How to support the transition towards climate friendly and resilient agri-food systems in Central Eastern Europe?

eco logic

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1 Introduction

Agriculture in the EU accounts for approximately 13% of greenhouse gas (GHG) emissions.[1] Globally, the agri-food system is responsible for nearly a third of global emissions.[2] Agriculture and food consumption are key drivers of biodiversity decline, environmental degradation and health costs associated with the currently dominant diets. There is a growing recognition and consensus that we urgently need to improve the sustainability of agri-food systems to address these multiple and interconnected crises.[3,4]

The 11 countries in Central Eastern Europe (CEE) – Bulgaria, Croatia, Czechia, Hungary, Estonia, Latvia, Lithuania, Poland, Romania, Slovakia, Slovenia – account for approximately a third of the total agricultural land and 23% of the EU agricultural emissions.[5] The countries in the region share historical and socio-economic similarities, as well as challenges and opportunities, which makes them distinct from non-CEE countries.

This policy brief highlights the need for a systemic and integrated approach to support the transition to climate friendly and resilient agri-food systems in CEE countries. The brief underlines how the key policy instruments that countries have at their disposal – the Common Agricultural Policy, National Energy and Climate Plans, and policies to support sustainable food consumption – can be better used to support such an integrated approach. Finally, the brief points to the importance of setting clear goals, as well as developing societal support, and capacities for the transition.

2 Building blocks for the transition

There is increasing scientific evidence and consensus that the transition towards climate friendly and resilient agri-food systems requires three key elements:

- A shift in the way that food is produced – towards a greater reliance on agroecological practices and nature-based solutions
- A shift towards more plant-based diets and organic foods
- A reduction in food waste

How we produce food needs to shift towards a greater reliance on agroecological practices and nature-based solutions, and support more sustainable livestock production

A fundamental shift is needed towards a greater reliance on **agroecological practices** as part of an alternative paradigm that builds on ecological principles in managing agricultural systems. Agroecological practices can replace, or at a minimum strongly reduce, the need for external inputs such as synthetic pesticides, mineral fertilisers and antibiotics, the production and use of which is associated with significant emissions and other negative impacts on the environment and human health. Agroecological practices include a wide range of practices, such as crop rotation, inclusion of legumes or cover crops, intercropping, as well as more complex system re-design, such as organic farming.[6]

It is important to note that the additional potential of soil carbon sequestration on mineral soils[i] is limited, uncertain and the risk of intentional or unintentional reversal of sequestered carbon is high. Nonetheless, improving management on mineral soils is still absolutely needed, especially on croplands. If current agricultural land management practices are not improved, croplands will continue to lose carbon. Climate impacts also lead to additional losses. This calls for vast improvements in arable systems, primarily as an adaptation strategy with co-benefits for maintaining carbon stocks.[7]

Agroforestry, which involves the combination of trees with grasslands or croplands, has significant mitigation potential, with many different benefits for biodiversity, improved microclimate, and water retention. Especially when agroforestry with native tree species is established in croplands previously dominated by cereal monocultures, agroforestry can increase resilience against droughts and erosion. One EU-wide assessment

i Mineral soils are characterized by organic matter content of up to 30%.

estimates that even if a limited share (10%) of agricultural land is converted to new agroforestry systems, this could deliver up to 235Mt CO_2eq/yr of carbon sequestration in the EU.[8]

Peatlands in the EU store four to five times more carbon than trees[9], a huge but vulnerable carbon store that must be maintained and restored. Peatlands are characterised by an organic matter content of at least 30%. In the CEE region, five countries have a significant share of peatlands in their territory: Poland, Romania, Latvia, Lithuania, and Estonia. Many of these peatlands continue to be drained for agricultural production, which makes them a significant source of emissions. For example, if Poland and Romania would rewet only four percent of their drained peatlands under agricultural use, this could lead to 41% and 49% reductions in agricultural emissions respectively.[10] When peatlands are restored, they can also sequester additional CO_2 from the atmosphere. However the sequestration would occur over a very long period, so that in the short-term rewetting mainly contributes to avoided emissions. In addition to reducing agricultural emissions**,** **peatland rewetting** and alternative management of drained peatlands with **paludiculture** also supports biodiversity and water retention and reduces the risk of flooding. Paludiculture should not be supported on conserved peatlands or peatlands in good state, with high biodiversity values. Rather, it is appropriate for already degraded and intensively used peatlands.

