

LATVIA'S PROGRESS TOWARDS AGRICULTURAL GHG MITIGATION

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Abstract. *Climate change brings in itself challenges and changes that are urgent for agricultural production both in Latvia and in the entire world. In this context agriculture plays a large role in causing the greenhouse effect and holds a large potential for climate change mitigation. This article aims to evaluate Latvia's progress towards agricultural GHG emissions mitigation. In order to meet the set aim, the research focuses on two key aspects: an evaluation of the present situation in Latvia regarding GHG emissions in agriculture; and analysis of agricultural sector policy in the field of GHG emissions mitigation. Research results shows that agricultural emissions (mainly from crop and livestock production) in Latvia are the second largest emitter of the total greenhouse gas emissions, accounting for 22%. This is a quite alarming indicator, as Latvia ranks third in the EU in terms of proportion of agriculture in total GHG emissions. According to statistical data, the crop sector is presently the largest GHG emitter. However, in order to meet international commitments, management practices for reducing these emissions are required. The research results showed that Latvian agricultural policy envisages number of activities which aims to reduce GHG emissions from agricultural practices.*

Key words: *GHG, mitigation, policy, measures, Latvia.*

INTRODUCTION

Climate change brings in itself challenges and changes that are urgent for agricultural production both in Latvia and in the entire world. Political goals set at various levels [1],[2] and research evidence [3]-[5] indicate that climate-friendly measures have to be introduced in agricultural activity in order to mitigate the negative effects of climate change as well as to adapt to the climate change. According to estimates [6] agriculture plays a large role in causing the greenhouse effect:

- agricultural activities contribute 14% of total global greenhouse gas (GHG) emissions;
- agriculture is the key economic sector producing methane CH₄ and nitrous oxide N₂O (CH₄ and N₂O are the key greenhouse gases being included in the Kyoto Protocol);
- among all the sectors, agriculture in particular has the greatest effect on climate change where emissions from agriculture in 2012 have increased by approximately 19% since 1990.

Agricultural GHG emissions are complex and heterogeneous, but the active management of agricultural systems and emerging technologies offers possibilities for GHG emissions mitigation [7]. Thus agriculture holds a large potential for climate change mitigation.

GHG mitigation measures are not something new and unusual for Latvia, as such measures have been implemented in Latvia's agriculture for a long period.

With the new programming period beginning, the year 2015 has highlighted a number of challenges for Latvia's agriculture that relate to implementing climate- and environmentally-friendly agricultural practices in agricultural activity.

Based on the mentioned considerations, this article aims to evaluate Latvia's progress towards agricultural GHG emissions mitigation. In order to meet the set aim, the research focuses on two key aspects: an evaluation of the present situation in Latvia regarding GHG emissions in agriculture; and analysis of agricultural sector policy in the field of GHG emissions mitigation. Latvia's agricultural sector policies in the context of the GHG emission measures were assessed in the following dimensions:

- Latvia's experience in introducing GHG reduction measures until 2015;
- GHG reduction measures to be planned and introduced in agriculture until 2020.

MATERIALS AND METHODS

To achieve the set aim and tasks of the research, the authors have used the publications and studies of Latvian and foreign scientists; statistical data from the European Environment Agency that covers twenty-two years in the time period from 1990 till 2012.

In order to study the problem elements authors have widely applied several research methods:

- to find out the real situation in Latvia regarding agricultural GHG emissions general scientific methods (analysis and synthesis, monographic) and statistical research methods (calculating statistical indicators, data generalization) were used;
- to analyze agricultural sector policy in the field of GHG emissions mitigation general scientific research methods were used – monographic method, analysis and synthesis, induction and deduction.

RESULTS AND DISCUSSION

Globally, the 21st century brought a number of challenges to be coped with. And climate change is one of the challenges the world’s society has to take into consideration, and everything has to be done to improve the current situation. Scientists have proved that the key cause of climate change is the increasing amount of GHG emissions in the atmosphere, which arise from human economic activities [6].

According to statistical information [8] the total amount of GHG emissions in Latvia has significantly decreased since 1990, which was associated with the fast decline in industrial production in the beginning of the 1990s. Yet, since 2001, the GHG emissions have constantly increased, as economic activity rose in the country. If we want to understand what the main sources of GHG emissions are in Latvia – on the whole, the largest GHG emitter is the energy sector (including energy production, energy consumption and the transport sector). However, the second largest emitter is the agricultural sector, accounting for 22% of the total GHG emissions. This is a quite alarming indicator, as Latvia ranks third in the EU in terms of proportion of agriculture in total GHG emissions where Ireland ranks first, followed by Lithuania [9]. Besides, with agricultural activity increasing every year, the amount of GHG emissions rises as well.

