CLIMATE CHANGE MITIGATION AND ADAPTATION: TWO DIFFERENT, YET INSEPARABLE STRATEGIES TO TACKLE CLIMATE CHANGE

In the light of the current human made climate crisis, it is crucial to employ several approaches to adjust to the impacts of climate change and to reduce the causes of climate change. This article will explain two strategies that are pursued globally – climate change mitigation and climate change adaptation. Within the LIFE OrgBalt project, experts and practitioners explore various practices for adaptation and mitigation in the agriculture and forestry sectors in the project regions.

What role do climate change mitigation and adaptation activities play in tackling climate change?

In order to achieve the Paris Agreement target of limiting global warming to well below 2, preferably to 1.5 degrees Celsius, compared to pre-industrial levels, an annual decline of greenhouse gas (GHG) emissions of 7.6% is needed between 2020 and 2030 globally [1]. Raija Laiho, Research Professor at the Natural Resources Institute Finland LUKE, comments that “climate change mitigation is essential for limiting the on-going change to a manageable level that prevents the risk of a complete and uncontrollable collapse of ecosystems, including agriculture and forestry”.

The Intergovernmental Panel on Climate Change (IPCC) stresses six key sectors in which active mitigation efforts should take place - Energy, Industry, Agriculture & Food, Forests & Land use, Transport, and Buildings & Cities [2].

Even if the mitigation efforts prove to be successful in reducing emissions, warming effects of the atmosphere do already and will in future impact the livelihood of our society. This is where climate change adaptation strategies come into play. As explained by Raija Laiho, “adaptation means all actions that we can take to be prepared to face the consequences of the on-going change. How much adaptation is needed depends on

how much and how fast we can mitigate". Our society will have to adapt, and a strong focus and efforts will be needed in the fields of Infrastructure and Buildings, Energy, Agriculture and Forestry, Insurance and Tourism, as stated by the European Commission [3]. The importance of adaptation is recognised on the EU level, as on February 24, 2021, the European Commission adopted the new strategy for adaptation to climate change, with the goal of becoming climate resilient by 2050 and pointing to the importance of data-based decisions for the implementation of adaptation measures [4].

Mitigation
reducing climate change – involves reducing the flow of heat-trapping greenhouse gases into the atmosphere, either by reducing sources of these gases or enhancing the "sinks" that accumulate and store these gases.

Adaptation
adapting to life in a changing climate – involves adjusting to actual or expected future climate and the consequenting environmental changes.

Source: https://climate.nasa.gov/solutions/adaptation-mitigation/

It is evident that the agricultural and food industry will need to mitigate and adapt to climate change. Moreover, when it comes to climate change adaptation and mitigation, the actions in each sector and location need to be context-specific. As explained by Kaido Soosaar, Associate Professor of Environmental Technology at the University of Tartu, "the role of mitigation or adaptation in the context of climate change is strongly dependent on the scale and sector of activity. While land use / land use planning at the local scale might efficiently contribute to mitigating climate change, adaptation is still required. Land use at a particular site and in a given time should cope with new environmental conditions".

Actions in AFOLU – a prospect for change

There is significant need for mitigation and adaptation activities in the Agriculture, Forestry and Other Land Use (AFOLU) sector. According to the IPCC, emissions from the AFOLU sector in the period 2007-2016 represented 23% of total net anthropogenic emissions of GHGs [5].

In July 2021, European Commission adopted a series of legislative proposals concerning land use and forestry in the period 2021 – 2030. The proposals work towards the intermediate goal of 55% GHG reduction in the EU until 2030. A central principle of the proposals is the "no debit" rule – all accounted emissions from land use should be compensated with the removal of CO2 from the atmosphere by the activities in the sector [6]. However, the compensation of emissions is not always straightforward in the land use sector, e.g. to compensate for 1 ha of lost peatland, at least 7 ha of a forest would have to be planted [7]. The compensation of emissions in this manner may prove to be challenging in Europe as there is simply not enough space for planting enough forest without conflicting with other land use interests.

