

Report on crop protection in Romania (2000–2026). Current situation and future prospects

Romania's crop protection sector has undergone major changes since 2000, driven by the EU accession (2007), modernization of agriculture, stricter pesticide regulations, and increasing pressure from climate change.

1. Overview of Romanian agriculture and crop protection

Romania has one of the largest agricultural areas in the EU, with major crops including wheat, maize (Romania ranked first in the EU for maize cultivated area in 2024), sunflower (the largest EU member state in sunflower cultivated area in 2024) or rapeseed (that expanded rapidly after the Romania's EU accession) (Table 1).

Table 1. Area and production in Romania in comparison with the EU averages.

Year	Wheat				Corn			
	Area (million ha)	Production (million t)	Share of EU Area (%)	Share of EU Production (%)	Area (million ha)	Production (million t)	Share of EU Area (%)	Share of EU Production (%)
2000	2.55	4.43	9.1	4.3	3.08	6.50	18	11
2010	2.17	5.81	8.2	4.3	2.10	9.04	22	15
2020	2.16	6.41	9.9	5.1	2.50	10.85	24	16
2024*	2.10	9.29	10.5	8.4	2.50	5.99	26	10
	Sunflower				Rapeseed			
	Area (million ha)	Production (million t)	Share of EU Area (%)	Share of EU Production (%)	Area (million ha)	Production (million t)	Share of EU Area (%)	Share of EU Production (%)
2000	0.79	0.72	19	17	0.05	0.04	1	1
2010	0.81	1.26	24	22	0.54	0.94	8	6
2020	1.28	2.17	30	27	0.43	0.95	8	6
2024*	1.35	1.49	31	20	0.60	1.16	10	7

*2024 provisional values reported by INS and European market estimates

Reference: Eurostat Crop Production Database; Romanian National Institute of Statistics Crop Production for Main Crops 2024 [\[insse.ro\]](https://insse.ro)

Romania is also consistently among the largest horticultural products producers countries in the European Union (Table 2).

Table 2. Area and production for horticultural production in Romania in comparison with the EU averages.

Year	Vineyard			Orchards (Fruit Trees)		
	Area (million ha)	Production (million t)	Share of EU Area (%)	Area (million ha)	Production (million t)	Share of EU Area (%)
2000	245	1.10	6.8	238	1.49	9.0
2010	204	0.92	6.4	205	1.30	8.2
2020	190	1.05	6.0	198	1.42	7.8
2024*	187	0.93	5.9	190	1.31	7.5
	Vegetables					
	2000	320	4.20	7.0		

2010	250	3.10	5.8			
2020	210	2.40	4.8			
2024*	185	2.06	4.3			

Reference: Trends in vineyard area and grape production in Romania during the past decade; Romania Wine Statistics 2024.

2. Situation of crop protection and pesticide use in Romania

Sales and applications of crop protection and pesticide use in Romania in predominantly split between herbicides (roughly 47%) and fungicides (47%), with insecticides making up a smaller portion (around 6%). The following multi-decade table illustrates how total volumes evolved from the post-communist stabilization phase (early 2000s) up to the modern era. (Table 3).

Table 3. Total pesticide sales in Romania (By Main Categories) - Total quantity of active substance sold (in metric tons)

Year / Period	Herbicides	Fungicides & Bactericides	Insecticides & Acaricides	Total Pesticides (incl. Molluscicides/Other)
2000	~5,600	~4,200	~980	~11,200
2005	~5,150	~3,950	~850	~10,350
2010	4,890	3,420	690	9,400
2015	4,680	3,610	580	9,310
2018	4,310	3,920	510	9,940 (High Molluscicide use)
2020	4,125	3,877	453	17,915 (Spike due to Molluscicides)*
2022	4,010	3,790	390	8,600
2024	4,150	3,910	280	8,750 (Insecticide ban drop)
2025–2026 (Est.)	4,200	4,050	210	8,900

*Note: In 2020, Eurostat and INSSE added massive singular applications of specific regional rodenticides and snail treatments (molluscicides—9,304 tons), driving up the "Total" category, while the primary field crop treatments remained steady.

The physical weight of chemicals used in Romania has largely declined. However, the actual surface area of land requiring treatment has dramatically expanded due to intensive, large-scale commercial farming (Table 4).

Table 4. The application paradox (Active substance vs. treated land area)

Indicator Type	Historical baseline (early 2000s)	Modern level (2020s–2026)	Long-term trend dynamics
Herbicide treated land	~2.90 Million Hectares	~3.88 Million Hectares	+33% area treated (driven by expanding mono-crop maize, sunflower, and wheat fields).
Herbicide mass used	~5,600 Metric Tons	~4,200 Metric Tons	-25% chemical weight (driven by modern micro-dose solutions replacing heavy old formulas).
Fungicide treated land	~1.85 Million Hectares	~2.39 Million Hectares	+29% area treated (driven by shifting climate patterns and volatile, wet spring disease vectors).
Fungicide mass used	~4,200 metric tons	~4,050 metric tons	Relatively stable (+8.2% variation within specific mid-decade intervals depending on blight intensity).

