SUPPORTING SEED DIVERSITY FOR RESILIENT EU AGRICULTURE

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Introduction

Europe's food systems are under growing pressure from the triple planetary crisis of climate change, biodiversity loss and pollution. Between 23 and 44 per cent of the European Union (EU) and United Kingdom (UK) agricultural land is already at high risk of topsoil carbon loss, with implications for food security and resilience.[1,2]

Seed diversity is central to adaptation. **Locally adapted conservation varieties help crops** withstand heat, drought, and pests, while reducing vulnerability to shocks.* Where diversity is lost, systems become more fragile, and recovery is slower.

Across Europe, community **seed banks and grassroots seed networks** are safeguarding and developing this diversity. Small-scale farmers, breeders and amateur gardeners exchange varieties of open-pollinated vegetable seeds,† experiment on farm and engage in participatory breeding. Their initiatives deliver practical solutions for conserving biodiversity, supporting climate adaptation and strengthening the resilience of food systems. While these initiatives are tailored to local conditions, they also preserve knowledge and cultural heritage.

EU policy has the potential to strengthen these efforts. Recognizing informal exchange of open-pollinated vegetable seeds would contribute to climate adaptation and biodiversity conservation.[3] Yet current rules are optimized for standardized markets. Registration requirements, strict uniformity criteria and compliance costs exclude many conservation and farmer-bred varieties. This has contributed to **genetic erosion** and weakened resilience.[4]

Current Policy Measures

Some measures have already created space for diversity. EU directives on conservation and amateur varieties, provisions under the Organic Regulation for heterogeneous material and support through the Common Agricultural Policy (CAP) 2023-2027 have begun to lower barriers. Simplification steps for very small farms have also reduced administrative burdens. Taken together, these measures mark important progress, but their impact remains limited and uneven across Member States.[5]

Reform is now under discussion. The proposed Plant Reproductive Material Regulation (PRM) (COM(2023) 414) aims to consolidate seed rules and align them more closely with biodiversity and climate objectives. It would introduce sustainability requirements for registering new varieties, while exempting material for amateur gardeners and conservation organizations, including seed banks, from many obligations. Proportionate procedures will be essential to ensure that small operators and community seed systems can benefit.[6]

International frameworks reinforce this direction. The International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA), the Convention on Biological Diversity (CBD), the United Nations Declaration on the Rights of Peasants and Other People Working in Rural Areas (UNDROP) all highlight the importance of crop diversity and farmers' rights. Assessments by the Intergovernmental Panel on Climate Change (IPCC) and the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) confirm that agrobiodiversity is central to climate adaptation, the conservation of biodiversity and resilient food systems.

Evidence and Analysis

This brief draws on research led by the Environmental Social Science Research Group (ESSRG) working with partners in the Horizon Europe PLANET4B project. The analysis combined literature review, expert interviews, workshops and policy analysis. Although much of the empirical work focused on Hungary, the findings are consistent with evidence across Europe and beyond: where enabling conditions exist, informal seed systems flourish, supporting resilience, knowledge exchange and cultural heritage.

Challenges and Policy Options

This section highlights core challenges that hinder the potential of seed banks and grassroots seed networks from thriving. It also outlines policy options in the form of actions that can be taken at the EU policy level to overcome these challenges. The following policy options should not be seen as stand-alone or linear, but as interconnected and complementary to one another.

* In this brief, "conservation varieties" refer to registered seed varieties that are traditionally grown, or newly developed for conservation purposes, are freely reproducible and are characterized by their level of genetic and phenotypic diversity.
† Note the important distinction between the exchange of seeds for commercial purposes versus the exchange of seeds for conservation purposes. This brief is focused on the exchange of seeds for the purpose of conservation and sustainable use of plant genetic resources. Exchanging seeds for conservation purposes is often done in small quantities and may or may not involve financial compensation. This contrasts with the commercial exchange of seeds for generating profit.