In addition to peatlands, is also important to restore non-peat wetlands and mosaic-like landscapes. Wetlands and landscape elements, such as trees, hedgerows and standing water increase the water retention capacity of landscapes, improves water supply in drier periods, increases the ability of soils to absorb and retain moisture, and protects soils against erosion.[11]

A key element of transition is also a move towards **sustainable livestock production**. Currently, intensive livestock production, reliant on imports of feed, is a key driver of agricultural emissions, water and air pollution, and biodiversity decline.[12]

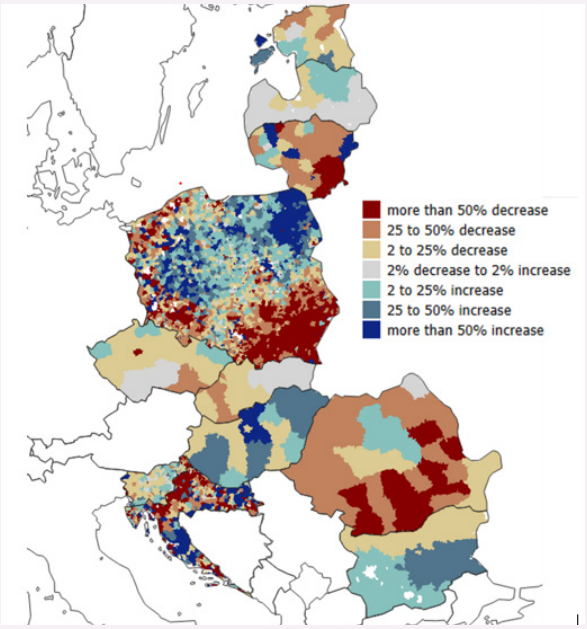
Box 1:

Livestock production in CEE countries

Since 2000, the CEE region has seen a significant increase in cattle numbers in some areas and the reduction of livestock in more extensively managed areas (see Fig. 1). The number of livestock units (LSU) for bovine animals dropped between 2004–2010 and then increased again from 2010–2021 for a small total net increase (0.7% increase) over the whole period. In Croatia, Bulgaria, Lithuania, and Romania the bovine LSU decreased by 9%, 15%, 19% and 35% respectively, while in Poland and Hungary there was a 24% and 23% increase in bovine LSU between 2004–2021. In Slovakia, Slovenia, Czechia, Latvia and Estonia, the bovine LSU increased much less, between 0.7%–5.5%. Even where bovine LSU have decreased, the ruminant sector still accounts for a significant share of the agricultural emissions mostly due to beef and dairy production.[13] Poultry numbers in the region nearly doubled between 2004–2021, driven by more than a tripling of poultry production in Poland. Only in Estonia and Slovakia, poultry production decreased. Pig numbers have decreased in the whole region, but the imports of pork have increased substantially (by 400%).

The region is a net exporter of beef and poultry, and net importer of pork. In the same period, the consumption of soy (largely driven by animal feed use) has increased by 40%. Imports of soy from South America have increased, as well as the domestic production of soy. (All data from FAO 2024.[12])

Fig. 1: Changes in cattle livestock units between 2000–2020 (in % increase/decrease) for CEE countries



Source: Malek, Ž., Yashchun, O., Romanchuk, Z., See, L., 2024b. Harmonized livestock number dataset for Europe. https://doi.org/10.5281/zenodo.11058509

Technological efficiency improvements can reduce the emission intensity of livestock production, reducing the carbon footprint per unit of output. These improvements focus, for example, on feeding and breeding strategies, biogas, manure storage, machinery for low-emission slurry application or urea and nitrification inhibitors. Indeed, efficiency improvements need to play a role in reducing agricultural emissions and in CEE countries there might be more opportunities for increasing efficiencies compared to non-CEE countries. However, there are two significant concerns with this approach. First, some of the technologies such as machinery used in low-emission slurry application and synthetic nitrification inhibitors also carry risks for soil health and thus potentially undermine productive capacity of soils.[7] Secondly, these technologies do not sufficiently reduce absolute emissions or other environmental externalities. Despite technological improvements and significant investment in efficiency improvements and the modernisation of production, agricultural emissions in CEE region have continued to stagnate since 2000, and since 2010 they have increased again, also driven by increasing livestock numbers. To meet the long-term climate targets and stay within planetary boundaries, technological efficiency improvements are insufficient and an absolute reduction in total numbers of animals is needed.[14,15]

