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TRANSITIONING TOWARDS SUSTAINABLE AGRICULTURE IN THE BALTIC COUNTRIES – STRATEGIC AND REGULATORY FRAMEWORK ASSESSMENT

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Abstract. The agricultural sector in the Baltics has undergone significant transformations since gaining independence from the Soviet Union, transitioning from centrally planned systems to market-oriented approaches; and now, initially focused on increasing productivity and achieving self-sufficiency, agricultural policies in the Baltic countries has shifted towards environmental sustainability and climate resilience, aligning with the objectives of the European Green Deal. However, transitioning from conventional farming practices to more sustainable methods presents challenges for policymakers and farmers alike, necessitating a thorough examination of existing regulations and their effectiveness in promoting environmentally friendly practices. This study aims to analyse the strategic and legal aspects of sustainable agriculture in the Baltic countries, with a focus on field crop production. Two main tasks have been formulated: first, to identify key strategic and legal factors influencing sustainable agriculture in alignment with the EU strategies, and second, to conduct a case study investigating these factors' impact on sustainable agriculture in the Baltic States, particularly how they align with the EU sustainability goals.

The conclusions drawn from the analysis emphasize the importance of sustainable land management practices in mitigating environmental impacts and fostering agricultural resilience. While Estonia demonstrates average to good ratings across soil, water, air, and biodiversity factors, Latvia and Lithuania face challenges, particularly in soil condition and air pollution. However, it is concluded, that despite the progress, there is an urgent need for further evaluation and adaptation to address specific challenges, such as soil degradation, biodiversity loss, and increasing emissions from agricultural activities.

Key words: sustainable land management, Baltics, policy, regulations, agriculture.
JEL code: Q18, Q53

Introduction

The three Baltic countries - Estonia, Latvia, and Lithuania - have undergone significant transformations in their agricultural sectors since gaining independence from the Soviet Union in the early 1990s. Following decades of centralised planning and collective farming under the Soviet rule (Federal Research Division, 1996), these nations embarked on a path of market liberalisation, privatisation, and integration into European and global markets. Initially, their agricultural policies aimed at dismantling collective farms, privatising land and enterprises, and adhering to the European Union (EU) standards. The focus was on increasing productivity, modernising infrastructure, and achieving food self-sufficiency. However, the introduction of the European Green Deal in 2019 marked a shift, setting ambitious goals for climate neutrality, biodiversity conservation, and sustainable food systems by 2050. This recalibrated the Baltic countries' agricultural policies towards greater emphasis on environmental sustainability, climate resilience, and ecosystem conservation. Consequently, policymakers now strive to align their agricultural strategies with the Green Deals objectives, investing in measures to promote biodiversity, reduce carbon emissions, and enhance agricultural resilience. However, policymakers also find themselves at a crossroads due to the need for many farmers, who previously operated under the Soviet-era practices and switched to a more productive approach in the following two decades, to transition to new, more sustainable methods with the new EU Strategies (Zalmane, 2024). This significant shift in farming practices has sparked discussions and distrust within the system, further complicating policy making efforts.

In this context, understanding the effectiveness of existing regulations in promoting sustainable agriculture in the Baltic countries is crucial. There is a need to investigate the implementation and

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enforcement of these regulations, identifying opportunities and challenges in aligning agricultural policies with the goals of the European Green Deal.

Therefore, **the aim** of the study is to analyse the strategic and legal aspects of sustainable agriculture in order to determine their effectiveness in fostering the transition towards environmentally friendly farming practices, **focusing on field crop production**. To achieve the aim, two **tasks** have been set:

1) to identify the main strategic and legal aspects affecting sustainable agriculture in the Baltics according to the EU strategies;

2) to carry out a case study, where the main strategic and legal factors impacting sustainable agriculture in the Baltic States will be investigated, paying particular attention to how they align with the EU's sustainability goals towards agriculture.

Research results and discussion

1. Countries' comparison and description of the EU strategic and regulatory base

1.1. The Baltic countries' characteristics

All three Baltic countries - Estonia, Latvia and Lithuania - are located in the temperate climate zone, where the climate is significantly influenced by the Baltic Sea. Despite the fact that they are characterized by a relatively short vegetation season, as well as a high level of humidity in the hottest months of the year and distinctly cold winters (HELCOM, 2021), agriculture is a widely developed industry in the Baltic region. Of the total land area, agricultural land in the Baltics occupies approximately half of the total area, while the other half is occupied by forests. The fact that agricultural production plays a significant role is also shown by the percentage within the gross domestic product, where, for example, Latvia ranks first among the countries of the EU with a share of 5%, where the average for the EU-27 in 2022 is 2.2% (Global economy, 2024). Also, an important indicator is that, despite the fact that the total agricultural land in Estonia and Lithuania has been slightly decreasing in recent years (Table 1), the arable land areas have a tendency to increase, which indicates an active acquisition of agricultural land directly for production, which is expected to be influenced by the establishment of uncultivated land for production, as well as the use of perennial grass areas in the production of field crops.

