TRANSFORMATION SCENARIOS FOR BOOSTING ORGANIC FARMING AND ORGANIC AQUACULTURE TOWARDS THE FARM-TO-FORK TARGETS

D3.1 EU-level CAPRI impact assessment for the organic sector

REPORT / PUBLIC

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AUTHOR(S)	Jarmila Curtiss, Davide Pignotti, Nicolas Lampkin, Alexander Gocht (Thuenen)
CONTRIBUTOR(S)	Michele Schiavo (IDDRI); Ambra de Simone, Boglarka Bozsogi, Susanne Padel (IFOAM EU); Raffaele Zanoli (UPM), Heike Kuhnert, Sebastian Neuenfeldt, Davit Stepanyan, XinXin Yang (Thuenen)
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Executive summary

Achieving the European Union's target of 25% organic farmland by 2030 is a cornerstone of the Farm-to-Fork and Biodiversity Strategies under the European Green Deal. Meeting this objective requires a profound transformation of European agriculture within a very short timeframe and across highly diverse national and regional contexts. Policymakers face two central challenges: understanding how organic expansion may unfold spatially under different drivers and assessing the economic and environmental implications of such a transition. This report addresses both challenges by combining a novel projection framework for organic area expansion with a comprehensive modelling of sectoral impacts using the CAPRI model.

A novel modelling framework to assess organic transition pathways

A key contribution of this report is the development of a spatially explicit and scenario-consistent modelling framework that bridges foresight narratives with a structural agricultural model. Organic area projections are generated externally using a logistic growth model, calibrated on historical data and regionalised to Member States and NUTS2 regions. This approach captures non-linear adoption dynamics and ensures consistency with long-term saturation levels and scenario-specific drivers, overcoming limitations of uniform scaling approaches used in many existing assessments.

The projections feed into a tailored implementation of organic farming constraints in CAPRI. Through region- and activity-specific shocks—covering restrictions on mineral fertilisers and pesticides, crop rotation requirements, and livestock stocking densities—the model simulates systemic adjustments in agricultural supply, land use, farm income, and environmental indicators across the EU. The framework enables a comparison of three transformative pathways developed in Work Package 2: *Green Public Policy* (GPP), *Organic on Every Table* (OET), and *Divergent Pathways* (DPW), alongside a *Business as Usual* trajectory and the *CAPRI Baseline*.

Pathways to 25% target and spatial diversity of outcomes

The results indicate that, relative to the CAPRI Baseline projection of 12% organic UAA by 2030, reaching the 25% target requires the conversion of roughly 20 million hectares of additional farmland to organic. However, the ability of Member States and regions to contribute to this expansion varies widely. The logistic growth model demonstrates stronger convergence across countries than implied by uniform proportional scaling, but still reveals persistent disparities, with some regions projected to exceed 40% organic area while others remain around or below 10%.

A comparison of the scenarios shows that the pathway taken matters substantially for the pace and distribution of organic expansion:

- In the GPP scenario, strengthened policy support generates broadly distributed growth and reduces disparities. Countries with currently low organic shares, including several in Eastern and Southern Europe, show the strongest acceleration. The structure of organic land use shifts from 51% to 63% arable, from 39% to 29% grassland and from 10% to 9% permanent crops.
- In the OET scenario, rising consumer demand, expanded organic value chains, and stronger emphasis on arable land conversion, drive rapid expansion in market-responsive Member States and arable-land dominant regions. This favours countries in Central Europe (including Czechia, Slovakia and Slovenia) and the Baltic States resulting in more pronounced cross-country differences and higher organic area concentration in regions where market development is feasible and represents significant potential for organic

expansion. The structure of organic land use shifts from 51% to 65% arable and from 39% to 24% grassland, with permanent crops unchanged at 10%.

- In the DPW scenario, uneven policy ambition, heterogenous market development, and diverging institutional capacities produce the most contrasting outcomes. Some countries reach levels above 35–40%, while others, particularly those with weaker administrative capacity or low domestic demand (mainly Eastern European Member States), see only marginal increases. The structure of organic land use shifts less than in the other scenarios from 51% to 61% arable, from 39% to 29% grassland and from 10% to 11% permanent crops.

Well-established organic hubs in Austria, Scandinavia, and parts of Southern Europe remain strong across all scenarios. However, the extent and location of catch-up growth vary considerably. Regions with favourable agronomic conditions, stronger policy incentives, or expanding domestic markets show significant increases, whereas regions constrained by structural factors, such as limited processing infrastructure or low public procurement performance, exhibit slower or stagnant growth.

Economic and agricultural system impacts

The CAPRI simulations show that achieving 25% organic area induces meaningful but manageable structural adjustments in EU agriculture. Reductions in mineral fertiliser use of around 40–50% (100% of synthetic nitrogen fertiliser) in converted areas, substantial declines in synthetic pesticide use, and imposed rotation and stocking constraints collectively lead to moderate yield reductions—particularly in cereals, oilseeds, and row crops. Aggregate agricultural production falls relative to the CAPRI Baseline, though the magnitude of the decline differs across scenarios and regions. Among the scenarios, the largest drop in total primary agricultural output is observed in DPW (–3.1%), followed by GPP (–2.9%), and finally OET (–2.7%).

Impacts are most pronounced in arable-dominated regions, where lower input intensity directly affects yields, cropping patterns, and profitability. Adjustments are smaller in regions dominated by extensive grassland systems, where current practices already align more closely with organic requirements and stocking density restrictions bind less strongly. In several Central and Northern European regions, increased reliance on fodder legumes alters feed availability and livestock composition, contributing to modest reductions in cattle and dairy intensity.

Farm income declines moderately at EU level, though with substantial regional variation. Income losses are generally larger in scenarios where organic expansion is concentrated in high-value arable systems with larger yield gaps.

- In the GPP scenario, broader and more evenly distributed expansion leads to comparatively smaller average income declines, reflecting both smoother structural adjustments and the role of policy incentives in stabilising margins.
- In the OET scenario, conversion is concentrated in market-responsive regions with more intensive cropping systems, resulting in larger income impacts, which however, are expected to be compensated to a greater level by prices due to stronger demand.
- In the DPW scenario, uneven uptake and mixed institutional conditions produce the widest spread of income outcomes, with some regions benefiting from diversification opportunities, while others face sharper declines due to structural rigidities.

These results underscore the importance of targeted support measures to buffer transitional income losses, particularly in arable regions with large yield gaps or limited access to organic value chains. Without such measures, the transition could widen regional disparities and undermine longer-term incentives for conversion, especially in Member States with weaker policy support or slower market development.

Environmental impacts of organic expansion

Across all scenarios, expanding organic farming delivers consistent and policy-relevant environmental gains. These improvements stem from substantial reductions in synthetic inputs and shifts toward more diverse and extensive production systems.

- Nitrogen surplus and overall nutrient pressures decline across the EU, with the strongest reductions, often exceeding 10–20% relative to the CAPRI Baseline, in regions characterised by intensive arable production. These decreases reflect both lower mineral fertiliser use and greater incorporation of legumes and temporary grass into rotations.
- Pesticide use falls sharply, with reductions in total active substances reaching 30–40% or more in Member States where organic expansion is concentrated in high-input arable systems. The scale of reduction differs by scenario, with the OET and DPW pathways achieving the largest declines due to greater conversion of pesticide-intensive crops.
- Greenhouse gas (GHG) emissions decrease relative to the baseline under all 25% scenarios. Sector-level GHG reductions are modest in aggregate (typically 2–5% below the CAPRI Baseline), but the impacts become more pronounced when expressed per hectare of newly converted organic land, where reductions frequently exceed 150–300 kg CO_2e/ha, reflecting lower input use and shifts toward more extensive livestock systems.
- Biodiversity-friendly farming practices improve across Europe, with OET and DPW generating slightly stronger responses than GPP. Regions with high arable crop shares and potential for reducing chemical inputs show the largest gains. Although the EU-27 BFPI increases by only 3–4.7% at the sectoral level, the implied biodiversity gain on the land that converts to organic is around 33–36%, highlighting the benefits of organic transition.

The magnitude and spatial distribution of these environmental benefits vary across scenarios, reflecting differences in where and how organic conversion occurs. These results underline the importance of spatially differentiated policy design, as environmental effectiveness depends not only on the scale of organic expansion but also on its geographical allocation and underlying land-use structure.

Policy implications

The analysis provides several insights relevant to the implementation of the EU's organic targets and future CAP design:

1. Achieving the 25% target requires strong acceleration of conversion in Member States with low current organic shares.
2. Policy design matters: pathways dominated by regulatory and financial incentives (GPP) yield more equitable and coherent outcomes than those relying primarily on market forces (OET).
3. Market development is crucial, particularly in countries with latent conversion potential but insufficient demand.
4. Spatial differentiation is essential: support instruments must reflect regional differences in agronomic potential, market conditions, and transition costs.
5. Environmental gains justify targeted investment: reductions in nutrient surpluses, pesticide use, emissions, and increases in biodiversity-friendly practices are substantial and aligned with wider Green Deal objectives; however, the environmental cost-

effectiveness of organic expansion varies significantly between land-use categories and regions.

6. Monitoring and adaptive governance are needed to manage risks of uneven development illustrated by the DPW scenario.

Key messages

- The modelling assesses the implications of achieving the 25% organic farmland target by 2030 under contrasting policy and market conditions. Differences in these conditions (drivers) produce distinct spatial patterns of organic conversion: policy-led expansion (GPP) yields more even growth, demand-led expansion (OET) concentrates growth in market-responsive countries, and divergent national trajectories (DPW) can exacerbate regional inequalities.
- Organic expansion to 25% of EU farmland would involve significant structural adjustments in the whole agricultural sector, resulting in lower average yields and moderate farm income reductions, but these impacts are spatially heterogeneous and can be mitigated through targeted support measures.
- The environmental benefits are robust across scenarios: reductions in nitrogen surplus, lower pesticide use, improved biodiversity-friendly practices, and decreased GHG emissions. However, these benefits vary spatially and depend strongly on the land-use structure and distribution of organic uptake.
- The modelling does not determine whether the 25% organic target is realistically attainable; the actual outcomes will depend on future consumer demand, market development, and Member States' policy choices under the CAP. Effective progress toward higher organic shares will require coherent policy support, market and value-chain development, and region-specific strategies, ensuring that environmental benefits are realised while managing the associated economic trade-offs.

Acronyms

AEI	Agro-Environmental Indicators
AGLINK	Agricultural Linkage Model
AGMEMOD	Agricultural Member State Modelling.
AKIS	Agricultural Knowledge and Innovation System
APRO	Agricultural Production Statistics (Eurostat code)
APRO_CPSH	Crop Production Statistics (Eurostat code)
APRO_LU	Agricultural Land Use (Eurostat code)
ARM	Armington Trade Specification
BAU	Business as Usual (scenario)
BFPI	Biodiversity-Friendly Farming Practices Index
BNF	Biological Nitrogen Fixation
CAP	Common Agricultural Policy
CAPEX	Capital Expenditure
CAPRI	Common Agricultural Policy Regionalised Impact Analysis
CEN	Central Europe North (macro-region)
CES	Central Europe South (macro-region)
CLMS	Copernicus Land Monitoring Service
COCO	CAPRI Consistent and Consolidated database
CO_2e	Carbon Dioxide Equivalent
DG	Directorate-General (European Commission)
DPW	Divergent Pathways (scenario)
EA	Economic Accounts (Eurostat code)
ECA	European Court of Auditors
EEA	European Environment Agency
EU	European Union
EU27	27 EU Member States
F2F	Farm to Fork Strategy
FADN	Farm Accountancy Data Network
FAOSTAT	Food and Agriculture Organisation of the United Nations Statistics
FIBL	Research Institute of Organic Agriculture
FSDN	Farm Sustainability Data Network
FSS	Farm Structure Survey (Eurostat)

GDP	Gross Domestic Product
GHG	Greenhouse Gas
GHGI	Greenhouse Gas Inventory
GPP	Green Public Policy (scenario)
GWP	Global Warming Potential
HHI	Herfindahl-Hirschmann Index
IFM-CAP	Individual Farm Model for Common Agricultural Policy Analysis
IFOAM	International Federation of Organic Agriculture Movements
IFS	Integrated Farm Statistics (Eurostat)
IO	Input–Output
IPCC	Intergovernmental Panel on Climate Change
IR	Ireland (macro-region)
LAU	Local Administrative Units
LSU	Livestock unit
LULUCF	Land Use, Land Use Change and Forestry
LUC	Land Use Change
LUS	Land Use Survey (Eurostat code)
MDI	Multi-Degradation Index
MS	Member State
NE	Northern Europe (macro-region)
NBP	Nitrogen Balance Position
NPK	Nitrogen, Phosphorus, Potassium
NUTS	Nomenclature of Territorial Units for Statistics
OAP	Organic Action Plan
OET	Organic on Every Table (scenario)
PEN	Pesticide Equivalent Number
RDP	Rural Development Programme
SDG	Sustainable Development Goal
SE	Southern Europe (macro-region)
SERI	Swiss State Secretariat for Education, Research and Innovation
UAA	Utilised Agricultural Area
WGI	Worldwide Governance Indicators
WP	Work Package
WTO	World Trade Organisation

ISO Country codes

AT	Austria
BE	Belgium
BG	Bulgaria
CY	Cyprus
CZ	Czechia
DE	Germany
DK	Denmark
EE	Estonia
EL	Greece
ES	Spain
FI	Finland
FR	France
HR	Croatia
HU	Hungary
IE	Ireland
IT	Italy
LT	Lithuania
LU	Luxembourg
LV	Latvia
MT	Malta
NL	Netherlands
PL	Poland
PT	Portugal
RO	Romania
SE	Sweden
SI	Slovenia
SK	Slovakia

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Declaration

The authors used OpenAI's ChatGPT for assistance with language refinement, formal notation checks, and drafting the Executive Summary, and Elicit for literature review. All AI-generated content was reviewed and edited by the authors, who accept full responsibility for the final text.

1 Introduction

Achieving the European Union's target of managing 25% of its agricultural land under organic farming by 2030, as set out in the Farm-to-Fork and Biodiversity Strategies of the European Green Deal, represents a transformative ambition for European agriculture. Organic farming is not only a production method; it is a pathway toward more environmentally sustainable, resilient, and health-oriented food systems. However, reaching this target by 2030 requires an unprecedented acceleration in organic conversion across highly diverse farming contexts. The scale and complexity of this transition pose significant challenges for policymakers, who need spatially detailed, analytically consistent, and empirically grounded tools to evaluate the implications of different development pathways.

While past studies have explored the impacts of organic expansion at national or EU level, many rely on static projections or simplified scenario tools that do not adequately capture the diversity of policy and market conditions shaping the organic transition. These approaches often lack spatial resolution or fail to account for the system-wide trade-offs between economic outcomes, food security, and environmental benefits. This deliverable, contributing to Work Package 3 of the OrganicTargets4EU project, addresses these gaps by linking empirically calibrated projections of organic growth with the CAPRI model.

CAPRI is a comparative-static, partial equilibrium model of the agricultural sector, developed to assess the regional and global impacts of agricultural and environmental policies. It is particularly well suited to the objectives of this study due to its detailed regional resolution at the NUTS2 level and its integrated environmental modules, which include greenhouse gas emissions and nutrient balances. Although the current version of CAPRI does not distinguish explicitly between organic and conventional production systems, it provides a robust framework for simulating structural change through the imposition of policy-based constraints and technical adjustments. In this study, CAPRI has been adapted to reflect key characteristics of organic farming, such as bans on mineral fertilisers, limits on pesticide use, crop rotation requirements, and stocking density constraints.

The modelling strategy adopted here follows a two-step process. First, projections of organic farming expansion are developed externally at the NUTS2 level, capturing the heterogeneous and non-linear dynamics of organic conversion across Member States and land use categories. These projections reflect the scenario narratives developed in Work Package 2 Participatory foresight and scenario analysis and serve as a bridge between foresight analysis and quantitative modelling. The analysis draws on three normative development pathways—Green Public Policy (GPP), Organic on Every Table (OET), and Divergent Pathways (DPW)—alongside a counterfactual Business as Usual (BAU) trajectory. Each scenario represents a distinct configuration of policy, market, and structural drivers, offering a rich basis for exploring how the organic transition might unfold across Europe.

In the second step, the projected organic shares are implemented in CAPRI through a series of region- and activity-specific shocks. This allows for an integrated assessment of the land use, economic, and environmental impacts of achieving the 25% organic farming target under each scenario, constituting the core modelling outputs of the study.

The remainder of this report is structured as follows:

- Chapter 2 presents the overall methodological framework, explaining how organic area projections are combined with the CAPRI model to simulate systemic impacts;
- Chapter 3 introduces the scenario narratives and outlines how their qualitative assumptions are operationalised for quantitative modelling;
- Chapter 4 describes the CAPRI model in more detail and explains how its supply and market modules were adjusted to reflect organic farming practices and policy targets;
- Chapter 5 outlines the methodology used to project organic area shares at regional level and across land use categories;
- Chapter 6 presents the results of the scenario analysis, including impacts on land use, production, market dynamics, farm income, and environmental indicators;
- Chapter 7 discusses the findings in relation to other studies and highlights both methodological innovations and limitations.
- Finally, Chapter 8 concludes with key messages for policy and research.

2 Methodological framework

The methodological framework applied in the OrganicTargets4EU project combines externally generated projections of organic farming expansion with the Common Agricultural Policy Regionalised Impact analysis (CAPRI) modelling system (Britz & Witzke, 2014). CAPRI serves as the main tool for the quantitative policy impact assessment. It is a global, comparative-static, partial equilibrium model of agriculture, with NUTS2-level supply modules linked to a global market module covering the rest of the world. This structure makes it particularly suitable for the project, as it allows regional adjustments in production and land use to be analysed consistently alongside international trade and price effects.

The version of CAPRI used in this study does not distinguish explicitly between organic and conventional farming systems, nor does it cover aquaculture. Ongoing collaborative work in several research projects (e.g., CAPRI OF, Horizon Europe projects ACT4CAP and LAMASUS) is extending the model to capture organic and conventional farming separately, but this functionality is not yet available. Results therefore reflect the aggregate effects on the entire agricultural sector of reaching different organic farming targets under alternative scenarios.

The framework therefore follows a two-step process: (1) external projections of organic area expansion at NUTS2 level, developed separately for arable land, grassland, and permanent crops; and (2) implementation of these projections in CAPRI through policy shocks reflecting organic farming regulations and practices on fertilisers, pesticides, crop rotations, and livestock density. CAPRI then translates the projected organic growth into system-wide impacts on production, markets, and environmental indicators. The following sections present the approach in greater detail.

The two-step methodological approach is summarised in Figure 1. It illustrates the sequential link between the external organic projections and the CAPRI modelling adjustments for organic systems, and the feedbacks captured within CAPRI across the agricultural, market, and environmental domains.

Step 1: External projections of organic area

Because CAPRI does not endogenously simulate organic conversion, projections of organic farmland expansion are developed externally. The projection framework represents organic farmland expansion as a non-linear adoption process, reflecting heterogeneous conditions across EU Member States. At its core is a logistic growth model that captures the typical pattern of early acceleration, mid-term slowdown, and eventual convergence toward a saturation level. The model is first calibrated at the EU level by fitting a logistic curve to historical organic area shares from 2000 to 2022, from which an aggregate saturation level is derived.

To translate this EU-level trajectory into country-specific pathways, we developed a regionalisation procedure that adjusts saturation levels to reflect cross-country differences. This adjustment is based on three indicator groups: (i) structural and biophysical characteristics (e.g., land use composition, soil and climate suitability), (ii) levels of policy support, and (iii) organic market development. These factors are used to rescale the EU saturation level to country-specific values. National growth rates are then calibrated against these saturation levels and historical trends to produce Business-as-Usual projections of organic farmland in 2030.

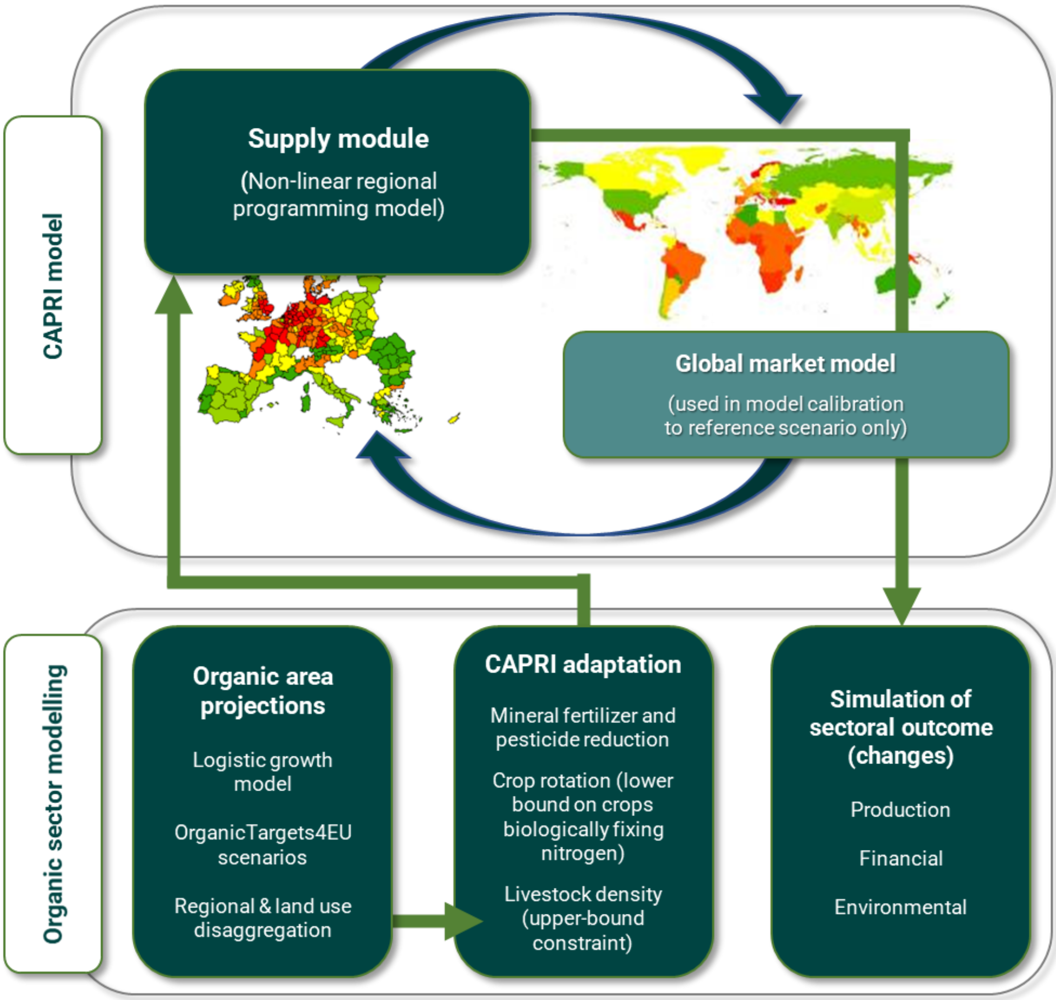


Figure 1: Modelling framework for EU 25% organic farmland target assessment

Source: own compilation

Using this framework, we developed scenario-specific projections based on the three 25%-target narratives formulated in OrganicTargets4EU. These represent contrasting incentive regimes: policy-driven (GPP), market-driven (OET), and spatially fragmented (DPW). The scenarios were operationalised by modifying the scaling factors that determine long-term saturation levels. Country-level projections were then generated by optimising growth rates within the logistic model to ensure consistency with both country-specific saturation levels by 2050 and the 25% EU-wide organic area target by 2030. Finally, the projections were disaggregated to NUTS2 level and across the major land-use categories to support integrated and spatially explicit policy analysis (see Figure 2 and Chapter 5 for more detail).

Step 2: CAPRI implementation

The externally generated projections are introduced into CAPRI via a set of policy shocks that reflect the main regulatory differences between organic and conventional farming. These include:

- bans and restrictions on mineral fertiliser use, in particular synthetic nitrogen fertiliser,
- reductions in synthetic pesticide availability,
- adjustments to crop rotations (increased shares of fodder and legumes), and
- livestock stocking density limits.

Other differences in farming practices—such as yield gaps between organic and conventional systems or differences in crop damage responses to pests—are not imposed as explicit shocks. Instead, they emerge endogenously from the restrictions applied to fertiliser use, pesticide availability, crop rotations, and stocking densities, together with the parameterisation of production activities at NUTS2 level.

These shocks are quantified by contrasting the external organic area and CAPRI Baseline projections and imposed directly in CAPRI's supply module at the NUTS2 and land use category level. This ensures that the projected 25% EU organic area share, including its spatial distribution, is achieved. While organic land shares are fixed exogenously, the supply module still adjusts endogenously through its internal mechanisms, such as nutrient balancing, feed allocation, and herd-flow dynamics. In turn, these adjustments feed into the market module, which determines changes in production activities, input use, prices, farm income, and environmental indicators such as greenhouse gas emissions and nutrient balances. Further details are provided in Chapter 4.

The two-step framework combines external projections of organic farming with the CAPRI modelling system in a complementary way. The projections provide plausible and heterogeneous pathways of organic growth at regional level, while CAPRI translates these trajectories into system-wide impacts on production, markets, and the environment. This integration mak4es it possible to assess the implications of reaching the EU's organic targets in a manner that is both empirically grounded and analytically consistent. In doing so, the approach delivers a methodological contribution by linking realistic projections of organic expansion with a robust modelling framework for policy impact assessment.

3 Scenarios

The analysis is structured around a set of policy and market scenarios that define alternative pathways for the development of organic farming in the EU to reach the 25% of agricultural land area target. These were developed as part of Work Package 2 of the project. The scenarios are introduced here directly after the data section because they provide the assumptions that drive and will be referenced in the subsequent modelling steps. In particular, the scenario narratives specify the policy, market, and structural conditions under which organic area expansion may occur. These assumptions are then operationalised in two ways: (i) through the external projection of organic farming areas described in Chapter 5, and (ii) through the implementation of corresponding shocks within the CAPRI modelling system described in Chapter 4.

The scenario narratives in the OrganicTargets4EU project were produced under the work package responsible for strategic foresight (WP2) through a structured normative scenario analysis. This entailed initial desk research, Delphi surveys to distil 15 critical uncertainties (most important and most unpredictable drivers) from 51 identified factors, and a two-day expert workshop of researchers and sector actors who co-developed four internally consistent "Push" and "Pull" scenarios. Each storyline was titled and elaborated into a short narrative integrating logical cause-and-effect sequences. These methods and full scenario narratives are documented by Zanoli (2024).

The organic area projections and CAPRI impact modelling tasks focus on three of the scenarios: Green Public Policy (GPP), Organic on Every Table (OET) and Divergent Pathways (DPW). The fourth scenario developed in WP2, Power to the People, with neither strong policy nor market drivers and more a citizen-driven approach, was difficult to interpret for modelling with CAPRI and so was omitted. Furthermore, we developed a Business as Usual (BAU) scenario that reflects the historic data trends adjusted by organic conversion heterogeneity among EU Member States stemming from climate-soil conditions differences, organic farming support in the last EU Programming Period (2014-2022), and national demand for organic produce (see Section 5.4).

In this section, we provide short scenario summaries and identification of key drivers of organic sector growth that allow the scenario narratives to be systematically translated into differentiated regional modelling assumptions for organic expansion.

3.1 Green Public Policy (GPP) scenario

In summary, organic sector development in the GPP scenario is primarily driven by a strengthened policy framework, building on the Green Deal, Farm to Fork, and Biodiversity Strategies, as well as CAP reforms that place strong emphasis on organic farming and agri-environmental support. Conversion is encouraged through enhanced financial incentives and regulatory standards, with priority to regions facing significant environmental stress such as climate change impacts, biodiversity loss, and soil or water degradation. Policy support is also differentiated by countries' budgetary capacity to co-finance organic support measures and by institutional ability to strengthen Agricultural Knowledge and Innovation Systems (AKIS) and supply chain development.

Since market dynamics play only a secondary role in this scenario, the operationalisation focuses mainly on direct policy incentives, under the assumption that market capacity will be sufficient to absorb the increased organic supply. Consumer demand trends are therefore not explicitly modelled in the organic area projections or in the CAPRI impact analysis. Regional differentiation reflects disparities in environmental and land-use conditions, socio-economic context, and regulatory capacity. The key drivers and their operationalisation are summarised in Table 1.

Table 1: Key drivers of the organic transition in the Green Public Policy scenario

Key drivers	Operationalisation (regional differentiation)
Strengthened policy incentives and regulatory support across all EU Member States.	All countries **increase** their **policy** support for organic farming.
	Countries with currently lower levels of organic farming support will see a significant increase in policy-driven incentives; **closing the relative gap in the policy support**.
Organic farming adoption rates reflect **regulatory standards** and **socio-economic conditions**.	Differences in **budgetary capacity** for co-financing organic support measures and incentivising the market.
	Variability in **regulatory** (institutional) **capacity** to support Agricultural Knowledge and Innovation Systems (AKIS) and supply chain development.
Policy support addresses **environmental stress/ conditions and land use characteristics** and sets land use type **prioritisation**.	Accounting for regional disparities in **environmental stress** (e.g., climate-induced degradation, biodiversity loss) and their interaction with **land use types**.
	Accounting for the **potential of specific land use types to mitigate environmental stress** through organic conversion.

Source: own compilation

Box 1: Green Public Policy scenario short narrative

The public's environmental concerns, including climate change and biodiversity loss, are shaping EU policies. European farmers are on the frontline of a public push for sustainable agriculture, driven by the urgency of climate change and extreme weather events. Public support is playing a crucial role in this transition. The new CAP emphasises stronger support for organic farming and agri-environmental measures, making organic production more appealing, especially for arable producers. The pig and poultry systems witness a transition toward localised feed sourcing, leading to reduced intensity. Grazing cattle and herds are maintained and supported by public policies aimed at biodiversity conservation. Overall, livestock numbers decrease alongside reduced consumer demand for meat and dairy products. The CAP's significant support for organic farming makes it the most attractive option for farmers. However, alternative standards lead to consumer confusion and unreliable private demand. Therefore, organic premium prices aren't guaranteed and can fluctuate. This is where robust public support from the European Union steps in. This support extends to research, education, and market development for organic products. Additionally, public institutions across Europe are increasingly buying organic, creating a stable and reliable market demand. National differences in public support and market development are reducing in importance. With the many emerging alternative standards (e.g., regenerative, outcome-based approaches) backed by large corporate players, the EU organic regulation remains the essential tool to ensure the continued growth of organic farming and maintain consumer confidence.

Source: Zanoli (2024)

3.2 Organic on Every Table (OET) scenario

In the OET scenario, the expansion of organic farming is primarily demand-driven, reflecting strong growth in domestic consumption of organic products, greater accessibility through mainstream retail channels, and reinforced public procurement policies under the Green Deal. Consumer preferences and improved availability of organic products are central to this transition, supported by supply chain development and the growing role of large retailers. At the same time, expanding European demand stimulates both imports and exports of organic produce, positioning trade as an additional driver of growth. Policy plays an enabling but secondary role by ensuring procurement incentives and facilitating supply chain adjustments. As in the GPP scenario, adjustments in animal production are not considered explicitly in the projections of organic area shares or in the subsequent CAPRI impact analysis.

In translating the OET scenario into projections of organic area shares and subsequent CAPRI model impact analysis, we operationalize three main groups of drivers (see Table 2). First, the scenario builds on a continued public policy trend under the Green Deal, complemented by a stronger role of green public procurement. Regional differentiation is introduced through national strategic and action plans for organic farming, while the procurement effect is modulated by public procurement performance indicators and the absorptive capacity of domestic organic markets. Second, the scenario assumes a rise in domestic consumption and accessibility of organic food. This is reflected in regional variation by organic retail sales, GDP per capita, and farm structure–linked consumption patterns, while accessibility hinges on the evolution of domestic supply and the role of large retailers in developing organic supply chains. Third, the scenario incorporates growing European demand for organic produce stimulating trade flows. Regional export potential is thus informed by agricultural export intensity, export structure, and the quality of market infrastructure and performance.

Table 2: Key drivers of the organic transition in the Organic on Every Table scenario

Key drivers	Operationalisation (regional differentiation)
Continued public (Green Deal) policy support trend, stronger green **public procurement policy.**	Regional differences in current policy support are informed by National strategic plans/action plans.
	Potential for green public procurement policy is differentiated by public procurement performance indicator and organic market capacity.
Growing organic market through the increase in domestic consumption and accessibility of organic produce.	Potential for domestic consumption differs with organic retail sales and GDP per capita, farm structure consumption patterns and farm structure
	Regional differences in accessibility of organic food reflect domestic supply shifts and supply chains development, with specific importance of large retailers
Growing demand in Europe stimulates **exports and imports (trade)** with organic produce.	Regional differences in organic export potential are informed by agricultural export intensity, export structure, quality of market infrastructure/market performance

Source: own compilation

Box 2: Organic on Every Table scenario short narrative

Public policy has long championed organic farming, but now consumer demand is reshaping the entire organic food chain, creating an organic market boom driven by big business. Public policy has long championed organic farming, but now consumer demand is reshaping the entire organic food chain, creating an organic market boom driven by big business. Consumers' desire for healthy, sustainable food at home, work, and restaurants is transforming the landscape. Public procurement thus drives the diets and/or the diets push the public procurement, as a reinforcing loop. The organic label is a trusted symbol of the values they care about—environmental responsibility, animal welfare, and potential health benefits. This recognition is pushing supermarkets, restaurants, and even schools to offer more organic options. Big business is strategically aligning itself with this consumer demand. Major retailers and processors are expanding organic product lines and getting directly involved in the food chain by partnering with or acquiring smaller organic players. This wider availability makes organic food more accessible to everyone. As competition rises, the price gap between organic and conventional shrinks. At the same time, alternative models like e-commerce, local box schemes, farmers' markets, and direct consumer partnerships are flourishing. These options empower farmers, giving them more control over the supply chain and allowing them to negotiate better deals with processors and retailers, ultimately capturing a larger share of the final consumer price. This shrinking price gap further fuels consumer demand, creating a virtuous cycle.

This market-driven approach is making organic food more accessible and affordable, creating a win-win for everyone: consumers get the food they desire, farmers benefit from increased market opportunities, and taxpayers welcome more sustainable farming practices without the need for increased public support. Organic farmers, empowered by a strong market and greater control in the supply chain, are seamlessly integrating organic principles with agroecology and regenerative methods. A surge in organic conversion for arable and permanent crops is driven by favourable market conditions reinforced by favourable policies and regulations. Livestock production faces challenges due to shifting dietary preferences: grazing animal farming remains localised, primarily in mountain and less favoured regions, while pig and poultry production is increasingly challenged by plant-based meat substitutes.

Source: Zanoli (2024)

3.3 Divergent Pathways (DPW) scenario

In summary, in the DPW scenario, pressures such as food security concerns, high inflation, and declining farm profitability result in a marked rollback of the Green Deal, triggering growing social fragmentation and a weakening of EU-level environmental policies. While some Member States or regions maintain robust organic policy frameworks and continued public engagement—sustained particularly through the efforts of organic NGOs and active local demand—others retreat toward conventional, productivity-driven agriculture. In the resilient regions, innovative, market-aligned solutions emerge: private actors, including retailers, foundations, and payments for ecosystem services, step in to support the organic transition. This results in the rise of organic districts—regional hubs focused on arable and livestock systems serving urban consumers and strategic export markets. Despite the fragmentation, stable price premia and concentrated supply chains enable continued organic growth in these dynamic clusters.

Based on this narrative, the organic transition becomes uneven across the EU: select Member States maintain robust organic policymaking and public engagement, while others retreat into conventional, productivity-driven agriculture. To capture this diversity, we proceed differently to previous scenarios. We cluster countries according to their current organic market performance and their levels of policy support for organic farming (see Appendix A2 for the details of the cluster analysis). Based on this clustering, each country is then assigned scenario assumptions closest to the observed development trend. Countries with policy-led organic sector are considered most consistent with either the GPP scenario, development in countries with strong organic countries are aligned with assumptions of the Organic on Every Table (OET) scenario, and countries less engaged in organic farming are assumed to follow the Business as Usual trajectory (see Table 3). This approach allows the scenario to reflect regionally divergent dynamics of organic sector growth, while maintaining consistency with the broader framework of scenario narratives.

Table 3: Country-clusters used in the Divergent Pathways scenario

<table>
<tr><th colspan="2" rowspan="2"></th><th colspan="3">Organic market activity</th><th rowspan="2"></th></tr>
<tr><th>High</th><th>Moderate</th><th>Low</th></tr>
<tr><td rowspan="3">Policy support</td><td>High</td><td>AT, DE, SE</td><td>EE, FI, IT</td><td>CZ, LV, PT, SK, EL, IE</td><td>Environmental policy-led countries (GPP)</td></tr>
<tr><td>Moderate</td><td>DK, FR, LU</td><td>BE</td><td>HR, LT, SI</td><td rowspan="2"></td></tr>
<tr><td>Low</td><td></td><td>ES, NL</td><td>MT, BG, CY, PL, HU, RO</td></tr>
<tr><td colspan="2"></td><td colspan="2">Market-led countries (OET)</td><td colspan="2">Countries less engaged in organic farming (Baseline)</td></tr>
</table>

Source: own compilation

Box 3: Divergent Pathways scenario short narrative:

Social and economic challenges increasingly outweigh environmental concerns, leading to a stronger emphasis on a productivist agenda and a rollback of the Green Deal at the EU level. As a result, organic farming develops unevenly across Member States and regions, with two contrasting situations emerging. In some countries or regions, governments continue to maintain or even strengthen their support for organic farming. Here, domestic consumption of organic products is actively promoted, and organic NGOs play a key role in sustaining public interest. High public engagement and demand in these regions stimulate not only domestic production but also imports from areas with less-developed organic consumption. This creates a dynamic similar to the policy-driven scenario but limited to certain Member States or regions rather than the EU as a whole.

In other contexts, environmental concerns persist but governments are no longer actively engaged. The agricultural sector becomes more fragmented, with organic farming developing in opposition to the dominant conventional model, deepening divisions between regions, farmer groups, and social constituencies. In these areas, NGOs and civil society step in to drive autonomous organic initiatives. Financing relies increasingly on private-sector sources such as organic companies, retailers, foundations, and payments for ecosystem services. Growth tends to concentrate in regional hubs and urban areas with higher purchasing power, while some countries or regions orient production toward exports. The concept of organic districts becomes more prominent in these fragmented landscapes.

Source: Zanoli (2024)

4 CAPRI model and organic targets implementation

CAPRI is the central quantitative tool used in OrganicTargets4EU to assess the economic and environmental implications of achieving the EU's organic farming targets at EU-level. This section introduces the model and explains how it has been adapted for the purposes of this study.

4.1 About CAPRI

At its core, CAPRI consists of two main components:

- **Regional supply modules**. These represent agricultural production at NUTS2 level in the EU. Each module covers the main crop and livestock activities and is calibrated to observed production statistics using Positive Mathematical Programming (PMP). Supply behaviour is determined by profit maximisation subject to constraints on land, nutrient balances, and policy obligations. This structure ensures that observed activity levels can be reproduced while allowing for realistic responses to policy shocks.
- **Global market module**. This is a spatial multi-commodity model with global coverage (around 80 country groups) and approximately 60 primary and secondary agricultural products. Trade is modelled under the Armington assumption, meaning products are differentiated by their place of origin. This allows bilateral trade flows to be captured and ensures that regional supply changes in the EU are transmitted to international markets.

The supply and market modules are linked iteratively: commodity prices from the market module enter the profit-maximisation problems in the regional supply models, while aggregate supply from the regions feeds back into trade balances. This iterative mechanism ensures that EU-level production decisions and global market adjustments are jointly determined.

Building on this general description, the next section (Section 4.2) describes the design and role of CAPRI Baseline and Section 4.3 details how the regulatory and technological requirements of organic farming are translated into CAPRI through targeted shocks to fertiliser use, pesticide availability, crop rotations, and livestock density. The Global market module was not implemented in this study due to the lack of appropriate data and specification of organic markets.

4.2 CAPRI Baseline

In CAPRI, policy impact assessments are conducted relative to a baseline, which represents the expected development of agricultural production, markets, and environmental indicators under current policies and macroeconomic assumptions. This baseline is aligned with the European Commission's EU Agricultural Outlook (AGLINK), incorporating consistent assumptions on macroeconomic growth, population, technological progress, and trade conditions. By design, the baseline does not anticipate major policy changes. Instead, it projects a continuation of existing policy frameworks, providing a stable reference trajectory. It includes a default, trend-based projection of organic area expansion, reaching approximately 12% of utilised agricultural area (UAA) by 2030[1].

[1] Although recent evidence suggests that this level may have already been reached by 2025 (Lampkin et al., 2025), CAPRI relies on organic area shares from Integrated Farm Statistics (IFS), which report lower shares of organic UAA than Eurostat agricultural production statistics (see Section 4.4). The EU Agri Outlook modelling also assumes a 15% saturation level for organic production, which is currently under review.

CAPRI is calibrated to this baseline, ensuring that its supply and market modules reproduce the reference trajectory under the assumed policy and market drivers. This calibration is critical, as it guarantees that deviations observed in scenario simulations can be attributed directly to the organic shocks and constraints introduced in the modelling, rather than inconsistencies in the baseline or input data.

While the CAPRI Baseline provides a robust aggregate projection of agricultural activity, it does not explicitly differentiate between organic and conventional production systems in terms of technological characteristics such as yields, input use, or management intensity. These distinctions are introduced only in the scenario simulations through aggregate shock implementations based on the IFS 2020 dataset (see Section 4.3). In this way, the CAPRI Baseline provides the reference trajectory for the regional agricultural sector, while the IFS data inform the technological adjustments needed to simulate organic conversion realistically.

4.3 CAPRI adjustments for organic sector and implementation of policy targets

An important feature of CAPRI for this project is its detailed treatment of nutrient balances and feed requirements. The model includes mass balances for nitrogen, phosphorus, and potassium, accounting for nutrient uptake by crops and supply from mineral fertilisers, manure, crop residues, biological fixation, and atmospheric deposition. Livestock production is represented through a biologically driven herd-flow model, which links births, herd development, and slaughter. Feed allocation is determined endogenously to meet nutritional requirements, linking crop and livestock modules closely. These internal mechanisms are particularly relevant when analysing organic conversion, as restrictions on fertilisers or pesticides propagate through the system via crop yields, feed supply, manure availability, and livestock production.

In addition to economic outcomes, CAPRI provides a detailed environmental accounting framework, including greenhouse gas (GHG) emissions, nutrient surpluses and biodiversity indicators. Non-CO_2 GHG emissions (nitrous oxide and methane) are calculated following IPCC Tier 2 methodologies, while CO_2 emissions are estimated from land use and land-use change (Leip et al., 2011; Pérez Domínguez et al., 2012; Pérez Domínguez et al., 2020). This integrated treatment of economic and environmental indicators makes CAPRI a powerful tool for assessing organic policy targets.

There are, however, limitations that are directly relevant for OrganicTargets4EU. CAPRI does not currently distinguish organic and conventional production systems endogenously, and aquaculture is not represented. As a result, organic area shares are imposed exogenously (see Chapters 5 and 6), and the impacts of organic conversion are captured through shocks applied to input use, activity constraints, and production structures.

The implementation of organic farming in CAPRI requires translation of the regulatory and technological specificities of organic systems into model-consistent shocks and constraints. This is necessary because CAPRI, in its current form, does not explicitly distinguish between organic and conventional production systems. Instead, the approach relies on adapting parameters and variables within the supply module to reflect the main empirical restrictions associated with organic farming.

In this section, we therefore examine the core areas where organic farming differs most fundamentally from conventional systems—nutrient management, pesticide use, crop rotations, and livestock density—and assess how these differences can be represented in CAPRI. For each domain, we first summarise the regulatory principles that shape organic practices. We then describe the modelling strategy used to approximate these principles within CAPRI, focusing on adjustments to input balances, activity constraints, or technical coefficients.

At the conclusion of each subsection, we provide a formal description of how the respective shock was implemented in CAPRI. In this way, the section serves as a bridge between the empirical characteristics of organic systems and their operationalisation in the modelling framework, ensuring that the simulated scenarios of organic area expansion remain consistent with both regulatory requirements and CAPRI's structural logic.

4.3.1 Nutrient Management

Specifics of organic farming

The supply of nutrients via the soil, and from the atmosphere in the case of nitrogen, is a fundamental aspect of organic farming. Table 4 presents an overview of the regulations governing nutrient inputs in organic systems, differentiated by nutrient type: nitrogen, phosphorus, and potassium.

Table 4: Crop nutrients in organic farming and their treatment in CAPRI

Nutrient	Organic regulations / permitted sources	In CAPRI?	Comments
Nitrogen (N)	Synthetic nitrogen fertilisers not permitted	Yes	
	Biological nitrogen fixation through legumes in crop rotations required	Yes	Reflected through increased clover in grassland and grain and herbage legumes in arable land; affects production response curves for the actual crop, but not subsequent crops.
	Atmospheric deposition also a source	Yes	Atmospheric deposition occurs in both organic and conventional systems.
Phosphorus (P)	Chemically processed mineral fertilisers (e.g., triple superphosphate) not permitted	Yes	Lower-P index soils may face negative P budgets; CAPRI does not restrict P explicitly.
	Recovered or natural sources permitted (e.g., struvite from sewage, rock phosphate, basic slag/ Thomas phosphate)	No	Limited and heterogeneous use; not represented in CAPRI.
Potassium (K)	Only crude potassium salts or natural-origin sources permitted (e.g., potassium chloride, potassium sulphate)	No	Organic-specific K regulations not explicitly represented in CAPRI.
Organic nutrient sources (NPK)	Maximum 170 kg N/ha UAA from animal manures (excluding factory farming)	No	Transport constraints, manure application methods, and bedding requirements not represented. Partly reflected in stocking rates assumed.
	Sewage sludge prohibited	No	Not represented in CAPRI
	Crop residues permitted without restriction	Yes	Reflected in nutrient balances
	Biogas digestate permitted	No	High nitrogen availability; not represented in CAPRI.

Nutrient	Organic regulations / permitted sources	In CAPRI?	Comments
	Composted or fermented household waste permitted	No	Rare in practice; not represented in CAPRI.
	Mushroom culture waste (if from permitted inputs)	No	Limited use; not represented in CAPRI.
	Other organic amendments (e.g. worm casts, guano, horn/bone/blood meal, stillage, sapropel) permitted	No	Use mainly in horticulture, negligible at regional scale; not represented in CAPRI.
Other considera-tions	Nutrient exports and losses	Partly	Protein content of harvested crops influences nitrogen exports (may be lower in organic). Lower N_2O and NO_3^- losses typically observed in organic systems, but only partly captured in CAPRI.

Source: own compilation based on EU organic regulations[2]

Implementation of mineral fertiliser restrictions in CAPRI

The organic farming regulations on mineral fertiliser use are represented in CAPRI by reducing the total application of mineral nitrogen fertilisers in a region. The model distinguishes five nutrient input sources: mineral fertilisers, crop residues, manure, biological nitrogen fixation (BNF), and atmospheric deposition. Mineral fertilisers are not further disaggregated by type (e.g., nitrate, urea), and organic fertilisers beyond manure are not explicitly modelled due to data limitations. Consequently, the mineral nitrogen fertiliser reduction (shock) implemented in this study applies only to the aggregate use of mineral nitrogen fertilisers. However, CAPRI's structure allows substitution among input sources. Thus, when mineral nitrogen fertiliser use is reduced, farmers can partially offset the loss by increasing manure application or by cultivating nitrogen-fixing crops.

The shock is introduced at the NUTS2 regional level by reducing mineral (nitrogen)[3] fertiliser application per hectare of total utilised agricultural area (UAA) in the region, proportionally to the decline in the share of conventional farming (between the reference and OrganicTargets4EU scenario), accounting for differences in conversion rates and mineral nitrogen use between land use categories. This corresponds to the assumption that mineral fertiliser (nitrogen) use in a region is entirely attributable to conventional farming, reflecting the restrictions of no mineral fertiliser use in organic farming. In other words, if a region's conventional area decreases by 10% relative to its reference, mineral fertiliser use in a region also decreases by 10%. The nitrogen fertiliser use from CAPRI Baseline serves as the reference regional fertiliser use.

The shock is calculated at regional level considering land use-specific organic shares and is implemented at regional level as follows:

$$Fert_r^{Total,SCEN} = \sum_l \left(Fert_{r,l}^{Total,REF} * \left(1 - \frac{UAA_{r,l}^{Conv,REF} - UAA_{r,l}^{Conv,SCEN}}{UAA_{r,l}^{Conv,REF}} \right) \right)$$

[2] https://agriculture.ec.europa.eu/farming/organic-farming/organic-production-and-products_en (accessed 3 December 2025)

[3] Although, the shock is applied to nitrogen fertilisers, CAPRI's nutrient balance framework ensures that the use of phosphorus and potassium fertilisers is reduced proportionally.

where:

- $Fert_r^{Total,SCEN}$ is the mineral nitrogen use per ha of total (organic and conventional) UAA in region r under a 2030 OrganicTargets4EU scenario, stemming from conventional farming in the region;
- $Fert_{r,l}^{Total,REF}$ denotes the mineral nitrogen use per ha of total UAA in region r and land use category l ($l \in \{arable\ land, permanent\ grassland, permanent\ crops\}$), in the reference (CAPRI) scenario;
- $UAA_{r,l}^{Conv,REF}$ is the conventional UAA in land use category l in region r in the reference scenario;
- $UAA_r^{Conv,SCEN}$ is the projected conventional UAA in land use category l in region r under each OrganicTargets4EU scenario.

This approach determines the total availability of mineral fertiliser in each NUTS2 region but does not specify how the reduction is allocated across individual crops or production activities. CAPRI does not permit mineral fertiliser shock disaggregation to land use categories or activities; instead, it captures only the aggregate effect at the regional level.

Increased biological nitrogen fixation in CAPRI

Another important aspect of nutrient management in organic farming is crop rotation. Fodder legumes, which enhance soil fertility and supporting nutrient cycling, are a cornerstone of organic farming. To account for the higher share of legumes typically present in organic rotations, we impose constraints on the minimum area expansion of nitrogen-fixing crops. This is described in greater detail in Section 4.3.4.

Animals and their manures are also an important part of the nutrient cycle. Introducing stocking rate constraints (see Section 4.3.3), to align CAPRI modelling better with organic farming practice, thus represents a powerful shock. By co-determining regional manure nutrient supply and through the internal nutrient balances, changes to animal density, reshapes land use, crop choice, and the scarcity value (shadow cost) of nutrients.

4.3.2 Pesticides

Specifics of pesticide use in organic system

Pest and disease management in organic farming is based primarily on preventive strategies such as crop rotation, resistant varieties, and ecological practices that enhance natural pest control. The use of synthetic pesticides is generally prohibited, with only a restricted set of natural or low-risk substances permitted under defined conditions. These may include mineral-based compounds, biological controls, or plant-derived substances, but their use remains limited compared with conventional systems. Table 5 provides an overview of the main pesticide categories and their permitted use in organic farming, together with their treatment in CAPRI.

Table 5: Pesticide categories in organic farming and their treatment in CAPRI

Pesticide category	Organic regulations / permitted sources	Addressed in CAPRI[1)]	Comments
Herbicides	Not permitted	Yes—100% reduction	May be reflected in higher labour and machinery costs
Insecticides	No synthetic pesticides; some natural substances, biological controls, soaps, and oils permitted	Yes—70%-100% reduction dependent on crop/activity	Mainly relevant in horticultural crops (vegetables, potatoes, permanent crops)
Molluscicides	Only ferric phosphate permitted	Yes—70%-100% reduction dependent on crop/activity (together with insecticides)	Mainly relevant in horticultural crops (vegetables, potatoes, berries)
Fungicides	Most prohibited; some alternative products such as sulphur and copper compounds allowed	Yes—50%-100% reduction dependent on crop/activity	Mainly relevant in horticultural crops (vegetables, potatoes, permanent crops)
Growth regulators	Not permitted	Yes—100% reduction	–

See Appendix A3 for the specific pesticide reductions per activity applied in CAPRI as a shock due to organic conversion.

Source: own compilation based on EU organic regulations[3]

Implementation of pesticide reduction in CAPRI

Although ongoing research projects (e.g., BrightSpace[4]) aim to map pesticide use by crop and active ingredient, the version of CAPRI applied in this study represents plant protection products at a "Tier 2" level. At this level, pesticide use is disaggregated into five categories: herbicides, fungicides, insecticides, other pesticides, and growth regulators. Applications are estimated using monetary data from FADN, with optimal pesticide rates per hectare derived from a damage-avoidance function. This function links pesticide quantities to reductions in yield losses and is specified with three unknown parameters. Pesticide use is optimised by balancing yield responses to pesticide applications against pesticide costs, so that expected net revenue per hectare is maximised relative to the no-damage benchmark. Restrictions on pesticide use therefore affect both yields and production costs across NUTS2 regions.

The pesticide reduction shock is quantified against the pesticide application levels per activity in the CAPRI Baseline scenario (the reference). Using this reference, the organic conversion factor (based on the decline of conventional area in the given land use category from reference to scenario) is applied to establish an upper limit on pesticide use per activity (in the given land use category) in each NUTS2 region. Individual caps apply to each pesticide categories ($Pestcat$), including herbicides, fungicides, insecticides, growth regulators and other pesticides. The resulting constraint is formalised as:

$$Pestuse_{r,act}^{SCEN} \leq Pestuse_{r,act}^{REF} \cdot \left(Orgshock_{r,act \in l}^{SCEN} \cdot Pestreduct_{act}\right),$$

[4] https://brightspace-project.eu/ (accessed 3 December 2025)

where:

- $Pestuse_{r,act}^{SCEN}$ denotes use of pesticides in a given category (category subscript supressed for simplification) in activity act in region r under a OrganicTargets4EU scenario;
- $Pestuse_{r,act}^{REF}$ represents CAPRI Baseline pesticide category use in activity and region;
- $Orgshock_{r,act \in l}^{SCEN}$ is the reduction in conventional area per activity in a region due to organic conversion in a land use category l, $act \in l$; the area shock is calculated analogously to the conversion shock in mineral fertiliser reduction in Section 4.3.1;
- $Pest\_reduct_{act}$ denotes pesticide reduction factor specific to pesticide category and activity due to organic conversion (see Appendix A3).

Within this limit, CAPRI endogenously allocates pesticide quantities across pesticide categories through economic optimisation. This constraint affects both yields and production costs of cropping activities, as input use is adjusted to reflect the new limitations.