Moreover, high output and efficiency in specialised livestock production often comes at the expense of animal welfare. When animals are kept in confined spaces and without access to natural behaviours such as grazing, foraging or social interaction wellbeing, this leads to physical and psychological stress, and increased susceptibility to injuries and various diseases, the latter of which also has broader implications for public health and the environment. The increased use of antibiotics in livestock production contributes to the development of antibiotic-resistant bacteria. Livestock conditions ease the emergence of zoonotic diseases, namely, diseases that can be transmitted from animals to humans like the COVID-19 virus.[16]

The scale of livestock production that is sustainable in a given country and geographic context, while considering global planetary health, remains a matter of discussion. National scenarios for sustainable livestock production are needed to guide policy discussions. These need to consider the role of circular and environmentally friendly systems, including mixed organic crop-livestock systems and extensive systems based on grazing and feed self-sufficiency, which can support biodiversity, cultural landscapes, and resilience. A shift from intensive livestock towards these systems can support the transition towards more climate friendly agri-food systems, provided they are part of an overall shift towards reduced livestock numbers and more plant-based diets.

In extensive grazing systems the numbers of livestock might need to be optimized to avoid further abandonment and maintain biodiversity, since grazing herbivores help to maintain biodiversity and cultural landscapes. However, an overall reduction in direct livestock emissions in line with long-term climate targets is still needed. Even countries with the lowest livestock numbers, such as Bulgaria, Slovakia, or the Baltic countries, would need to achieve reductions in direct national livestock emissions by 2050.[17]

Will agroecological transition threaten food security? In the short term and compared to conventional systems reliant on synthetic inputs, the transition to agroecological solutions can lead to lower yields, which some stakeholders have argued would threaten food security. However, food security is not a concern in the EU context, although lower output is a risk in terms of carbon leakage and displacement of EU emissions abroad. Recent studies have shown that, if the transition to agroecological practices is coupled with a shift towards more plant-based diets and a reduction in food waste, this can ensure sufficient agricultural output and simultaneously deliver climate, environmental and health goals.[18,19]

At the same time, the transition towards more agroecological and nature-based solutions is essential to maintain and increase carbon stocks, support biodiversity and soil health as key ingredients of the long-term productive capacity of agriculture.[20] By relying more on nature and agroecological practices, agricultural production gains in resilience to droughts and other extreme events.[21]

Dietary change enables a shift in the way we produce food and carries significant public health benefits

A shift towards more plant-based or plant-rich diets is a central strategy for the sustainability transition in agri-food systems because of the high resource and emission intensity associated with animal-based foods. Shifting towards a greater reliance on plant-based foods relieves pressure to maximise agricultural production with high-input/high-output agricultural model and enables a shift towards agroecological practices, organic farming, agroforestry and paludiculture.

More plant-based diets also support human health by promoting an increased consumption of fruits, vegetables, whole grains, legumes, and nuts. Recent studies have shown that current dietary patterns that lead to non-communicable diseases are a key contributor to the hidden health costs of agri-food systems.[4,22]

The term "plant-based diet" encompasses a spectrum of eating habits, from moderately incorporating animal products to purely vegan diets. A well-known example of a plant-based diet is the Mediterranean diet. In public discussion, the term plant-based is frequently misinterpreted as meaning "purely plant-based" or "vegan".[23] Rather, descriptions of plant-based diets predominantly highlight the promotion of wholesome, plant-derived foods such as fruits, vegetables, whole grains, legumes, nuts, and seeds with a limited share of foods from animal origin.[24,ii] Moderate meat consumption, in particular reducing the consumption of red meat, allows us to stay within planetary health boundaries.[14]

Reducing food waste conserves resources and improves food security

According to Eurostat, an estimated 10% of food in Europe is wasted after it reaches retail, food services or households directly. Within the EU, households contribute to over half of the entire food waste production, accounting for 54%. Food manufacturing generates 21% of the total food waste, primary production and restaurants/food service each nine percent, and the retail and food distribution the remaining seven percent.[25]

Food waste represents a significant loss of resources, including water, land, energy, labour, and capital, and contributes significantly to greenhouse gas emissions.[26] Reducing food waste not only conserves resources but also has the potential to improve food security by redirecting food to those in need.[4]

3 How can the transition be supported?

A coordinated and systemic approach is needed to address the changes required both on the production and consumption side. On the production side, policymakers must address farmers' dwindling economic position in the agri-food supply chains, lacking incentives to take up alternative ways of farming, as well as knowledge, tailored advice, and research to support farmers in making the transition. On the consumption side, coordinated food strategies, dietary guidelines, support for sustainable public procurement and development of markets for organic foods and plant-based foods are some key instruments to support the transition.