Table 1

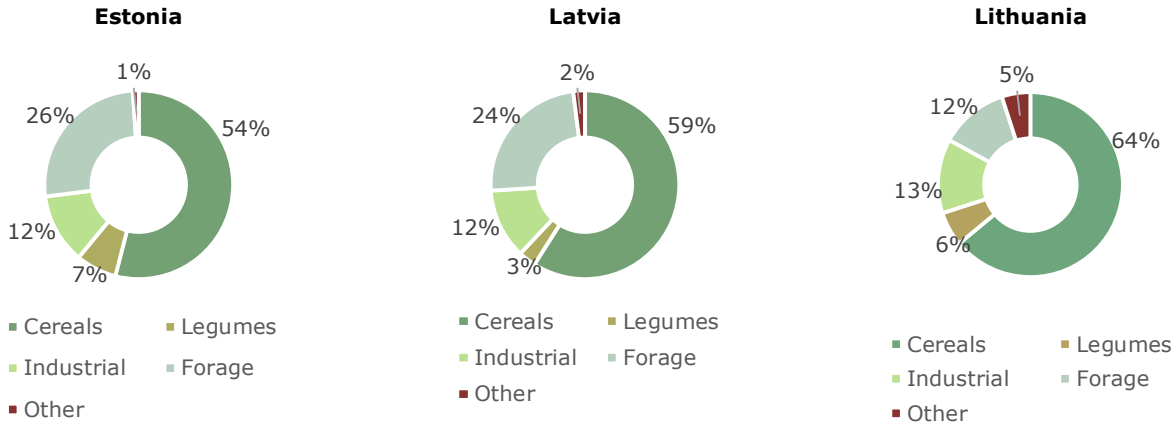
Main indicators of agriculture in the Baltic countries

	Estonia			Latvia			Lithuania		
	2015	**2020**	**2022**	**2015**	**2020**	**2022**	**2015**	**2020**	**2022**
Utilised agricultural area (UAA), thous. ha	993.6	975.3	986.2	1884.8	1969.0	1970.4	3006.0	2942.8	2911.3
Arable land, thous. ha	669.7	694.4	707.3	1229.8	1333.5	1356.7	2172.0	2249.4	2292.5
Organic area of UUA, thous. ha	155.8	220.8	231.0	231.7	291.2	297.0	213.6	235.5	271.3
Organic area of UUA, %	15.7	22.4	23.4	12.3	14.8	15.1	7.1	8.0	9.3
GDP from Agriculture, %	2.9	2.1	2.5	3.5	4.0	5.0	3.4	3.5	4.0
Proportion of persons employed in the agri sector, %	3.9	3.0	2.6	7.9	7.2	6.8	9.1	5.7	5.5
Number of farms	**	11369	**	**	68983	**	**	132076	**

Source: author's construction based on Statistics Estonia; Official statistics of Latvia; Official statistics portal of Lithuania
** ***no data***

Indeed, arable farming serves as the cornerstone of agriculture in the Baltic countries, where cereals, including winter and spring wheat, barley, and oats, dominate approximately half of the cultivated land.

Over the past two decades, there has been a notable increase in the cultivation of winter and spring oilseed rape. However, certain regions, particularly in Estonia and Latvia, face challenging soil properties and climatic conditions, leading to a decline in oilseed rape cultivation in specific regions. Besides field crops, the cultivation of vegetables, potatoes, and fruits and berries also holds significance in the agricultural landscape.



Source: author's calculations based on Statistics Estonia; Official statistics of Latvia; Official statistics portal of Lithuania

Fig. 1. **Structure of crop area in the Baltic States in 2020**

Beside arable crop cultivation, also livestock farming plays a pivotal role in agricultural sector in Baltic states, encompassing dairy farming, pork and beef production, and poultry farming. However, for the scope of this discussion, the focus is on arable crop cultivation, leaving livestock farming beyond current exploration. But it is crucial to note that both livestock and arable crop cultivation contribute to different emissions factors (Latvia's Informative Inventory…, 2022). It is essential to research emission factors, because they allow to identify which agricultural activities contribute most to greenhouse gas emissions, guiding efforts to reduce environmental impact (Table 2).