4.3.3 Livestock production and feed input

Organic livestock system specifics

Organic livestock systems are generally managed extensively. Key principles include providing animals with access to open areas, limiting stocking density through maximum livestock units (LSU) per hectare, and ensuring that feed is primarily sourced regionally, ideally produced on-farm. These regulatory requirements are intended to promote animal welfare, reduce environmental impacts, and strengthen the link between livestock and land resources. Table 6 provides an overview of the main regulatory conditions for organic animal husbandry and their treatment in CAPRI.

Table 6: Fodder and livestock in organic farming and their treatment in CAPRI

Topic	Organic regulations / permitted conditions & treatments	In CAPRI?	Comments
Rearing	Animals must be reared as organic from birth or hatching; parent stock must also be organic (exceptions allowed).	No	CAPRI does not distinguish organic vs. conventional breeding stock.
Access to land	Systems must be land-based, with access to open areas and pastures when conditions allow. Organic animals must be kept on organic land; non-organic animals may use organic land under restrictions.	No	Detailed requirements (e.g., verandas, veterinary exemptions, seasonal access) are not represented.
Feed status	100% organic feed; at least 60% (70% from 2023) sourced from the farm itself or other organic farms in the region. No growth promoters or synthetic amino acids.	No	CAPRI does not model farm-level feed sourcing or nutrient composition rules.
Ruminant nutrition	Ruminants must feed on maternal milk; ≥60% of daily ration dry matter must be roughage, forage, or silage (may drop to 50% for dairy cows in early lactation).	No	Feed composition rules are not explicitly represented in CAPRI.
Farm conversion	Whole-farm conversion required, but parallel organic and non-organic livestock permitted if they are different species.	No	CAPRI does not track parallel conversion.
Stocking rates	Maximum 170 kg N/ha equivalent (converted to LSU by authority).	Yes	Implemented through livestock density constraints in CAPRI.

Topic	Organic regulations / permitted conditions & treatments	In CAPRI?	Comments
Housing requirements	Solid floors with bedding, adequate space, ventilation, and lying areas.	No	Housing systems not represented in CAPRI.
Conversion periods	Simultaneous conversion of land and livestock or specific conversion periods required.	No	CAPRI does not model transition periods.
Health care	Preventive health care emphasised; routine medication prohibited; synthetic treatments allowed only for disease.	No	Health care practices not represented in CAPRI.
Pigs	100% organic feed (30% from farm or regional organic farms); housing with solid, bedded floors; group housing; outdoor exercise areas permitting rooting/dunging; limited protein exemptions for piglets.	No	CAPRI does not model pig-specific housing or feed requirements.
Poultry	Organic feed; slow-growing breeds; ≥1/3 of floor area solid with litter; open access; max. 3,000 laying hens per compartment; outdoor runs vegetated and resting between flocks.	No	Breed restrictions, housing, and flock size limits are not modelled in CAPRI.

Source: own compilation based on EU organic regulations[3]

Implementing organic stocking rate in CAPRI

Because CAPRI does not distinguish between organic and conventional production systems and pigs and poultry rely heavily on imported feed, the analysis of organic conversion in livestock focuses on ruminants (cattle, sheep, and goats). These systems are directly linked to land use through grassland and fodder demand, while monogastric systems are underrepresented in the organic sector and less affected by land-based restrictions.

We introduce an explicit shock to the livestock system, which is implemented through an upper bound on livestock density, expressed in livestock units (LSU) per hectare of fodder area. This fodder area consists of grassland and other fodder crops on arable land (OFAR) including temporary herbage legume/grass mixtures. The upper bound is derived from observed differences in stocking rates between organic and conventional systems at NUTS2 level, using IFS 2020 data as the reference. This dataset provides crop areas, animal numbers (converted into LSU), and their classification by production system.

From these data, system-specific (conventional and organic) stocking rates are first calculated as the ratio of ruminant LSU to fodder area:

$$SR_{r,2020}^{s} = \frac{LU_{r,2020}^{s}}{FODD_{r,2020}^{s}} \quad for\ s \in \{ORG, CON\},$$

where LU_r^s denotes the number of ruminant livestock units in region r under system s, and $FODD_r^s$ is the corresponding fodder area.

An aggregate stocking rate in a region is then obtained as a weighted average of the two system-specific rates, with weights reflecting the relative fodder (grassland plus OFAR) shares of organic and conventional farming:

$$SR_r^{BASE} = \sum_{s\in\{ORG,CON\}} w_{r,2020}^{s} \cdot SR_{r,2020}^{s},$$

with

$$w_{r,2020}^{s} = \frac{FODD_{r,2020}^{s}}{FODD_{r,2020}^{ORG} + FODD_{r,2020}^{CON}}.$$

Scenario-specific stocking rates are calculated analogously, except that the reference fodder shares are replaced by the scenario-specific distribution of organic and conventional fodder:

$$SR_r^{SCEN} = \sum_{s\in\{ORG,CON\}} w_r^{s,SCEN} \cdot SR_r^s, \qquad w_r^{s,SCEN} = \frac{FODD_r^{s,SCEN}}{FODD_r^{ORG,SCEN} + FODD_r^{CON,SCEN}}.$$

The relative difference between the reference stocking rate and the scenario-specific value determines the shock factor SR_shock_r:

$$SR\_shock_r = \frac{SR_r^{BASE}}{SR_r^{SCEN}}.$$

This factor is then applied in CAPRI as an upper bound constraint on livestock density at the NUTS2 level:

$$SR_r^{SCEN} \leq SR_r^{REF} \cdot SR\_shock_r.$$

In CAPRI, the CAPRI Baseline stocking rate (SR_r^{REF}) may deviate slightly from the IFS 2020 reference (SR_r^{BASE}) due to model calibration. The formula therefore uses SR_r^{REF} as an anchor. In this way, the model constrains ruminant herd sizes in line with the observed differences in organic and conventional stocking intensities.

Other aspects of organic livestock production, such as longer growth periods, altered feeding practices, or lower yields, are not implemented as explicit shocks but are captured indirectly through CAPRI's biological herd-flow structure and its system-wide linkages. Because the model does not distinguish between organic and conventional animals or feed, detailed animal–feed interactions cannot be represented. Nonetheless, CAPRI reacts to changes in feed availability, such as those arising from fertiliser or pesticide restrictions in the crop sector, so that livestock adjustments are observed indirectly through the interaction of land use, input constraints, and feed balances. On the other hand, by impacting the regional manure nutrient supply and through the internal nutrient balances, the stocking rate shock impacts land use, crop choice, and the shadow cost of nutrients.

4.3.4 Crop rotation

Specifics of crop rotation in organic system

Crop rotation is a cornerstone of organic farming, serving to maintain soil fertility, manage pests and weeds, and enhance biodiversity. CAPRI, however, is a comparative-static model and therefore does not capture the temporal sequence of crops on the same plot across multiple years. Instead, it represents crop allocation at a single point in time. Within this static framework, a more diversified crop mix at the regional level serves as a proxy for rotational diversity, which is assumed to characterise organic systems.

In practice, organic systems rely more heavily on biologically driven processes, particularly through the use of herbage legumes (e.g., clover, lucerne) and grain legumes (e.g., peas, beans) that fix atmospheric nitrogen and contribute to nutrient cycling. Compared with conventional farming, organic crop rotations therefore tend to allocate a disproportionately larger share of arable land to grain and herbage legumes and fodder crops.

Implementation of organic crop rotation in CAPRI

In CAPRI, crop rotation is not modelled dynamically as sequences over time but represented through the static allocation of crop shares within arable land. To approximate the role of crop rotations in organic systems, we implement a lower bound on the area of OFAR (other fodder on arable land)[5] and PULS (grain legumes) in the different scenarios.

The procedure begins by calculating the share of organic arable land in the base period (IFS 2020):

$$OrgShare_r^{ARAB,REF} = \frac{OrgUAA_r^{ARAB,BASE}}{UAA_r^{ARAB,BASE}},$$

where $OrgUAA_r^{ARAB,BASE}$ is the organic arable land and $UAA_r^{ARAB,BASE}$ is the total arable land in region r in the base year 2020. The calculated organic share is adopted as the reference. The increase in the organic share between the reference and a given scenario is then:

$$\Delta OrgShare_r^{ARAB,SCEN} = OrgShare_r^{ARAB,SCEN} - OrgShare_r^{ARAB,REF} .$$

Next, for each activity $a \in \{OFAR, PULS\}$, the difference in their shares between organic and conventional systems is calculated from IFS 2020 data as:

$$d_{a,r}^{REF} = OrgShare_{a,r}^{BASE} - ConvShare_{a,r}^{BASE} .$$

The minimum increase in the activity share under a scenario is obtained by multiplying this difference with the change in the organic share of arable land:

$$\Delta OrgShare_{a,r}^{SCEN} = d_{a,r}^{REF} \cdot \Delta OrgShare_r^{ARAB,SCEN}.$$

The scenario-specific minimum activity share is then given by:

$$Share_{a,r}^{SCEN} = Share_{a,r}^{REF} + \Delta OrgShare_{a,r}^{SCEN} ,$$

where $Share_{a,r}^{REF}$ denotes the aggregate activity share in the IFS 2020 reference. Assuming constant arable land across scenarios, the corresponding activity area becomes:

$$UAA_{a,r}^{SCEN} = Share_{a,r}^{SCEN} \cdot UAA_r^{ARAB,REF}.$$

Finally, the relative difference between the baseline activity area and the scenario-specific activity area determines the shock applied in CAPRI:

$$Shock_{a,r}^{SCEN} = \frac{UAA_{a,r}^{SCEN}}{UAA_{a,r}^{BASE}}.$$

This factor is then implemented in CAPRI as a lower-bound constraint on the activity area (or share):

$$UAA_{a,r}^{SCEN} \geq UAA_r^{BASE} \cdot Shock_{a,r}^{SCEN} ,$$

for $a \in \{OFAR, PULS\}$. In this way, CAPRI enforces a minimum increase in legumes and fodder crops consistent with the observed differences between organic and conventional rotations, while leaving the model free to allocate additional area endogenously depending on relative profitability and policy conditions.

[5] The implemented shock exclusively regards temporary grassland, as the expansion of the legume share is simulated there, while the BNF potential accounted for in the CAPRI model for permanent grassland is held constant across all scenarios.

4.3.5 Other organic farming restrictions

No additional shocks are applied to other input categories (e.g., seeds, energy, labour) or to demand-side variables. This is for two main reasons. First, CAPRI already captures a high degree of interconnectivity within the agricultural system. Core shocks to fertiliser use, pesticide availability, and land use propagate through the model and trigger endogenous adjustments in yields, input use (including seeds and energy), production costs, and scarcity prices (shadow cost). Second, sufficiently detailed and harmonised data are lacking for several categories, particularly seed costs and components of final demand at the regional and activity level. This prevents the derivation of robust and meaningful shocks.

Furthermore, policy-related shocks, such as conversion and maintenance support payments for organic farming, cannot currently be represented, since CAPRI does not distinguish explicitly between organic and conventional farms.

In this study, we do not impose exogenous yield shocks. Per-hectare yields are kept at their calibrated coefficients for each activity–technology pair (T1 intensive, T2 extensive). This choice reflects two design considerations: (i) our CAPRI branch already represents multi-technology variants (T1 intensive, T2 extensive) per activity, which embody realistic input–output trade-offs; and (ii) adding separate, continuous yield penalties on top of these discrete technologies would risk double counting extensification effects and reduce calibration stability. Hence, any yield response arises endogenously from technology choice and crop composition rather than from an externally forced "yield curve." In addition, introducing realistic yield shocks requires evidence-based elasticities (such as crop- and region-specific fertiliser and pesticide yield elasticities/damage functions), which are unavailable.

Since CAPRI is calibrated to observed cost structures, these modelled adjustments reflect realistic substitution patterns. Imposing further explicit shocks would reduce the internal consistency of the simulation results. As a result, we rely on CAPRI's internal mechanisms to capture the broader system-wide consequences of the organic area increases.

4.4 Data

This section describes the data sources and processing steps used to construct a consistent dataset for the CAPRI supply module at NUTS2 level, distinguishing between organic and conventional production systems. It also provides the empirical basis for the organic area projections presented in Chapter 5. The focus is on the Integrated Farm Statistics (IFS), which provide the structural backbone for allocating organic and conventional production across crops and livestock. Additional sources are used to validate, harmonise, and supplement the IFS data, ensuring coherence with CAPRI activity definitions.

4.4.1 Main data sources

Several complementary data sources were combined to construct the dataset:

Farm Structure Survey (FSS 2010)

The FSS data provides EU-wide structural data on farms and serves as the historical baseline for CAPRI's calibration. It includes crop and livestock activities but while some organic production data are included, it does not systematically distinguish all individual organic activities from conventional production.

German FSS (FSSDE)

For Germany, a more detailed version of the FSS is available for 2010 and 2020. These data allow validation of IFS results and provide additional insights into the distribution of organic and conventional farming at regional level.

Integrated Farm Statistics (IFS 2010, 2020)

The IFS is the core dataset used in OrganicTargets4EU to describe the distribution of organic and conventional activities at NUTS2 level. It reports crop areas and livestock numbers classified by production system (organic vs. non-organic) and replaced the earlier Farm Structure Survey (FSS). Data for 2010 and 2020 were delivered by Eurostat specifically for this project, covering land use ("ef_lus_main") and livestock indicators ("ef_lsk_main").

IFS has several advantages. It is based on the full Agricultural Census (ACS) and triennial structural surveys (farm-level records aggregated to NUTS2), offering highly reliable information on farm activities and their regional distribution. However, the dataset also has limitations that are relevant for interpreting organic shares. To ensure consistency, the IFS 2020 data were validated against FSS 2010, FSSDE (for Germany), and Eurostat APRO statistics, with the following issues identified:

- *Lower reported organic area shares compared to Eurostat's Agricultural Production (APRO) statistics*. Differences between IFS/ACS and APRO arise primarily from definitional inconsistencies in how UAA is classified. For example, IFS do not include certain land categories, most notably permanent grassland not eligible for subsidies (J3000TXJ3000TE), which is sometimes important for organic farms. Also, in IFS/ACS, small farms below the survey size threshold are not included, which may lead to underreporting of organic areas. In contrast, APRO relies more heavily on certification and administrative data, which tends to capture organic areas more comprehensively.
- *Coverage differences between Member States*. Different treatment of common land across Member States in IFS data also creates discrepancies in organic areas when compared to other sources[6].
- *Confidentiality rules*. In some NUTS2 regions, provided IFS data are suppressed or aggregated to protect farm anonymity, which reduces the spatial and commodity details.

Because of these issues, organic UAA shares derived from IFS are systematically lower than those published in Eurostat's APRO tables. Nevertheless, IFS provides the most consistent EU-wide basis for distinguishing organic and conventional systems at regional level, which is crucial for linking with CAPRI[7].

CAPRI Time Series Database (1999–2018)

The CAPRI time series database provides harmonised data on agricultural production and input use at national and regional levels. It is constructed from multiple sources, primarily Eurostat and FADN, and complemented by further statistics, including national statistical yearbooks, data from agricultural ministries, and FAOSTAT. Within CAPRI, these data are mainly used to derive allocation shares that disaggregate broad statistical categories into CAPRI's specific activity aggregates. This ensures consistency between structural statistics (e.g. FSS/IFS) and the CAPRI modelling baseline. A detailed description of the database generation process is provided in the CAPRI manual (Gocht & Witzke, 2025).

[6] https://wikis.ec.europa.eu/spaces/IFS/pages/83690017/3.1+IFS+Core (accessed 3 December 2025)
[7] For more details on the gaps and inconsistencies in the EU organic farming statistics, see ECA (2023)

4.4.2 Dataset for CAPRI shock implementation

Together, these sources ensure that organic and conventional production can be consistently represented in CAPRI at the required spatial resolution. However, CAPRI activity categories differ from the crop and livestock classifications reported in FSS/IFS. The core CAPRI model itself is based on the usual consolidated and consistent dataset maintained by the CAPRI team, with a base year of 2017. The complete methodology for creating this foundational dataset is described in the CAPRI Manual (Gocht & Witzke, 2025).

The final dataset, which is used for deriving scenario-specific projections of organic growth (Chapter 5) and quantifying corresponding shocks (Section 4.3), combines IFS structural information with CAPRI activity categories. The IFS dataset distinguishes total, conventional, and organic crop areas and livestock numbers matching the CAPRI activity classification for each NUTS2 region. A mapping procedure was therefore applied to allocate IFS categories to CAPRI activities, both for crops (e.g., cereals, oilseeds, fodder) and for animals (e.g., cattle, sheep, goats, pigs, poultry). Full mapping tables are provided in Appendix A4.

While the augmented IFS dataset provides the most consistent EU-wide basis for distinguishing organic and conventional farming at the NUTS2 level, as explained above, several limitations were identified during its creation and validation. The most important of these are:

- Coverage of grassland: Permanent grassland not eligible for subsidies is incompletely captured in IFS, which may lead to underestimation of organic shares in regions with extensive grazing systems.
- Confidentiality restrictions: For some regions, especially at NUTS2 level, data are suppressed or aggregated to preserve confidentiality, reducing spatial detail.
- Definitional differences: Organic shares in IFS are generally lower than those reported in Eurostat APRO statistics, mainly due to different definitions and the treatment of common land.
- Regional heterogeneity: Discrepancies are larger for permanent crops and permanent grassland than for arable crops, which are reported more consistently in Eurostat APRO statistics.

5 Organic area projections

Because CAPRI does not endogenously distinguish between organic and conventional farming systems, scenario-specific projections of organic area are developed externally and then introduced into the model as exogenous inputs. These projections ensure that the EU-level target of 25% organic farmland by 2030 is consistently reflected across scenarios, while allowing for heterogeneous developments across countries, land-use types, and farming systems.

The organic area projections are designed to highlight the role of different drivers of organic growth, narrated by the scenarios outlined in Chapter 3, in shaping possible development pathways. Building on the structural dataset described in Section 4.4, the projections produce trajectories of organic growth at NUTS2 level for the three main land-use categories—arable land, grassland, and permanent crops. In doing so, they capture both the heterogeneity of farming systems across regions and the non-linear dynamics that typically characterise organic conversion processes. They thus provide a more realistic spatial representation of how the 25% target might be achieved under alternative conditions.

This section describes the methodology used to generate these projections, the data sources and assumptions applied, and the translation of scenario narratives into quantitative spatially differentiated pathways of organic area expansion. The resulting projections form the basis for implementing organic shocks in CAPRI (Section 4.3), thus for analysing the economic, environmental, and market implications of organic area expansion meeting 2030 organic targets (Section 6.2).

5.1 Methodological framework

The projection approach proceeds in three stages: (i) fitting an EU-level logistic growth model to historic data to derive baseline saturation levels of organic area shares; (ii) regionalising saturation levels and growth rates to obtain country-level projections, with scenario-specific adjustments and calibration ensuring that the EU-level organic share reaches 25% by 2030; and (iii) disaggregating the results to NUTS2 level using a conditional land-use distribution key. The overall framework is summarised in Figure 2.

The projection approach makes several methodological contributions. A central innovation is the use of a logistic growth model to capture the non-linear dynamics of organic area expansion. Unlike linear extrapolation, the logistic framework reflects the empirical reality that growth tends to slow as saturation levels are approached, thereby generating more plausible long-term projections. This adds both realism and internal consistency to the scenarios, especially when combined with calibration to ensure the EU-wide 25% target by 2030.

Another strength of the approach lies in its hierarchical structure. Starting from EU-level trends, saturation levels are regionalised to countries and then further disaggregated to NUTS2 level. This top-down sequence ensures that the OrganicTargets4EU scenarios are methodologically consistent with each other, as they build stepwise on the same reference structure while incorporating progressively more regional detail.

At the same time, the approach has limitations. Proceeding from aggregate to disaggregate levels inevitably introduces simplifications: country- and region-specific heterogeneity in farm structures, policy support, and consumer demand are only partially captured by the scaling factors used in the regionalisation. This also entails a potential aggregation bias: because the EU-level logistic growth curve is applied top-down, it may not fully reflect the diversity of regional dynamics. The calibration procedure, while effective at meeting the EU target, constrains projections mechanically to 25% by 2030 and may understate the uncertainty of alternative pathways. However, it is the objective of the projection design to reflect the OrganicTargets4EU scenario narratives. They should therefore be interpreted as plausible pathways under specified drivers, not as deterministic forecasts.

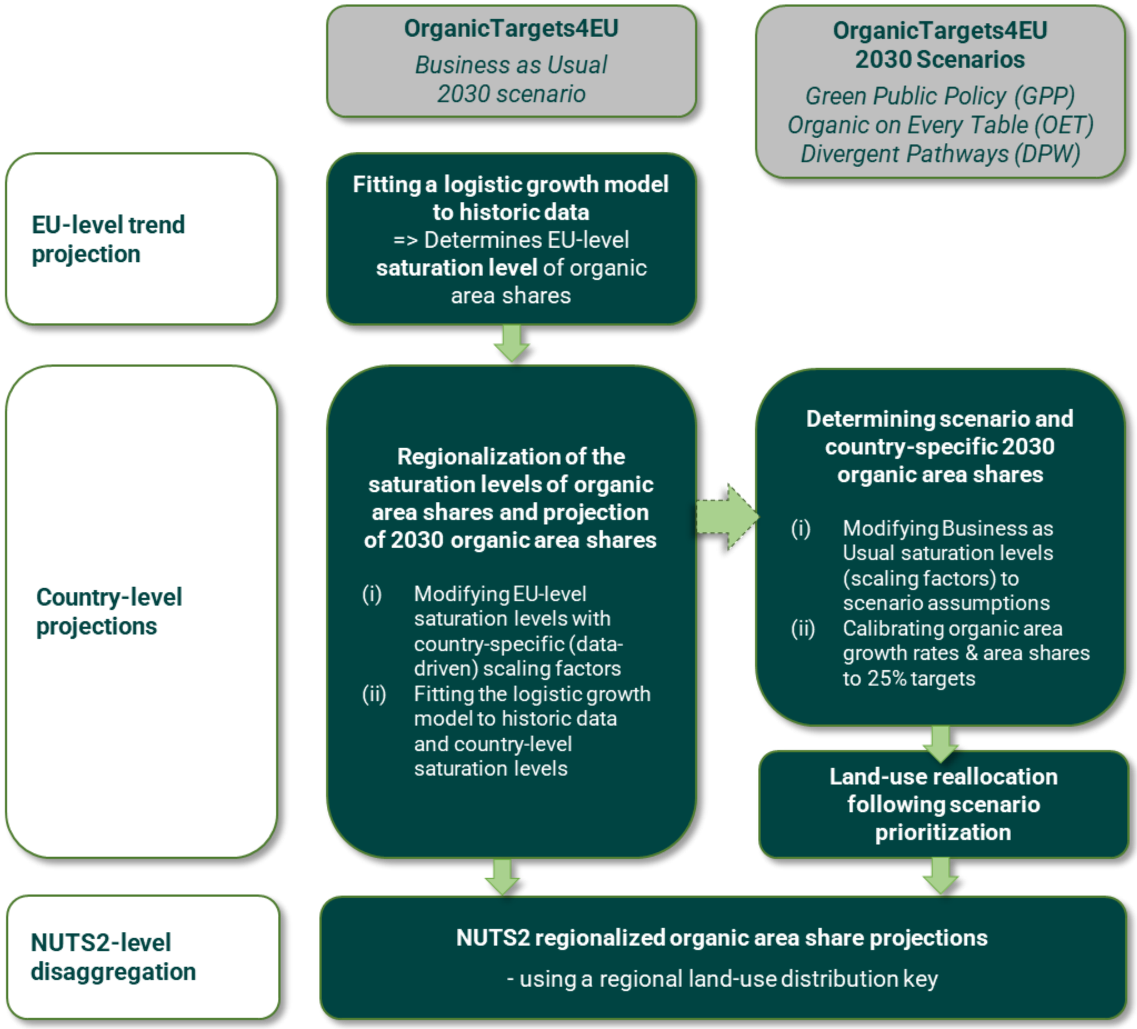


Figure 2: Methodological framework for organic area projections in OrganicTargets4EU

Source: own compilation

Taken together, the approach combines innovation and consistency. By embedding a logistic growth model in a hierarchical calibration framework, the OrganicTargets4EU projections provide a transparent and methodologically robust basis for exploring alternative development pathways towards the EU organic target. At the same time, the simplifications inherent in top-down disaggregation and target calibration underline the importance of cautious interpretation and of complementing the results with sensitivity analyses and contextual knowledge.

5.2 CAPRI Baseline organic area projections

An important contrast exists between the CAPRI Baseline and the OrganicTargets4EU scenario projections. In the CAPRI Baseline, which serves as the reference in the CAPRI simulations, organic area shares are scaled equally across all Member States, leading to a uniform growth trajectory that reaches only about 12% UAA by 2030 (Section 4.2). In contrast, the OrganicTargets4EU scenarios introduce non-linear and regionally heterogeneous growth patterns, reflecting country-specific drivers and scenario assumptions while ensuring that the EU-wide organic share reaches 25% by 2030 (except in the Business as Usual (BAU) scenario).

Within the CAPRI Baseline, organic farming is represented through a default linear projection of organic area expansion, derived from historical trends. The projection is implemented by scaling up the 2020 organic areas in all Member States by a factor of 1.4, which results in an EU-wide organic share of approximately 12% of utilised agricultural area (UAA) by 2030 in line with the Agricultural Outlook 2022.

The CAPRI Baseline trajectory thus falls well short of the Farm to Fork Strategy target of 25% organic UAA by 2030. It serves as the benchmark against which the OrganicTargets4EU organic area projections are compared. By contrasting the CAPRI Baseline projection with the scenario-based projections, the CAPRI analysis highlights how organic conversion outcomes differ not only in conversion scale but also when driven by different factors, resulting in different spatial and land use distribution.

5.3 Logistic organic area growth model for the EU

In the search for a robust model for EU organic area growth projections, we analysed FiBL Statistics data[8] on the share of organic agricultural areas in the EU from 2000 to 2022. Comparing linear and exponential trend lines unveiled that an exponential model provides a superior fit to the historical data. However, the extrapolation of this model yields extreme (high) projections of organic area shares in the long run, as diminishing rate of growth can be expected to set in eventually. To address this limitation, we considered constraints on the organic conversion and assumed a saturation level for the European organic area share. Such assumptions combined with a close to exponential initial growth is well depicted by a logistic growth model which also integrates a decelerating growth rate as such saturation threshold is approached. This model offers a structured approach to modelling the dynamics of the EU organic area expansion and was adopted for the Business-as-Usual (BAU) organic area growth projections as well as the projections under the scenarios developing alternative paths towards 25% organic area share target.

The formal mathematical representation of the logistic growth model is provided in Equation 1:

$$O_{t_n} = \frac{K}{1 + \left(\frac{K - O_{t_0}}{O_{t_0}}\right) \mathrm{e}^{-r \cdot t}}, \qquad (1)$$

where:

- O_{t_n} represents the projected organic area share at target time t_n (2023, 2024, ..., 2050),

[8] https://statistics.fibl.org/, accessed 3 December 2025.

- O_{t_0} denotes the historic (observed) organic area share at the initial time t_0 (2000). It sets the starting organic share and determines how far the region is from saturation,
- K is the organic area share capacity or saturation level. It is the maximum organic area share achievable, reflecting the potential for organic farming expansion under future conditions, which include land and climatic suitability, economic incentives (market demand and infrastructural development) and policy incentives assumed by the scenarios.
- r parameter is the intrinsic (annual) growth rate (expressed as a decimal),
- t denotes time in years from t_0.

The logistic equation naturally ensures an S-shape of the organic area growth. In the initial phase, i.e., at small O_{t_n}, the denominator is dominated by the exponential term, which leads to rapid, approximately exponential growth. When O_{t_n} is near midpoint ($K/2$), the growth rate is at its maximum. As O_{t_n} approaches K, the exponential term in the denominator becomes negligible, slowing growth asymptotically. The S-shape of the logistic model is intrinsic, thus does not require r to vary explicitly with K.

For the baseline projections, we first derived the EU-level growth rate r and saturation level K from EU historical data collected and provided by FIBL[9] (reconciled with Eurostat (database) values). We iterated over K values spanning from 20-40% and identified for each level r minimising the error of projection, i.e., the sum of squared differences between the observed and the projected organic area shares for 2000 and 2022:

$$Error = \sum_{t=2001}^{2022} \left(O_t^{observed} - O_t^{projected}\right)^2, \qquad (2)$$

Figure 3 illustrates the historical EU organic area shares alongside the linear, exponential trend lines, as well as the fitted logistic growth model (baseline). The Figure demonstrates the logistic trend starting from the organic area share in $t_0 = 2000$ (O_{2000}). The fitted trend corresponds saturation level K of 31% and growth rate r of 0.086. These model parameters delivered minimum prediction error of EU organic shares in the period 2011-2022.[9]

The next steps of the organic area share projection task, which is regionalisation and 25% organic area share target in scenario projections will aim at maintaining the integrity of the historical growth curve and the BAU projections.

[9] Best fit over the entire period 2000-2022 was delivered by the logistic growth model with the parameters r = 0.093 and K = 23, which would suggest that organic area share is currently near the growth breaking point (growth peak) of 11.5% and could be expected to slow down and not exceed 23% even in the long run. This model, however, delivers a slightly worse fit for 2011-2022, which depicts more recent conditions assumed to drive future trend more than initial conditions of 2000-2010.

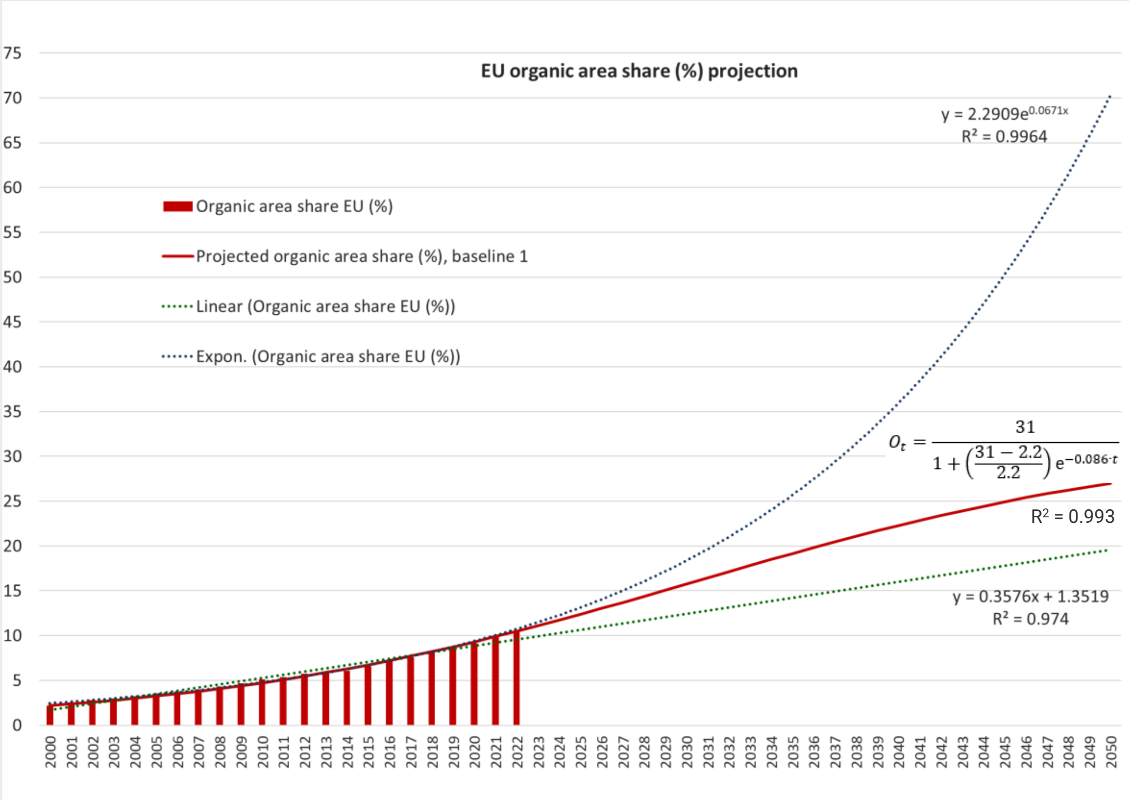


Figure 3: EU organic area share in 2000-2022 with EU-level Business as Usual trend projection (red line)

Red line represents the logistic growth projection based on Equation 1 with O_{2000} = 2.19%, K = 31%, and r = 0.086.

Source: own compilation

5.4 Regional Business as Usual projections

To account for regional heterogeneity, the following approach implements a regionally disaggregated BAU projection. It takes the EU-level organic area BAU projection as a central benchmark, ensuring coherence while allowing for spatial differentiation across Member States and regions. The approach follows three steps:

i. Determining regional (country-level) differences in the long-term potentials (saturation levels) for the organic area conversion, K;

ii. Deriving organic area growth rate r by fitting logistic growth model to historic country-level organic area shares and K levels from (i);

iii. Projecting country-level organic area shares 2030 using parameters derived in (i) and (ii) in the logistic growth model.

5.4.1 Regionalisation of organic area saturation levels

The parameter K represents the proportion of a country's utilised agricultural area (UAA) that could realistically transition to organic farming in the long term. In the BAU scenario, this maximum organic area share reflects the climatic, land use, and farming system potentials for organic conversion, given current political, economic, and market conditions. We incorporate the variability in K due to these natural and institutional conditions by applying following formula:

$$K_{BAU} = K_{EU\_BAU} \cdot \prod_i \delta_i, \qquad (3)$$

where K_{EU_BAU} is the organic area saturation level fitted to EU historical data (i.e. 31% as shown in Figure 3), and δ_i represents country-specific adjustment (scaling) factors—climatic and land suitability factor (δ_{clim_land}), policy factor (δ_{policy}), and market factor (δ_{market}). The country subscript is suppressed in the notation for simplicity.

To streamline the representation of scaling factor scores, we chose an approach of consolidating the factors into a finite set of representative values for clusters of countries rather than treating each country separately. Therefore, we first clustered EU member states based on indicators informing the three key domains.[10] This simplifies the analysis, reducing complexity while preserving the core conceptual distinctions necessary for assessing organic conversion potential. This ensures a more structured and interpretable framework for regional differentiation while maintaining a level of detail needed for robust analysis. Table 7 provides an overview of the variables used for clustering in each conversion drivers' domain—climatic and land suitability, policy support and organic market activity.

Climate and land use-based country clusters

The factor $\delta_{clim\_land\_suit}$ aims to account for regional variations in the maximum organic area share capacity (K) based on the region's climatic and land suitability for organic conversion. The factor is informed by the climatic zone typology from the European Environmental Agency (EEA) (see Figure 4). We assign the EU countries to five climatic regions. For countries with territories of multiple climatic zones, we consider the dominant one. Table 8 presents the resulting climate-based country clusters, with an additional distinction based on the share of permanent grassland.

Based on a literature review, these climatic regions may represent following relative advantages and constraints for organic farming:

Climate cluster 1: Countries in the *subtropical Mediterranean climate* excel in permanent crops such as olives, grapes, and citrus, which are well-suited to organic systems due to their adaptability to dry conditions (Kassam et al., 2010). However, hot, dry summers and water scarcity present significant challenges for organic farming, especially in arable systems (Wittwer et al., 2023). A significant challenge in this climate is the high prevalence of pests and diseases, which increases the need for organic pest management strategies (Lampkin & Padel, 1994). These may be mitigated by organic farming techniques such as agroforestry, cover cropping, and water-efficient irrigation (Altieri et al., 2018).

[10] For the country clustering, we used a hierarchical agglomerative cluster analysis based on Ward's minimum-variance method to group observations according to their similarity. After estimating the hierarchical tree, we visualised ten clustering levels to inspect how groups form and merge, allowing us to compare different levels of aggregation and select the most meaningful structure for further analysis.

Table 7: Variables used for regionalisation of EU long-term saturation levels of organic area shares

Scaling factor	Variable (unit, year)	Source
δ_{clim_land}	Main climates of Europe (categories, 2024)	European Environmental Agency (2024)
	Share of permanent grassland in UAA (%, 2020)	Eurostat (code: ef_lus_main)
δ_{policy}	UAA share receiving organic support (%, 2018)	Deliverable D1.2 (Lampkin et al., 2024)
	Organic support expenditures (€/ha UAA, 2018)	Deliverable D1.2 (Lampkin et al., 2024)
	Expenditures to land rent ratio	Deliverable D1.2 (Lampkin et al., 2024), Eurostat (code: apri_lprc)
	Organic area share (%, 2020)	FIBL Statistics
	Regulatory quality indicator (2023)	World Bank (2024)
δ_{market}	Organic retail sales value share of total food sales (%, 2022)	FIBL Statistics
	Organic retail sales per capita (%, 2021)	FIBL Statistics
	Organic retail sales per 1000 ha (%, 2021)	FIBL Statistics
	Agricultural exports per capita (Million €, 2020)	EC, Data Explorer (code: IMP_06 EU ag trade)
	Disposable income (2020)	Eurostat (code: tec00113)
	Logistic performance index	World Bank (2023)

For more detailed information on data sources, see Figure 4, Table 9 and Table 10.

Source: own compilation

Table 8: Country clusters based on climate zones and grassland share

Climate clusters	Share of permanent grassland in total UAA[a]		European climates[b]
	(a) Lower	(b) Higher	
1. Subtropical (Mediterranean) climate	CY, MT	ES, PT, IT, EL	1, 2, 3
2. Temperate maritime climate	DK	BE, NL, LU, FR, IE	4
3. Temperate transitional climate	LT, PL	CZ, EE, DE, LV	5
4. Temperate continental climate	RO, BG, HU, SK	AT, HR, SI	6, 7
5. Temperate cold climate	SE, FI		8, 9, 10

[a] The allocation of countries to lower and higher permanent grassland share groups is cluster specific, i.e., the threshold varies between clusters;

[b] See Figure 4.

Source: own compilation based on EEA (2024)

Climate cluster 2: The temperate maritime climate is a moderate climate with consistent rainfall, which supports a wide range of organic arable crops and livestock systems (Stolze et al., 2000). The cluster is characterised by moderate pest and disease pressure, which is manageable within organic systems (Lampkin & Padel, 1994). The year-round precipitation helps maintain soil moisture, reducing the need for irrigation and supporting soil fertility (Reganold & Wachter, 2016). However, excessive rainfall can lead to nutrient leaching and increased risks of fungal diseases, necessitating strategic crop rotations and soil management practices (Mäder et al., 2002).

Climate cluster 3: The temperate transitional climate serves as an intermediate zone between maritime and continental climates, featuring moderate temperature variations and seasonal precipitation. Organic farming is generally well-suited to this region due to a balance of soil fertility and manageable climatic risks (FiBL & IFOAM, 2022). The variability in temperature and precipitation patterns requires resilient crop rotations and organic soil amendments to maintain productivity (Lobell et al., 2011). This region is particularly favourable for mixed farming systems, including organic livestock and diverse crop production (Migliorini & Wezel, 2017).

Climate cluster 4: Temperate continental climate has warm summers and cold winters, which create climatic variability potentially impacting organic farming's sustainability (van Ittersum et al., 2013). Moderate rainfall levels and variable soil quality result in average suitability for organic systems (FiBL & IFOAM, 2022). This region may represent diversification opportunities aligned with organic farming (Lampkin & Padel, 1994). Extreme winter temperatures may limit the growing season, requiring cold-resistant crops or protective soil management practices (Lampkin & Padel, 1994). This climatic region presents opportunities for crop diversification, including organic legumes, cereals, and forage crops, which align with sustainable farming strategies (Altieri, 2018).

Climate cluster 5: Countries in the northern *temperate cold climate* benefit from low pest and disease pressure due to cooler climates, which aligns well with organic farming practices that minimise chemical use (Reganold & Wachter, 2016). High levels of soil organic matter and stable climatic conditions support fertility and sustainability in farming systems (Lampkin & Padel, 1994). The shorter growing season is a key constraint, but organic farming is particularly well-suited for grasslands and cereal production, as these crops can thrive under cooler conditions (Chanev, 2021). Perennial cropping systems and winter-hardy varieties help mitigate the limitations of a shorter season (Mäder et al., 2002).

Although certain climatic conditions may suggest high suitability for organic conversion, land cover and land use structures can pose constraints, making some regions less conducive to organic farming. Agricultural systems that are more adaptable to organic farming tend to be mixed arable-grassland systems. In regions with a higher share of permanent grassland, farmers can adopt a stepwise transition, beginning with organic pasture before fully converting their arable land. Higher share of permanent grassland can be also found in mountain and alpine regions that have cooler climates, and abundant rainfall, which make these regions highly suitable for organic (extensive) livestock systems (Niggli et al., 2009).

In contrast, regions with limited permanent grassland require direct conversion of arable land, which is both riskier and economically challenging, particularly in cold climates where organic yields tend to be lower. Organic livestock farms typically integrate permanent grassland for pasture-based feeding, reducing feed costs and increasing farm self-sufficiency (Lampkin & Padel, 1994; Sanders et al., 2016). A lack of permanent grassland, however, forces organic farms to rely on purchased feed, which is often expensive and imported from warmer regions where organic feed production is more viable.

Given the significant role of grassland in organic conversion, we introduce a second layer to the regional clustering, differentiating countries within the climatic clusters based on their share of permanent grassland (see Table 8, columns (a) and (b)).

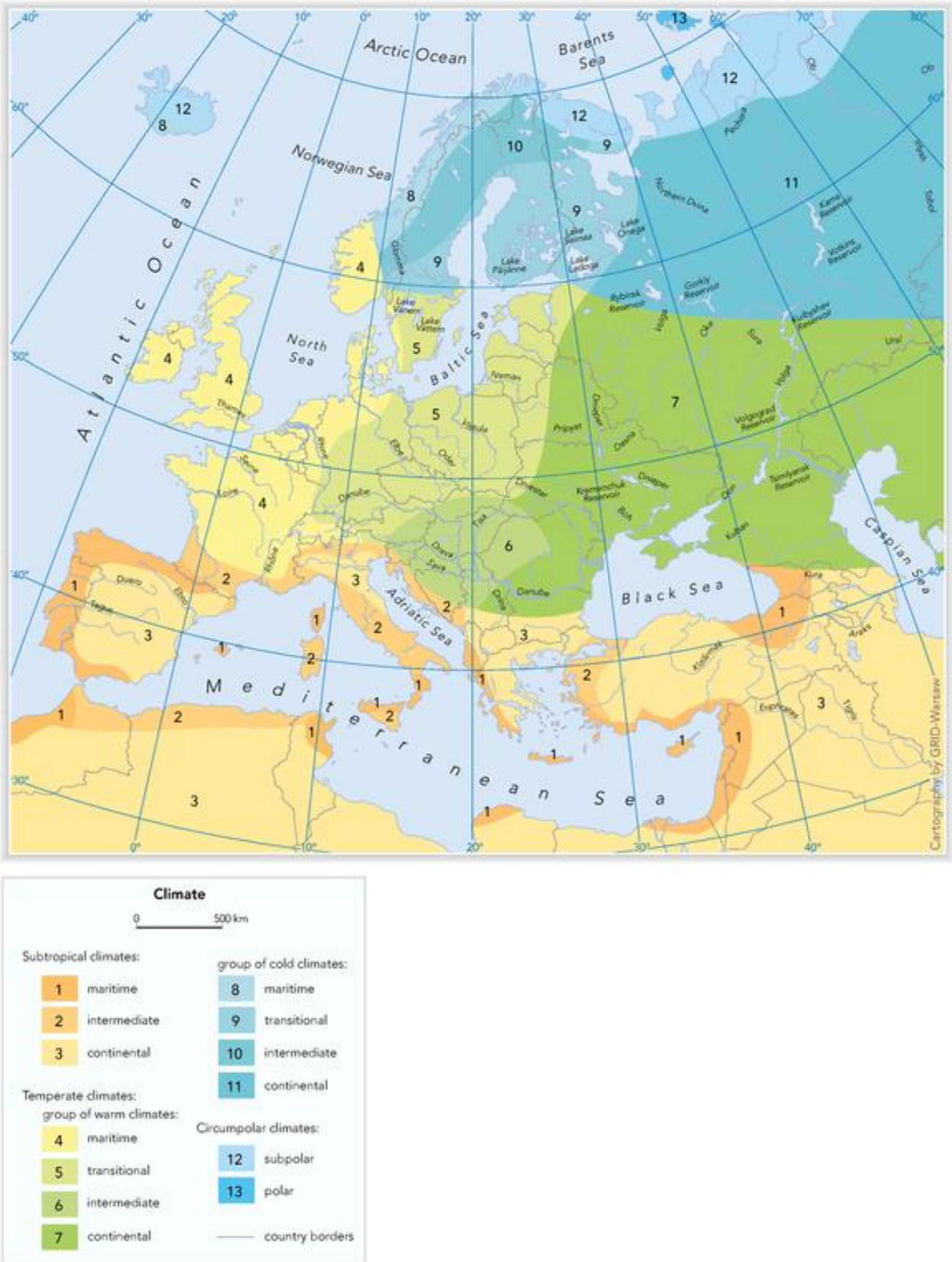


Figure 4: Main climates of Europe

Source: EEA (2024): https://www.eea.europa.eu/en/analysis/maps-and-charts/climate (published 25 January 2012, modified 20 September 2024, accessed on 3 December 2025)

Policy-based country clusters

The policy factor δ_{policy} captures the heterogeneity in organic farming policy support across countries during the most recent EU programming period. To establish an empirical foundation for this factor, we collected and analysed a range of indicators that reflect policy support levels as well as policy effectiveness. These are as follows:

- *Share of supported organic area in utilised agricultural area (UAA) (2018):* This variable represents the percentage of UAA receiving financial support for organic farming. A higher share indicates a stronger commitment to promoting organic agriculture through institutional and financial frameworks.
- *Expenditure per hectare organic UAA (2018):* This metric reflects the financial intensity of organic farming support per hectare. Higher payments suggest a greater level of investment in incentivising the conversion to and maintenance of organic farming systems.
- *Expenditure-to-land rent ratio:* This ratio illustrates the level of organic farming support payments relative to regional land costs. It provides a proxy of the *real support per hectare*, highlighting the attractiveness of organic farming in regions where land costs might otherwise present a barrier to adoption. A higher ratio signifies relatively stronger support, encouraging organic farming uptake.
- *Regulatory quality (2018):* Based on the Worldwide Governance Indicators, this variable measures the capacity of governments to design and implement effective policies and regulations. Strong regulatory quality is indicative of a conducive environment for organic farming, facilitating the development of robust networks, market access, and institutional frameworks.
- *Organic area share in UAA (2020):* This variable measures the proportion of UAA already converted to organic farming. A higher organic area share is often linked to a more developed organic farming sector, supported by well-established agricultural knowledge and innovation systems (AKIS) and networks of stakeholders such as processors, cooperatives, and retailers.

By examining the interplay of these variables, we were able to differentiate countries based on their level and type of policy support. Similar to the approach used for the climatic suitability factor, countries were grouped into clusters that exhibited comparable patterns of policy support.

In the clustering process, the highest weight was assigned to the variable representing the *Share of supported agricultural area*. For countries with moderate shares of supported area, the *Expenditure-to-land rent ratio*, which reflects the real level of support per hectare, was used as the secondary criterion. In contrast, for countries with low shares of supported area, the real expenditures were deemed less relevant. Instead, differentiation was based on the effectiveness of the regulatory framework, as measured by the *Regulatory quality* indicator. The resulting five clusters of EU countries, categorised by their policy support for organic farming, are presented in Table 9.

Table 9: Policy support indicators and policy-based country clusters

Policy clusters	Share of supported area 2018 (%)[a]	Expenditure 2018 (€/ha)[a]	Expenditure-to-land rent ratio[a,b]	Regulatory quality 2023[c]	Organic area share in UAA 2020 (%)[d]
1. Countries with high share of supported area					
AT	**19.4**	234	0.76	1.36	**25.7**
EE	**18.9**	99	1.30	1.43	**22.5**
CZ	**14.4**	105	0.85	1.30	**15.3**
LV	**13.5**	107	1.51	1.17	**14.8**
FI	**12.1**	205	0.83	1.77	**13.9**
SE	**11.8**	211	1.31	1.72	**20.3**
Average	***15.0***	*160*	*1.09*	*1.46*	***18.8***
2. Countries with high support payments and moderate share of supported area					
SI	**9.6**	210	**1.48**	0.73	10.3
SK	**8.2**	108	**1.89**	0.60	11.8
HR	**6.4**	350	**4.79**	0.64	7.2
LT	**6.2**	197	**1.88**	1.34	8.0
Average	***7.6***	*216*	***2.51***	*0.83*	*9.3*
3. Countries with moderate to low share of supported area and low real support payments					
BE	**5.9**	243	**0.81**	1.17	7.3
DE	**6.9**	261	**0.79**	1.46	9.6
DK	**8.5**	184	**0.33**	1.84	11.5
EL	**4.7**	390	**0.84**	0.58	10.2
ES	**4.3**	152	**0.97**	0.69	10.0
FR	**3.6**	173	**1.18**	1.15	8.8
IT	**8.5**	352	**0.42**	0.64	16.0
PT	**5.7**	124	**1.03**	0.76	8.1
Average	***6.0***	*235*	***0.79***	*1.04*	*10.2*
4. Countries with low share of supported area, higher regulatory quality					
LU	**3.8**	258	0.96	**1.93**	4.6
IE	**1.6**	111	0.34	**1.75**	1.7
NL	**0**	0	0.00	**1.79**	4.0
Average	***1.8***	*123*	*0.44*	***1.82***	*3.4*
5. Countries with low share of supported area, lower regulatory quality					
MT	**0.1**	374	4.30	**0.69**	0.8
CY	**3.5**	805	8.94	**0.78**	4.4
PL	**2.4**	138	0.55	**0.78**	3.5
HU	**2.2**	186	1.08	**0.32**	6.0
BG	**1.4**	354	1.60	**0.41**	2.3
RO	**1.4**	232	2.90	**0.32**	3.5
Average	***1.8***	*348*	*3.229*	***0.55***	*3.4*

Source: own compilation based on: [a] Lampkin et al. (2024, p.11-14), [b] Eurostat (code: apri_lprc): https://ec.europa.eu/eurostat/databrowser/view/apri_lprc/default/table?lang=en (accessed 20 October 2024); [c] World Bank (2024); [d] FIBL Statistics https://statistics.fibl.org/ (accessed 1 December 2024)

Policy cluster 1: Countries with a high share of supported area

Cluster 1 represents countries which exhibit the highest shares of UAA receiving organic support, ranging from 11.8% to 19.4%. This indicates strong institutional commitment to organic farming through policy measures. Another variable marking the cluster are comparatively high organic area shares, ranging from 13.9% to 25.7%. These indicate mature and well-established organic farming systems, with a higher capacity to complement and support further organic sector development. The policy factor is expected high reflecting stronger government prioritisation of organic farming compared to countries in the remaining clusters. These countries are thus expected to maintain steady policy-driven organic sector growth in the upcoming period.

Policy cluster 2: High support payments and moderate share of supported area

Cluster 2 groups countries with significant financial incentives for organic farming (high real support compared to land costs), but with moderate levels of organic land coverage. The policy factor should highlight their substantial but not leading position in organic farming support, and a developing organic sector with room for growth. The financial incentives complemented with lower land and labour cost as well as suitable (heterogenous) farm structure suggest potentially high effectiveness of the policy support (high farm response to the policy support).

Policy cluster 3: Moderate share of supported area and low real support payments

Cluster 3 includes countries where organic farming is moderately developed (similar to Cluster 2) but receives relatively less real financial support per hectare (lower expenditure-to-land rent ratios with an average of 0.79). Organic area growth in these countries may depend more on market and structural incentives rather than direct financial support.

Policy cluster 4: Low share of supported area, higher regulatory quality

Cluster 4 comprises countries with lower prioritisation of organic farming within their agricultural policy frameworks, small organic sectors but strong governance systems. Despite this, their high regulatory quality suggests higher effectiveness of the adopted (yet low) policy measures (when compared to Cluster 5). It may translate into well-functioning governance frameworks for future organic farming policies if financial and institutional support is increased, which is to be considered in the policy-driven GPP scenario.

Policy cluster 5: Low share of supported area, lower regulatory quality

Cluster 5 represents countries with the least subsidised and least developed organic sectors. In the business-as-usual conditions, the sectors' future capacity to convert to organic farming is expected to be constrained by both limited prioritisation of organic farming and low regulatory quality. The policy factor should underscore the need for addressing institutional weaknesses and enhancing both financial and structural support to foster organic sector growth.

Market-based country clusters

Similar to the heterogeneity in the policy support, we analysed the heterogeneity in organic market activity across EU countries to define country clusters to be assigned relative values for the market factor (δ_{market}). The availability of indicators for organic market development is limited, primarily consisting of data on organic retail sales and their share in the total agricultural produce sales. Unfortunately, data on trade flows of organic products is available for less than half of EU countries and, therefore, could not be fully incorporated into the clustering process. The resulting country clusters, along the core clustering variables, are presented in Table 10.

Table 10: Organic market indicators and market-based country clusters

Market clusters	Organic market share 2022[a] (%)	Organic retail sales 2021[a] (€/person)	Organic retail sales 2021[a] (k€/ha)	Agric. exports 2020[b] (k€/person)	Disposable income 2020[c] (k€/year)	Logistic performance score[d]
1. Countries with well-developed organic markets						
AT	**11.3**	**267**	**0.856**	1.50	**26.8**	4
DE	**6.3**	**191**	**0.903**	0.90	**30.1**	4.1
DK	**12.0**	**384**	**0.855**	2.64	**24.6**	4.1
FR	**6.1**	**187**	**0.440**	11.38	**25.2**	3.9
LU	**8.2**	**306**	**1.293**	1.86	**34.3**	3.6
SE	**8.2**	**264**	**0.730**	0.57	**24.3**	4
Average	***8.7***	***617***	***1.716***	***3.14***	***27.5***	***4***
2. Countries with moderately developed organic markets						
BE	**3.7**	85	**0.652**	3.58	26.7	4
EE	**4.6**	70	**0.078**	0.94	17.5	3.6
ES	**2.5**	248	**0.481**	4.93	15.2	3.9
IT	**3.6**	62	**0.291**	0.79	22.5	3.7
NL	**4.4**	79	**0.750**	5.37	26.7	4.1
FI	**2.2**	9	**0.017**	0.04	19.6	4.2
Average	***3.5***	***92***	***0.378***	***2.6***	***21.4***	***3.9***
3. Countries with emerging and underdeveloped organic markets						
CZ	1.6	**22**	**0.064**	0.76	21.0	3.3
HR	2.2	**26**	**0.066**	0.59	15.3	3.3
IE	2.7	**36**	**0.044**	2.60	21.8	3.6
LT	1.0	**18**	**0.017**	1.99	20.1	3.4
LV	1.5	**27**	**0.026**	1.63	15.0	3.5
SI	1.8	**23**	**0.100**	1.03	19.8	3.3
BG	1.0	**5**	**0.007**	0.74	16.1	3.2
CY	2.0	**11**	**0.074**	0.47	22.0	3.2
EL	0.3	**1**	**0.002**	0.10	26.2	3.7
HU	0.3	**3**	**0.006**	1.00	16.1	3.2
MT	2.0	**1**	**0.057**	0.20	20.5	3.3
PL	0.6	**9**	**0.022**	0.87	19.2	3.6
PT	2.0	**2**	**0.005**	0.64	18.4	3.4
RO	0.2	**2**	**0.003**	0.37	16.1	3.2
SK	1.0	**9**	**0.026**	0.58	16.6	3.3
Average	***1.3***	***13***	***0.035***	***0.90***	***18.9***	***3.4***

Source: own compilation based on: [a] Fibl Statistics: https://statistics.fibl.org/ (accessed 1 December 2024); [b] EC, Data Explorer (code: IMP_06 EU ag trade): https://agridata.ec.europa.eu/extensions/DashboardIndicators/DataExplorer.html (accessed 20 October 2024); [c] Eurostat (code: tec00113): https://ec.europa.eu/eurostat/databrowser/product/page/tec00113 (accessed 15 October 2024); [d] World Bank (2023).

