

Design of agricultural policy 2:

A Food-Security-Sensitive Bioeconomy Transition

Policy brief

Deliverable 4 within project:

FOODAGRI

Food security and sustainability of agricultural production: the role of institutions and policies

Nitra, August 2026

A Food-Security-Sensitive Bioeconomy Transition

Policy brief for Central and Eastern Europe

The bioeconomy transition offers Central and Eastern Europe (CEE) opportunities to strengthen sustainability, resource efficiency, innovation, and rural development. It may also increase competition for land, biomass, and other agricultural resources, with implications for food security.

0.07–0.28 young-to-older manager ratio	74.7–111.7 2022 food production index	68.8–77.7 overall food-security score
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WHY IT MATTERS

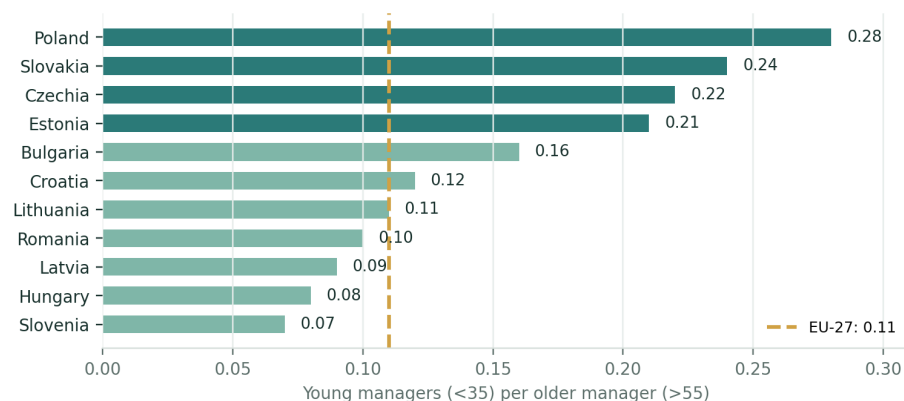
The impacts of bioeconomy transition will differ across CEE countries and regions because of varying farm structures, uneven institutional capacity, and different levels of readiness for the bioeconomy.

EU Bioeconomy Strategy Promotes renewable resources, food security, sustainability, climate action, and competitiveness.	Common Agricultural Policy Turns bioeconomy objectives into farm practices via support, policies, and regulations.	BIOEAST cooperation Provides a platform for coordinating bioeconomy research, innovation, and policy.
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Policy Context

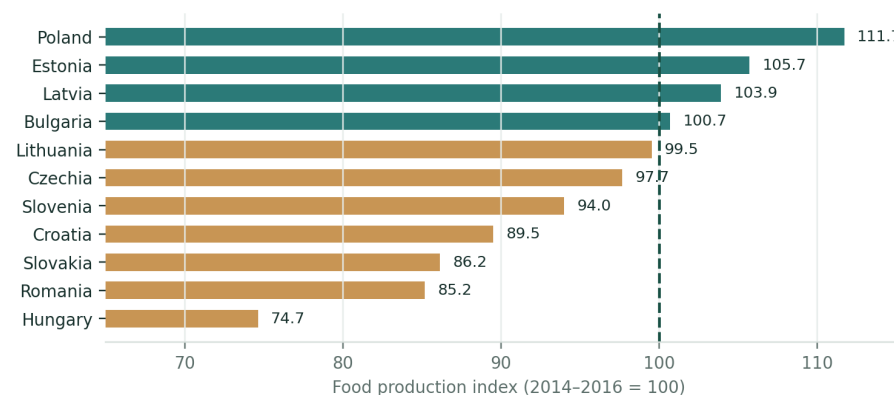
Different starting conditions require differentiated policy

The indicators are complementary snapshots of generational renewal, food production and food security.



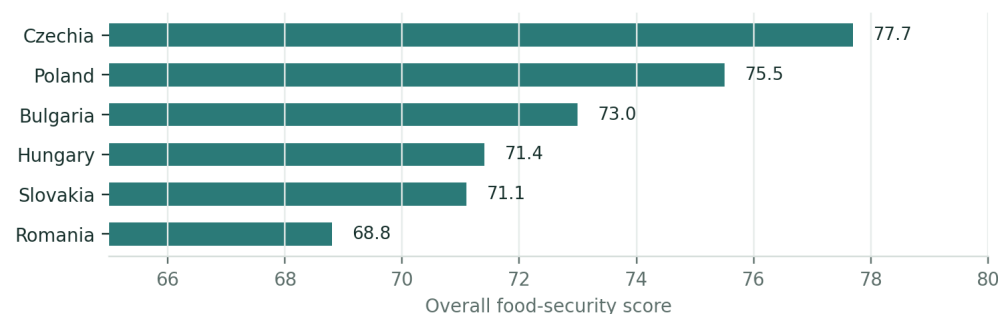
Generational renewal remains weak

EU-27 reference 0.11. Source: European Commission (2026).