Table 2

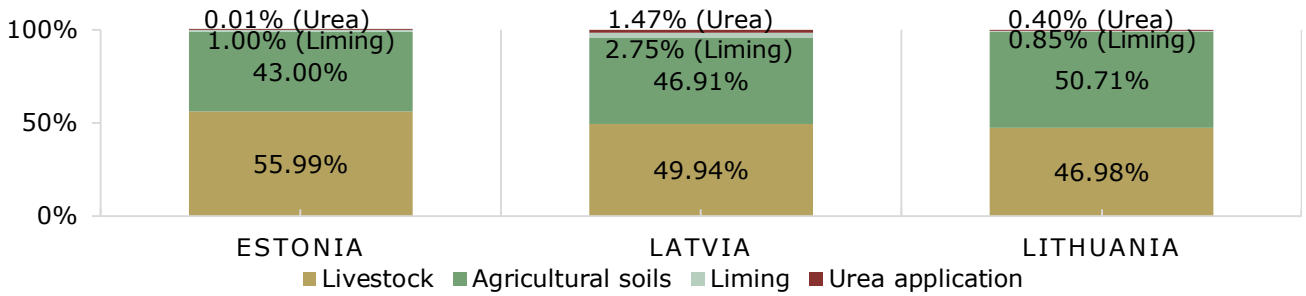
Emission factors in the Baltic States and their share from agricultural activity

	Estonia		Latvia		Lithuania	
	2015	**2020**	**2015**	**2020**	**2015**	**2020**
NH_3, total, Gg	10.94	9.65	16.08	15.96	39.75	39.61
- NH_3, agri, %	93.12	93.46	86.22	86.24	95.87	95.59
NMVOC, total	21.52	23.89	35.74	35.78	50.20	45.94
- NMVOC, agri, %	21.62	19.04	23.56	22.63	27.97	25.95
NO_x, total, Gg	30.63	23.24	37.76	32.86	57.48	52.67
- NO_x, agri, %	12.93	15.65	18.51	21.19	18.13	21.02
$PM_{2.5}$, total, Gg	6.65	5.14	16.47	16.82	9.20	7.30
- $PM_{2.5}$, agri, %	4.16	4.89	2.74	2.91	4.84	5.05
SO_2, total, Gg	36.17	11.08	3.59	3.52	15.32	11.27
- SO_2, agri, %	0.35	0.80	6.73	9.36	0.80	1.15

Source: European Environment Agency's database

Although in general, the data show that emissions tend to decrease in the examined countries since 2015, agriculture is still one of the main emitters among all sectors, where their increase can be

observed. The main agricultural air polluters, such as methane (CH_4) and nitrous oxide (N_2O) are greenhouse gases that significantly contribute to climate change. These emissions primarily stem from livestock farming, manure management, and fertilizer use in crop production.



Source: author's construction based on European Environment Agency's database

Fig. 2. Structure of emission sources in agricultural sector in the Baltic States in 2020

In 2020, in all three countries all the emissions from agricultural sector are mostly divided between livestock and agricultural soil management. Comparing agricultural emission accounts from 2015 to 2020, it can be observed, that the overall sector's emissions have increased in Estonia and Latvia, but declined in Lithuania (Table 3).

Table 3

Changes in emission factors from the agricultural sector in the Baltic States comparing 2015 and 2020, (Gg CO_2 equivalent)

	Estonia			**Latvia**			**Lithuania**		
	2015	**2020**	**%**	**2015**	**2020**	**%**	**2015**	**2020**	**%**
Livestock	828.91	878.84	*+6.0*	1152.98	1123.83	*-2.5*	2382.12	2117.73	*-11.1*
Agricultural soils	621.93	675.03	*+8.5*	972.34	1055.61	*+8.6*	2094.01	2285.74	*+9.2*
Liming	9.04	15.73	*+74.0*	19.94	61.87	*+210.3*	19.25	38.18	*+98.3*
Urea	0.03	0.13	*+378.3*	6.21	9.10	*+46.6*	42.26	66.10	*+56.4*
Total	**1459.91**	**1569.74**	***+7.5***	**2151.47**	**2250.41**	***+4.6***	**4537.64**	**4507.75**	***-0.7***