According to statistical data [8], the crop sector is presently the largest GHG emitter, which also indicates the increasing trend in GHG emissions. In this case, particularly nitrogen dioxide emissions from fertilisers applied to soils are one of the main sources of GHG emissions (Table 1).

The reason why data summarized in Table 1 are alarming and a special focus has to be placed on agricultural soils management and its relation with GHG emissions is because, with agricultural production intensification increasing and reintegrating the presently unfarmed agricultural area into production, GHG emissions will continue to grow. In this context very topical issue is implementation of measures aiming to reduce GHG emissions from agriculture practice.

In this paper authors have analyzed agricultural sector policy in the field of GHG emissions mitigation and summarized different measures which aim to benefit climate change. According to information summarized in Figure 1 Latvia’s farmers have introduced a number of measures for reducing GHG emissions from agricultural activity since 2004.

Table 1

Total GHG emissions from agriculture and their division by sources in Latvia, 1990-2012 (Gg CO₂ eq) and share in average EU28 emissions in 2012 (%)

Source of agricultural GHG emissions	1990	2011	2012	Share in EU28 emissions in 2012, %
Enteric fermentation – cattle (CH ₄ emissions, Gg CO ₂ eq)	2 065	637	657	0.5
Enteric fermentation – sheep (CH ₄ emissions, Gg CO ₂ eq)	28	13	14	0.1
Manure management – cattle (CH ₄ emissions, Gg CO ₂ eq)	67	54	58	0.3
Manure management – swine (CH ₄ emissions, Gg CO ₂ eq)	118	32	30	0.1
Manure management – solid storage and dry lot (N ₂ O emissions, Gg CO ₂ eq)	564	118	118	0.5
Agricultural soils – direct soil emissions (N ₂ O emissions, Gg CO ₂ eq)	1619	962	1011	1
Agricultural soils – pasture, range and paddock manure (N ₂ O emissions, Gg CO ₂ eq)	358	87	88	0.3
Agricultural soils – indirect emissions (N ₂ O emissions, Gg CO ₂ eq)	1034	389	414	0.5
Total GHG emissions from agriculture (Gg CO ₂ eq)	5 853	2 292	2 390	3
Share of agricultural GHG from total GHG emissions (%)	22.51	20.84	21.73	-