Market cluster 1: Countries with well-developed organic markets

These countries exhibit well-developed organic markets supported by high domestic demand as depicted by the high share of organic sales in agricultural produce sales, high retail sales per capita, and high households' disposable income. Their leadership in organic market development is expected to be reflected in higher organic area shares.

Market cluster 2: Countries with moderately developed organic markets

Cluster 2 groups countries with moderately developed organic markets characterised by market shares ranging from 2.2% (FI) to 4.6% (EE). Organic sales per capita are generally lower than in Cluster 1, however, mostly higher disposable income of households may hold potential for further growing demand.

Market cluster 3: Countries with emerging and underdeveloped organic markets

Countries in Cluster 3 are marked with lower normalised organic retail sales (per capital and per hectare of UAA) and mostly lower households' disposable income when compared to the first two clusters. This may indicate markets with relatively constrained consumers' purchasing power but also underdeveloped or developing markets. The low value of the World Bank indicator of Logistics Performance Index, particularly in its aspects of logistics competence and quality, and tracking and tracing score, suggests less developed market infrastructure in these countries.

5.4.2 Scaling factors for organic area saturation

To introduce an evidence-based adjustment to organic conversion saturation level (long-term organic area share potential, K_{BAU}), i.e., to identify the levels of the country cluster-specific scaling factors δ_i, we analyse *cluster-related variation in the observed organic area shares across EU Member States*. The variation in the observed organic area shares across EU Member States, O_{2020}, is thus considered proxy for the variation in K_{BAU}. We use organic area share data from the year 2020, as it provides the most comprehensive statistics available.

We estimated beta regressions of O_{2020} using climate, policy, and market clusters as covariates (factor variables). This type of analysis is chosen due to the nature of the dependent variable (ratio between 0 and 1) and its skewed distribution. This approach allows us to assess factor-related differences between the regional clusters in the organic land conversion rates and assign them with accordingly differentiated scaling factor values.

Beta regression results

The results of the beta regressions of four model specifications are documented and discussed in Appendix A5. Because the sample size is limited to merely 27 Member States, we rely on estimates of the parsimonious model M3 (without control variables). This allows us to ensure statistical reliability while extracting meaningful insights. Although models with control variables may suffer from the potential problem of overfitting, they also capture meaningful relationships and are used for sensitivity analysis of core variable estimates (see Appendix A5 for more detail).

The estimated coefficients (Table A7) and derived conditional means presented in Figure 5 (along with 95% confidence intervals) suggest that countries in the market cluster 1 (Market CL1) have the highest organic area shares when compared to other clusters, followed by market cluster 2 and lastly market cluster 3 (reference group); all with statistically significant differences. This result is consistent with our assessment of organic market activity across the clusters and validates the clustering. This provides a useful approximation of the relative organic growth potential provided by the existing market conditions specific to the countries in the three clusters.

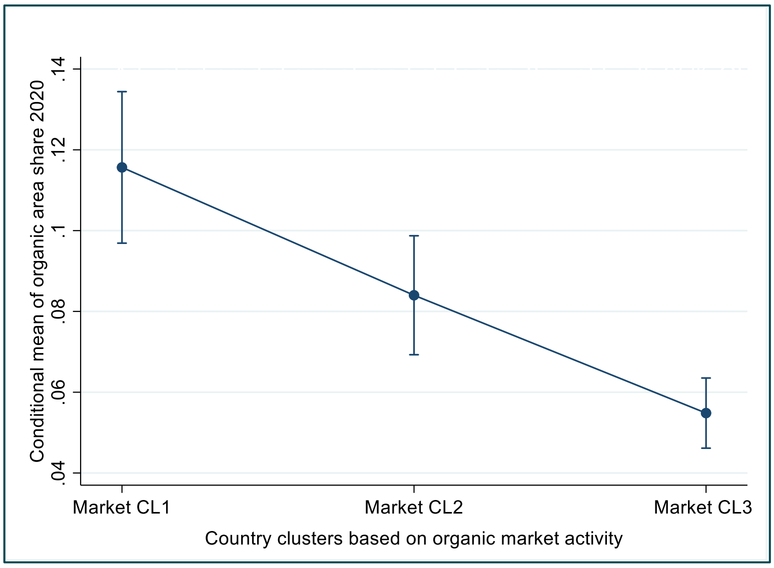


Figure 5: Conditional means of organic area shares 2020 by market clusters (with 95% confidence intervals)

Based on parameter estimates of model M3 in Appendix A5; See Table 10 for countries in each cluster.

Source: own compilation

Similar to the organic market variable, the parameter estimates for the policy clusters suggest that the organic conversion rate is strongly positively related to organic policy support. The organic area shares differ statistically significantly between all policy clusters, except Pol CL4 and 5. Figure 6 illustrates the conditional organic area share differences across the five policy clusters.

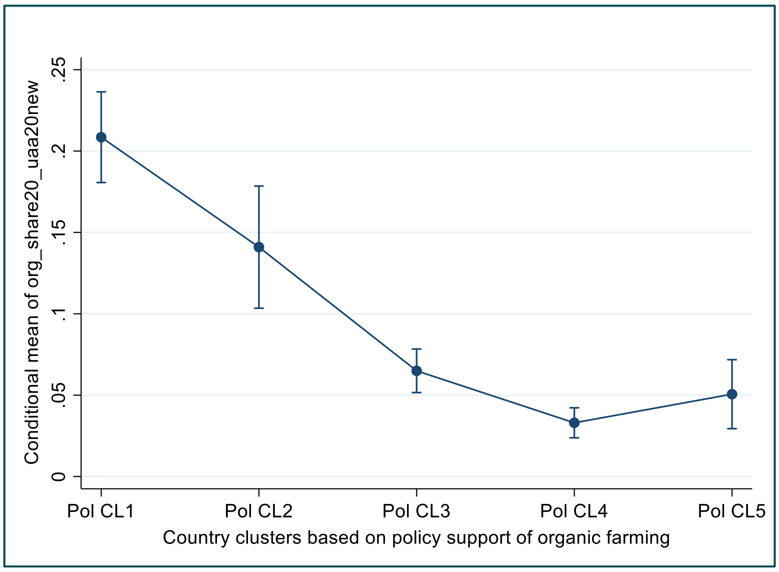


Figure 6: Conditional means of organic area shares 2020 by policy clusters (with 95% confidence intervals)

Based on parameter estimates of model M3 in Appendix A5; See Table 9 for countries in each cluster.

Source: own compilation

The final variable of interest captures the variability in suitability of the identified climatic zones and land-use types for organic conversion. Since literature alone does not offer a clear assessment of the suitability of differentiated climatic zones for organic conversion, the parameter estimates offer valuable insights for deriving the scaling factor (δ_{clim_land}). Figure 7 illustrates the conditional organic area share differences between climatic zones, revealing substantial within-cluster variation given by the share of permanent grassland, particularly in Clim CL1 and Clim CL4. This highlights the importance of considering within-cluster differences in agricultural land cover and use.

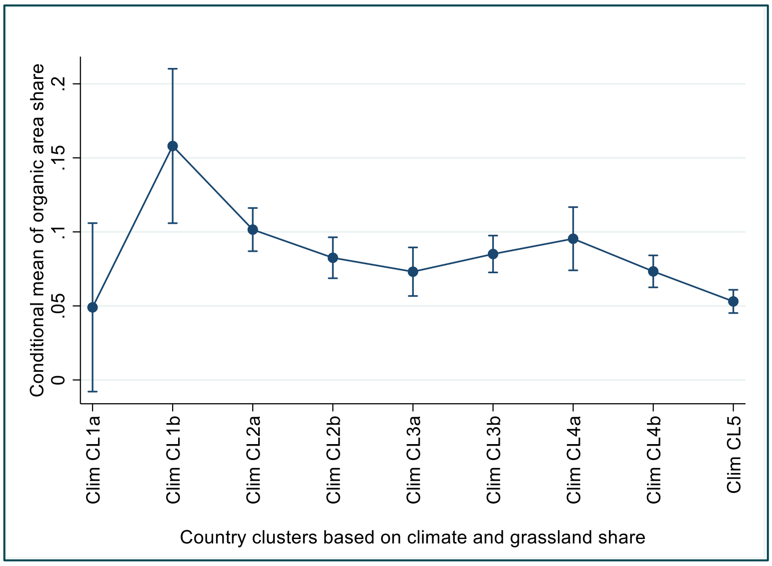


Figure 7: Conditional means of organic area shares 2020 by climate clusters (with 95% confidence intervals)

Based on parameter estimates of model M3 in Appendix A5; See Table 8 for countries in each cluster.

Source: own compilation

Consistent with findings in the literature, the results suggest that countries in the Mediterranean region (Clim CL1b, excluding Cyprus and Malta—classified as Clim CL1a) exhibit the highest climatic suitability for organic conversion, largely due to their substantial share of permanent crops. In contrast, the temperate cold region (represented by Sweden and Finland) appears more challenging, potentially also due in part to the low share of permanent grassland.

Deriving scaling factors for EU-level organic area saturation level

To derive the scaling parameters δ_i, we standardised and rescaled the cluster-specific parameter estimates from model M3 (see Appendix A5 for estimated model comparison). We then applied the standardised parameters to a factor of 1 and calibrated these values to ensure that the average across countries (weighted by their share in the total EU agricultural area) approximates 1. This adjustment ensures that the weighted average of the country-specific K_{BAU} closely aligns with projected K_{EU_BAU}. The obtained values of the scaling parameters δ_i are presented in Table 11.

Table 11: Scaling factors for climatic and land suitability, policy support and organic market activity

Climate cluster	δ_{clim_land}	Policy cluster	δ_{policy}	Market cluster	δ_{market}
Climate cluster 1a	0.77	Policy Cluster 1	1.28	Market Cluster 1	1.20
Climate cluster 1b	1.27	Policy Cluster 2	1.12	Market Cluster 2	1.00
Climate cluster 2a	0.80	Policy Cluster 3	1.02	Market Cluster 3	0.80
Climate cluster 2b	0.90	Policy Cluster 4	0.87		
Climate cluster 3a	0.85	Policy Cluster 5	0.87		
Climate cluster 3b	1.10				
Climate cluster 4a	0.90				
Climate cluster 4b	0.90				
Climate cluster 5	0.70				

Source: own compilation

To validate the approximated values, we re-estimate the beta regressions of organic area shares in 2020, this time replacing the cluster-level fixed effects with the derived scaling factors. The statistical significance of the estimated coefficients in Table 12 indicates a strong explanatory power of the scaling factors, confirming their validity. The policy factor exhibits a considerably greater influence on a country's organic area share compared to the market and climate factors.

Table 12: Beta regression estimates of organic area shares with scaling factors (country-level analysis for 2020)

	Model M5		Model M6	
Variables	**Coeff.**	**P-value**	**Coeff.**	**P-value**
Constant	-10.195***	(0.000)	-10.831***	(0.000)
δ_{clim_land}	1.577***	(0.000)	1.509***	(0.000)
δ_{policy}	4.497***	(0.000)	4.610***	(0.000)
δ_{market}	1.707***	(0.000)	2.087***	(0.000)
Land rent price			0.064***	(0.000)
Old member state (MS)			-0.006	(0.972)
Years org. support (OS)			0.010*	(0.068)
Old MS x Years OS			-0.013**	(0.030)
Scale constant	5.630***	(0.000)	6.744***	(0.000)
N	27		25	
Log pseudolikelihood	74.302		81.279	
BIC	-132.125		-133.587	

P-values: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$; Model M6 excludes Malta and Cyprus

Source: own compilation

Applying the formula in Equation 1 with the presented scaling factors yields country-specific estimates of the long-term organic area saturation levels, K_{BAU} (see Table 13). Under ceteris paribus conditions, the projected organic area potentials range from 16.7% in Malta and Cyprus to 42.7% in Austria, indicating a plausible and diverse distribution across Member States. Austria is closely followed by Spain and Italy, both with projected saturation levels of 40.1%. While Spain and Italy's potential is primarily driven by favourable climatic and land use conditions, Austria's high value is predominantly influenced by strong policy support and a well-developed organic market, reflecting the country's established development path in the organic sector.

Other countries with projected saturation levels exceeding 30% include Germany, Denmark, Estonia, France, Portugal, Sweden, and Slovakia, although the underlying drivers vary across these cases. At the lower end of the spectrum, below 20%, are Malta, Cyprus, Ireland, and Poland, showing low scores across all three scaling factors. Also, Bulgaria, Hungary, Romania, and the Netherlands are projected as unlikely to reach the 25% organic area target even in the long term, given current conditions.

At the EU level, the weighted average of the national K_{BAU} values suggest a long-term organic area potential of 30.3% under ceteris paribus assumptions. This outcome indicates a well-calibrated set of heterogeneity (scaling) parameters used for regionalising K, as the average closely approximates the EU-wide saturation level of 31% derived from historical trends (2000–2022).

5.4.3 Determining intrinsic organic area growth rate

The final parameter required for projecting organic area shares to 2030 using the logistic growth model is the country-specific organic area growth rate, r_{BAU}. To estimate this parameter, we combined the previously determined K_{BAU} values with historical data on observed organic area shares for the period 2015–2022. These inputs were used in an optimisation procedure, where the growth rate r was estimated to minimise the error between the projected organic area shares ($O_t^{projected}$) from the logistic model (Equation 1) and the observed values ($O_t^{observed}$) over the same period (see Equation 4).

$$Error(r_{BAU}) = \sum_{t_0=2015}^{2022} \left(O_t^{observed} - O_t^{projected}(r_{BAU})\right)^2, \qquad (4)$$

We employed a numerical optimisation algorithm using Excel Solver to determine the $r_{baseline}$ values that minimised the objective function for $Error(r_{BAU})$. Given the objective function, the GRG nonlinear solving method was selected, as it effectively handles smooth nonlinear functions. The solver iteratively identified solutions for r_{BAU} independently for each country by using the respective K_{BAU} and $O_{t0} = O_{2015\pm2}$, calculated as the moving average of $O_{2013-2017}$. This approach reduced the influence of potential outlier values in the initial projection year and provided an improved fit to the observed data.

Fitting the organic area share projections to the data from 2015 to 2022 aimed to capture the political and economic factors established during the most recent programming period, which is assumed to represent the baseline (business-as-usual) scenario. The optimisation approach was slightly modified for countries that experienced a temporal but significant decline in organic area shares during the 2015-2022 period. Specifically, for Bulgaria and Poland, the initial organic area shares (O_{t_0}) were adjusted to the observed levels in 2014 and 2018, respectively.

It is also noteworthy that two countries, Greece and Portugal, experienced significant increases in organic area shares in 2022. While this year is included in the baseline trends, the organic area shares for these two countries could be considered outliers, as they were influenced by newly introduced policy measures (Greece—currently subject to review) and/or changes in support conditions (Portugal). However, these outliers had an insignificant impact on the O_{2030} projections in the logistic growth model, as the projections were largely fitted to the dominant trends observed from 2015 to 2021.

The optimised organic area growth rates, r_{BAU} for each country are presented in Table 13. The EU average organic area growth rate equals 0.10 (10%).

Table 13 lists all derived parameters for the BAU projections of organic area shares in 2030 (O_{2030_BAU}). In the final step of the approach, these are applied within the logistic growth model (Equation 1). The projections are presented in the result Section 6.1.

Table 13: Country-level parameters of the logistic growth model for 2030 organic area share projections in Business as Usual scenario

Country	Climatic & land suitability factor δ_{clim_land}	Market factor δ_{market}	Policy factor δ_{policy}	Regionalised K_{BAU} (%)	Regionalised r_{BAU}
AT	0.90	1.20	1.28	42.7	0.085
BE	0.80	1.00	1.02	25.3	0.071
BG	1.10	0.80	0.87	23.7	0.070
CY	0.77	0.80	0.87	16.7	0.058
CZ	0.85	0.80	1.28	26.8	0.077
DE	0.85	1.20	1.02	32.2	0.101
DK	0.85	1.20	1.02	32.3	0.115
EE	0.85	1.00	1.28	33.6	0.130
EL	1.27	0.80	1.02	32.1	0.185
ES	1.27	1.00	1.02	40.1	0.062
FI	0.70	1.00	1.28	27.7	0.163
FR	0.80	1.20	1.02	30.4	0.138
HR	0.90	0.80	1.12	25.0	0.127
HU	1.10	0.80	0.87	23.7	0.144
IE	0.80	0.80	0.87	17.2	0.080
IT	1.27	1.00	1.02	40.1	0.085
LT	0.90	0.80	1.12	25.0	0.062
LU	0.80	1.20	0.87	25.8	0.086
LV	0.85	0.80	1.28	26.8	0.076
MT	0.77	0.80	0.87	16.7	0.153
NL	0.80	1.00	0.87	21.5	0.079
PL	0.90	0.80	0.87	19.4	0.070
PT	1.27	0.80	1.02	32.1	0.138
RO	1.10	0.80	0.87	23.7	0.133
SE	0.70	1.20	1.28	33.2	0.064
SI	0.90	0.80	1.12	25.0	0.058
SK	1.10	0.80	1.12	30.6	0.061
EU[a]	**1.00**	**0.99**	**1.00**	**30.3**	**0.101**

[a] EU weighted average using Member States' UAA.

Source: own compilation

5.5 Organic area projections under OrganicTargets4EU scenarios

The organic area projections under the three selected OrganicTargets4EU scenarios (see Chapter 3) build on the parameterisation of the logistic growth model established in the Business as Usual (BAU) scenario. To align with the scenario narratives and support achievement of the 25% organic area share target, the approach involves adjusting both the saturation levels and growth rates. These adjustments reflect:

- a policy- and market-driven increase in organic conversion capacity, represented by higher saturation levels (K_S); and
- an increase in the organic area growth rate (r_S), capturing the effect of stronger incentives for conversion, particularly in countries with currently low organic area shares.

To illustrate the mechanics and implications of these parameter adjustments, we present a stylised projection of EU organic area shares under a hypothetical saturation scenario designed to meet the Farm to Fork (F2F) target of 25% organic share of EU UAA by 2030. The projection is not a direct output of the OrganicTargets4EU model but serves to demonstrate how a higher saturation level (K_S) could result in reaching the policy target with optimised growth rate (r_S). Achieving the F2F target is technically feasible under a range of assumptions, but requires either accelerated short-term growth or a long-term structural shift in the organic sector's expansion potential (saturation level).

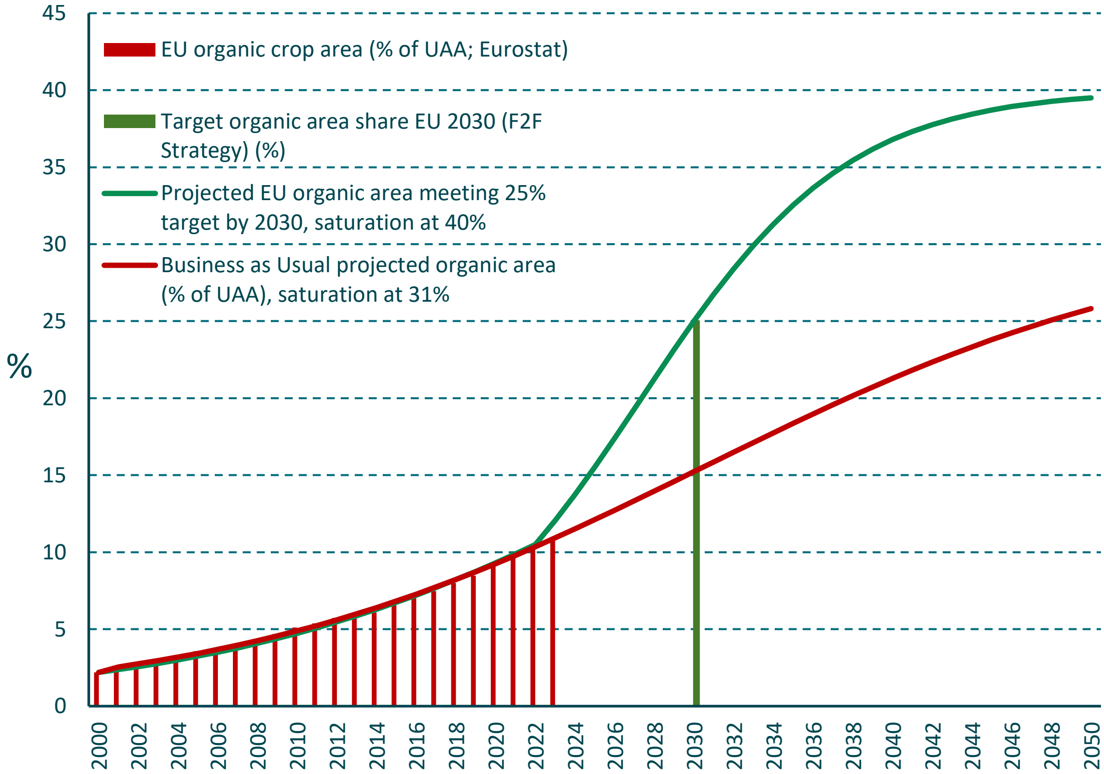


Figure 8: EU organic area share projections under the Business as Usual scenario (red) and illustrative trend meeting the 25% Farm to Fork organic target by 2030 (green)

Source: own compilation

In Figure 8, the EU-level BAU projection (red), fitted to historical data, is at 15% falling short of the F2F target. The trend depicted by the green line illustrates the potential pathway consistent with achieving the 25% target; here assuming a long-term organic area saturation level at 40% share.

In the country-level projections, the scenario-specific organic area shares are modelled from 2020 organic area shares. The resulting logistic growth model is defined as follows:

$$O_S = \frac{K_S}{1 + \left(\frac{K_S - O_{2020}}{O_{2020}}\right) \mathrm{e}^{-r_S \cdot 10}}, \qquad (5)$$

where K_S and r_S are scenario-specific saturation and growth rate parameters for each EU Member State, and O_{2020} represents their respective organic area shares observed in 2020. With scenario-adjusted K_S, the growth rates are calibrated to achieve the EU-wide organic area share target (O_S) of 25% by 2030. The methods of organic area saturation adjustments to each scenario and of the growth rate calculation are presented in the following two sections.

5.5.1 Scenario and country-specific saturation levels of organic area shares

The scenario-driven increase in organic conversion capacity K_S is incorporated through the scaling of the K_{EU_BAU} by a vector of the country and scenario-specific factors δ_{Si}:

$$K_S = K_{EU\_BAU} \cdot \prod_i \delta_{Si}, \qquad (6)$$

The scaling factors δ_{Si} are the core parameters translating the core drivers of the organic sector development in the scenarios in the organic area projections. Their composition varies by scenario, with scaling factors from the BAU scenario, that are unaffected by the development scenario narrative, remaining unchanged (see Table 14). This ensures methodological consistency between the scenarios.

Table 14: Scenario-specific scaling factors used for regionalisation of EU long-term saturation levels of organic area shares

Scenario	Scaling factor	Indicator (source)
GPP	$\delta_{clim\_land\_BAU}$	As in BAU scenario; see Section 0
	δ_{market_BAU}	As in BAU scenario; see Section 0
	δ_{policy_GPP} as a product of:	
	- $\delta_{pol\_will\_GPP}$	Uniform across countries (filling in gap in political will), set to 1.3
	- $\delta_{pol\_cap\_GPP}$	Regulatory quality indicator 2020 (World Bank, 2024; Worldwide Governance Indicators) Real GDP per capital 2020 (Eurostat, code: nama_10_pc)
	- $\delta_{pol\_need\_GPP}$	Land Multi-degradation Index (Pravalie et al., 2024) Land use structure (Eurostat, code: ef_lus_main)
OET	$\delta_{clim\_land\_BAU}$	As in BAU scenario; see Section 5.4.2
	δ_{policy_OET} as a product of:	
	- $\delta_{green\_deal\_OET}$	$\delta_{policy\_baseline}$ adjusted for the difference of observed to target organic area share (2027/30) from CAP Strategic Plans in 2023-27 (see Lampkin et al., 2024/Deliverable 1.2)
	- $\delta_{public\_procur\_OET}$	Performance in public procurement (ECA, 2023)[b] Assessment of market potential to accommodate public procurement policy (Le Douarin, 2021)
	δ_{market_OET} as a product of:	
	- δ_{demand_OET}	Organic retail shares 2021 (Fibl Statistics), farm size structure (Eurostat, code: ef_lus_main), GDP growth (Eurostat, code: nama_10_pc)
	- δ_{supply_OET}	HHI & 4 Firm Concentration Rate in food retail (Van Dam et al, 2021); number of organic meat and vegetable processors per 1000 ha UAA (Eurostat, code: org_cpreact)
	- δ_{export_OET}	Agricultural export intensity (EUR/ha) (EC, Data Explorer; code: IMP_06 EU ag trade), intra-EU agricultural trade structure (Eurostat, code: ds-059331), agricultural export growth (EC, Data Explorer[12] code: IMP_06 EU ag trade))
DPW[a]	δ_{i_GPP} in policy-led countries	As in GPP scenario
	δ_{i_OET} in market-led countries	As in OET scenario
	δ_{i_BAU} in countries less engaged in organic farming	As in BAU scenario; see Section 0

[a] Follows data-based country clustering (see Appendix A2)

[b] https://public.tableau.com/app/profile/eca.public.procurement/vizzes

Source: own compilation (see Appendix A6 for underlying data sources)

Green Public Policy

In the policy-driven **GPP scenario**, the shift in the maximum potential organic area shares K_{GPP} is modelled by rescaling the policy factor δ_{policy}. It consists of three components:

- The policy factor $\delta_{pol\_will\_GPP}$ stands for a policy-driven shift in organic conversion potential uniform across all Member States, which reflects high level political will to support organic farming. Setting the factor in all countries equal to 1.3 suggests that countries lagging behind in policy support fill in the support gap and the increases the organic area saturation level by on average 30%.
- Regionally differentiated scaling factor $\delta_{pol\_cap\_GPP}$ depicting regional heterogeneity in the policy capacity that is informed by the World Bank score of regulatory quality and GDP per capita to reflect economic viability of national co-financing. It introduces regional heterogeneity but does not shift the weighted average of the K level (see Appendix A6).
- Scaling parameter $\delta_{pol\_need\_GPP}$ introduces heterogeneity among countries in the environmental urgency for political intervention. The factor is informed by the Land Multi-degradation Index (Pravalie et al., 2024) under consideration of the countries' land use structure. It results in a 21% increase in the average K level (see Appendix A6).

The remaining two scaling factors for climatic and soil suitability and market development remained identical to the BAU scenario. Applying the scaling factors to the 31% EU baseline saturation level results in the regionalised K_{GPP} reaching EU average of 47.9% (Table 15).

Organic on Every Table

The OET scenario introduces a broader set of heterogeneity factors than the GPP or BAU pathways, combining continued environmental policy support with strong market pull. It is not a purely market-driven scenario, as experts consulted during the WP2 foresight process emphasised that market forces alone would be insufficient to achieve a rapid, EU-wide acceleration of organic conversion to reach 25% by 2030 (Zanoli, 2024). Instead, OET couples stable Green Deal–aligned policies with considerable growth in organic food consumption and targeted support for organic market infrastructure.

Reflecting this mixed policy–market dynamic, the scenario applies two distinct upward adjustments to long-term organic area saturation levels. First, a policy-induced shift moderately increases saturation by +16.5% relative to BAU, considerably smaller than the +57.3% policy-driven increase assumed in the GPP scenario. Second, a stronger market-induced shift of +69.4% reflects the enhanced role of domestic demand, retail supply-chain development and export potential in driving organic expansion under OET. Together, these adjustments capture the combined influence of policy continuity and market momentum on countries' long-term capacity to expand organic area.

Two policy components shape the country-specific policy scaling factor in OET. First, $\delta_{policy\_baseline}$ reflects the continuation of Green Deal priorities. It builds upon the baseline policy scaling used in the BAU scenario ($\delta_{policy\_baseline}$) and adjusts it by the relative difference between observed and target organic shares reported in Member States' CAP Strategic Plans for 2023–2027 (see Lampkin et al., 2024). The adjustment mechanism follows the approach described in Appendix A7.

Table 15: Country-level scaling factors of the logistic growth model for organic area share projections in the GPP scenario

Country	Climate & land factor δ_{clim_land}	Market factor δ_{market}	Policy factors $\delta_{pol\_will\_GPP}$	$\delta_{pol\_cap\_GPP}$	$\delta_{pol\_need\_GPP}$	K_{GPP} (%)
AT	0.90	1.20	1.30	1.05	1.15	52.6
BE	0.80	1.00	1.30	1.05	1.20	40.6
BG	1.10	0.80	1.30	0.9	1.20	38.3
CY	0.77	0.80	1.30	1	1.30	32.5
CZ	0.85	0.80	1.30	0.95	1.15	29.9
DE	0.85	1.20	1.30	1.05	1.10	47.4
DK	0.85	1.20	1.30	1.1	1.10	49.7
EE	0.85	1.00	1.30	0.95	1.10	35.8
EL	1.27	0.80	1.30	0.93	1.30	49.5
ES	1.27	1.00	1.30	1	1.40	71.6
FI	0.70	1.00	1.30	1.1	1.10	34.1
FR	0.80	1.20	1.30	1.05	1.20	48.7
HR	0.90	0.80	1.30	0.93	1.10	29.7
HU	1.10	0.80	1.30	0.9	1.20	38.3
IE	0.80	0.80	1.30	1.1	1.20	34.0
IT	1.27	1.00	1.30	1	1.30	66.5
LT	0.90	0.80	1.30	0.95	1.15	31.7
LU	0.80	1.20	1.30	1.1	1.20	51.1
LV	0.85	0.80	1.30	0.95	1.10	28.6
MT	0.77	0.80	1.30	1	1.30	32.5
NL	0.80	1.00	1.30	1.1	1.30	46.1
PL	0.90	0.80	1.30	0.93	1.15	31.0
PT	1.27	0.80	1.30	0.93	1.30	49.5
RO	1.10	0.80	1.30	0.9	1.15	36.7
SE	0.70	1.20	1.30	1.1	1.10	41.0
SI	0.90	0.80	1.30	0.93	1.10	29.7
SK	1.10	0.80	1.30	0.93	1.10	36.3
EU[a]	**1.00**	**0.99**	**1.30**	**1.00**	**1.21**	**47.9**

[a] EU weighted averages using Member States' UAA; Similar to the BAU scenario, the values were assigned to clusters of countries formed in the selected variables informing the scaling factors (see Appendix A6)

Source: own compilation

The second policy component emphasises public procurement of organic products, which plays a greater role in OET than in any other scenario. Country differentiation is informed by (i) the European Court of Auditors Performance in Public Procurement indicators (ECA, 2023) and (ii) a qualitative assessment of each country's market potential to absorb public-procurement-driven organic demand (Le Douarin, 2021). Table 16 reports the final policy scaling factors after sensitivity checks to avoid extreme values and ensure scenario coherence.

The main driver of organic expansion under OET is market development, captured through three scaling factors representing domestic demand, domestic supply capacity, and export potential. Their relative importance follows the scenario narrative: domestic demand receives the highest weight, followed by export opportunities, and finally domestic supply (as imports can supplement domestic production in meeting growing demand).

The factor for domestic demand (δ_{demand_OET}) reflects the country-specific potential for increased organic consumption. It is based on organic retail market shares in 2021, the prevalence of subsistence and semi-subsistence farming (reducing market participation), GDP growth, capturing changes in purchasing power. Together, the country variation in these variables represent differences in the capacity of consumers to shift toward marketed organic products.

The domestic supply factor (δ_{supply_OET}) captures the role of food retail chains in expanding organic supply and accessibility. With increasing importance of large retailers in the organic supply chain, national retail concentration was identified in WP2 as shaping the speed of organic market development. We approximated the countries' variation in this factor using: (i) the Herfindahl–Hirschman Index (HHI) for food retail concentration, and the Four-Firm Concentration Rate (4FCR) quantified by Van Dam et al., (2021), assuming that highly concentrated retail sectors can scale organic assortments more efficiently (by building supply chain infrastructure, reaching consumers in smaller towns, etc.), and (ii) organic processing infrastructure, both creating facilitating conditions for farmers to convert.

The factor for export potential (δ_{export_OET}) accounts for the role of cross-border demand in sustaining organic growth. Countries differ in agricultural export intensity (EUR/ha), the composition of intra-EU trade in agri-food products, export growth rates over recent years. These indicators, obtained from Eurostat (2025), highlight countries that can expand organic area by serving growing EU demand, particularly in premium segments.

Table 16 summarises the full set of scaling factors shaping saturation levels under the OET scenario. Sensitivity checks were applied to prevent extreme outliers and to ensure that countries with stronger policy or market conditions for organic growth are assigned correspondingly higher scaling factors (i.e., maintaining monotonic relationships across policy and market drivers).

The average EU long-term saturation level in the OET scenario (K_{OET}) presented in Table 16 reaches 60.6% organic farmland, which exceeds the corresponding saturation level projected for the GPP scenario. While policy support is assumed to accelerate the speed of structural adjustment at the farm level, the long-run potential for organic expansion is ultimately constrained by demand, value-chain capacity, and market absorption. In the OET scenario, substantial structural shifts on the demand and supply-chain side provide the conditions for a deeper and more sustainable expansion of organic area. These considerable market changes are therefore assumed to generate the strongest long-term increase in saturation levels, enabling the structural transformation required to meet the 25% organic target by 2030.

Divergent Pathways

The DPW scenario represents a spatial mix of the three other scenarios, with each country assigned the set of scaling factors from GPP, OET or BAU depending on which pathway most plausibly reflects its expected organic sector development. This allocation is based on the clustering analysis presented in Appendix A2, which groups countries according to their current organic market performance and the strength of their policy support for organic farming. The DPW scenario thus applies the scaling factors of the GPP, OET, or BAU pathways according to these country clusters. This produces a highly heterogeneous pattern of long-term organic area saturation (K_{DPW}), resulting in an EU average of 47.6% organic farmland by 2030 (Table 17), which nears the GPP scenario, but shows the highest cross-country dispersion among all scenarios.

Countries assigned to the BAU-type cluster show the lowest long-term conversion potential. These include the island Member States Cyprus and Malta, as well as several Eastern European countries such as Poland, Bulgaria, Hungary, and Romania. In these countries, limited market development and weaker policy support imply that the 25% organic target is not reached even in the long run.

Table 16: Country-level scaling factors of the logistic growth model for organic area share projections in the OET scenario

	Climate & land factor	Policy factors		Market factors			
Country	δ_{clim_land}	$\delta_{green\_deal\_}$	δ_{procur_OET}	δ_{demand_OET}	δ_{supply_OET}	δ_{export_OET}	K_{OET} (%)
AT	0.9	1.28	1	1.14	1.27	1.25	62.1
BE	0.8	1.17	1.1	1.48	1.15	1.1	57.3
BG	1.1	1	1	1.21	1	1.15	42.9
CY	0.77	0.95	1	1.22	1.05	1.05	27.9
CZ	0.85	1.28	1.15	1.25	1.1	1.1	58.4
DE	0.85	1.17	1.15	1.2	1.21	1.25	64.2
DK	0.85	1.07	1.2	1.3	1.27	1.25	63.8
EE	0.85	1.28	1.1	1.12	1.1	1.1	50.1
EL	1.27	1.07	1	1.33	1	1.2	63.4
ES	1.27	1.12	1.05	1.21	1.16	1.2	76.7
FI	0.7	1.28	1.25	1.34	1.15	1	54.0
FR	0.8	1.02	1.25	1.21	1.21	1.3	57.8
HR	0.9	1.12	1.2	1.29	1.05	1.1	58.8
HU	1.1	1.04	1.2	1.26	1.05	1.1	57.0
IE	0.8	1.08	1.2	1.53	1.1	1.05	49.4
IT	1.27	1.07	1.05	1.28	1.15	1.3	79.7
LT	0.9	1.18	1.2	1.21	1.1	1.1	55.7
LU	0.8	1.04	1.1	1.32	1.21	1.25	52.9
LV	0.85	1.28	1.25	1.19	1.1	1.1	58.3
MT	0.77	1.08	1	1.26	1	1	30.0
NL	0.8	1.04	1.15	1.46	1.27	1.1	57.6
PL	0.9	0.91	1.2	1.38	1.05	1.1	44.4
PT	1.27	1.12	1.05	1.23	1.16	1.2	78.0
RO	1.1	0.87	1	1.26	1	1.15	44.0
SE	0.7	1.28	1.25	1.34	1.15	1	51.7
SI	0.9	1.18	1.1	1.31	1.1	1.25	58.9
SK	1.1	1.18	1.05	1.23	1.1	1.1	59.0
EU[a]	**1.00**	**1.05**	**1.11**	**1.26**	**1.13**	**1.19**	**60.6**

[a] EU weighted average using Member States' UAA; Similar to the BAU scenario, the values were assigned to cluster of countries formed in the selected variables informing the scaling factors (see Appendix A6).

Source: own compilation

At the opposite end of the spectrum, the highest long-term saturation levels are assigned to countries with strong organic market performance and well-developed processing and export infrastructures. This includes Spain and Italy in the Mediterranean region, and Denmark, France, the Netherlands and Belgium, with their mature domestic organic markets. In these cases, organic expansion continues to be driven by robust consumer demand, strong value chains, and favourable institutional or market conditions.

The resulting distribution reflects the defining feature of the DPW scenario: a structurally fragmented organic transition in which some countries advance rapidly while others remain on a slower trajectory, leading to the largest spatial disparities among all scenarios.

Table 17: Country-level scaling factors of the logistic growth model for organic area share projections in the OET scenario

Country	Driving scenario	K_{DPW} (%)
AT	GPP	52.6
BE	OET	57.3
BG	BL	23.7
CY	BL	16.7
CZ	GPP	29.9
DE	GPP	47.4
DK	OET	63.8
EE	GPP	35.8
EL	GPP	49.5
ES	OET	76.7
FI	GPP	34.1
FR	OET	57.8
HR	BL	25.0
HU	BL	23.7
IE	GPP	34.0
IT	GPP	66.5
LT	BL	25.0
LU	OET	52.9
LV	GPP	28.6
MT	BL	16.7
NL	OET	57.6
PL	BL	19.4
PT	GPP	49.5
RO	BL	23.7
SE	GPP	41.0
SI	BL	25.0
SK	GPP	36.3
EU[a]		**47.6**

[a] EU weighted average using Member States' UAA.

Source: own compilation

5.5.2 Scenario and country-specific organic area growth rates

The scenario-specific organic area growth rates $r_{scenario}$ are calculated with the following assumptions:

- The projected organic area shares should closely approximate $K_{scenario}$ by 2050 (this ensures that the projected area is sufficiently informed by the scenario specific $K_{scenario}$ in 2030.
- The steepness of the logistic growth is moderated by the distance of the country's organic area share in 2020 to her respective K_S level.
- By 2030, the country-individual growth rates should ensure 25% organic areas across the EU.

This is ensured in the following methodological steps:

1. Calculating growth rate ensuring that countries near their scenario-specific organic area share potential (saturation level) K_S by 2050.

$$r_{S\_2050} = -\frac{1}{30} ln\left(\frac{\frac{K_S}{K_S \cdot 0.99} - 1}{\frac{K_S}{O_{2020}} - 1}\right), \qquad (7)$$

2. Adjusting the steepness n_S of the growth rate r_{S_2050} to reach 25% organic area share in the EU by 2030 by solving the optimisation problem of weighted organic area shares sum equal 25% (when applied in O_S equation above).

3. Introducing growth heterogeneity in which organic area share growth is amplified (reduced) in countries lagging with their O_{2020} further behind (closer to) their saturation level K_S by solving z_S in the following equation to minimise differences between countries in achieved O_{2050} relative to K_S.

$$w_S = \left(\frac{K_S - O_{2020}}{K_S}\right)^{z_S}, \qquad (8)$$

Steps 2 and 3 are performed iteratively to achieve best fit in both criteria. The scenario specific organic area growth rate used in the projections is the following product:

$$r_S = r_{S\_2050} \cdot n_S \cdot w_S, \qquad (9)$$

The country-specific organic area growth rates obtained using the approach are presented in Table 18.

5.6 Land use structure of organic conversion

The main objective of this step of organic area projections is to identify scenario-specific shifts in the land use due to conversion to organic farming thus to disaggregate the national projections to land use categories. We consider three main land use types—*arable crops* (cereals for grain, grain legumes, oilseeds, green crops (herbage/forage), potatoes, vegetables, herbs, and other arable crops), *permanent crops* (fruits, berries and nuts, grapes, olives, citrus fruits, other permanent crops) and *permanent grassland*. In this section, we describe the general approach and the scenario-specific assumptions.

5.6.1 General approach

To allocate the projected increase in organic land areas between 2020 and 2030 to land use types in each EU member state, we follow the steps below:

1. Assessment of (a) environmental benefits of organic conversion on main land use types as the main policy targets in the GPP scenario, and (b) consumer preferences and trade potentials as conversion drives in the OET scenario.

2. Clustering of regions (a) with similar climatic, land use, production systems resulting in similar environmental challenges and environmental policy targets, as well as (b) of regions with similar organic market potentials.

Table 18: Scenario-specific organic area annual growth rates calibrated for organic area development reaching 25% F2F organic target by 2030

Country	r_{GPP}	r_{OET}	r_{DPW}
	s_{GPP} = **0.86**	s_{OET} = **0.77**	s_{DPW} = **0.89**
	w_{GPP} = **0.081**	w_{OET} = **0.409**	w_{DPW} = w_{SCEN}
AT	0.152	0.162	0.152
BE	0.207	0.220	0.220
BG	0.240	0.244	0.223
CY	0.222	0.216	0.196
CZ	0.152	0.188	0.152
DE	0.199	0.211	0.199
DK	0.192	0.203	0.203
EE	0.136	0.160	0.136
EL	0.232	0.241	0.232
ES	0.222	0.225	0.225
FI	0.166	0.188	0.166
FR	0.203	0.210	0.210
HR	0.190	0.218	0.183
HU	0.213	0.228	0.193
IE	0.255	0.268	0.255
IT	0.192	0.200	0.192
LT	0.189	0.213	0.178
LU	0.231	0.232	0.232
LV	0.146	0.186	0.146
MT	0.291	0.289	0.269
NL	0.231	0.239	0.239
PL	0.224	0.237	0.206
PT	0.221	0.238	0.221
RO	0.240	0.246	0.224
SE	0.153	0.167	0.153
SI	0.166	0.198	0.156
SK	0.184	0.205	0.184
EU[a]	0.209	0.219	0.206
S.D.	**0.038**	**0.030**	**0.035**

[a] EU weighted average using Member States' UAA.

Source: own compilation

3. Assignment of relative organic policy and market weights to the main land use conversion within each regional cluster, representing the regions' environmental/organic policy and consumer demand/trade focus.
4. Scaling of the policy/market weights by the current land use type shares in conventional farming to capture differences in farming systems and their land potentials for organic conversion. This approach ensures that each activity receives a share of new organic land in each country that is consistent with its current agricultural footprint and the scenario's emphasis on organic expansion (environmental policy support vs. consumer demand).

This step can be formalised as follows:

$$\Delta Org\_UAA_l^{SCEN} = \Delta Org\_UAA_{total}^{SCEN} \cdot \frac{Conv\_share_{l,2020} \cdot Weight_l^{SCEN}}{\sum\left(Conv\_share_{k,2020} * Weight_k^{SCEN}\right)}, \qquad (10)$$

where:

- ΔOrg_area_l represents new organic area (i.e., area converted from conventional to organic farming between 2020 and 2030) allocated to land use l ($l = 1,..,k$) in a given country (country subscript is suppressed for simplification) under a scenario $SCEN$;
- ΔOrg_UAA_{Total} denotes country's total new organic area calculated from the observed 2020 and projected 2030 organic area shares O_{2030} as

$$\Delta Org\_UAA_{total}^{SCEN} = O_{2030}^{SCEN} \cdot UAA_{2020} - org\_UAA_{2020}, \qquad (11)$$

  assuming total utilised agricultural area remains constant over time:

$$UAA_{2030} = UAA_{2020}. \qquad (12)$$

- $Conv\_share_{l,2020}$ is the share of land use type l on the country's conventional UAA $Conv\_UAA_{2020}$. This term informs about the current conventional land use structure and thus the representation of each land use type in the land pool for potential conversion;
- $Weight_k^{SCEN}$ demarks policy weights (in the GPP scenario) and market weights (in the OET scenario) that reflect the policy prioritisation of and market emphases on land use type for organic expansion, defining $\sum Weight_k^{SCEN} = 1$;
- $\sum(Conv\_share_{k,2020} * Weight_k^{SCEN})$ is the scaling factor that ensures that the sum of organic area allocations across all activity groups matches the total organic area increment by adjusting the allocation proportionally based on both land use type shares and policy/market weights;

Using this formula, the organic area increments were distributed across the land use categories in each country, aligning with both the current agricultural land structure and scenario goals.

5.6.2 Land use weights for scenario implementation

The implementation of the organic areas disaggregation to land use categories depends primarily on the assumptions on the scenario-specific policy or markets weights described below.

Business as Usual

In the BAU scenario, the projected increase in country-level organic area between 2020 and 2030 is allocated across land-use types according to each country's organic land-use structure observed in 2020. The allocation weights can therefore be expressed as follows (with variables defined above):

$$Weight_l^{BAU} = \frac{Org\_UAA_{l,2020}}{Org\_UAA_{total,2020}}. \qquad (13)$$

Green Public Policy

The drivers of agricultural system change in each scenario indirectly set different emphases for organic land use. The GPP scenario narrative highlights growing public and political concern about major environmental challenges such as climate change, biodiversity loss, and water and soil issues, and corresponding policy and private responses. As different land uses vary in their environmental footprint, and European regions differ in their environmental risks and challenges, they may have different policy targets for organic conversion. This will be reflected in the policy weights assigned to the main land use types. We inform the specification of the policy weights through a structured 2-step approach.

Table 19: Environmental benefits of organic conversion on main land use categories

Resource focus	Arable land	Permanent grassland	Permanent crops
Biodiversity	High gains due to reduced pesticide and nitrogen fertiliser use (pollinators, soil microbiota, natural predators, flora) and increased land use diversity.	Already high biodiversity, enhanced by organic practices (e.g., wildflowers, grazers).	Moderate to high benefits; orchard understories and hedgerows provide habitats, inter-row vegetation. Reduced pesticide use, especially herbicides, and many insecticides, less in fungicides.
Soil health	Moderate to high improvement; organic amendments and reduced compaction. Impact of multi-annual legumes in rotation.	Very high benefits from undisturbed soils and continuous vegetation cover.	High benefit; reduced inputs and minimal soil disturbance promote long-term health.
Carbon sequest-ration	Moderate improvement; depends on crop rotation and cover cropping. Impact of multi-annual legumes in rotation important.	High due to perennial vegetation and minimal disturbance.	High; woody vegetation (trees, vines) stores carbon, enhancing sequestration in new plantings. Vegetative understoreys and between rows increase soil sequestration.
GHG emissions	High reduction from eliminating synthetic fertilisers (N_2O) and pesticides. Also reductions in livestock numbers and consumption.	Moderate reduction; emissions mainly from livestock grazing. Reduction in livestock numbers and consumption key factor.	High reduction; trees/vines sequester carbon while inputs decrease. Reduced nitrogen use important.
Water quality	Major gains from reduced nitrate leaching, phosphate and pesticide runoff. Implications for aquatic biodiversity.	Already good filtration; organic conversion further reduces pollutants. Improved infiltration helps reduce flood risk and surface pollutants.	High; reduced fertiliser and pesticide runoff in long-term systems.
Ecosystem services	Gains in pest control, pollination, and nutrient cycling.	Long-standing services (e.g., erosion control, water retention) are reinforced.	High enhancement of pollination, pest control, and cultural ecosystem services.
Qualifi-cations	Reduced crop yields may restrict benefits per kg product, but needs to take account of mitigating impact of livestock number reduction.	Reduced grass yields and stocking rates may restrict benefits per kg product, but mitigating impact of livestock number reduction may be high.	Reduced crop yields may restrict benefits per kg product. (Systems often independent of livestock production).
Overall assessment	**High**	**Low**	**High**

Source: own compilation based on: Sanders et al. (2025); Stolze et al. (2000); Bengtsson et al. (2005); Tuck et al., (2014); Caprio et al. (2015); Smith et al, (2008); Soussana et al. (2010); Fernández-Romero e al. (2015); Shepherd et al. (2003); Ramos & Martínez-Casasnovas (2006)

Step 1: Environmental benefits of land use conversion

The potential environmental benefits of the conversion to organic farming are well document (Sanders et al., 2025; Stolze et al., 2000) but differ between land use categories. Table 19 provides a brief description of the core differences based on literature and own expertise.

When comparing the most prevalent land use categories, arable land and permanent grassland, the environmental benefit of converting arable land can be considered higher than that of permanent grassland. This is particularly relevant in the context of the elimination of synthetic pesticides and fertilisers in intensively managed systems. However, permanent grassland conversion offers unique, stable benefits in terms of biodiversity, carbon sequestration, and erosion control. Permanent crops (perennial systems) conversion like orchards and vineyards may have high localised impact with lasting benefits offering stable carbon sequestration, biodiversity enhancement, and reduced erosion risk.

Step 2: Regional clustering and land use targets of organic policy

In the next step, we cluster regions with similar environmental threats and concerns calling for similar structural approach to policy support (see Table 20 and Table 21). The clustering is linked to regional differences in climate, land-use patterns, farming intensity (Table 20), and regional environmental challenges (Table 21) that we consider the key factors influencing future regional policy priorities for land use conversion. The assigned policy weight reflecting the land use targets of environmental (incl. organic) policies are presented in Table 22.

We identified five country clusters grouping countries with similar environmental traits and farming systems. A short characterisation of the regional clusters and allocated policy weights follows. It is important to note that weights assigned to each land use category within a cluster reflect the relative distribution of projected organic land conversion, not the total scale of conversion.

Cluster **PW-CL1** includes Western European countries—Belgium, France, Germany, Luxembourg, and the Netherlands—characterised by temperate oceanic and temperate continental climates. These countries have a high proportion of arable land (47–70%), with moderate shares of permanent grassland in some areas (28–51% in NL and DE). Permanent crops are minimally represented (<4% in most countries). Green crops (temporary grassland used for herbage and forage) are moderately to highly prevalent in arable systems under both organic and conventional management, particularly in Belgium, the Netherlands, and Germany. The use of organic green crops is relatively well-established in the Netherlands and Luxembourg (see Table 20).

Based on the conversion benefits outlined in Table 19, countries in Cluster PW-CL1 are expected to prioritise reducing nitrate and pesticide runoff to improve water quality, combat soil degradation, and mitigate biodiversity loss. As a result, arable land conversion carries the highest policy weight (PW = 0.4) due to its strong environmental benefits, especially in reducing nitrate leaching and pesticide use. Permanent grassland receives the second-highest weight (PW = 0.35) owing to its significant contributions to soil health, biodiversity (including pollinator support), and carbon sequestration. In contrast, permanent crops, which are less common in the region, receive a lower priority (PW = 0.25), reflecting the relatively lower per-hectare environmental benefits of their conversion.

Cluster **PW-CL2** includes countries in the Mediterranean climatic zone—Croatia, Cyprus, Greece, Italy, Malta, Portugal, and Spain. These countries have a moderate share of arable land (24–53%), except for Malta (89%) and Cyprus (79%). A defining feature of the cluster is the relatively high proportion of permanent, high-value crops such as orchards and vineyards (5–23%). Key environmental challenges in this region include water scarcity, soil erosion, and intensive pesticide use, particularly in permanent crop and horticulture systems (though the latter is not the focus here).

The greatest potential for environmental benefits in the **PW-CL2** countries lies in the organic conversion of arable land and permanent crops, with lesser relevance for grassland and livestock systems. Arable land conversion remains the top priority due to its greater share in the land use structure compared to permanent crops and higher farming intensity compared to permanent grassland. This is reflected in the policy weights outlined in Table 22. Arable land conversion holds the highest priority (PW = 0.4), followed closely by permanent crops (PW = 0.35)—the highest assigned weight for permanent crops among all regional clusters. In contrast, permanent grassland receives a lower policy weight (PW = 0.15), as it is typically managed extensively, subject to lower environmental pressures, and organic conversion thus contributes fewer environmental benefits.

Cluster **PW-CL3** includes countries of Central and Eastern Europe—Bulgaria, Czechia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, and Slovakia—most of which have a temperate continental climate. These countries are characterised by a high proportion of arable land (66–82%), moderate shares of permanent grassland (15–32%), and minimal areas under permanent crops (<3.2%). Green crop shares, in both conventional and organic systems, are generally low—particularly in Bulgaria and Latvia—indicating a limited adoption of more sustainable practices.

Biodiversity loss and soil degradation are the primary environmental concerns in this cluster. As such, agricultural policy is expected to focus strongly on the conversion of arable crops, which offers substantial benefits through increased crop diversity, improved soil health, and enhanced biodiversity. This is reflected in the higher policy weight assigned to arable land conversion (PW = 0.5); highest among all clusters. Within this focus, expanding the share of temporary grasses in organic arable systems is seen as a key strategy.

Permanent grassland conversion holds moderate importance (PW = 0.2), as most converted areas are already on grassland, offering moderate benefits for biodiversity and carbon sequestration. Permanent crops conversion also receives a moderate policy weight (PW = 0.3), with the main environmental benefit being the reduction of pesticide use.

