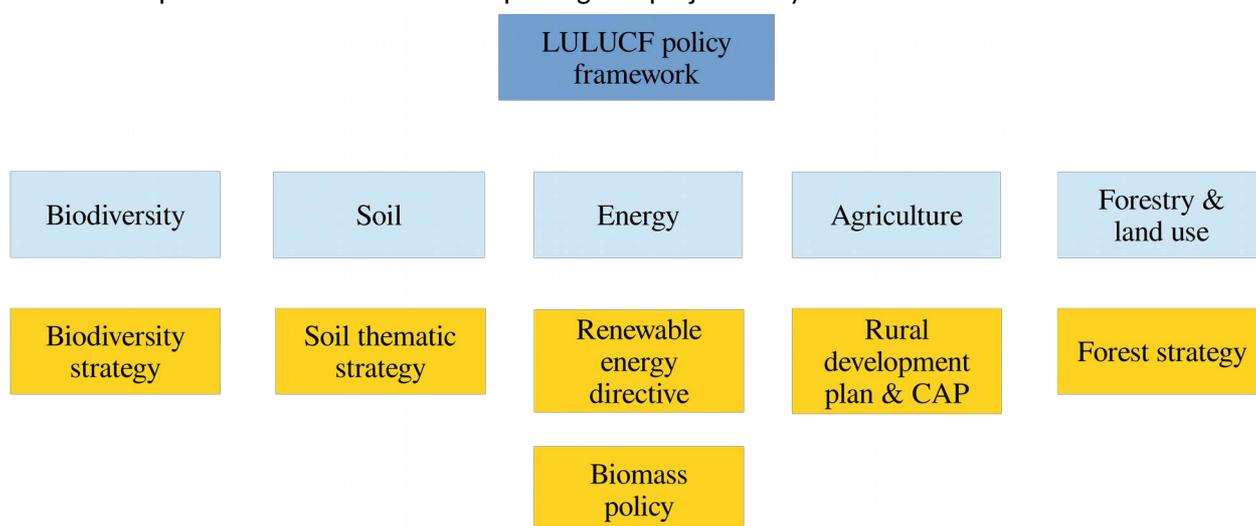
Figure 1: Policy framework.

At present LULUCF emissions are not accounted towards the targets under the 2020 Climate and Energy Package. It is, however, covered under the second commitment period target of the Kyoto Protocol. Latvia's obligations under the Kyoto protocol second commitment period are related to activities listed in paragraphs 3.3 and 3.4 (afforestation, reforestation, deforestation and forest management). Latvia has to reach certain forest management reference level (Decision No. 2/CMP.6 of the Conference of Parties, 2011) and to secure neutral or positive (no net GHG emissions) balance in afforestation and deforestation. The latest is challenging target considering that Latvia's economy is re-growing after several crisis following to restoration of independence in 1990, which requires new infrastructure like rail-roads, industrial networks, drainage

systems and forest roads. Expansion of settlements will lead to increase of deforested area, contributing at the same time to implementation of other climate change mitigation targeted measures, like more efficient transport, agriculture and forestry in following decades.

2.1.1 Biodiversity strategy

The EU 2020 headline target of the biodiversity strategy is halting the loss of biodiversity and the degradation of ecosystem services in the EU by 2020, and restoring them so far as feasible, while stepping up the EU contribution to averting global biodiversity loss. The EU 2050 vision – biodiversity and the ecosystem services it provides are protected, valued and appropriately restored for biodiversity's intrinsic value and for their essential contribution to human well-being and economic prosperity.

However, implementation of the biodiversity strategy may have negative impact on the GHG emissions in Latvia. Growing stock in forests in Latvia is considerably higher than it would be under natural conditions due to forest management measures, like drainage, artificial regeneration, thinning, fertilization in the past and others. Setting aside of certain area of forests due to nature conservation reasons or forest management restrictions, especially on drained mineral soils and poor organic soils would return carbon stock to a natural status resulting in the net GHG emissions from living and dead biomass carbon pools. In grasslands implementation of the biodiversity strategy can reduce CO2 emissions due to accumulation of carbon in soil.