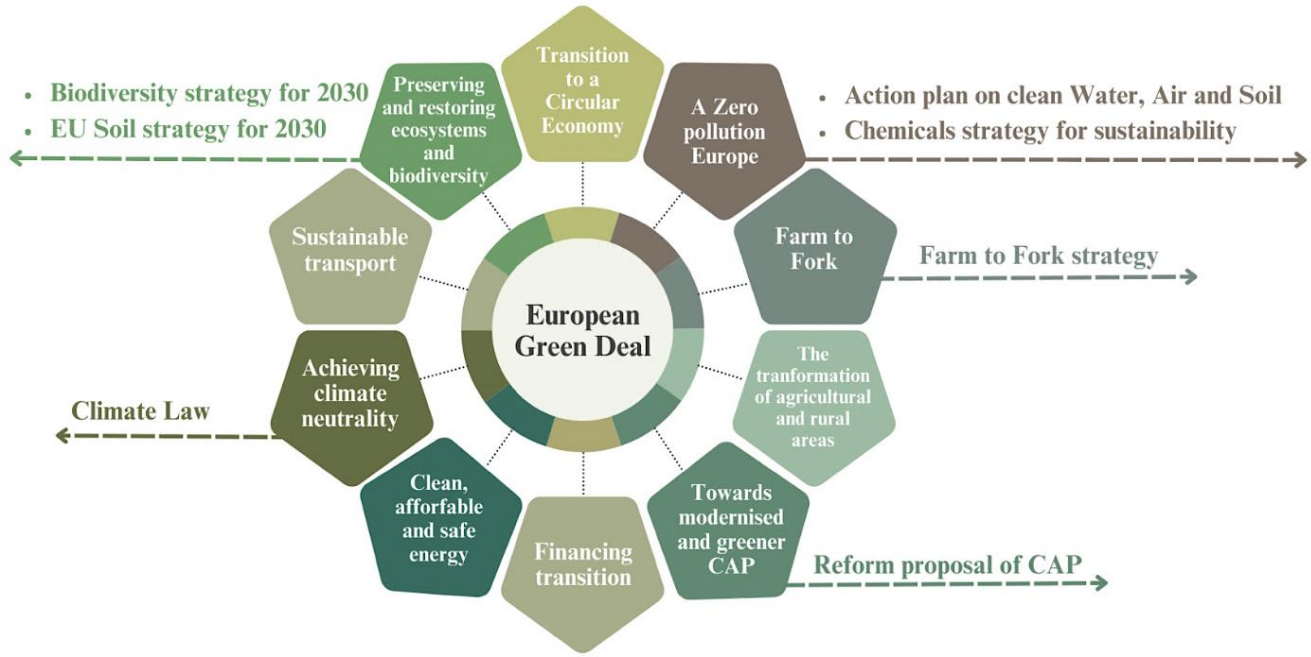
Source: author's construction based on European Environment Agency's database

Since at least one half of the emissions in the entire Baltic region comes from the management of agricultural land and, assuming that these emissions will continue to increase as a result of both – arable land increase and farm productivity, it is essential to understand the most effective approach how to lower total emissions from such agricultural operations.

As members of the EU, the Baltic countries are subject to the EU regulations and directives governing agricultural practices. Compliance with EU standards is essential to ensure access to EU funding, maintain market access, and uphold environmental and food safety standards, where ensuring alignment between national agricultural policies and EU regulations holds paramount importance for fostering the long-term sustainability and competitiveness of the Baltic agricultural sector. Additionally, evaluating the implementation of sustainable land management practices (SLM) across various EU strategic and regulatory frameworks provides valuable insights into the effectiveness of policy measures, where such assessment facilitates comparisons between national strategies and EU goals, showing how effectively countries are progressing towards achieving their sustainability targets and enhancing the overall resilience of their agricultural systems.

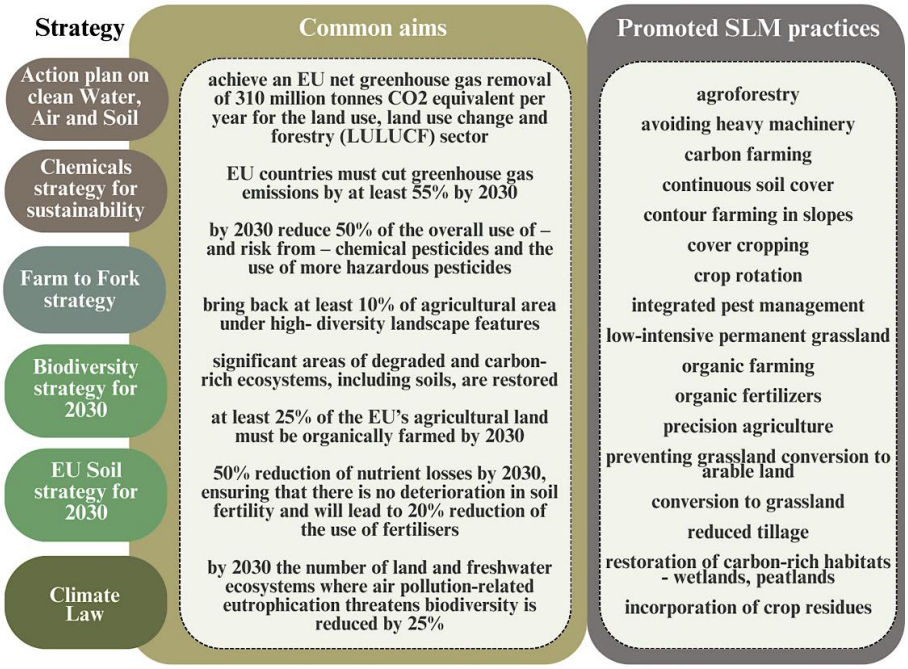
1.2. EU strategic and regulatory framework

In the continuation of this subsection, the EU's strategic and regulatory framework for sustainable land management will be examined, where the cornerstone strategy for Europe, the **European Green Deal**, introduced by the European Commission in December 2019, stands as the EU's principal strategy for achieving climate neutrality and advancing sustainable development. This initiative aims to reshape the EU into a more environmentally conscious and resilient economy, while also upholding principles of social equity and economic prosperity. At its core, the European Green Deal strives to curb greenhouse gas emissions, foster renewable energy sources, transition to a circular economy, safeguard biodiversity, and promote sustainable practices in agriculture and food systems (European commission, 2019) (Fig. 3). It includes measures for various sectors such as energy, construction, finance, transportation, agriculture, where, considering SLM within agricultural scope, most relevant strategies and targets for the sector comes from five different key actions (Fig. 4).



