# INFORMATION ON LULUCF ACTIONS IN LITHUANIA

## Progress report

Under requirements of Article 10 of the EU Decision No 529/2013/EU

Submission to the European Commission

Vilnius, 2017

# Contents

# Executive Summary

According to the Article 10 of the Decision No 529/2013/EU of the European Parliament and of the Council of 21st May 2013, Member States shall to 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. The activities referred to in Article 3(1) are afforestation (A), reforestation (R), deforestation (D) and forest management (FM) and activities specified in Article 3(2) are cropland management (CM) and grazing land management (GM) which Member States shall prepare and maintain annual accounts. Member States are also obliged to report emissions and removals resulting from activities specified as revegetation, wetlands drainage and rewetting if such activities have been chosen by Member State for the 2nd Commitment Period.

Information on Lithuania's current and future actions to limit or reduce greenhouse gas emissions and to maintain or increase removals in the Land Use, Land Use Change and Forestry sector is prepared by the Ministry of Environment and the State Forest Service under the Ministry of Environment in co-operation with the Ministry of Agriculture and other relevant institutions.

# Introduction

Following Article 10 of the Decision No 529/2013/EU (*thereafter* – Decision) of the European Parliament and of the Council dated on 21st of May 2013, Member States are obliged to draw up and transmit to the Commission information on their current and future land use, land use change and forestry (*thereafter* – 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. The activities referred to in Article 3(1) are afforestation (A), reforestation (R), deforestation (D) and forest management (FM). Activities specified in Article 3(2) are cropland management (CM) and grazing land management (GM) which Member States shall prepare and maintain annual accounts for. The accounting period for cropland management and grazing land management activities begins on 1st January 2021. Prior to 1st 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 the greenhouse gases such as carbon dioxide ($CO_2$), methane ($CH_4$) and nitrous oxide ($N_2O$).

The information on LULUCF actions has to cover the duration of the accounting period of 1st January 2013 – 31st December 2020; information on LULUCF actions in this midterm progress report cover accounting period of 1st of January 2013 - 31st of December 2016. Pursuant to Article 10(2) of the Decision the information on LULUCF actions shall include the following information relating to the activities:

a) a description of past trends of emissions and removals including, where possible, historic 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).

# 1. Enhanced communication

## 1.1 Climate Change management policy, communication between ministries and consultation with stakeholders

On 7 July 2009 the Seimas of the Republic of Lithuania adopted the Law on Financial Instruments for Climate Change Management, which sets provisions on the development of the National Strategy for Climate Change Management Policy (*thereafter – Strategy)* and its implementation action plans and determines areas of public administration relating to adaptation of climate change and mitigation of climate change. Following the Law the Strategy for the National Climate Change Management Policy until 2050 was approved by Parliament in November 2012. The Strategy covers adaptation and mitigation policies and sets short-term (by 2020), indicative medium-term (by 2030 and 2040) and long-term (by 2050) climate change mitigation and adaptation goals and objectives in the following Lithuania's economy sectors: energy, industry, transport, agriculture, households, environmental protection and rational use of national resources (forestry, ecosystems, biodiversity, landscape), spatial planning and regional policy, health care, research and development, education and provision of information to the public, international co-operation. It also defines policies and measures necessary for Lithuania to implement targets of the EU climate and energy package till 2020 and to meet its Kyoto second commitment period target. In 2013 Inter-institutional action plan on the implementation of the Goals and Objectives for 2013-2020 of the Strategy for the National Climate Change Management Policy was approved by the Government. The inter-institutional action plan sets measures for 3 years in all economy sectors. LULUCF related actions are consistent part of the measures in agriculture, soil, forestry, ecosystems, biodiversity, landscape, water resources management, spatial planning and regional policy, science and public information. The plan is being updated annually and contains targets, objectives, and measures, financial resources, implementing institutions, assessment criteria and values.

The Strategy and the Interinstitutional Action Plan are being implemented by the Ministry of Environment, Ministry of Energy, Ministry of Finance, Ministry of Transport and Communications, Ministry of Health, Ministry of Education and Science, Ministry of Foreign Affairs, Ministry of Economy, Ministry of the Interior, Ministry of Agriculture, municipal and other institutions within their remit. The implementation of the Strategy and the Interinstitutional Action Plan are coordinated by the Ministry of Environment.

The implementation of the Strategy and the Interinstitutional Action Plan are financed from the funds of the state budget of the Republic of Lithuania, municipal budgets, the EU and international organisations and other sources. State and municipal institutions engaged in the implementation of the Strategy provide the Ministry of Environment with information about the progress in implementing the Strategy and its implementation plan by submitting annual activity reports.

Every two years, the Government of the Republic of Lithuania accounts for the implementation of the Strategy to the Seimas of the Republic of Lithuania by preparing and presenting a report on the implementation of the Strategy.

The consultation with stakeholders is ensured through the work of the National Climate Change Committee. The Committee consists of experts from government, municipal, science and

non-governmental organizations (NGOs) and has an advisory role. The main objective of the Committee is to advise on the development and implementation of the national climate change management policy. The Committee also has a role on promotion of the implementation of the provisions of the UNFCCC and coordinates compliance with the requirements of the Kyoto Protocol and the EU legal acts related to the UNFCCC.

National Forestry Sector Development Programme for 2012–2020 was adopted by the Government of Republic of Lithuania on 23 May 2012. During preparation in 2010–2012 the Programme was negotiated to governmental and non-governmental organisations from forestry sector and outside, i.e. agricultural sector, economic sector. In addition to the formal legal procedure stakeholders were engaged at different steps of preparation and on different levels. Firstly the Advisory Council of Forestry (includes representatives from state forests, private forests, forest science, forestry education, forest industry, environmental NGO's) was involved in preparation. At the later stage draft of the Programme was published in internet for public comments and additional opinions from single individuals and some other organizations not represented at the Advisory Council were collected. In that way the stakeholders of all levels have had the possibility to make input to this Programme. In 2015 the independent intermediate report on implementation of the Programme was performed with stakeholders through public consultations and involvement of governmental institutions, participating in the implementation of the Programme. However the revision of the Programme was not fully accomplished by the end of 2016 and final report on implementation of National Forestry Sector Development Programme was not approved.

## 1.2. Description of the process taken to develop GHG inventory LULUCF information, including a list of the authorities and the main stakeholders involved

The system to develop Land use, land use change and forest (LULUCF) GHG inventory is a part of the National system for Lithuanian GHG inventory preparation. The main entities participating in GHG inventory preparation process are:

- Ministry of Environment
- Environmental Protection Agency
- State Forest Service
- National Climate Change Committee
- Permanent GHG inventory working group
- Data providers
- External consultants

The principle scheme showing institutions responsibility in preparation of the GHG inventory in Lithuania and their interaction is shown in Figure 1-1.

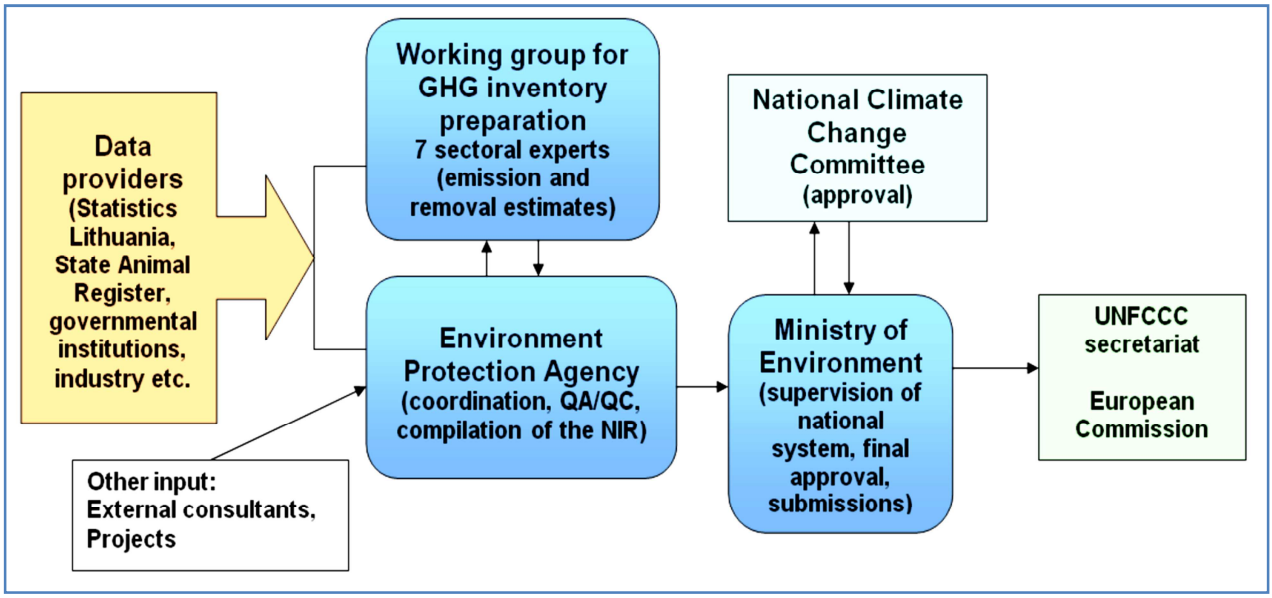


**Figure 1-1.** Institutional set-up for GHG inventory

Detailed description of National GHG inventory system is provided in Lithuania's annual GHG inventory reports to the EU and the UNFCCC secretariat (*National greenhouse gas emission inventory report of the Republic of Lithuania 1990-2014, Chapter 1.2 "Institutional Arrangement and Process for Inventory Preparation" available at: http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/9492.php).*

**Ministry of Environment** of the Republic of Lithuania is a National Focal Point to the UNFCCC. The Ministry of Environment is designated as *single national entity* responsible for the national GHG inventory. It has overall responsibility for the national system of GHG inventory and is in charge of the legal, institutional and procedural arrangements for the national system and the strategic development of the national inventory.

**Environmental Protection Agency** (EPA) under the Ministry of Environment starting from 2011 was nominated as an entity responsible for GHG inventory preparation by the Order of the Minister of Environment No D1-1017. As the compiler of the GHG inventory, EPA has the following functions and responsibilities: development and implementation of QA/QC plan and specific QA/QC procedures, checking and archiving of supplied input data, prepared inventory and used materials; key categories analysis and general uncertainty assessment; compilation of CRF tables and NIR, cooperation with sectoral experts on the selection of methods complying with IPCC 2006 Guidelines for calculation of emissions giving the priority to key categories and categories with high uncertainty. The EPA establishes and operates GHG inventory database and archive, where archives of GHG inventory submissions and all supporting reference material is stored and maintained.

**State Forest Service** (SFS) is the key institution in charge of GHG inventory LULUCF part. SFS compiles the National Forest Inventory (NFI) and the forest information system, carries out monitoring of the status of the Lithuanian forests, collects and manages statistical data etc. The Service functions under the Ministry of Environment.

Since 2010 the State Forest Service in the GHG inventory preparation process is responsible for calculations of emissions and removals of LULUCF (forestry part) sector and Kyoto Protocol

activities under Art. 3 para 3 and 4 following the Order of the Minister of Environment 29 of July, 2010 No D1-666 (repealed by the Order of the Minister of Environment No D1-61, 23-01-2014). SFS representative is also a member of permanent working group for GHG inventory preparation under the Government Resolution No 683. In this framework, the State Forest Service has the following responsibilities:

- Collection of activity data and emission factors used to calculate emissions and removals for LULUCF and KP-LULUCF sectors;
- Selection of methods (complying with IPCC Good Practice Guidance for LULUCF) for calculation of emissions and removals giving the priority to key categories and categories with a high uncertainty;
- Emission and removals estimates for LULUCF and KP-LULUCF sectors;
- Uncertainty assessment for LULUCF and KP-LULUCF sector;
- Checking and archiving of input data, prepared estimates and used materials;
- Preparation of CRF tables and NIR parts for LULUCF and KP-LULUCF;
- Implementation of QA/QC plan and specific QA/QC procedures related to LULUCF and KP-LULUCF;
- Providing the final estimates (CRF tables and NIR part) for the Environmental Protection Agency;
- Evaluating requirements for new data, based on internal and external reviews.

Quality assurance and Quality control for data collection, data processing issues, preparation of reporting tables achieved by State Forest Service, elaborated control routines of executed LULUCF activities are ensured with the help of procedures established by Environmental Protection Agency. Every GHG emissions and removals submission is presented to scientific-advisory board, where chosen methods, activity data, emission factors and other parameters are discussed and approved.

The following QA/QC procedures were carried out to ensure LULUCF GHG estimates quality:

- **periodical trainings** of field crews and individual training of new staff;
- **data consistency and completeness control** – carried out during measurements by field crews while entering data, and during processing of data after field works;
- **independent internal check assessments** – carried out on 5% of measured sample plots by NFI Control team;
- **independent external check assessments and judgments** of data processing procedures and algorithms used in the course of NFI, elaborated models, uncertainties etc. – carried out by third parties;
- **cross checking of statistics** gathered from permanent and temporary sample plots, comparison of NFI and SFI results;
- **domestic and external expert analysis and reviews;**
- **data archiving** (maintenance and storage) in several forms and copies in order to recover lost or corrupted data etc.

