



## POLICY BRIEF No. 69

# European network for the conservation and sustainable use of plant genetic resources in nature and on farm

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to maintain crop production in the changing cultivation environment caused by climate change. This being achieved by integrating the conservation and use of plant genetic resources, which are at the heart of global food and environmental systems. This policy brief presents the key achievements of the Farmer's Pride project that underpin and have enabled the establishment of a European *in situ* (in-nature) PGR network. Some of the key objectives of Farmer's Pride are to:

- Improve on-farm and *in situ* conservation of landraces<sup>1</sup> (LR) and crop wild relatives<sup>2</sup> (CWR)
- Back-up or safety duplicate the seeds of these precious resources through *ex situ* (off-site) storage and multiplication in national gene banks and community seed banks
- Ensure wide accessibility and use of these conserved resources
- Harmonize and better integrate formal conservation and informal dynamic conservation management efforts at the global, regional, or national level.

Farmer's Pride research has produced numerous deliverables that document:

- (i) the occurrence of many thousands of plant genetic resources (PGR) across Europe, held either as LR on farms, or as CWR in natural habitats;

The EU Horizon 2020 project titled “**Networking, Partnership and Tools to enhance in situ conservation of European Plant Genetic Resources**”, known as Farmer's Pride, aims to address the unprecedented challenge of sustainable food production in Europe. It has enabled nations to keep pace with population growth and their related food needs, and

<sup>1</sup> Landraces: a set of populations or clones of a plant species, which are naturally adapted to the environmental conditions of their region (COMMISSION DIRECTIVE 2009/145/EC).

<sup>2</sup> Crop wild relatives: wild plant species that are genetically related to cultivated crops of the same genus.



## Why landraces (LR) and crop wild relatives (CWR) are so essential to our future

Both LR and CWR are fundamental for sustaining agricultural production into the future. They contain the novel genes or genetic traits that will be used by breeders and farmers in cultivated varieties to protect our crops from pests and diseases, to adapt to climate change and other environmental changes, and to improve agronomic performance and nutritional quality of our food plants. Without proper conservation and access to these resources, the world will not be able to meet its 2030 goals/targets, for feeding the world human population or achieve the Sustainable Development Goals relating to food, nutrition security and environmental protection.

- (ii) the active, *in situ* conservation and *ex situ* back-up or safety duplication of PGR – including through national gene banks and community seed banks (CSBs);
- (iii) how PGR are used and accessed by communities and researchers;
- (iv) useful traits for future crop breeding; and
- (v) the review of support mechanisms – including the public’s willingness-to-pay (WTP) for PGR conservation services deriving from them. Collectively, these activities will, at the very least, double the diversity available to users across Europe.

## Farmer’s pride achievements and key findings

### Landraces

- ☑ First European database for LR occurrence data – collated from 17 European institutions – contains 19,335 records of various crop LR maintained *in situ*, and data analysis demonstrating that 20% of these crops are located in the Natura 2000 network.
- ☑ Proof that a significant diversity of LR is retained across Europe, despite the productive advantage of modern cultivars. This may be due to LR resilience or acceptable productivity levels under marginal or harsh climatic conditions, niche markets or organoleptic qualities that have helped to sustain production and continued to increase demand in local and city markets.
- ☑ Guidelines<sup>3</sup> and best practices developed to help promote LR propagation, management and access for users, as well as a tool to locate in the field (on-farm) LR propagation materials for cultivation, repatriation, breeding, development and research.
- ☑ Showcasing the role of CSBs in providing local conservation and production support<sup>4</sup>.