2.1.2 Soil strategy

According to the EU Commission working document SEC(2006)1165 and recent research in relevant areas there has been a significant increase in soil degradation processes, and there is evidence that these processes will further increase if no action is taken. The processes directly affecting GHG emissions and CO_2 removals in LULUCF sector in Latvia are:

- organic matter decline: highlighted in Southern countries, but losses of carbon from organic soils in one of the largest source of GHG emissions in Latvia;

- compaction: reduces fertility of soil as well as diminish potential of carbon storage in these soils. In Latvia topsoil and subsoil density in cropland is 30 % higher in comparison to similar forest soils[1].

2.1.3 Renewable energy policy

According to the directive (2009/28/EC) Latvia has to reach 40 % of renewable sources in gross final consumption of energy in 2020 to secure implementation of the EU common 20 % target. The implementation of the directive will have limited impact on LULUCF sector domestically due to abundance of forest resources left aside (the most of harvesting residues, stumps and undergrowth trees), but further increase of demand of solid biofuel in other EU countries might lead to more harvests in low valued deciduous and over-matured forests. At least 30 % of the growing stock in forests in Latvia is technically and legally accessible for harvest and the increase of harvesting stock is limited only by productivity of existing machinery, capacity of roads and harbours. Respectively, increase of demand and willingness to pay more for solid biofuel abroad

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[1] *LSFRI Silava (2015) Augsnes oglekļa krājumu novērtēšana aramzemē un pļavās (Evaluation of soil carbon stock in cropland and grassland, EEA grants project report). 63 pp.*

will increase harvests in Latvia and the rate of the increase may vary depending from market cost of biofuel and dominating supply regions.

2.1.4 Forest Policy

The main goal defined in the Forest policy is to ensure a sustainable management of Latvian forests and it is being accomplished by documents of policy planning and regulations. In light of the importance of forest in maintaining the environment, ensuring the social needs of society and in economics – the goals are:

- to ensure that the area of forest is not decreasing by setting limits to the forest land transformation;
- to ensure maintenance and increase of productivity of forest lands;
- to encourage afforestation of agriculturally non-effective land.

The Forest Law is the central law of the forest sector of Latvia, stating the following goals:

- to promote economically, ecologically and socially sustainable management and utilization of forests;
- to regulate terms of management.

The Forest Law also determines that terms of management of protected natural areas, micro reserves and protection zones are defined by other regulations. The Cabinet of Ministers defines terms of evaluation of a sustainable forest management by meeting criteria and indicators of Pan-Europe.

Among other regulations, the Regulation on Determination Criteria of Compensation and Calculation of Deforestation should be mentioned. This Regulation defines a procedure of calculation and compensation and criteria for negative effect caused by deforestation. It defines that the compensation to the government should be paid if the land that is registered with National Real Estate Cadaster information system as the forest area deforested. The compensation should be paid for:

- decrease of carbon dioxide attraction potential;
- reduction of biological diversity;
- decrease of quality of the environmental and natural resource protection zones and sanitary protection zone functions.

Forest-based Sector Development Guidelines are medium-term policy planning document. Guidelines consist of the forest-based sector development medium-term (2014-2020) strategic goals, guidelines of policy development, directions of actions to achieve these goals, problems hindering achievement of these goals, and results in policies. Following the goals of "Europe 2020: A strategy for smart, sustainable and inclusive growth", Forest-based Sector Guidelines give important investment to achievement. For example, initiative "Resource efficient Europe" – to help to decouple economic growth from the use of resources, support the shift towards a low carbon economy, increase the use of renewable energy sources, modernize our transport sector and promote energy efficiency.

2.1.5 Bioeconomy

The goal of Commission's strategy and action plan "Innovating for Sustainable Growth: a

Bioeconomy for Europe" is a more innovative and low-emission economy, reconciling demands for sustainable agriculture and fisheries, food security, and the sustainable use of renewable biological resources for industrial purposes, while ensuring biodiversity and environmental protection. It includes agriculture, forestry, fisheries, food and pulp and paper production, as well as parts of chemical, biotechnological and energy industries. Each euro invested in EU-funded bioeconomy research and innovation is estimated to trigger €10 of value added in bioeconomy sectors by 2025.

The Guidelines of Environmental Policies 2014-2020 set general goal to ensure ability of living in clean and settled environment, by fulfilling actions moving towards sustainable development, maintaining the quality of environment and biological diversity, ensuring sustainable use of natural resources, participation of society in making decisions and information of environmental state.

Rural Development Programme 2014-2020 sets three long-term strategic rural development policy goals:

- competitiveness of agriculture;

- sustainable management of natural resources and climate policies;

- balanced regional development in rural areas.