The Common Agricultural Policy (CAP)

A key element in realizing this transition is to redirect the existing subsidy and incentive systems and facilitate an enabling environment that addresses the barriers faced by farmers. The CAP can play a major role in this regard due to its significant budget. However, our analysis of the way the 11 CEE countries have designed the CAP shows that the CAP continues to have limited positive impact for climate mitigation and adaptation and could be much better used to support the transition.[27] There is an open gap between the budget allocated towards climate mitigation and adaptation and the untargeted payments towards emission-intensive activities, including livestock production and drainage-based agriculture.

ii In their updated guidelines from 2024, the German Nutrition Society, for example, recommends that milk products can be consumed daily, and meat consumption should be limited to 300g per week. For more information see: https://www.dge.de/gesunde-ernaehrung/gut-essen-und-trinken/dge-empfehlungen/.

In the current period, CEE countries can still significantly improve the climate impacts of the CSPs. Countries can:

- Strengthen the **conditionalities** around soil health, permanent grassland protection, landscape features and peatland protection.
- Tie **coupled** payments for livestock to clear environmental and animal welfare standards and limit these payments to livestock raised extensively for the purpose of supporting biodiversity, prevention of rural abandonment or other clearly defined environmental goals. Moreover, countries can phase out coupled payments that currently go to intensively managed livestock and large dairy and cattle holdings.
- Set high environmental standards and objectives for **investment** funds going to modernisation and productivity improvements, which currently represent the bulk of the investment budget for farm holdings. Substantially increase the share of the budget going to targeted climate and environmental investments.
- Strengthen funding and incentive levels for **agroforestry** and **peatland rewetting** through eco-schemes, agri-environment-climate commitments, and advisory support. Introduce pilot projects for developing new agroforestry and paludiculture systems.
- **Strengthen the requirements in eco-schemes** in arable systems to set higher ambition for crop rotation, inclusion of legumes, residue management, and support for landscape features. Due to the large area that is targeted under eco-schemes, any improvements in eco-schemes will have significant impacts on mitigation, resilience, and biodiversity.
- **Improve the funding and design of ambitious agri-environment-climate commitments** to further avoid deadweight requirements. Improve the flexibility for farmers and ensure sufficient advisory support to increase the interest and uptake in these measures.
- Significantly **strengthen animal welfare interventions** by shifting support from minimal technical improvements (such as only 10% increase in living space) to ambitious requirements for access to outdoors and grazing. Remove support for so-called mega-stables (units with more than 500LSU) under animal welfare and coupled payments.
- **Improve eligibility criteria for CAP payments** to include trees, woody strips, and agroforestry systems. Support pilot projects, ambitious agri-environment-climate measures, and investments measures, coupled with advisory support to support the establishment of new agroforestry systems, as a game changer for increasing carbon stocks and improving resilience of agricultural landscapes.
- Develop targeted investment and interventions to support the value chains and **market development** for organic products, and advisory and research **capacity for organic farming**.
- Focus on the development of institutional **capacities**, research, and advisory support for agroecological practices, agroforestry and paludiculture.
- Begin a **dialogue and evidence-building** to support a fundamental reorientation of the **CAP post 2028**.[iii]

Bridging agricultural, food and climate objectives through National Energy and Climate Plans (NECPs)

NECPs are a key tool bridging agricultural, food, and climate objectives. However, the analysis of the draft NECPs in CEE countries shows that these do not reflect sufficient ambition for agriculture as none of the countries are projected to meet both their ESR and LULUCF target. This highlights the need for a step-change in mitigation efforts in agriculture and land management in CEE countries. Indeed, agriculture and land management receive very limited attention in current draft NECPs. The emphasis on quantitative climate targets also means that technical measures, which yield easily quantifiable emission reductions, are favoured over more holistic approaches, including agroecological practices, agroforestry, peatland rewetting, and dietary changes.