Despite growing land treatments, Romania continuously ranks near the bottom of European chemical expenditure, applying under 1 kg of active substance per hectare. [1]

3. Levers and barriers for agroecology usage and preventive approach in crop protection in Romania

Transitioning toward agroecology and preventive crop protection in Romania presents a unique paradox. On one hand, Romania's massive smallholder farm network naturally employs low-input farming. On the other hand, its large-scale commercial sector is highly dependent on conventional chemical inputs to remain competitive in global grain markets. Several financial, environmental, and structural factors are creating momentum for preventive and ecological crop protection techniques in Romania.

- EU CAP Strategic Plan incentives (Eco-schemes)

The current European Common Agricultural Policy (CAP) allocates significant direct payments to Romanian farmers who voluntarily adopt eco-schemes. Financial rewards are explicitly tied to crop rotation, maintaining soil cover, and dedicating land to non-productive biodiversity features (e.g., hedges, buffer strips) that naturally harbor pest predators.

- Low baseline chemical intensity

Romanian historically averages usage is below 1.0 kg of active pesticide substance per hectare per year, a large percentage of its agricultural land (especially among small-to-medium farms) requires less remediation to transition to certified organic or low-input farming compared to Western Europe.

- The neonicotinoid ban enforcement

Now that emergency exemptions for neonicotinoids on maize and sunflowers have been legally halted in Romania, commercial farms are structurally forced to seek non-chemical alternatives, such as biological seed treatments, pest-resistant crop varieties, and adjusted planting windows.

- Expansion of digital and precision agriculture

Large-scale farms in regions like South Muntenia and the West are increasingly adopting drone mapping, smart weather stations, and precision-spraying machinery. These technologies serve as a lever for preventive protection by allowing micro-targeted biological applications before an outbreak spreads.

- Romania adopted a revised National Action Plan on Reducing Risks Associated with the Use of Plant Protection Products through Government Decision No. 135/2019, replacing the previous 2013 action plan. The plan was developed in accordance with Directive 2009/128/EC on the sustainable use of pesticides.

- Increasing environmental awareness

Growing concerns about soil degradation, biodiversity loss, pesticide resistance, and climate change are motivating farmers and policymakers to consider alternative crop protection strategies. Sustainable practices such as crop rotation and pesticide reduction are increasingly recognized for their environmental benefits.

2. Barriers (Obstacles to the Preventive Approach)

Despite these enablers, deep-seated structural and economic challenges impede the widespread adoption of agroecology.

- Extreme farm polarization

Romanian agriculture is heavily split between millions of subsistence smallholders (under 5 hectares) and a small number of massive, corporate big-size-farms (thousands of hectares). Big-size-farms rely on highly mechanized mono-cropping (corn, wheat, sunflower), a system that is

inherently vulnerable to pests and financially dependent on fast-acting, synthetic, broad-spectrum pesticides.

- An audit conducted by the European Commission Directorate-General for Health and Food Safety (DG SANTE) in 2019 found that implementation of the Sustainable Use Directive in Romania was generally weak. The report identified shortcomings relating to operator training, inspection of pesticide application equipment, integrated pest management implementation, and enforcement measures.

- Weak agricultural extension services:

There is a critical shortage of public, independent agronomic advisors in Romania. Most advisory services available to medium and large farmers are provided directly by representatives of multinational chemical corporations, creating an inherent bias toward chemical solutions over complex, long-term agroecological preventative measures.

- Economic risk and immediate yield pressures

Transitioning to integrated pest management (IPM) or biocontrol tools requires a 3-to-5-year learning curve where yields can temporarily fluctuate. Lacking robust state-backed insurance or transition subsidies, capital-strapped Romanian farmers cannot afford the short-term economic risk of abandoning predictable chemical regimens.

- Higher costs and short shelf-life of biocontrols

Biological crop protection tools (such as macro-organisms, pheromone traps, and botanical extracts) are frequently more expensive per hectare than generic chemical herbicides or fungicides. Furthermore, Romania's hot, dry summers can reduce the efficacy and shelf life of delicate biological formulations compared to stable synthetic chemicals.

- Climate change-induced pest shifts

Increasingly mild winters and erratic spring rainfall in the Danube plains have accelerated the proliferation of resilient pests and fungal blights. Faced with intense, unpredictable pest pressure, farmers often resort to emergency chemical applications rather than waiting for slow-acting preventive ecosystem balances to establish.

4. Projects and programs nationally funded in the domains of crop protection

Table 5. Examples of programs and projects nationally funded

Program/project name	Funder	Overall Budget	Description: Objectives, Duration, Consortia,...
National Research Projects (PNC DI IV / UEFISCDI): Exploratory Research Projects (PCE)	Executive Agency for Higher Education, Research, Development and Innovation Funding	PCE 2026 Call: The overall budget allocated for this competition is 80,000,000 lei aprox 16 mil EUR	1. Objectives The main goal of the PCE instrument is to support and promote fundamental and exploratory scientific research in Romania. It focuses on: [1, 2] Scientific Excellence: Funding high-performance researchers with a proven international track record. Frontier Ideas: Validating innovative hypotheses, establishing new research trends, and stimulating breakthrough concepts.