Cluster **PW-CL4** includes Northern European countries—Sweden, Finland, and Denmark—characterised by cold temperate and boreal climates. Their land use structures are dominated by arable land (85–99%), with limited permanent grassland (<15%) and minimal permanent crops (<1%) (see Table 20). Notably, all three countries—especially Finland and Sweden—show high shares of green crops within arable land, particularly under organic management (up to 61%), reflecting a strong orientation toward sustainable practices.

The main environmental concerns in this cluster are GHG emissions from arable systems and the preservation of biodiversity in large-scale cropping landscapes. Accordingly, arable land conversion carries the highest policy weight (PW = 0.4) due to its potential to reduce emissions and enhance biodiversity. Although grasslands represent a smaller share of land use, their conversion offers significant per-hectare environmental benefits—particularly for carbon sequestration, biodiversity enhancement, and water regulation. These benefits, especially relevant for livestock-related GHG mitigation, justify the second-highest policy focus on grassland (PW = 0.35). In contrast, permanent crops, which have a minimal presence in the region, receive lower policy support (PW = 0.25).

Cluster **PW-CL5** comprises Alpine and high-grassland regions—Austria, Slovenia, and Ireland—characterised by a high proportion of permanent grassland in their agricultural land use (48–90%). Organic green crop use in arable system is relatively low in Ireland, but more prevalent in Austria and Slovenia. Permanent crops occupy only a small share of agricultural land (<6%) across the cluster.

These regions face multiple environmental challenges. Steep slopes and mountainous terrain increase susceptibility to soil erosion, particularly when combined with overgrazing and heavy rainfall events. Biodiversity loss is a major concern, driven by habitat fragmentation, land abandonment, and agricultural intensification, threatening rare and endemic species. The region also contributes notably to greenhouse gas (GHG) emissions, especially methane from livestock and nitrous oxide from manure management. Climate change exacerbates these risks through glacier retreat, altered hydrological cycles, and shifting vegetation zones. Additionally, water resource degradation—from nutrient runoff, land abandonment, and tourism pressures—further stresses these fragile mountain ecosystems.

In **PW-CL5** countries, organic conversion of permanent grassland holds the highest environmental potential, offering substantial benefits for biodiversity, soil stabilisation, and carbon sequestration. This justifies its high policy weight (PW = 0.5). Arable land conversion is associated with moderate environmental benefits, particularly in reducing pesticide and nitrate use, and receives a policy weight of 0.3. Permanent crop conversion, while potentially beneficial for controlling soil erosion and supporting pollinators, plays a minor role due to its low land share, and therefore receives the lowest policy priority (PW = 0.2).

In summary, arable land conversion holds high political importance across most regions, with the highest priority in PW-CL3 (Central and Eastern Europe) due to its potential to address widespread nitrate pollution, soil degradation, and biodiversity loss from intensive large-scale farming. Permanent grassland conversion is most significant in PW-CL5 (Alpine and high-grassland regions), where it contributes to GHG emission reduction, carbon sequestration, and soil stabilisation. Permanent crop conversion is most important in PW-CL2 (Mediterranean Europe), primarily for its role in erosion control, biodiversity enhancement, and pesticide reduction.

Table 20: Land use characteristics of EU member states in the policy-weight clusters

Cluster/Country	Share of arable (incl. hort.) land in UAA 2020 (%)	Share of permanent crops in UAA 2020 (%)	Share of permanent grass in UAA 2020 (%)	Share of org. green crops in org. arable 2020 (%)	Share of green crops in total arable land 2020 (%)
PW-CL1					
BE	**63.6**	1.6	**34.8**	48	40
DE	**70.3**	1.2	**28.5**	34	27
FR	**62.8**	3.7	**33.6**	46	28
NL	**55.4**	2.1	**42.6**	68	55
LU	**47.2**	1.2	**51.7**	49	52
Cluster average	*59.9*	*2.0*	*38.2*	*49.0*	*40.4*
PW-CL2					
CY	78.6	**20.3**	1.1	50	51
EL	33.6	**23.6**	42.8	53	14
ES	48.8	**20.7**	30.5	8	10
HR	59.1	**5.2**	35.7	43	13
IT	52.8	**18.7**	28.6	45	38
MT	89.3	**10.8**	0.0	3	87
PT	24.6	**21.9**	53.5	78	48
Cluster average	*55.3*	***17.3***	*27.5*	*40.0*	*37.3*
PW-CL3					
BG	**69.1**	3.0	**27.9**	1	**5**
CZ	**70.7**	1.2	**28.1**	46	**21**
EE	**70.6**	0.4	**29.0**	39	**26**
HU	**82.1**	3.2	**14.7**	36	**11**
LT	**76.6**	1.1	**22.4**	1	**13**
LV	**67.7**	0.5	**31.8**	45	**23**
PL	**75.5**	2.4	**22.1**	35	**10**
RO	**66.1**	2.3	**31.6**	19	**10**
SK	**71.5**	0.9	**27.6**	45	**16**
Cluster average	***72.2***	*1.7*	***26.1***	*29.7*	***15.0***
PW-CL4					
DK	**90.4**	1.1	8.5	**44**	23
FI	**98.9**	0.2	1.0	**61**	41
SE	**84.5**	0.1	15.4	**61**	46
Cluster average	***91.3***	*0.5*	*8.3*	***55.3***	*36.7*
PW-CL5					
AT	50.0	2.6	**47.5**	23	19
IE	9.8	0.0	**90.1**	52	24
SI	36.3	6.0	**57.8**	52	33
Cluster average	*32.0*	*2.9*	***65.1***	*42.3*	*25.3*

Source: own compilation

Table 21: Country clusters based on environmental challenges and benefits of organic conversion

Country cluster	Primary environmental issues	Priority benefits of organic
PW-CL1 Western Europe (BE, FR, DE, LU, NL)	- High nitrate and pesticide runoff affecting water bodies (e.g., Baltic Sea, North Sea) (Wivstad et al., 2023). - Soil compaction and degradation from intensive arable farming (Lal, 2004). - Loss of pollinators and biodiversity due to low field crop diversity and high synthetic input use (Geiger et al., 2010).	- Water quality improvement through reduced nitrate leaching and pesticide use (Shepherd et al., 2003). - Soil health restoration via organic amendments and reduced tillage (Mäder et al., 2002). - Biodiversity recovery in arable and horticultural systems (Tuck et al., 2014). - Climate benefits from reduced N fertiliser, reduced livestock and increased multi-annual legumes.
PW-CL2 Mediterranean Europe with higher share of high-value crops (CY, EL, IT, MT, PT, ES, HR)	- Water scarcity and inefficient water use in irrigation-heavy systems (Zwart & Bastiaanssen, 2004). - Soil erosion on slopes and fragile landscapes in permanent crops (e.g., olives, vineyards) (García-Ruiz et al., 2015). - High pesticide use and residues affecting ecosystems and human health (Silva et al., 2019).	- Water conservation through organic soil management and mulching (El-Beltagi et al., 2022). - Soil stabilisation and erosion control with organic practices in permanent crops (Ramos et al., 2011). - Reduced pesticide use and improved habitat quality for pollinators and beneficial insects (Pimentel et al., 2005). - Nitrogen use reductions for climate.
PW-CL3 Central and Eastern Europe (BL, CZ, EE, HU, LT, LV, PL, RO, SK)	- Soil degradation and loss of organic matter due to intensive ploughing (Boardman & Poesen, 2006). - Low biodiversity in arable systems dominated by cereals and low share of green crops (Tscharntke et al., 2005). - Emerging issues of water pollution from growing fertiliser use (Schoumans et al., 2014).	- Soil health improvements with organic matter inputs and diversified rotations (Mäder et al., 2002). - Increased biodiversity through reduced pesticide use and crop diversification (Bengtsson et al., 2005). - Potential for scaling organic practices in less intensive systems with lower baseline input use (FIBL & IFOAM, 2023).
PW-CL4 Northern Europe (SE, FI, DK)	- GHG emissions from livestock and grassland systems (Smith et al., 2007). - Water pollution in sensitive freshwater ecosystems (Stålnacke et al., 1999). - Biodiversity loss in intensively managed arable areas (Macdonald & Feber, 2015).	- Lower GHG emissions through improved grazing management and organic feeds (Soussana et al., 2010). - Water quality enhancement with reduced fertiliser runoff (Shepherd et al., 2003). - Pollinator recovery and biodiversity increases in grassland and arable systems (Hole et al., 2005).
PW-CL5 Alpine and high-share grassland regions (AT, IR, SI)	- Soil erosion on slopes due to permanent crop and livestock systems (García-Ruiz et al., 2015). - GHG emissions linked to livestock and dairy farming (Smith et al., 2007).	- Soil conservation and erosion control in sloped fields (Zuazo & Pleguezuelo, 2008). - Enhanced carbon sequestration in permanent grasslands and organic orchards. - Promotion of landscape diversity and agro-tourism opportunities (Tasser et al., 2005).

Source: own compilation

Table 22: Country clusters and policy weights of land use conversion in the Green Public Policy scenario

Cluster	Arable land	Permanent grass	Permanent crops
PW-CL1: Western Europe (BE, FR, DE, LU, NL)	0.4	0.35	0.25
PW-CL2: Mediterranean Europe (CY, EL, IT, MT, PT, ES, HR)	0.4	0.25	0.35
PW-CL3: Central and Eastern Europe (BL, CZ, EE, HU, LT, LV, PL, RO, SK)	0.5	0.2	0.3
PW-CL4: Northern Europe (SE, FI, DK)	0.4	0.35	0.25
PW-CL5: Alpine and high-share grassland regions (AT, IR, SI)	0.3	0.5	0.2

Source: own compilation

Organic on Every Table

In the OET scenario, the market plays the primary role in driving the conversion of land to organic farming between 2020 and 2030. The land use structure of newly converted organic areas is assumed to be shaped largely by domestic demand for organic products and export potential, which is influenced by each country's existing land use structure and its agricultural trade profile as of 2020.

Market forces are expected to primarily incentivise the conversion of arable land, given that demand for meat is projected to decline under the OET scenario. Consequently, cropland systems, which are more directly linked to plant-based food production, are more likely to convert to organic farming. At the same time, the regional distribution of organic conversion is assumed to align more closely with comparative production advantages, particularly since consumers are not expected to pay significantly higher price premiums for organic produce. For this reason, the conversion of permanent crops will also be concentrated in regions with greater agroecological suitability and lower production costs.

Based on these considerations, we qualitatively identified seven country clusters, each assigned different market weights to reflect the varying structure of market-driven land use conversion (see Table 23). Compared to the GPP scenario, the market-based scenario results in a more pronounced differentiation of weights, reflecting the uneven distribution of competitive advantages and market responsiveness across the EU. It is important to note that the market weights assigned to each land use category within a cluster reflect the relative distribution of the projected organic land, not the total scale of conversion. A more balanced allocation of weights across arable land, permanent grassland, and permanent crops suggests that all three land use types offer market potential for organic expansion. Conversely, highly skewed weights indicate that only specific land uses are likely to respond to market demand, given factors such as production cost advantages, existing infrastructure, consumer preferences, and export viability; the intensity of the response (how much land is expected to be converted) was subject to organic area projections (see Section 5.4 and Section 5.5).

Table 23: Country clusters and market weights of land use conversion in the Organic on Every Table scenario

Cluster	Arable land	Permanent grass	Permanent crops
MW-CL1: Cereal exporters (BG, RO)	0.9	0.05	0.05
MW-CL2: Countries with growing domestic demand and exports (BE, CZ, EE, HU, LT, LV, NL, PL, SK)	0.7	0.2	0.1
MW-CL3: High-demand and agricultural trade countries (FI, SE, DK, DE, AT)	0.6	0.3	0.1
MW-CL4: Livestock and milk product exporter (IE, LU)	0.5	0.5	0
MW-CL5: Diversified system potential (FR, HR, SI)	0.5	0.3	0.2
MW-CL6: Permanent crops/citrus exporters (CY, MT)	0.4	0	0.6
MW-CL7: Permanent crop exporters with specialised animal produce for exports (EL, ES, IT, PT)	0.3	0.2	0.5

Source: own compilation

The first cluster, **MW-CL1**, includes Bulgaria and Romania, both of which are assigned a high market weight for arable land conversion (MW=0.9). This is primarily driven by their growing export potential, rather than domestic demand, which is expected to remain relatively low. Both countries are major cereal exporters, and their role is projected to expand as demand for organic cereals increases in wealthier EU member states.

This export demand may also include organic cereals for animal feed, as organic arable farming also expands in high-demand countries, potentially outpacing their domestic feed production capacity. Moreover, Bulgaria and Romania benefit from a comparative advantage in production due to lower labour and land costs, making them attractive suppliers in a price-sensitive organic market.

MW-CL2 includes a group of countries with growing domestic demand for organic products and export potential, but whose agricultural systems are dominated by arable land use and less specialised in permanent grassland-based livestock production. Countries such as Poland, Hungary, and the Czechia have extensive arable areas and are already major producers of cereals, oilseeds, and industrial crops. Similarly, the Netherlands and Belgium are highly productive arable producers and significant vegetables exporters with well-developed supply chains. In OET scenario—where market forces drive organic expansion—these countries are well-positioned to respond to rising demand for organic plant-based foods, both domestically and in export markets. Accordingly, a high market weight is assigned to arable land conversion (MW = 0.7), reflecting its structural dominance and the strong alignment of arable systems with market demand under this scenario.

The lower weight for permanent grassland (MW = 0.2) reflects the limited role of grassland-based livestock systems in driving market-based organic expansion within this cluster. Unlike countries with strong organic dairy sectors, most MW-CL2 members have either relatively small permanent grassland areas or limited consumer willingness to pay premiums for organic animal products. Additionally, the decline in meat consumption projected under the OET scenario further weakens the economic case for converting grassland. Grassland in these countries is often used extensively and yields lower per-hectare returns compared to more intensive arable systems, making it a less attractive target for organic conversion in a market-driven context. Lastly, permanent crops receive a minor weight (MW = 0.1), consistent with their low representation in national land use and limited export competitiveness relative to Mediterranean producers.

MW-CL3 includes Austria, Germany, Denmark, Finland, and Sweden, countries with mature organic sectors, high domestic demand, and well-developed supply chains for organic food. These countries are characterised by a strong consumer willingness to pay for organic products, well-established certification and marketing systems, and public trust in organic labels. In the OET scenario, which assumes market-driven expansion, the conversion of arable land receives the highest weight (MW = 0.6), reflecting continued growth in demand for organic plant-based products, cereals, and vegetables. These countries also have the structural capacity to support efficient organic arable production, with strong infrastructure, advisory systems, and policy alignment.

A moderate weight is also assigned to permanent grassland (MW = 0.3), especially due to the importance of organic dairy and mixed livestock systems in countries like Austria, Germany, and Denmark. These systems contribute to national organic output and are often closely linked to regional identity and high-value product labels. Despite a projected overall decline in meat consumption under OET, organic dairy and sustainable livestock remain viable in this cluster due to stable demand niches and strong domestic markets. The low weight for permanent crops (MW = 0.1) reflects their limited role in total agricultural land use across the cluster, as most permanent crop production (e.g., fruits, vineyards) is concentrated in southern Europe. Altogether, MW-CL3 represents countries where balanced conversion is feasible across land use types, driven primarily by domestic market strength rather than export expansion.

MW-CL4 comprises Ireland and Luxembourg, two countries with a strong orientation toward livestock and dairy production, and relatively limited areas under permanent crops. In both cases, the agricultural sector is shaped by extensive grassland use, particularly for pasture-based ruminant systems. Under the Organic on Every Table (OET) scenario—where market forces drive organic land conversion—the cluster reflects a balanced conversion potential between arable land and permanent grassland, each receiving a market weight of 0.5. This allocation acknowledges both the growing domestic and export demand for organic livestock products, particularly dairy, and the emerging demand for plant-based organic foods, including cereals and feed crops.

Permanent grassland conversion is a core feature of this cluster's transition pathway, especially in Ireland, where over 90% of agricultural land is under grass. Market-driven incentives for organic dairy, combined with Ireland’s pasture-based brand image and export capacity, support the feasibility of converting significant grassland areas to organic management. Luxembourg, while smaller in scale, shares similar land use characteristics and maintains policy support for sustainable livestock. At the same time, arable land conversion plays a complementary role, especially in expanding feed self-sufficiency and reducing reliance on conventional imports. The market weight on permanent crops reflects their negligible land share and lack of relevance in the production systems of either country. Overall, **MW-CL4** represents a grassland-intensive cluster where organic conversion is driven by livestock sector dynamics but still includes a meaningful organic conversion on arable component in response to evolving domestic market demands.

MW-CL5 includes France, Croatia, and Slovenia, countries characterised by diverse agricultural systems that integrate arable land, permanent grassland, and permanent crops in varying proportions. This cluster reflects regions with balanced organic conversion potential across all land use types. In the OET scenario, these countries are well-positioned to respond to demand across multiple product categories, ranging from organic cereals and vegetables to livestock products and fruit crops. The moderate weight for arable land conversion (MW = 0.5) reflects the central role of arable systems in these countries, particularly in France, where large-scale organic crop production is already well established and expanding.

The permanent grassland weight (MW = 0.3) accounts for the continued importance of livestock systems, particularly dairy and mixed farming in mountain and foothill regions such as the Alps and the Massif Central in France, as well as hilly regions in Slovenia and Croatia. These areas provide opportunities for grass-fed organic livestock production, which aligns with growing consumer interest in sustainable and animal welfare-friendly products. The permanent crops weight (MW = 0.2) reflects the significant share of orchards and vineyards, particularly in southern France and parts of Slovenia and Croatia, where organic viticulture, olive production, and fruit cultivation are already expanding. These systems are particularly responsive to niche market demand and export potential. Altogether, **MW-CL5** captures a flexible and multi-functional conversion profile, where all three land use types contribute meaningfully to the organic transition under market conditions.

MW-CL6 includes Cyprus and Malta, two small Mediterranean island states with high-value agricultural sectors and a strong presence of permanent crops, particularly citrus, olives, and fruit orchards. While the overall scale of organic agriculture remains underdeveloped in both countries, the land that is converted to organic farming between 2020 and 2030 is expected to be concentrated in permanent crop systems. As such, permanent crops are assigned the highest market weight (MW = 0.6) in this cluster. This does not imply a large expansion of organic farming in absolute terms, but rather a proportional allocation of the modest projected increase in organic area to the most relevant land use category.

The arable land weight (MW = 0.4) reflects the secondary role of crop production—mainly vegetables, pulses, and cereals—for local consumption. Although limited in area, arable farming plays a meaningful role in domestic food supply and can respond to niche organic demand, especially for short-supply chains or tourism-driven markets. Permanent grassland receives no market weight, as neither Cyprus nor Malta has significant grazing systems, and livestock production in Cyprus (e.g., for halloumi cheese) and aquaculture in Malta (e.g., tuna exports) are already operating successfully in conventional niche markets. These sectors face few incentives to convert, particularly given the technical, logistical, and market barriers to organic certification and processing. As such, MW-CL6 represents a constrained but targeted conversion profile, where organic farming is likely to expand only in specific land use types with agroecological and market suitability.

MW-CL7 brings together Greece, Spain, Italy, and Portugal, i.e. countries with strong Mediterranean agricultural traditions, large areas of permanent crops, and significant exports of high-value plant and animal products. In the OET scenario, the highest share of organic growth is expected in permanent crops, reflected in a market weight of 0.5. These countries are major producers of olives, wine, citrus, and nuts, which are well-suited to organic farming and increasingly in demand in both EU and global markets. Their agroecological conditions, established branding, and export capacity make permanent crop systems the most attractive for market-driven organic conversion.

However, the allocation of weights to arable land (0.3) and permanent grassland (0.2) also reflects meaningful market potential across all three land use types. Arable systems, particularly those producing cereals, legumes, and vegetables, offer selective opportunities for conversion, especially where existing organic value chains and irrigation efficiency allow for profitable organic cultivation. Meanwhile, permanent grassland supports extensive livestock systems—notably sheep and goat farming—which, while not yet widely converted to organic, have niche potential, particularly in relation to local specialty products and grazing-based certifications. Although permanent crops dominate the projected conversion, the presence of non-zero weights across all land types indicates that MW-CL7 has a diversified potential, with multiple pathways for market-responsive organic expansion.

Divergent Pathways

In the DPW scenario, the land use conversion weights across arable land, permanent grassland, and permanent crops are not applied uniformly to all countries. Instead, countries are assigned to different scenario pathways as presented in Section 5.5 and Appendix A2. Each country's land use conversion weights are then drawn from the corresponding cluster weights defined under the GPP, OET or Business as Usual scenarios, depending on their pathway allocation. This approach mirrors the structure used in projecting organic area growth, where saturation levels and scaling factors also vary by country and scenario. By aligning land use weights with the scenario-specific pathways, the DPW scenario allows for more differentiated, context-sensitive projections, reflecting the different realities of national trajectories in the EU's organic transition.

5.7 Projection disaggregation to NUTS2 regions

The organic area increments allocated to the individual land use categories were further distributed among the NUTS2 regions based on the relative representation of each crop within the NUTS2 region weighted by the organic farming representation as a proxy for the region's relative conversion suitability (within a country).

In the first step, we assigned preliminary (un-normalised) regional weights. For land-use type l in country c, we computed each region's r preliminary weight from its 2020 land endowment and organic farming representation: [11]

$$\omega_{r,l} = UAA_{r,l,2020} \cdot OrgShare_{r,l,2020}, \qquad \Omega_l = \sum_{r \in c} \omega_{r,l}, \qquad (14)$$

In the next step we allocate the national organic area increment in the land use category by scenario to NUTS2 regions using the normalised regional weights $\frac{\omega_{r,l}}{\Omega_l}$ as follows:

$$\Delta Org\_UAA_{r,l,2030}^{SCEN} = \frac{\omega_{r,l}}{\Omega_l} \cdot \Delta Org\_UAA_{l,2030}^{SCEN}, \qquad (15)$$

The regional organic area increments by land-use type were then used to calculate the total land use-specific NUTS2 organic and conventional areas in 2030 as follows:

$$Org\_UAA_{r,l,2030}^{SCEN} = Org\_UAA_{r,l,2020} + \Delta Org\_UAA_{r,l,2030}^{SCEN}, \qquad (16)$$

$$Conv\_UAA_{r,l,2030}^{SCEN} = UAA_{r,l,2020} - Org\_UAA_{r,l,2030}^{SCEN}, \qquad (17)$$

assuming total utilised agricultural area in each land-use type and region remains constant over time:

$$UAA_{r,l,2030} = UAA_{r,l,2020}. \qquad (18)$$

For the implementation of the regional shocks on mineral fertiliser and pesticide use due to organic area expansion, we calculated the regional and land use-specific reduction factor in conventional area between the OrganicTargets4EU scenarios and the CAPRI Baseline as:

$$Conv\_Reduct_{r,l}^{SCEN} = \frac{Conv\_UAA_{r,l,2030}^{CAPRI} - Conv\_UAA_{r,l,2030}^{SCEN}}{Conv\_UAA_{r,l,2030}^{CAPRI}}. \qquad (19)$$

[11] We additionally imposed an upper feasibility constraint to ensure that the redistributed organic land remained within each region's available land endowment and re-normalised the unconstrained regions proportionally to maintain the national total. For simplicity and clarity of presentation, this constraint is omitted from the formal notation.

6 Results

This Chapter presents the outcomes of the organic area projections and the CAPRI impact assessment carried out under the OrganicTargets4EU scenarios. The results are structured in two parts. First, we examine how organic farmland shares are expected to evolve across EU Member States and regions under the CAPRI Baseline, the Business as Usual (BAU) scenario, and the three OrganicTargets4EU development pathways (Green Public Policy—GPP, Organic on Every Table—OET, Divergent Pathways—DPW) towards achieving 25% EU farmland target. These projections illustrate how different drivers—policy support, market demand, and divergent national trajectories—shape the scale and spatial pattern of organic expansion, and how they influence the distribution of organic farming across land-use types.

Second, we assess the agricultural, economic, and environmental implications of expanding organic farming under these scenarios using the CAPRI modelling framework. Because CAPRI represents the agricultural sector in aggregate, the results reflect system-wide adjustments associated with the transition to a higher share of land managed organically. The analysis highlights changes in production levels, land-use allocation, crop and livestock structures, farm income, and selected environmental indicators, and compares these outcomes against the CAPRI Baseline to quantify the incremental effects of reaching higher levels of organic farming.

Taken together, the results provide a coherent picture of both the potential pathways towards achieving the EU's 25% organic area target by 2030 and the consequences of such a transition for the European agricultural sector.

6.1 Organic area projections

6.1.1 Country-level organic area projections across scenarios

The projected organic area shares for all EU Member States in 2030 under the CAPRI Baseline, the Business as Usual, and the three OrganicTargets4EU development scenarios reaching the 25% target are presented in Table 24. Comparison of the projections across scenarios shows several key patterns.

The CAPRI Baseline, aligned with the Agricultural Outlook 2030 projection of 12% organic UAA, applies a uniform proportional increase to the 2020 organic areas. This approach amplifies existing disparities: frontrunners such as Austria (37.8%) and Estonia (31.7%) move well above 30%, while laggards such as Ireland (2.1%), Malta (0.7%), Romania (3.6%), and Bulgaria (3.7%) remain at or below 4%. The result is a relatively high cross-country dispersion, with a standard deviation of 9.5.

The BAU scenario, in contrast, projects an EU average of 14.9% by 2030. By incorporating non-linear growth trajectories, it moderates extremes and reduces dispersion (standard deviation 8.1). Catch-up dynamics are visible for low-share countries: Greece rises from 4.2% in 2020 to 16.7% in 2030, France from 8.9% to 18.9%, and Croatia from 7.3% to 14.9%. Meanwhile, growth is more modest in frontrunners such as Austria (34%) and Estonia (29.6%), suggesting limited further expansion where organic farming is already well established.

Across the OrganicTargets4EU scenarios (GPP. OET, DPW), all countries contribute to the EU-wide target of 25% organic UAA by 2030, but their national outcomes diverge. For example, the Czechia reaches 32.5% in the OET scenario compared with 23.3% in GPP, while Latvia achieves 33.1% in OET but only around 23% in GPP and DPW. Italy stands out as a consistent high performer, surpassing 40% in all three scenarios, while Ireland, Cyprus, and Malta remain below or close to 10%, despite multiple-fold increases. These differences reflect how varying drivers — policy incentives, consumer demand, and structural divergence — shape the pace of organic conversion.

Taken together, the findings in Table 24 highlight three key insights. Firstly, the method of projection matters: proportional scaling exaggerates disparities, whereas logistic growth models produce stronger convergence. Secondly, the assumptions underlying scenarios play a critical role in shaping distribution: policy-driven versus market-driven incentives lead to very different national trajectories, even when the EU target remains the same. Thirdly, persistent outliers at either end of the spectrum highlight the structural diversity of EU agriculture, with barriers and potential that cannot be addressed by aggregate targets alone.

Table 24: Country-level organic area share projections under the CAPRI Baseline and OrganicTargets4EU 2030 scenarios (in % of UAA)

Scenarios[b] Country	IFS 2020	CAPRI baseline	BAU	GPP	OET	DPW
AT	26.8	37.8	34.0	41.0	41.7	41.4
BE	6.8	9.5	10.8	21.7	22.8	26.4
BG	2.6	3.7	4.8	13.9	12.3	10.6
CY	3.6	5.1	5.6	14.8	11.7	9.4
CZ	15.2	21.4	19.8	23.3	32.5	23.5
DE	9.6	13.6	17.4	27.3	28.6	28.0
DK	11.8	16.6	20.8	30.3	31.0	34.6
EE	22.5	31.7	29.6	29.7	34.1	29.9
EL	4.2	6.0	16.7	20.0	19.1	20.8
ES	8.0	11.3	12.8	32.6	28.9	33.8
FI	13.9	19.6	23.2	24.9	30.0	25.2
FR	8.9	12.6	18.9	27.0	26.0	29.5
HR	7.3	10.3	14.9	18.3	24.1	15.5
HU	5.5	7.8	13.3	19.4	20.7	13.7
IE	1.5	2.1	3.0	10.0	9.6	10.5
IT	15.7	22.1	24.1	40.5	39.8	41.3
LT	8.0	11.3	11.7	19.8	24.3	15.9
LU	4.6	6.4	8.7	21.0	18.2	21.6
LV	15.9	22.5	20.3	22.9	33.1	23.1
MT	0.5	0.7	2.1	5.2	4.0	4.1
NL	4.1	5.7	7.3	18.8	17.8	21.5
PL	3.3	4.6	5.6	13.8	14.1	10.1
PT	5.7	8.0	14.8	22.7	24.6	23.5
RO	2.5	3.6	7.4	13.4	12.3	10.4
SE	20.5	28.9	25.0	31.8	33.6	32.1
SI	12.1	17.0	15.6	21.6	29.9	17.9
SK	10.2	14.4	14.7	23.5	27.9	23.9
EU[a]	**8.5**	**12.0**	**14.9**	**25.0**	**25.0**	**25.0**
S.D.	**6.7**	**9.5**	**8.1**	**8.4**	**9.5**	**9.9**

[a] EU weighted average using Member States' UAA;
[b] Scenarios: BAU = Business as Usual, GPP = Green Public Policy, OET = Organic on Every Table, DPW = Divergent Pathways.

Source: own compilation

The numerical differences across scenarios shown in Table 24 are illustrated and further interpreted in the following figures and sections.

6.1.2 Country and NUTS2 differences in organic area projections between CAPRI and Business as Usual scenarios

Figure 9 compares country-level organic area shares in the two 2030 baseline scenarios with the reference year 2020. The CAPRI Baseline applies a uniform proportional scaling of the 2020 levels, reproducing the existing country ranking and thereby amplifying disparities. Austria, Estonia, and Sweden remain clear frontrunners well above the EU average, while Ireland, Malta, Romania, and Bulgaria continue to lag far behind with very low shares.

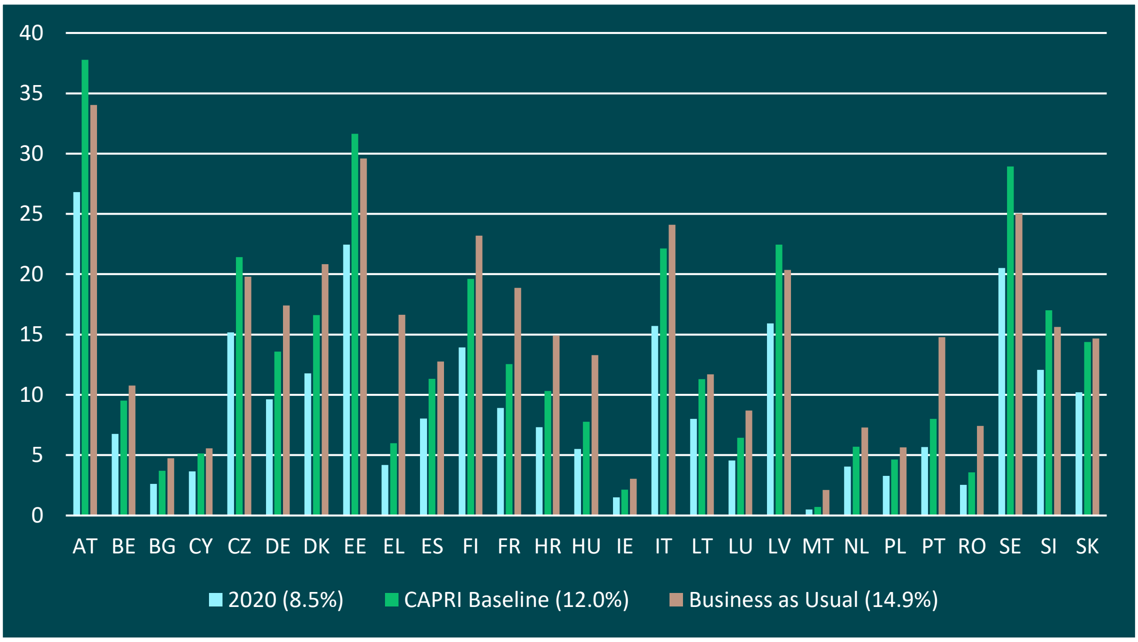


Figure 9: Country-level IFS 2020 and projected organic area shares (% of UAA) under CAPRI Baseline and the Business as Usual 2030 scenarios

Source: own compilation

By contrast, the BAU scenario moderates these extremes. Countries with low initial organic shares—such as Greece, Portugal, Romania, France, and Croatia—show stronger relative growth, while traditional frontrunners (Austria, Sweden, Estonia) grow more modestly. This produces a more balanced cross-country distribution (shown in standard deviations in Table 24), even as the EU-wide average rises to 14.9% (compared to 12% in the CAPRI Baseline).

Importantly, the organic sector growth in the BAU scenario is not only a function of the logistic growth model but also reflects country-specific factors such as climate and soil conditions, land-use structure, and current policy and market trends. As a result, the convergence tendencies do not hold uniformly. Some frontrunners with currently higher levels of organic area shares—notably Finland and Italy—show even higher expansion potential in the BAU than in CAPRI, reflecting favourable conditions. Conversely, in several laggard countries where structural constraints remain strong, such as Bulgaria, Ireland, Cyprus, or Poland, organic growth in the Business as Usual is not significantly faster than under the CAPRI Baseline.

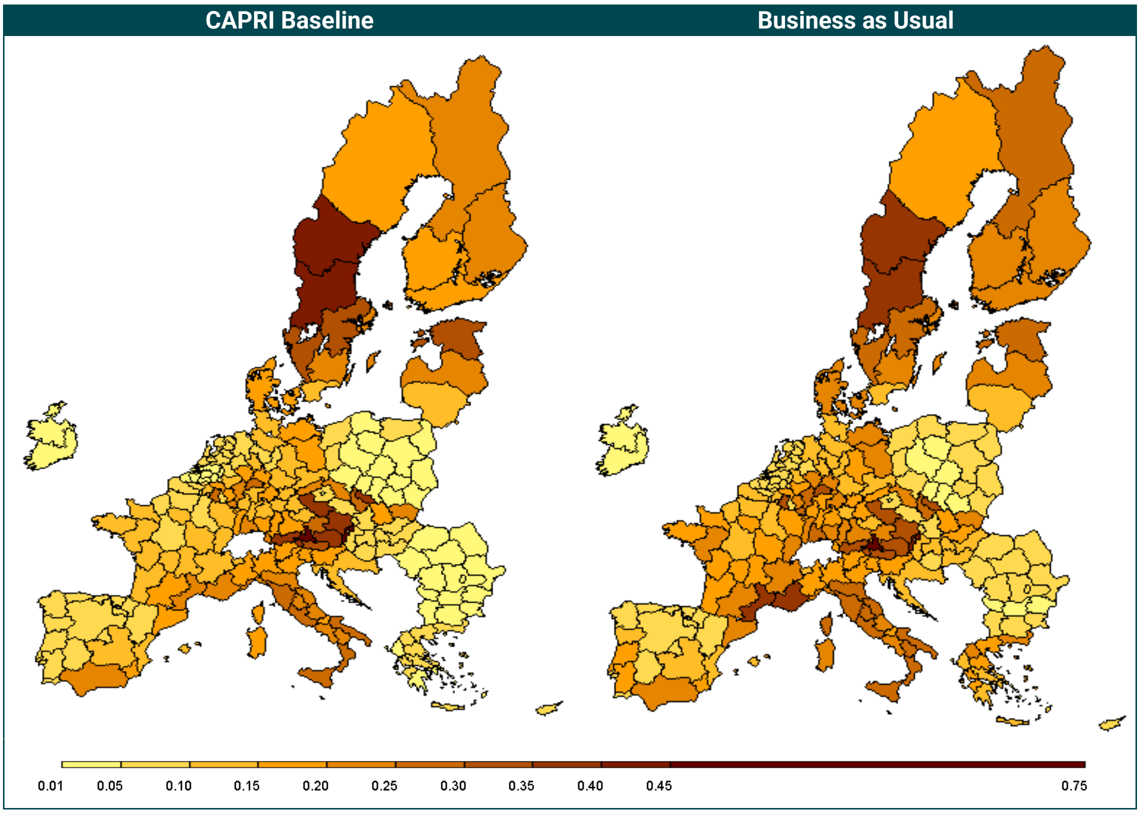


Figure 10: Projected organic area shares of total UAA (%) at NUTS2 level in the 2030 CAPRI Baseline and Business as Usual scenarios

Source: own compilation

Figure 10 translates these country-level results into a spatial perspective at NUTS2 level. Under the CAPRI Baseline, the existing "organic hubs" in Alpine regions, Scandinavia, and parts of the Mediterranean dominate the map, while Central and Eastern Europe remain comparatively light-shaded, reflecting low organic shares. The BAU retains the prominence of these traditional hubs but shows a more even spread of darker shades across Central-Northern and Eastern Europe. This suggests that, when more recent organic conversion dynamics, market and policy trends and regional heterogeneity are taken into account, organic farming is expected to expand more strongly outside the established frontrunner regions, leading to a geographically broader distribution of organic area by 2030.

Together, these figures underline the central methodological point: while the CAPRI Baseline projects a continuation of current disparities, the Business as Usual generates convergence both statistically (lower dispersion across Member States) and spatially (a more even spread across regions).

6.1.3 Country and NUTS2 differences in organic area projections between OrganicTargets4EU development scenarios

Building on the baseline/BAU comparison, Figure 11 and Figure 12 shift the focus to the three OrganicTargets4EU development scenarios, all calibrated to achieve the 25% EU organic area share by 2030. The development scenarios reveal how alternative drivers of growth—public policy support, consumer demand, or divergent national trajectories—shape the distribution of organic farming across Member States. The figures show that, although the EU-level target is consistently reached, the pathways to this outcome vary widely, resulting in distinct national profiles of organic expansion.

Figure 11 compares country-level projections of organic area shares in 2030 under the BAU and the three development scenarios (GPP, OET, DPW). In the policy-driven GPP scenario, growth is more evenly distributed: most countries converge towards the EU target, and extreme outliers are less common. By contrast, the OET scenario, where rising consumer demand creates both larger domestic markets and greater trade opportunities, accentuates growth in several countries. The Czechia, Latvia, Italy, and Denmark all exceed 30%, with Italy and Denmark surpassing 40%. The DPW scenario generates the broadest spread. Some countries, notably Ireland, Malta, and Bulgaria, remain well below 15%, while others, including Italy and Spain, climb beyond 40%. Some countries stand out because, given their natural endowments and existing policy or market gaps, either pathway leads to substantial organic growth and neither policy- nor demand-driven trajectories dominate. This is the case for Italy, Portugal, Spain, Belgium, Ireland, and Sweden. In other Member States, however, one scenario clearly reveals greater expansion potential than the others.

Figure 12 illustrates these contrasts by showing the relative differences in projected organic area shares between the three OrganicTargets4EU scenarios. The largest divergences appear in Central and Eastern Europe as well as in Southern Member States. For example, Latvia, the Czechia or Slovenia expand much more strongly under OET compared to GPP, reflecting the accelerating effect of demand-led growth in these regions and currently already high policy support for organic farming. Conversely, Portugal, Luxemburg, Greece and Malta show higher organic uptake under GPP, highlighting the importance of policy-driven incentives in overcoming structural or market barriers. The DPW scenario often diverges from both, combining strong growth in certain countries (e.g., Italy, Spain) with continued stagnation in others (e.g., Malta, Ireland, Bulgaria).

Figure 13 illustrates the projected regional distribution of organic area shares across the EU at the NUTS2 level under the Business as Usual and the three development scenarios (GPP, OET, DPW). Several patterns stand out. First, the well-established “organic hubs” in Austria, Scandinavia, and parts of Southern Europe remain dominant across all scenarios, reflecting structural strengths and historical momentum. Second, scenario differences emerge in regions with moderate or low organic penetration: in the OET scenario, consumer demand strongly drives expansion in Central and Western Europe, creating more balanced growth across the EU; in the GPP scenario, policy support favours Southern and Eastern Europe, where conversion rates accelerate; while the DPW scenario produces the most uneven outcome, with very high concentrations in some regions (e.g. Northern Europe) and slower uptake elsewhere. These contrasts underline that, although the EU-wide 25% target is met in all cases, the regional pathways can differ substantially, which has important implications for land-use patterns, production structures, and market adaptation at the subnational level.

The regional projections in Figure 13 already suggest that scenario drivers shape not only the overall extent but also the spatial distribution of organic farming. Figure 14 sharpens this perspective by showing the absolute differences between the OrganicTargets4EU scenarios and the CAPRI Baseline. The results highlight that the strongest upward deviations occur in Southern Europe—particularly Spain and Portugal—where policy incentives or consumer demand could accelerate conversion well beyond the proportional growth assumed in the CAPRI Baseline. Eastern Europe shows a more mixed picture, with substantial gains under GPP and OET but weaker expansion in DPW, reflecting uneven structural adaptation. In contrast, much of Northern and Central Europe remains close to the CAPRI Baseline, indicating that frontrunners and countries with steady growth trajectories are less sensitive to scenario-specific drivers. Together, these figures illustrate how alternative development pathways not only influence national averages but also reshape the regional geography of organic farming across the EU.

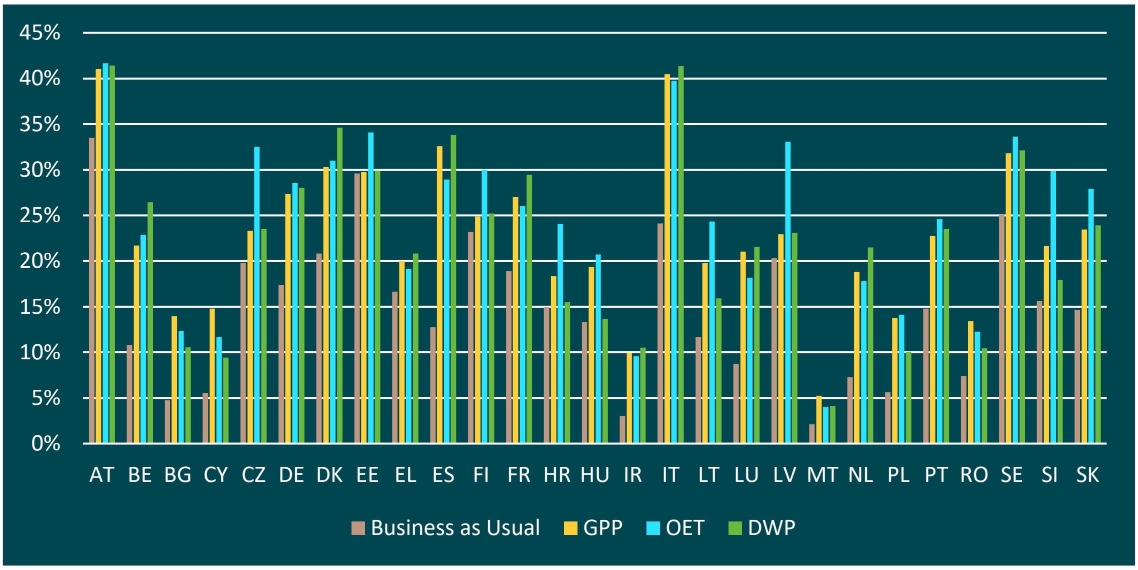


Figure 11: Country-level projected organic area shares under OrganicTargets4EU 2030 scenarios

Source: own compilation

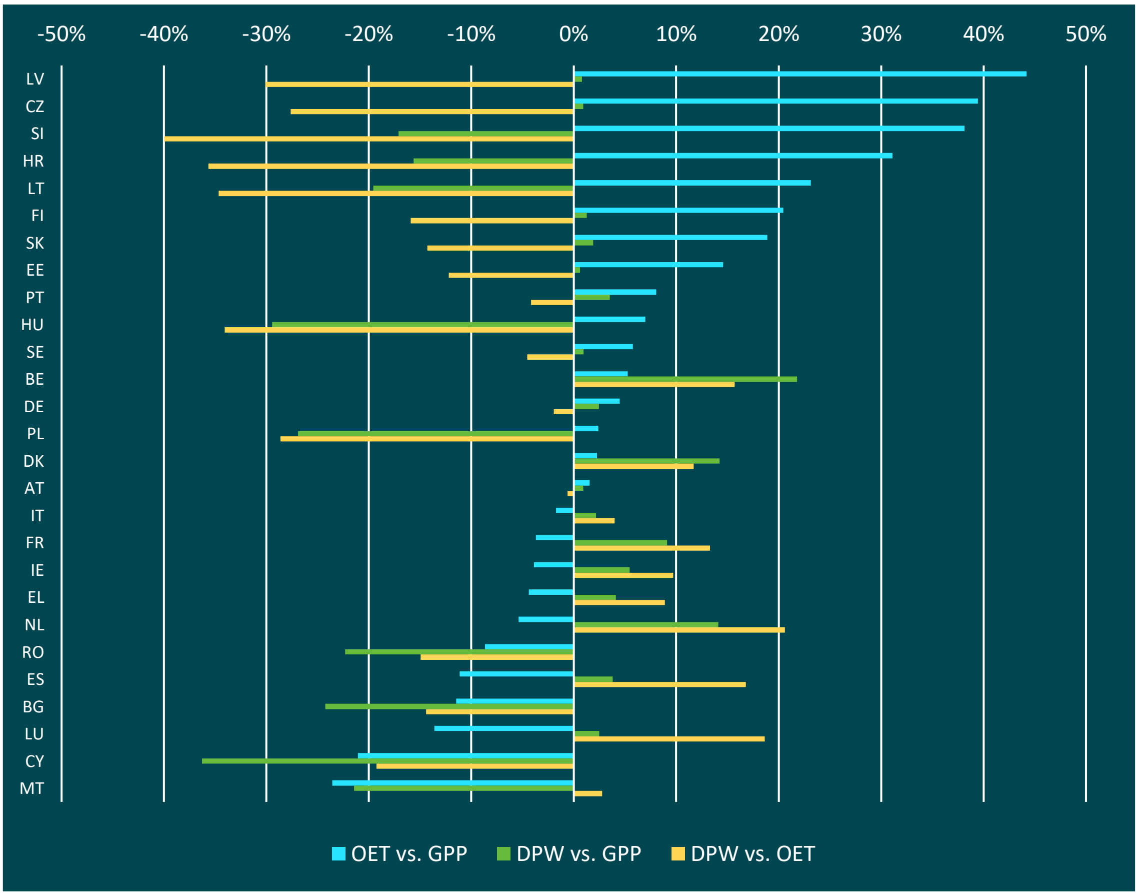


Figure 12: Relative differences in projected organic areas between the 2030 OrganicTargets4EU development scenarios

Source: own compilation

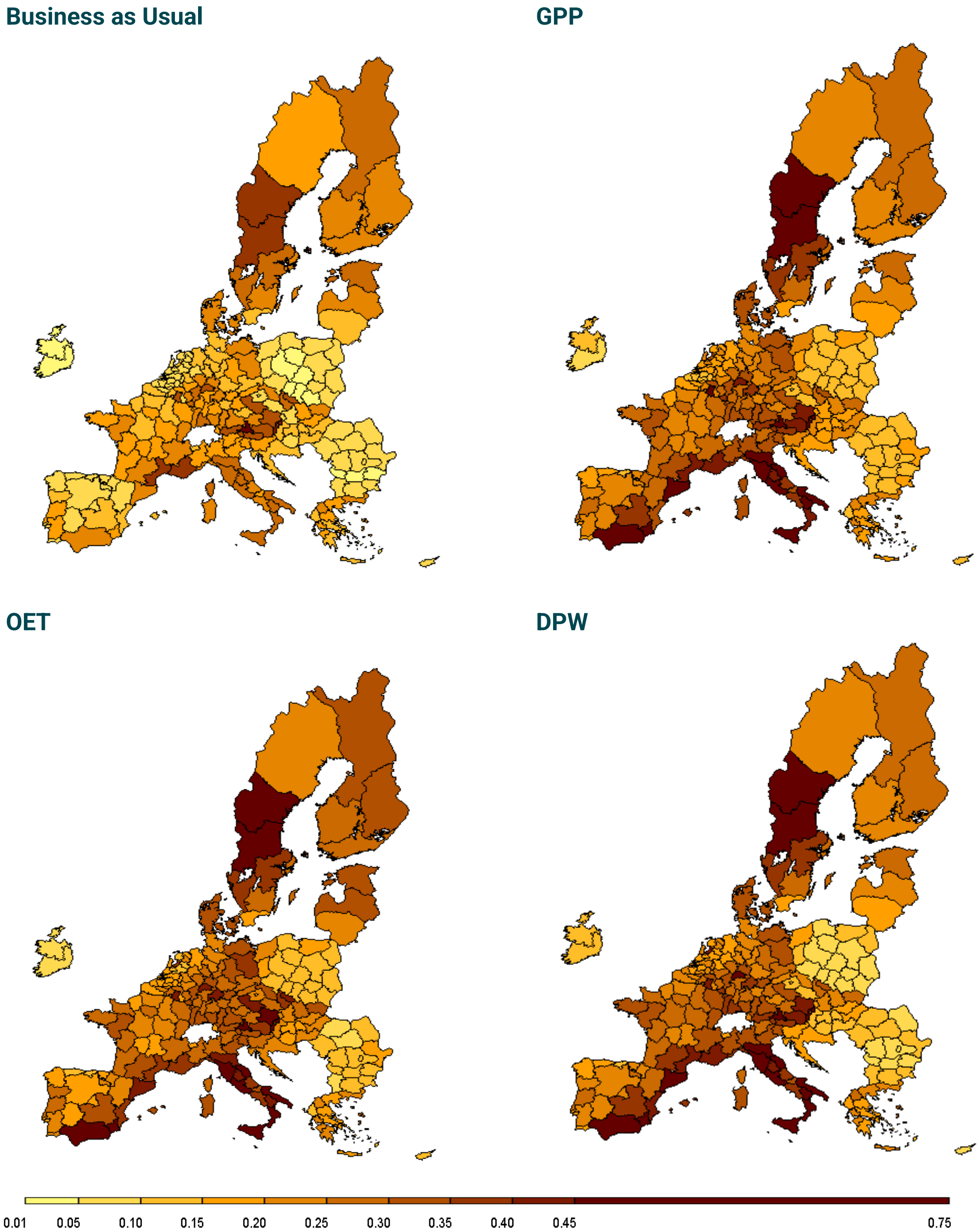


Figure 13: Regional distribution of projected organic area shares (EU NUTS2) under the Business as Usual and 2030 OrganicTargets4EU development scenarios

Source: own compilation

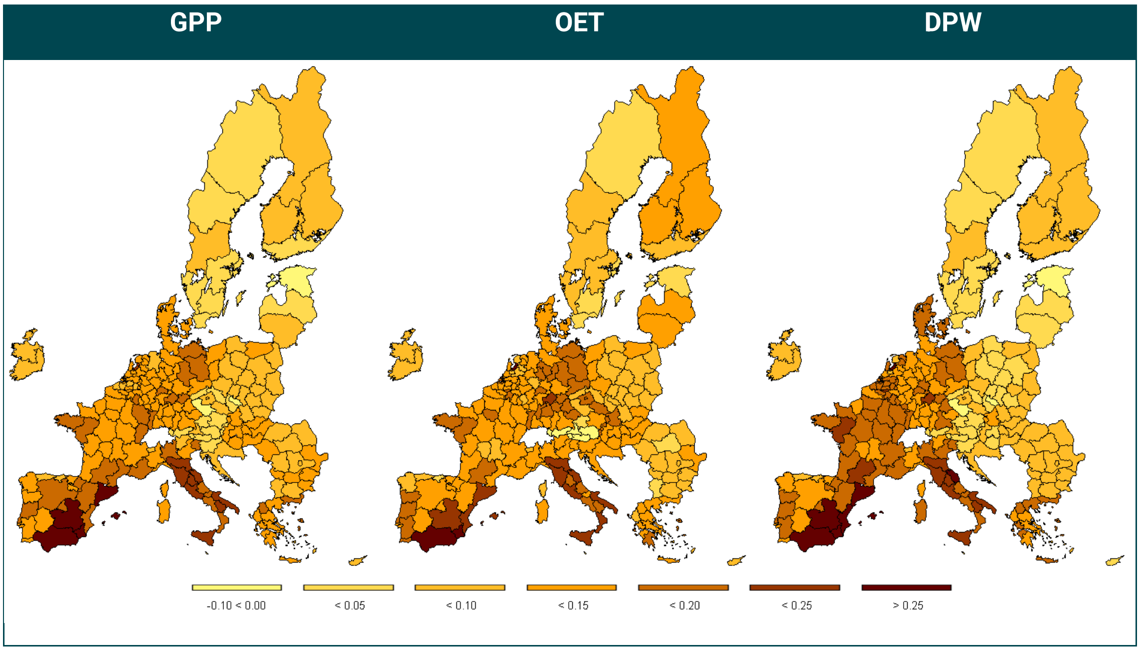


Figure 14: Absolute (percentage point) differences in organic area shares between the 2030 25%-target scenarios and the CAPRI Baseline

Source: own compilation

6.1.4 Scenario-specific land use structure of the projected organic area shares

The earlier results highlighted how organic growth differs across countries and regions under alternative scenarios. Figure 15 adds a complementary perspective by examining how organic expansion is distributed across land-use types—arable land, permanent grassland, and permanent crops. The figure distinguishes between the composition of newly converted land (2020–2030) and the resulting overall structure of organic farmland in 2030.

The IFS 2020 data show a markedly different land-use composition between conventional and organic farming: conventional agriculture is dominated by arable land (69%), with permanent grassland at 26% and permanent crops at 5%, whereas organic farming relies more heavily on grassland (39%) and permanent crops (7%), with arable land accounting for a smaller share (54%). This reflects the historical prominence of extensive, grassland-based systems in organic production.

The CAPRI Baseline and Business as Usual scenario project proportional growth, leaving this structure essentially unchanged by 2030. In both cases, organic farming continues to rely on grassland and arable land in roughly the same proportions as in 2020, implying that baseline assumptions do not alter the balance between land-use types.

By contrast, the development scenarios introduce much stronger shifts toward arable land conversion:

- In the GPP scenario, the newly converted organic area consists of 75% arable land, 19% grassland, and 6% permanent crops. This results in a total 2030 structure of 67% arable land, 27% grassland, and 6% permanent crops. Policy-driven conversion deliberately favours arable land for the environmental benefits while maintaining some role for grassland.

- In the OET scenario, consumer demand amplifies this trend: the newly converted organic area consists of 80% arable land, 12% grassland, and 8% permanent crops. By 2030, the overall organic structure shifts to 71% arable land, 22% grassland, and 8% permanent crops, marking the strongest departure from the grassland-heavy profile of 2020.
- The DPW scenario shows a somewhat more balanced expansion, with 70% arable land, 22% grassland, and 7% permanent crops in the newly converted areas, leading to a 2030 structure of 64% arable land, 29% grassland, and 7% permanent crops.