3 [https://more.bham.ac.uk/farmerspride/wp-content/uploads/sites/19/2020/09/D2.4\\_In\\_situ\\_landrace\\_propagation\\_management\\_guidelines.pdf](https://more.bham.ac.uk/farmerspride/wp-content/uploads/sites/19/2020/09/D2.4_In_situ_landrace_propagation_management_guidelines.pdf)

4 Bartha, B., Feher, J., Platzer, E., Maierhofer, H., Poulsen, G. (2021) Community Seed Bank (CSB) Management Guidelines Along Four Network Showcases. Available at: [https://more.bham.ac.uk/farmerspride/wp-content/uploads/sites/19/2021/07/D2.3\\_Community\\_seedbank\\_management\\_guidelines.pdf](https://more.bham.ac.uk/farmerspride/wp-content/uploads/sites/19/2021/07/D2.3_Community_seedbank_management_guidelines.pdf)



## Crop wild relatives

- ✓ First European database gathering CWR occurrence data, containing over three million locations and representing 616 priority CWR distributed across 43 countries in Europe, and a tool<sup>5</sup> for managers of European protected areas to identify which CWR are present in the sites they manage.
- ✓ Identification of active *in situ* conservation of CWR in the Natura 2000 network, national or local protected area networks. 519 CWR were located within 31% of sites<sup>6</sup>, demonstrating the potential of existing networks – specifically the Natura 2000 network – to conserve CWR in Europe.
- ✓ Practical experience brought to light a lack of initial awareness among land managers about CWR and their significant value to food security. However, once they learnt about their value, they were keen to engage in their *in situ* conservation and expand the ecosystem service value of their land; to help them, CWR Population Management Guidelines<sup>7</sup> were designed, to aid efficient population management and retain maximum CWR genetic diversity *in situ* for the long term.

## Identification of adaptive traits

- ✓ 64 useful adaptive traits in *in situ* LR and CWR for ten crops were identified to address future agricultural and market needs for Europe.
- ✓ Of the population studies conducted under the project, 63% of LR showed traits for resistance to pests and diseases, tolerance to environmental stress and have useful nutritional/organoleptic properties.

## Access to genetic resources

- ✓ Continued access to a broad diversity of genetic planting material (crop varieties) is essential for the future of European agriculture – to help reduce the long-term impact of climate change and to ensure food, nutrition and livelihood security. However, access to seeds containing this diversity is currently very restricted. Bottlenecks include: (i) potential users are unaware of potentially available PGR and where/how to obtain it; (ii) the true value of PGR is not characterised and therefore cannot be quantified; (iii) access to *in situ* conserved PGR is unorganized; (iv) procedures and conditions under which materials

could be made available are unclear or often do not exist; (vi) some landowners are reluctant to provide access to LR or CWR diversity due to issues linked to Intellectual Property Rights and/or ethical reasons.

- ✓ There is both demand for and a need to establish a central point that collects data or provides access to data about PGR managed *in situ*, and that facilitates making these resources available to potential users. This role can be taken on by *in situ* networks in collaboration with genetic resources centres, thus ensuring active *in situ* conservation and access to crop diversity for potential users.
- ✓ A model website<sup>8</sup> was created to demonstrate how access to apple PGR material conserved *in situ* in the Netherlands could be achieved;<sup>9</sup> the model is being expanded to include information from other crops and countries.
- ✓ Some form of material transfer agreement is required between the *in situ* provider and user that sets out the conditions under which the material is made available and can be used. This process could be mediated by the designated national genetic resources centre.

## Support mechanism — Public willingness-to-pay for PGR conservation

- ✓ The European Union's (EU) Common Agricultural Policy (CAP) is considered to be the critical public policy in terms of both impacts and funds dedicated to the conservation of biodiversity.
- ✓ A survey of the general public's willingness-to-pay (WTP) for the conservation of wheat LR in Europe (demand side), as well as to assess the willingness of farmers to participate in on-farm conservation of wheat LR schemes (supply side), reveals that

5 <https://www.ecpgr.cgiar.org/crop-wild-relatives-in-natura-2000>

6 Rubio Teso, M. L., Álvarez Muñiz, C., Gaisberger, H., Kell, S., Lara-Romero, C., Magos-Brehm, J., Maxted, N. and Iriondo, J. (2020b) Crop wild relatives in Natura 2000 network. [https://more.bham.ac.uk/farmerspride/wp-content/uploads/sites/19/2020/07/MS19\\_Crop\\_Wild\\_Relatives\\_in\\_the\\_Natura\\_2000\\_Network.pdf](https://more.bham.ac.uk/farmerspride/wp-content/uploads/sites/19/2020/07/MS19_Crop_Wild_Relatives_in_the_Natura_2000_Network.pdf)