Source: author's construction based on (European Commission., 2019)

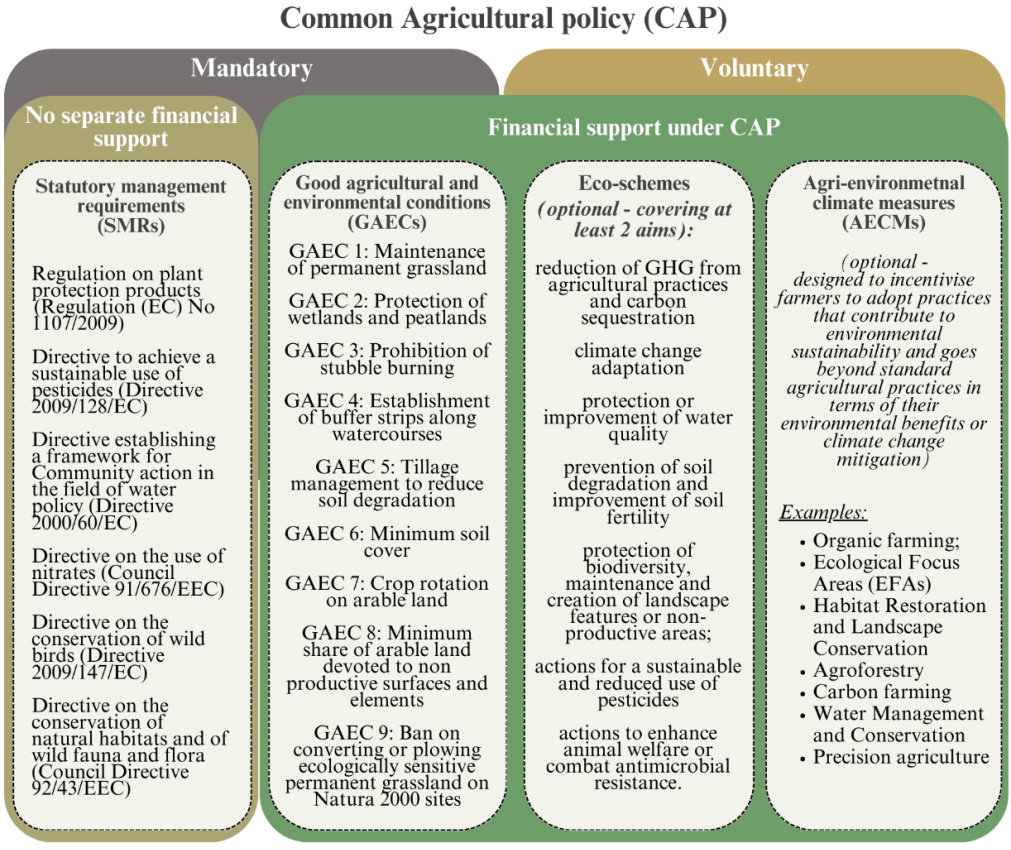
Fig. 3. **The main directions of the European Green Deal and their relevant strategies for agricultural sector**



Source: author's construction

Fig. 4. **The European Green Deal strategies relevant for SLM, common aims and promoted agricultural practices**

The EU pursues its set goals through a mix of regulatory frameworks, financial incentives, research, and partnerships, with the Common Agricultural Policy (CAP) serving as a primary tool (European commission, 2023). CAP integrates mandatory measures – directives, regulations, and voluntary measures to advance sustainability in agriculture and land management across Member States (Fig. 5).



Source: author's construction based on (European Parliament…, 2021)

Fig. 5. **Framework of the Common Agricultural Policy (CAP)**

The CAP consists of several parts where, in order to receive more significant financial support, it is necessary to integrate more agricultural practices in line with the EU's goals. For example **statutory management requirements** (SMRs) are mandatory for every farmer nevertheless they receive the financial support under CAP or not, and SMRs include such measures which are binding for every farmer who operates in the sector. Most of the time requirements in directives and regulation are implemented in national legislation. If farmer decides to apply for financial support under CAP, he/she must correspond to *conditionality* or, in other words, respect a set of basic rules. Conditionality includes the previous mentioned SMRs and also **good agricultural and environmental conditions** (GAECs). In order to receive even more significant financial support, every Member State, according to the guidelines, develops voluntary measures, where, if farmer corresponds to SMRs and GAECs, it is possible to implement one or various different **eco-schemes** and **agri-environmental climate measures** (AECMs).