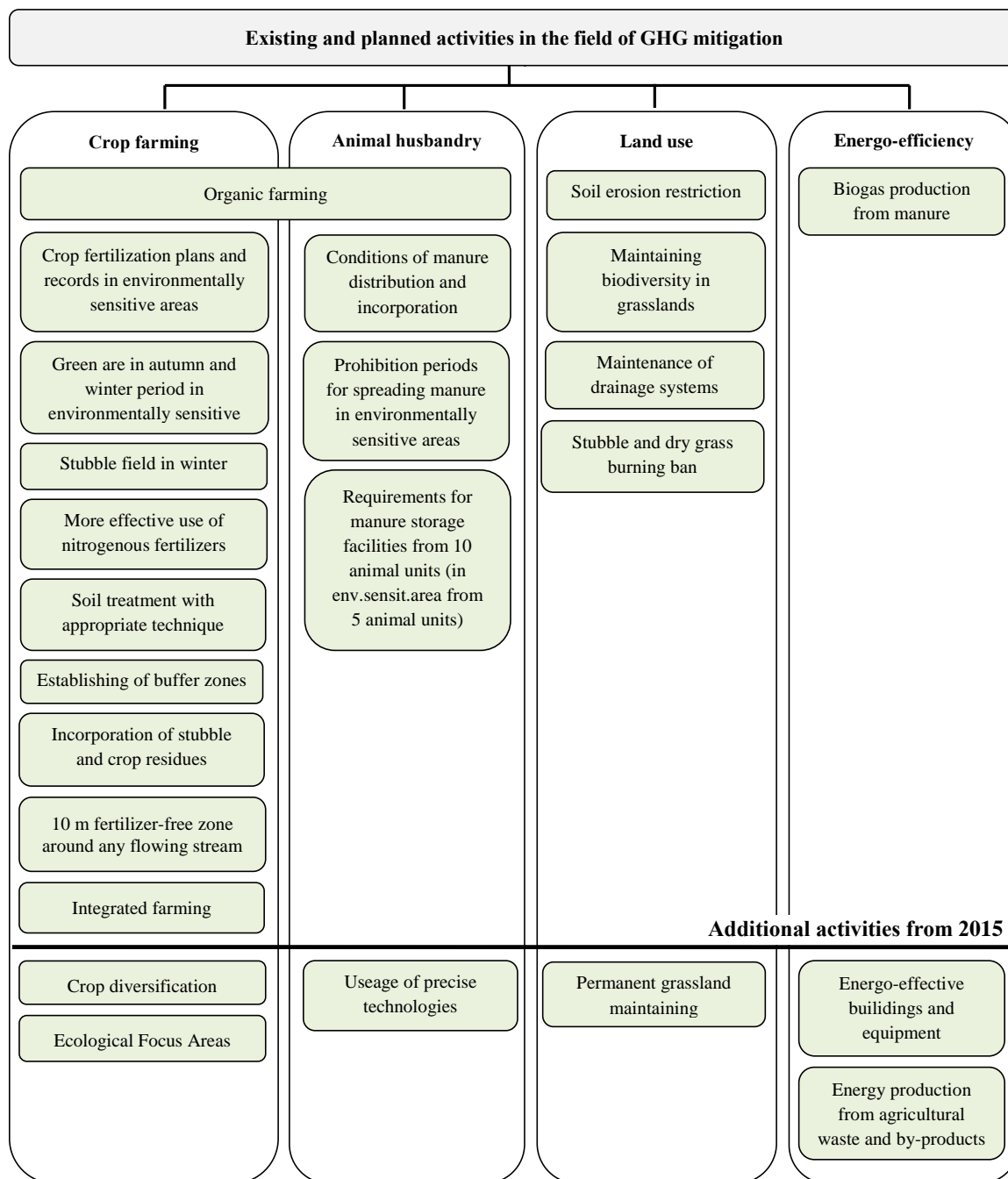


Figure 1. Agricultural sector policy in the field of GHG mitigation measures in Latvia until 2015 and additional activities starting from 2015

Farmers who were eligible for EU direct payments had to comply with the certain requirements as well as measures of the Rural Development Programmes 2004-2006 and 2007-2013, which contributed to good agricultural practices, applied to the agricultural area, and to the environmental situation, including the reduction of GHG emissions. Besides, the introduction of GHG mitigation measures is indirectly affected by the Cabinet regulations that regulate such areas as:

- control of pollution produced by agricultural activity;
- protection of particularly sensitive territories;
- management of manure in livestock buildings;
- biogas production.

The current programming period, i.e. until 2020, also envisages financial support for introducing GHG emission mitigation measures. A special focus will be placed on climate- and environmentally-friendly agricultural practices or the “green component”, which is an extra payment to all beneficiaries of

basic payments if corresponding practices are complied with. On the whole, all the above-mentioned measures of Latvia's agricultural policy concerning GHG emission mitigation measures until 2015, as well as planned activities from 2015 are summarised in Figure 1.

From the overall situation analysis it can be concluded that formally Latvian agricultural policy foresees more than 20 different measures related with GHG emission mitigation and covers such areas as crop farming, animal husbandry, land use and energy-efficiency. However, there is lack of scientific evidences and calculations that could show GHG reduction potential of these measures in Latvia, how effective they are; and is there necessity for any additional GHG reduction measures in order to meet international commitments. Such considerations call for further research and more detailed situation assessment in the field of GHG emission mitigation measures.

CONCLUSIONS

1. In Latvia agriculture contributes about 22% of total GHG emissions in CO₂ equivalents in 2012 and due to increased agricultural activity Latvian agricultural GHG emissions show growing trend, i.e. in 2012 amount of agricultural GHG emission increased by 4.3% if compared with 2011.
2. In order to ensure that Latvia will be able to meet Kyoto Protocol target for second commitment period, sustainable management practices for reducing GHG from agriculture need to be developed and adopted. Special focus should be paid on such management practices that tend to mitigate CH₄ emissions from cattle enteric fermentation, N₂O direct emissions from agricultural soils and indirect N₂O emissions from agricultural soils, which currently are the main sources of agricultural GHG emissions in Latvia.
3. Latvian agricultural policy foresees more than 20 different measures related with GHG emission mitigation and covers such areas as crop farming, animal husbandry, land use and energy-efficiency. However, there is lack of scientific evidences and calculations that could show GHG reduction potential of these measures in Latvia.

ACKNOWLEDGEMENTS

This research was carried out with generous funding by the Government of Latvia for 1.2. Programme "Environment and Climate" – "Value of Latvia's ecosystem and climate dynamic impact on those – EVIDEnT", a component of the National Research Programme 2014-2017. Research direction: Environment, Climate and Energy.

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