7 [https://more.bham.ac.uk/farmerspride/wp-content/uploads/sites/19/2021/07/Crop\\_Wild\\_Relative\\_Population\\_Management\\_Guidelines.pdf](https://more.bham.ac.uk/farmerspride/wp-content/uploads/sites/19/2021/07/Crop_Wild_Relative_Population_Management_Guidelines.pdf)

8 The website can be accessed here: <https://projects.cgn.wur.nl/farmerspride/index.html>

9 van Hintum T., Csörgő S., Veteläinen M., Bartha B. and Heinonen M. 2021 Farmer's Pride: Showcase demonstrating improved *in situ* resource access.



estimated conservation costs (€1.8m–€33m/year) are well within the general public's WTP (€80.2m/year).

- ✓ Formal support schemes under the EU CAP exist for animal genetic resources but are currently, at best, only *ad hoc* for LR, despite the high benefit-cost ratio (2.4–44.6).
- ✓ Current support payment levels (€120–€251/ha), where they exist at all, are on average below what farmers state as necessary to cover their opportunity costs (€300–€550/ha).
- ✓ The use of conservation tender mechanisms has significant potential for improved cost-effectiveness, given that savings relative to current uniform payment approaches could be substantial (21–60%).
- ✓ The EU, as well as national policymakers, urgently need to explore mechanisms through the CAP (and equivalent national legal instruments for non-EU countries) to systematically support the *in situ* or on-farm conservation of Europe's LR heritage for wheat and other crops and CWR diversity.

## Creating a European Network for *in situ* Conservation and Sustainable Use of PGR

The core objective of Farmer's Pride was to establish a European *in situ* network for the conservation and sustainable use of PGR, building on existing structures and networks, such as the European Cooperative Programme for Genetic Resources (ECPGR) and the Natura 2000 Network of protected areas of the European Union, to maximize the conservation of LR and CWR genetic diversity. Farmer's Pride gained widespread support for the establishment of networks from diverse stakeholders.<sup>10</sup> The establishment process of a European network has begun but requires long-term support (see Call for Action section) from ECPGR and the European Commission.

## Our call for action to policy makers

A European network for *in situ* conservation and sustainable use of PGR (hereafter referred to as "European network") is vital to the success of national and pan-European actions for PGR conservation

and use, resilient agriculture and food systems, and nutrition, livelihood and economic security. The continued support of national governments is needed to secure EU leadership in the establishment, governance, and long-term sustainability of such a network. National policy makers are called upon to:

- ✓ Promote the establishment of a European network to the European Commission, European Parliament, European Council, and other relevant EU bodies.
- ✓ Encourage expressions of interest from stakeholders of PGR-rich sites in their countries<sup>9</sup> to join the European network.
- ✓ Explicitly include agrobiodiversity conservation within national biodiversity strategies.
- ✓ Link national funding to the application of long-term conservation and diversity management strategies and actively involve partners from civil society in these programmes.
- ✓ Set objectives and implement effective monitoring of *in situ* PGR.
- ✓ Implement seed laws to facilitate the registration of heterogeneous crop varieties that do not meet normal DUS<sup>11</sup> criteria.
- ✓ Establish and maintain national PGR programmes to implement *ex situ* and *in situ* PGR activities to fulfil their obligations under international legal and policy instruments, such as the Food and Agriculture Organization's (FAO) Second Global Plan of Action on Plant Genetic Resources for Food and Agriculture (PGRFA), the International Treaty on PGRFA and Convention on Biological Diversity.
- ✓ Promote integration of CSBs into national PGR and biodiversity conservation programmes, facilitate and implement Farmers' Rights, and subsidize alternative agricultural practices that promote agrobiodiversity maintenance.
- ✓ Encourage the accurate recording of native and introduced CWR and LR diversity held *in situ* or on-farm and ensure the data is available via EURISCO<sup>12</sup>.