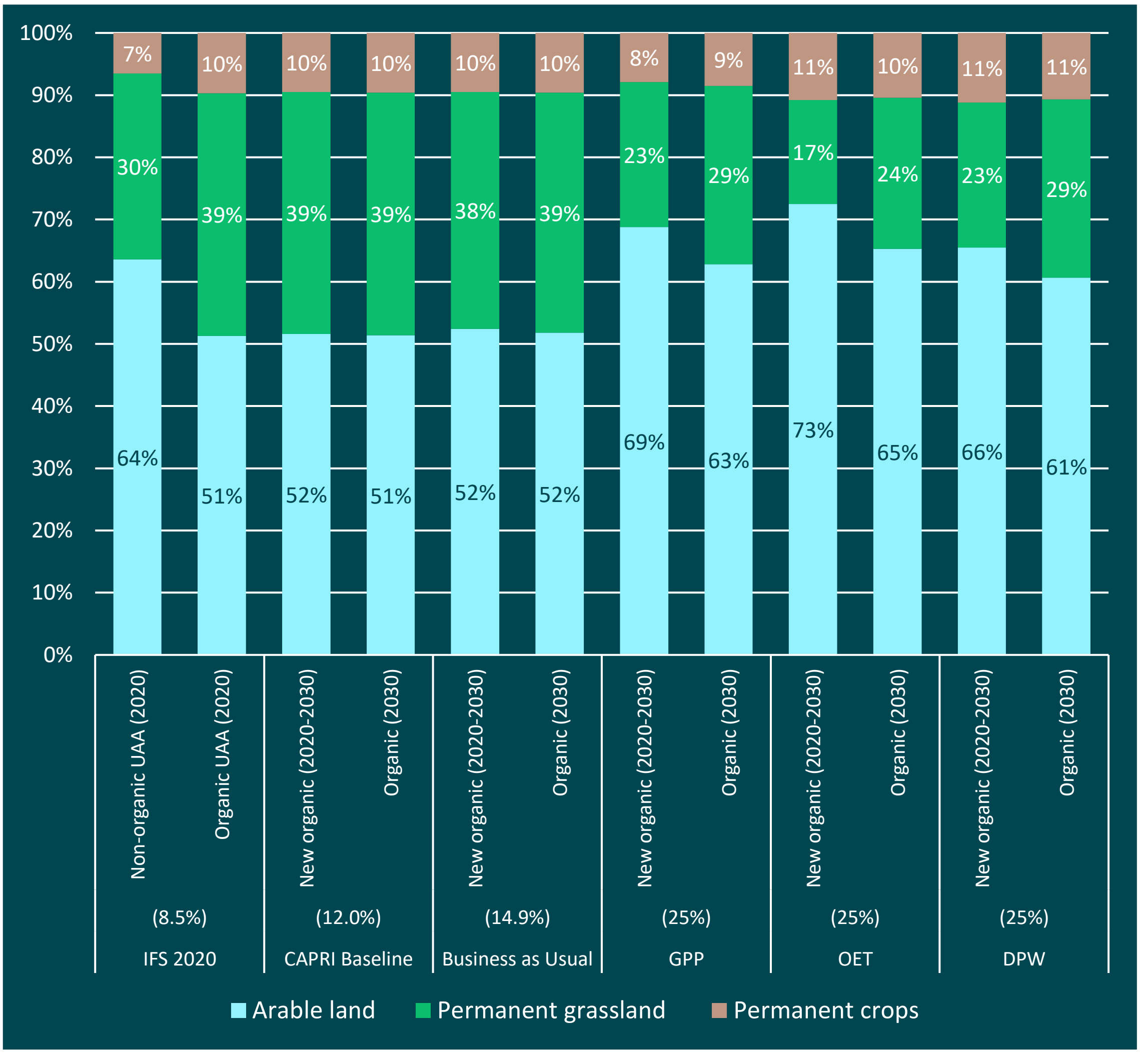


Figure 15: Land use structure of the organic area shares in 2020 and as projected for 2030 by scenario

Source: own compilation

These results underscore that the dominant driver of organic growth — whether policy support valuing environmental benefits or market- and consumer-led demand — shapes not only the scale but also the composition of organic farming. In the policy-oriented GPP pathway, grassland maintains a relatively strong role in the newly converted area, reflecting incentives that favour extensive land uses with environmental co-benefits. By contrast, the demand-driven OET scenario shifts organic expansion decisively toward arable land, aligning with consumer demand for cereals and arable-based products. The DPW scenario produces an intermediate outcome but still tilts organic growth more strongly toward arable land compared with the 2020 structure. This pattern is consistent with the assumption that, as organic expansion progresses, much of the low-cost, less intensively used land is already converted, making further growth increasingly reliant on bringing more intensively farmed arable land into organic production.

Overall, Figure 15 shows that even when the EU-wide organic target of 25% is uniformly met, the land-use composition of organic farming diverges substantially across scenarios. These differences carry important implications for crop–livestock interactions, feed balances, and the environmental footprint of organic expansion.

In summary, the results in in the section show how the method of projection — and the assumptions about drivers of organic growth — shape expectations for 2030. While the CAPRI Baseline suggests a simple continuation of current disparities, the Business as Usual and the 25% scenarios reveal the possibility of greater convergence, catch-up among laggards, and divergent national outcomes and spatial under different development pathways.

6.2 CAPRI impact assessment of organic targets

This section assesses the impacts of expanding organic farming to 25% of UAA in the EU by 2030. The analysis builds on the simulated outcomes of the CAPRI supply module and compares results across three levels of organic area expansion:

- the **CAPRI Baseline**, aligned with the Agricultural Outlook projections and assuming a 12% organic share by 2030;
- the **Business as Usual (BAU)**, which projects from last programming period more heterogeneous trends, resulting in 15% EU organic area share; and
- the **three OrganicTargets4EU development scenarios**—Green Public Policy (GPP), Organic on Every Table (OET), and Divergent Pathways (DPW)—each reaching the 25% EU-wide target under different policy and market assumptions.

The analysis draws on the modelled responses to the exogenous shocks applied to fertiliser use, pesticide availability, crop rotation, and livestock stocking density (see Section 4.3). The results cover changes in land use, crop and livestock production, yields (by shifts from intensive to extensive technology typology), and economic and environmental indicators. The results are derived for the aggregate agricultural sector; they therefore represent system-wide effects of achieving the 25% organic target, not the evolution of the organic sector in isolation. They are reported both in absolute terms and relative to the CAPRI Baseline (12%), which provides a consistent reference point for quantifying the additional effects of expanding organic area to 15% (under BAU) and 25% under the alternative development pathways.

Although the three OrganicTargets4EU scenarios achieve the same EU-wide organic area share, their simulated effects differ in magnitude and spatial distribution. Aggregate EU-level differences are modest, but larger contrasts emerge at the regional and activity level, particularly in land-use composition, crop mix, and livestock intensity. These variations mirror the distinct drivers of organic expansion—policy support in GPP, market and consumer demand in OET, and regionally differentiated trends in DPW.

We discuss each outcome indicator in the following sequence. First, we describe the general impact patterns that emerge across all scenarios, followed by a comparison between scenarios. Finally, we examine the spatial heterogeneity of impacts, focusing on differences across European countries and regions, using the DPW scenario (relative to the CAPRI Baseline) as an illustrative example.

To facilitate the interpretation of disaggregated results and enable consistent comparisons between variables and geographical units, several of the regional outcomes are aggregated into five macro-area groups, as detailed in Table 25.

Table 25: EU27 Member states and their macro area

Macro Area	Member States
Southern Europe (SE)	PT, ES, EL, IT, SL, HR, CY, MT, BG
Central Europe South (CES)	AT, FR, CZ, HU, SK, RO
Central Europe North (CEN)	BE, DE, LU, NL, PL
Northern Europe (NE)	DK, FI, SE, EE, LT, LV
Ireland (IR)	IE

Source: own compilation

It is important to interpret these findings in light of the modelling framework and its limitations, discussed in Chapter 7.

6.2.1 Land use and animal production

Aggregate impacts across scenarios

This section presents the CAPRI results on the modelled impacts of organic area expansion under the OrganicTargets4EU scenarios on agricultural land use and livestock units (LSU) by 2030, covering the main crop, fodder, and animal categories. The presentation of results is accompanied by figures that show the simulated impacts expressed both as absolute changes (in thousand hectares or LSU) and as percentage differences relative to the CAPRI Baseline. While the figures also include results for the BAU scenario, the following interpretation focuses on the OrganicTargets4EU scenarios achieving a 25% organic share of agricultural area by 2030.

Interpretation of the land use results should consider that the simulated changes mainly reflect (i) the lower competitiveness and production feasibility under the imposed organic constraints, given the limited scope for yield adjustments due to the CAPRI assumption of fixed yields for intensive and extensive technologies, and (iii) competition for arable land resulting from the expansion of legumes and temporary grassland within the imposed rotational constraint.

The CAPRI results on land use change presented in Figure 16 indicate that the expansion of organic farming triggers a reallocation of land away from intensive arable crops toward legumes and fodder activities (excluding fodder maize). Cereals, by far the most widespread crop in the European landscape, contract by around 3–4% (−1.7 to −1.9 million ha) across all scenarios reaching 25% organic area by 2030, relative to the CAPRI Baseline. This decrease is driven mainly by reductions in wheat (soft and durum) and is only partly offset by increases in cereals better suited to organic systems, such as oats (around +1%) and rye/meslin (+10%). The most pronounced change is the decline in fodder maize area (−18 to −19%, equivalent to −1.2 to −1.3 million ha), a nitrogen-demanding crop less compatible with organic nutrient management, captured in the category *fodder maize and root crops*. Oilseeds, vegetables, and potatoes also shrink modestly (−1 to −2%, with variation among crops within these categories). Permanent crops show only a marginal decrease (below 0.4%), which is consistent with the high sunk costs and limited alternative use of land already established with perennial plantations.

In contrast, we observe a strong expansion in pulses (+53% to 56%) and, to a lesser extent, fodder legumes and temporary grassland within the category *fodder other on arable land* (+21-23%). This reflects the model's implementation of organic crop rotation requirements and the increased role of nitrogen-fixing crops to compensate for reduced mineral fertiliser use.

While the overall grassland area remains broadly stable in aggregate, it shifts toward more extensive use in line with organic practices (+8% to 10%), reducing the share of intensively farmed grassland. This adjustment mirrors observed patterns in the IFS data, where organic farms devote proportionally less area to maize and more to clover-rich mixtures.

Changes in crop production resulting from shifts in land-use allocation and feed availability, combined with the limitations on stocking rates per fodder area, drive the adjustments in animal numbers across the different scenarios. The resulting changes in animal populations by 2030, expressed in livestock units (LSU), are presented in Figure 17.

Across all scenarios reaching 25% organic area share, livestock production declines compared to the CAPRI Baseline, though the magnitude of the reduction differs by production system. The sharpest decreases are observed in pig fattening and breeding (-8% to -10%) and in beef meat activities (around -5% to -6%, mainly caused by the reduction in the number of suckler cows), followed by poultry (-3% to -4%). Sheep and goats and dairy cows are least affected, showing reductions lower than 1%. In the case of dairy cows, this reflects the relatively higher profitability of milk compared with meat production.

These patterns are the result of the dynamic interplay between the shocks and the described land-use changes. The substantial reduction in fodder maize, key input for intensive cattle and pig systems, combined with the overall decline in cereal production, significantly constrains the availability of feed for intensive livestock production. Conversely, the induced reduction in stocking rates alleviates the pressure to balance the feed output. By contrast, extensive grassland expands under the organic area projections, favouring ruminant systems that rely more directly on grazing. This explains why dairy cows and sheep and goats, though still reduced, prove more resilient than pigs, poultry, and beef fattening systems.

In summary, the sector shifts away from feed- and input-intensive systems toward relatively more extensive, grass-based ruminant production. Nevertheless, even ruminant systems face downward pressure on herd sizes due to overall land competition and lower crop yields.

Differences between scenarios

Although all three OrganicTargets4EU development scenarios are calibrated to reach the EU-wide target of 25% organic UAA by 2030, the distribution of conversion across land-use categories and regions differs, shaping the corresponding outcomes.

In the GPP scenario, the reduction in cereals and fodder maize and the increase in pulses and other fodder on arable land are less pronounced than in the OET scenario, indicating more moderate structural change on the land use side. Nevertheless, the model projects a stronger decline in animal numbers across all categories under GPP. This scenario assumes higher proportion of permanent grassland in the newly converted area than the OET scenario, which results in a greater impact of the stocking constraints (in line with policy driven scenario achieving conversion through regulatory measures rather than through market adjustments). The livestock reductions are primarily constraint-driven, reflecting the lower permissible intensity per fodder area, and the broader inclusion of grassland-dominated regions in the organic expansion. In contrast, the more market-responsive OET scenario (assuming higher conversion intensity on arable land than other scenarios) exhibits a closer alignment between crop-side reallocation and livestock adjustments, resulting in a more balanced restructuring of production systems.

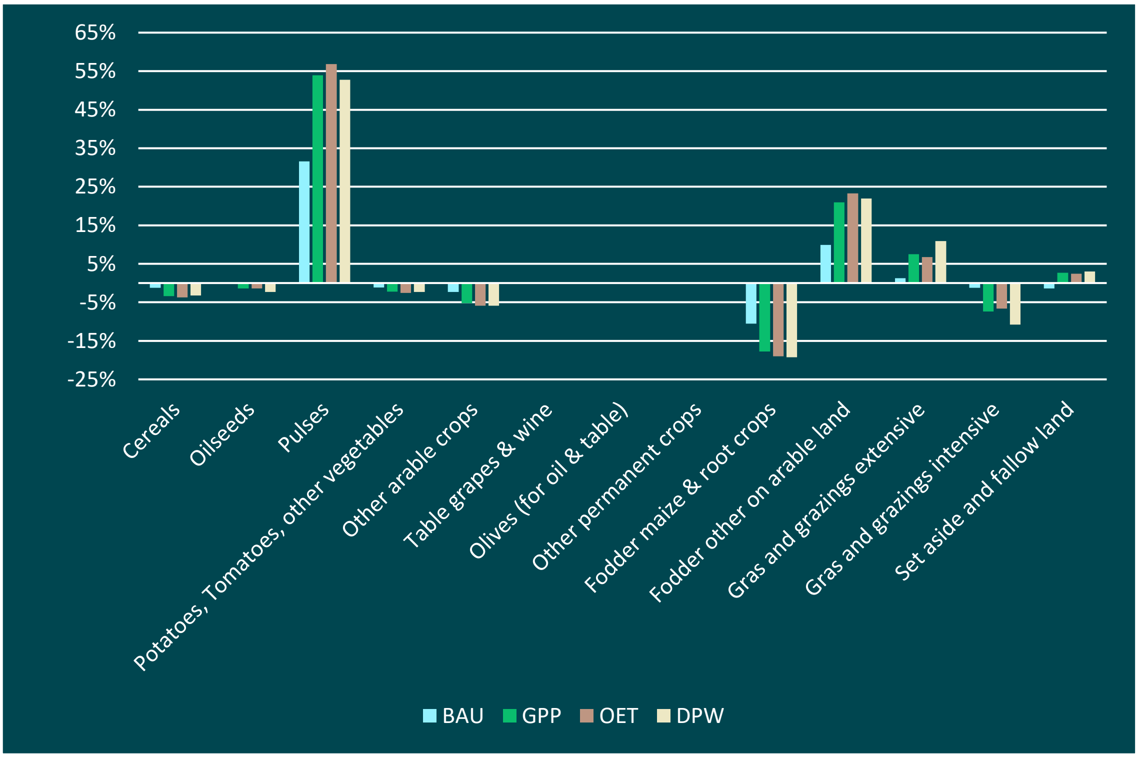


Figure 16: Absolute (1,000 ha, above) and relative differences (%, below) in 2030 agricultural area between OrganicTargets4EU scenarios and CAPRI Baseline by agricultural activity (crop) and scenario

Source: own compilation

The DPW scenario shows a land-use pattern broadly similar to GPP, only the shift between intensive and extensive grass and grazing areas is pronounced more. This reflects the scenario's emphasis on fragmented and regionally differentiated organic development, where strong conversion occurs in some high-demand or high-support regions, while others remain close to the BAU scenario. The overall impact on animal production is similar to GPP (greater than in the OET scenario), because the mechanisms driving livestock reduction (higher proportion of permanent grassland in converted area and its allocation in more grassland-dominated regions) are comparable.

In the DPW scenario, the larger shift toward extensive grazing systems further amplifies the reduction in livestock numbers. Conversion is concentrated in regions with high stocking densities (e.g., Western and Northern Europe), where organic expansion enforces stricter stocking limits and reduces feed intensity. At the same time, more marginal areas with lower productivity contribute little to offsetting this decline. Consequently, as in GPP, livestock adjustments in DPW are primarily constraint- and structure-driven, not market-induced, leading to similar aggregate reductions in animal numbers but with more spatial heterogeneity in the underlying production systems. This divergence highlights how uneven regional drivers and structural conditions can amplify disparities, even under the same EU-wide target.

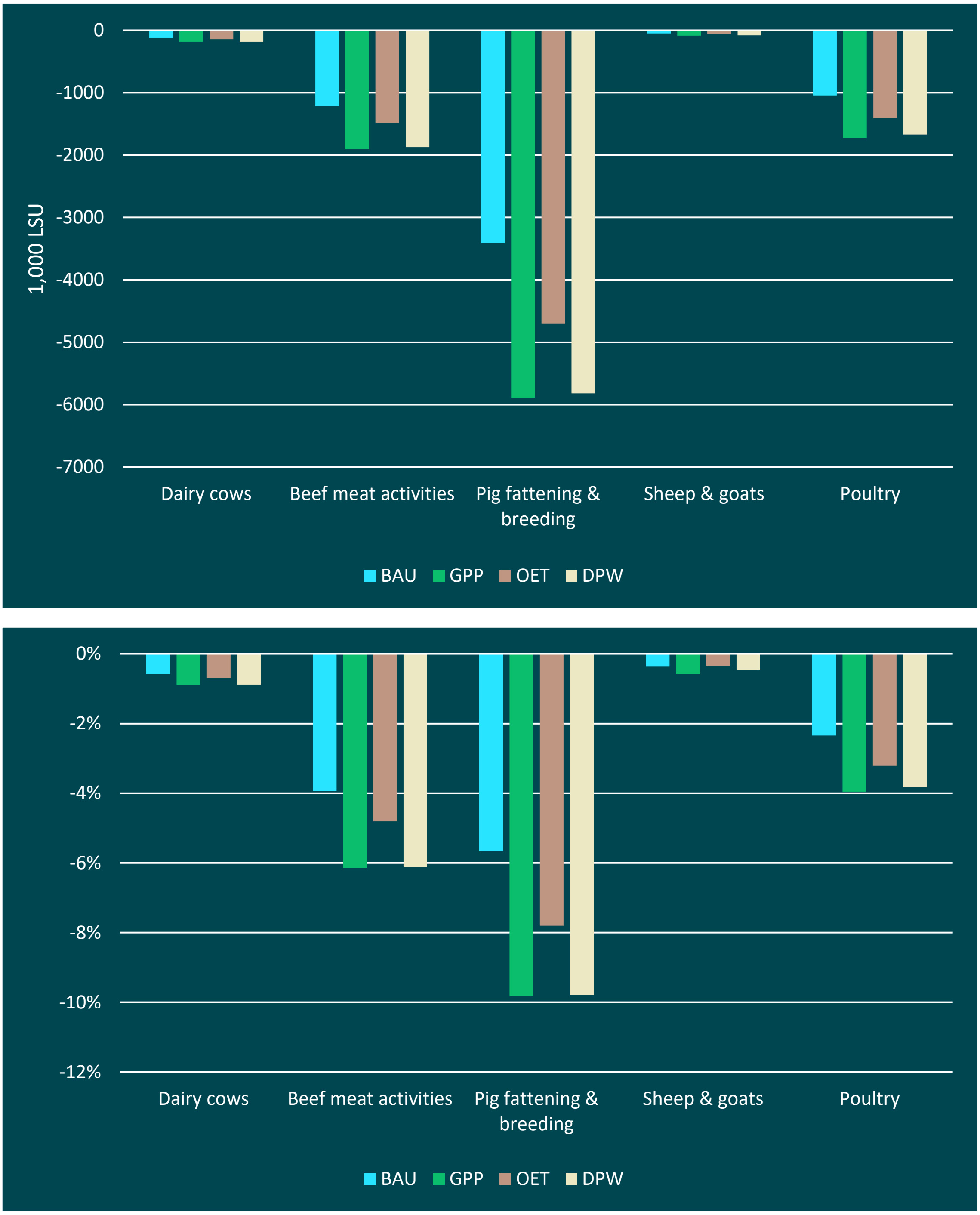


Figure 17: Absolute (1,000 LSU, above) and relative differences (%, below) in 2030 animal production volume between OrganicTargets4EU scenarios and CAPRI Baseline by animal category and scenario

Source: own compilation

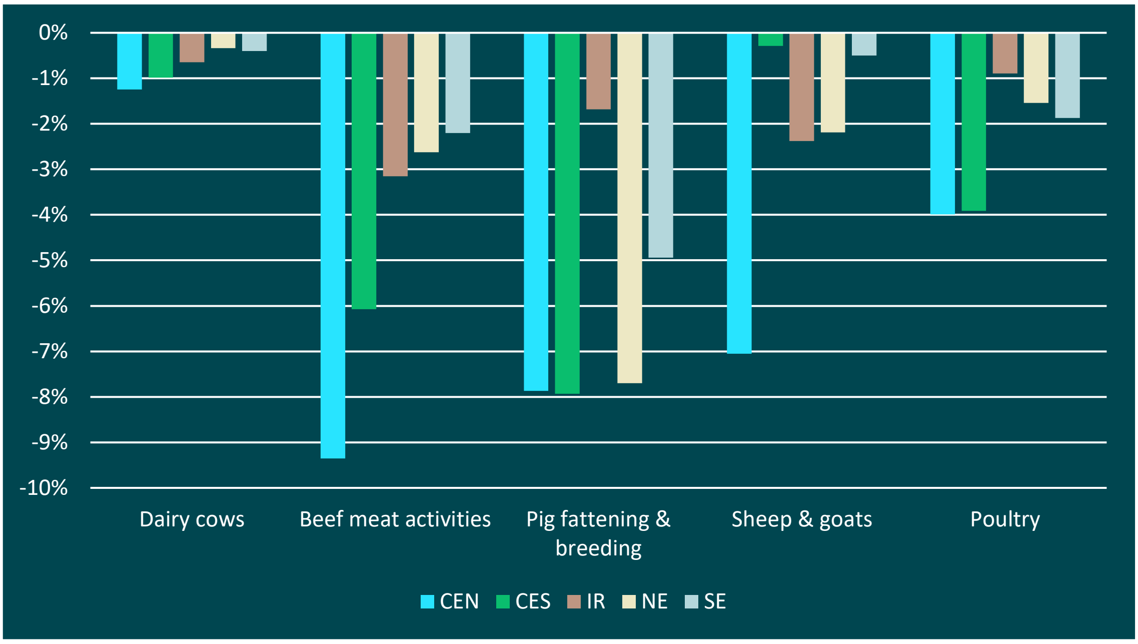


Figure 18: Percentage difference in land use area (above) and livestock units between CAPRI Baseline and DPW scenario by activity category and macro region

Source: own compilation

Spatial change in land use and production systems: the case of the Divergent Pathways scenario

To illustrate the regional and structural heterogeneity of adjustment processes, this section highlights the spatial distribution of land-use and livestock changes under the Divergent Pathways (DPW) scenario. This scenario reflects a regionally differentiated evolution of organic farming, where conversion potentials and drivers vary according to existing production systems, structural conditions, and market responsiveness.

Land use adjustments

At the EU level, cereals emerge as the most affected crop group, with a total area decline of about 1.7 million hectares (–3.25%) compared to the CAPRI Baseline. The largest relative decreases occur in Denmark (–10.8%), Estonia (–9.2%), and Italy (–6.8%), while the most pronounced absolute reductions are recorded in Spain (–0.35 million ha), Germany (–0.23 million ha), Italy (–0.19 million ha), and Denmark (–0.15 million ha). Across the EU, the reduction is accompanied by a gradual shift away from high-yielding, nitrogen-demanding cereals (grain maize, soft and durum wheat, barley) toward less input-intensive crops such as oats and rye.

The total oilseed area remains relatively stable; however, rapeseed cultivation contracts sharply in several countries—particularly Germany (–0.06 million ha), Czechia (–0.05 million ha), and Latvia, Slovakia, Estonia, Spain, and Sweden, all experiencing reductions exceeding 10%.

In contrast, fodder crops expand markedly, increasing by about 2.3% (1.6 million ha) at the EU level. This reflects a substitution of fodder maize (–1.33 million ha, –19.4%) by fodder on arable land (+2.94 million ha, +22%). Permanent grassland also undergoes considerable extensification, with around 2.7 million ha (11%) shifting from intensive to extensive management. The most significant relative increases in fodder and extensive grassland area are found in Estonia, Denmark, Latvia, and Czechia, while the largest absolute increases occur in France, Germany, Spain, and Italy, mirroring the scale of their agricultural sectors.

Permanent and horticultural crops show only minor adjustments. The area under vegetables declines slightly (–0.3%), mostly in Spain and France, while fruit and olive orchards decrease marginally (–0.2% and –0.1%, respectively). Similarly, potatoes and sugar beet contract by around 10%, with the most substantial reductions in France (–17,000 ha) and Germany (–13,400 ha). In contrast, pulses expand strongly by 53% (≈ +1 million ha), with the largest gains in Western and Central Europe, while Romania, Bulgaria, and Estonia show only minor increases (<5%).

Livestock adjustments

Livestock numbers decline throughout the EU, most strongly for beef cattle (–6%), reflecting a general downsizing of ruminant herds. The largest reductions occur in the Netherlands, Germany, and Denmark (each exceeding –10%), whereas some Northern regions (Estonia, Latvia) show slight increases linked to expanding grassland areas. Dairy cow numbers fall by about 1%, particularly in Germany, France, Slovakia, Ireland, and Austria, while again increasing slightly in Estonia, Latvia, and Finland (+0.4%).

The number of monogastric animals, especially pigs, also decreases, with declines of up to 10% in Germany and France. These adjustments reflect both land-use reallocation toward less intensive systems and the lower stocking density constraints associated with organic production.

Overall, the DPW scenario portrays a transition from input- and yield-intensive crop systems toward more extensive, fodder-based, and legume-enriched rotations, particularly in Northern and Central Europe. The accompanying reduction in livestock—especially in intensive pig and beef systems—highlights the trade-off between productivity and environmental performance. At the same time, the scenario reinforces regional contrasts, with more intensive regions undergoing sharper structural adjustments, while extensive or grassland-dominated areas expand their role in supplying organic fodder and pasture.

6.2.2 Supply

Aggregate impacts across scenarios by farming activity

The structural adjustments in agricultural land use and animal stocks, combined with lower yields resulting from the expansion of organic farming, lead to an overall decline in agricultural production. This is illustrated in Figure 19 for crop products and in Figure 20 for animal products. The heterogeneity in yield responses to the input constraints, shown in Table 26, results in a slightly disproportionate decline in total supply relative to the changes in cultivated area and livestock numbers. Across the scenarios achieving a 25% organic share, the total primary agricultural output declines by approximately 11–12 million tonnes, corresponding to a reduction of 2.7–3.1% relative to the reference scenario.

The supply of cereals is projected to decline by around 6% across all scenarios targeting the 25% EU organic area. Since cereal yields fall by only 1–5% overall, this reduction is driven mainly by the contraction in cultivated area. In contrast, the decline in oilseed supply stems primarily from lower yields, as the cultivated area remains relatively stable. Sugar beet and industrial crops (classified under other arable crops) exhibit the largest yield and volume losses, significantly influencing the aggregate supply given their high physical output per hectare. Grass production also decreases, not only due to the shift from intensive to extensive grassland and grazing systems, but also because of lower yields, indicating that this adjustment (organic conversion) mainly occurs in regions with low-yielding grassland systems.

Exceptions to the general decline in supply are observed for other fodder on arable land (mainly temporary grasses) and pulses, which record yield gains and area increases. The rise in fodder supply is largely area-driven, whereas pulse production expands disproportionately to its area increase due to higher yields. Livestock production and supply decline roughly in proportion to the reductions in animal numbers (LSU) presented in Section 6.2.1.

Differences between scenarios

The structure of supply changes (Figure 19) follows a pattern consistent with the results for land use and animal numbers. In the OET scenario, the reduction in the supply of arable crops, such as cereals and oilseeds, is more pronounced due to the higher conversion rate on these land categories and the greater expansion of pulses. In contrast, the GPP scenario shows a smaller reduction in field crop and fodder supply, indicating that a larger share of conversion occurs on grasslands and more extensive land. This reflects the scenario's stronger emphasis on permanent grassland conversion. The DPW scenario amplifies this trend, exhibiting an even more pronounced reallocation between intensive and extensive grassland and grazing systems, particularly in lower-yielding grassland regions.

The decline in animal production presented in Figure 20 closely mirrors the changes in livestock units (LSU) shown in Figure 17. In both GPP and DPW, animal production decreases more sharply than in OET, as the higher rate of organic expansion on grassland causes the livestock density constraint to bind more strongly. Consequently, the differences in animal production between scenarios are the main drivers of the variation in aggregate output. Among the scenarios, the largest drop in total primary agricultural output is observed in DPW (–3.1%), followed by GPP (–2.9%), and finally OET (–2.7%).

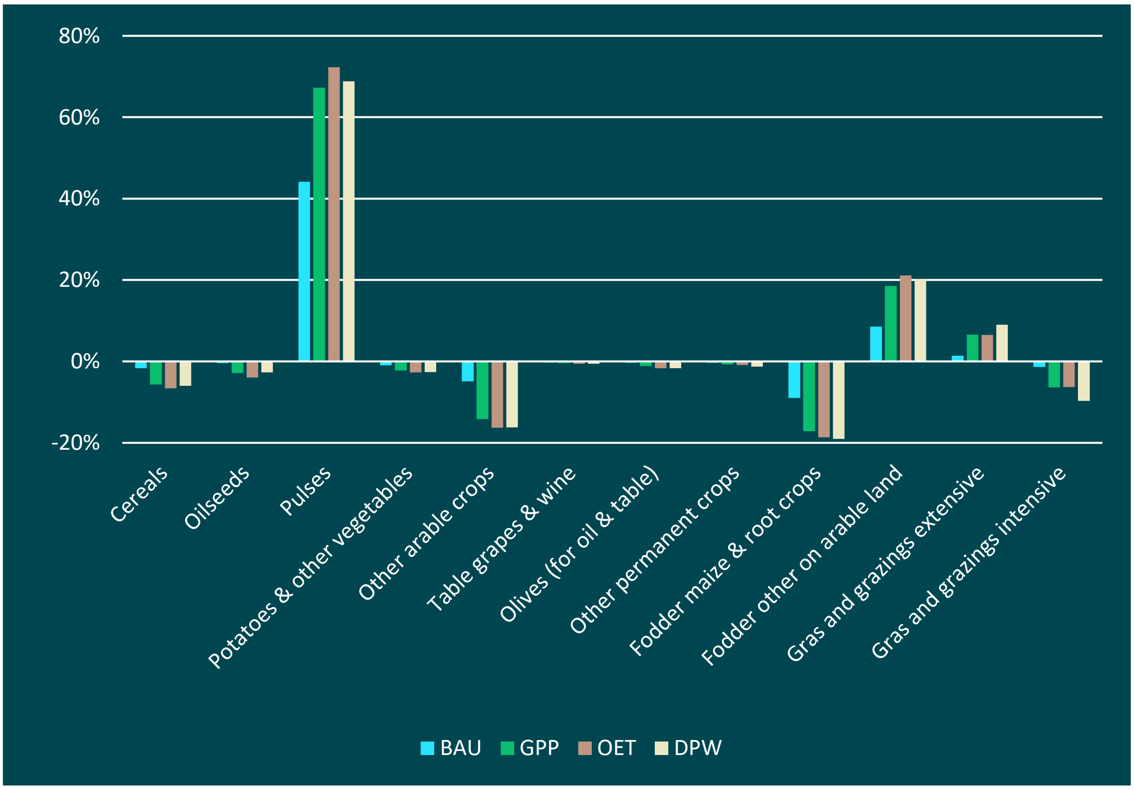
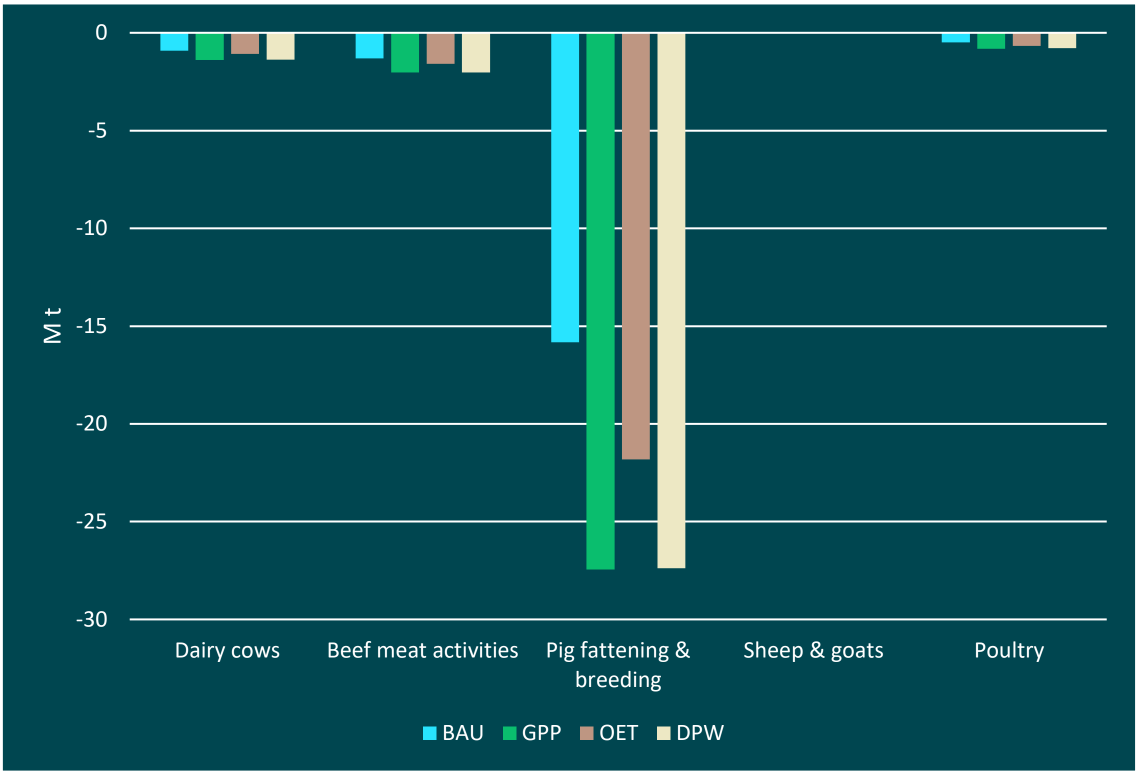


Figure 19: Absolute differences (in Mt, above) and relative differences (%, below) in 2030 crop supply between OrganicTargets4EU scenarios and CAPRI Baseline by agricultural activity (crop category) and scenario

Source: own compilation



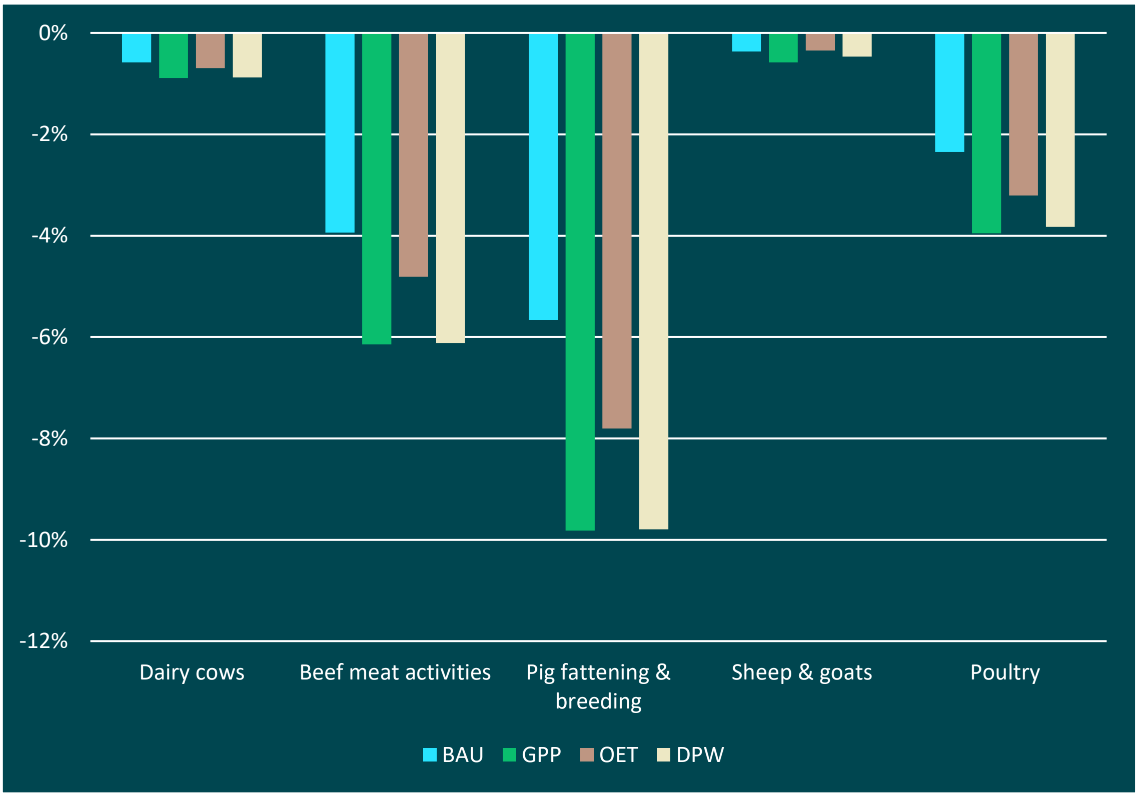


Figure 20: Absolute (Mt, above) and relative differences (%, below) in 2030 supply volume of animal produce between OrganicTargets4EU scenarios and CAPRI Baseline by agricultural activity (animal category) and scenario

Source: own compilation

Table 26: Percentage changes in average yields (t/ha) of selected crops under the OrganicTargets4EU scenarios relative to CAPRI Baseline

Crop / Scenario	BAU	GPP	OET	DPW
Soft wheat	-0.31	-2.06	-2.68	-2.46
Durum wheat	0.00	-1.97	-1.77	-2.61
Rye and Meslin	-0.38	-3.72	-3.40	-3.77
Barley	-0.26	-1.62	-2.22	-2.11
Oats	0.21	-1.47	-1.46	-1.60
Grain Maize	-0.63	-2.03	-2.26	-2.35
Other cereals	-0.76	-3.89	-4.53	-3.73
Paddy rice	-0.10	-0.97	-0.73	-1.34
Rape	-0.04	-0.91	-1.19	-0.97
Sunflower	-0.46	-1.96	-1.74	-1.50
Soya	-0.31	-0.67	-1.12	-0.55
Other oils	-0.43	-1.66	-1.91	-1.70
Pulses	9.55	8.64	9.84	10.53
Potatoes	0.76	0.41	0.12	-0.07
Sugar Beet	-0.69	-3.72	-4.22	-4.58
Flax and hemp	1.05	0.35	-0.34	-0.08
Tobacco	-0.04	-0.49	-0.72	-0.41
Other industrial crops	-0.61	-3.65	-4.67	-3.81
Other crops	-0.33	-2.10	-2.33	-2.48
Tomatoes	-0.05	-0.23	-0.34	-0.37
Other Vegetables	-0.20	-0.25	-0.18	-0.37
Apples Pears and Peaches	-0.47	-0.57	-0.18	-1.19
Other Fruits	-0.23	-0.61	-0.78	-0.98
Citrus Fruits	-0.12	-0.87	-1.43	-1.52
Table Grapes	-0.03	-0.15	-0.34	-0.20
Olives for oil	-0.09	-1.10	-1.82	-1.85
Table Olives	-0.14	-0.49	-0.81	-0.81
Wine	-0.12	-0.31	-0.43	-0.46
Fodder maize	1.76	0.79	0.49	0.40
Fodder root crops	-0.17	0.17	-0.17	-0.87
Fodder other on arable land	-1.24	-1.99	-1.71	-1.41
Grass and grazing extensive	0.16	-0.88	-0.23	-1.71
Grass and grazing intensive	-0.16	1.01	0.31	1.27

Source: own compilation

Aggregate supply and spatial differences in supply change

Across the three OrganicTargets4EU development scenarios, the total supply of primary agricultural products in the EU declines moderately by −2.9% to −3.3% relative to the CAPRI Baseline. In absolute terms, the reduction ranges from −14.5 to −16.3 billion euro of output, with the smallest decline in the OET scenario (−14.5 G€, −2.9%) and the largest in the DPW scenario (−16.3 G€, −3.3%)[12]. The GPP scenario lies in between (−15.6 G€, −3.1%) (see Appendix A7). The

[12] These values combine production quantities with yields that are weighted by the prices prevailing in the simulation year. In these calculations, the prices correspond to the prices of the CAPRI Baseline in the simulation year (2030). They are recomputed using the scenario's output composition, so that aggregated quantities reflect the scenario-specific production structure while maintaining Baseline price levels.

overall contraction in EU agricultural supply remains thus modest given the expansion of EU organic farmland share increase by 13% (from 12% in CAPRI Baseline).

The reduction in total agricultural supply is driven by two structural mechanisms. First, the expansion of organic farming leads to lower average yields, particularly for nutrient-intensive crops such as cereals and fodder maize, due to the removal of synthetic nitrogen, reduced plant-protection options, and the binding of crop-rotation constraints. Second, the transition induces adjustments in livestock systems, including lower stocking densities and reduced feed use, which further decrease output in the beef, pig, and dairy sectors. Together, these crop and livestock responses explain the consistent decline in EU-level agricultural production across all scenarios.

Scenario differences reflect the spatial distribution and land-use composition of projected organic area. In OET, market development drivers shift more organic conversion toward Central and Eastern Europe and into arable land, where yield penalties are somewhat lower and structural adjustments more evenly spread, resulting in the smallest supply reduction. In GPP, strong policy incentives accelerate conversion in regions with high input use, increasing the extent of yield loss and livestock adjustments. DPW generates the largest contraction, as high-conversion clusters in Western and Southern Europe coincide with regions where organic constraints induce the most pronounced crop and livestock adjustments, while low-conversion regions contribute little compensating output.

Figure 21 illustrates the regional difference in agricultural output loss intensity more explicitly using the indicator of change in primary agricultural supply per additional hectare of organic area (in 1,000 €/ha) across NUTS2 regions. This change can also be interpreted as the marginal supply effect per hectare of converted area.

The results highlight clear regional heterogeneity in supply responses. The strongest declines per converted hectare (dark brown areas) are observed in Western and Central Europe, particularly in Germany, Denmark, the Netherlands, northern France, Austria, and parts of northern Italy, i.e. regions characterised by high-intensity arable and livestock systems and thus a large productivity gap between conventional and organic management. In these regions, organic conversion replaces high-yielding systems, resulting in relatively large production losses per additional organic hectare.

In contrast, Southern and Eastern European regions as well as Scandinavia exhibit smaller relative supply reductions, reflecting lower baseline yields, more extensive production systems, and a higher share of crops that are already compatible with organic management. Some regions in Spain, Portugal, Finland, Sweden, Hungary and Romania even show near-neutral effects, indicating that conversion there mainly occurs on low-intensity land with limited output displacement.

The regional supply change patterns also differ across scenarios. While livestock-intensive regions are consistently affected in all cases, countries with a regionally heterogeneous land-use compositions (arable land vs. permanent grassland or crops) show marked regional contrasts between scenarios. These differences are particularly visible in Austria and the Czechia, where the spatial distribution of land-use differentiated conversion leads to diverging regional outcomes. The DPW scenario reinforces this spatial polarisation, with moderate output adjustments in extensive regions and sharper contractions in the highly productive zones of Western and Northern Europe.

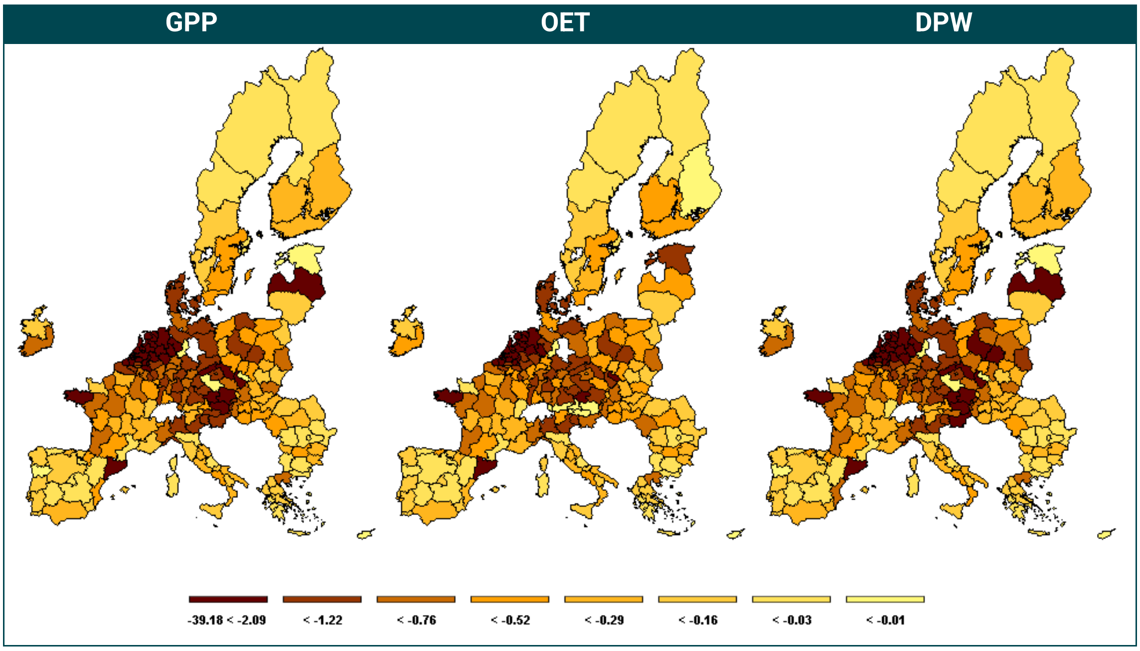


Figure 21: Changes in EU NUTS2-level agricultural supply with primary output per hectare of additional organic area (in 1,000 €/ha) under OrganicTargets4EU scenarios relative to CAPRI Baseline

Source: own compilation

6.2.3 Income effects

This section reports on income changes resulting from achieving the 25% organic targets. Because only the CAPRI supply module was utilised, it does not include potential changes in prices achieved conventionally due to supply reductions. The marketing of products in premium organic markets has also not been modelled, nor have the organic support payments received.

Across the EU, the projected aggregate agricultural income decreases by slightly more than −2%. Similar to the supply changes, the largest income decline is projected under the DPW scenario (−2.3%), followed by GPP (−2.2%) and OET (−2.1%). These small differences suggest that the income losses are stronger driven by livestock adjustments, which are simulated to be stronger in the DPW and GPP scenarios.

A closer analysis shows that the income reduction is primarily driven by two sectors: cereal production (accounting for roughly 18–20% of total losses, dominated by soft wheat) and pig production (around 15% of total losses). Figure 23 illustrates the spatial distribution of relative income changes for these two key contributors under the most regionally contrasting DPW scenario.

For soft wheat, relative income reductions are widespread across Europe. The strongest percentage declines appear in regions where organic expansion most strongly reshapes the existing arable system, particularly in central France, eastern Germany, northern Italy, and parts of Spain, where structural constraints and limited room for rotational reconfiguration reduce profitability more sharply than in other regions.

For pig production, relative income losses are concentrated in regions with high livestock density, where the livestock-intensity constraint binds most tightly. This pattern is clearly visible in Catalunya (Spain), Denmark, northern Germany, and Lombardia (Italy), where even moderate reductions in herd size lead to above-average percentage declines in income. These regions show some of the most pronounced relative impacts across Europe.

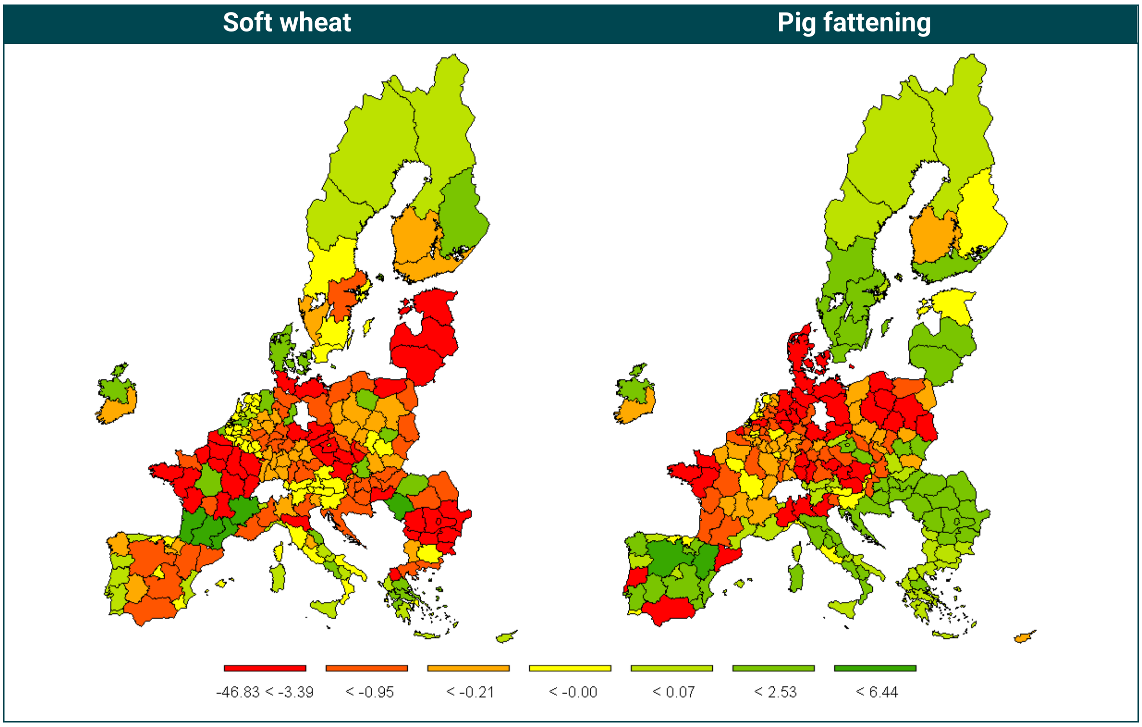


Figure 22: Change in income (1,000 €) from soft wheat and pig production in EU NUTS2 regions in the DPW scenario compared to the CAPRI Baseline

Source: own compilation

The two maps also highlight that, even within the same scenario (DPW), the impacts of a given organic area expansion in a region can differ substantially between production systems. Soft wheat and pig production respond to the same regional organic growth stimulus in markedly different ways, reflecting their distinct biophysical requirements, input dependencies, and degrees of integration within regional farming systems. These activity-specific responses jointly produce the overall regional income effects shown in previous sections (and below), but they also illustrate why interpreting aggregate indicators can be challenging, as the net effect in a region often masks opposing or non-aligned impacts across crops and livestock.

This heterogeneity underscores that organic area expansion is not a uniform shock. Instead, its consequences propagate through sector-specific pathways, depending on the structure of the regional production system, the presence of livestock–crop linkages, and the extent to which constraints bind. As such, Figure 23 demonstrates how the same policy-consistent expansion can impose relatively shallow adjustments in arable systems while triggering much sharper adjustments in livestock production, or vice versa. Recognising these differentiated responses is essential for a nuanced understanding of the scenario outcomes.

At the national level, the largest relative income losses occur in Denmark, Slovakia, and Latvia, while in absolute terms, France, Germany, and Spain contribute most to the overall EU-level reduction (Table A18 in the Appendix). However, both total and relative income losses are influenced by the scale of organic expansion projected in each region.

To ensure comparability and better interpret adjustment intensity, we normalised the income losses by the additional organic area (relative to the CAPRI Baseline). The resulting indicator, agricultural income loss per hectare of additional organic UAA, captures the marginal opportunity cost of conversion and reveals comparable spatial patterns across scenarios. This normalisation distinguishes between regions where total income losses are high due to extensive conversion and those where each converted hectare entails particularly high adjustment costs, reflecting higher baseline intensity, tighter resource constraints, or lower system adaptability.

The regional agricultural income losses per hectare of additional organic UAA, presented in Figure 23, range from approximately –€108 to –€581 per hectare of converted land (25% to 75% percentiles), with medians of –€259 –€294 per hectare across scenarios. The highest losses occur in intensively farmed regions with a strong focus on cereals and pig production, such as northern France, Denmark, the Netherlands, Weser-Ems (Germany), regions in Austria and northern Italy. These are high-cost and high-intensity production systems, where even moderate yield reductions translate into substantial income declines, resulting in higher opportunity costs per converted hectare.

In contrast, more extensive or mixed-farming regions, for example, parts of Romania, the Baltic States, but also Spain show smaller income reductions per converted hectare. Their lower land and labour costs, together with more flexible land-use structures and/or less intensive production systems, make organic conversion less disruptive to farm income. The uneven spatial pattern of income effects therefore reflects both the technological and economic heterogeneity of European agriculture: high-intensity, high-cost regions bear the greatest adjustment costs, while more extensive and lower-cost regions can absorb organic growth with relatively moderate income effects.