CAP is one of the oldest and most significant policies of the EU, having been established in 1962 (Gabel, 2024). It is usually designed for exact time period, where the current CAP is designed for 7 years period – 2 transitional years from 2021 to 2022 and the main period from 2023-2027 prioritizing a more democratic approach, ensuring that each Member State can tailor it to their specific needs and goals (European Commission, 2018). This design empowers countries to implement policies that resonate with their agricultural sectors while fostering greater participation and decision-making at the local level. Additionally, the CAPs flexibility allows for the adaptation of strategies to diverse regional contexts, promoting a more inclusive and responsive agricultural policy framework across the EU.

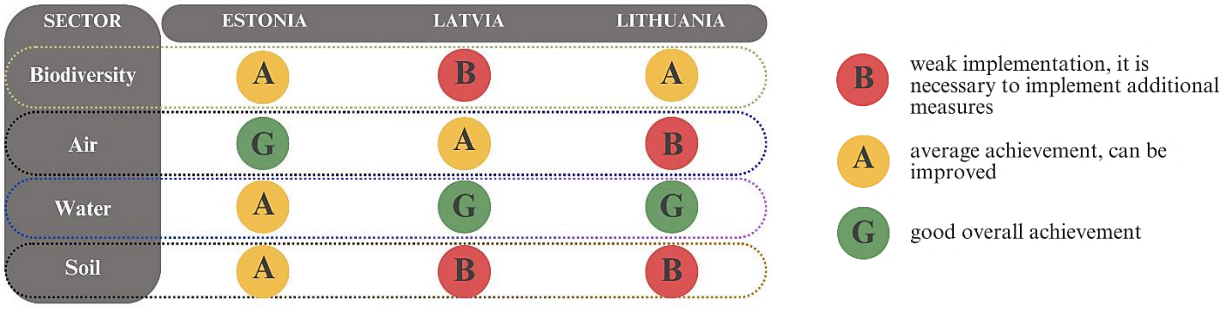
It is essential to evaluate how the Baltic States, unified since their independence from the USSR, individually implement CAP and its alignment with their sustainability goals, alongside assessing how local legislation supports these endeavours.

2. Case study and comparative analysis

The case study and comparative analysis will be carried out based on both the Commissions national evaluation and recommendations for the development of the CAP, where, by comparing the recommendations with the comparison of the countries discussed in the first chapter, the achievements and shortcomings of each country in the implementation of sustainable practices will be evaluated, as well as the CAP developed by all three Baltic States, considering also the implemented regulations in the national legislation that correspond to the legal basis of the SMRs.

2.1. Risk factors' assessment

European Commission, in the end of the 2020, came up with recommendations for CAP implementation for every Member State (European Commission, 2020), where each country was analysed in depth taking into account various objectives – food security, environment and climate change actions, socio-economic and rural area strengthening, knowledge sharing and innovation fostering. Based on this evaluation and observing country characteristics, risk factors that are defined in connection with sustainable land management were identified, as well as their current state was evaluated (Fig. 6).



Source: author's construction

Fig. 6. **Assessment of thematic sectors in relation to the fulfilment of climate and environmental requirements in the Baltic States**