**Permanent GHG Inventory working group** was established in 2011 by the Governmental Resolution No 683. This group consists of representatives from 8 institutions, responsible for GHG estimates in various sectors. Within the group, institutions responsible for GHG estimates in

LULUCF sector are: State Forest Service (LULUCF – forest lands; KP-LULUCF) and Aleksandras Stulginskis University (LULUCF – croplands, grasslands, wetlands, other lands). Functions and responsibilities of the working group for GHG inventory preparation as a whole are defined as follows: search and identification of specific data providers, preparation of requests for new data, identification, on the basis of the IPCC good practice guidelines, of methodologies for calculation of GHG emissions setting priority to key categories and categories with high uncertainty level;

- Determination of activity data and appropriate emission factors;
- Calculation of emissions;
- Data quality control;
- Filling CRF tables for corresponding sectors, drafting relevant NIR sectoral chapters;
- Preparation of comments and answers to the questions and comments received during the EC and UNFCCC reviews.

**National Climate Change Committee** consists of experts from government, academia and non-governmental organizations (NGOs) and has an advisory role. Before final submission to the UNFCCC Secretariat and the European Commission, National Inventory Report is forwarded to the National Climate Change Committee for the comments and final approval.

**Data providers** are responsible for collection of activity data, applying QC procedures (documentation in checklists to be provided to EPA), evaluation of uncertainties of the initial data.

The main providers of the data for the Lithuania‘s GHG inventory LULUCF part are State Forest Service (annual statistical data on forestry ), The National Land Service under the Ministry of Agriculture (Lithuanian Land Fund data), The Geological Survey of Lithuania (data on peat extraction areas), etc.

Aiming to set up the system to ensure better data collection for the preparation of NIR, the Government Resolution No 388 determines responsibilities of other ministries and their subordinated institutions, as well as other institutions and the state science research institutes to provide data which they collect and possess and are required for the inventory compilation.

**External consultants**, independent specialists providing data for the GHG inventory (data providers) may also be involved during the inventory process in preparation and upgrading of methodologies, data review and evaluation, they can also perform expertise of the whole inventory or of its separate parts. External experts can be contracted annually in the areas where specific expertise is needed and the experience and knowledge of the working group member’s is not enough.

## 2. Overview of national circumstances

Lithuania is a small Middle European state at the shore of the Baltic Sea. Covering an area of 65 302 km² it is similar in size to Ireland. Lithuania's territory extends 373 km from East to West and 276 km from North to South. There are 6129 kilometres from the geographical centre of Lithuania to the equator and 3873 km to the North Pole.

Lithuania is bordered with five neighbouring states. In the North, Lithuania has a 588 km border with Latvia, in the East and South – 660 km border with Belarus. In the South West, country borders with Poland (103 km) and the Russian Federation (273 km). More than three fourths of Lithuania's borders stretch along rivers and lakes. Lithuania's economic zone in the Baltic Sea (with and area around 6 400 km²) reaches the waters of Sweden. 100 kilometres of Baltic Sea's coastline belongs to Lithuania as well.

Lithuania's is a flat land. This is most evident as you travel from the eastern to the western part of the country – towards the Baltic Sea. Our highest hill is rising 293.8 m above the sea level. There are no mountains in Lithuania.

More than a half of Lithuania's land is suitable for agriculture. About 33.3% of our land area is occupied by forests, 5.8% by wetlands, 4.8% is attributed to settlements.

Lithuanian climate is formed affected by global factors and local geographical circumstances. Key features of the climate depend on the country's geographical location. The territory of Lithuania lies in the northern part of the temperate climate zone. The distance from the equator (6100 km) and from the North Pole (3900 km) determines general solar radiation flux and atmospheric circulation patterns over the country. According to the general classification of climate, almost the entire territory of Lithuania is assigned to the south-western sub-region of the continental forest region of the middle latitudes of the Atlantic Ocean, because its climate is close to that of Western Europe; while the Baltic coast is assigned to the South Baltic sub-region.

The character of climate variations in Lithuania greatly depends on the processes of atmospheric circulation, i.e., cyclone and anticyclone formations and air mass advection of a different nature. It was observed that a number of deep cyclones visiting Lithuania in cold seasons (November - March) was increasing, whereas a number of anticyclone formations decreasing. The changing patterns of atmospheric circulation entailed changes in other climatic indices: changes in thermal season duration decrease in seasonal differences of air temperature and precipitation amount, decline in snow cover indices.

Rapid increase in average annual temperature in Vilnius observed in the last 30 years (Figure 2-1).

Average annual temperature, compared with the beginning of 20$^{th}$ century, has increased 0.7 – 0.9 °C which leads to more frequent droughts (for example 1992, 1994, 2002, 2006 summer seasons). Changes in precipitation patterns are not homogenous – in some parts of Lithuania it is increasing, in others – decreasing. However, these changes are not very significant. There is an observed tendency of precipitation increase during cold season and decrease during warm season. Liquid precipitation is becoming more frequent in cold season.

Changes in temperature and precipitation patterns will affect different economical activities and natural ecosystems. Coastal region is one of the most vulnerable regions in Lithuania. Lithuanian coast is in the south-eastern region of Baltic Sea which will undergo biggest changes in 21$^{st}$ century, due to the sink of terrain and sea level rise. Pessimistic scenario suggests that water

level in this region can rise by 0.5 – 1.0 m. In that case, there would be high risk of flooding urban areas of western part of Lithuania.

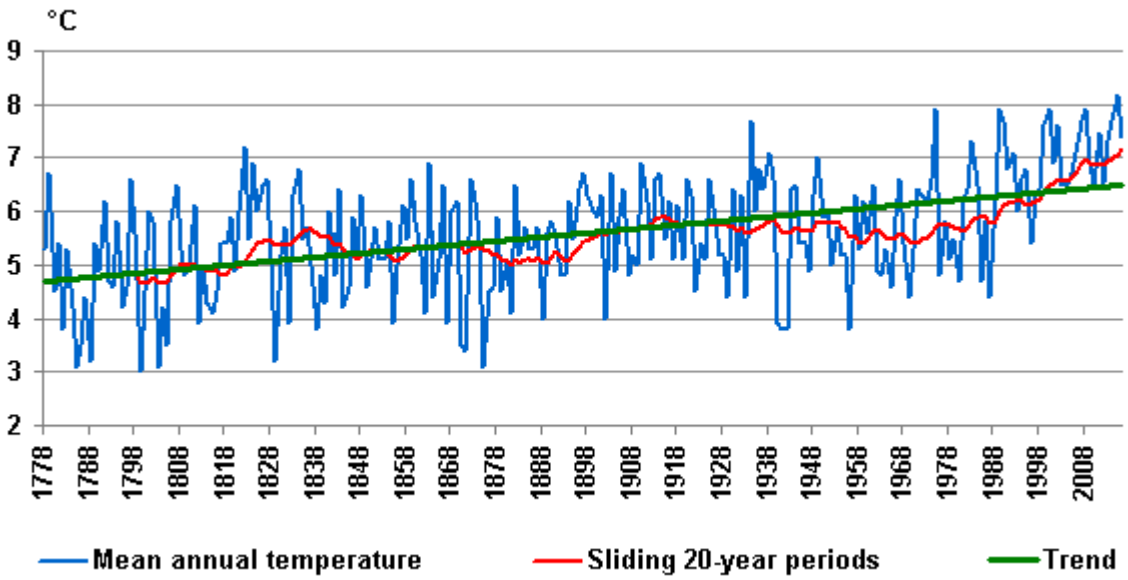


**Figure 2-1.** Annual mean air temperature in Vilnius, 1778-2016[1]

Bearing in mind climate change mitigation, it is essential to preserve and protect areas that have high carbon sequestration capacity. The most important are: forests, wetlands, peat lands and grasslands. Promotion of carbon sequestration through sustainable forest management, reforestation and afforestation, improvement of cropland management practices and resume with supportive activities like mowing and grazing in order to preserve natural state of meadows and semi-natural grasslands also should not be forgotten.

Forests cover a large part of the territory of Lithuania and constitute to 2,186.7 thous. ha which is more than 33 % (33.5 %) of the territory of the country. All Lithuanian forests are distributed into four functional groups. In the beginning of 2016, distribution of forests by functional groups was as follows: group I (strict nature reserves) – 26.5 thous. ha (1.2%); group II (ecosystems protection and recreational forests) – 266.5 thous. ha (12.2%); group III (protective forests) – 333.4 thous. ha (15.2%); and group IV (exploitable forests) – 1,560.3, thous. ha (71.4%)

In the second half of the 20th century, Lithuania's forest coverage increased by more than 10 per cent - 10.9 % since 1956. This increase was determined not only by the forest afforested artificially but also by the forest that regenerated naturally. This process has especially speeded up in recent years when 4-5 thousand hectares of unused land naturally regenerate on annual basis. The National Forestry Sector Development Programme for 2012–2020 approved by Resolution No. 569 of the Government of the Republic of Lithuania of 23 May 2012 provides for increasing the many-sided benefit brought by the forests taking into consideration a long duration of the growth of a forest and differences in the forms of property and their interaction, as well as ensuring the implementation of the principles of sustainable forest sector in all forests of the country. Thereby the Programme it is sought to increase forest coverage of the country up to 34.2 per cent by the year

[1] Lithuanian Hydrometeorological Service under the Ministry of Environment. Available from: http://www.meteo.lt/en/web/guest/weather-temperature

2020 by afforesting vacant lands and lands that are not suitable to be used for agricultural activities, and to encourage people financially to afforest forests in private and state-owned lands, to develop forest regeneration on a genetic-ecological basis with selectively valuable and qualitative forest increasing matter, to optimise the growth of forest increasing matter seeking to provide the market with high-quality forest saplings in a long-term perspective, to enlarge the oak areas and to ensure proper protection of forests against diseases, pests and expansion of fires by improving forest sanitary and fire-prevention systems. Despite that forest land area has increased significantly and many new forests have been planted on private and State land the need for further enlargement of forest land still remains. According to the National Land Service under Ministry of Agriculture[2] data by 01.01.2016, there are more than 69 000 ha of land not used for agriculture – abandoned agricultural lands already covered with trees and bushes, but had not yet reached the requirements for forest land. More than half of such land belongs to the State and is aimed to be afforested in the near future. A similar target is also set in the Master Plan for the territory of the Republic of Lithuania. However, this process is slowed down by incomplete land reform, problems related to the transfer of free land from the state land fund to managers of state-owned forests for afforestation, as well as legal restrictions linked with afforestation of land that has relatively high productivity. Lithuania is considering to implement additional measures to increase the rates of afforestation in private lands or protect agricultural lands already covered with trees from conversion back to agricultural land use.

Since one third of Lithuania's territory is occupied by forest land, forestry is of one of the most important sectors having impact not only for Lithuania's environment but also for economy. By 1st of January 2015, around half of all forest land in Lithuania was of State importance – 1,165.4 thous. ha. Nearly 873.0 thousand ha of private forests were registered at the State Enterprise Centre of Registers. The number of private forest owners amounts to more than 247 thousand. Average private forest estate is 3.4 ha. The total value added in the forest sector (including manufacture of furniture) reached EUR 1.5 billion in 2014. Sectors share in the total national value added has increased from 4.5% (2013) up to 4.9%. The largest share (EUR 778.0 million) of value added in the sector was generated by furniture industry.

Lithuanian forests contain more than 80 % of all biomass (about 93 % if calculating only biomass accumulated in woody plants in all land uses, according to NFI measurements). With account of the requirements for ensuring biodiversity and nature protection, as well as the technological aspects, up to 750 thousand cubic meters of felling residues could be used potentially for energy production each year.

Croplands area in Lithuania was decreasing since 1990 up to 2005. This is closely related with socio-economic changes appeared in Lithuania. Significant reforms were introduced in the early 90's, particularly after the restoration of independence with the purpose of re-establishment of private ownership and management in the agriculture sector. The legislations were adopted for dismemberment of the collective farms, but they did not ensure their replacement by at least equally productive private farms or corporations. Agricultural production decreased by more than 50% from 1989 to 1994. The farms were broken into small holdings, averaging 8.8 ha in size, often not large enough to be economically viable. Area of grasslands prevailed.