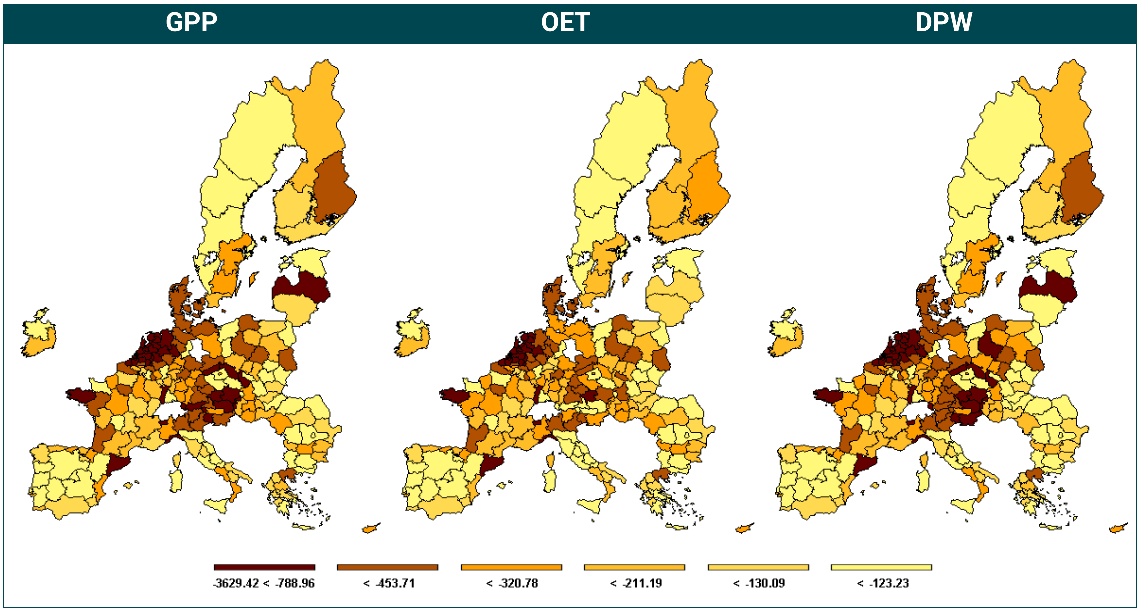


Figure 23: EU NUTS2 level agricultural income losses per hectare of additional organic area (in €/ha, compared to CAPRI Baseline) under the 25% target scenarios.

Source: own compilation

6.2.4 Environmental impacts

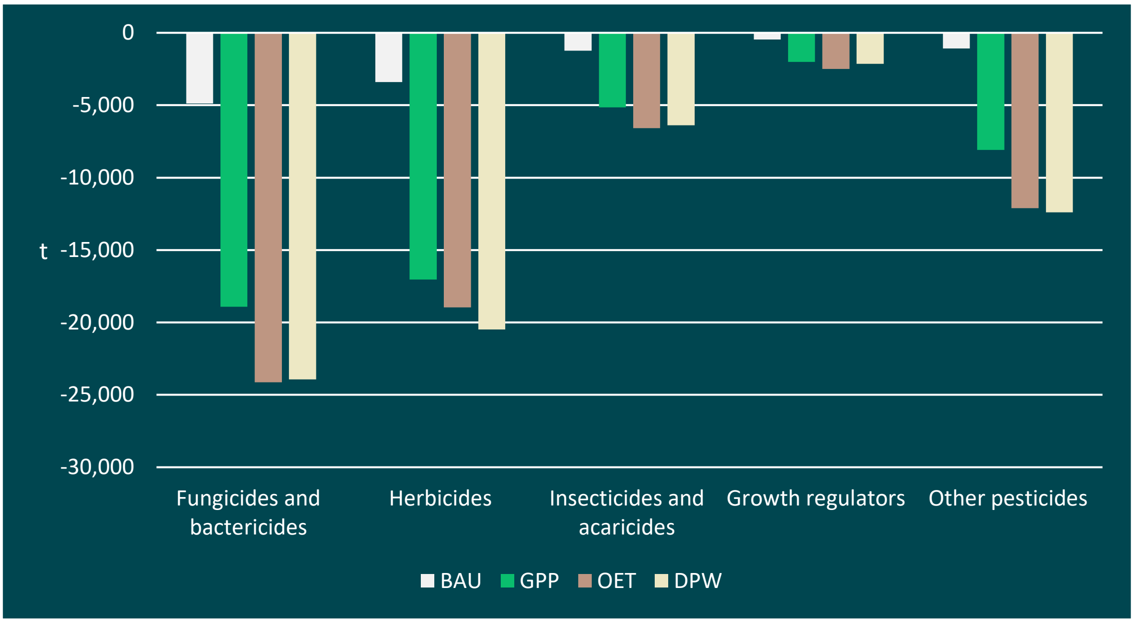
This section presents the environmental effects of expanding organic farming areas in the EU, interpreted as the implications of organic conversion for major environmental pressures and outcomes simulated in CAPRI. The assessment begins with indicators closest to farm management and proceeds toward broader system-level impacts. Specifically, we examine changes in synthetic pesticide use, nutrient balances (nitrogen surplus), global warming potential (GWP) and the biodiversity friendly farming practices index (BFP).

These indicators collectively represent the main environmental dimensions captured by the CAPRI model— chemical input intensity, nutrient cycling, land-use diversity, and greenhouse-gas emissions—based on its environmental accounting framework (Britz & Witzke, 2014; Leip et al., 2008; Leip et al., 2011; Pérez Domínguez et al., 2020; Paracchini & Britz, 2010). Organic area expansion affects these outcomes through the imposed restrictions on mineral fertilisers and pesticides, adjustments in crop rotations and livestock densities, and the resulting shifts in production structure. Evidence from the literature consistently shows that organic systems tend to reduce nutrient and pesticide loads, enhance on-farm biodiversity, and lower overall GHG emissions (Stolze et al., 2000; Niggli et al., 2009; Reganold & Wachter, 2016; Sanders et al., 2025). The following subsections quantify how these effects materialise across the OrganicTargets4EU scenarios, given our modelling assumptions.

In the last subsection, we extend this analysis toward a trade-offs assessment, relating environmental improvements, expressed through normalised indicators such as GWP per hectare of converted area, to the corresponding opportunity costs of conversion captured in the CAPRI supply module (in the income change indicator). These represent the shadow costs of the projected organic area growth and input-use constraints, and can be interpreted as the social costs of organic area expansion borne by agricultural producers. This integrated perspective allows us to discuss the balance between environmental benefits and the sectoral economic adjustments implied by the organic transition.

Pesticide use change

The growth of the organic area leads to a marked decrease in the overall use of pesticides due to regulatory prohibition of synthetic pesticides. This was reflected in the restrictions (shocks) exogenously imposed in the modelling framework. The results shown here, however, do not reflect only the pesticide reduction quantified in the shocks, but a composite sectoral outcome after the model’s internal adjustments to the pesticide and other constraints. That implies an outcome of the reallocation of production across crops and technologies (intensive vs. extensive) within regions, and the resulting aggregate shifts across the EU. Thus, the reported percentage changes in pesticide use represent the realised aggregate effect after accounting for shifts in crop composition and production intensity, rather than the direct size of the imposed shock.



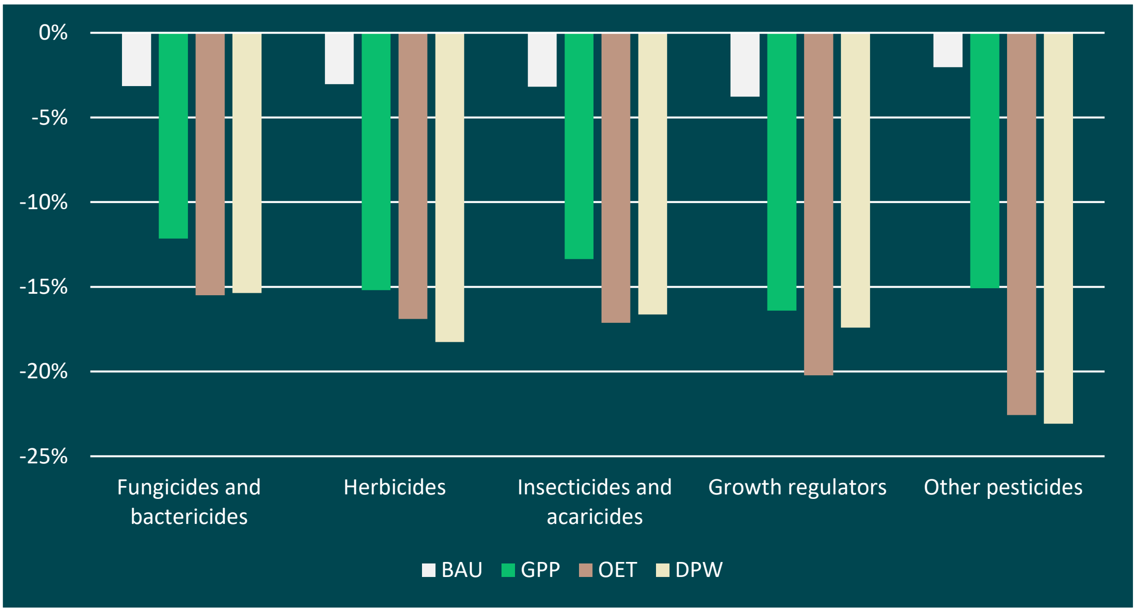


Figure 24: Absolute difference (in t, above) and relative difference (%, below) in pesticide use in 2030 between CAPRI Baseline and OrganicTargets4EU scenarios

Source: own compilation

As a consequence of these structural changes, total pesticide use declines by approximately 14% to 17%, depending on the scenario, making a substantial contribution to the Farm to Fork Strategy pesticide reduction target. As shown in Figure 24, all pesticide categories contract, with the largest absolute decreases in fungicides and herbicides. The reduction is most pronounced in cereal production, where pesticide use per hectare falls by up to 18%, while oilseeds, vegetables, and permanent crops are affected to a lesser extent. However, these crop-specific effects likely vary considerably across regions, reflecting differences in crop composition, climatic conditions, and baseline pesticide intensity (see below).

The strongest decline in total pesticide use in the sector is observed under the DPW scenario (Figure 24). This outcome reflects both the structure and the geographic pattern of organic area expansion. In DPW, greater agricultural area shares are converted in Spain, Italy, France, the Netherlands, Belgium, and Denmark—countries characterised by intensive crop and horticultural systems with comparatively high baseline pesticide use. The scenario therefore entails a stronger displacement of conventional, high-input production systems than either of the other two scenarios, particularly the policy-driven GPP scenario. Consequently, the DPW scenario produces the largest aggregate reduction in pesticide use across the EU. As illustrated in Figure 25, the greatest absolute and relative reductions in pesticide use occur in these high-intensity Member States, resulting in the largest aggregate pesticide reduction at the EU level under DPW.

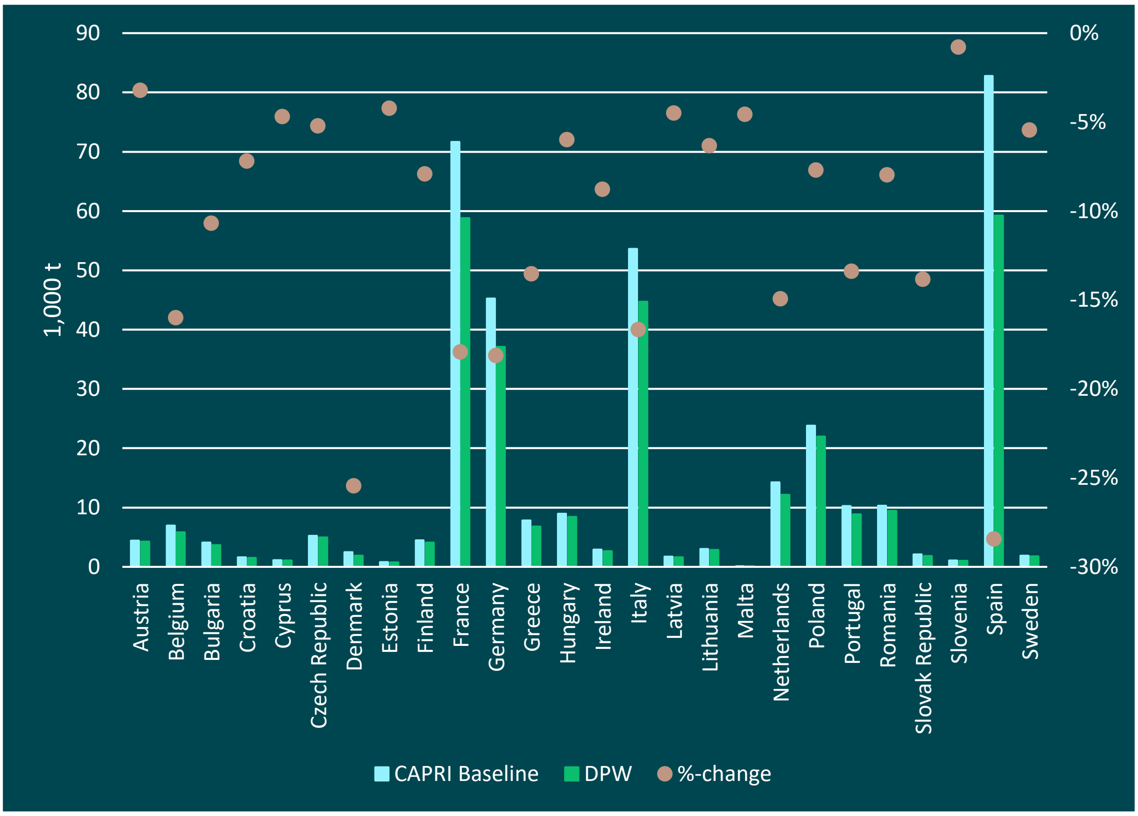


Figure 25: Total use of pesticides in CAPRI Baseline and DPW scenario (in tonnes) and percentage difference between baseline and DPW

Source: own compilation

Figure 26: Absolute (1,000 t, above) and relative (%, below) differences between CAPRI Baseline and OrganicTargets4EU scenarios in 2030 by scenario

Source: own compilation

Nitrogen reduction and nutrient flows effect

Similarly to the pesticide results, the reported changes in nitrogen and nutrient flows do not depict only the direct magnitude of the imposed reduction in mineral fertiliser use due to organic conversion, but rather the realised aggregate effects after accounting for shifts in crop composition, production intensity, and the regional distribution of the converted area.

The reduction in mineral fertiliser use has two main consequences: a decline in production potential and a reallocation of nutrient flows within the agricultural system. Figure 26 illustrates the absolute and relative changes in nitrogen inflows and outflows compared with the CAPRI Baseline. With the expansion of organic farming areas, mineral nitrogen fertiliser inputs decrease by about 13–15%, depending on the scenario. The concurrent reduction in animal numbers (as discussed above) also lowers the availability of manure, further diminishing total nutrient inputs from organic sources. At the same time, the increased share of nitrogen-fixing crops contributes additional biologically fixed nitrogen, accompanied by lower nutrient exports through harvested crops. The combined effect of these adjustments results in an overall sectoral nitrogen surplus reduction of around 10% across all scenarios. In line with the pesticide results, the nitrogen surplus reduction is slightly stronger in the DPW scenario than in the other two 25% organic target scenarios, reflecting the larger organic conversion shares in regions with intensive arable production and higher baseline fertiliser use.

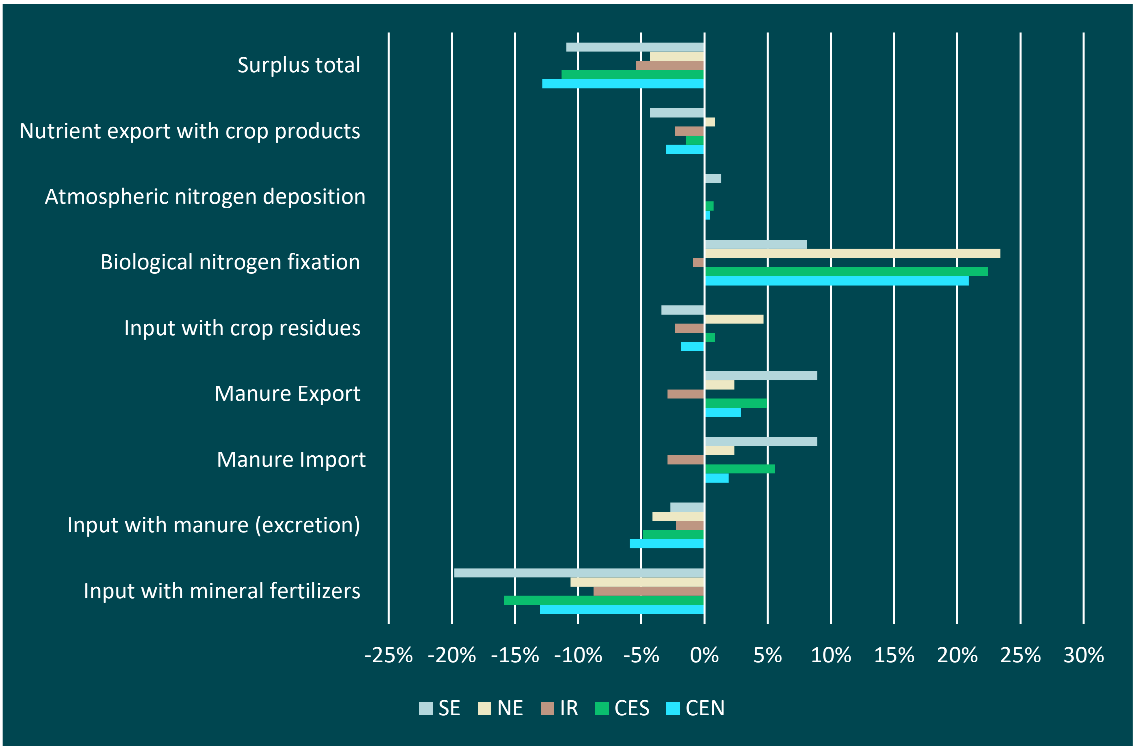


Figure 27: Percentage difference of nutrient flows in 2030 between CAPRI Baseline and Divergent Pathway scenario by EU region [a]

[a] SE=Southern Europe, NE=Northern Europe, IR=Ireland, CES=Central Europe South, CEN=Central Europe North (see Table 25 for country allocations)

Source: own compilation

Figure 27 provides a regional breakdown of changes in nitrogen inflows and outflows. The reduction in mineral fertiliser input is observed across all macro-areas, with the strongest declines in Southern Europe (SE) and Central Europe South (CES), where organic area expansion is concentrated in arable systems previously characterised by high fertiliser intensity. These same regions also show the largest increases in biological nitrogen fixation, reflecting a greater share of legume crops in organic rotations. In contrast, Northern (NE) and Central-North (CEN) Europe experience more moderate reductions, as conversion there involves a higher share of grassland and mixed livestock systems. The overall nitrogen surplus decreases in all macro-areas, most notably in CES and SE, consistent with the greater reliance on crop-based organic production. The results thus point to marked regional heterogeneity in nitrogen flow responses, shaped by differences in production structures, crop composition, and the regional focus of organic conversion.

This heterogeneity becomes more so evident when examining the spatial distribution of nitrogen surplus changes across NUTS2 regions. Figure 28 illustrates these differences for the DPW scenario, showing percentage changes in nitrogen surplus compared with the CAPRI Baseline at NUTS2 level.

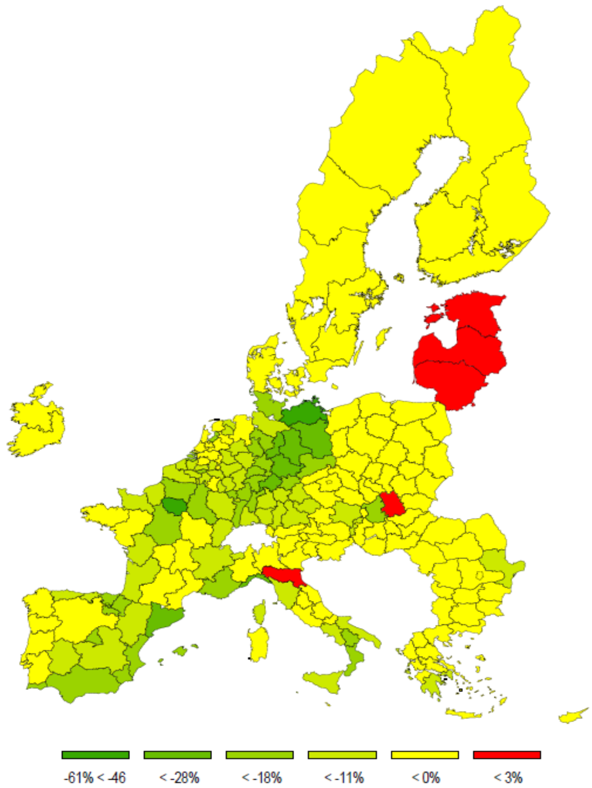


Figure 28: Percentage changes of nitrogen surplus in DPW scenario compared to CAPRI Baseline across EU NUTS2 regions

Source: own compilation

Figure 28 highlights the pronounced spatial variation in nitrogen-surplus responses under the DPW scenario. The largest reductions (dark and medium green areas) occur across Central and Western Europe, particularly in regions of Germany, France, Austria, and northern Italy, where organic area expansion replaces high-input arable and mixed farming systems. These regions benefit from strong reductions in mineral fertiliser use combined with an increased share of legume crops. Moderate decreases (light green to yellow) dominate much of Southern and

Eastern Europe, where lower baseline fertiliser application and a greater share of grassland limit the relative surplus decline. In contrast, a few regions show no change or slight increases in nitrogen surplus (orange to red), notably in Finland, the Baltic States, and parts of northern Italy and Romania. These outliers are primarily associated with limited conversion potential, livestock concentration, or imbalances between manure supply and crop nitrogen demand following structural adjustments. Overall, the pattern underscores the heterogeneous environmental outcomes of organic expansion, which depend strongly on regional production structures and initial nutrient intensity.

In regions such as Emilia-Romagna, the observed increase in nitrogen surplus under the DPW scenario appears to be linked to a modelled expansion of arable area at the expense of forest land. This land reallocation does not stem from scenario-specific policy assumptions within CAPRI, but rather from the model's internal balancing of land use and feed supply following the imposed organic area targets. As organic yields are lower and feed demand remains high, CAPRI compensates by slightly expanding agricultural land, often drawing from less productive or marginal land categories, which can include forest in the baseline land-use balance. The newly cultivated land then receives organic nitrogen inputs from biological fixation and manure, resulting in a localised increase in nitrogen surplus. In Emilia-Romagna, this reflects the tension between maintaining production and limiting nutrient accumulation in a region already characterised by intensive livestock–crop linkages.

These regional differences in nitrogen balance adjustments are likely to translate into varying reductions in nitrous oxide (N_2O) emissions, and consequently into differences in global warming potential, discussed in the following section.

Global Warming Potential

The Global Warming Potential (GWP) indicator used in CAPRI quantifies the combined climate impact of the main greenhouse gases emitted from agricultural activities, namely methane (CH_4), nitrous oxide (N_2O), and carbon dioxide (CO_2) from energy use. Emissions are expressed in CO_2 equivalents (CO_2e) using the global warming potential factors from the Intergovernmental Panel on Climate Change (IPCC, AR4), thereby allowing their aggregation into a single metric of climate impact. Within CAPRI, the calculation of GWP builds upon the emission accounting framework developed by Leip et al. (2008) and further detailed in the CAPRI Environmental Module and CAPRI model documentation (Britz & Witzke, 2014). The indicator captures both direct and indirect emissions from crop and livestock production, including enteric fermentation, manure management, fertiliser application, and soil processes.

In addition to these on-farm emissions, CAPRI also reports agriculture-related emissions from connected sectors, which are included in the extended GWP balance. These comprise emissions from mineral fertiliser production, GHG emissions from agricultural input industries, and land-use change (LUC)-related emissions. Together, these components provide a comprehensive representation of the overall greenhouse gas footprint of agricultural production and provide consistent measures for assessing both direct and upstream climate implications of structural and management changes related to the expansion of organic farming.

Absolute and relative changes in GWP

The expansion of organic farming areas yields clear climate benefits per unit land area, reflected in a reduction of GWP from agriculture across all scenarios: −18.9 Mt CO_2e in GPP, −16.7 Mt CO_2e in OET, and −18.4 Mt CO_2e in DPW, corresponding to −4.3%, −4.0%, and −4.7%, respectively (see Appendix A7). As shown in Figure 29, nearly all Member States record a decline in agricultural GWP compared with the CAPRI Baseline, with the exception of Estonia and Latvia, where a slight increase results from higher livestock numbers and the associated rise in methane emissions.

The largest absolute contributors to the EU-wide GWP reduction are Germany, France, and Spain, which together account for 61% in GPP, 56% in OET, and 64% in DPW of the total EU-wide CO_2e reduction. These countries also exhibit the strongest relative GHG emission declines, particularly under the DPW scenario. In contrast, under the OET scenario, where a larger share of organic area expansion occurs in Central and Eastern Europe and the overall decrease in animal numbers is less pronounced, the most significant relative reductions are observed in Slovakia (−7.3%), Slovenia (−6.8%), and Czechia (−6.6%).

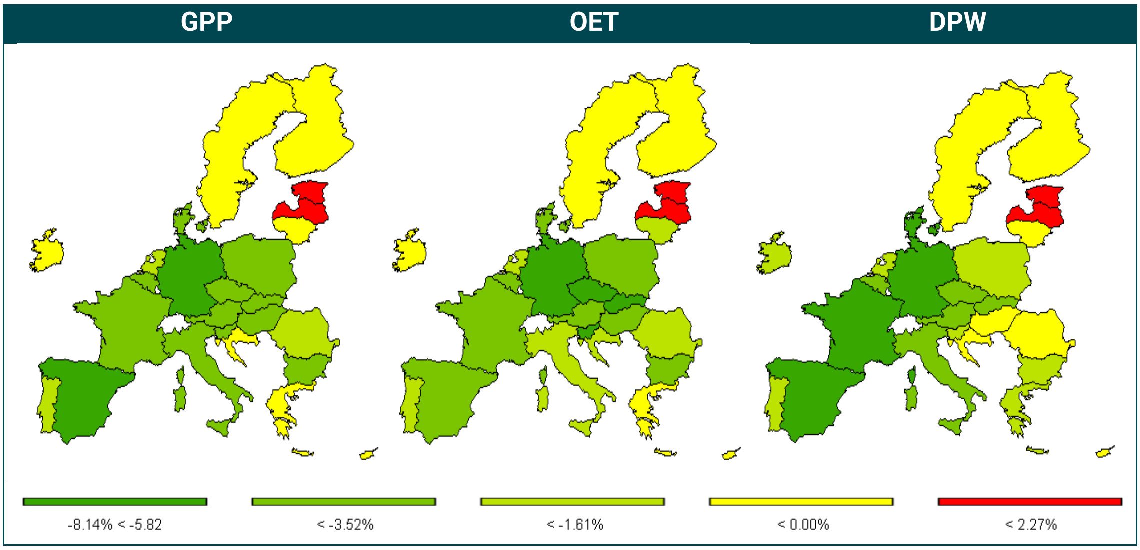


Figure 29: Relative differences (%) between OrganicTargets4EU scenarios and CAPRI Baseline in projected GWP (CO_2e) from agriculture in EU Member states

Source: own compilation

GWP change intensity across regions

To disentangle the climate effects from the scale of organic expansion, we normalise the total GWP change by the additional organic area in each region, expressing it as kilograms of CO_2 equivalent (kg CO_2e) per hectare (relative to the CAPRI Baseline). This indicator highlights the emission reduction efficiency per converted hectare, reflecting how the regional production structure, particularly the livestock density and nutrient balance, shapes the climate performance of organic expansion.

As shown in Figure 30, the largest GWP reductions per hectare occur in intensively farmed regions with high stocking densities and imbalanced animal-to-land ratios, such as northern France, Denmark, the Netherlands, northern Italy, and parts of southern Germany. Notably, northern Czechia and parts of Austria also display strong GWP reductions, particularly under the GPP and

DPW scenarios, where the combined effects of reduced ruminant numbers, lower mineral fertiliser use, and shifts in crop composition result in substantial emission savings per converted hectare.

Conversely, the lowest GWP improvements per hectare are observed in more extensive or crop-dominated regions, such as Romania, Bulgaria, and parts of the Baltic States, where baseline emission levels are already low and the potential for further mitigation through organic conversion is limited.

Overall, the pattern indicates that environmental benefits per converted hectare are highest in emission-intensive systems, where organic expansion primarily replaces livestock-heavy or fertiliser-intensive production. This underscores that the climate effectiveness of organic transition depends not only on the total area converted but also on the regional composition and initial intensity of production systems.

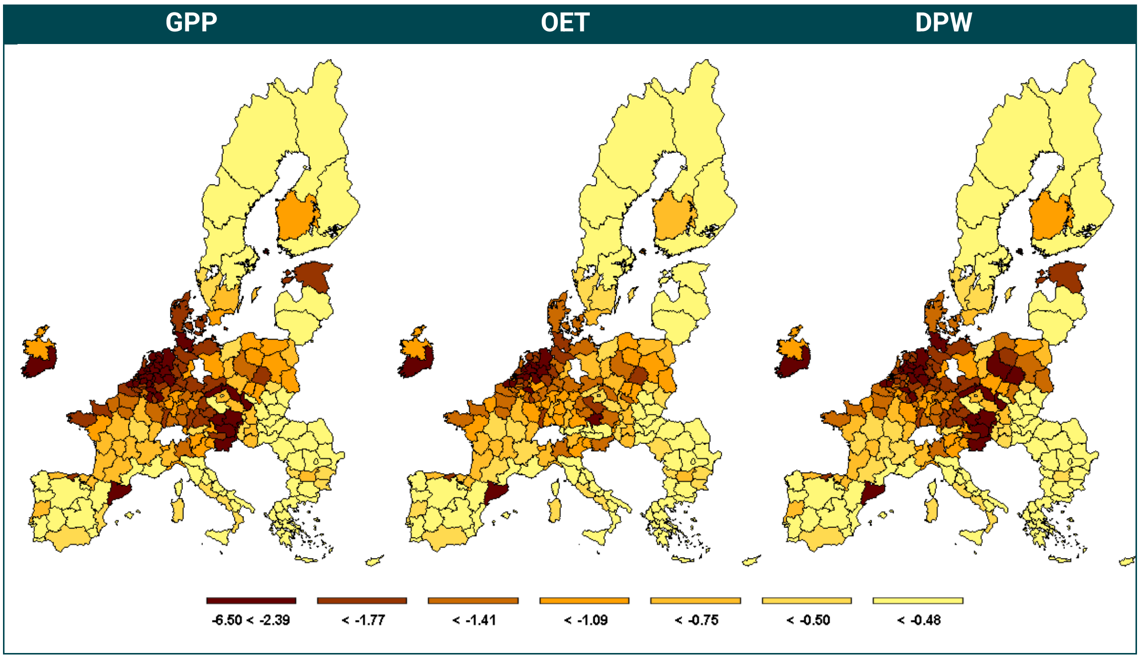


Figure 30: Change in GWP per hectare of additional organic area (kg CO_2e/ha) at NUTS2 level under the 25% organic target scenarios

Source: own compilation

Sources of emission change

Across scenarios, the largest reduction in GHG emissions from agriculture originates in the decline in nitrous oxide (N_2O) emissions from mineral fertiliser application, as shown in Table 27 and illustrated in Figure 31. Across the three 25% organic target scenarios, these emissions fall by around 15–18% compared to the CAPRI Baseline, reflecting the lower use of synthetic fertilisers under organic management. This reduction alone accounts for roughly one-third of the decrease in total GWP from agriculture observed in the model results.

In addition, the decline in ruminant numbers contributes significantly through reduced methane emissions from enteric fermentation and manure management, which together represent the second and third largest sources of GHG reduction, mainly in the GPP and DPW scenarios. These changes mirror the livestock density constraints and the reduced feed availability accompanying the organic area expansion.

Beyond direct on-farm emissions, the reduced use of mineral fertilisers also leads to lower energy-related CO_2 emissions from fertiliser manufacturing, resulting in additional GHG reductions in agriculture-related sectors. Emissions from fertiliser production decline by approximately 13–15%, while emissions from other agricultural input industries fall by around 14% compared to the CAPRI Baseline.

Taken together, these three drivers—lower N_2O emissions from fertilisers, reduced CH_4 emissions from livestock, and declining upstream emissions from input production, account for the majority of the total GWP reduction (over 80%) across all scenarios. This highlights that the climate benefits of organic expansion are primarily linked to reduced input intensity and livestock density, rather than to changes in crop composition alone.

Table 27: Emissions from agriculture and related sectors in 2030 by source and scenario (in Mt CO_2e)

Scenario	CAPRI Baseline	BAU	GPP	OET	DPW
Emissions from agriculture					
Global warming potential from agriculture	405.7	398.4	388.4	389.5	386.8
Methane emissions from enteric fermentation	165.7	163.0	161.6	162.6	161.4
Methane emissions from manure management (housing and storage)	35.0	34.1	33.5	33.8	33.4
Methane emissions from rice production	2.0	2.0	2.0	2.0	2.0
N_2O emissions from manure management (housing and storage)	19.4	18.9	18.5	18.7	18.5
Indirect N_2O emissions from volatilisation (manure management)	5.6	5.4	5.3	5.4	5.3
N_2O emissions from manure application	28.0	27.1	26.5	26.8	26.5
N_2O emissions from grazing	22.0	21.5	21.1	21.3	21.2
N_2O emissions from mineral fertiliser application	49.3	47.8	42.7	41.8	41.7
N_2O emissions from the cultivation of org. soils	13.3	13.3	13.4	13.3	13.4
N_2O emissions from crop residues	40.3	40.5	40.3	40.3	40.0
N_2O emissions from volatilisation (ag. soils)	6.5	6.4	6.0	6.0	6.0
Indirect N_2O emissions from leaching and runoff	8.1	7.9	7.3	7.3	7.2
CO_2 emissions from liming	8.0	8.0	8.1	8.1	8.1
CO_2 emissions from urea application	2.6	2.6	2.2	2.2	2.2
Emissions from agriculture-related sectors					
Emissions from mineral fertiliser production	56.0	54.5	49.2	48.2	48.1

Source: own compilation

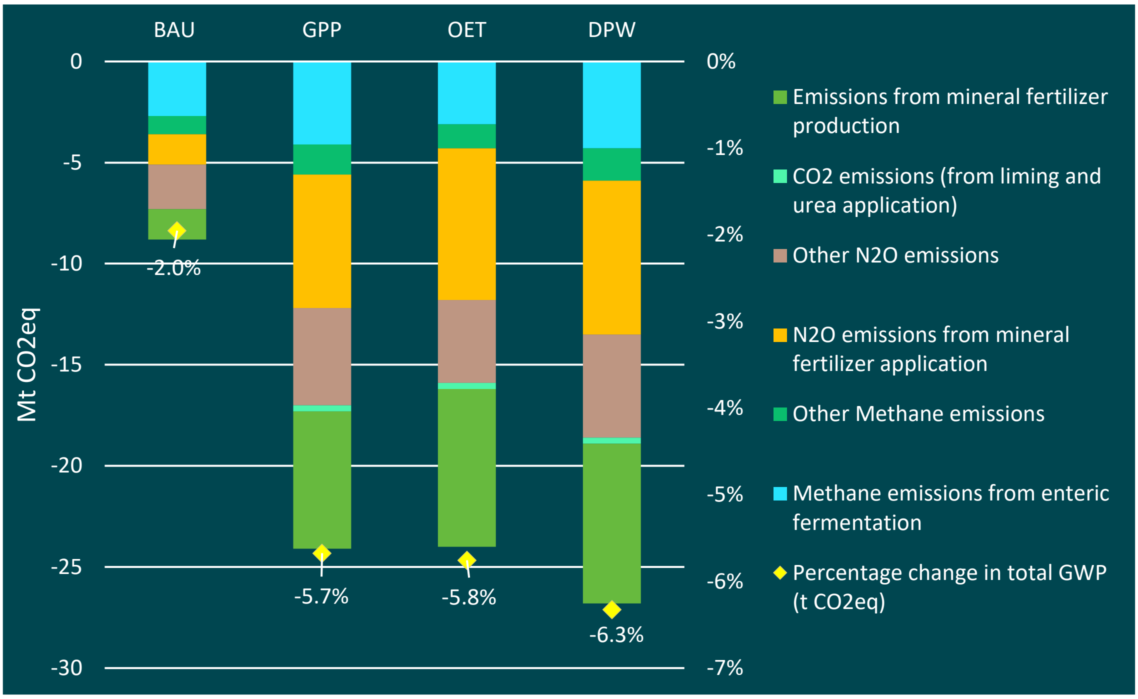


Figure 31: Emission reduction from agriculture and related sectors in 2030 relative to CAPRI Baseline by source and scenario (in Mt CO_2e on primary axis and % change on secondary axis)

Source: own compilation

Regional differences in emission sources of GWP reduction: Case of DPW scenario

To shed more light on the structural origins of the regional differences in the intensity of GWP reduction presented above, we use the DPW scenario as an illustrative example. This scenario exhibits the strongest overall emission reduction and the most pronounced regional contrasts, making it suitable for analysing the underlying sources of change. Table 28 therefore disaggregates the total GWP reduction by emission source and macro-region, distinguishing between methane (CH_4), nitrous oxide (N_2O), and carbon dioxide (CO_2) emissions from both agricultural and agriculture-related activities. This breakdown allows us to identify which processes drive the mitigation effects in different production systems across Europe.

As presented in Table 28, the overall reductions in agricultural GWP under the DPW scenario vary across EU macro-regions, ranging from −2.1% to −5.3%, and are accompanied by substantial differences in the dominant sources of emission decline. These contrasts reflect the heterogeneity of regional production structures, as well as differences in climatic conditions, livestock densities, and dependence on external inputs.

In Southern Europe (SE), GWP declines are mainly driven by strong reductions in N_2O emissions from mineral fertiliser application (−19.8%) and urea use (−22.4%), as well as upstream emission savings from fertiliser production (−19%) and input industries (−18%). These reductions reflect the region's relatively fertiliser-intensive arable systems and the pronounced decrease in mineral input use under organic management. In addition, the high representation of permanent crops, such as olive groves, vineyards, and orchards, contributes to the emission decline, as their conversion to organic farming typically involves a shift toward low-input management practices and enhanced soil fertility through biological rather than mineral sources.

Table 28: Percentage changes in GWP (CO_2e) from agriculture and related sectors in the DWP scenario in 2030 by source and EU macro region[a]

	CEN	CES	IR	NE	SE
Emissions from agriculture					
Global warming potential from agriculture	-5.26%	-4.95%	-2.46%	-2.15%	-5.19%
CH_4 emissions from enteric fermentation	-3.96%	-2.62%	-2.21%	-0.03%	-1.62%
CH_4 emissions from manure management (housing and storage)	-4.70%	-4.97%	-1.72%	-3.89%	-4.68%
CH_4 emissions from rice production	0.00%	-0.67%	0.00%	0.00%	-0.53%
N_2O emissions from manure management (housing and storage)	-6.55%	-4.12%	-2.17%	-5.03%	-3.59%
Indirect N_2O emissions from volatilisation (manure management)	-6.54%	-5.20%	-1.88%	-4.77%	-3.15%
N_2O emissions from manure application	-5.99%	-5.19%	-2.12%	-5.22%	-3.90%
N_2O emissions from grazing	-4.53%	-5.05%	-2.38%	-1.68%	-2.47%
N_2O emissions from mineral fertiliser application	-13.42%	-16.06%	-8.79%	-10.63%	-19.76%
N_2O emissions from the cultivation of org. soils	0.35%	0.35%	0.00%	0.13%	1.53%
N_2O emissions from crop residues	-1.91%	0.84%	-2.32%	4.60%	-3.41%
N_2O emissions from volatilisation (ag. soils)	-7.86%	-9.23%	-3.75%	-5.54%	-9.80%
Indirect N_2O emissions from leaching and runoff	-13.20%	-11.60%	-5.67%	-4.40%	-11.45%
CO_2 emissions from liming	0.31%	0.93%	0.00%	0.17%	0.41%
CO_2 emissions from urea application	-10.98%	-14.26%	-8.80%	-13.91%	-22.43%
Emissions from agriculture-related sectors					
Emissions from mineral fertiliser production	-11.82%	-14.92%	-8.36%	-10.25%	-18.99%

[a] SE=Southern Europe, NE=Northern Europe, IR=Ireland, CES=Central Europe South, CEN=Central Europe North (see Table 25 for country allocations)

Source: own compilation

In Central Europe North (CEN) and Central Europe South (CES), the GWP reduction is more evenly distributed between N_2O and CH_4 sources. Both regions show substantial declines in N_2O emissions from fertilisers (–13.4% and –16.1%) and indirect losses from leaching and runoff (–13.2% and –11.6%), combined with marked decreases in methane emissions from enteric fermentation and manure management (–3% to –5%). This reflects the joint effect of lower fertiliser intensity and livestock density adjustments, particularly in Germany, France, Austria, and Czechia.

In contrast, Northern Europe (NE) and Ireland (IR) display much smaller overall GWP reductions (around –2.1% to –2.5%). Here, methane emissions remain almost unchanged (–0.03% in NE, –2.2% in IR), reflecting the high share of grass-based ruminant systems with limited scope for further emission mitigation under organic constraints. The reduction in fertiliser-related N_2O emissions is still notable (–8% to –11%), but these systems have less reliance on mineral inputs, which limits the total GWP improvement.

Interestingly, the land-use change (LUC)-related emissions show substantial regional variation, with the strongest reductions in CES (–25.9%), indicating a net land-sparing or avoided deforestation effect, while in Ireland (+3.2%) LUC emissions slightly increase, likely due to grassland-to-cropland adjustments in response to reduced livestock numbers.

Overall, these results illustrate that:

- Southern and Central European regions achieve the strongest emission reductions through lower fertiliser and input use.
- Livestock-driven CH_4 reductions dominate in Central Europe, while N_2O-related reductions dominate in Southern Europe.
- Northern regions show smaller relative gains due to the structural dominance of low-input, grass-based livestock systems with limited substitution effects.

These regional differences in the composition of emission reductions are clearly reflected in the spatial pattern of GWP change per hectare of converted organic area presented in Figure 30. Regions with strong fertiliser-related emission reductions—such as those in Southern and Central Europe—correspond to the highest GWP decreases per hectare, consistent with their intensive arable systems and high baseline input use. Conversely, areas where methane emissions remain stable, such as Northern Europe and Ireland, show only modest GWP gains per hectare, reflecting the limited mitigation potential of predominantly grass-based livestock systems. In Central Europe, the simultaneous reduction in both livestock-related CH_4 and fertiliser-related N_2O emissions explains the pronounced GWP improvements observed in northern Czechia, Austria, and southern Germany. Altogether, the spatial heterogeneity in GWP efficiency underscores that the climate benefits of organic expansion depend not only on the scale of conversion but also on regional production intensity and emission profiles.

Assessment of environmental and economic trade-offs: CO_2-reduction efficiency

To relate the climate effects of the organic expansion to the economic burden on producers, we construct a combined indicator of GHG (CO_2e) emission reduction efficiency of organic conversion defined as GWP reduction per euro of agricultural income loss (kg CO_2e/€), i.e. the ratio between the simulated change in GWP (from agriculture) and the simulated change in agricultural income in the CAPRI regional supply modules (both relative to the CAPRI Baseline). This indicator expresses how many kilograms of CO_2e are avoided for every euro of income foregone due to the organic-area and input-use constraints. Because income is simulated at constant prices (of CAPRI Baseline simulation) and without market feedbacks, the income change can be interpreted as a producer-side opportunity or shadow cost of the structural adjustment (see Section 6.2.3). Normalising GWP by this cost allows us to compare very different regional situations on a common cost-effectiveness scale.

On average, the indicator lies around 3 kg CO_2e/€ at EU level. Using a simple regional average, we obtain about 3.0 kg CO_2e/€ in GPP, 2.9 in OET and 2.8 in DPW. When we weight by actually converted organic area, which better reflects the EU aggregate outcome, the ranking changes slightly: 2.8 in GPP, 2.9 in OET and 3.1 in DPW. This means that, for the areas that actually convert, the DPW scenario delivers the highest climate benefit per euro of income loss. Put differently, DPW places more of the additional organic area in places where the overall mitigation cost (€/t CO_2e) is lowest.

The differences between scenarios are not dramatic, but they tell us something about the mechanism:

- The GPP scenario projects the most regionally balanced conversion intensity, but works through stronger conversion of permanent grassland systems and stocking density restrictions, thus picks up to a greater degree high-emission systems. These systems' representation in the EU-wide UAA is, however, lower.

- The OET scenario spreads conversion more to Central/Eastern Europe, where income losses are smaller but also emission reductions are smaller, which is shown in the slightly lower unweighted GHG emission efficiency.
- The DPW scenario concentrates more conversion in high-intensity Western and Mediterranean regions, which results in higher area-weighted efficiency, even though some of these regions also face high income losses.

The regional results presented in Figure 32 reveal pronounced heterogeneity. In the most efficient regions, each euro of income loss avoids more than 6 kg CO_2e, while in others the ratio falls below 1.5 kg CO_2e or even turns negative where emissions increase slightly.

High-CO_2-efficiency regions with values above 6 kg CO_2e/€ include parts of Czechia, Slovakia, eastern Poland, northern France, eastern Germany, parts of Sweden, Ireland and some Bulgarian regions. In these regions, a relatively small reduction in income triggers a very sizeable GHG reduction, typically because conversion eliminates a combination of mineral fertiliser emissions, upstream fertiliser-production emissions and methane from ruminants. Many of these areas are also characterised by moderate factor costs (land, labour), so the same structural adjustment is cheaper in income terms.

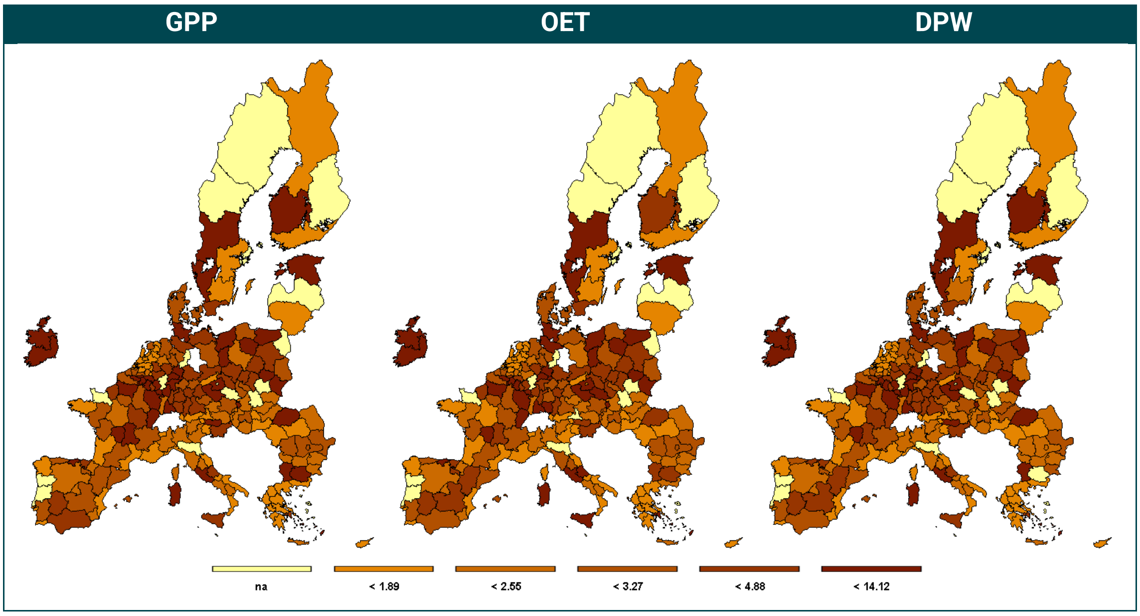


Figure 32: CO_2 reduction per unit of income loss from organic conversion (kg CO_2e/€) relative to CAPRI Baseline (EU NUTS2, by scenario)

Source: own compilation

At the opposite end, several regions show values below 2 kg CO_2e/€ (corresponding to abatement costs of 500 €/t CO_2e), in some cases close to zero or even negative (where income still falls but GWP moves less, or where GWP increases slightly because livestock does not contract). Their common features are:

- already low emission intensity per hectare (extensive grazing, permanent crops, horticulture),
- limited scope to reduce livestock numbers (high share of grass-based systems), or

- relatively high factor costs (especially land rents and labour), so that even small output or stocking-rate reductions show up as notable income losses. In such systems, organic conversion is still environmentally positive, but each euro spent (or lost) buys little CO_2 reduction.

To summarise the spatial heterogeneity, EU regions can be grouped by their CO_2-efficiency of organic conversion defined as the reduction in CO_2e from unit of income loss (kg CO_2e/€) as in Table 29. The included inverse ratio of CO_2-reduction efficiency depicts the abatement costs of carbon reduction by means of organic transition.

Table 29: EU Member States clustered by CO_2 efficiency of organic conversion

Efficiency class	kg CO_2e/€ (€/t CO_2e)	Member States (Region)	Policy interpretation
Very low	< 1.5 kg CO_2e/€ (>666 €/t CO_2e)	NL, MT, EL, PT (some), Baltic grazing zones, AT Alps	Conversion yields small climate benefits per euro, focus on biodiversity and water outcomes than GHG emissions.
Moderate	1.5–3.0 kg CO_2e/€ (333–666 €/t CO_2e)	ES, IT, FR (Atlantic), DK, HU, RO, BG	Balanced trade-off, typical cost range for standard organic support.
High	3.0–6.0 kg CO_2eq€ (167–333 €/t CO_2e)	DE (most), FR North-East, CZ (some), PL Central/West, AT (some), PT (some)	Efficient mitigation, good candidates for targeted eco-schemes.
Very high	> 6.0 kg CO_2e/€ (<167 €/t CO_2e)	CZ (some), SK, PL (some), DE (East), SE, IE, EE, BG (some), FR (North)	Priority zones, strong climate return per euro, highest justification for support.

Source: own compilation

From this analysis, we derive two main conclusions:

- Uniform organic support payments will not be cost-effective with respect to GWP reductions. Paying the same €/ha in a high-efficiency German or Czech livestock region and in a low-efficiency permanent-crop region in the South buys very different amounts of CO_2e reduction.
- Some high-intensity regions merit higher, not lower, compensation. They lose more income but they also deliver more climate benefit. In a climate-targeted CAP, these should be rewarded, not penalised, for high opportunity costs.

Caution is warranted in interpreting extreme values, i.e., where income losses are minimal or emissions increase slightly (e.g., Estonia, Latvia, some Nordic and Dutch regions), the ratio becomes unstable (these should be flagged as outliers and not used for policy benchmarking). Moreover, this indicator focuses solely on climate effects. If biodiversity, water quality change or pesticide reduction were included, the CO_2-efficiency (abatement cost) values would appear more favourable, and possibly also spatially heterogenous. Also, the income losses (conversion costs) are calculated at constant prices, without consideration of market price increases. Accounting for consumers' willingness to pay would allow to quantify the remaining need for policy transfer and regionally differentiated support efficiency.

Biodiversity-friendly Farming Practice Index

To assess how changes in farm management under the scenario narratives affect biodiversity potential, we apply the Biodiversity-friendly Farming Practices Index (BFPI), originally developed by Paracchini and Britz (2010) and further applied in CAPRI-Spat policy assessments. The index combines several CAPRI-derived indicators, including crop diversity, fertiliser input intensity, and the share of land use types such as grassland, permanent crops, and olive groves in the utilised agricultural area (UAA). Each component is weighted to a composite index ranging from 0 (lowest biodiversity relevance) to 10 (highest). In our application, the index is normalised to a scale from 0 to 1. It is important to note that the BFPI is not a direct measure of biodiversity, but a proxy of management practices known to influence biodiversity outcomes. It is thus suited for assessing the potential of agricultural systems to support biodiversity under different policy and market conditions (Paracchini & Britz, 2010).

In the CAPRI Baseline, the EU-27 average BFPI stands at 0.603, and increases moderately under all three OrganicTargets4EU scenarios, reaching 0.629 in GPP and 0.631 in both OET and DPW (see Appendix A7). These changes correspond to an improvement of 3–4.7%, confirming that organic expansion delivers consistent enhancements in biodiversity-friendly practices at EU scale. While the sectoral EU-27 BFPI increases only moderately, this sectoral view masks a much stronger improvement on the land that actually undergoes conversion. After decomposition, the implied BFPI of newly converted organic land is approximately 0.80 in GPP and 0.82 in OET and DPW, compared with a baseline value of 0.603. This corresponds to a 33–36% improvement in biodiversity-friendly management on converted farmland.

Baseline BFPI levels vary considerably across Member States and regions. Ireland, Portugal, Greece, Romania, and Croatia score highest due to extensive grassland systems and lower input use, while Cyprus, Malta, the Netherlands, and Belgium record the lowest values, reflecting more intensive production structures. Most Central and Eastern European countries fall in the mid-range.

Scenario-induced changes differ by country and region (see Figure 33). The largest improvements occur in France, Italy, Austria, and, from a lower baseline, Belgium and the Netherlands. Countries with already high baseline scores, such as Ireland, Estonia, Finland, and Latvia, show only limited increases, indicating a saturation effect. Cyprus is a notable outlier, with small declines across scenarios, mainly due to reduced organic area relative to the Baseline.To assess regionally the marginal responsiveness of the BFPI to organic expansion, we calculated the percentage change in the index per one-percentage-point increase in organic farmland. At EU level, responsiveness averages 0.341% in GPP, 0.362% in OET, and 0.361% in DPW (Appendix A7), indicating modest but consistent biodiversity gains with each incremental expansion of organic area. The regional patterns underlying these averages reveal considerable regional contrasts[13].

The marginal responsiveness of the BFPI varies considerably across Europe (Figure 34). Across all scenarios, the highest marginal improvements appear in parts of France, Austria, Poland, and Czechia, where values frequently exceed 1.7 percentage points per unit of organic growth. These

[13] Some regions exhibit atypical relationships between marginal responsiveness and absolute BFPI changes. Regions such as CZ030000 (Jihozápad), FI130000 (Keski-Suomi), and LV000000 (Latvia) show very low marginal responsiveness despite large absolute increases in the BFPI, reflecting substantial projected organic expansion from a low Baseline rather than high sensitivity to marginal change. Conversely, CZ050000 (Střední Čechy) and CZ070000 (Střední Morava) display exceptionally high marginal responsiveness alongside extreme values in other environmental indicators, suggesting potential modelling artefacts or locally inconsistent structural assumptions. For this reason, these regions are not interpreted substantively in the main text.

regions combine sizeable projected organic expansion with production systems that respond strongly to reduced input intensity and increased crop diversification. In contrast, regions in Scandinavia, the Baltic area, Ireland, and southern Spain show comparatively low responsiveness—often below 0.13—reflecting extensive grassland dominance or structural constraints that limit the marginal effect of additional organic conversion.