Food-production trends diverge

Four countries were at or above the 2014–2016 baseline. Source: World Bank (2026).



Food-security performance varies

Czechia led the six-country group; Romania recorded the lowest score. Source: Statbase (2026).

CEE has no single optimal bioeconomy transition trajectory.

CEE countries have differing ageing and related innovation potential, unequal capacity to absorb new biomass demand, varying institutional capacity.

Different CEE countries and farm structures require different policies and regulations.

The way forward

Sustainable technologies, precision farming, circular practices, and diversified bio-based activities can increase productivity, reduce resource pressures, strengthen supply chains, and create new rural income opportunities.

The key risk is an uneven transition that prioritizes biomass expansion over food security, environmental sustainability, and rural inclusion.

A successful transition requires coordination across agriculture, energy, environment, research, industry, and rural development. CAP Strategic Plans, national bioeconomy strategies, BIOEAST, advisory services, and innovation policies should be aligned around food security, sustainability, and resilience.

Policy should support sustainable productivity, resource-efficient technologies, soil and water protection, local processing, and diversified rural incomes, while ensuring that smaller farms and less-developed regions can participate in emerging value chains. Monitoring should track not only bio-based output, but also land use, food production, input dependence, food prices, rural employment, and household vulnerability.

The CEE bioeconomy transition should be food-security-sensitive, territorially differentiated, and socially inclusive, creating value from biological resources without undermining food availability, affordability, or environmental sustainability.

MONITORING DASHBOARD

Resources

Land use; soil and water; biomass sourcing; input and energy dependence.

Food security

Food production; prices; affordability; availability; climate resilience; household vulnerability.

Inclusion & value

Rural jobs; participation by farm size; local processing; advisory and rural services access; generational renewal.

Sources: European Commission (2026); World Bank (2026); Statbase (2026). Policy context: EU Bioeconomy Strategy, CAP and BIOEAST. Prepared within the project Food Security and Sustainability of Agricultural Production: The Role of Institutions and Policies.

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Why the Bioeconomy Transition Matters in CEE?

By Pokrivčák, Ján; Bojnec, Štefan; Tóth, Marián

The bioeconomy transition offers Central and Eastern Europe (CEE) opportunities to strengthen sustainability, resource efficiency, innovation, and rural development. However, it may also increase competition for land, biomass, and other agricultural resources, with implications for food security. These trade-offs are particularly important in CEE countries, where agricultural potential coexists with diverse farm structures, uneven institutional capacity, and different levels of readiness for the bioeconomy. The impacts will therefore differ across CEE countries and regions.

Policy Context

The policy context is shaped by the interaction of EU-level strategies, agricultural policy instruments, and macro-regional coordination initiatives. Rather than emerging as a single policy field, the bioeconomy is embedded in broader agendas for climate neutrality, circular resource use, rural innovation, and food-system resilience.

EU Bioeconomy Strategy

The EU Bioeconomy Strategy promotes the use of renewable biological resources while linking economic development with environmental sustainability and climate objectives. For CEE, it provides opportunities to strengthen bio-based industries, rural innovation, resource efficiency, and value creation. However, greater biomass use must be balanced against food production and environmental constraints.

Common Agricultural Policy

The CAP is a key instrument for translating sustainability and bioeconomy objectives into agricultural practice. Income support, eco-schemes, rural development measures, investment support, and national Strategic Plans can encourage sustainable production, innovation, farm resilience, and participation in emerging bio-based value chains.

However, outcomes depend on national implementation and farm-level access to finance, technology, knowledge, and advisory services. CAP measures should therefore be designed to reflect the structural diversity of CEE agriculture.

BIOEAST and Regional Cooperation

BIOEAST provides a CEE platform for coordinating bioeconomy research, innovation, and policy. It promotes research capacity, rural diversification, cross-sector cooperation, and place-based innovation. Living labs, research infrastructures, and stronger links among researchers, farmers, businesses, and policymakers can help translate these priorities into practice.