Kristīne Sirmā, Head of the Sustainable Agricultural Development Division, Agricultural Department, Ministry of Agriculture of Latvia, explains that "the European Union sets environmental standards and co-finances most of Member States' agricultural spending. Through the Common Agriculture Policy Strategic Plan Latvia will support farmers and foresters in the implementation of cost-effective and long-term climate change mitigation and adaptation measures at farm level."

Actions in the AFOLU sector can bring real change to global and local mitigation and adaptation efforts. The sector's importance has been recognised at the European level and regulation that aims to foster sustainable forestry and agriculture is expected to be central to the sector's mitigation efforts.

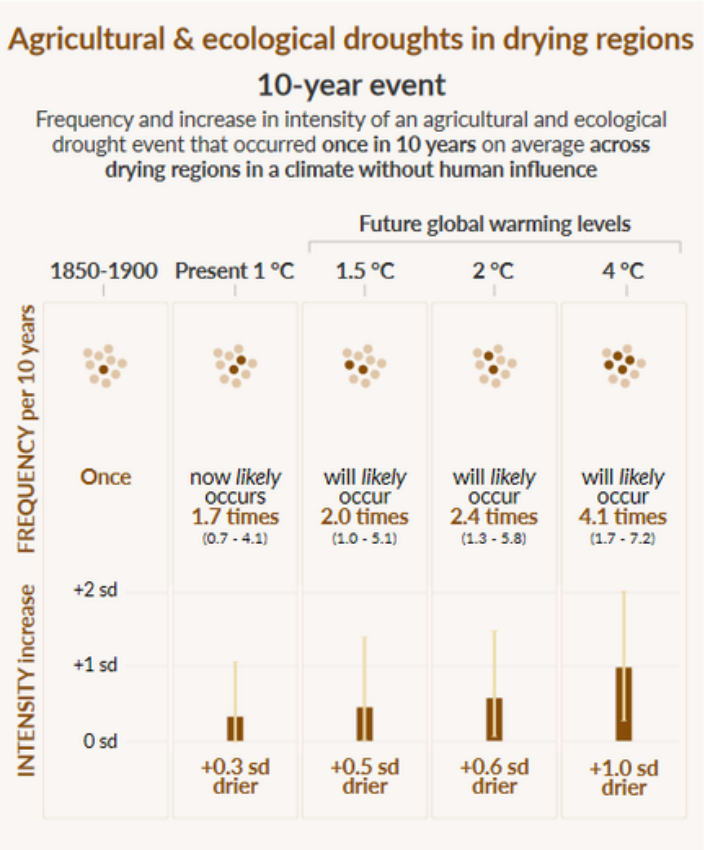
For instance, the less climate mitigation actions are taken to lower the potential global warming levels the more frequently and severely the agricultural sector is expected

to experience droughts, as illustrated in Figure 1. This pattern is expected for the drying regions globally identified by the IPCC, including Western and Central Europe [8]. This leads to feedback loops like increase of spontaneous fires in forests and peatlands, and thawing of permafrost soil, leading to an increase of GHG emissions.

As climate extremes increase with global warming contrarily to droughts, warmer air masses in summer bring intensive precipitation events leading to floods, more intensive soil erosion, nutrient losses and eutrophication of waterbodies in rural areas.

While sustaining or increasing carbon sequestration is a preferred mitigation method, there is still the need to adapt to climate change by introducing more drought-tolerant crop species, new varieties suitable for longer growing period and winter crops hardening and surviving in conditions of unstable or missing snow cover.

Figure 1.



Intensity changes are expressed as fractions of standard deviation of annual soil moisture.

Source:https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SPM.pdf

Smaller steps to reach big aims: improve national inventory of the GHG emissions

As the AFOLU sector's role in the carbon cycle can be two-sided (with soils and forests acting both as sources and sinks of carbon – read more here [9]), it is crucial to support practices that contribute to reaching the climate goals.