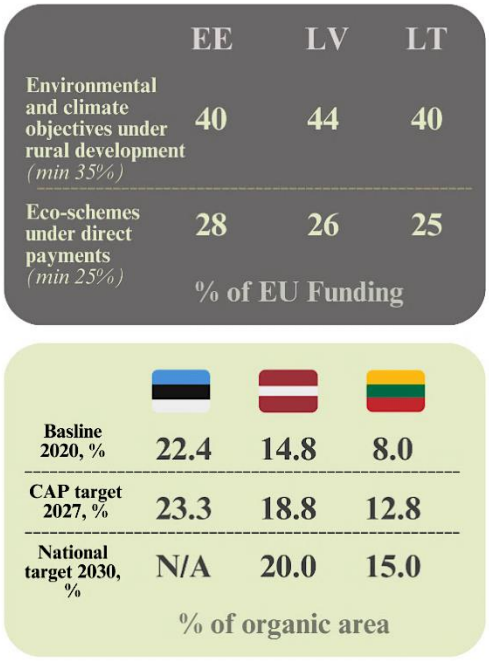
Taking into account the characteristics of the countries and the analysis of the Commission's recommendations, *four sectors* exposed to risks from soil management were distinguished. The direct impact can be observed on the condition of the *soil*, which secondarily affects the quality of *water* and *air*, as a result also affecting the overall *biodiversity*. The **soil** condition on average is weak, which is influenced by intensive tillage, where conventional practices are used in 88% of arable land in Lithuania, 91% in Latvia, while a more positive indicator is in Estonia - 54%, respectively. This is also reflected in the indicators of soil organic matter and CO_2 content in the soil - in Latvia and Lithuania it is below the EU average 43.1 g/kg CO_2 (LT – 25 g/kg CO_2, LV – 36 g/kg CO_2), while in Estonia it is higher – 51 g/kg CO_2. In addition, it is necessary to improve soil coverage in winter – in Estonia there are about 28% of soils without coverage in the winter period, while in Latvia 30% and in Lithuania at least half of the areas. This, in turn, significantly affects the leaching and run-off of nutrients, polluting **water** resources, which can be observed as nitrate pollution in water bodies, however, compared to the EU average, these risks are considered low in the Baltics, with the exception of a slightly increased risk in Estonia, where increased eutrophication is observed in the Baltic sea coastline and is characterized as a result of polluting activities. Soil coverage, reduced tillage and crop rotation are also solutions to **air** pollution, where the main emission factors are ammonia and nitrous oxide from tillage and intensive use of organic and inorganic fertilizers. Currently, in compliance with the binding emission reduction targets, Estonia fulfils its obligations, while Latvia and Lithuania are slightly behind; however, taking into account the forecasts, the modelled development shows that in the long term, as productivity increases in all countries, emissions tend to increase, which means that attention must be paid to the risk mitigation. As a result of the listed factors, **biodiversity** also needs to be significantly improved – the bird index in the countries has significantly decreased, as well as the state of natural habitats, which, mainly from the perspective of soil management, is affected by intensive soil cultivation, transformation of grasslands, also wetlands and peatlands, so as a solution are mentioned the management and return of such areas, as well as the increase of natural landscape elements, especially in intensively managed regions.

2.2. Cross-country analysis

The CAPs of all three countries (European commission, 2023), as well as their national targets and regulations (Riigikogu, 2019; Republic of Latvia, 2014; Order on the…, 2012), were used for the cross-country analysis. First of all, when evaluating the national level legislation, all countries have integrated binding directives under SMR measures, which include restrictions on the use of both synthetic and organic fertilizers, especially by introducing a calendar restriction, where it is forbidden to spread organic fertilizers during the winter period, on average from the end of November to the middle of March , as well as use synthetic fertilizers on frozen or too wet soil. All countries have also included a limit for

applying up to 170 kg ha^{-1} N per year with organic fertilizers. Similarly, in all countries, a Nitrate Vulnerable Zone (NVZ) has been determined, where in Estonia and Latvia it is in part of the territory, but in Lithuania it has been established in the entire territory of the country, thus forcing the agricultural sector to pay special attention to activities leading to nitrate pollution.

Countries' total CAP funding for environmental and climate goals is in line with the recommendations of the European Commission, where in most cases the minimum mark is exceeded (Fig. 7).



Source: author's construction based on (European commision, 2023)

Fig. 7. **The proportion of the EU funding distribution in the Baltic States and indicators of organic target areas**

GAECs	ESTONIA	LATVIA	LITHUANIA
GAEC 1: Maintenance of permanent grassland	29.05 %	24.64 %	25.83 %
GAEC 2: Protection of wetlands and peatlands	from 2024	from 2025	from 2024
GAEC 3: Prohibition of stubble burning	included	included	included
GAEC 4: Establishment of buffer strips along watercourses	3 m and around irrigation ditches	3 m	3 m
GAEC 5: Tillage management to reduce soil degradation	included	included	included
GAEC 6: Minimum soil cover	50%	55-65%	55-65%
GAEC 7: Crop rotation on arable land	included	included	included
GAEC 8: Minimum share of arable land devoted to non productive surfaces and elements	4%, 3% if other measures	4%	4%, 3% if other measures
GAEC 9: Ban on converting or plowing ecologically sensitive permanent grassland on Natura 2000 sites	included	included	included
Additional:			
GAEC 10: Drainage system maintenance	not included	included	not included

Source: author's construction based on (European commision, 2023)

Fig. 8. **GAEC requirements in the Baltic States**

When evaluating GAEC measures, all three countries have behaved relatively similarly, choosing the same categories of measures and/or derogations. They have a goal of a proportion of grass in the range of 21 to 30%, national regulations have included a ban on burning straw residues, there are measures to limit tillage on slopes, a requirement for crop rotation has been introduced, as well as a ban on ploughing in Natura 2000 areas. The GAEC 2 measure will be implemented until the mapping of such areas will be developed, as well as the GAEC 6 requirement, compared to other EU member states, is lower than 80% due to short vegetation period and Nordic location. Estonia has introduced an additional requirement for buffer strips, while Latvia has adhered to the 4% limit in the introduction of landscape elements, and has also introduced an additional GAEC 10 requirement for the maintenance of drainage systems (Fig. 8).