[2]Land Fund of the Republic of Lithuania, 2016. Available from: *http://www.nzt.lt/go.php/lit/Lietuvos-respublikos-zemes-fondas/1*

Croplands and Grasslands area has changed dramatically in Lithuania since 2005 with the introduction of Single Area Payment Scheme (SAPS). SAPS is a form of support whereby direct payment is made for agricultural land irrespective to the type of production carried out on the land, and this might be one of the reasons of decrease in grasslands area. Furthermore, in 2004 when Lithuania became the member of EU, communities Structural Funds became available. In order to use funding from EU Structural Funds efficiently, the Single Programming Document (SPD) of Lithuania for 2004–2006 was prepared. The strategy provided in the SPD was divided into priorities and implemented on the basis of one or several measures. Support for Rural and Fisheries development was provided under the measures of the 4$^{th}$ SPD priority. The main objective of the Rural and Fisheries Development priority is to develop an advanced agriculture, forestry, and fishery sector on the basis of natural resources and the traditions of inhabitants and by investing in alternative activities, traditional farming, and economic diversification. This support is a non-repayable grant of between 45% and 100% of eligible expenses. In 2004–2006, 191 million EUR was allocated to implement the measures of the Rural and Fisheries Development priority. According to the support contracts signed, the largest amount of funding (95 million EUR) was allocated to beneficiaries who submitted applications for the measure named "Investments into Agricultural Holdings". These measures resulted in agricultural land management, hence increase in croplands area and decrease in grasslands that were mostly ploughed for agricultural purposes. However, cropland areas slightly decreased in 2015, resulting in slight increase in grassland area. In addition to this, Lithuania, altogether with all EU Member States, is included in the renewed (2014–2020) Common Agricultural Policy which sets requirements for maintaining permanent grassland areas (keeping total grassland area not deteriorated). Greening requirements (permanent grassland protection) sets the restriction that grassland and grazing land areas cannot decrease more than 5 % of total country area comparing to the area of grassland estimated in 2012. Application of new Common Agricultural Policy will have an impact on keeping the balance between cropland and grassland areas in Lithuania.

Lithuanian climate conditions and natural soil productivity is favourable for the development of crop production. The main crops grown are wheat, rye, rape, flax, sugar beet, potatoes, fruits, vegetables, etc. Generally, in the development of crop production the following key production tendencies are identified: crops grown for feedstuffs and food (both for internal and foreign market) and crops grown for other purposes (as industrial crops grown for biofuel production, textile and chemical industry). The production of main crops in Lithuania (grain crops, flax, potatoes, vegetables etc.) is still characterised by insufficient yields as well as quality. This is a result of usage of outdated technologies, lack of proper machinery, various drying and storage facilities as well as packaging equipment (especially that regards vegetable, fruit and berry growers), use of poor quality seeds (currently only about 10-15 % of the total grain crop area was sowed with certified seeds) as well as lacking farm management practices. Furthermore, problems mentioned above, such as unfavourable farm structure, low level of producer's co-operation are also factors hindering the development of competitive crop production. Generally, all crops grown in Lithuania are given an equal priority. However, the development of production of certain crops, as for example, rape is envisaged to increase. Although rape is a relatively new crop in Lithuania, it is expected to have a great potential in the future in the light of the increasing demand for bio-fuel.

Geographical location and climatic conditions are favourable for grasslands in Lithuania. Historically grasslands were covering nearly half of the Lithuania's agricultural land and still are

significant element of landscape, especially in the hilly regions. Nowadays grasslands in Lithuania are highly fragmented and diverse, average cartographical unit is only 1.6 hectare, half of them even less than 1 hectare. Grasslands in Lithuania mainly represents non-degraded and sustainably managed grasslands, but without significant management changes during the last decades affecting the carbon stock. Since 1990's socio-economic changes led to decreased number of cattle and less intense use of grasslands for grazing and fodder production. But intensification of grassland management is foreseen supported by recent technological developments which stimulate use of grassland biomass for bioenergy production, both biofuels and biogas.

The third largest group of land is wetlands (5.8%). The total number of rivers and rivulets is 22 200 (the longest river – *Nemunas*), and the number of lakes is well over 830. Inland waters are distributed into two separate groups of managed and unmanaged wetlands. Unmanaged wetlands are all surface waters (lakes, riverbeds, lakelets, ponds etc.) and unmanaged are peat lands. Managed wetlands are considered as peat extraction areas, which are monitored by Lithuanian Geological Service. Peat extraction areas are recorded since 1992. Extraction area was fairly stable from 1992 to 2001 fluctuating in approximately 12% range, but since 2002 extraction area has been decreasing. In addition to this it must be mentioned that due to the aim of protecting unmanaged natural wetlands (peatlands), Lithuanian Geological Survey is not providing any new permissions for peat extraction, which means that only existing peat extraction sites can be operated and expanded, if the permission was given for a broader area before 2004. In 2014 peat extraction volume comprised to 536.3 tonnes. Extracted peat is mostly used for production of organic fertilizers or fuel.

## 3. Description of past emissions and removals

In general, past emissions and removals of greenhouse gases in LULUCF sector in Lithuania are mostly related with the history and land use changes. Perfunctory forest land accounting during inter-war and later occupation period as well as introduction of various support schemes has led to rather considerable land use changes and different land management, what in the end has caused fluctuations in total emissions and removals trend.

Forest coverage in Lithuania was expanding continuously since 1948, however data on forest coverage in Lithuania during inter-war period is very limited and the exact numbers are still unknown.

Expert judgement made by the authors of "The Chronicle of Lithuanian Forests. XX Century"[3] allows us to presume forest coverage to be around 21 percent in 1938, even though some authors argue that only small part of heavily afforested areas of Vilnius region (south-eastern part of Lithuania) were included into this number at that time, and some 150 thous. ha could be unaccounted.

The lowest forest coverage has been accounted during the World War II and through occupation period, because no forest preservation policy existed at that time.

During the period when Lithuania was part of Soviet Union, forest accounting was rather thorough – unfortunately only in State owned forests. Forests belonging to collective farms and being less than 10 ha were disregarded as well as those belonging to small farms and being less than 1 ha.

After restoration of Independence in 1991, there were no legal obstacles for implementation of forest accounting. However, the land reform has been also started at that time, so the State Forest Inventory (*SFI*) has been suspended or even discontinued as less important. In 1996, when the new cycle of SFI has been started there were found numerous areas of naturally afforested areas that were missing in the previous inventories or in State land accounting related documents.

Early 90's had introduced significant reforms in agriculture sector as well. The main target was re-establishment of private ownership and management. Even though legal acts were adopted for dismemberment of the collective farms, but they did not ensured their replacement by at least equally productive private farms or corporations. Agricultural production decreased by more than 50% from 1989 to 1994. The farms were broken into small holdings, averaging 8,8 ha in size, often not large enough to be economically viable. Area of grasslands prevailed.

Croplands and grasslands area has changed dramatically in Lithuania since 2005. This is the result of introduced Single Area Payment Scheme (SAPS) since 2004. SAPS is a form of support whereby direct payment is made for agricultural land irrespective to the type of production carried out on the land, and this might be one of the reasons of decrease in grasslands area. Furthermore, in 2004 when Lithuania became the member of EU, communities Structural Funds became available. In order to use funding from EU Structural Funds efficiently, the Single Programming Document (SPD) of Lithuania for 2004–2006 was prepared. The strategy provided in the SPD was divided into priorities and implemented on the basis of one or several measures. During 2004–2006, 191 million EUR was allocated to implement the measures of the Rural and Fisheries Development priority. According to the support contracts signed, the largest amount of funding (95 million EUR) was

[3] *Lietuvos Respublikos Aplinkos Ministerija, Miškų departamentas. Lietuvos miškų metraštis. XX amžius. Vilnius, 2003*

allocated to beneficiaries who submitted applications for the measure named “Investments into Agricultural Holdings”. These measures resulted in agricultural land management, hence increase in croplands area and decrease in grasslands that were ploughed for agricultural purposes. Since 2012 total cropland and grassland areas remained fairly stable and conversions to and from each category were similar.

Past emission trends are based on the National Inventory Report (NIR), submitted in 2016 which comprise 1990 – 2014 accounting period.

Total GHG emissions amounted to 21,112.7 kt $CO_2$ eqv. excluding LULUCF and 12,543.5 kt $CO_2$ eqv. including LULUCF in 2012 and 19,777.8 kt $CO_2$ eqv. without LULUCF and 11,668.8 kt $CO_2$ eqv. with LULUCF in 2014. The greenhouse gases include $CO_2$, $CH_4$, $N_2O$, HFCs, PFCs, $SF_6$ and $NF_3$. The emissions of GHG expressed in kt $CO_2$ eqv. in 2012 have decreased by 55.8 % comparing to the base year excluding LULUCF and by 72.4 % including LULUCF and 59.0 % comparing to the base year excluding LULUCF and 73.9 % including LULUCF in 2014. Figure 3-3 shows the estimated total greenhouse gas emissions in $CO_2$ eqv. from 1990 to 2014.

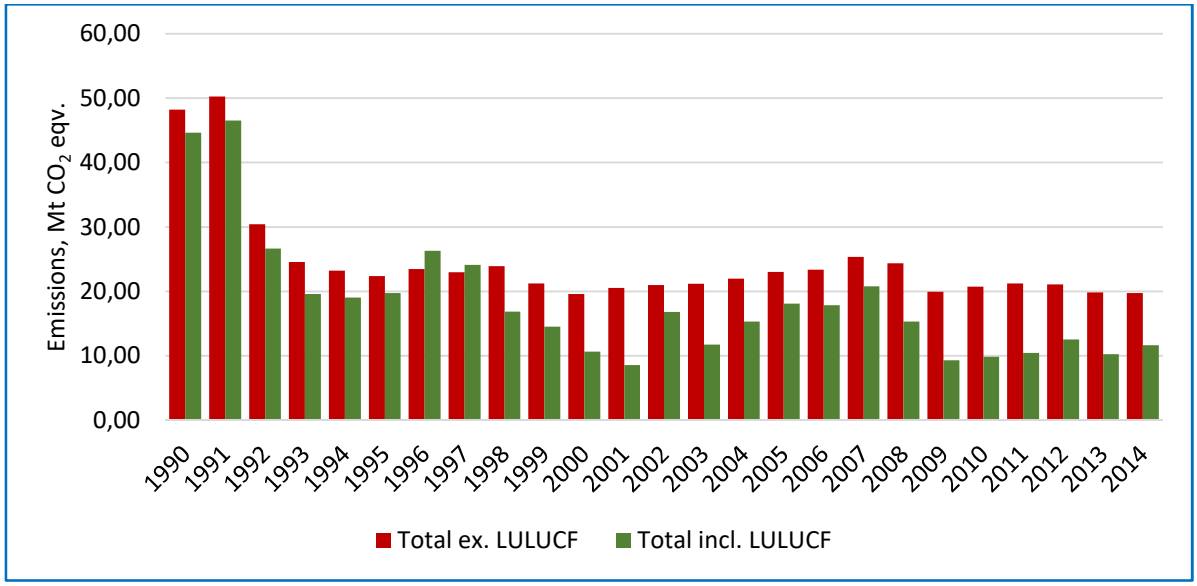


**Figure 3-3.** Emission trends for aggregated greenhouse gases in 1990-2014, kt $CO_2$ eqv.

The most important greenhouse gas is $CO_2$, it contributed 66.6% to the total national GHG emissions expressed in $CO_2$ eqv. in 2012, followed by $N_2O$ (15.2%) and $CH_4$ (16.4%). PFCs, HFCs and $SF_6$ amounted together to 1.8 % of the total greenhouse gas emissions (excl. LULUCF) in Lithuania; in 2014 the composition of greenhouse gas contribution to the total national GHG emissions expressed in $CO_2$ eqv. has not changed significantly: $CO_2$ - 64.4 %, $N_2O$ - 15.8 %, $CH_4$ - 17.5 % $CO_2$ emissions have decreased by 60.4% since 1990 in 2012 and 64.4 % in 2014 (excluding LULUCF). In 2012, the actual $CO_2$ emissions (incl. LULUCF) was 85.0% lower than the emissions in 1990 and 86.7 % lower in 2014. Between 1990 and 2000 greenhouse gas emissions decreased significantly as a consequence of the decline in industrial production and associated fuel consumption. Once the economy started to grow again, emission rose again until 2007 but this was in part compensated by reductions achieved through energy efficiency and measures taken to reduce emissions. Comparing with 2012 $CO_2$ emissions in 2014 decreased by 16.1 % including LULUCF or 8.9 % excluding LULUCF. The largest source of $CO_2$ emissions is energy sector which

contributes around 80.8% of all $CO_2$ emissions in 2014. Compared to 2012 $CO_2$ emissions from energy sector decreased by 9% in 2014.

The Land Use, Land-Use Change and Forestry sector for 1990-2014 as a whole acted as a $CO_2$ sink except in 1996 and 1997 when emission constituted to 2,820.95 and 1,146.59 kt $CO_2$ eqv. (Figure 1-3). That is explained by sudden spruce dieback followed by beetle invasion that caused huge losses in trees volume of Lithuania`s spruce stands, which had direct impact on biomass calculations and on total GHG balance from this sector.