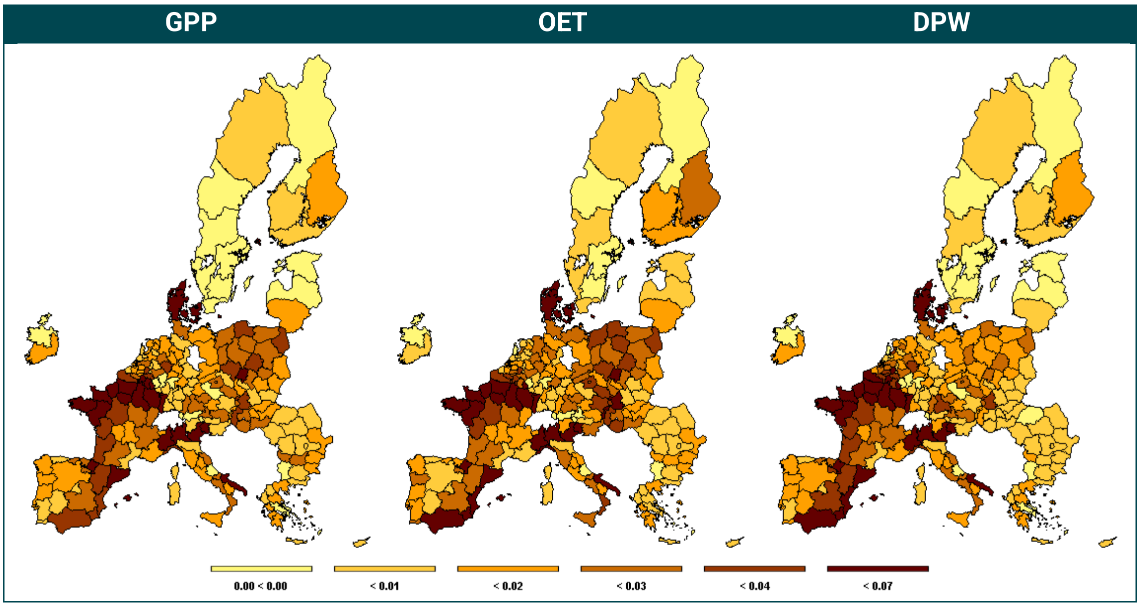


Figure 33: Absolute change in Biodiversity friendly farming practice index (BFPI) relative to CAPRI Baseline at EU NUTS2 level by scenario

Source: own compilation

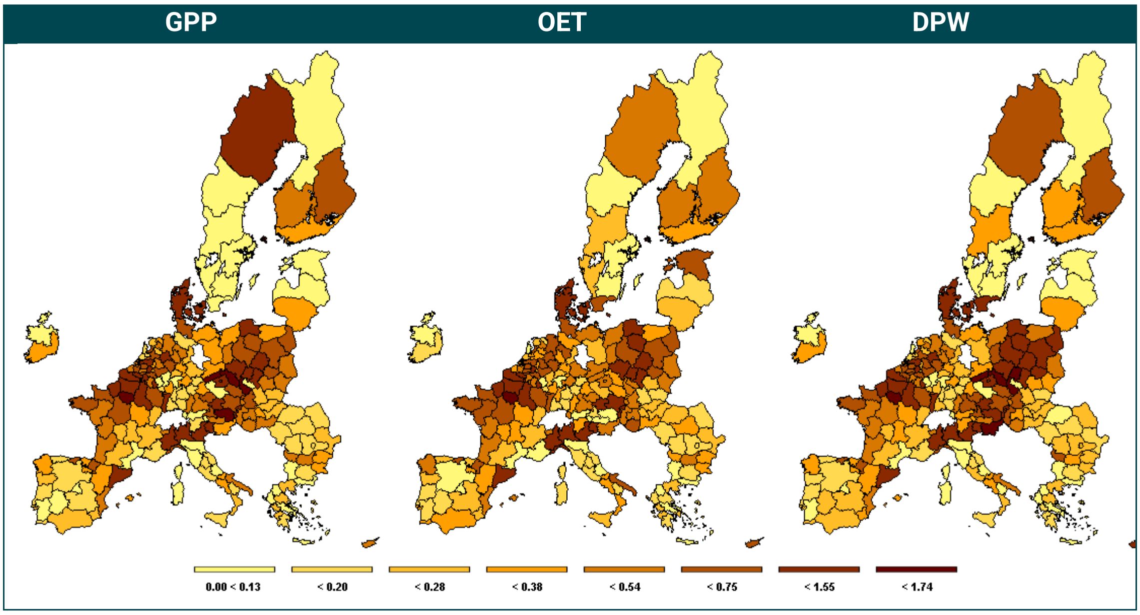


Figure 34: Marginal percentage change in the Biodiversity-Friendly Farming Practices Index (BFPI) per percentage-point increase in organic farmland, relative to the CAPRI Baseline (EU NUTS2, by scenario)

Source: own compilation

Scenario differences follow expected patterns. GPP produces the most concentrated high-responsiveness clusters, linked to ambitious organic expansion and substantial rotation adjustments. OET exhibits a broader distribution of medium responsiveness, reflecting the greater role of market-driven changes in arable systems. DPW generates the most even but muted pattern, with fewer regions achieving very high marginal gains and overall more moderate improvements.

Taken together, the BFPI results show that organic expansion leads to consistent biodiversity improvements across the EU, with OET and DPW producing slightly larger gains than GPP. The magnitude of these changes depends strongly on the spatial distribution of organic conversion and the underlying land-use structure. Countries and regions with substantial arable land and scope for crop diversification exhibit the strongest biodiversity responses, whereas areas dominated by extensive grassland or structurally rigid systems show more limited marginal effects. Accordingly, the biodiversity benefits of additional organic expansion are highly region-specific: regions with diverse arable systems and significant potential to reduce input intensity yield the largest gains, while already extensive or constrained regions respond only modestly. These patterns underscore the importance of spatial differentiation when assessing the biodiversity co-benefits of alternative organic transition pathways.

7 Discussion

This section reflects on the main results of the analysis presented in the deliverable and situates them within the existing literature on the Farm-to-Fork Strategy and organic sector development. We discuss how the simulated impacts of reaching a 25% organic share (on production, land use, income, and environmental outcomes) compare to findings from other studies, highlighting where results converge and where differences arise due to scenario assumptions and modelling choices.

We then consider the methodological implications of our two-stage approach, which combines externally generated, spatially differentiated organic area projections with the CAPRI sector model. This framework provides transparency and flexibility but also entails simplifications regarding organic management practices and behavioural responses. The section concludes by outlining priorities for future work, including further refinement of organic system representation in CAPRI and improved empirical evidence on conversion dynamics.

7.1 Modelling organic targets: outcome comparison

Under the CAPRI Baseline, the EU organic area is projected to reach 18.72 million hectares (12% of UAA) by 2030, with an additional 20.27 million hectares needed to meet the 25% target. This conversion gap remains constant across the three OrganicTargets4EU development scenarios and forms the basis for the scenario comparison presented in this section.

Across studies, achieving such a substantial expansion of organic farmland generally requires three major land-use adjustments: a reorganisation of arable crop rotations, extensification of grassland, and alternative input strategies for permanent crops. Four of the major EU-level modelling studies summarised in Table 30 (Henning et al., 2021; Barreiro-Hurle et al., 2021; Bremmer et al., 2021; and Lampkin & Padel, 2023) also implement the 25% target through external projections of organic farmland shares. Our approach is similar in principle but differs in two important ways. First, we regionalise the long-term organic growth potential to the NUTS2 level and allocate expansion across arable land, grassland and permanent crops according to region-specific suitability factors and conversion drivers (see Chapter 5). Second, we adjust model parameters for each land use and crop category as far as CAPRI allows, reflecting differences in yields, rotation constraints and input availability under organic management. This stands in contrast to the IFM-CAP modelling approach used by Kremmydas et al. (2025) and Rey Vicario et al. (2025), which explicitly distinguishes organic and conventional technologies at farm level and selects the least-cost conversion pathway to achieve national or EU-wide targets.

Our methodology also differs from studies such as Henning et al. (2021) and Barreiro-Hurle et al. (2021), which rely on aggregated input shocks, typically uniform reductions in fertiliser, pesticide or feed use. In our analysis, the yield effects from the removal of plant protection products and synthetic fertilisers are directly modelled, and we introduce minimum shares of nitrogen-fixing crops (legumes and fodder on arable land) to fulfil organic rotation requirements (Section 4.3). Rotation constraints in earlier studies played a more limited role, often implemented only through small catch-crop adjustments.

Table 30: Comparison of modelling approaches in selected studies on implications of organic farming expansion to 25% of agricultural area in the EU

	OrganicTargets4EU	Henning et al. (2021)	Barreiro-Hurle et al. (2021)	Kremmydas et al. (2023, 2025)	Bremmer et al. (2021)	Lampkin and Padel (2023)	Rey Vicario et al. (2025)
Model type	Regional optimisation model	Partial equilibrium	Partial equilibrium	Farm optimisation model	Partial equilibrium	Simulation	Farm optimisation model
Organic representation	Not explicit	Not explicit	Not explicit	Explicit	Not explicit	Explicit	Explicit
Databases	CAPRI+FSS+IFS on organic production at Nuts2 level	CAPRI	CAPRI	FADN	AGMEMOD	Eurostat	FADN
How is adoption decision modelled	The adoption decision is modelled through scenario narratives developed in the OrganicTargets4EU project, which are operationalised via external projections of organic farming areas and corresponding shocks within the CAPRI modelling system.	Exogenous projections at Member States' levels for permanent, arable, grassland.	Exogenous projections at Member state level.	Utility maximisation between farming systems	Qualitative and quantitative methods based on local expert survey on farm responses to policy changes, used in models like AGMEMOD to simulate market and macro impacts.	Linear trend projections based on individual crop area changes 2016-2020 vs. 25% shares of 2020 areas for individual crops	Action-oriented (budget), Result-oriented (GHG), Mixed (cost-effective) approaches
Implementation of the shocks							
Yield gap	Yield gap impacted via pesticide damage function	Based on FADN econometric estimation			Based on expert information , lower average yields of organic (ranging from −7% to −54%) are the primary cause of the production decline	Yield differences derived from Eurostat crop output data	Based on FADN econometric estimation
Crop rotation	Minimum share of N fixing crops; Increased legumes share in temporary grassland	min. share of catch crops	min. share of catch crops	Maximum for main crop area Minimum share of N fixing crops	--	2020 distribution of organic land (linear) or of all agricultural land (equals shares)	Rotational constraints, nitrogen management
Inputs modelled as change in: cost	--	Pesticides; Increasing additional costs for mechanical pest control		Pesticides, Costs (Seeds, fertilisers, etc.)	--	--	Pesticides, seeds, fertilisers, feeds
Inputs modelled as change in: quantity	Fertilisers, pesticides	Fertilisers	Fertilisers	Fertilisers	--	By major category (insecticides, herbicides, fungicides etc.)	Fertilisers, feeds
Other production limitations	Max livestock density on organic share of land area	--	--	Max. stocking density, Feed self-sufficiency (min share), Min. share of fodder in diet, Lower feed efficiency	Price premium	Organic and non-organic livestock densities based on 2020 averages-	Maximum stocking density, feed self-sufficiency, min. fodder required

Source: own compilation

Table 31: Comparison of selected studies on organic farming expansion to 25% of agricultural area in the EU—scenarios results at EU level

		OrganicTargets4EU			Henning et al. (2021)	Barreiro-Hurle et al. (2021)	Kremmydas et al. (2023, 2025)		Bremmer et al. (2021)	Lampkin and Padel (2023)		Rey Vicario et al. (2025)		
Scenarios presented (Normally 25% UAA, 40 Mha, unless stated otherwise)		**Green Public Policy (GPP)**	**Organic on Every Table (OET)**	**Divergent pathways (DPW)**	**Organic as measure,** part of full scenario, some results only for DE	**Organic target** as single measure and part of full scenario	**MS Target** (each MS individually reaches 25%)	**EU Target** (reached overall with MS budget flexibility	**Scenario 3** (organic area at least 25%)	**Linear trend** (reflects proportions of current organic farming)	**Equal 25% shares** (reflects current overall agriculture)	**CAP budget** (18.3 Mha)	**Env. (GHG) target** (10.7 Mha)	**Combined** (cost-efficient) (14.1 Mha)
Land use (area)	Cereals	-3.4%	-3.7%	-3.2%	-1.2%	Farm to Fork & Bio-diversity strategies include 25% organic target but results not disaggregate. Targets also include reductions in pesticide use, nutrient surplus, increase in area for high-diversity landscape features	-3.7%	-1.7%		-4.0%	-4.0%			
	Oilseeds	-1.4%	-1.4%	-2.3%	-1,1%		-1.4%	-0.7%		-13.8%	-13.8%			
	Pulses	+53%	+57%	+53%	+/-0		+1.2%	+0.8%		-22.4%	-22.4%			
	Other fodder	+21%	+23%	+22%	+/-0		+0.8%	+1.2%		+12.4%	+12.4%			
	Grassland	+7.5%[a]	+6.7%[a]	+10.9%[a]	10%[a]		+0.3%	-1.5%		+9.4%	+9.4%			
Supply	Cereals	-5.7%	-6.6%	-6.0%	-4.1%		-6.8%	-4.6%	-8% wheat -5% maize	-5.4%	-10.0%	-3.5%	-0.7%	-0.8%
	Oilseeds	-2.9%	-4.0%	-2.7%	-4.4%		-5.4%	-2.1%		-4.3%	-8.8%			
	Vegetables, perm. crops	-4.0%	-4.0%	-4.0%	-3.4%		-5.3%	-2.2%		-14.1% -8.4%	-10.0% -5.9%	-- -0.4%	-- +0.01%	-- -0.6%
	Fodder	-1.0%	-1.0%	-1.0%	-1.9%		-1.8%	-1.0%		--	--	-2.3%	-1.9%	-2.6%
	Beef meat	-6.0%	-6.0%	-6.0%	-1.0%		-2,7%	-4.3%		--	--	-1.4%	-1.7%	-1.9%
	All dairy	-1.7%	-1.7%	-1.7%	-0,3%		-1.1%	-0.5%		--	--			
Animal numbers	Dairy cows	-0.9%	-0.7%	-0.9	No effect		All cattle	All cattle		All cattle	All cattle			
	Cattle	-5.7%	-4.5%	-5.7			1.8%	-2.3%		-17.2%	-12.8%			
	Pigs	-7.0%	-5.6%	-6.9%			-0.5%	-0.5%		-14.0%	-17.8%			
	Other animals	-3.3%	-2.7%	-3.2%			-2.0%	-2 to -3%		--	--			
GHG emissions	Agriculture	-4.3%	-4.0%	-4.66%	-10 Mt CO_2e (-3%)		-3.8%	-3.7%		-14.7%	-9.4%	-4.3%	-6.6%	-7.3%
Producer income and consumer welfare change[b]		-6.3 G€	-5.8 G€	-6.5 G€	Cons. welfare: -5.87 G€ Prod. Income: -5.30 G€	Producer income: -6.3 G€	Producer income: -2.9 G€			--	--			
Other results	Price increases				Decline	Producers < 15%	Producers < 11%		--	--	--			
	Net imports								--	--	--			
	Net exports								--	--	--			

[a] Change from intensive to extensive grassland; [b] billion Euros (G€), modelled using CAPRI supply module (at constant prices of the reference scenario)—the presented income losses encompass losses from agricultural production and land use change, as well as consumer (monetary) welfare reduction.

Source: own compilation

The study results summarised in Table 31 indicate that the expansion of organic farmland translates directly into a decrease in the area dedicated to main cereals, such as wheat and grain maize. Our finding of the considerable reduction in cereal area is similar to the MS Target scenario in Kremmydas et al. (2025) and the Linear Trend scenario in Lampkin & Padel (2023). In all three cases, the projected cereal contraction is larger than in several other studies, reflecting the stronger structural adjustments embedded in these scenario assumptions. In our simulations, the reduction in cereal area is consistent with the agronomic structure of the CAPRI shocks: cereals (particularly fodder maize) are among the most fertiliser-intensive crops, and the removal of synthetic nitrogen, combined with reduced pesticide availability, imposes substantial yield and cost penalties on these activities. When this is coupled with explicit rotation requirements, including minimum shares of legumes and temporary grassland, the model reallocates land away from high-N crops toward nitrogen-fixing and forage activities that perform better under organic conditions. These mechanisms are particularly pronounced in intensive arable regions, where N use is initially high and conversion therefore induces larger structural adjustments. The effect is also slightly higher in the OET scenario, where a greater conversion rate (greater reduction of fertilisers and pesticides) on arable land is projected.

In the studies by Kremmydas et al. (2023, 2025) and Lampkin & Padel (2023) the range of projected outcomes across scenarios is substantially wider for oilseeds, pulses, and arable fodder crops than for cereals. Lampkin & Padel's linear-growth scenario largely preserves the 2020 organic land-use structure, with higher proportions of temporary grass, pulses and perennial crops, but the declining share of pulses in agricultural overall in the 2016-2020 period leads to an overall reduction in pulses by 2030, despite the organic increases. Their alternative equal share scenario maintains existing overall land use distribution, with organic cereals etc. increasing to catch up and organic pulses and perennial crops declining to proportional levels. These dynamics make the organic impacts on total land area less easy to interpret. Our explicit modelling of rotation constraints and nutrient limitations therefore explains not only the stronger displacement of cereals, but also why our scenario results display a wider dispersion of outcomes for pulses and fodder crops.

Regarding grassland, although the total area remains fixed, we observe a more substantial shift towards extensive grazing (up to 11% of the grassland is shifted to the extensive production), similar to findings of Henning et al. (2021).

With respect to permanent crops, we observe a stable area with relatively low yield decreases (around -1%). This finding is consistent with the expectations of Henning et al. (2021), who show that the area dedicated to permanent crops would remain stable despite a decrease in yields following conversion to organic farming. Nevertheless, it is important to acknowledge that permanent crops are characterised by a high degree of input dependence, even in organic farming systems. A significant limitation of the model is its inability to fully capture the alternative technologies available for organic permanent crop production, as discussed in the limitations section. Furthermore, the classification of permanent crops may vary across studies, with some including vegetables and others excluding them, which may introduce additional complexity in comparing results across studies.

Consistent with other studies, the expansion of organic farming is projected to cause a general decline in livestock numbers. The projected reduction in beef meat supply in OrganicTargets4EU (−5.6% to −6.0%) is substantially higher than the negligible impacts reported by Henning et al. (2021; −0.3%) and Barreiro-Hurle et al. (2021; −1.1%). The magnitude, however, is comparable to the upper range of results from the IFM-CAP model of Kremmydas et al. (2023, 2025; −4.3% to −

5.7%). Several factors may explain why livestock reductions are stronger in our analysis. First, the spatial distribution of projected organic expansion is driven by policy, market, and soil-climatic suitability, which allows organic growth in regions with high policy and market capacity, irrespective of their livestock system intensity and conversion costs. Second, when stocking-density constraints are applied together with crop-rotation requirements under fertiliser bans, structural adjustments are more pronounced, especially in the high livestock-density regions. Together, these mechanisms generate a larger overall reduction in livestock production than in several earlier assessments.

Furthermore, the OrganicTargets4EU dairy supply reduction of -1.7% across all scenarios is the strongest among all comparable model results (Kremmydas et al., 2025: -0.5%; Henning et al., 2021: -0.3%; Barreiro-Hurle et al., 2021: -1.1%). The stronger reduction in our study reflects the explicit propagation of organic constraints across the crop and animal modules, particularly the combined impact of lower fodder maize availability, restricted nutrient inputs and binding stocking-density thresholds.

Despite the stronger production adjustments, the estimated producer income and consumer welfare impacts are comparable to other studies. Across the three OrganicTargets4EU scenarios, income losses (before price adjustments and without organic premiums) range from €5.8 billion to €6.5 billion. Barreiro-Hurle et al. (2021) and Henning et al. (2021) estimate similar income effects of €5.3 billion to €6.3 billion (with price adjustments). That income effects are similar despite stronger adjustments in crop and livestock supply suggests that the OrganicTargets4EU approach may identify more cost-efficient conversion pathways, reflecting a more differentiated representation of regional conversion potential, land-use-specific trade-offs, and spatially differentiated structural constraints.

Across all OrganicTargets4EU scenarios, agriculture-related GHG emissions fall by –4.3% to –4.6%, broadly in line with earlier studies but slightly stronger than the –3% reported by Henning et al. (2021). These improvements result from reduced fertiliser and pesticide use, increased nitrogen-fixing crops, extensification of grassland, and lower livestock numbers. The explicit modelling of rotation and nutrient constraints, combined with spatially detailed organic area allocation, leads to more pronounced improvements in nitrogen balances and pesticide reduction compared with studies relying on aggregate input shocks. Thus, while consistent with the general findings of the literature, the environmental benefits in our scenarios emerge more strongly and with clearer regional differentiation.

In summary, the OrganicTargets4EU results broadly align with the direction of change found in earlier modelling exercises but exhibit stronger adjustments in cereals, fodder crops, and livestock systems. These differences arise from the regionalised projection of organic area, the explicit implementation of rotation and nutrient constraints, and the detailed representation of crop–livestock interactions. As a result, the OrganicTargets4EU analysis offers a more spatially resolved and agronomically grounded interpretation of how EU agriculture may adjust to large-scale organic expansion and highlights the importance of considering regional diversity when designing effective policy pathways toward the 25% organic target.

7.2 Methodological contribution and limitations

7.2.1 Contributions of the methodological approach

The methodological approach applied in this work follows a two-stage structure: organic area expansion is projected externally using a spatially explicit growth model and these projections are then implemented in CAPRI through targeted shocks and constraints. This design responds to the current limitation that CAPRI does not endogenously distinguish between organic and conventional farming. It enables us to explore alternative organic development pathways while still capturing system-wide market and production responses within the sector model.

A key contribution of this approach lies in how organic area growth is projected. In contrast to studies that apply proportional scaling of current organic shares (as in the CAPRI baseline) or rely on expert judgement and policy-target backcasting, the OrganicTargets4EU projections introduce non-linear growth dynamics and explicitly differentiate saturation levels across Member States and land-use types. This results in more moderate expansion in high-share frontrunner countries and stronger relative growth in low-share countries, producing a more balanced distribution of organic area by 2030 across the EU. This contrasts, for example, with Barreiro-Hurlé et al. (2021) or Bremmer et al. (2021), in which proportional expansion tends to reinforce existing disparities. Moreover, by disaggregating the projections to NUTS2 level and applying land-use-specific allocation keys, our approach better reflects spatial heterogeneity in conversion potential than national-level modelling alone.

The main advantage of the two-stage framework is that it combines this regional (NUTS2) granularity with a differentiated representation of conversion across land-use categories (arable land, permanent grassland, and permanent crops), which is anchored in the scenario narratives (GPP, OET, DPW). This allows the resulting projections to be mapped into CAPRI (through differentiated shocks) in a way that produces more realistic regional supply responses than homogeneous shocks would.

The scenario design also enables a clear distinction between political (GPP) and market-driven (OET) drivers of organic expansion. In GPP, conversion is directed towards land uses with high environmental relevance, such as permanent grassland, while OET primarily incentivises conversion in arable systems aligned with consumer demand and value chain incentives. This leads to region- and land-use-specific conversion patterns that are more plausible than uniform expansion assumptions used in earlier studies.

Finally, the implementation of the organic area projections in CAPRI goes beyond applying aggregated area shocks. The modelling framework incorporates endogenous yield effects resulting from reduced plant protection inputs and imposes minimum shares of nitrogen-fixing crops to reflect organic crop rotation requirements (see Section 4.3). This represents a methodological advancement over studies such as Barreiro-Hurlé et al. (2021) and Henning et al. (2021), in which crop rotation effects were included only in simplified form.

More importantly, the approach demonstrates how the existing CAPRI model structure can be used to simulate the system-wide implications of organic conversion in a spatially detailed and internally consistent way, even in the absence of a dedicated organic production system module. By introducing regional organic area shares as exogenous constraints, the supply module translates these shocks into regionally differentiated adjustments in land use, yields, input use, animal husbandry, and production costs, while accounting for nutrient balances, herd dynamics, and feed requirements. These adjustments are then passed onto the supply and environmental indicators. This allows for a coherent assessment of the economic, structural, and environmental consequences of organic expansion under different policy and market scenarios.

7.2.2 Projection limitations

Despite the methodological advances achieved through the spatially explicit and non-linear projection framework, several limitations should be acknowledged when interpreting the organic farmland projections developed in this report.

A first limitation concerns some of the structural assumptions that underpin the projection approach. While the projections incorporate policy and market data-based heterogeneity across countries and NUTS2 regions, they do not fully account for the structural complementarities and lock-ins that influence the practical feasibility of conversion. For example, regions characterised by tightly integrated crop–livestock systems, high feed dependency, or strong manure–land balances may encounter specific barriers to organic conversion that are not anticipated ex ante. As a result, the projections may assign organic farmland to areas where conversion is structurally constrained, leading to higher associated costs, such as greater agricultural income losses, than would arise under a cost- or price-optimised allocation consistent with the scenario assumptions. An extended version of the CAPRI model, explicitly incorporating the organic sector, would allow for a more realistic representation of farmer responses to changing prices, costs, and policy incentives, and could capture the market-mediated feedbacks that are currently absent from the projection phase.

A second limitation relates to how scenario differentiation is operationalised. The use of scaling factors to represent policy, market, and structural drivers provides a transparent mechanism for translating scenario narratives into quantitative projections. For some readers, this may be seen as an oversimplification of the complex, multi-dimensional nature of organic expansion. For others, the approach may already introduce a large number of interacting factors, complicating the interpretation of their isolated impacts. This dual perception reflects an inherent trade-off between transparency, parsimony, and contextual detail in cross-country projection exercises.

A third limitation, related to the second point, regards the approach to parametrisation of the scaling factors used to estimate country-specific saturation levels. While the approach incorporates relevant structural, policy, and market indicators, it could be further strengthened by drawing on additional empirical evidence. In particular, longitudinal regression analyses of organic conversion patterns at the NUTS2 level could help capture context-specific determinants of adoption, such as regional variations in farm structure, market infrastructure, advisory services, or policy support, without requiring full micro-level modelling. This would enhance the robustness and spatial precision of the saturation estimates. So far, to mitigate uncertainty in the scaling factors, the parameterisation was supported by expert validation and sensitivity checks. These could not be fully documented within the size constraints of this deliverable, but they played an important role in ensuring internal consistency and plausibility of the projected trajectories.

Finally, the projection approach does not incorporate feedback from projected organic growth into the underlying drivers. In principle, an extended CAPRI model an explicit representation of organic and conventional production systems could capture these interactions, including how rising organic shares might influence market conditions, incentives for conversion, and longer-term structural change. However, such modelling requires reliable system-specific data, particularly on organic price premiums, that are not yet available at EU-wide scale.

Taken together, these limitations underline the need to interpret the projections as plausible, scenario-consistent pathways rather than deterministic forecasts. They provide a structured basis for exploring the implications of alternative organic development strategies, while recognising the uncertainties and simplifications inherent in projecting structural change across a heterogeneous agricultural landscape.

7.2.3 CAPRI model limitations in assessing organic transition

The version of the CAPRI model used in this analysis is effective for estimating aggregate supply-side impacts of organic expansion. However, it is subject to several important limitations that constrain the interpretation and generalizability of the results. These limitations are structural in nature, stemming from the model's broad representation of the agricultural sector. These limitations are also summarised in Table 32 in comparison to other studies.

One of the most fundamental constraints is that CAPRI does not explicitly distinguish between conventional and organic farming systems. As a result, the model cannot endogenously determine how land is reallocated between these systems, nor can it capture system-specific changes such as reductions in pesticide or mineral fertiliser use. This prevents a nuanced analysis of how organic practices might replace conventional inputs, or how yield impacts differ between systems.

In the livestock sector, the model only represents aggregated livestock activity, without differentiating between organic and conventional production methods. This aggregation limits the model's ability to simulate shifts toward organic livestock systems, including organic-specific feed flows or distinct management requirements. As a result, important structural dynamics, such as feed sourcing, stocking densities, and certification-based constraints, cannot be adequately depicted.

Moreover, the model does not track simultaneous changes occurring on conventional and organic land in response to the imposed shocks. This limits the granularity of insights into farm management changes, especially where organic farming employs practices not yet common in the broader agricultural sector. For instance, organic-approved pesticide alternatives (e.g., natural or biological treatments) are not modelled, meaning no substitution effect is represented when pesticide use is reduced. Such substitutions would likely mitigate yield losses, making the model's estimate of yield reductions an overstatement of actual impacts.

A similar limitation applies to mineral fertiliser use. While it is possible to estimate overall regional reductions, the model cannot assign nutrient inputs to specific systems. There is no representation of land where only manure is applied (as in organic farming), nor can nutrient sources be distinguished by system. As such, all fertiliser reductions are treated in aggregate, which fails to reflect system-specific nutrient management strategies.

Additionally, the model does not account for potential positive spill-over effects associated with the expansion of organic farming, such as improved soil health, ecosystem services, or public health benefits, that may influence long-term productivity or resilience.

Finally, to remain consistent with the organic area projections used in this study, the impact assessment is conducted solely within the supply module of CAPRI. Market responses, such as shifts in consumer demand, trade flows, or price adjustments, are not simulated, as shocks are imposed exogenously. This absence of market feedback limits the model's ability to reflect potential buffering or amplifying effects that would arise from real-world economic adjustments.

These limitations mean that the results presented in this analysis should be interpreted as indicative of directional trends rather than precise estimates of real-world outcomes. In particular, the absence of system-specific input substitution, the lack of market feedback, and the aggregated treatment of livestock and nutrient flows imply that both the scale and distribution of impacts may be overstated or misallocated. While the CAPRI model provides a valuable macro-level perspective on the supply-side implications of organic expansion, it does not fully capture the adaptive behaviour of farmers, market actors, or policy interventions that would influence the transition in practice. The findings should therefore be seen as a conservative representation of structural change, rather than a detailed simulation of farm-level or regional dynamics.

Table 32: Limitations of selected studies on organic farming in the EU

	Henning et al. (2021), Barreiro-Hurle et al. (2021) OrganicTargets4EU	Kremmydas et al. (2023, 2025) Rey Vicario et al. (2025)	Bremmer et al. (2021)	Lampkin and Padel (2023)
Model structure & activity aggregation	The CAPRI model does not explicitly distinguish between organic and conventional farming as separate activities. The model does not differentiate between conventional and organic products.	IFM-CAP differentiates between organic and conventional production systems based on FADN data. It does not differentiate between conventional and organic output products. It assumes fixed farm structure, meaning farms' production specialisation and size remain unchanged.	The model does not differentiate between conventional and organic products. It focuses only on crop production, leaving out the potential impacts on the animal production sector.	The model focuses specifically on organic crop areas, crop output and livestock numbers, but has no optimisation function. It utilises national level data, so that regional or farm-level details are not represented
Input/ chemical representation	In Henning et al. (2021) and Barreiro-Hurle et al. (2021), pesticides are only included as an aggregate cost component in CAPRI, so the model cannot distinguish between different types of Plant Protection Products (PPP) (CAPRI version used in OrgTargets4EU distinguishes between pesticide categories and captures the damage effect of pesticides on the yields). In all three studies, the conversion target is implemented as an exogenous shock based on assumptions about yields or costs, not on endogenous farmer decision-making.	Key inputs like mineral fertiliser and pesticide use are modelled only as aggregates. The lack of organic-approved substitutes risks overstating yield losses by omitting mitigating substitution effects.		Pesticide and fertiliser changes are based on and assessment of current regulatory requirements and input use statistics. Yield reductions are estimated on the basis of statistical data on crop outputs and livestock stocking rates.
Ecosystem, synergies & spillovers	All the modelling approaches do not focus on the trade-offs (e.g., lower production for environmental benefit) and fails to capture the positive synergies that the improved environmental outcomes provide for, like positive feedback to yields resulting from enhanced ecosystem services (e.g., improved biodiversity/pollination).			
Demand & trade assumptions	While Henning et al. (2021) and Barreiro-Hurle et al. (2021) simulate the market responses to the supply changes within the EU, in OrganicTargets4EU the EU agricultural supply change is modelled without market responses, like demand shifts or price changes. This is to respect the spatial projections of organic area growth (in line with scenario narratives), which does not allow for system utility optimisation under market feedback.	The results are contingent upon the assumption that organic price premiums over conventional products remain unchanged from the current (pre-target) level.	The approach assumes that EU demand for food and feed will remain unchanged, overestimating the trade and indirect land use change (ILUC) impacts.	The model considers the interactions between crop output reduction, reduced livestock numbers and reduced demand for feed cereals. The links to consumer demand for meat and dairy products, and to food waste is discussed but not modelled.

Source: own compilation

7.2.4 Future steps: Explicit organic sector modelling in CAPRI

The shift from shock implementation to an explicit depiction of organic farming in the CAPRI model requires a complex, multi-stage development effort by the CAPRI modelling network. The process begins with preparation to ensure a stable code base, followed by thorough Data Collection and an update to the COCO CAPRI database to establish separate time series for conventional and organic activity levels, yields, and input use (fertiliser/pesticides) at the Member State level. Further development allows for prototype implementation and regionalisation of this data to the NUTS2 level.

An important step is the positive mathematical programming, the feed and the fertiliser calibration, where new parameters, equations, and constraints specific to organic systems (e.g., feed ratios, zero mineral fertiliser use, and premiums linked to organic production) are integrated, followed by an update of the trend estimation for organic systems. The success of these developments must be assured through rigorous validation using test scenarios before the enhanced model is merged back into the CAPRI trunk, making the explicit OF functionality available to the broader modelling community, while also updating satellite components such as the mitigation and environmental indicators. This work could only be partially achieved and is still ongoing[14]. In the current study, the two-stage approach was developed to overcome the still-existing limitations of the aggregate approach.

[14] For more detail, see the project "Introduction of organic farming into the CAPRI supply model (CAPRI Organic Farming)" co-ordinated by EuroCARE GmbH, funded by the European Commission, DG Environment (2021-2023).

8 Conclusions

This deliverable assessed how the EU could move towards managing 25 % of its agricultural land organically by 2030 and what such a transition would imply for agricultural production and the environment. To do so, we applied a two-stage modelling approach. First, we developed spatially explicit projections of organic area expansion reflecting different policy and market drivers described in three OrganicTargets4EU scenarios (see Zanoli, 2024 and Appendix A1). Second, we introduced these projections into the CAPRI model to simulate the resulting adjustments in land use, production structures, incomes and environmental outcomes. This approach made it possible to analyse the organic transition in a way that is regionally differentiated, transparent in its assumptions, and consistent with the broader agricultural market context.

The results demonstrate that the pathway toward the 25 % target matters. A proportional scaling of current organic shares, as in the CAPRI Baseline, perpetuates existing disparities between frontrunners and laggards. By contrast, the logistic growth framework applied in the Business as Usual and OrganicTargets4EU scenarios supports catch-up dynamics, with stronger relative growth in countries currently below the EU average. The three development scenarios reach the same EU-level target but trace different routes to get there. Policy support, market demand, and divergent national potentials and strategies each leave distinct spatial signatures on where organic farming expands and on which land-use systems are affected.

The CAPRI simulations show that expanding organic area leads to shifts toward more extensive land use, lower average yields, and adjustments in crop and livestock composition. These structural changes translate into moderate production and income effects, while also delivering clear environmental gains, including reductions in fertiliser and pesticide use and improvements in nutrient balances, greenhouse gas emissions and biodiversity. The results confirm the central trade-off underlying large-scale organic expansion: environmental benefits rise, but the farming system must adjust its crop rotations, feeding practices and market relations. Across all scenarios, faster organic expansion is projected in Mediterranean Member States and in much of Western Europe, reflecting favourable structural, climatic, and market conditions. This regional divide is amplified in the Divergent Pathways (DPW) scenario, where differentiated national trajectories lead to the highest cross-country dispersion. In contrast, the Organic on Every Table (OET) scenario moderates these disparities by emphasising market development, which enhances the organic growth potential of Central and Eastern European countries and leads to a more spatially balanced expansion pattern.

Although the three development scenarios converge on the same EU-wide organic area share of 25%, the CAPRI results show that their system-wide impacts differ. The Green Public Policy (GPP) scenario produces the strongest adjustments in land use, livestock intensity, and environmental outcomes due to stronger regulatory incentives. The OET scenario delivers similar environmental benefits but with more moderate structural change, as expansion is concentrated in regions with robust demand and well-developed supply chains, with a larger share of arable land converted. This land-use structure leads to more pronounced crop adjustments and a more even spread of structural change across Member States than in GPP. DPW generates the largest disparities: some regions undergo transformations similar to GPP or OET scenarios, while others remain closer to the Baseline, resulting in pronounced contrasts in crop–livestock interactions, feed balances, and income effects. These differences highlight that alternative pathways to 25% organic farming can have substantially different economic and structural implications.

The CAPRI simulations confirm the central trade-off underlying large-scale organic expansion: environmental benefits rise, but the farming system must adjust its crop rotations, feeding practices, and market relations. Expanding organic area leads to shifts toward more extensive land use, lower average yields, and changes in crop and livestock composition. These structural changes translate into moderate production and income effects while delivering clear environmental gains, including reductions in fertiliser and pesticide use and improvements in nutrient balances, greenhouse gas emissions and biodiversity.

The study thus highlights both the potential and the trade-offs of meeting the EU's organic target. While environmental benefits are evident, achieving the target entails structural adjustments that may require compensation or flanking policies. The analysis also demonstrates how CAPRI can be used, even in its current form, to simulate large-scale structural transitions through targeted constraints and scenario assumptions. The developed approach provides a stepping stone for further model development, especially toward integrating organic farming explicitly in CAPRI's activity structure, and offers a replicable method for combining foresight-based projections with economic policy modelling.

In sum, this deliverable provides a structured and operational basis for understanding how the EU could move towards its organic farming target and what such a shift would mean in practice. It shows that the outcomes of the organic target depend strongly on the strategic pathway chosen. Looking ahead, further work should place more emphasis on farmer decision-making under structural constraints, value-chain adaptation, and region-specific policy design. The organic transition is not only a quantitative expansion of hectares; it is a systemic reorientation that requires coordinated support across production, processing, markets, and governance.

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APPENDICES

A1 Scenario narratives

Appendix A1 contains selected scenario narratives as described in the original document by Zanoli (2024). See the original document for the methodology of the applied normative scenario analysis.

A1.1 Green Public Policy

Growing concerns among the public and policymakers regarding significant environmental challenges such as climate change, biodiversity loss, and issues related to water and soils have intensified. In response, there is a heightened focus on bolstering and improving European policy frameworks, including initiatives like the Green Deal, Farm 2 Fork, and Biodiversity Strategies, along with subsequent policies. The escalating severity of extreme weather events, like droughts and floods, coupled with rising costs for energy, fertiliser, and imported feed, is prompting farmers to increasingly embrace and cooperate with green policies to mitigate risks.

The evolving political landscape, marked by the forming of new farmer networks, signals a proactive engagement with environmental concerns and a shift in production systems. There is an increasing collaboration between organic and agroecology organisations, as well as environmental NGOs. This collaborative effort extends to establishing diverse production standards, focusing on ensuring long-term resilience.

Building upon the commitments outlined in the CAP 2023-27, the future CAP reform strongly emphasises organic farming and agri-environmental support. Given the added environmental benefits, this strategic shift makes organic production more appealing, especially for arable producers. The pig and poultry systems witness a transition toward localised feed sourcing, leading to reduced intensity. Overall, livestock numbers decrease alongside reduced consumer demand for meat and dairy products.

The push for conversion to organic practices is primarily driven by policy initiatives and public support rather than market forces. While premium prices are not guaranteed and may experience fluctuations, policy measures actively support the organic Agricultural Knowledge and Innovation Systems (AKIS), supply chain, and market initiatives to encourage and facilitate conversion.

There is growing acceptance of organic practices at the national and local levels, with organic food becoming the standard in public institutions such as hospitals, canteens, and schools. The widespread adoption of organic practices is particularly encouraged in regions facing significant environmental challenges. Regions grappling with issues like abandonment find new opportunities to re-engage with farming.

While current organic regulations gain prominence, there is increasing pressure from other farming groups to develop alternative standards, such as integrated and regenerative approaches, including the introduction of EU sustainability labelling. Efforts to standardise and reduce greenwashing are essential to avoid the proliferation of competing standards. Adaptations to organic regulations are necessary to address emerging challenges related to climate, biodiversity, and consumer expectations, ensuring the continued predominance of organic practices.

A1.2 Divergent Pathways

Concerns regarding food security, high inflation rates, and unfavourable reactions from farmers to reduced profitability contribute to a diminished focus on environmental policies. The prioritisation of social issues over environmental concerns results in an escalating trend of social fragmentation. A heightened emphasis accompanies this shift to a productivist agenda, leading to the rollback of the Green Deal and a general weakening of the European Union's influence.

Certain member states or regions opt to uphold and cultivate robust organic policies and agri-environmental support. Committed member states actively encourage the consumption of domestic products. Organic non-governmental organisations play a pivotal role in sustaining political interest in these regions, with high levels of public engagement and demand acting as catalysts for imports and production from regions with less established domestic consumption.

Standards on greenwashing (green claims) reduce the proliferation of competing standards, and national organic regulations address new challenges, such as climate, biodiversity, and consumer expectations, to maintain the predominance of organic standards. This makes it more attractive for arable producers to convert to organic production with added environmental benefits. The policy supports organic AKIS, supply chain and market initiatives to motivate and facilitate a conversion. Conversion would be widespread, and farmers in regions where abandonment is a problem would find new opportunities for re-engaging with farming.

Conversely, in various countries, backing for organic and environmental policies faces withdrawal, prompting a minority of the public to harbour ongoing concerns about environmental issues. Mainstream agriculture revivals and mainstream agriculture lobbies improve efforts to support conventional farming development. This leads to a neutral approach to farming policies, with no significant changes toward stronger support for organic farming conversion.

NGT are allowed in conventional agriculture but banned from organic. Quality of conventional products does not always meet adequate standards, and food scandals arise for some food products. Food preferences become polarised and consumers are segmented into supporters and detractors of organic products. Consequently, individuals find themselves compelled to seek solutions independently due to uneven government engagement. This has led to a discernible split within the agricultural sector, with organic initiatives emerging in opposition to conventional methods, thereby deepening divisions among different regions, farmer groups, and social demographics. Innovative solutions are imperative within the organic sphere to address these challenges, placing a significant emphasis on fostering solidarity within the supply chain. Notably, organic non-governmental organisations (NGOs) are pivotal in organising autonomous initiatives that support the organic sector. The financial sector has also transformed, with private-sector sources, including organic companies, retailers, foundations, and payments for ecosystem services (such as water, carbon, and biodiversity offsetting), assuming heightened importance in sustaining these initiatives. The conversion to organic practices aligns more closely with market demand rather than purely environmental considerations. The growth of the organic sector is becoming concentrated in specific regional hubs for both arable and livestock systems, with consumption patterns gravitating towards urban centres where consumers wield greater purchasing power. Price premiums remain steady for most organic products. Additionally, some countries and regions strategically orient themselves towards exporting organic products to areas characterised by high demand. In this evolving landscape, the concept of organic districts gains popularity and provides focal points for concentrated organic activities leading to large and stable organic supply chains. This multifaceted approach underscores the dynamic nature of the organic movement, where economic, environmental, and regional considerations intertwine to shape the future trajectory of the sector in regions with high demand.

A1.3 Organic on Every Table

Organic farming's benefits for the environment and society are well understood by citizens and policymakers alike, and this is broadly reflected in their actions towards organic.

The Green Deal is challenged by the polarity between long-term green targets and emergency needs triggered by global crises and trade. However, evidence of the climate emergency and water issues keep environmental considerations prominent, triggering the agri-food industry push for NGTs. However, thanks to the lobbying of organic and like-minded NGOs and national authorities, the Green Deal remains, and NGTs are kept out of organic.

The push for protecting biodiversity and groundwater resources and reducing oxygen loss in rivers, lakes and local watercourses is connected to organic farming. It helps reinforce the positive political climate for organic.

Organic primacy is propelled and stands out from attempts from alternative standards and schemes to gain room and legal recognition in the sustainability and market domain.

Nearly all people recognise the organic label as a guarantee for the food values they care about.

Organic food has reached all European families—in their houses when preparing dinner, but also at work and in restaurants, and is increasingly coupled with health-related attributes and claims. Organic food is widely included in schools and public canteens, through targeted green public procurement policies.

The organic premium still exists, but the price differential is smaller (except for animal products), partly because supply chain actors are empowered, and farmers have more direct involvement in the distribution chains and can broker better agreements with processors and distributors, which is reflected in the prices offered by large retail chains to their customers.

Large-scale retailers play a leading role in facilitating the mainstream availability of organic products by increasing the range of products and getting more involved in the organic food chain. They have also incorporated and consolidated some small-scale alternative and specialised retailers. However, alternative models are expanding and innovating, e.g., e-commerce, digital box schemes and CSAs, farmers' markets, new distribution models, and general farmer-consumer partnerships.

Organic farmers receive preferential credit due to their ecosystem services (e.g., carbon and biodiversity credits). Private investment funds and public support both play an important role in financing the sector.

While the generally positive policy and market conditions encourage a widespread conversion to organic for arable and permanent crops, livestock production is carried out in the context of wider societal shifts in relation to the diminishing role of animal products in healthy and sustainable diets. Issues such as appropriate production methods, animal welfare etc. are important, and grazing animal farming doesn't expand overall. Still, it is concentrated in specific areas, such as mountain regions and less favoured areas.

Organic Agricultural Knowledge and Information Services (AKIS) widely exists in all schools, agricultural training and advisory services, universities and research institutions and are becoming mainstream.

The current trends on AKIS sustainable farming are mainstreaming organic agriculture, placing it side by side with agroecology and regenerative methods

A2 Allocation of Member States to development trajectories in the Divergent Pathways scenario

The implementation of the DPW scenario is based on the premise that EU Member States differ substantially in their capacity and willingness to develop organic farming through policy support and market dynamics. Accordingly, countries are grouped based on their potential to follow development trajectories similar to the policy-driven (GPP) or market-driven (OET) scenarios. Countries assessed as less likely to progress beyond the Business as Usual (BAU) trajectory are characterised by comparatively weak policy support targeted in their national Organic Action Plans and by less developed organic markets.

To operationalise this differentiation, EU Member States were clustered independently along two contextual dimensions: policy support and market development. Each dimension is represented by a set of proxy variables capturing key structural characteristics (see Table A1 and Table A2). Clustering was conducted separately for each dimension to avoid conflating distinct drivers of organic expansion.

We first applied a hierarchical agglomerative cluster analysis using Ward’s minimum-variance method, which groups countries by minimising within-cluster variance at each step of the aggregation process. To explore the underlying hierarchical structure, a dendrogram was generated and inspected across multiple potential cluster partitions. The dendrogram was configured to display ten successive clustering levels, allowing us to assess how countries group together as the distance threshold increases and to evaluate the stability of alternative cluster solutions. Specifically, we generated cluster solutions ranging from five to ten clusters, enabling comparison across different levels of aggregation—from relatively broad groupings to more finely differentiated structures.

Overall, the hierarchical Ward procedure allows the latent grouping structure in the data to be examined without imposing a priori assumptions regarding the number or shape of clusters. The generation of multiple cluster solutions provides flexibility in selecting a partition that is both empirically robust and conceptually consistent with the DPW scenario logic.

However, due to the relatively low number of available proxy variables and number of observations (countries), the quantitative clustering results were triangulated with qualitative expert judgement within the project team to ensure consistency with contextual knowledge of national policy frameworks and market conditions.

The variables and data used for each dimension, together with the final cluster allocation of EU Member States, are presented in Table A1 and Table A2. The cross-classification of policy and market clusters, which defines the final DPW country grouping, is shown in Table 3 in Section 3.3.

Table A1: Indicators of policy support for organic farming and resulting policy clusters across EU Member States

EU Member State	Planned support 2027 as % of UAA	Target organic area as % of agricultural area	Expenditure for organic area (€/ha) 2027/8	Share of organic in environmental expenditures (%)
Policy cluster 1: High policy support for organic farming				
AT	23.7	35	252	26.3
CZ	21.3	22	140	16.7
DE	12.1	30	232	23.7
EE	23.3	25	113	27.9
EL	16.4	25	306	50.4
FI	19.4	25	155	17.6
IT	11.9	25	200	22.3
LV	18.8	20	142	35.2
PT	19.2	20	120	29.1
SE	14.5	30	167	23.1
SK	14.1	20	134	15
IE	7.5	10	265	7.9
Policy cluster 2: Moderate policy support for organic farming				
BE	12	20	281	16.4
DK	15.4	20	184	26.2
FR	11.7	18	178	24.2
HR	12.1	12.1	283	24.6
LT	12.8	15	226	37.7
LU	19.8	20	342	20.7
SI	17	18	274	21.7
Policy cluster 3: Low policy support for organic farming				
BG	4	7	585	22.6
CY	9	10	459	21.9
MT	2.5	5	3913	13.2
PL	4.5	7	380	15.1
ES	5.1	20	134	11.1
HU	5.3	10	226	8.7
NL	6	15	200	6.2
RO	3.5	5	150	9.4

Source: Own compilation based on data from Lampkin et al. (2024)

Table A2: Indicators of organic market activity and resulting organic market clusters across EU Member States

EU Member State	Per capita organic retail sales (€) 2022	Organic retail sales share as % in total agricultural sales 2022	Organic exports plus retail sales per capita (€) 2022
Market cluster 1: High organic market activity			
AT	274.1	11.3	274.1
DE	181.5	6.3	181.5
DK	365.3	12.0	441.6
FR	177.4	6.1	190.4
LU	248.2	8.2	248.2
SE	247.8	8.2	247.8
Market cluster 2: Moderate organic market activity			
BE	81.3	3.7	81.3
EE	71.7	4.6	101.8
ES	52.7	2.5	88.0
FI	67.4	2.2	78.0
IT	62.2	3.6	111.5
NL	80.6	4.4	80.6
Market cluster 3: Low organic market activity			
BG	5.9	1.0	5.9
CY	12.0	2.0	n.a.
CZ	21.5	1.6	36.0
EL	6.3	0.3	6.3
HR	25.8	2.2	26.5
HU	3.1	0.3	5.2
IE	45.2	2.7	45.2
LT	17.7	1.0	33.4
LV	27.1	1.5	54.2
MT	5.0	2.0	n.a.
PL	8.4	0.6	8.4
PT	0.0	2.0	n.a.
RO	2.1	0.2	12.6
SI	23.0	1.8	23.0
SK	15.0	1.0	n.a.

Source: Own compilation based on Fibl Statistics, accessed 20 May 2024

A3 Parametrisation of organic pesticide reduction

Table A3: Pesticide reduction factors applied in CAPRI for organic area by crop activity

Activity code[a]	Fungicides	Herbicides	Insecticides	Growth regulators	Molluscicides
SWHE	1	1	0.9	1	1
DWHE	1	1	0.9	1	1
RYEM	1	1	0.9	1	1
BARL	1	1	0.9	1	1
OATS	1	1	0.9	1	1
MAIZ	1	1	0.9	1	1
OCER	1	1	0.9	1	1
RAPE	0.9	1	0.9	1	1
SUNF	0.9	1	0.9	1	1
SOYA	0.9	1	0.9	1	1
OOIL	0.9	1	0.9	1	1
OIND	0.9	1	0.9	1	1
FLOW	0.7	1	0.7	1	0.8
OCRO	0.9	1	0.9	1	1
MAIF	1	1	0.9	1	1
ROOF	0.7	1	0.9	1	1
OFAR	1	1	1	1	1
PARI	1	1	0.9	1	1
PULS	0.9	1	0.9	1	1
POTA	0.7	1	0.9	1	1
SUGB	0.7	1	0.9	1	1
TEXT	0.9	1	0.9	1	1
TOBA	0.9	1	0.9	1	1
TOMA	0.7	1	0.7	1	0.8
OVEG	0.7	1	0.7	1	0.8
FALL	1	1	1	1	1
APPL	0.5	1	0.7	1	0.8
OFRU	0.5	1	0.7	1	0.8
CITR	0.5	1	0.7	1	0.8
TAGR	0.5	1	0.7	1	0.8
TABO	0.5	1	0.7	1	0.8
TWIN	0.5	1	0.7	1	0.8
OLIV	0.5	1	0.7	1	0.8
NURS	0.7	1	0.7	1	0.8
NECR	0.9	1	0.9	1	1
GRAE	1	1	1	1	1
GRAI	1	1	1	1	1

Values in the table correspond the relative reduction in pesticide use in each crop category by pesticide category; [a] See Table A4 and Table A5 for the list of activity codes.

Source: own compilation

A4 Data mapping and organic area representation

Table A4: Mapping of CAPRI crop activities with Integrated Farm Statistics (IFS) codes 2020

CAPRI code	Crop production activity	IFS code (2020)
SWHE	Soft wheat production activity	C1110T
DWHE	Durum wheat production activity	C1120T
OATS	Oats and summer cereal mixes production activity without triticale	C1400T
RYEM	Rye and meslin production activity	C1200T
OCER	Other cereals production activity including triticale	C1600_1700_1900T
MAIZ	Grain maize production activity	C1500T
BARL	Barley production activity	C1300T
PARI	Paddy rice production activity	C2000T
ROOF	Fodder root crops production activity	R9000T
OFAR	Fodder other on arable land production activity	G2000T + G1000T + G9000T
MAIF	Fodder maize production activity	G3000T
RAPE	Rape production activity	I1110T
SUGB	Sugar beet production activity	R2000T
POTA	Potatoes production activity	R1000T
SUNF	Sunflower production activity	I1120T
SOYA	Soya production activity	I1130T
OOIL	Other seed production activities for the oil industry	I1190T + I1140T
OIND	Other industrial crops production activity	I5000T + I9000T
NURS	Nurseries production activity	L0000T
FLOW	Flowers production activity	N0000T
OCRO	Other crops production activity	ARA99
PULS	Pulses production activity	P0000T + I1130T
TEXT	Flax and hemp production activity	I2100T + I2200T + I1150_2300T + I2900T
TOBA	Tobacco production activity	I3000T
TOMA	Tomatoes production activity	Data not provided
OVEG	Other vegetables production activity	V0000_S0000
APPL	Apples, pears and peaches production activity	F1100T + F1200T
OFRU	Other fruits production activity	F2000T + F3000T + F4000T
TAGR	Table grapes production activity	W1200T
TWIN	Wine production activity	W1100T
TABO	Table olives production activity	O1100T
OLIV	Olive production activity for the oil industry	O1910T
CITR	Citrus fruits production activity	T0000T
FALL	Fallow land	Q0000T
GRAS	Gras and grazing production activity	J0000T

The IFS data for 2020 was provided by Eurostat at the EU NUTS2 regional level. Where CAPRI provides a more detailed breakdown than IFS/FSS, IFS aggregate values are allocated proportionally to CAPRI 2018 category values in each NUTS2 region. The IFS/FSS data, which follow a different aggregation structure, were first disaggregated using the same logic and then reallocated to the CAPRI aggregates.