What the Evidence Tells Us

The available indicators demonstrate that CEE countries face very different starting conditions.

Generational renewal remains a challenge. The ratio of young farm managers to older managers is below one in all countries examined. The ratio is particularly low in Slovenia, Hungary, Latvia, Romania, and Croatia, while Poland, Slovakia, and Czechia perform relatively better. An ageing

agricultural workforce can constrain innovation adoption, farm succession, and adaptation to new bioeconomy opportunities.

Table 1: Ratio of young farm managers less than 35 years old to elderly farm managers more than 55 years old in 2020

	Ratio
Bulgaria	0.16
Czechia	0.22
Estonia	0.21
Croatia	0.12
Latvia	0.09
Lithuania	0.11
Hungary	0.08
Poland	0.28
Romania	0.10
Slovenia	0.07
Slovakia	0.24
EU-27	0.11

Source: Compiled by authors based on European Commission (2026).

Food production trends are uneven. In 2022, Poland, Estonia, Latvia, and Bulgaria were at or above the 2014–2016 food production baseline, while Hungary, Romania, Slovakia, Croatia, Slovenia, and Czechia remained below it. This suggests that the potential food-security implications of bioeconomy development differ substantially across countries.

Table 2: Food production index in selected CEE countries, 1993, 2004 and 2022 (2014–2016 = 100)

	1993	2004	2022
Bulgaria	102.37	95.53	100.70
Czechia	125.48	107.84	97.66
Estonia	103.34	72.74	105.70
Croatia	79.21	79.13	89.50
Hungary	87.62	108.48	74.66
Lithuania	95.72	76.60	99.53
Latvia	117.07	66.24	103.90
Poland	105.84	94.52	111.70
Romania	100.10	112.31	85.18
Slovakia	138.03	116.25	86.15
Slovenia	105.2	119.31	94.00

Source: Compiled by authors based on World Bank (2026).

Food-security performance also varies. In 2022, Czechia had the highest overall food-security score among the six countries shown, followed by Poland and Bulgaria. Romania had the lowest score and particularly weak sustainability and adaptation performance. Slovakia performed relatively well on affordability but considerably weaker on availability and sustainability/adaptation.

Table 3: Food security index, 2022

Country	Score changes 2022 vs. 2012	Overall score	Affordability	Availability	Quality and Safety	Sustainability and Adaptation
Czechia	+5.4	77.7	91.3	69.4	76.3	70.3
Poland	+7.0	75.5	87.4	63.8	81.5	66.7
Bulgaria	+9.5	73.0	85.8	66.5	79.5	56.6
Hungary	+5.3	71.4	86.7	63.3	74.4	57.0
Slovakia	+6.9	71.1	89.1	55.3	77.9	57.6
Romania	+5.8	68.8	85.1	60.6	77.9	47.1

Source: Compiled by authors based on Statbase (2026).

Taken together, these indicators show that **CEE countries does not have a single bioeconomy or food-security trajectory**. Policy should therefore be differentiated according to national and regional conditions.

Conclusion

Key opportunities and risks

Sustainable technologies, precision farming, circular practices, and diversified bio-based activities can increase productivity, reduce resource pressures, strengthen supply chains, and create new rural income opportunities. However, competition for agricultural resources, market volatility, climate risks, and unequal access to finance and technology may disproportionately affect smaller farms and less-developed regions.

The key risk is therefore not bioeconomy development itself, but an uneven transition that prioritizes biomass expansion over food security, environmental sustainability, and rural inclusion.

Governance and policy priorities

A successful transition requires stronger coordination across agriculture, energy, environment, research, industry, and rural development. CAP Strategic Plans, national bioeconomy strategies, BIOEAST, advisory services, and innovation policies should be aligned around food security, sustainability, and resilience.

Policy should support sustainable productivity, resource-efficient technologies, soil and water protection, local processing, and diversified rural incomes, while ensuring that smaller farms and less-developed regions can participate in emerging value chains. Monitoring should track not only bio-based output, but also land use, food production, input dependence, food prices, rural employment, and household vulnerability.

Overall, the CEE bioeconomy transition should be food-security-sensitive, territorially differentiated, and socially inclusive, creating value from biological resources without undermining food availability, affordability, or environmental sustainability.

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