When evaluating national goals regarding organic agriculture, a positive mark is that all countries have set more ambitious goals at the national level in relation to the Commission's set target (Fig. 7). However, when evaluating the Baltic States Eco scheme and Agri-environment and climate measures, it can be seen that Estonia, despite the fact that it has the highest indicator in terms of organic areas, has planned support measures for both conversion and maintenance of already existing areas in both measures. Lithuania has not established a support system for the transition to organic farming under the AECC measures, but has maintained support for existing organic areas. In contrast, Latvia has implemented support measures for transition areas and certified areas only under eco-schemes (Fig. 9; Fig. 10).

Eco-schemes	ESTONIA	LATVIA	LITHUANIA
In total	5	6	9
• *relevant to SLM*	*4*	*5*	*6*
Fertilisation	included	included	included
Soil conservation practices	included	included	included
Organic farming	included	not included	included
Landscape and biodiversity	included	included	included
Wetlands and peatlands	not included	not included	included
Grassland and grazing	not included	included	included
Precision agriculture	not included	included	not included

Source: author's construction based on (European commision, 2023).

Fig. 9. **Implemented Eco-schemes in the Baltic States according to their thematic purpose**

Agri-environment-climate commitments (AECC)	ESTONIA	LATVIA	LITHUANIA
In total	12	12	6
• *relevant to SLM*	*7*	*5*	*3*
Fertilisation and Soil amendement	included	included	included
Soil management	included	not included	not included
Crop rotation diversification	included	not included	not included
Landscape	included	included	not included
Water management	included	included	not included
Grassland and grazing	included	included	included
Precision agriculture	not included	not included	not included
Organic farming	included	included	included

Source: author's construction based on (European commision, 2023).

Fig. 10. **Implemented Agri-environment and climate measures in the Baltic States according to their thematic purpose**

Evaluating measures implemented by countries through Ecoschemes and Agri-environment and climate measures, it can be seen that sustainable soil management and relevant practices are an essential part of most measures – in Ecoschemes they are included in almost every measure, while in agri-environment measures, judging according to the total number, such practices are included in at least half of them. Looking at the focus of each country, it can be seen that there is a relatively small orientation towards precise agricultural technology support, which could be explained by the fact that such practices are resourceful, and the countries have not implemented strict measures for the restoration of wetlands and peatlands, which could be explained by the already mentioned lack of mapping within GAEC 2 measure.

In addition, by analysing the set priorities with the previously discussed risk factors (Fig. 6), it can be concluded that Estonia's overall indicators are optimal and, taking into account that there is a tendency in pollution increasing from soil management, as well as the reduction of biodiversity associated with this risk, the introduced measures are considered optimal, since most of the measures related to soil cultivation have been implemented, except for the support for precision technologies, which could, however, significantly improve integrated nutrient management in the long term, which is one of the priorities within the CAP. In the case of Lithuania, a somewhat opposite trend is observed, where the greatest focus is on Ecoschemes, still including measures related to biodiversity. Taking into account that in Lithuania the crop sector is the most intensive within the Baltic background and active production takes place there, as well as the risk factors are soil and air, while biodiversity is satisfactory, the approach with a focus on Ecoschemes is rational, however, here support for precise technologies could address nutrient targeted supply where needed (Patel et al., 2023). Finally, Latvia has maintained a middle path, introducing both Ecoschemes and agro-environment targeted measures, which clearly coincide with the risk factors, which are soil and biodiversity. And although a moderate approach has been introduced, evaluating the Commission's recommendations, which were focused on crop rotation and wetland and peatland management, these goals are not reflected in the measures.

Conclusions

1) The agricultural sector significantly contributes to the economies of the Baltic countries, with Latvia ranking the first among the EU countries in terms of the agricultural share of GDP (2022 – 5%), thus highlighting its importance within the region.

2) Even though there has been a slight decrease in emissions since 2015, it is forecasted that with productivity increase, emissions from the agricultural sector, particularly methane, ammonia, and

nitrous oxide, will remain a concern and will continue to increase, thus contributing to climate change and environmental degradation

3) The implementation of sustainable land management practices is defined as one of the most essential approach for mitigating environmental impact and fostering agricultural resilience, with a focus on reducing emissions, enhancing biodiversity, and improving soil health.

4) The European Green Deal and the Common Agricultural Policy (CAP) serve as crucial frameworks for guiding sustainability efforts in the Baltic countries, emphasizing the need for alignment between the national agricultural policies and EU regulations to achieve long-term sustainability goals.

5) When evaluating the natural risks related to soil cultivation and agricultural production in four different sectors - soil, water, air and biodiversity, Estonia has an average to good rating in all factors, while in Latvia weaknesses are soil condition and biodiversity, and in Lithuania – soil condition and air pollution.

6) While progress has been made in integrating sustainability measures into agricultural policies, there is a need for further evaluation and adaptation to address specific challenges, such as soil degradation, biodiversity loss, and emissions reduction, which has a negative tendency to increase especially from agricultural land management.

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