The LULUCF sector during the period 2002-2014 removed from nearly 18% to 53 % of the total $CO_2$ emissions in Lithuania. Largely this should be contributed to forest land with smaller contribution from grassland (keeping in mind that is accounted under UNFCCC requirements and 2013 Wetlands Supplement to 2006 IPCC Guidelines was not applied) and harvested wood products in recent years.

Lower removals from LULUCF sector, comparing with 2009, has been mainly caused by decreased mean annual volume change from forest land (from 9.3 mill. $m^3$ in 2009 to 7.8 mill. $m^3$ in 2014). Total removals in forest land were also different: in 2009 were 11,762 Gg $CO_2$ and only 9,767 Gg $CO_2$ were removed in 2014.

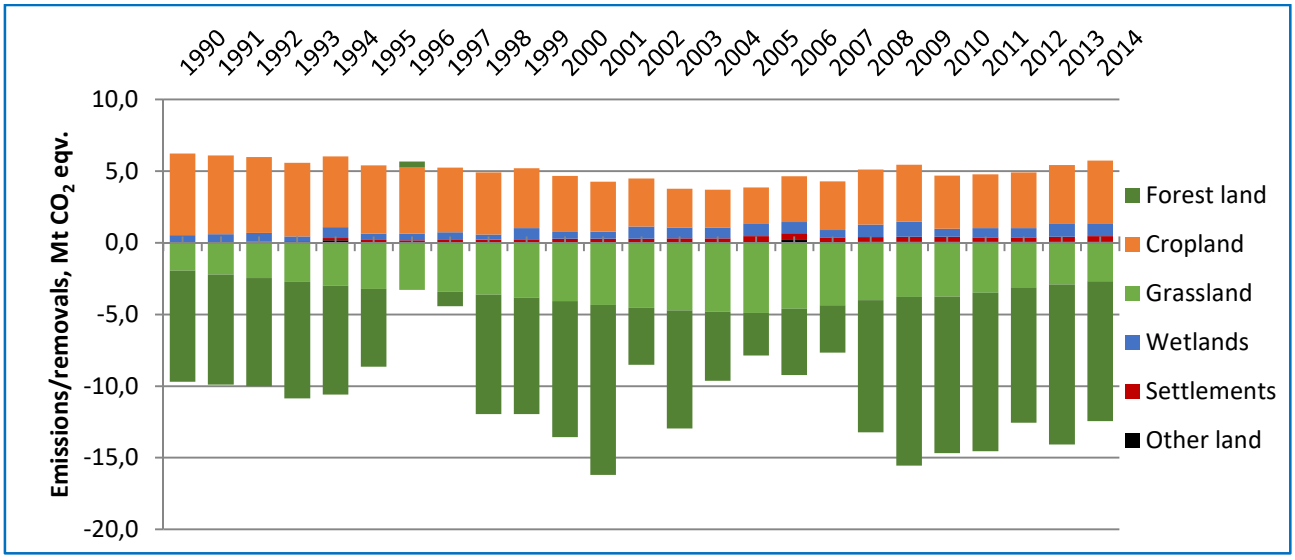


**Figure 3-1.** Lithuanian total greenhouse gases emissions/removals from LULUCF sector for the period 1990-2014, kt $CO_2$ eqv.

For the first commitment period Lithuania has chosen to report emissions and removals from the article 3.3 of the Kyoto Protocol activities specified as afforestation (A), reforestation (R) and deforestation (D), together with the only activity under article 3.4 of the Kyoto protocol – forest management (FM). Lithuania has been successfully implementing the commitments under the Kyoto protocol – to reduce greenhouse gas emissions by 8% below 1990 level during the first commitment period of 2008–2012. By 2012, the greenhouse gas emissions in Lithuania have been reduced by 55.8 % compared with 1990. In 2014 greenhouse gas emission reduction in Lithuania was 58.9 %, comparing to 1990.

The area subjected to AR was 34.63 thous. ha in 2012 and reached 41.11 thous. ha in 2014 (Fig. 3–2). There could be two moment distinguished in the time series of 1990–2014 describing the AR trend line. The first time period of artificial afforestation/reforestation has started in 1990–2000

and is related with Lithuanian history. After the restoration of Independence in 1990's forest expansion was the key priority among politicians therefore afforested and reforested areas constituted to more than 500 ha annually. But this number was steadily decreasing in 1994. After the spruce dieback which hardly hit the Lithuanian forest in 1994, afforestation and reforestation rates again returned to the 1990's level. Another two huge increases in AR area were recorded in 2001–2007 (result of the storm damages in 2001) and 2009–2014 (introduction of the EU support schemes for AR). Afforestation and reforestation resulted in a net removal of -262.8 kt $CO_2$ eq. in 2014.

In the beginning of 2013, deforested area since 1st of January 1990 was 1247.8 ha and in 2014 it expanded up to 1983 ha (Fig. 3-2). Deforestation was mainly caused by the forest area conversions to settlements (road building, cities expansion etc.), other lands (quarries etc.) and wetlands (flooding etc.) land use categories. Areas of deforestation are under very strict regulation and control legitimated by the Forest Law (original text adopted in 1994) and Lithuanian Republic Governmental Resolution No 1131 dated on September, 2011 with its amendments on 9th of November 2016. In general, forest conversion to other land is very rare i.e. only for road building or settlements establishment and also requires special procedure of compensation. Statutory way of compensation is afforestation of non-forest land up to 3 times larger than used to be deforested. Deforestation activity has caused emissions of 207.2 kt $CO_2$ eq. in 2013 and increased to 265.2.7 kt $CO_2$ eq. in 2014.

Net removals from Article 3.3 activities were -117.4 kt $CO_2$ eqv. in 2012 and in 2014 it resulted in net emissions of 20.4 kt $CO_2$ eqv..

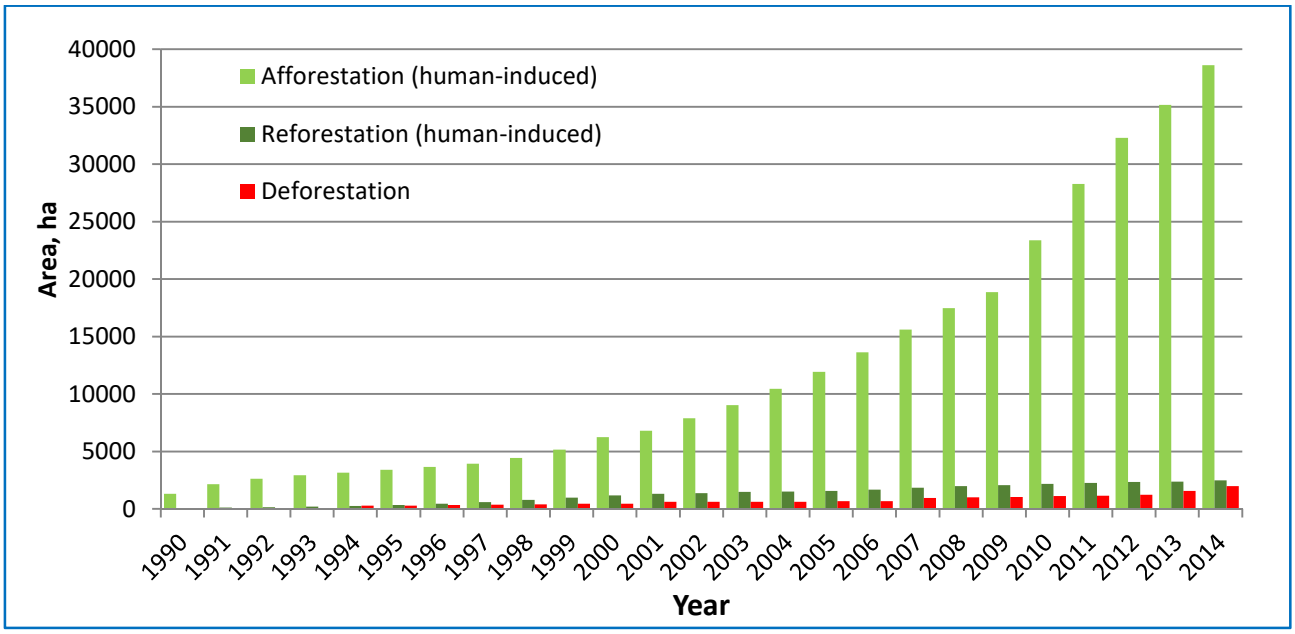


**Figure 3-2.** Cumulative area of afforestation, reforestation and deforestation, 1990-2014

The area subjected to forest management was 2,150.2 thous. ha in 2012 and expanded up to 2,156.1 thous. ha in 2014. Net removals from Article 3.4 activity (FM) were -7,614.1 kt $CO_2$ eqv. in 2012 and -8,981.1 kt $CO_2$ eqv. in 2014.

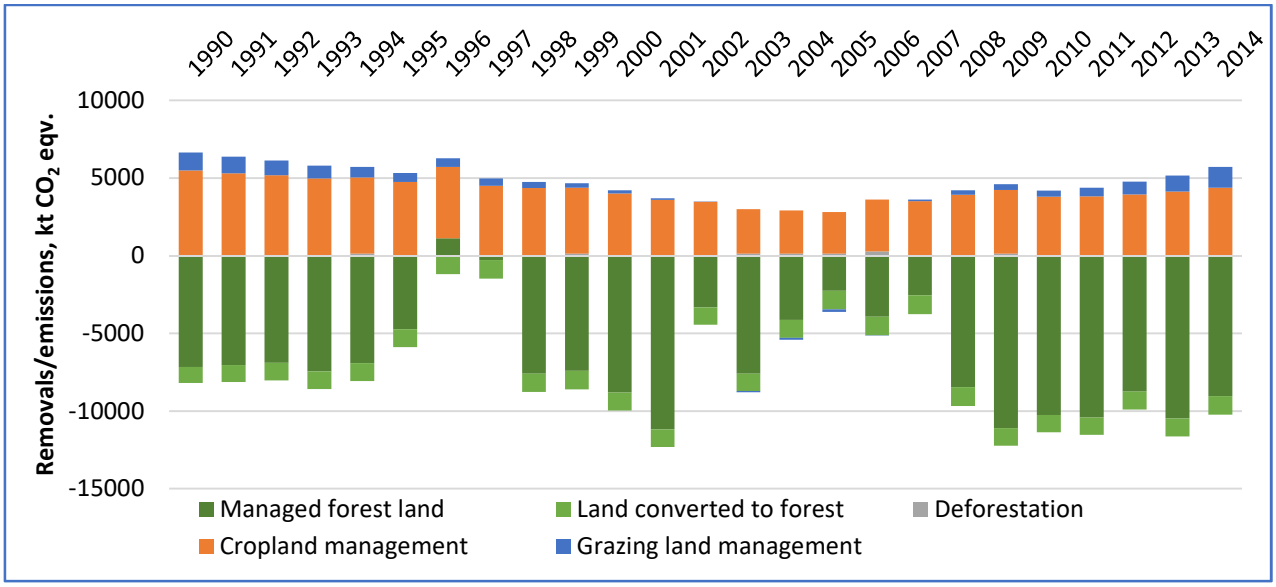


**Figure 3-4.** Past emissions/removals for relevant categories 1990-2014, kt $CO_2$ eqv.

Due to the fact that Decision 529/2013/EU Article 10 required projections for afforestation, reforestation, deforestation and forest management categories possess sufficient emissions/removals data from 2008 and beyond, representative categories of managed forest land, afforestation/reforestation and deforested areas were used for projection evaluation. Reporting of emissions and removals from cropland management and grazing land management activities are still not obligatory for second Kyoto Protocol commitment period, however it is required to report preliminary emissions and removals from those activities under the above mentioned Decision, therefore those emissions were used for the projections evaluation. Greenhouse gas emissions from cropland management are not significantly different from cropland emissions under UNFCCC reporting, on the contrary, grazing land management results in emissions almost through the entire reporting period while grassland acts as a sink for entire reporting period under UNFCCC reporting systems. Differences are caused mainly due to the usage of 2013 Wetlands Supplement to 2006 IPCC Guidelines, which provides much higher $CO_2$ emission factors from drained organic soils in grassland. Organic soils constitutes 8.2 % of total managed grassland area, therefore it is a significant source of $CO_2$ emissions, resulting in grazing land management being a source of GHG emissions. 2013 Wetlands Supplement for the UNFCCC reporting is not mandatory yet, therefore Lithuania chose not applying it.