<sup>10</sup> <https://more.bham.ac.uk/farmerspride/network/>

<sup>11</sup> Distinctiveness, uniformity, and stability

<sup>12</sup> EURISCO: European Search Catalogue for Plant Genetic Resources (<https://eurisco.ipk-gatersleben.de/apex/f?p=103:1>).



- ☑ Ensure *in situ* and on-farm PGR are available via EURISCO.
- ☑ Facilitate access and exchange of PGR across geographical borders.
- ☑ Explore the use of cost-effective conservation tender mechanisms to support the on-farm conservation of Europe's agricultural heritage of LR of all crops.

## Key messages to different stakeholder groups on the establishment of a European *in situ* PGR conservation network

### PLANT BREEDING / SEED SECTORS



Active *in situ* conservation, management and sustainable use of PGR could more than double the genetic diversity available to plant breeders, by:

- Providing access to a much wider pool of genetic diversity either *in situ* or on-farm.
- Use of this increased breadth of diversity to enable the breeder to respond more appropriately to changing environmental conditions and changes in EU or national government policy context.
- Provision of a longer-term 'insurance policy' for the plant breeding sector.

The European network will facilitate collaboration and knowledge exchange between *in situ* PGR custodians and plant breeders, by:

- Creating direct links between the diverse *in situ* PGR custodians (e.g. farmers and protected area managers) and the germplasm users.
- Providing greater opportunities for collaboration between *in situ* PGR custodians in research, testing and reintroduction of PGR into the field.

### FARMERS AND OTHER LR CUSTODIANS



Farmers and other LR custodians play a vital role in conserving PGR for food, nutrition, livelihood and economic security. An important goal of the European network is to empower its stakeholders to maintain and manage their PGR autonomously, by:

- Providing greater recognition for LR/heritage varieties and those who grow, maintain and document their history and traditional practices.
- Adapt legal environment (e.g. marketing rules and phytosanitary restrictions) to dynamic use and management of plant genetic resources on farm.
- Providing monitoring tools and reporting schemes to manage *in situ* and on-farm PGR networks and report their status at regional and global levels.
- Ensuring threatened *in situ* PGR populations are securely backed-up in a national genetic resources centre (GRC) and / or CSBs. Material would be deposited according to terms agreed between the provider and the GRC.
- Supporting repatriation of PGR diversity to historic and novel agroecosystems and the monitoring of their cultivation and adaptation processes.
- Increasing opportunities for LR product marketing through added-value and conservation-related certification schemes.
- Supporting seed propagation programmes to improve access to seeds and exchange of knowledge between all members of the European network (private and public sector).
- Providing technical support, training, evidence-based examples of good management practices, niche market development and product value-added potential to improve income generation for LR custodians.
- Providing and promoting access to a platform for access to reliable information, knowledge sharing and collaboration between PGR conservation and sustainable use actors.



Raising awareness among nature conservation agencies/organizations – as the custodians of CWR – of their importance as a contribution to food, nutrition and economic security, and as a global heritage, is vital to ensure the *in situ* protection of wild populations of CWR.

The European network offers many benefits to CWR custodians, including:

- Demonstration and recognition of the additional value of their work to society, in contributing to ecosystem services and thus promoting food and economic security, particularly in providing resilience in agriculture in response to climate change.
- Providing a marketing advantage for landowners, enabling them to attract more ecotourists and provide opportunities for wider community engagement, leading to greater public awareness of their site and its importance.
- Opportunities for additional funding through environmental stewardship and strong public support for *in situ* conservation of resources considered valuable for society.

## Our call for action to all stakeholders

We call all stakeholders (plant breeding / seed sectors, farmers and other LR custodians, environment / nature conservation organizations) to action, asking them to:

- ✓ Promote the European network through their own networks and contacts.
- ✓ Ensure, where appropriate, the nomination of localities that are rich in populations of CWR/LR diversity for inclusion in the European network.
- ✓ Support the earliest formal establishment of the European network to maximize the conservation of resources, to help reduce the long-term impact of climate change and to ensure food, nutrition, and livelihood security.

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