Challenge	Policy Option
1. Enable proportionate seed rules to protect seed diversity. Global commitments under the CBD and the Kunming–Montreal Global Biodiversity Framework (KM GBF) call for maintaining crop genetic diversity to enhance resilience and food security (KM GBF Target 10). Yet, current legal frameworks often favor uniform, commercial varieties, restricting the exchange and marketing of traditional and farmer-bred seeds. Proportionate regulatory approaches are essential to sustain agrobiodiversity as a foundation for climate adaptation.	• Exempt conservation, non-commercial and farmer-bred varieties from the scope of the proposed **PRM.** • Allow small-quantity, local sales and exchanges without catalogue listing, following examples such as Hungary's exemption for small-scale, non-industrial seed sales. • Establish a nano-enterprise threshold (for example, < EUR 100 000 annual revenue) to reduce administrative obligations for micro-producers. • Issue Commission guidance to ensure Member States apply PRM flexibility consistently and enable proportionate cross-border sharing of conservation material.
2. Recognize and protect grassroots custodians of agrobiodiversity. The ITPGRFA and the UNDROP recognize farmers and local communities as custodians of seed diversity. Upholding their rights to save, use, exchange and sell seeds is critical to conserve agrobiodiversity and safeguard traditional knowledge systems.	• Include explicit recognition of the importance of community seed custodians and their traditional knowledge in the PRM, ensuring effective measures to enable their participation. • Safeguard farmers' rights to save, use and exchange seed in non-commercial channels through clear exemptions in EU seed legislation. • Develop flexible quality standards for diverse material, drawing on the **Organic Regulation (EU 2018/848)** and **Delegated Regulation (EU) 2021/1189** on organic heterogeneous material. • Integrate protection of traditional knowledge into PRM denomination rules by requiring checks against national and community seed bank records to prevent misappropriation of local variety names.
3. Strengthen collaboration between formal and informal seed systems. IPBES and the **IPCC** highlight that inclusive innovation and local knowledge are central to climate adaptation. Bridging formal and informal seed systems allows the integration of scientific research with experiential learning, strengthening adaptive capacity and long-term sustainability (KM GBF Target 21).	• Dedicate Horizon Europe calls to participatory breeding and community-led agrobiodiversity research. • Provide fair compensation for farmers and gardeners engaged as co-researchers in EU- and Member State-funded projects. • Support multi-actor projects and Operational Groups under the EU CAP Network to strengthen collaboration among farmers, breeders, gene banks and civil society. • Strengthen Agricultural Knowledge and Innovation Systems (AKIS) in Member State CAP Strategic Plans to ensure participatory research results are shared through advisory services.

Challenge	Policy Option
4. Redirect agricultural support to the dynamic management of genetic resources. The **KM GBF** and the Food and Agriculture Organization of the United Nations **(FAO) Commission on Genetic Resources for Food and Agriculture (CGRFA)** call for conserving and sustainably using genetic diversity on farms. Incentives for the dynamic management of local varieties enhance adaptation, food security and the resilience of rural livelihoods.	• Expand **CAP eco-schemes** to reward participatory breeding, on-farm dynamic management and seed conservation and community seed banks. • Pilot **result-based payments** for genetic diversity, using indicators such as the number of local varieties cultivated or hectares under conservation crops. • Integrate agrobiodiversity objectives into national **AKIS** strategies to guide advisory services on seed diversity and exchange. • Use **CAP rural development funds (Pillar II)** to support regional seed networks, local seed banks and conservation contracts. In Hungary, agreements between the national gene bank and small-scale farmers have proved mutually beneficial and expanded scientific knowledge on diverse crop varieties under changing climate conditions.
5. Foster systems of care and farmer autonomy for resilient seed systems. Assessments by the IPBES highlight that transformative change in food systems requires approaches grounded in equity, cooperation and respect for ecological limits. Local autonomy and self-organizing dynamics enable farmers to respond rapidly to environmental change. Upholding farmers' rights to seeds, as recognized under **UNDROP**, is essential to maintain this adaptive capacity and strengthen the resilience of agricultural landscapes.	• Introduce measurable outcome targets for on-farm genetic diversity in **CAP Strategic Plans**, linking payments to practices that sustain reciprocal relationships between farmers and ecosystems. • Establish a proportionate **PRM route** for small operators, enabling farmer-to-farmer exchange and community seed initiatives as part of self-organizing local systems. • Expand **CAP eco-schemes** and **rural development measures** to support community-based conservation, cooperative breeding and other care-oriented approaches. • Strengthen coordination across **Directorate-General for Agriculture and Rural Development (DG AGRI), Directorate-General for Health and Food Safety (SANTE), Directorate-General for Environment (DG ENV)** and **Directorate-General for Research and Innovation (DG RTD)** to align PRM, CAP and research measures with locally driven innovation.
6. Support knowledge platforms and regional seed networks. The CBD, Nagoya Protocol and KM GBF Target 21 underline the importance of protecting traditional knowledge and ensuring equitable benefit-sharing. Strengthening community seed networks and knowledge platforms helps maintain and transmit this knowledge base, reinforcing social learning and innovation.	• Fund interoperable, multilingual platforms under **Horizon Europe** or **Digital Europe** to document varieties, cultivation practices and community protocols. • Accept platform records as proportionate evidence in **PRM** processes, for example for denomination and prior-use checks. • Support collaboration among seed initiatives, researchers, non-governmental organizations and national authorities to expand and link seed knowledge systems across Member States.