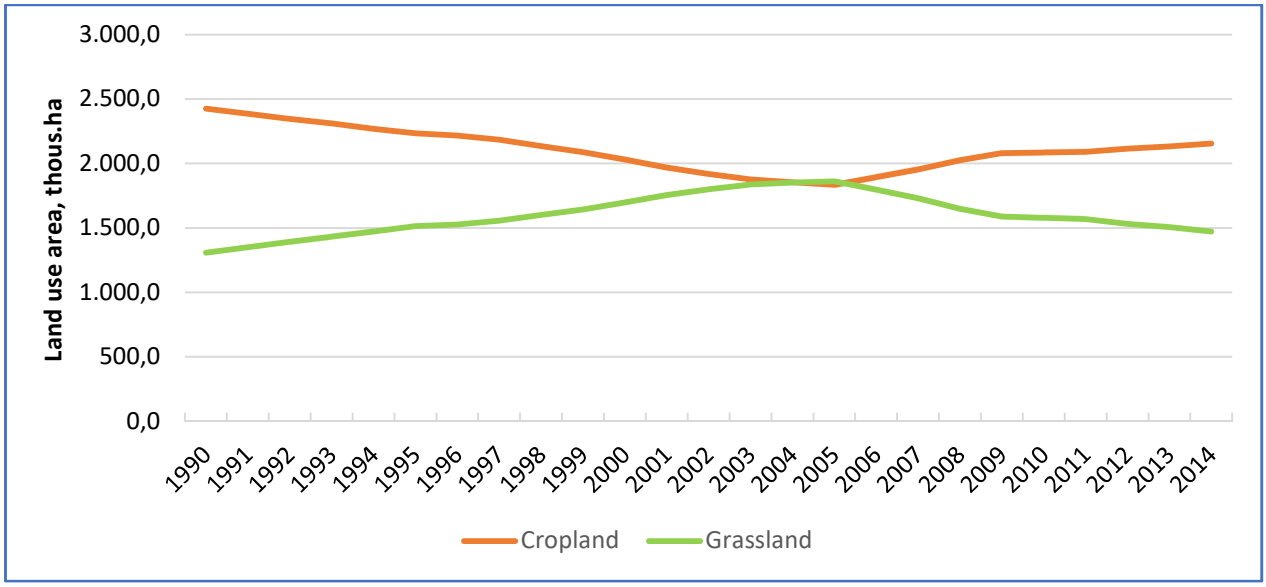


**Figure 3-5.** Past emissions/removals for relevant categories 1990-2014, kt $CO_2$ eqv.

Projections of emissions/removals from cropland management and grazing and management are very much driven by the changes in cropland and grassland area, mostly grassland conversions to cropland and vice versa. Past changes in cropland and grassland were determined by historical situation in Lithuania: after the restoration of Independence agricultural arable lands started to decrease due to the difficult economical situation and started to increase again after Lithuania joined European Union and started providing support for agricultural activities.

## 4. Projections for emissions and removals for 2015–2020

The following paragraph provides greenhouse gas emissions and removals projections for the required period of 2015–2020 and analysis of the potential to increase removals or to reduce emissions. The projections are made for all required categories according to the Article 10 (1) and (2) of Decision No 529/2013/EU. Categories, specified in above mentioned decision Article 3 (1), (2) and (3), include: afforestation, reforestation, deforestation, forest management, cropland management and grazing land management. The best available data has been used for consideration. Since reporting of GHG emissions/removals from A/R/D and forest management activities are mandatory only from 1$^{st}$ KP reporting period (2008) and CM and GM reporting is mandatory from 2013 for EU only, unpublished historical data of GHG emissions/removals up to 2008 and 2013 was used for projections estimation. Three different scenarios were elaborated: without measures (WM), with existing measures (WEM) and with additional measures (WAM).

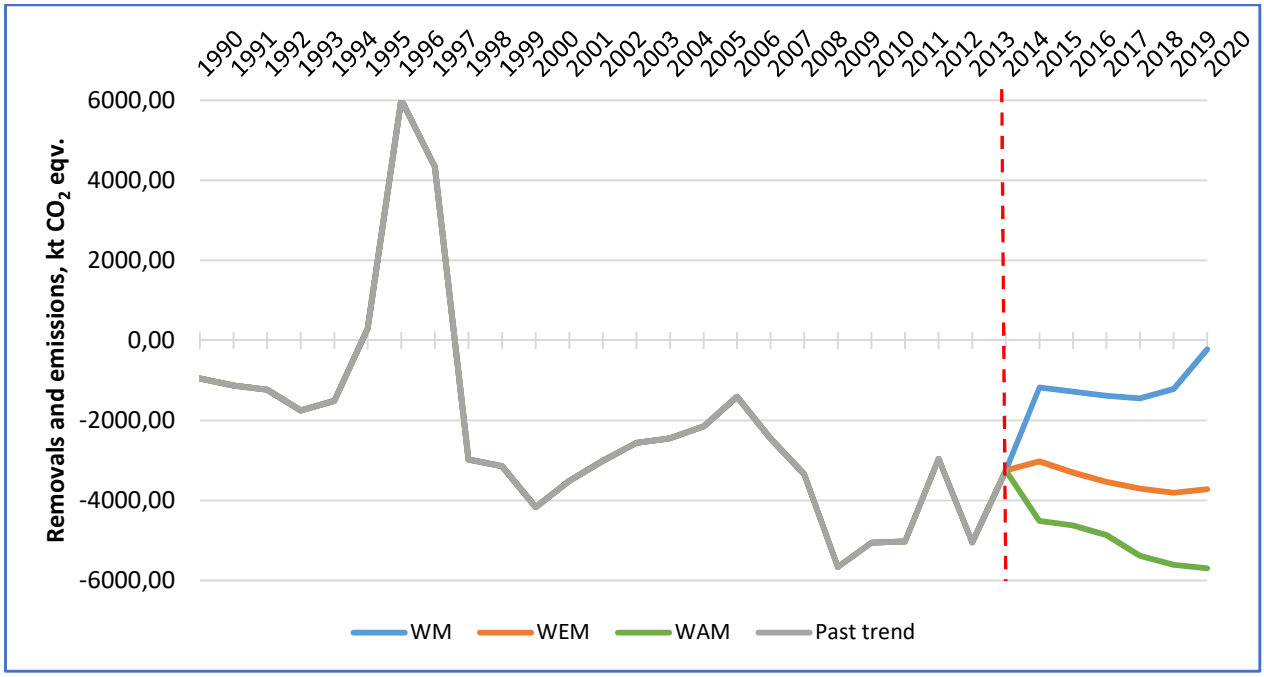


**Figure 4-1.** Historical and future emission and removals trend for aggregated greenhouse gases in 1990-2020 in LULUCF sector, kt $CO_2$ eqv.

Future greenhouse gas emissions and removals projections have been compiled using data from National Inventory Report (NIR) 1990–2014 and taking into account measures determined in the national strategies and plans (listed in Chapter 5).

Projections of greenhouse gas emissions and removals have changed since previous (initial) submission in 2015 as well as past trend of greenhouse gas emissions and removals of required categories, due to the significant recalculation of data in 2016 and different categories included in projections evaluation. $CO_2$ emissions from biomass burnt in forest land category (in the event of forest wildfires) were recalculated in 2016 submission; $CO_2$ emissions in cropland and grassland due to the drainage of organic soils and management of mineral cropland soils, as well as direct $N_2O$ emissions from N mineralization/immobilization in cropland and grassland were also recalculated in 2016 submission.

Despite the above mentioned recalculations of relevant categories for National GHG inventory report, projections in progress report are different compared to the initial report of LULUCF actions since in previous submission emissions/removals from cropland and grassland categories were used for projection evaluation instead of cropland management and grazing land management, which are calculated slightly different. The main difference occurs due to the use of 2013 Wetlands Supplement of 2006 IPCC Guidelines, which is not mandatory and therefore not applied for UNFCCC inventory categories in Lithuania. Higher values of $CO_2$ emission factors from drained organic soils presented in 2013 Wetlands Supplement, comparing to the ones in 2006 IPCC Guidelines, resulted in significant increase of $CO_2$ emissions from grasslands. Due to the renewed methodology managed grassland became a net GHG emission source for almost entire reporting period. Lithuania does not have special modelling tool to project annual forest growing stock volume changes, which is the main factor increasing inaccuracy of GHG emissions/removals projections and has one of the largest shares in total emissions/removals balance. Due to the lack of such tool projections for requested categories were done assuming annual growing stock volume

change will remain at the certain level indicated for each scenario. More predictable factors, used for projection evaluation, such as area changes are projected assuming either historical trend or trends foreseen in policies.

**Projections of scenarios**

Projections of **WM scenario** shows decrease in greenhouse gas removals from all requested categories. Several assumptions were taken into consideration. For managed forest land, it was assumed that area will remain in 1990–1997 level, where it fluctuates around 30 % of the total land area. Felling rates and annual growing stock volume changes are assumed to remain similar to the ones in years 1990–1995 (exceptional years of 1996–1997 with negative impact of droughts and pests invasion which resulted in significant spruce dieback were excluded from projections estimation). It was assumed that due to the lack of significant improvement in policies straight after the restoration of Independence GHG removals neither could have significantly increased nor decreased in managed forest land. Due to the lack of support programmes, afforestation and reforestation activities are also assumed to remain at the level of 1990–1997. Managed cropland area is assumed to be fluctuating around the one before the implementation of Common Agricultural Policy (CAP) in 2004 or slightly decreasing, because with no additional incentives from state would increase farmers' inertia to go for crop production. Abandoned grasslands would prevail. Due to the abovementioned reasons only around -1.2 Mt $CO_2$ eq. would be removed by these categories annually under certain conditions.

According to **WEM scenario** forest land area should reach 34.2% of the total forest land area by 2020 according to the National Forestry Sector Development programme adopted in 2012. Felling rates will remain constant and similar as in current situation – 7.3 mil. $m^3$ (2010–2014 data). The full potential of harvesting is not exploited in Lithuania. There could be approximately 9.5 mil. $m^3$ harvested each year, however, it was assumed that without additional policies (promotion of harvested wood products for example) harvesting would not increase in Lithuania. It was also assumed that annual growing stock volume changes should remain as documented between 2004 and 2014. Current croplands and grasslands trend shows that with support from Rural Development Programme interest in agriculture and livestock farming is equally important and should not change significantly in the upcoming years. It was assumed that cropland area will decrease comparing to the most recent years of past trends and the decrease in cropland area will result in increase of grassland, due to the National Rural Development programme 2014–2020 which commits to keep certain amount of green areas in Lithuania, preserving areas important for maintaining biodiversity and environmentally sensitive areas. It is expected that approximately 3.5 Mt $CO_2$ eq. to be removed annually in 2012–2020 under WEM scenario.

The most controversial scenario is with additional measures **(WAM scenario)** which should include policies and measures adopted and implemented to mitigate climate change as well as policies and measures which are planned for that purpose. No drastic changes in forest land should be expected even if adding additional measures to current conditions. Forest land area could be expected to increase by 0.2 – 0.3% based on current situation. Increase in forest land area mostly depends on support from national programs for afforestation of abandoned lands and Rural Development Programme, however it was experienced that afforestation/reforestation support programmes are not fully implemented currently. Short rotation forest plantations with the main aim to produce as much wood as possible were included in Lithuanian Forest Law amendment in 2015,

however no significant increase in forest land area was detected due to this amendment and is not expected to significantly increase forest land area in the future (only approx. 92 ha of short rotation forest plantations were declared for Rural Development Support programme in 2015). Felling rates are estimated similar to current conditions because it is unlikely these amounts will increase even with additional policies promoting use of harvested wood products, as great potential of unexploited forest stands still exist. Cropland area is expected to slightly decrease in the near future. Advanced cropland management practices should result in slightly decreased net emissions, however it will not become a net sink in the future. Grassland area should start to increase a little bit or at least remain at the same value as in 2014. It is expected that overall grassland management will act as a net source over 2015–2020 due to the high rate of emissions from drained organic soils. Mean annual tendencies of greenhouse gas emissions and removals in forest land, managed cropland and managed grassland were also taken into account while preparing projections for the WEM scenario, assuming that net annual emissions/removals should keep the trend of changes since 2009.

**Information on progress of past trends of emissions/removals and projections evaluation**

Lithuania is planning significant improvements in greenhouse gas inventory and projection evaluation as well. Improvement in greenhouse gas inventory consists of national carbon stock values in soils implementation in agricultural land uses GHG inventory (cropland management and grazing land management activities) as well as estimation of carbon stocks in dead wood. Improvement in GHG projection estimation comprises of two international projects started in 2016.

In 2016 Lithuania has implemented carbon stock evaluation project funded by the Norway Grants programme under the “Partnership project on Greenhouse gas inventory” in the framework of the programme LT10 “Capacity-building and institutional cooperation between beneficiary State and Norwegian public institutions, local and regional authorities”. The aim of the project was to estimate carbon stock values in mineral and organic soils in various land-uses in Lithuania and organic carbon stored in dead organic matter (dead wood) and harvested wood products. Organic carbon stock values in upper 30 cm layer of soils were estimated in forest land, cropland, grassland and wetland (peatlands); carbon stock values in pairs of newly afforested/reforested areas and alongside agricultural areas (mainly grasslands) were estimated as well. National carbon stock values is planned to be included in national greenhouse gas inventory in LULUCF sector in the next submission (2018). Better evaluation of annual carbon stock changes in LULUCF sector, particularly managed forest land category, includes implementation of interpolation-extrapolation tool. Usage of this tool is addressed to annual growing stock volume - annual growing stock volume increment - and will help to reduce inter-annual variation of carbon stock changes both in living biomass and dead wood, as well as improve accuracy of inventory. Interpolation-extrapolation tool will be implemented in Lithuania’s 2017 National GHG inventory submission.