In this context, Kaido Soosaar points to a crucial issue with carbon accounting, - externalised emissions (leakage) - "as long as consumption and demand are not decreasing, emissions are not expected to drop, but instead to be replaced by other sources or activities where emission counting is not studied that well due to omitted externalities (e.g. replacing peat products with coconut residues)." It is therefore crucial to employ measures that bring real gross mitigation without shifting the emissions to another activity or region, and for that, science-based monitoring and accounting of emissions is essential.

Calculation of emissions is a complex task where LIFE OrgBalt aims to contribute with improving national GHG inventories. The national GHG inventories are crucial for a data-based evaluation and monitoring of the progress in reaching GHG reduction targets. However, the national inventories are based on estimations for GHG emission factors for each action in the sectors. The more and higher quality data becomes available, the more precise the factors and estimates will get. AFOLU is one of the key sectors that national inventories must report on. LIFE OrgBalt seeks to fill knowledge gaps of GHG emission assessment and reporting from nutrient-rich drained organic soils and it will improve national inventories by elaboration and verification of GHG emission factors and activity data in cropland, grassland and forest land.

Towards a scientific basis for climate change mitigation practices in agriculture and forestry

Improving the emission assessment and reporting for the region within LIFE OrgBalt will be combined with identifying and promoting the best mitigation measures in agriculture and forestry. As put by Kaido Soosaar, “the results of climate change mitigation measures which are studied and will be demonstrated by LIFE OrgBalt project will be communicated to increase the awareness of landowners. The results of the various studied measures and their efficiency in economic or climate change mitigation context will be published. For policy makers the main benefit could be scientifically proven and locally studied results that can be the basis for development of new policies.”

The plans and agreements for climate change mitigation and adaptation in the AFOLU sector in place favour the implementation of good practices in the sector to achieve climate goals. Read further to learn what the practitioners have to say about common mitigation and adaptation strategies employed in agriculture and forestry sectors.

What in practical terms do climate change mitigation and adaptation measures in land use mean?

LIFE OrgBalt surveyed project key stakeholders about the strategies for climate change mitigation and adaptation that are currently used in the agricultural and forestry sectors. It was emphasised that more awareness among practitioners is needed to understand that one measure may contribute simultaneously to water protection, biodiversity and climate protection. The practitioners need credible information to choose the most efficient measures. As put by Riina Maruštšak, the Head of Environmental Policy at the Estonian Chamber of Agriculture and Commerce, “there are farmers who do not associate these practices with climate action as so far mainly water protection topics have been in focus regarding environmental protection in agriculture.”

Some of the actions practiced in agriculture include precision farming, growing winter crops, and minimum tillage, according to Riina Maruštšak. Liisa Toopakka, Conservation Expert of the Finnish Association for Nature Conservation, emphasises that it is crucial to stop the draining of new peatland areas, both in agriculture and forestry.

Forestry practice choices, like maintaining continuous cover, increasing rotation length, and fertilising with ash, are mentioned by the practitioners in Finland. Nerijus Kupstaitis, head of the Forest Policy Group of the Ministry of Environment of the Republic of Lithuania, states that currently the traditional forestry approaches for growing the so far justified tree species and forest types on nutrient-rich organic soils are used in Lithuania. Aidas Pivoriūnas, Moderator of the Standard Development Group of the Forest Stewardship Council adds that the newly adopted FSC National Forest Stewardship Standard for Lithuania sets out rules for forest owners, which include catchment water protection, justified use of fertilizers only, and other protective measures towards soils and water resources.

The LIFE OrgBalt project will demonstrates innovative practices to mitigate and adapt to climate change. In that way LIFE OrgBalt seeks to encourage practitioners to take steps towards climate neutral land use.

[to find out more visit our webpage]

LIFE ORGBALT TEAM

[1] https://www.un.org/en/climatechange/science/key-findings
[2] https://www.unep.org/interactive/six-sector-solution-climate-change/
[3] https://ec.europa.eu/clima/policies/adaptation/how/sectors_en
[4] https://ec.europa.eu/clima/policies/adaptation/what_en
[5] https://www.ipcc.ch/srccl/chapter/summary-for-policymakers/
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