			Global Visibility: Enhancing the international footprint and recognition of Romanian scientific output. [1, 2, 3] 2. Duration Projects feature flexible execution lifecycles calculated around tight institutional frameworks: [1] Standard Framework: A minimum duration of 24 months and a maximum of 36 months. Budget Proportionality: If a project lasts less than 36 months, its overall ceiling is reduced proportionally against the maximum 1,200,000 lei limit. [1] 3. Consortia / Team Structure PCE grants are individual institutional grants, not multi-partner consortia. The structure operates through a single Host Institution and an internal research group:
National Research Projects (PNCDI IV / UEFISCDI): Frontier Complex Research Projects (PCCF) or Change Challenge Projects (PPS)	Executive Agency for Higher Education, Research, Development and Innovation Funding	PCCF / PPS overall framework budget: Up to 250,000,000 lei per competition line. Maximum budget per individual project: Up to 10,000,000 lei per complex multi-partner project	1. Objectives The principal aim of these collaborative consortium instruments is to amplify institutional R&D synergies and advance interdisciplinary frontier knowledge. The specific goals are to: Bridge Capabilities: Solve highly complex scientific or societal issues that a single research institution cannot address alone. Interdisciplinary Trajectories: Encourage unconventional approaches, experimental methodologies, and investigation lines at the intersection of established disciplines. Resource Consolidation: Effectively pool national institutional infrastructures, laboratories, and high-performance computation tools. Socio-Economic Integration: Create solid pathways for converting foundational, frontier discoveries into tangible technological, industrial, or social applications. 2. Duration Because of the inherent structural complexity of managing multiple partnering

			organizations, these projects utilize a longer execution window than standard individual grants: Minimum Duration: 36 months. Maximum Duration: 48 months (4 full calendar years). Note: Extensions or modifications are strictly regulated based on annual stage performance reviews and budgetary execution thresholds set by the Ministry. 3. Consortia Structure Unlike single-host PCE grants, these instruments are built explicitly on formalized, collaborative national networks: The Coordinator (Lead Partner): A high-performing Romanian public university or national R&D institute that acts as the primary legal contractor and administrator. The overall Project Director is tied directly to this leading entity. Partnership Pool: A mandatory mix of multiple distinct legal entities. This typically comprises a minimum of 3 to 5 separate organizations, which can include public universities, academy institutes, and accredited R&D organizations. Private Sector Inclusion: Depending on the specific sub-program call (especially under Innovation/Challenge tracks), the inclusion of economic operators (SMEs, spin-offs, or large companies) is highly encouraged or required to validate commercial viability. Internal Component Projects: The consortium's master proposal is structured into interlinked sub-projects. Each sub-project has an designated institutional Lead Investigator, all feeding into the centralized objective managed by the primary Coordinator.
AFIR, Operational Groups (OGs) under the European Innovation Partnership (EIP-AGRI)	Romanian CAP payment agency	The overall budget for Operational Groups (EIP-AGRI) in Romania is €20,041,176 under the current Strategic	The structural and organizational blueprint for Operational Groups (GO PEI) under Romania's Strategic Plan (PS 2023–2027 / Intervention DR-34), managed by the Agency for Financing Rural Investments

		Plan (PS 2023–2027) framework	(AFIR), is defined by the following core criteria: [1] 1. Objectives The absolute priority of a PEI Operational Group is to bridge the gap between academic theory and practical agricultural operations. The concrete objectives dictate that projects must: [1] Solve Practical Bottlenecks: Target immediate, real-world issues faced by local agri-food or forestry businesses. [1, 2] Validate Innovations: Co-design, test, and adapt new technological, digital, or biological solutions directly within real farm environments. [1, 2] Promote Environmental Performance: Build methods that optimize resource consumption, enhance climate resilience, and reduce waste. [1, 2] Disseminate Learnings: Ensure that pilot results, datasets, and operational successes are distributed broadly to the European EIP-AGRI Network. [1] 2. Duration Operational Group partnerships are designed around strict, fast-paced execution parameters to keep innovations timely: Standard Implementation Timeline: Projects must fully complete all design, piloting, and testing within a maximum threshold of 36 months. Phase Split: Timeframes encompass both the formalization/animation phase of the joint group and the actual rollout/data collection of the agricultural pilot project. [1] 3. Consortia / Partnership Structure An Operational Group cannot function as an isolated business entity. It must be organized via a legally formalized Cooperation Agreement binding a highly diverse network of mandatory partners: [1] The Legal Entity: The partners set up an associative structure, choosing a
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			single legal partner to act as the official Representative/Leader before AFIR. The Core Multi-Actor Trio: The grouping must integrate at least three distinct entities, including at minimum: An Agricultural/Forestry Practitioner: Actual farmers, cooperative leaders, or processing micro-enterprises to host the testing. A Research Provider: Public universities, institutes, or academy stations supplying scientific knowledge. An Advisory Specialist: Agricultural consultants or innovation brokers to facilitate tech transfer and compliance. [1, 2] Optional Partners: NGOs, software companies, technology developers, or retail entities may join to round out specialized project actions
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References

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