To achieve goals of rural development policies, common priorities of the European Union have been set:

- to encourage knowledge transfer and innovation in agriculture, forestry and rural areas;

- to improve competitiveness of all types of agriculture and to strengthen vitality of farms;

- to encourage organization of food movement and risk management in agriculture;

- to restore, preserve and improve ecosystems depending on agriculture and forestry;

- to encourage effective usage of resources and economics resistant to climate change with low emission level of carbon dioxide in agricultural, food and forestry sectors;

- to encourage social inclusion, decrease of poverty and economic development in rural areas.

2.2. Climate change mitigation measures in Rural Development Programme 2014-2020

The climate mitigation targeted measures for LULUCF sector are proposed in the LULUCF sector action plan (529/2013/EU art 10), which is subordinated to medium term planning document: National Development Plan of Latvia for 2014-2020[2]. The implementation of the measures is set on by the Rural Development Programme 2014-2020 (Ministry of Agriculture, 2014). The measures adopted in the Rural Development Programme are basis for the WEM scenario.

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[2]   *http://www.nap.lv/*

2.2.1 Measures in farmlands

Development and adaptation of drainage systems in cropland

The activity is aimed on reconstruction and improvement of existing drainage systems in cropland.

The direct impact in cropland is associated with accumulation of CO_2 in soil carbon pool due to higher productivity of the drained fields and application of more advanced management practices. The evaluation of impact of the measure considers that it will be implemented in extensively managed cropland where poor conditions of drainage systems shorten active vegetation season or production of agricultural crops is not possible at all.

Support to introduction and promotion of integrated horticulture

The measure applies to the establishment of new orchards. Implementation of the measure will affect carbon stock in living biomass and soil. The impact of the measure is projected for the 20 years' period for soil and 30 years – for living biomass carbon pools.

Support to diversification of crop rotation

The measure considers diversification of crop rotation in cropland, including application of green manure, to secure higher inputs of organic material into soil. Implementation of the measure will result in removals of CO_2 in soil.

Growing of papilionaceous plants (legumes)

This measure considers use of legumes in mixture with other crops in cropland, considering higher inputs of organic material into soil and partial replacement of mineral fertilizers with nitrogen fixing plants. Just like the diversification of crop rotations it considers a set of targets in agriculture. Implementation of the measure will result in CO_2 removals in soil.

Greening of cropland

The scope of the measure is leaving a certain area of cropland out of conventional cropping system. Te measure will reduce GHG emissions by reduction of management activities on organic soil in cropland.

2.2.2 Measures in forest land

Development and adaptation of forestry infrastructure

The most of the forest drainage systems in forest land in Latvia are established before 1990. The measure is aimed on reconstruction and improvement of existing drainage systems in forest land increase value of forests and productivity on drained soils. The measure will secure continuous growth of carbon stock in living and dead biomass in drained forests. Forest drainage is one of the most efficient solutions to increase CO_2 removals in living biomass and other carbon pools in forest lands on mineral soils.

Afforestation and improvement of stand quality in naturally afforested areas

The scope of the measure is efficient utilization of farmlands, which are not used for food or fodder production. This is the most efficient climate change mitigation measure

in the Rural development plan 2014-2020; however, the impact is limited to the scale of implementation of the measure.

The afforestation secures accumulation of CO_2 in living and dead biomass, litter and soil.

Regeneration of forest stands after natural disturbances

The measure considers restoration of forest stands after natural disturbances, like forest fires and strong storms, as well as reconstruction of diseasing valueless forest stands. The measure will affect mainly carbon stock in living biomass and dead wood carbon pools. The breeding effect in regenerated stands is considered as a main driving force for additional CO_2 removals.

Improvement of ecological value and sustainability of forest ecosystems

The scope of the measure is to support pre-commercial thinning of forests to secure implementation of sustainable forest management practices aimed to increase economic and ecological value of forests.

Pre-commercial thinning has a short and long term impact. A short impact is a transfer of certain portion of the carbon from living biomass to the dead biomass pool with following conversion into CO_2. The long term impact is increase of growing rate (by 15 % annually in average, according to an expert judgement used in growth models).

Summary of impact of the proposed measures in WEM scenario in LULUCF sector is provided in Table 1.