To avoid the risks of mitigation action undermining other goals and to develop synergies with environmental and public health needs, the NECPs should include explicit objectives for the increased implementation of agroecological practices, agroforestry and peatland rewetting as well as sustainable food consumption.

iii See https://ieep.eu/wp-content/uploads/2023/09/Transforming-EU-land-use-and-the-CAP-a-post-2024-vision-paper-IEEP-2023.pdf

As a minimum, countries should also aim to quantify the climate mitigation potential of their CAP interventions and develop national assessments for mitigation benefits from dietary changes. These quantifications can serve as a basis for evaluating the need for revisions of the CAP Strategic Plans and development of additional policies.

Developing policies for sustainable food consumption and reduced food waste

Sustainable food consumption is a key lever for sustainability transition in agri-food systems. To make progress in this area, a key first step is to shift the perspective from individual responsibility to the role that food environments play in determining food consumption.

Typically, a "consumer responsibilisation"[28] approach places the responsibility for sustainable choices in the hands of consumers, based on the assumption that enlightened consumers can make the "right" choice. This approach suggests that consumer demand determines market supply: if consumers stop demanding certain unsustainable products, their production will eventually cease. However, individual decisions are not made in isolation but are significantly influenced by the contexts in which they occur.

Factors such as the availability of sustainable products, pricing strategies, marketing tactics, and social norms shape decision environments and consumer behaviour. [iv]

Sustainable food consumption can be promoted by shaping the food environments in such a way as to ensure that sustainable and healthy products and meals are the most affordable, available, accessible, and enjoyable. Sustainable and healthy choices become the easy choices.

National and local food strategies can support the improvements in decision environments and ensure that the various policy instruments work together coherently. Various tools are available that can be part of this policy mix.

- Campaigns, food advertising and marketing address the socio-cultural contexts in which people make their decisions about food consumption. They can help to make a sustainable diet more attractive and desirable.
- Educational and advisory services can enable the acquisition of appropriate capabilities and competences to actively apply healthy and sustainable consumption e.g. through cooking skills, gardening skills, but also through the knowledge of the effects of an unsustainable diet and how to change this diet.
- Financial incentives have an influence on supply and demand and can thus reduce the consumption of products containing sugar or animal products, for example, and promote the consumption of fruit and vegetables or plant-based products overall.[23] The financial instruments include taxes, e.g. the meat taxation, the sugar tax, the withdrawal of the reduced VAT rate for animal products, the reduction of the VAT rate for fruit, vegetables and legumes to zero percent or the introduction of an excise tax on animal products.
- Out-of-home catering can effectively shape food environments as it represents an area of food consumption that has been growing for years. Ensuring a more sustainable supply within this sector is crucial for driving the transformation of the agri-food system, especially because public consumption helps shape standards and perceptions of what is considered normal. State actors hold direct influence over this market, particularly in organised catering for public authorities, schools, or hospitals. They can also establish procurement guidelines, legal regulations, advisory services, and standards. Furthermore, the communal catering sector can play a pivotal role in fostering the development of bio-regional and plant-based value chains.[29]

iv See e.g. SAM. (2023). Towards sustainable food consumption – Promoting healthy, affordable and sustainable food consumption choices (Publications Office of the European Union). European Commission, Directorate-General for Research and Innovation, Group of Chief Scientific Advisors. https://data.europa.eu/doi/10.2777/29369
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Setting clear goals, building societal support, and capacity

To speed up the development of the required policies for transition, several streams of actions[30] are needed:

1. Increase awareness of what are the key elements of the sustainability transition: how we produce food, dietary changes, and reduced food waste. A useful resource in this context is the webinar series "Climate Action in Agri-food Systems in Central Eastern Europe".
2. Develop proof of concepts in different countries and regions that will demonstrate the benefits of the sustainability transition for farmers and wider society.
3. Define clear and simple goals that can be easily recognised and broadly accepted, such as concrete goals for peatland rewetting, establishment of new agroforestry systems, area under organic farming, consumption of organic foods in schools, production of plant-based foods, ambitious animal welfare with outdoor access and grazing.
4. Build sufficient political and societal pressure around these goals.
5. Develop a broad coalition of societal actors working together to push for the setting up and implementation of concrete goals.
6. Increase capacities in different institutions and cross-sectoral coordination to support and sustain the transition.

These conditions build on and reinforce each other and can ultimately facilitate the wider transition towards climate-friendly and resilient agri-food systems in CEE countries.

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