During the GHG inventory partnership project with Norwegian Environment Agency Lithuania has also implemented task on improving greenhouse gas projection evaluation, which resulted in creation of projection estimation tool for different economy sectors in Lithuania. Greenhouse gas emissions/removals projection estimation tool does not cover all assumptions which may affect greenhouse gas emissions and removals, however it helps to project basic trajectories of emissions and removals in key categories. In the end of 2016 Lithuania joined the EU GHG Projections Reporting support 2016-2017 project to improve greenhouse gas projection

evaluation in all economy sectors including LULUCF. The main aims of the project for LULUCF sector are to improve various policies and measures implementation in projection scenarios and gain experience of good practice examples for growing stock volume changes estimation for greenhouse gas removals in forest land.

# 5. National strategies and plans for implementation of greenhouse gas emission mitigation and adaptation measures in agriculture, forestry and land use sectors

The main Lithuanian policies related to greenhouse gas emissions reduction and improve the sustainability of agriculture and forestry management and contain LULUCF related actions are the following:

**Common climate change management policy**

- **Strategy for the National Climate Change Management Policy until 2050 and Inter-institutional action plan on the implementation of the Goals and Objectives for 2013-2020 of the Strategy for the National Climate Change Management Policy**

  The Strategy for the National Climate Change Management Policy until 2050 was approved by Parliament in November 2012. The Strategy covers adaptation and mitigation policies and sets short-term (by 2020), indicative medium-term (by 2030 and 2040) and long-term (by 2050) climate change mitigation and adaptation goals and objectives in the following Lithuania's economy sectors: energy, industry, transport, agriculture, households, environmental protection and rational use of national resources (forestry, ecosystems, biodiversity, landscape), spatial planning and regional policy, health care, research and development, education and provision of information to the public, international co-operation. It also defines policies and measures necessary for Lithuania to implement targets of the EU climate and energy package till 2020 and to meet its Kyoto second commitment period target. In 2013 Inter-institutional action plan on the implementation of the Goals and Objectives for 2013-2020 of the Strategy for the National Climate Change Management Policy was approved by the Government. The inter-institutional action plan sets measures for 3 years in all economy sectors. LULUCF related actions are consistent part of the measures in agriculture, soil, forestry, ecosystems, biodiversity, landscape, water resources management, spatial planning and regional policy, science and public information. The plan is being updated annually and contains targets, objectives and measures, financial resources, implementing institutions, assessment criteria and values. More detail information on the LULUCF measures is provided in the Section 6.

  The Government Resolution No 366 "On approval of Inter-institutional Action Plan for implementation of Goals and Objectives for 2013–2020 of the Strategy for the National Climate Change Management Policy" of 23 April 2013 put into force an Action Plan where measures for implementation of climate change policy for 2013–2016 are set. In 2014 new

Action Plan with measures for 2015–2017 was adopted by the Resolution No 833 of the Government of the Republic of Lithuania, followed by the latest amendment in 2016 by the Resolution No 846 of the Government of the Republic of Lithuania.

Measures that address forestry sector are:

1. Afforestation of state-owned unused land or land that is barely suitable for agriculture by passing to state forest in order to create economically valuable, biologically resistant forest.
2. Management of the state-owned forests passed to state forest enterprises and management of land plots formed by land-use documents for state afforestation.
3. Afforestation of private-owned unused land or land that is barely suitable for agriculture by providing financial support from the Rural Development Programme.
4. Development and implementation of a system for wood biomass mobilisation from forest by using financial mechanisms.
5. Implementation of investment projects for forest residues for biomass production.
6. Promotion of non clear-cut felling in private-owned forests by implementation of promotional measures.
7. Supervision that the area of state-owned forest, where chemicals for forest health protection from deceases, pests and unwanted vegetation are used, does not exceed plots determined in the National Forest Area Expansion Program 2012-2020..
8. Preparation of an inventory and recommendations for management and restoration of endangered or degraded forest ecosystems.

In the Action plan target and assessment criteria are set in order the minimum annual removals by sinks in LULUCF shall comprise 3.7 m $tCO_2eq$. The National Forestry Sector Development Programme for 2012–2020 sets the task to increase forest coverage up to 34.2% of the country area. Therefore it is expected to afforest 30 000 ha of unused land and land unfit for agriculture until the year 2020 (from 2011 inclusive) or to afforest 3 000 ha per year.

Measures that address agriculture sector are:

1. Implementation of investment projects on biogas collection and application for energy production in rural areas in order to reduce the methane release in livestock complexes.
2. Conducting of researches on sustainable use of nitrogen fertilizers and preparation of recommendations.
3. Implementation of agri-environment programmes.
4. Development of selection and scientific research programme for new species and breeds of agricultural plant and livestock which adaptive to climate change and resistant to diseases.
5. Development of system to forecast agricultural plant diseases and pests.

These measures will be implemented through the use financial resources from the EU Rural Development Programme for period 2014-2020.

## Common Agricultural Policy

- **Lithuania's Rural Development Programme 2014-2020.**

Lithuania's Rural Development Programme 2014–2020 has been prepared by the Ministry of Agriculture of the Republic of Lithuania (MoA) in cooperation with the Ministry of Environment in fulfilment mission and objectives laid down in the Articles 3 and 4 of the European Parliament and the Council Regulation (EC) Nr. 1305/2013 on support for rural development by the European Agricultural Fund for Rural Development (EAFRD) and repealing Council Regulation (EC) No 1698/2005. In order to achieve the objectives of rural development, which contribute to the Europe 2020 strategy for smart, sustainable and inclusive growth, the main target of the National Rural Development Programme is promoting growth of agriculture sector based on innovative technologies, that is more territorially and environmentally balanced, climate-friendly and resilient and competitive and innovative. Therefore, all three objectives of the EAFRD will be implemented: (a) fostering the competitiveness of agriculture; (b) ensuring the sustainable management of natural resources, and climate action; (c) achieving a balanced territorial development of rural economies and communities including the creation and maintenance of employment.

On the basis of the analysis of the Lithuanian rural conditions and problems identified, measures will be implemented in all six Union priorities for rural development of the EAFRD and in 16 out of 18 thematic areas. Also, in order to implement properly the EU strategy on Forestry the thematic area related to the improvement of forestry economic value and forest areas expansion has been chosen in addition.

- **Nitrate Action Plans under the Nitrates Directive**

Implementation of the Council Directive of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources (91/676/EEC) with the latest amendment by the Regulation (EC) No 1137/2008 of the European Parliament and the Council of 22 October 2008 (further – Nitrates Directive) is primarily directed towards the minimization of the water pollution with nitrates. Activities are supported for the establishment of modern manure silos and other measures which enable the control against manure penetration into the surroundings. Sole replacement of manure handling systems from thick or dry silos to liquid silos may lead to a reduction in emission of nitrogen compounds to atmosphere by up to 20 times. The country took an obligation that the Nitrates Directive would be implemented in two phases.

By the Order No D1-490/3D-39 of Ministers of Environment and Agriculture the Program for Minimization of Water Pollution Caused by Agriculture activities was adopted on 8 June 2012. The Oder sets requirements pursuant to Council Directive 91/676/EEC concerning the protection of waters against pollution caused by nitrates from agricultural sources:

1. The nitrogen input to soils per calendar year must not exceed 170 kg per hectare (fertilization with the application of manure or slurry of grazing animals).

2. Farms keeping animals must store manure and slurry in the manner which would ensure the prevention of surface and groundwater.

3. Spreading manure and slurry from 15 November to 1 April (in the cold season), as well as on frozen, water-saturated, flooded or snow-covered ground, is forbidden.

4. Spreading manure and slurry from 15 June to 1 August is forbidden with the exception when it is done with the purpose of fertilizing the fallow, pastures or areas which are designated for growing winter crops.

The Order No D1-367/3D-342 of Ministers of Environment and Agriculture on environmental requirements for manure management adopted on 14 July 2005 with later amendments sets requirements pursuant to Council Directive 91/676/EEC concerning the protection of waters against pollution caused by nitrates from agriculture activities, particularly the environmental requirements on the use of manure for croplands fertilization. Additionally, the farm, keeping animals are required to store manure and slurry in storage vessels which comply with environmental requirements. In order to reduce greenhouse gas emission, also there are established requirements for slurry storage covering and slurry speeding technology in the Order No D1-367/3D-342.

Fulfilment of the advanced farming rules and recommendations may also be attributed to the implementation of nitrates directive since these describe the sustainable farming and optimization of the amounts of the substance penetrating into the soil (nitrogen compounds in particular).

- **Programmes of measures within River Basin Management Plans, as required under the Water Framework Directive**

The Water Framework Directive 2000/60/EC sets out a requirement for the EU member states to develop River Basin Management Plans (RBMP) for the planning and implementation of measures to improve water quality.

The main water related problems identified in the 1$^{st}$ RBMP were as follows: diffuse pollution, point-source pollution, hydromorphological changes and insufficient information on water status and pressures.

As far as the reduction of diffuse pollution is concerned, the main supplementary measures were directed towards an improvement of the legal basis and the performance of pilot projects on agricultural pollution reduction.

The Programmes of measures under River Basin Management Plans provide a list of measures to be implemented, the geographical area where the measure should be implemented, the responsible institutions, deadlines and funds required, as well as the source of funds. There are various measures required: national, local and water body related. Nine different state institutions are responsible for the implementation of the programmes of measures.

Supplementary measures for the reduction of agricultural pollution were provided having only assessed the extent to which pollution would be reduced through the implementation of basic measures, and by the requirements of the Nitrate Directive in respect of the potential impact on agriculture. Seeking to improve the status of water bodies

at risk due to the spread of pollution, supplementary measures were provided for the reduction of water pollution from diffuse sources as follows:

1. There are plans to review the national legal base regulating the use and management of organic and mineral fertilizers and in relevant legal acts to establish the following:

a) The maximum allowable amount of nitrogen fertilizers per one hectare, whether these are organic or mineral fertilizers;

b) The maximum allowable amount of phosphate fertilizers per hectare, whether these are organic or mineral fertilizers;

c) To require farms that use fertilizers in smaller than 150 ha utilized agricultural areas to draw up fertilization plans;

d) To set regulations for legal and natural persons that draw up fertilization plans;

e) To provide environmental requirements regarding manure management for farms that own fewer than 10 livestock units.

2. To prepare and to validate methodology for the preparation of fertilisation plans, following which an economically optimal amount of fertilisers could be calculated.

3. To submit proposals to the Ministry of Agriculture supplementing Lithuania's Rural Development Programme 20014–2020 with more efficient measures that would constitute conditions for farmers to obtain support to reduce pollution in water bodies caused by agricultural activities.

4. To carry out the trial project of implementing measures to intercept pollutants released through drainage, and seeking to assess the efficiency of such measures in view of Lithuanian conditions.

5. To annually organise training and raise awareness among farmers regarding environmental requirements.

**Forestry and other land management**

- ***National Forestry Sector Development Programme for 2012–2020***

The National Forest Area Development Program 2012–2020 approved by Resolution No 569 of the Government of the Republic of Lithuania of 23 May 2012. The goal of the Programme is to implement long-term forest economy policy that would be coherent with other sectorial policies, would be based on country specific traditions, the EU regulations, international conventions, resolutions, treaties, programmes, and to set goals and tasks for forestry sector development up to 2020. The Programme sets a strategic goal on forestry development, other forestry goals, and tasks to achieve the set goals, evaluation criteria. In the Annex the implementation evaluation criteria for the years 2011, 2015 and 2020 are set. The Programme is sought to increase forest coverage of the country up to 34.2 % by 2020 by afforestation of abandoned lands and lands that are not suitable to be used for agricultural activities, and to encourage people financially to plant forests in private and state-owned lands, to develop forest regeneration on a genetic-ecological basis with selectively valuable and qualitative forest increasing matter.

In 2011 the Forest Law was amended by tightening the procedure of forest land transformation. Forest land may be transformed into farming land or other type of land only in exceptional cases. In addition to that new compensation system was created, which ensures obligation to plant new forest on non-forest land as a compensation for the forest land plot transformed into the other land use. This regulation serves not only as additional guarantee to prevent decrease of forest land area, but also creates conditions for increase of forest coverage.

In the period 2007–2013 with a financial support from Rural Development Program 2007–2013 the area of 17.2 thous. ha was afforested and additional 3.6 thous. ha were afforested in 2014.