Table 1: Summary of the projected impact of the measures in WEM scenario

Measure	Impact, kilotonnes CO$_2$ annually	Estimated duration of impact	Cost, mill. EUR	Notes
Farmlands				
Development and reconstruction of drainage systems	6.1	20 years	24	Estimated according IPCC 2006
Support to integrated horticulture	4.5	20 years for soil, 30 years for biomass	2.4	Estimated according IPCC 2006
Support to diversification of crop rotation	14	20 years	36	Measure with multiple targets indirectly affecting carbon stock in soil, estimated according IPCC 2006
Growing of legumes	66	20 years	45	Measure with multiple targets indirectly affecting carbon stock in soil, estimated according IPCC 2006
Greening of cropland	33	Depends from carbon stock in organic soils	23	Estimated according IPCC 2006
Forest lands				

Information on policies and measures

Measure	Impact, kilotonnes CO_2 annually	Estimated duration of impact	Cost, mill. EUR	Notes
Development of forest infrastructure	16	At least 80 years	24	Estimated according country specific growth models and default IPCC 2006 emission factors for soil
Afforestation	49	80 years	14	Estimated according country specific growth models
Regeneration of forest stands after natural disturbances	18	100 years	5.6	Estimated according country specific growth models
Improvement of ecological value and sustainability of forest ecosystems	28	80 years	28	Estimated according country specific growth models

3. PROJECTED EMISSIONS PER SECTOR

3.1. Land use, land use change and forestry

3.1.1 Main assumptions

The main data source for land use and carbon stock changes is National forest inventory (NFI). Other sources and research data are used to verify calculations and to provide activity data for those sources which are not covered by the NFI.

Area of organic soils in croplands and grasslands is updated according to the inventory of historical data about farmlands implemented in 2009 (L.U. Consulting, 2010). Area of cropland and grassland in LULUCF reporting is synchronized with Agriculture reporting, including recalculation of cultivated organic soils.

The NFI and research data are used to estimate time series for areas and gross increment. Mortality data are calculated on the base of the NFI data and mortality factors (Lazdiņš et al., 2012b). Distinction between forest land remaining forest land and areas converted to forest land is made according to the age of dominant species in forests on afforested land – if age of dominant species is less than zero in 1990, it is considered as land converted to forest, in other cases it is considered as forest land remaining forest land.

3.1.2 Projections of the GHG emissions

The impact of the existing measures (WEM scenario, which includes the measures of the Rural Development Programme 2014-2020) on CO_2 emissions and removals is considered in the projection of the LULUCF sector. According to the estimates the net CO_2 emissions WOM (without measures)would increase from 1.1 million tonnes CO_2 in 2015 to 7.2 million tonnes CO_2 in 2035 (Figure 2). The main drivers for increase of the CO_2 emissions will be ageing of forest leading to decrease of increment and growth of mortality, deforestation to settlements due to growth of economic activity in rural regions, and increase of peat production for use in horticulture. Notably, that several key sources of CO_2 emissions are estimated using Tier 1 method according to the IPCC 2006, for instance, CO2 emissions from organic soil in forest land, cropland, grassland and wetlands contributing to nearly 10 mill. tonnes of CO2 eq. Implementation of the Tier 2 methods and application of the country specific emission factors might change the estimates in future. It has to be noted, that Latvia since 2015 uses emission factors provided in Supplement to the 2006 Guidelines for National Greenhouse Gas Inventories: Wetlands (Wetlands Supplement), and the impact of new guidelines to the LULUCF sector has to be further evaluated to avoid overestimation of GHG emissions or CO2 removals in soil.