Conclusions

Responding to the triple planetary crisis requires agricultural systems that safeguard biodiversity, strengthen resilience and value those who work most closely with the land. Across Europe, grassroots actors such as small-scale farmers, gardeners and community seed networks are already key agents of change by conserving and developing climate-resilient seed diversity. Their efforts demonstrate that innovation and care can coexist, but they remain constrained by rules designed for uniform production.

The revision of the PRM offers a pivotal opportunity to align seed policy with biodiversity and climate goals. It can do so by creating flexible legal pathways for traditional and farmer-bred varieties, recognizing the role of on-farm conservation actors and directing CAP and Horizon Europe funding towards participatory research, dynamic management and community-based conservation. Together, these measures would help the EU advance its commitments under the KM GBF and UNDROP. Supporting these self-organizing systems and linking formal with informal seed networks will be essential to preserve Europe's agricultural heritage and build a resilient, inclusive food system that reflects the EU's long-term climate and sustainability vision.

References

[1] Breure, T.S., De Rosa, D., Panagos, P., Cotrufo, M. F. and Lugato, E. (2025) 'Revisiting the soil carbon saturation concept to inform a risk index in European agricultural soils', Nature Communications, 16, Article 2538. Available at: https://doi.org/10.1038/s41467-025-57355-y

[2] Van Etten, J., de Sousa, K., Aguilar, A. and Barrios, M. et al. (2019) 'Crop variety management for climate adaptation supported by citizen science', Proceedings of the National Academy of Sciences of the United States of America, 116(10), pp. 4194–4199. Available at: https://doi.org/10.1073/pnas.1813720116

[3] European Commission (2020) EU Biodiversity Strategy for 2030: Bringing nature back into our lives (COM(2020) 380 final). Publications Office of the European Union. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A52020DC0380

[4] Batten, Y. L., Plana Casado, M. J. and van Zeben, J. (2021) 'Decoding Seed Quality: A Comparative Analysis of Seed Marketing Law in the EU and the United States', Agronomy, 11(10), Article 2038. Available at: https://doi.org/10.3390/agronomy11102038

[5] European Court of Auditors (2024) Common Agricultural Policy Plans – Greener, but not matching the EU's ambitions for the climate and the environment (Special Report No. 20/2024). Available at: https://www.eca.europa.eu/en/publications/SR-2024-20

[6] Šajn, N. (2024) Plant reproductive material (EU Legislation in Progress briefing, PE 754.645). European Parliamentary Research Service. Available at: https://www.europarl.europa.eu/RegData/etudes/BRIE/2023/754645/EPRS_BRI(2023)754645_EN.pdf

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