- **Prioritised Action Frameworks (PAFs) as required under Article 8 of the Habitats Directive [4]**

For the purpose of implementation of stipulations of the Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and wild fauna and of the Council Directive 79/409/EEC of 2 April 1979 on the conservation of wild birds, the territories of Lithuania have been divided into Natura 2000 zones and other territories protected by the state and municipalities, where certain limitations of human activities are set seeking preserve natural habitats of animals and plants. People farming in these zones must strictly follow environmental requirements and develop only the permissible economy branches or stop developing them at all. These areas in the country make 19% of the total area of the declared agricultural land (13% of total area of Lithuania and 69% of protected area in Lithuania). Based on the experience gained during implementation of the rural development program's 2007-2013 measure "implementation of Natura 2020 2004 – 2013", the participation of farmers in the initiatives to protect the biodiversity was vague. In 2007-2012 only 10.8% (147 thou ha) of all agriculture area attributed to Natura 2000 was supported. However, the number of willing to participate in this initiative is growing. In 2014 14.2 thous. ha were declared under *Natura 2000* protection in agricultural land and 5.6 thous. ha of forest land declared under *Natura 2000* protection, meanwhile in 2015 under *Natura 2000* protection 20.9 thous. ha were declared for Rural Development Programme support, only the declared *Natura 2000* area in forest land remained similar as in 2014. It remains very important that biodiversity protection actions would be coordinated with agriculture and forest management activities by creating conditions for the country's territory potential (natural and recreational resources, landscape) to preserve its naturalness by forming a balanced landscape.

Landscape and Biodiversity Conservation Programme from 2015 to 2020 containing nature management measures, including Natura 2020 territories management measures related to climate mitigation and adaptation activities in grasslands, wetlands and forests will be approved was approved 9th of January in 2015.

[4] Lithuanian Rural Development Programme for 2014–2020 (amended).. *Approved by the Europoean Commission Decision No C(2016)923. Available at: https://zum.lrv.lt/lt/veiklos-sritys/kaimo-pletra/lietuvos-kaimo-pletros-2014-2020-m-programa/programa-2*

**Financial instruments**

- ***Lithuania's Rural Development Programme 2014–2020***

Amended Lithuania's Rural Development Programme for 2014–2020 period was submitted to European Commission on 12 December 2014. Programme for the new period will further enhance the existing policy framework for sustainable management of natural resources, contributing to both climate change mitigation and enhancing the resilience of farming to the threats posed by climate change and variability.

In the National Rural Development Program for 2007–2013, which aimed at the improvement of life quality in rural areas by increasing employment, supporting transition from agricultural activities to non-agricultural activities, stimulating the development of main services and crafts of the rural population, financial support for rural development from the European Agricultural Foundation (RDEAF) was foreseen based on the following trends: increased competitiveness of agricultural and forestry sector, improvement of environment and landscape, improvement of life quality and other measures. 7.8 billion LTL have been allocated for trend one, which covers the implementation of the Council Directive of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources (91/676/EEC). Another 3.2 billion LTL have been allocated for the increase of economic value of forests. Trend two, which includes ecological farming **(in 2012 a total of 2594 certified ecological farms accounted for 163.3 thous. ha and covered 5.7 % of agricultural land and in 2015 it increased up to 209.6 thous. ha**), land afforestation, and improvement of the condition of risky water bodies was assigned 2.8 billion LTL.

- **LIFE Programme**

Regulation (EU) No 1293/2013 of the European Parliament and of the Council of 11 December 2013 on the establishment of a programme for the environment and climate action (life) and repealing Regulation (EC) No 614/2007 establishes the Environment and Climate Action sub-programmes of the LIFE Programme for the next funding period, 2014–2020. The budget for the period is set at €3.4 billion in current prices, from which at least 55% of the budgetary resources allocated to projects supported by way of action grants under the sub-programme for Environment shall be dedicated to projects supporting the conservation of nature and biodiversity. 1.02% of the total budget is dedicated for the projects are being implemented in Lithuania.

**Cross-sectoral policies**

- **Inspire Directive**

In order to implement the European Parliament and Council Directive No 2007/2/EC of 14 March 2007 (OJ 2007 L 108, p. 1), which establishes the European Community Infrastructure for Spatial Information (INSPIRE), the Law of the Republic of Lithuania on

Geodesy and Cartography was amended. The infrastructure of the collection of Lithuanian spatial information was developed, which is dedicated: to collect metadata from spatial data sets of State's cadastre, registry, State's and municipalities institutions according to methodology approved by the Government's authorized institution; to provide spatial datasets and other metadata through Lithuanian Spatial Information Portal (www.geoportal.lt); to assure the quality of services and information provided by Lithuanian spatial information portal and necessary technological solutions; coordinate and monitor the services related with the use of spatial datasets and related metadata; to ensure the interaction of spatial datasets. Additionally, this approach increasing availability and use of public information in Lithuania as well as availability of interoperable data for European institutions. Implementation of the INSPIRE Directive also contributes to increased transparency in agriculture and forestry management.

The latest INSPIRE implementation report for Lithuania is available at: http://inspire.ec.europa.eu/reports/country_reports_mr2012/ENV-2013-00680-00-00-EN-TRA-00.pdf

The latest INSPIRE implementation report in original (Lithuanian) language from 2016 is available at: http://cdr.eionet.europa.eu/lt/eu/inspire/reporting/envvzrm5q/INSPIRE_Country_Report_LT_2016_Final.pdf

- **National Renewable Energy Action Plans** [5]

The National Renewable Energy Resources Development Strategy was adopted on 21 June 2010 by the Government Resolution No 789 of the Republic of Lithuania.

The targets for renewable energy are following:

- by 2010 7 % of all the electricity consumed in Lithuania shall be produced from RES (achieved);
- by 2020 energy from RES shall amount to 23 % in the total final energy balance (overachieved);
- by 2020 no less than 20 % of electricity to be generated from renewable energy sources;
- in 2020 renewable energy sources will cover no less than 60 % of heat from district heating sector;
- RES (including biofuel) will make 20 % in the total primary energy supply by 2025.

Following measures are designated for achievement of the targets: subsidies from the EU Structural Funds, the Special Programme for Climate Change, feed-in tariffs, discount for the connection to the grid, excise duty exemption for electricity produced from RES and excise duty exemption for energy products with substances of biological origin. Evaluation of impact of RES policy on the GHG emissions included the evaluation of general impact of the overall targeted use of RES, thus no more detailed analysis by separate measures has been performed (the information is available in the 6th National Communication).

[5] Lietuvos kaimo plėtros 2014–2020 metų programa. *SSGG ir poreikių identifikavimas. Strategijos aprašymas. 2014 m.*

During the last decade Lithuania has rather successfully deployed renewable energy sources. According to national statistics, in 2015, the share of renewable energy sources in the total energy balance of the country reached up to 25,86 %.

However, it should be noted that in Lithuania the potential of use of biomass, especially of felling residues, is still poorly exploited. Wood fuel potential accumulated in Lithuania's forests is not fully used in the country's energy sector. The biggest part of this not used potential is in softwood broadleave stands as they are used not intensively enough, also in felling residues in private forests, pre commercial thinnings. There is possibility to use additionally about 1 mill. cubic metres of such wood each year. However, using part of this potential is not economically beneficial and requires financial support. Additionally, approximately 95 per cent straw pellets are exported and not used in domestic market.

Agriculture and forestry contribution to the climate change mitigation is linked to the production of renewable energy as these sectors are the largest contributors to renewable energy (93.4 per cent 2010). The biggest contributor of the production of renewable energy is forestry – 84.6 percent (on average in the EU-27 to 48.3 per cent) and agriculture – 8.8 percent (on average in the EU-27 to 10.6 per cent). In Lithuania the share of energy crops growing on agricultural land increased from 3.5 percent in 2007 to 4.5 percent in 2014 of total agricultural lands[6] and this number is much higher than the average in the EU-27 (1.6 per cent).

At present National Renewable Energy Programme is being drafted in order to assess and update the targets for renewable energy set in the National Renewable Energy Resources Development Strategy.

[6] National bioenergy data from the Ministry of Agriculture. Available at: https://zum.lrv.lt/lt/veiklos-sritys/zemes-ir-maisto-ukis/bioenergetika, accessed 15 12 2016

## 6. GHG emission reduction and adaptation in agriculture, forestry and land use sectors

In the table below a list of existing measures (land management activities, research initiatives etc.) to promote mitigation and adaptation actions in the agriculture, forestry and land use sectors in Lithuania is provided. This list includes all relevant measures that cover activities as agriculture land management, reversion of land degradation through revegetation or afforestation, reforestation and other forest management. All the listed measures are set in Inter-institutional action plan on the implementation of the Goals and Objectives for 2017–2020 of the Strategy for the National Climate Change Management Policy, National Forestry Sector Development Programme for 2012–2020 and mostly are supported by the updated Rural Development Programme 2014–2020.

**Table 6.1. List of existing measures to promote mitigation and adaptation actions in the LULUCF sector for 2013–2020 in Lithuania**

| No | Measure | Policy | Objective Key categories, key land areas | Type of policy instrument | *Greenhouse gas affected* | *Type of effect* | *Implementation time* | Cost | Quantitative impact |
|---|---|---|---|---|---|---|---|---|---|
| *Agricultural land use sector* | | | | | | | | | |
| *A01* | *Minimization of the direct and indirect nitrogen compounds emissions from agriculture activities: maintain forecasting system for crops diseases and other pests* | In Inter-institutional action plan on the implementation of the Goals and Objectives of the Strategy for the National Climate Change Management Policy | *Promote use of environmentally friendly management methods in agriculture, in order to protect status of water and soil.* | *Research and Development (R&D):* | *$CO_2$, $N_2O$* | *$CO_2$, $N_2O$ reduction* | *Continuously 2014–2020* | *Cost: 1080 thous. EUR* | *NA* |
| *A02* | *Implementation of soil monitoring system and improvement of agricultural methods in order to minimize the loss of soil layer: the analysis of soil agrochemical characteristics* | In Inter-institutional action plan on the implementation of the Goals and Objectives of the Strategy for the National Climate Change Management Policy | | *Planning/Monitoring* | *$N_2O$* | *$N_2O$ reduction (balanced use of fertilisers)* | *Continuously 2014–2020* | *Cost: 224 thou EUR* | *NA* |

| No | Measure | Policy | Objective<br>Key categories, key land areas | Type of policy instrument | *Greenhouse gas affected* | *Type of effect* | *Implementation time* | Cost | Quantitative impact |
|---|---|---|---|---|---|---|---|---|---|
| *A03* | *Support for environmentally friendly agriculture management programs*<br>*Implementation of biodiversity conservation projects* | In Inter-institutional action plan on the implementation of the Goals and Objectives of the Strategy for the National Climate Change Management Policy<br><br>Lithuania's Rural Development Programme 2014–2020. | *In order to avoid degradation of land resources due to increased intensity of agricultural activities, the use of chemicals and erosion, it is necessary to support restoration and conservation of biodiversity and landscape, including Natura 2000 sites, reduce risks of surface water pollution and promote the deployment of high natural value of organic farming. Organic farming will be encouraged in less favourable areas for agriculture activities, in order to reduce the risk of soil erosion.* | *Subsidies and Incentives* | *$CO_2$, $N_2O$* | *Increased absorption of $CO_2$ and decreased risk of $N_2O$ leakage due to protection of soil organic layer* | *2013 Continuously in 2014–2020* | Cost: 4730.5 thous. EUR per year | *NA* |
| *A04* | *Development of the consulting services on agriculture management activities* | In 2013 Inter-institutional action plan on the implementation of the Goals and Objectives for 2013–2020 of the | *Support the consultations of farmers and forest managers by introducing them to application of the climate and* | *Information/Education* | *$CO_2$, $N_2O$* | *Raising the awareness of the farmers and forest managers will decrease the* | *2013–2017* | Cost: 40 thou EUR per year | *NA* |

| No | Measure | Policy | Objective<br>Key categories, key land areas | Type of policy instrument | *Greenhouse gas affected* | *Type of effect* | *Implementation time* | Cost | Quantitative impact |
|---|---|---|---|---|---|---|---|---|---|
| | | Strategy for the National Climate Change Management Policy<br><br>Lithuania's Rural Development Programme 2014–2020. | *environment friendly agricultural practices.* | | | *risk to overexploit land and forests sources* | | | |
| *A05* | *Support of research activities related to development of adaptive agricultural plant species to climate change* | In Inter-institutional action plan on the implementation of the Goals and Objectives of the Strategy for the National Climate Change Management Policy.<br><br>Rural Development Plan 2014–2020. | *Due to climate change the risk of extreme climatic events is increasing, the new diseases and pest are developing as well as animal disease outbreaks becoming more frequent thus a need of effective risk management in the agriculture and forest sectors is urgent.* | *Research and development (R&D)* | - | *Adaptation measure* | *Continuously 2014–2020* | Cost: 124 thous. EUR per year | *NA* |

