



CLIMATE-SMART AGRICULTURE & SEED DIVERSITY TRANSITION

Policy Brief

Name of Indicator: Crop production and yield (production, yield per hectare, seed variety performance)

Field of Application: Economy & Supply Chains

This policy brief is part of the ClimEmpower policy recommendations, available from climempower.eu. It translates evidence and project findings into practical guidance for regional and local policymakers seeking to strengthen resilience to climate and other systemic disruptions. It focuses on crop production and yield stability, and the farming practices and seed systems that allow agriculture to remain productive under drought, heat and extreme weather.

The main recommendation is to promote the transition toward climate-smart agriculture and greater seed diversity. Policies should support adaptive farming practices that maintain productivity under climate stress — precision irrigation, crop diversification, soil management and drought-resistant, locally adapted seed varieties — reducing dependency on uniform systems and increasing the adaptive capacity of production.



Key Challenges

- Rising temperatures, droughts and extreme events reduce yield stability
- Low crop diversity and water-intensive practices increase vulnerability
- Soil degradation, water scarcity and biodiversity loss weaken long-term resilience



Good Practices

- Precision irrigation, crop diversification and soil conservation
- Diverse, locally adapted seed varieties and seed exchange networks
- Capacity-building and advisory services for small-scale producers



Priority policy actions



Integrate climate risk into agricultural policy frameworks

Systematically incorporate drought, heatwave and extreme-weather impacts into agricultural planning tools and policy instruments.



Incentivise climate-smart agricultural practices

Support precision irrigation, crop rotation, diversification and soil conservation through financial incentives and eco-schemes.



Strengthen seed diversity and resilient seed systems

Support conservation, seed exchange networks and research on climate-adapted crop varieties.



Enhance farmers' capacity and access to knowledge

Strengthen advisory services and knowledge-sharing, with particular attention to small-scale and vulnerable producers.



Ensure policy coherence with adaptation frameworks

Align measures with the CAP, national climate adaptation plans and biodiversity strategies.

Implementation Roadmap

1

Phase 1 — Assessment and vulnerability mapping

Assess crop production trends, yield variability and climate risks, identifying vulnerable areas and how crop systems and seed varieties perform under stress.

2

Phase 2 — Policy deployment and scaling of practices

Enable large-scale adoption of climate-smart practices through incentives, advisory services and access to innovation.

3

Phase 3 — Strengthening seed systems and innovation

Promote access to diverse, resilient seed varieties through conservation initiatives, seed networks and research on climate-adapted crops.

4

Phase 4 — Monitoring and adaptive governance

Track yields, soil conditions and resilience indicators over time, using the data to adapt policies as climate conditions evolve.

Funding

Common Agricultural Policy (CAP)

Eco-schemes and Rural Development can fund climate-smart practices and local seed varieties.

European Regional Development Fund (ERDF)

Can finance water management, digital tools and local supply chain development.

Horizon Europe

Can fund research on climate-resilient crops, seed diversity and agroecology.

LIFE Programme

Can support soil restoration and sustainable land use demonstration projects.

National agricultural and adaptation schemes

Can further reinforce these measures in the most exposed regions.



Conclusion

The transition toward climate-smart agriculture and seed diversity improves food security and price stability by reducing yield variability, and protects rural livelihoods by increasing the adaptive capacity of farmers.

It also contributes to environmental sustainability through improved soil health, reduced water consumption and enhanced biodiversity, particularly through the use of traditional and resilient seed varieties.