Table A5: Mapping of CAPRI animal production activities with Integrated Farm Statistics (IFS) codes 2020

CAPRI code	Animal production activity	IFS code (2020)
HEIR	Heifers raising activity	[a]
CAMF	Calves male fattening activity	A2010[a]
CAFF	Calves female fattening activity	A2010[a]
CAMR	Calves male raising activity	A2010[a]
CAFR	Calves female raising activity	A2010[a]
BULF	Male adult fattening activity	A2120 + A2130
HEIF	Heifers fattening activity	A2220 + A2230
DCOW	Dairy cows production activity	A2300F
SCOW	Suckler cows production activity	A2300G
SOWS	Sows for piglet production	A3110 + A3120
PIGF	Pig fattening activity	A3130
HENS	Laying hens production activity	A51100
POUF	Poultry fattening activity	A5140 + A5210 + 5220 + A5230
SHGM	Sheep and goats activity for milk production	A4100 + A4200[a]
SHGF	Sheep and goats activity for fattening	A4100 + A4200[a]
OANI	Other animals activity	[a]

[a] These categories were either not included in the Eurostat data delivery or unavailable in the 2020 IFS data categorisation. They were therefore extrapolated using the consolidated CAPRI time series. The information on the number of CALVES is missing in the 2020 IFS categorisation. We estimate the values from other cattle categories (DCOW, SCOW, HEIF and BULF), and disaggregate the total number of cattle to CAMF, CAFF, CAMR and CAFR, using their proportions in the 2018 CAPRI data.

Source: own compilation

Table A6: Utilised agricultural area (UAA) by Member State, land use category, organic farming practice (1000 ha) constructed from 2020 IFS NUTS2 level data provided by Eurostat

	UAA	Perm crops	Arable land	Grass-land	Organic perm. crops	Organic arable land	Organic grass-land	Organic UAA	Organic UAA share
AT	2661.0	63.0	1388.1	1210.0	14.9	310.4	388.9	714.2	26.8%
BE	1358.8	21.4	862.0	475.4	0.9	33.9	57.0	91.7	6.8%
BG	4565.8	100.8	3322.3	1142.7	16.3	79.4	30.0	125.7	2.8%
CY	132.5	28.0	102.2	2.3	2.0	3.3	0.1	5.3	4.0%
CZ	3478.1	32.8	2467.2	978.1	4.8	90.3	434.2	529.3	15.2%
DE	16534.7	179.4	11625.0	4730.3	22.0	743.3	828.3	1593.6	9.6%
DK	2493.6	5.0	2260.8	227.8	1.0	249.0	44.1	294.1	11.8%
EE	970.8	3.5	689.7	277.7	2.5	123.4	94.1	220.0	22.7%
EL	3889.3	821.8	1498.9	1568.5	31.3	85.6	43.4	160.3	4.1%
ES	23906.1	4610.0	11762.7	7533.4	483.6	691.9	745.0	1920.5	8.0%
FI	2268.7	3.6	2242.8	22.3	0.7	305.4	7.7	313.8	13.8%
FR	27335.1	991.8	17096.7	9246.6	179.8	1324.8	936.6	2441.1	8.9%
HR	1588.5	75.3	973.6	539.6	12.2	67.5	39.2	118.9	7.5%
HU	4942.6	152.9	4057.0	732.6	9.9	161.9	101.0	272.8	5.5%
IR	4918.5	0.9	1208.9	3708.8	0.0	18.1	56.3	74.4	1.5%
IT	12724.8	2151.8	7439.2	3133.8	453.1	1062.5	490.5	2006.2	15.8%
LT	2902.6	21.0	2231.3	650.3	5.1	185.5	43.4	233.9	8.1%
LUX	130.8	1.3	61.2	68.3	0.1	2.8	3.1	6.0	4.6%
LV	1965.7	7.6	1332.0	626.1	3.1	156.3	154.2	313.7	16.0%
MT	8.6	0.8	7.8	0.0	0.0	0.0	0.0	0.0	0.5%
NL	1804.3	36.4	995.5	772.4	1.1	30.4	41.7	73.2	4.1%
PL	14621.6	365.9	11020.7	3235.0	29.4	347.1	111.2	487.8	3.3%
PT	3952.1	845.7	1055.9	2050.5	35.3	32.2	157.4	224.9	5.7%
RO	12790.5	335.8	8731.2	3723.5	10.3	235.3	80.1	325.7	2.6%
SE	2982.6	3.5	2515.5	463.5	0.5	476.3	135.3	612.0	20.5%
SI	480.9	28.3	173.0	279.6	3.6	13.6	40.9	58.1	12.1%
SK	1912.7	17.5	1375.8	519.4	1.7	71.8	121.8	195.3	10.2%

Source: own compilation

A5 Beta regression for parametrisation of Business as Usual scenario

This Appendix provides supplementary material to Section 5.4.2. Table A7 presents the results of beta regression estimations for four model specifications M1-4. All models include factor variables for market clusters and policy clusters. Two of these models include climatic zone variables only (M1 and M2), while the other two additionally incorporate land cover differentiation through the share of permanent grassland (M3 and M4). Within each pair, one model is estimated with and one without additional control variables. Note that models without control variables (M1 and M3) exclude Malta and Cyprus, which have specific conditions for organic farming development insufficiently controlled for in the parsimonious models, affecting the model fit.

Table A7: Beta regression estimates of regional determinants of organic area shares (country-level analysis for 2020)

	M1		M2		M3		M4	
Variables	**Coeff.**	**P-value**	**Coeff.**	**P-value**	**Coeff.**	**P-value**	**Coeff.**	**P-value**
Constant	-3.616***	(0.000)	-4.315***	(0.000)	-3.558***	(0.000)	-3.396***	(0.000)
Market-Cluster 1	0.506***	(0.001)	0.898***	(0.000)	0.813***	(0.000)	0.871***	(0.000)
Market-Cluster 2	0.377***	(0.001)	0.458***	(0.000)	0.458***	(0.000)	0.456***	(0.000)
Market-Cluster 3 (Ref.)								
Policy-Cluster 1	1.648***	(0.000)	2.148***	(0.000)	2.044***	(0.000)	1.898***	(0.000)
Policy-Cluster 2	0.922***	(0.007)	1.413***	(0.000)	1.570***	(0.000)	0.907	(0.102)
Policy-Cluster 3	0.869***	(0.000)	0.897***	(0.000)	0.711***	(0.000)	0.870***	(0.000)
Policy-Cluster 4	-0.235	(0.530)	0.556***	(0.005)	0.446	(0.140)	0.049	(0.924)
Policy-Cluster 5 (Ref.)								
Climate-Cluster 1	0.393**	(0.034)	0.655***	(0.000)				
Climate-Cluster 2 (Ref.)								
Climate-Cluster 3	0.259	(0.251)	-0.087*	(0.088)				
Climate-Cluster 4	0.480*	(0.097)	-0.126	(0.273)				
Climate-Cluster 5	-0.050	(0.858)	-0.365**	(0.018)				
Climate-Cluster 1a					-0.785	(0.222)	elim.	
Climate-Cluster 1b					0.507***	(0.001)		
Climate-Cluster 2a							-0.606***	(0.002)
Climate-Cluster 2b					-0.228***	(0.000)	-0.656***	(0.000)
Climate-Cluster 3a					-0.360**	(0.042)	-0.479	(0.223)
Climate-Cluster 3b					-0.196***	(0.000)	-0.733***	(0.000)
Climate-Cluster 4a					-0.070	(0.688)	-0.514	(0.137)
Climate-Cluster 4b					-0.356***	(0.000)	-0.509	(0.178)
Climate-Cluster 5					-0.702***	(0.000)	-0.802***	(0.004)
Land rent price			0.061***	(0.000)			0.057***	(0.000)
Share perm. grassland			0.001	(0.789)				
Old member state (MS)			0.169	(0.473)			0.000	(.)
Years org. support (OS)			0.025***	(0.000)			0.025***	(0.000)
Old MS x Years OS			-0.027***	(0.000)			-0.028***	(0.001)
Scale constant	5.369***	(0.000)	7.356***	(0.000)	5.818***	(0.000)	7.358***	(0.000)
N	27		25		27		25	
Log pseudolikelihood	70.750		88.898		76.712		88.916	
BIC	-101.951		-129.513		-110.578		-129.550	

P-values: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$; Models M1 and M3 excl. Malta and Cyprus (Climate-Cluster 1a).

Source: own compilation

The estimated coefficients with respect to the market clusters in all four models suggest that countries in the market cluster 1 have the highest conversion rate among the clusters, followed by market cluster 2 and lastly market cluster 3 (reference group), with statistically significant differences. By differentiating the variable for climatic zones by grassland share (comparing model M1 and M3), the market impact differences between the clusters increase.

The parameter estimates for the policy clusters appear more sensitive in magnitude to the inclusion of control variables, which is expected given their policy-related nature (e.g., years of organic farming support). However, their ranking remains consistent across models. Three models suggest that the conversion rate difference between policy clusters 4 and 5 is statistically insignificant. Only in model M2 (which includes climatic zones without differentiation by land-use structure) and in the model excluding Malta and Cyprus do countries in policy cluster 5 exhibit a higher organic area share than those in policy cluster 4.

The remaining parameter estimates indicate a higher organic conversion rate with growing policy support (decreasing cluster number). Models M2 and M4, which include control variables, provide further insights into the impact of policy support, showing that policy duration positively influences the current organic area share. However, this effect has diminished over time in "old" Member States, reinforcing our assumption of a declining conversion response to policy support over time and the existence of an organic area saturation level.

The final factor variable of interest captures the variability in suitability of the identified climatic zones and land-use types for organic conversion. Model M1 estimates the effects of the five climatic zones without land differentiation, while model M2 introduces control variables for the share of permanent grassland and average land rent price as proxies for land quality and/or marginal cost. However, when comparing model M2 with parameter estimates from models M3 and M4, the results suggest that differentiating land types within climatic zones provides a better model fit than assuming a constant effect of grassland share across all zones. Consistent with the literature, the results suggest that the Mediterranean region, Climate Cluster 1b (contrary to Cyprus and Malta, Climate Cluster 1a) has the highest climatic suitability for organic conversion, largely due to its high share of permanent crops. In contrast, the temperate cold region (Sweden and Finland) appears the least suitable, possibly also partially due to the low share of permanent grassland.

To derive the scaling parameters δ_i for the Business as Usual scenario, we use estimates of model M3 which included climate zones differentiated by land use and delivered better model fit when compared to Model M1. The inclusion of control variables served in models M2 and M4 both as a robustness check of the country clustering, and as a sensitivity analysis of the key relationships. While these extended models reveal meaningful associations, they may also be subject to potential overfitting. Because of this issue, we recommend for future research (i) conducting a qualitative comparative analysis (QCA), or (ii) extending the quantitative analysis to a longitudinal format or to the NUTS2 level, thereby increasing the number of observations and allowing for the inclusion of additional structural variables.

A6 Scaling factor parametrisation and country clusters

Table A8: Saturation level scaling factor for policy capacity in logistic growth model for implementing Green Public Policy scenario in 2030 organic area projections

EU Member State	GDP per capita 2020[a] (€)	Regulatory quality[b] 2023	GDP annual growth[a] 2013-2023 (%)
Policy capacity cluster 1 ($\delta_{pol\_cap\_GPP} = 1.10$)			
IE	63220	1.749	7.9
LU	82030	1.929	2.3
DK	47940	1.840	2.2
FI	35990	1.765	0.7
NL	40800	1.791	1.9
SE	42600	1.718	2
Policy capacity cluster 2 ($\delta_{pol\_cap\_GPP} = 1.05$)			
AT	35480	1.361	1.2
BE	33990	1.168	1.6
DE	35180	1.457	1.1
FR	30800	1.154	1.1
Policy capacity cluster 3 ($\delta_{pol\_cap\_GPP} = 1.0$)			
CY	24630	0.778	3.4
ES	22510	0.694	1.7
IT	24960	0.644	0.8
MT	22260	0.687	6.6
Policy capacity cluster 4 ($\delta_{pol\_cap\_GPP} = 0.95$)			
CZ	17900	1.304	2.1
EE	15070	1.430	2.2
LT	14310	1.338	3.3
LV	11890	1.172	2.4
Policy capacity cluster 5 ($\delta_{pol\_cap\_GPP} = 0.93$)			
EL	16320	0.579	1.1
HR	12010	0.644	2.7
PL	13370	0.780	3.5
PT	16940	0.755	1.7
SI	19630	0.731	2.7
SK	15510	0.602	2.2
Policy capacity cluster 6 ($\delta_{pol\_cap\_GPP} = 0.90$)			
BG	6810	0.408	2.4
HU	12930	0.318	3
RO	9020	0.319	3.4

GDP annual growth 2013-2023 (%) in the last column was not used for the clustering, it purely informs about the convergence tendencies in economic development among the EU Member States and potential future shifts between clusters. Until 2030, changes in the countries' cluster allocation are unexpected.

Source: own compilation based on: [a] Eurostat (code: nama_10_pc): https://ec.europa.eu/eurostat/databrowser/product/view/NAMA_10_PC (accessed 10 May 2024); [b] World Bank (2024, Worldwide Governance Indicators): https://databank.worldbank.org/source/worldwide-governance-indicators (last updated: 11 May 2024; accessed 10 January 2025)

Table A9: Saturation level scaling factor for policy need in logistic growth model for implementing Green Public Policy scenario in 2030 organic area projections

EU Member State	Agricultural land[a]			Arable land[a]		Share of arable in total agricultural land[b]
	No or very low degradation (%)	Medium to very high (%)	High to very high (%)	No or very low degradation (%)	High to very high (%)	
Cluster 1: Very low land degradation countries ($\delta_{pol\_need\_GPP}$ = 1.1)						
DE	64.82	6.86	0.64	67.81	0.48	0.66
DK	70.15	6.51	0.89	68.82	0.96	0.84
EE	52.95	8.43	0.44	51.96	0.44	0.48
FI	69.34	4.88	0.28	65.61	0.37	0.60
HR	95.84	0.15	0.00	96.29	0.02	0.28
LT	66.07	3.91	0.15	62.26	0.12	0.59
LV	42.78	6.97	0.25	45.7	0.38	0.47
SE	58.58	8.82	0.46	57.19	0.51	0.76
SI	59.62	8.17	0.77	58.07	1.36	0.15
SK	75.04	3.63	0.21	78.11	0.16	0.69
Cluster 2: Low land degradation countries ($\delta_{pol\_need\_GPP}$ = 1.15)						
AT	44.69	23.22	6.06	55.1	5.02	0.49
CZ	33.31	24.76	4.81	35.64	3.71	0.64
IE	52.74	14.01	2.21	17.81	12.65	0.07
PL	49.44	10.98	1.34	51.99	0.93	0.73
RO	33.91	28.56	6.60	27.02	7.83	0.64
Cluster 3: Medium land degradation countries ($\delta_{pol\_need\_GPP}$ = 1.2)						
BG	28.2	32.55	6.07	21.51	7.18	0.67
FR	26.59	31.39	6.31	18.02	7.09	0.48
HU	27.31	39.83	13.62	26.9	14.2	0.78
LU	31.92	33.97	10.54	35.39	9.05	0.33
Cluster 4: High land degradation countries ($\delta_{pol\_need\_GPP}$ = 1.3)						
BE	13.51	36.27	9.91	7.25	7.65	0.39
CY	11.75	36.52	8.85	7.7	9.45	0.58
EL	12.98	58.38	26.26	8.21	27.1	0.41
IT	9.77	62.28	23.30	5.9	32.2	0.53
MT	12.22	48.25	10.00	25.93	0	0.04
NL	6.75	62.45	20.37	9.13	14.01	0.31
PT	16.14	42.92	11.26	12.5	12.75	0.22
Cluster 5: Severe land degradation countries ($\delta_{pol\_need\_GPP}$ = 1.4)						
ES	5.07	67.02	29.78	2.53	36.19	0.52

Land Multi-degradation Index (Prăvălie et al. 2024) is used as a proxy for the urgency of policy support for organic conversion (policy need); Categories in [a] indicate percentage shares of farmland in a land degradation category.

Source: own ompilation based on: [a] Prăvălie et al. (2024); [b] Eurostat (code: ef_lus_main): https://ec.europa.eu/eurostat/databrowser/view/ef_lus_main/ (accessed 10 May 2024)

Table A10: Saturation level scaling factor for Green Deal policy in logistic growth model for implementing Organic on Every Table scenario in 2030 organic projections

EU Member State	Policy factor in BAU δ_{pol_BAU}	Target organic area for 2027/30 / 2020 organic area[a]	Core policy scaling factor in OET[b]	Policy factor in OET (Green Deal)[c] $\delta_{green\_deal\_OET}$
EE	1.28	1.1	1.00	1.28
FI	1.28	1.3	1.00	1.28
AT	1.28	1.3	1.00	1.28
LV	1.28	1.4	1.00	1.28
FR	1.02	1.4	1.00	1.02
HR	1.12	1.4	1.00	1.12
CZ	1.28	1.4	1.00	1.28
RO	0.87	1.4	1.00	0.87
SE	1.28	1.5	1.00	1.28
IT	1.02	1.6	1.05	1.07
SI	1.12	1.7	1.05	1.18
SK	1.12	1.7	1.05	1.18
DK	1.02	1.8	1.05	1.07
LT	1.12	1.9	1.05	1.18
EL	1.02	2.0	1.05	1.07
PL	0.87	2.0	1.05	0.91
CY	0.87	2.3	1.10	0.95
PT	1.02	2.5	1.10	1.12
ES	1.02	2.5	1.10	1.12
BE	1.02	2.8	1.15	1.17
DE	1.02	2.9	1.15	1.17
BG	0.87	3.0	1.15	1.00
NL	0.87	3.8	1.20	1.04
HU	0.87	4.1	1.20	1.04
LU	0.87	4.3	1.20	1.04
IE	0.87	6.0	1.25	1.08
MT	0.87	7.9	1.25	1.08

[a] Ratio of target organic area share in country's agricultural land for 2027/2030 in National Action Plans for organic based on Lampkin et al. (2024); [b] Scaling factor reflecting support increase intensity in [a]; [c] Final policy scaling factor applied in OET scenario, representing a product of δ_{pol_BAU} and [b].

Source: own compilation

Table A11: Saturation level scaling factor for public procurement policy in logistic growth model for implementing Organic on Every Table scenario in 2030 organic area projections

EU Member State	Performance in public procurement 2020[a]	Market capacity for public procurement policy[b]	Public procurement policy scaling factor δ_{procur_OET}
Cluster 1: Low performance in public procurement & weaker market infrastructure			
BG	-5.3	Low	1
CY	-7.0	Low	1
AT	-5.7	Medium-low	1
EL	-6.3	Medium-low	1
MT	-3.0	Low	1
RO	-3.3	Medium-low	1
Cluster 2: Low performance in public procurement & moderate market infrastructure			
ES	-11.7	Medium-high	1.05
IT	-5.7	Medium-high	1.05
PT	-6.7	Medium-high	1.05
SK	-4.7	Medium-high	1.05
Cluster 3: Medium-low performance in public procurement & weaker market infrastructure			
SI	-3.0	Medium-low	1.1
LU	-2.0	Medium-low	1.1
BE	-1.7	Medium-low	1.1
EE	-1.0	Medium-low	1.1
Cluster 4: Medium-low performance in public procurement & medium-high market capacity			
CZ	-1.7	Medium-high	1.15
DE	-0.7	High	1.15
NL	-2.3	Medium-high	1.15
Cluster 5: Medium-high performance in public procurement & medium market capacity			
IE	2.7	Medium-low	1.2
DK	1.4	High	1.2
HR	1.7	Medium-low	1.2
HU	1.7	Medium-low	1.2
LT	1.0	Medium-low	1.2
PL	1.0	Medium-low	1.2
Cluster 6: High performance in public procurement & medium market capacity			
FR	3.0	Medium-high	1.25
LV	5.0	Medium-low	1.25
SE	5.0	Medium-low	1.25
FI	7.0	Medium-high	1.25

Performance in public procurement is given a greater weight in the scaling factor than the facilitating market capacity; Categories of market capacity for public procurement policy are derived qualitatively based on data and description of organic supply chain structures and trends (2017–2020) based on Le Douarin (2021).

Source: own compilation based on: [a] ECA (2023): https://public.tableau.com/app/profile/gti1940/viz/eca_dashboard/Story (accessed 30 July 2024); [b] Le Douarin (2021)

Table A12: Saturation level scaling factor for organic produce demand in logistic growth model for implementing Organic on Every Table scenario in 2030 organic area projections

EU Member State	Organic retail shares 2021[a]	Degresive con-sumption growth factor[b]	GDP per capita[c] 2020 (€/person)	GDP annual growth[c] 2013-23	Share of farms with zero or less than €2000[d] 2020	Moderating factor for purchasing power and subsistance[e]	Domestic demand factor[f] δ_{demand_OET}
Cluster 1: High market demand growth, constrained by consumer purchasing power and subsistence							
BG	1.0	**1.43**	6810	2.4%	37%	**0.85**	**1.21**
HU	0.3	**1.48**	12930	3.0%	38%	**0.85**	**1.26**
LT	1.0	**1.43**	14310	3.3%	39%	**0.85**	**1.21**
LV	1.5	**1.40**	11890	2.4%	52%	**0.85**	**1.19**
RO	0.2	**1.49**	9020	3.4%	72%	**0.85**	**1.26**
CY	0.8	**1.44**	24630	3.4%	47%	**0.85**	**1.22**
MT	0.3	**1.48**	22260	6.6%	60%	**0.85**	**1.26**
Cluster 2: Moderate to high market demand growth, moderate consumer purchasing power and subsistence							
CZ	1.6	**1.39**	17900	2.1%	13%	**0.90**	**1.25**
EE	5.0	**1.25**	15070	2.2%	25%	**0.90**	**1.12**
EL	0.3	**1.48**	16320	1.1%	28%	**0.90**	**1.33**
ES	2.5	**1.34**	22510	1.7%	18%	**0.90**	**1.21**
PT	2.0	**1.37**	16940	1.7%	33%	**0.90**	**1.23**
SK	2.0	**1.37**	15510	2.2%	19%	**0.90**	**1.23**
Cluster 3: Moderate to high market demand growth, moderate consumer purchasing power and subsistence (higher GDP growth)							
HR	2.2	**1.36**	12010	2.7%	27%	**0.95**	**1.29**
PL	0.7	**1.45**	13370	3.5%	27%	**0.95**	**1.38**
SI	1.8	**1.38**	19630	2.7%	22%	**0.95**	**1.31**
Cluster 4: Slower market demand growth (already high retail sales), high consumer purchasing power							
AT	11.3	**1.14**	35480	1.2%	4%	**1.00**	**1.14**
DE	7.0	**1.20**	35180	1.1%	1%	**1.00**	**1.20**
FI	2.5	**1.34**	35990	0.7%	1%	**1.00**	**1.34**
FR	6.6	**1.21**	30800	1.1%	6%	**1.00**	**1.21**
IT	3.9	**1.28**	24960	0.8%	10%	**1.00**	**1.28**
Cluster 5: Slower market demand growth (already high retail sales), high consumer purchasing power and higher GDP growth							
BE	3.8	**1.29**	33990	1.6%	1%	**1.15**	**1.48**
DK	13.0	**1.13**	47940	2.2%	8%	**1.15**	**1.30**
IE	2.7	**1.33**	63220	7.9%	7%	**1.15**	**1.53**
LU	11.0	**1.14**	82030	2.3%	2%	**1.15**	**1.32**
NL	4.4	**1.27**	40800	1.9%	1%	**1.15**	**1.46**
SE	8.9	**1.17**	42600	2.0%	4%	**1.15**	**1.34**

[b] The factor is derived from (a) to reflect asymmetric market maturation dynamics: countries with currently low organic demand are assumed to experience faster demand growth, while countries with already high organic demand exhibit slower growth; [d] Expressed in Standard Output; [e] The moderating factor is assigned values to captures shift and cross-country variation in the capacity to expand organic demand, accounting for differences in GDP per capita and its growth, and structural constraints related to the share of subsistence/semi-subsistence farms; [f] The final demand factor (δ_{demand_OET}) is computed as the product of the degressive consumption growth factor (b) and the moderating factor (e).

Source: own compilation based on: [a] Fibl Statistics; [c] Eurostat (code: nama_10_pc); [d] Eurostat (code: ef_m_org): https://ec.europa.eu/eurostat/databrowser/view/ef_m_org/ (accessed 27 October 2022)

Table A13: Saturation level scaling factor for organic produce demand in logistic growth model for implementing Organic on Every Table scenario in 2030 organic area projections

EU Member State	HHI food retailers 2017 [a]	4FCR food retailers 2017 [b]	Domestic supply factor (food retail) [c]	Organic vegetable processors [d] (2022)	Organic meat processors [d] (2022)	Domestic supply factor (processing) [e]	Domestic supply factor [f] δ_{supply_OET}
BG	587	37	1.00	0.52	0.02	1.00	1.00
EL	497	39	1.00	0.47	0.12	1.00	1.00
MT	n.a.	n.a.	1.00	n.a.	n.a.	1.00	1.00
RO	499	37	1.00	0.14	0.02	1.00	1.00
CY	n.a.	n.a.	1.00	1.01	0.17	1.05	1.05
HR	748	48	1.05	0.47	0.06	1.00	1.05
HU	779	46	1.05	0.61	0.07	1.00	1.05
PL	804	48	1.05	0.45	0.07	1.00	1.05
CZ	1247	45	1.10	0.48	0.44	1.00	1.10
EE	n.a.	n.a.	1.10	0.34	0.10	1.00	1.10
IE	1300	62	1.10	0.31	0.64	1.00	1.10
LT	1545	65	1.10	0.12	0.07	1.00	1.10
LV	1510	68	1.10	0.30	0.08	1.00	1.10
SI	1629	70	1.10	0.54	0.72	1.00	1.10
SK	1538	70	1.10	0.09	0.06	1.00	1.10
BE	994	29	1.00	2.58	1.16	1.15	1.15
FI	3272	94	1.15	0.35	0.23	1.00	1.15
IT	346	31	1.00	2.18	0.40	1.15	1.15
SE	2116	79	1.15	0.42	0.23	1.00	1.15
ES	654	41	1.05	1.49	0.28	1.10	1.16
PT	930	54	1.05	1.51	0.19	1.10	1.16
FR	679	46	1.05	2.37	3.61	1.15	1.21
DE	1273	70	1.10	n.a.	n.a.	1.10	1.21
LU	n.a.	n.a.	1.10	1.31	1.14	1.10	1.21
AT	1780	77	1.15	n.a.	n.a.	1.10	1.27
DK	1872	76	1.15	0.34	0.49	1.10	1.27
NL	1151	62	1.10	2.17	2.78	1.15	1.27

Countries are ordered in the level of δ_{supply_OET}; [a] Herfindahl–Hirschman Index for food retail concentration (HHI); [b] Four-Firm Concentration Rate (4FCR) in food retail; [c] The factor is derived from (a) and (b) to reflect the potential shift in organic food supply due to the capacity of the food retail sector; [d] Number of processors per 1000 ha UAA; [e] The factor is derived from (d) to reflect the potential shift in organic food supply due to the capacity of the organic produce processing; [f] The final supply factor (δ_{supply_OET}) is computed as the product of the factor (c) and the factor (e).

Source: own compilation based on: [a, b] Van Dam et al. (2021); [d] Eurostat (code: org_cpreact): https://ec.europa.eu/eurostat/databrowser/product/page/ORG_CPREACT (accessed 02 April 2025)

Table A14: Saturation level scaling factor for export of organic produce in logistic growth model for implementing Organic on Every Table scenario in 2030 organic area projections

Country clusters	EU Member States	Potential export impact on organic conversion	Scaling factor for export potential δ_{export_OET}	Description of export potential and organic land use change
Cluster 1: **Countries with low export intensity or extra-EU exporters**	SE, FI, MT	Low	1	FI & SE: Low agricultural export intensity and growth (2012-2022) MT: very low intra-EU trade
Cluster 2: **Extra-EU exporters, with niche product potential**	CY, IE	Low-moderate	1.05	Low share of intra-EU agricultural exports in total agricultural exports, but slightly growing agricultural exports.
Cluster 3: **Central and Eastern European Countries with emerging organic export potential**	CZ, LV, LT, EE, HU, PL, SK, HR	Moderate-low	1.10	Low but growing ag exports; lower LPI (developing trade infrastructure); Cereal-focused exports; Growing organic export potential (lower conversion cost)
Cluster 4: **Extra-EU importers and established agricultural export leaders with intensive agriculture**	NL, BE	Moderate-low	1.10	Very high intra-EU trade, high export intensity, however, high share of imported agricultural produce (for processing/ export); High organic imports, High costs of intensive systems' conversion.
Cluster 5: **Cereal exporters with fast growing organic export potential**	RO, BG	Moderate	1.15	Large share of cereals in export portfolio – potential for exports of organic cereal (incl. organic feed stuff); Low labour cost; High agricultural export growth (2012-2022).
Cluster 6: **Emerging organic exporters in specialised crops**	ES, PT, EL	Moderate-high	1.20	Growing ag exports; Important role of vegetables and fruit in ag exports (incl. processed/preserved foods).
Cluster 7: **Established, diversified agricultural exporters**	LU, DE, DK, AT, SI	High-moderate	1.25	Moderate to high ag export intensity; High share of EU-intra trade; Increase of horticulture and arable crops in organic produce portfolio.
Cluster 8: **Countries with mature organic market infrastructure; processed and specialised organic product export potential**	FR, IT	High	1.30	High export potential in large spectrum of products (incl. specialised crops and processed/preserved products); High LPI.

See Table A15 for accompanying statistics. The values of the scaling parameter were assugned qualitatively and subjected to sensitivity analysis.

Source: Own compilation

Table A15: Data and variables applied in organic export potential analysis

EU Member State	Ag export intensity [a] (1000 EUR/ha UAA) 2020	Share intra-EU exports in total ag exports [b] 2020	Ag export growth [c] 2012-2022	Average labor cost (annual) [d] 2020	Logistic performance index [e] 2022	Export potential factor [f] δ_{export_OET}
FI	0.69	0.76	1.01	55.0	4.2	1
SE	1.75	0.82	1.59	62.4	4	1
MT	10.97	0.05	1.20	24.0	3.3	1
CY	4.33	0.40	2.10	29.0	3.2	1.05
IE	2.80	0.36	1.84	55.1	3.6	1.05
BE	33.73	0.74	1.64	56.5	4	1.1
NL	46.85	0.73	1.61	62.2	4.1	1.1
CZ	2.59	0.90	1.85	24.3	3.3	1.1
EE	1.50	0.72	1.68	24.3	3.6	1.1
HU	1.91	0.82	1.63	17.2	3.2	1.1
HR	1.76	0.64	2.85	20.1	3.3	1.1
LT	1.74	0.63	1.80	17.4	3.4	1.1
LV	1.58	0.72	2.14	17.8	3.5	1.1
PL	2.71	0.72	2.64	18.2	3.6	1.1
SK	2.19	0.94	1.36	21.3	3.3	1.1
BG	1.21	0.51	2.45	10.9	3.2	1.15
RO	0.57	0.47	2.69	14.3	3.2	1.15
EL	1.64	0.71	1.66	22.7	3.7	1.2
ES	2.16	0.71	1.80	36.5	3.9	1.2
PT	1.48	0.75	1.78	25.2	3.4	1.2
AT	4.46	0.84	1.68	59.7	4	1.25
DE	4.63	0.76	1.42	59.0	4.1	1.25
DK	5.67	0.63	1.18	69.8	4.1	1.25
LU	10.36	0.96	1.57	71.8	3.6	1.25
SI	6.56	0.75	2.03	31.5	3.3	1.25
FR	1.89	0.66	1.44	57.7	3.9	1.3
IT	3.44	0.64	1.81	43.8	3.7	1.3

[a] Without fish (intra-EU agricultural export); The analysis also considered changes in agricultural product portfolio (Schaack et al., 2025)[g] and organic product import intensity (import volume of organic produce per 1000 ha UAA) (EC, 2024)[h].

Source: own compilation based on: [a, b] Eurostat (code: ds-059331): https://ec.europa.eu/eurostat/databrowser/product/page/ds-059331 (accessed 18 May 2025); [c] EC (Data Explorer; code: IMP_06 EU ag trade): https://agriculture.ec.europa.eu/data-and-analysis/markets/trade-data/trade-countryregion/trade-value_en; [d] Eurostat (code: lc_ncostot_r2): https://ec.europa.eu/eurostat/databrowser/product/page/lc_ncostot_r2 (accessed 08 November 2023); [e] World Bank (2023); [g] Schaack D et al. (2025) AMI Markt Bilanz. Öko-Landbau 2025: Daten, Fakten, Entwicklungen, Deutschland, EU, Welt. Agrarmarkt Informations-Gesellschaft mbH; [h] EC (2024) EU imports of organic agri-food products, Key developments in 2023, July 2024. European Commission, DG Agriculture and Rural Development, Brussels.

A7 CAPRI results

Table A16: EU Member State level changes in agricultural income (€) between OrganicTargets4EU scenarios relative to CAPRI Baseline (%)

Scenarios	BAU	GPP	OET	DPW
Austria	-1.06%	-2.08%	-2.16%	-2.14%
Belgium	-0.51%	-2.09%	-2.39%	-2.97%
Bulgaria	-0.47%	-2.72%	-2.62%	-1.19%
Croatia	-0.25%	-1.23%	-2.41%	-0.31%
Cyprus	-0.32%	-0.73%	-0.49%	-0.39%
Czechia	-0.96%	-1.32%	-2.48%	-1.34%
Denmark	-1.54%	-4.04%	-3.52%	-4.40%
Estonia	-0.10%	0.05%	0.11%	0.05%
Finland	-0.58%	-0.89%	-1.76%	-0.94%
France	-1.09%	-2.89%	-2.73%	-3.40%
Germany	-1.58%	-2.79%	-2.31%	-2.89%
Greece	-1.55%	-1.74%	-1.40%	-1.83%
Hungary	-0.70%	-2.31%	-2.72%	-0.75%
Ireland	-0.05%	-1.00%	-0.92%	-1.07%
Italy	-0.31%	-1.53%	-1.31%	-1.59%
Latvia	-2.82%	-3.26%	-4.08%	-3.28%
Lithuania	-0.81%	-2.10%	-3.17%	-1.11%
Malta	4.14%	3.47%	3.76%	3.81%
Netherlands	-0.30%	-1.99%	-2.15%	-2.77%
Poland	-0.94%	-2.04%	-2.01%	-1.68%
Portugal	-0.56%	-0.60%	-0.52%	-0.63%
Romania	-0.53%	-1.48%	-1.53%	-0.90%
Slovak Republic	-1.32%	-3.65%	-5.28%	-3.79%
Slovenia	-0.13%	-1.61%	-2.90%	-0.78%
Spain	-0.33%	-2.40%	-1.71%	-2.35%
Sweden	-0.26%	-0.53%	-0.83%	-0.56%
EU27	-0.77%	-2.21%	-2.05%	-2.30%

BAU=Business as Usual, GPP=Green Public Policy, OET=Organic on Every Table, DPW=Divergent Pathways

Source: own compilation

Table A17: Total area of organic farmland in the CAPRI model (1000 ha) in CAPRI Baseline and OT4EU scenarios

Scenarios	BS_CAPRI	GPP	OET	DPW
Austria	993.02	1079.89	1087.93	1089.99
Bulgaria	188.40	703.62	623.01	535.70
Belgium	121.51	281.37	297.37	344.71
Luxembourg	7.89	25.90	22.33	26.55
Cyprus	5.85	16.75	13.23	10.69
Czechia	821.50	890.54	1240.85	898.82
Germany	2116.36	4236.94	4405.38	4340.73
Denmark	441.36	804.84	822.98	919.30
Estonia	329.88	309.98	355.20	311.90
Greece	345.30	1174.72	1148.44	1223.66
Spain	2806.80	8058.07	7187.43	8393.92
Finland	372.35	474.84	576.16	481.04
France	3515.83	7658.48	7375.07	8371.96
Croatia	156.52	278.04	364.52	234.55
Hungary	425.77	1054.77	1127.51	746.16
Ireland	99.17	465.14	445.12	490.47
Italy	2903.28	5391.46	5301.21	5512.44
Lithuania	361.74	632.21	778.47	508.55
Latvia	466.41	476.53	687.11	480.31
Malta	0.08	0.57	0.44	0.45
Netherlands	103.58	343.93	319.53	385.95
Poland	649.19	1935.92	1983.30	1411.74
Portugal	276.40	791.83	860.18	819.99
Romania	481.02	1799.31	1645.20	1397.85
Sweden	899.64	990.00	1047.38	999.34
Slovenia	89.60	113.91	156.40	94.42
Slovakia	270.96	444.65	528.71	453.03
EU27	19249.39	40434.21	40400.46	40484.25

BS_CAPRI=Baseline, GPP=Green Public Policy, OET=Organic on Every Table, DPW=Divergent Pathways

Source: own compilation

Table A18: Total income from all agricultural activities in CAPRI Baseline and OrganicTargets4EU scenarios (million €)

Scenarios	BS_CAPRI	GPP	OET	DPW
Austria	5797.41	5671.46	5661.91	5667.68
Bulgaria	4223.94	4109.03	4113.46	4173.8
Belgium	5471.17	5344.96	5329.47	5298.96
Luxembourg	332.78	321.02	322.84	320.46
Cyprus	-530.54	-532.76	-531.5	-530.68
Czechia	3885.17	3832.61	3787.38	3831.94
Germany	37128.68	36004.29	36178.7	35968
Denmark	6645.03	6352.78	6387.47	6329.26
Estonia	696.87	696.71	697.16	696.74
Greece	7817.84	7677.54	7704.34	7670.56
Spain	44943.12	43712.96	44092.92	43649.21
Finland	2859.9	2827.32	2804.21	2826.26
France	50453.88	48977.41	49052.21	48701.08
Croatia	1404.79	1386.44	1369.82	1399.39
Hungary	6698.06	6540.47	6512.62	6644.91
Ireland	6913.24	6836.92	6842.01	6831.62
Italy	39798.11	39136.4	39220.49	39108.34
Lithuania	1721.99	1684.9	1666.44	1701.97
Latvia	939.07	908.05	900.37	907.9
Malta	12.85	13.26	13.3	13.31
Netherlands	24051.35	23539.08	23498.84	23352.03
Poland	18948.82	18538.03	18543.85	18606.18
Portugal	5364.6	5325.61	5329.88	5323.92
Romania	11848.27	11672.19	11665.68	11740.05
Sweden	2879.93	2859.64	2850.83	2858.64
Slovenia	915.84	900.01	888.22	907.66
Slovakia	1468.06	1413.51	1389.66	1411.48
EU27	292361.7	285433.4	285974.4	285094.5

BS_CAPRI=Baseline, GPP=Green Public Policy, OET=Organic on Every Table, DPW=Divergent Pathways

Source: own compilation

Table A19: Change in primary agricultural output per additional hectare of organic farmland (1000€/ha)

Scenario	GPP	OET	DPW
Austria	-3.12	-2.71	-2.89
Bulgaria	-0.34	-0.38	-0.28
Belgium	-2.08	-1.83	-1.74
Luxembourg	-1.38	-1.45	-1.38
Cyprus	0.06	0.18	0.42
Czechia	-4.56	-1.25	-4.13
Germany	-1.55	-1.23	-1.54
Denmark	-1.99	-1.69	-1.66
Estonia	2.15	-2.05	2.40
Greece	-0.21	-0.19	-0.20
Spain	-0.44	-0.38	-0.45
Finland	-0.36	-0.36	-0.35
France	-0.75	-0.74	-0.74
Croatia	-0.17	-0.18	-0.13
Hungary	-0.54	-0.55	-0.43
Ireland	-0.50	-0.48	-0.50
Italy	-0.46	-0.48	-0.46
Lithuania	-0.20	-0.21	-0.20
Latvia	-7.06	-0.53	-5.21
Malta	0.04	0.06	0.00
Netherlands	-3.73	-4.27	-4.09
Poland	-0.79	-0.74	-1.13
Portugal	-0.18	-0.19	-0.18
Romania	-0.25	-0.28	-0.23
Sweden	-0.43	-0.35	-0.42
Slovenia	-1.37	-0.99	-3.78
Slovakia	-0.76	-0.75	-0.75
EU27	-0.72	-0.67	-0.75

GPP=Green Public Policy, OET=Organic on Every Table, DPW=Divergent Pathways

Source: own compilation

Table A20: Change in agricultural income per additional hectare of organic farmland (€/ha)

Scenario	GPP	OET	DPW
Austria	-1449.9	-1427.7	-1337.8
Bulgaria	-223.0	-254.2	-144.4
Belgium	-789.5	-805.7	-771.5
Luxembourg	-652.8	-688.4	-660.1
Cyprus	-203.7	-130.0	-28.9
Czechia	-761.3	-233.2	-688.5
Germany	-530.2	-415.0	-521.8
Denmark	-804.0	-674.9	-660.7
Estonia	8.0	11.5	7.2
Greece	-169.2	-141.3	-167.7
Spain	-234.3	-194.1	-231.6
Finland	-317.9	-273.3	-309.5
France	-356.4	-363.2	-360.9
Croatia	-151.0	-168.1	-69.2
Hungary	-250.5	-264.3	-165.9
Ireland	-208.5	-205.9	-208.6
Italy	-265.9	-240.9	-264.4
Lithuania	-137.1	-133.3	-136.4
Latvia	-3064.1	-175.3	-2241.7
Malta	825.8	1246.2	1232.3
Netherlands	-2131.3	-2558.4	-2476.6
Poland	-319.3	-303.5	-449.3
Portugal	-75.6	-59.5	-74.8
Romania	-133.6	-156.8	-118.0
Sweden	-224.6	-197.0	-213.5
Slovenia	-651.2	-413.5	-1699.0
Slovakia	-314.1	-304.2	-310.8
EU27	-327.0	-302.0	-342.2

GPP=Green Public Policy, OET=Organic on Every Table, DPW=Divergent Pathways

Source: own compilation

Table A21: Nitrogen Surplus in CAPRI Baseline and OrganicTargets4EU scenarios (1000t)

Scenario	BS_CAPRI	GPP	OET	DPW
Austria	126.9	116.95	115.3	116.37
Bulgaria	179.13	155.74	157.3	168.06
Belgium	313.26	288.12	287.35	281.65
Luxembourg	17.62	14.03	16.59	15.99
Cyprus	30.6	29.77	30	30.16
Czechia	114.08	107.75	103.97	107.68
Germany	1041.02	813.91	833.96	806.74
Denmark	462.17	428.1	433.79	425.76
Estonia	45.07	46.52	46.67	46.53
Greece	310.46	292.89	294.06	291.94
Spain	1385.15	1168.1	1212.16	1173.98
Finland	147.66	139.71	132.91	139.26
France	2309.53	2028.36	2055.92	2003.38
Croatia	129.29	123.48	119.54	126.05
Hungary	286.17	262.77	258.8	280.41
Ireland	655.14	621.8	625	619.66
Italy	1056.15	963.72	969.24	961.02
Lithuania	147.64	143.71	138.94	148
Latvia	67.22	67.96	68.17	67.96
Malta	2.84	2.81	2.81	2.81
Netherlands	597.42	549.36	560.3	551.47
Poland	1067.73	966.14	963.68	1002.42
Portugal	188.54	177.45	177.43	176.95
Romania	262.14	228.73	227.99	242.63
Sweden	244.21	238.83	235.08	238.2
Slovenia	72.8	68.84	65.54	70.99
Slovakia	92.04	82.82	79.41	82.34
EU27	11351.98	10128.38	10211.88	10178.42

BS_CAPRI=Baseline, GPP=Green Public Policy, OET=Organic on Every Table, DPW=Divergent Pathways

Source: own compilation

Table A22: Global Warming Potential from agriculture in CAPRI Baseline and OrganicTargets4EU scenarios (1000t CO_2e)

Scenario	BS_CAPRI	GPP	OET	DPW
Austria	6936.07	6644.18	6645.32	6633.38
Bulgaria	5953.97	5674.88	5700.52	5817.31
Belgium	8906.75	8508.67	8518.37	8438.5
Luxembourg	835.86	764.67	808.42	799.54
Cyprus	582.05	577.45	578.83	579.87
Czechia	6111.71	5853.28	5703.99	5850.07
Germany	67940.84	63265.26	63890.91	63046.37
Denmark	13950.51	13183.74	13279.42	13122.89
Estonia	1834.4	1871.6	1875.08	1871.75
Greece	7579.71	7429.81	7443.17	7423.89
Spain	36302.89	33126.04	34010.86	33161.16
Finland	5863.25	5853.84	5823.67	5850.78
France	75334.08	70953	71509.32	70666.34
Croatia	3180.78	3133.18	3100.7	3153.63
Hungary	7205.62	6874.83	6821.83	7095.48
Ireland	31530.32	30789.12	30866.4	30743.22
Italy	29448.96	28234.84	28335.83	28181.22
Lithuania	4557.83	4514.29	4469.12	4553.81
Latvia	3036.63	3075.38	3089.29	3075.73
Malta	59.51	59.26	59.31	59.31
Netherlands	20616.46	19961.22	20120.28	20008.29
Poland	33711.21	32177.36	32170.56	32617.79
Portugal	7842.28	7622.72	7623.2	7612.14
Romania	14923.44	14528.17	14515.03	14701.79
Sweden	7740.93	7697.39	7671.46	7692.19
Slovenia	1449.19	1387.79	1339.04	1417.29
Slovakia	2453.14	2333.18	2278.36	2327.74
EU27	405888.4	386095.1	388248.3	386501.5

BS_CAPRI=Baseline, GPP=Green Public Policy, OET=Organic on Every Table, DPW=Divergent Pathways

Source: own compilation

Table A23: GHG Emissions from agricultural input industries in CAPRI Baseline and OrganicTargets4EU scenarios (1000t CO_2e)

Scenario	BS_CAPRI	GPP	OET	DPW
Austria	630.7682	612.1913	528.1707	609.0062
Bulgaria	773.7939	676.9657	667.0632	636.6103
Belgium	67.45998	56.99745	59.15001	56.77837
Luxembourg	2114.388	1871.178	1884.887	1995.91
Cyprus	51.52953	47.71171	48.98525	49.99403
Czechia	1073.305	863.9984	780.3779	862.2659
Germany	8467.012	7189.292	6902.307	7122.536
Denmark	1285.188	1081.344	1068.222	1013.237
Estonia	247.5748	223.7555	218.817	223.57
Greece	1171.73	1007.848	1027.24	998.985
Spain	5772.74	4418.419	4740.742	4426.819
Finland	758.7956	714.8223	669.3843	712.0336
France	11014.87	9309.722	9302.566	8856.452
Croatia	513.2992	465.726	430.7247	488.3915
Hungary	2540.651	2203.038	2154.121	2417.77
Ireland	2053.875	1895.779	1907.45	1884.64
Italy	3032.933	2362.838	2424.306	2328.84
Lithuania	1072.888	970.9386	911.3799	1024.134
Latvia	455.6634	396.7851	362.4105	396.0307
Malta	3.456894	3.31774	3.361436	3.365823
Netherlands	1115.308	978.728	985.555	942.5375
Poland	6441.647	5822.054	5778.822	6128.42
Portugal	420.0262	362.2746	360.8685	359.0171
Romania	2923.238	2571.224	2560.327	2713.562
Sweden	1113.744	1072.979	1046.357	1068.703
Slovenia	162.8962	155.3945	133.4731	161.8178
Slovakia	704.2045	617.7079	577.9819	614.2416
EU27	55915.52	47896.03	47475.9	48038.89

BS_CAPRI=Baseline, GPP=Green Public Policy, OET=Organic on Every Table, DPW=Divergent Pathways

Source: own compilation

Table A24: Change in Global Warming Potential per additional hectare of organic farmland (kg CO_2e/ha)

Scenario	GPP	OET	DPW
Austria	-3360.06	-3063.49	-3121.44
Bulgaria	-541.69	-583.17	-393.49
Belgium	-2490.07	-2208.45	-2097.84
Luxembourg	-3951.70	-1900.49	-1945.99
Cyprus	-422.09	-435.97	-450.11
Czechia	-3743.29	-972.28	-3384.08
Germany	-2204.86	-1769.29	-2200.39
Denmark	-2109.50	-1758.52	-1731.62
Estonia	-1869.92	1606.23	-2077.84
Greece	-180.73	-170.01	-177.40
Spain	-604.97	-523.22	-562.32
Finland	-91.82	-194.20	-114.73
France	-1057.56	-991.06	-961.20
Croatia	-391.71	-385.00	-347.92
Hungary	-525.90	-546.91	-343.77
Ireland	-2025.33	-1919.12	-2011.48
Italy	-487.95	-464.20	-485.88
Lithuania	-160.98	-212.87	-27.38
Latvia	3827.63	238.60	2811.97
Malta	-503.55	-553.89	-535.78
Netherlands	-2726.19	-2297.61	-2153.77
Poland	-1192.05	-1154.81	-1433.88
Portugal	-425.97	-375.27	-423.37
Romania	-299.84	-350.81	-241.76
Sweden	-481.88	-470.21	-488.88
Slovenia	-2525.82	-1648.98	-6625.58
Slovakia	-690.65	-678.09	-688.74
EU27	-934.31	-834.01	-912.98

GPP=Green Public Policy, OET=Organic on Every Table, DPW=Divergent Pathways

Source: own compilation

Table A25: GHG reduction per unit of income loss from organic conversion (kg CO_2e/€)

Scenarios	GPP	OET	DPW
Austria	2.32	2.15	2.33
Bulgaria	2.43	2.29	2.73
Belgium	3.15	2.74	2.72
Luxembourg	6.05	2.76	2.95
Cyprus	2.07	3.35	15.57
Czechia	4.92	4.17	4.92
Germany	4.16	4.26	4.22
Denmark	2.62	2.61	2.62
Estonia	-232.50	140.28	-287.31
Greece	1.07	1.20	1.06
Spain	2.58	2.70	2.43
Finland	0.29	0.71	0.37
France	2.97	2.73	2.66
Croatia	2.59	2.29	5.03
Hungary	2.10	2.07	2.07
Ireland	9.71	9.32	9.64
Italy	1.83	1.93	1.84
Lithuania	1.17	1.60	0.20
Latvia	-1.25	-1.36	-1.25
Malta	-0.61	-0.44	-0.43
Netherlands	1.28	0.90	0.87
Poland	3.73	3.80	3.19
Portugal	5.63	6.31	5.66
Romania	2.24	2.24	2.05
Sweden	2.15	2.39	2.29
Slovenia	3.88	3.99	3.90
Slovakia	2.20	2.23	2.22
EU27	2.86	2.76	2.67

GPP=Green Public Policy, OET=Organic on Every Table, DPW=Divergent Pathways

Source: own compilation

Table A26: Biodiversity friendly farming practice index (BFPI) in CAPRI Baseline and OrganicTargets4EU scenarios

Scenarios	BS_CAPRI	GPP	OET	DPW
Austria	0.5889	0.6073	0.6186	0.6085
Bulgaria	0.6198	0.6388	0.6376	0.6325
Belgium	0.3995	0.4248	0.4213	0.4272
Luxembourg	0.4782	0.5529	0.5394	0.5541
Cyprus	0.2625	0.2562	0.2557	0.2547
Czechia	0.6586	0.6730	0.6833	0.6733
Germany	0.4111	0.4234	0.4267	0.4243
Denmark	0.4193	0.4961	0.4957	0.5113
Estonia	0.6509	0.6535	0.6558	0.6536
Greece	0.7317	0.7485	0.7508	0.7493
Spain	0.6656	0.7009	0.7002	0.7112
Finland	0.5612	0.5706	0.5793	0.5712
France	0.5902	0.6316	0.6297	0.6398
Croatia	0.6863	0.7041	0.7156	0.6975
Hungary	0.6185	0.6446	0.6470	0.6293
Ireland	0.7621	0.7710	0.7701	0.7715
Italy	0.6157	0.6573	0.6634	0.6594
Lithuania	0.6447	0.6581	0.6643	0.6529
Latvia	0.6275	0.6344	0.6402	0.6345
Malta	0.3332	0.3430	0.3418	0.3438
Netherlands	0.3674	0.3851	0.3823	0.3868
Poland	0.5233	0.5555	0.5556	0.5465
Portugal	0.7507	0.7660	0.7733	0.7669
Romania	0.7058	0.7172	0.7168	0.7126
Sweden	0.6437	0.6469	0.6492	0.6474
Slovenia	0.5762	0.5944	0.6129	0.5859
Slovakia	0.6237	0.6424	0.6502	0.6431
EU27	0.6026	0.6293	0.6309	0.6309

BS_CAPRI=Baseline, GPP=Green Public Policy, OET=Organic on Every Table, DPW=Divergent Pathways

Source: own compilation

Table A27: Percentage change in the Biodiversity Friendly Farming Practice Index (BFPI) per percentage point change in the organic farmland share

Scenario	GPP	OET	DPW
Austria	0.961	1.297	0.918
Bulgaria	0.300	0.332	0.300
Belgium	0.520	0.409	0.409
Luxembourg	1.070	1.090	1.049
Cyprus	0.152	0.193	0.200
Czechia	1.148	0.338	1.049
Germany	0.218	0.255	0.223
Denmark	1.338	1.268	1.218
Estonia	-0.210	0.314	-0.241
Greece	0.164	0.199	0.162
Spain	0.249	0.294	0.304
Finland	0.317	0.311	0.319
France	0.486	0.497	0.497
Croatia	0.323	0.311	0.317
Hungary	0.364	0.356	0.297
Ireland	0.149	0.140	0.147
Italy	0.369	0.440	0.370
Lithuania	0.246	0.233	0.274
Latvia	2.242	0.190	1.663
Malta	0.645	0.780	0.934
Netherlands	0.369	0.335	0.336
Poland	0.673	0.652	0.816
Portugal	0.138	0.182	0.139
Romania	0.163	0.179	0.140
Sweden	0.176	0.184	0.181
Slovenia	0.686	0.496	1.839
Slovakia	0.329	0.314	0.326
EU27	0.341	0.362	0.361

GPP=Green Public Policy, OET=Organic on Every Table, DPW=Divergent Pathways

Source: own compilation

PROJECT COORDINATOR
Ambra De Simone
R&I Associate Manager | IFOAM Organics Europe
ambra.desimone@organicseurope.bio