Implementation of the WEM scenario will reduce CO_2 emissions by 199 Gg CO_2 annually in average, reaching maximum at 2020 and starting to reduce after 2029 because the affected lands will reach the end of transition period, when carbon stock in affected pools will approach to an equilibriumError: Reference source not found.
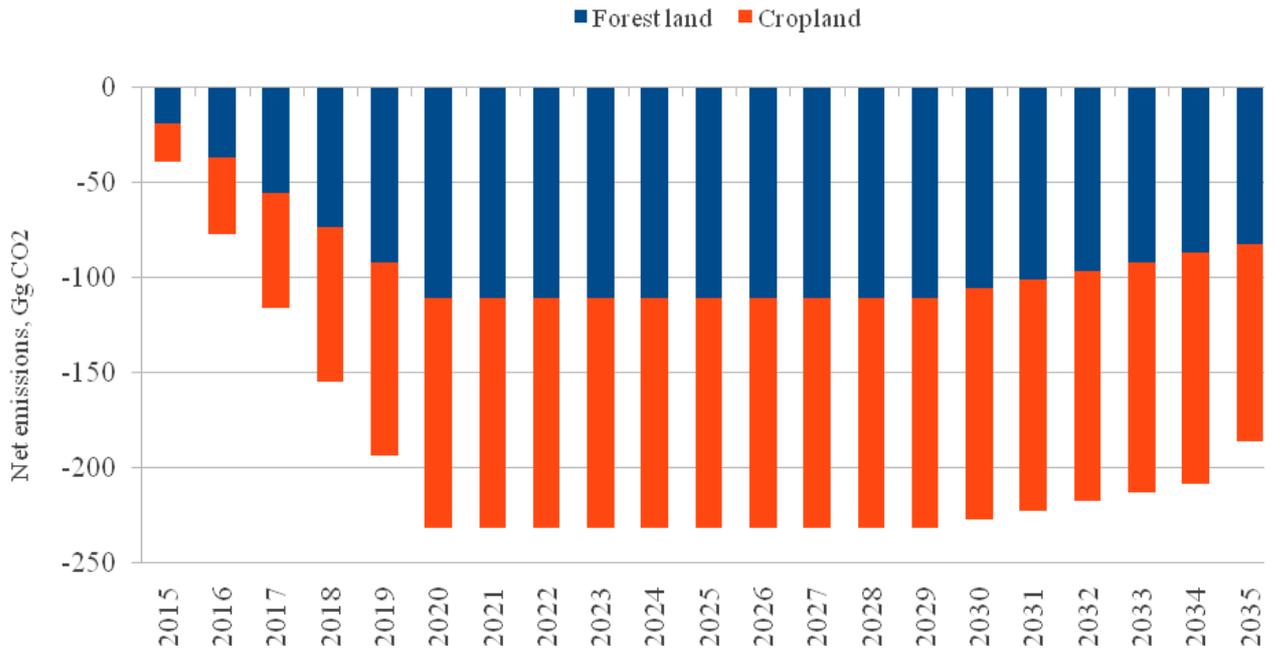
Projected emissions per sector

Figure 2: **Impact of existing measures on projections of CO₂ emissions from LULUCF sector**

The relative impact of the climate change mitigation measures in WEM scenario ranges from 1.8 % to 4.5 % of the emissions in comparison to the scenario where these measures are not implemented (Figure 3).
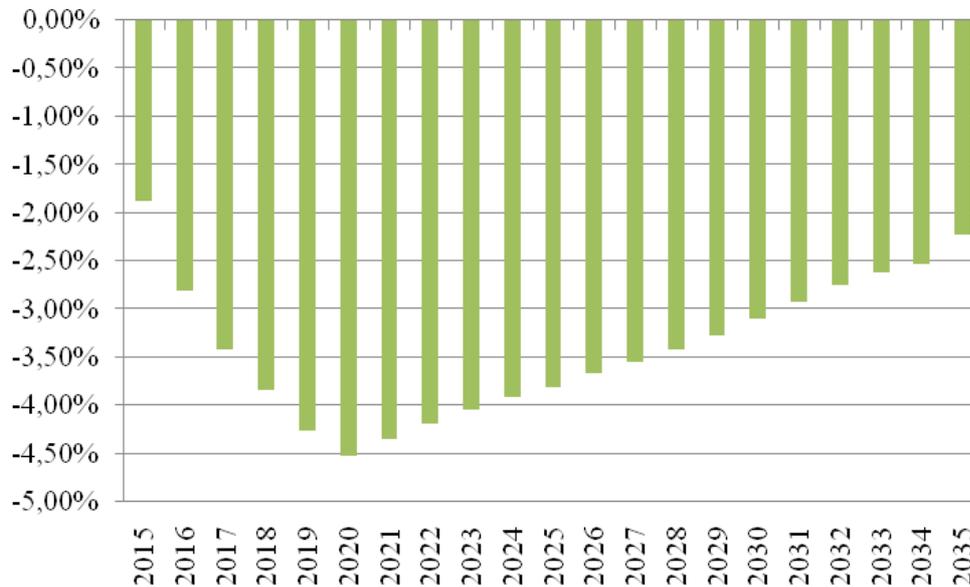

Figure 3: Relative impact of the WEM scenario on GHG emissions from LULUCF sector.

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