| No | Measure | Policy | Objective Key categories, key land areas | Type of policy instrument | *Greenhouse gas affected* | *Type of effect* | *Implementation time* | Cost | Quantitative impact |
|---|---|---|---|---|---|---|---|---|---|
| *A06* | *Implement economically effective measures related to decrease of methane emissions from manure management systems* | In Inter-institutional action plan on the implementation of the Goals and Objectives of the Strategy for the National Climate Change Management Policy. | *Promote biogas collection and use for energy supply in rural areas in order to reduce methane emissions from manure management* | *Subsidies and investments* | *$CH_4$* | *$CH_4$ reduction* | *Continuously 2014–2020* | Cost: 45 200 thous. EUR | *NA* |
| *Forestry* | | | | | | | | | |
| *F01* | *Afforestation of the abandoned and non useful for agriculture activities land. Increase forest ecosystems and the ecological stability of the landscape* | In Inter-institutional action plan on the implementation of the Goals and Objectives of the Strategy for the National Climate Change Management Policy<br><br>Lithuania's Rural Development Programme 2014–2020 | *In order to reduce atmospheric pollution originated from agricultural activities and contribute to climate change mitigation as well as to reduce the area of the abandoned land, the afforestation of these lands and the restoration of damaged forests must be supported.* | *Subsidies and Incentives* | *$CO_2$* | *Increase the absorption of $CO_2$* | *Continuously 2014–2020* | Cost: 3264 thous. EUR per year | *It was estimated based on historical data that AR activities absorbs approximately 164 $GgCO_2$ per year in Lithuania* |

| No | Measure | Policy | Objective Key categories, key land areas | Type of policy instrument | *Greenhouse gas affected* | *Type of effect* | *Implementation time* | Cost | Quantitative impact |
|---|---|---|---|---|---|---|---|---|---|
| | | | *The agriculture methods involving the use of multiple grassland and application of crop rotation technologies will be supported as well.* | | | | | | |
| *F02* | *Sustainable forestry: Promoting the use of biomass for energy production* | In Inter-institutional action plan on the implementation of the Goals and Objectives of the Strategy for the National Climate Change Management Policy<br><br>National Forestry Sector Development Programme for 2012 – 2020 | *In Lithuania of all the renewable energy sources the biomass, because of its volume and stable properties, is one of the most important, but the potential of biomass for biomass production is still poorly utilized. In order to reduce the negative impact of the under-utilization of biomass to the environment and especially the climate change the use of biomass must be promoted.* | *Subsidies and Incentives* | *$CO_2$* | *Reduction of $CO_2$ emissions in energy sector* | *Continuously 2014–2020* | Cost: 1,333.3 thous. EUR per year | *NA* |
| *F03* | *Investment in the resistance and environmental value of the forest* | In Inter-institutional action plan on the implementation of the Goals and | *Lithuanian Rural Development Programme 2014–2020 supports the* | *Subsidies and Incentives* | *$CO_2$* | *Better quality of forests will contribute to* | *2014–2020* | Cost: 3264.67 thous. EUR per | *NA* |

| No | Measure | Policy | Objective<br>Key categories, key land areas | Type of policy instrument | *Greenhouse gas affected* | *Type of effect* | *Implementation time* | Cost | Quantitative impact |
|---|---|---|---|---|---|---|---|---|---|
| | *ecosystems* | Objectives of the Strategy for the National Climate Change Management Policy National Forestry Sector Development Programme for 2012 – 2020 | *conservation of forest ecosystems that are necessary to maintain the ecological balance of the country, promoting non-clear cut final fellings in state and private owned forests.* | | | *increasing of $CO_2$ absorption* | | year | |
| *F04* | *Ensure compliance of environmental restrictions in forestry to maintain biodiversity and stable populations*. | In Inter-institutional action plan on the implementation of the Goals and Objectives of the Strategy for the National Climate Change Management Policy | *In order to keep stable and viable populations and biodiversity it is very important to provide consultations and applied forestry science findings for private forest owners.* | *Information/education* | *$CO_2$* | *Compliance of environmental restrictions helps to prevent intense forest resource use and may increase sequestration.* | *2014–2020* | *Cost: 3294.6 EUR* | *NA* |
| *Other measures* | | | | | | | | | |
| *M01* | *To improve the management of water resources and to ensure water quality improvement* | In Inter-institutional action plan on the implementation of the Goals and Objectives of the Strategy for the National Climate Change | *To ensure the continuing improving and renewal of meteorological and hydrological monitoring system* | *Monitoring* | *$N_2O$* | - | *Continuously 2014–2020* | Cost: 36.7 thous. EUR | |

| No | Measure | Policy | Objective<br>Key categories, key land areas | Type of policy instrument | *Greenhouse gas affected* | *Type of effect* | *Implementation time* | Cost | Quantitative impact |
|---|---|---|---|---|---|---|---|---|---|
| *M02* | *The implementation of measures of agricultural water projects* | In Inter-institutional action plan on the implementation of the Goals and Objectives of the Strategy for the National Climate Change Management Policy *Lithuania's Rural Development Programme 2014–2020* | Lithuania is in the area of the excessive humidity: about 90 % of the total crop production is growing on reclaimed lands. As a result, crop irrigation is not widely used; irrigation consumes a relatively small amount of water. It is drained about 2.9 million ha using a drainage system (respectively 86.3 % and 77.4 % of agricultural land). The average age of reclamation facilities is about 40 years, during this period, most of the facilities have not been renovated and depreciation reaching 57 %. Completely worn out land reclamation installations are in area of 222 thous. ha (6.6 % of agricultural land). | Subsidies and Incentives | - | Adaptation measure | 2015–2017 | Cost: 11.5 thous. EUR per year | *NA* |

| No | Measure | Policy | Objective Key categories, key land areas | Type of policy instrument | *Greenhouse gas affected* | *Type of effect* | *Implementation time* | Cost | Quantitative impact |
|---|---|---|---|---|---|---|---|---|---|
| | | | *Facility activities: land reclamation drainage systems, hydraulic structures (artificial water bodies HTS) polder reconstruction* | | | | | | |
| *M03* | *Improvement of the research program "Sustainability of agro-, forest and water ecosystems" and the execution of research projects, approve the final report of this program in which all the scientific reach results will be reviewed.* | In Inter-institutional action plan on the implementation of the Goals and Objectives of the Strategy for the National Climate Change Management Policy | *To encourage scientific research and experimental development as well as innovation in climate change field and to maintain the efficient use of allocated funds.* | *Research* | - | - | *2015–2018* | Cost: 2760 thous. EUR per year | *NA* |
| *M04* | *Implementation of the program for public awareness raising about measures in Environment protection sector in 2014-2020 (particularly on climate change mitigation and adaptation measures).* | In Inter-institutional action plan on the implementation of the Goals and Objectives of the Strategy for the National Climate Change Management Policy | *Raising public awareness regarding climate change impacts and possible prevention measures in agriculture and forestry sectors, renewable energy sources, environmentally friendly technologies, public information and education, scientific research.* | *Information* | - | - | 2015–2016 Continuously to 2020 | Cost: 38.5 thous. EUR per year | *NA* |

| No | Measure | Policy | Objective<br>Key categories, key land areas | Type of policy instrument | *Greenhouse gas affected* | *Type of effect* | *Implementation time* | Cost | Quantitative impact |
|---|---|---|---|---|---|---|---|---|---|
| *M05* | *Planning of protected areas, modernization and update of cadastre, strengthening of monitoring system and capacities of territories management* | In Inter-institutional action plan on the implementation of the Goals and Objectives of the Strategy for the National Climate Change Management Policy | To develop system of protected areas, to reconstruct and multiply number of natural elements of landscape in these areas. | *Planning/Monitoring* | - | Adaptation measure | Continuously 2014–2020 | Cost: 15,179 thous. EUR | *NA* |

**Policies and measures implemented to reduce GHG emissions and adapt to climate change impact on agriculture, forestry and land use sectors**

The main measure to mitigate climate change in forestry sector is to afforest and reforest areas, currently abandoned and not suitable for agricultural land use (not suitable due to the low fertility of soil, soil degradation etc.). According to the National Forestry Sector Development Programme for 2012–2020 and Interinstitutional action plan on the implementation of the Goals and Objectives of the Strategy for the National Climate Change Management Policy, up to 15 thous. ha of not suitable for agricultural purposes land should have been afforested. According to the most recent data, since 2011 there were almost 15 thous. ha afforested (14.5 thous. ha). Annual afforestation rates have decreased from 5 thous. ha in 2011 to 3.5 thous. ha in 2015, however, due to the growth of forest GHG removals in afforested areas increased from -165.9 kt $CO_2$ eqv. in 2011 to -298.5 kt $CO_2$ eqv., resulting in nearly doubled removals in 4 years. Lithuania is planning to include additional measure in national policies – seek possibilities preserving natural afforestation/reforestation areas in abandoned agricultural lands, especially where those lands are not suitable for agriculture or degraded. Such measures would help to preserve GHG removals already accumulated not only in premature forest biomass, but also soil organic carbon. The significance of preserving such forests can be seen from the picture below. Naturally afforested/reforested areas, included in State Forest Cadaster (SFC) are already under legal protection of Forest Law, on the contrary, naturally afforested/reforested areas which have not yet been included under State Forest Cadaster (have not yet fully met the requirements set for forest) can either return to agricultural land use (arable land, grasslands, etc.) or keep growing until it reaches the requirements of forests. Consideration of preserving such forests includes discussions of possible national support programmes for owners of such areas to have the incentive managing it as forest.

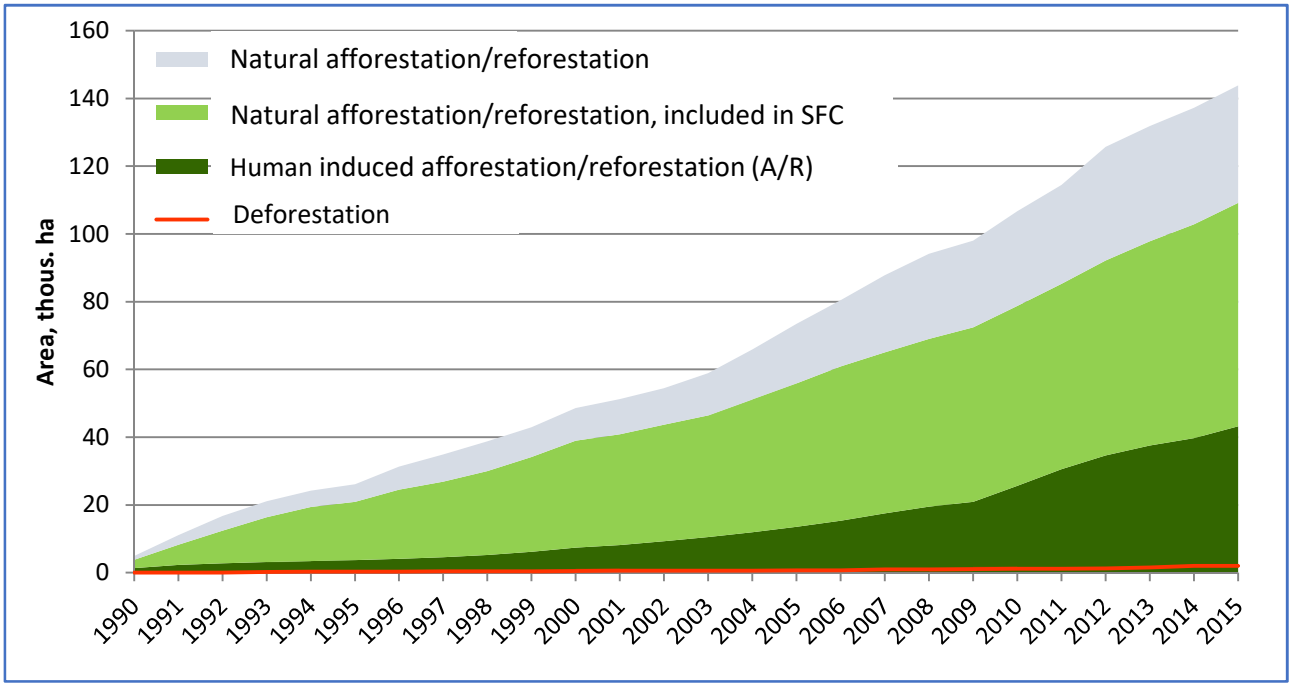


**Figure 6-1**. Cumulative area of afforestation, reforestation and deforestation during 1990 - 2015

Some of the policy measures indicated in initial Lithuania‘s report on LULUCF actions were merged with the others in newest adopted Inter-institutional Action Plan on the implementation of the Goals and Objectives for 2017–2020 of the Strategy for the National Climate Change Management Policy (2016), for example measure of Strengthening the control of release of genetically modified organisms into environment, inspection of entities involved in the limited use of genetically modified organisms were combined with overall measure of implementation of biodiversity conversation projects. The rest of the measures were either implemented (for example preparation of nature protection plans for territories important to habitat and birds reservation), but no direct impact to increase carbon sequestration was possible to estimate, or suspended due to the partly coverage under other measures.

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