



POLICY RECOMMENDATIONS & FINAL CONFERENCE

BACKGROUND DOCUMENT

Towards dynamic *in situ* conservation and sustainable use of agrobiodiversity

Our world is losing biological diversity, including agricultural biodiversity, understood as the diversity between and within cultivated plant and animal species for food and agriculture at an alarming rate. Our research in the H2020 DYNAVERSITY project, supported by the two Preparatory Actions on Genetic Resources for Food and Agriculture and the H2020 DIVERSIFOOD project, shows that **agricultural biodiversity**, as human-made diversity, is only **truly conserved and dynamically managed with the participation of a variety of local actors organised in networks and anchored in diverse social realities**.

1. INTRODUCTION: Why Crop Diversity?

Diversification, in order to reduce risk, is not an unfamiliar principle to investors. Why should it not be the case for the European genetic and cultural heritage in agriculture, its agrobiodiversity?

Agrobiodiversity is the diversity of agricultural and ecosystem uses, as well as its cultural identities. It offers a treasure trove for the future. It includes livestock animals and breeds, plant genetic resources used in food and agriculture (“PGRFA”), but also crop wild relatives (“CWR”), the ancestors or close cousins of our cultivated plants. It is time-tested over thousands of years in millions of hands and is constantly evolving in interaction with human societies and the environment. It involves the maintenance and creation of the huge diversity of agricultural plant varieties and livestock animals that have been used as raw material by breeders during the last century.

The diversity of agricultural plant varieties and livestock animals is recognised as crucial for the future world food supplies by the UN Sustainable Development Goals (Goal 2, “Eradication of Hunger”). Today, two-thirds of the world’s food depends on only six crops grown in monocropping production systems, a practice that increases agricultural vulnerability due to pests, climate change or market realities. Agrobiodiversity is a protection against pests and diseases, but also market volatility, its fluctuations and instability. Breeding to maintain diversity, for different agroecosystems and between crops and within crops, not just breeding with biodiversity, is an important strategy to turn our agriculture into sustainable production systems.

Managing agrobiodiversity is a multi-dimensional and dynamic effort.

Agrobiodiversity can only be managed dynamically. It combines deeply rooted local agronomic knowledge with complex social innovations that include but are not limited to breeding, using diversity to create new diversity. These efforts also aim to provide various alternatives to non-sustainable mainstream agricultural production systems, which remain one of the main drivers of agrobiodiversity loss. Agrobiodiversity indeed needs to be tested and constantly used (on farm and in gardens) in changing environments (climate change, management conditions) to provide crop evolution and adaptation. As a living cultural heritage developed by farmers, breeders, seed savers and other local actors over generations, agrobiodiversity is closely linked to cultural traditions and social cohesion. It is both a biological and socio-cultural heritage.



2. CONCEPT: From *Ex situ* Conservation to the Dynamic & Decentralised Management of Crop Diversity

The distinction between plant genetic resources of wild vs. domesticated species has led to different conservation strategies, emphasising *ex situ* efforts provided by gene banks.

The conventional approach to agrobiodiversity conservation is built upon the underlying assumption that, while **genetic resources of wild plants** are best preserved in their natural habitats or the spontaneous ecological communities to which they belong (i.e. *in situ*), **genetic resources of species of agricultural relevance** are best-conserved *ex situ* in genebanks, from where they can easily and efficiently be accessed for breeding and research purposes. During the early decades of international agrobiodiversity conservation efforts, most scientists and policy makers assumed that farmers had no interest nor incentive to keep conserving and managing the traditional agro ecosystems in which landraces and crop wild relatives prospered. The use of these resources was linked to underdevelopment, low production, and poverty. Under the ***ex situ* paradigm**, all plant genetic resources were primarily kept in controlled environments, removed from their place of origin and the dynamic effects of natural and human selective pressures. Even non-domesticated crop wild relatives were collected and stored in genebanks, to be regenerated easily if they presented a particular interest for breeding. To this day, the handful of active genetic reserves for the conservation of crop wild relatives maintain a smaller proportion of diversity than those conserved *ex situ*.

The shortcomings of *ex situ* agrobiodiversity conservation have paved the way for a multi-dimensional approach that includes on-farm conservation and management of agrobiodiversity.

The dominant *ex situ* approach to PGRFA conservation started to be questioned in the late 1980s, as rural sociologists and anthropologists demonstrated the relative in-effectiveness of a purely static means of conservation which removed the plants from their natural and cultural environment. The reductionist and “resource-based” view where agrobiodiversity is viewed as a resource for economic exploitation by breeders and seed companies was countered by a more holistic and systemic vision that looked at **conservation as a multi-dimensional, ecosystem-wide issue**.

Setting up complete *in situ* conservation programmes for PGRFA means providing for **active involvement of farmers and other relevant actors**, introducing a social variable that remains difficult to manage within scientific projects. Another complexity to address relates to the balancing act between the **maintenance of PGRFA unaltered (“on farm conservation”)** on the one hand and **allowing for their dynamic evolution as it occurs in farmers’ fields (“on farm management”)** on the other.

While the conservation approach focuses on the maintenance of identity, albeit cultivated instead of being stored in gene banks, the **agrobiodiversity management approach** focuses on maintaining an overall level of diversity to ensure the sustainability of the system. Maximising direct benefits to the local farmers, the dynamic management of agrobiodiversity includes **seed exchanges, selection efforts and responds to environmental, cultural and market influences**. It thus naturally has additional aspects to mere conservation, such as participatory and decentralised breeding, efforts to restore informal seed systems, the reintroduction of heritage varieties or landraces into farming systems and value chains, but also educational activities and tourism.

The integration of these activities into the very contrasting model of *ex situ* conservation remains a challenge that is increasingly recognised but remains to be fully addressed.

3. CONTEXT: A Diverse Landscape of Actors Navigating a Complex Policy Framework

The landscape of actors and networks involved in the conservation and use of PGRFA is wide and as diverse as the resources themselves, especially regarding to their *in situ* management, and requires a reconsideration of existing institutional structures and their governance.

There is a broad range of actors involved in agrobiodiversity conservation and management. **Ex situ conservation efforts** are carried out by **public gene banks**, which store genetic resources collected by European scientists and research institutions throughout time, especially in the 1960's and 1970's. Gene banks can either have a more generalist eco-geographical orientation (like the Bari gene bank for Mediterranean germplasm in Italy), or have a crop-specific focus (like the one in Braunschweig, Germany focusing on potatoes). Their collaboration was institutionalised in 1980 within the European Cooperative Programme for Plant Genetic Resources (ECPGR) (formerly "European Co-operative Programme for the Conservation and Exchange of Crop Genetic Resources" - ECP/GR) based on the recommendations of United Nations institutions and scientists regrouped in the European Society for Research and Breeding EUCARPIA, concerned that European initiatives were scattered and uncoordinated. Thanks to long-hauled cooperation, especially outstanding data management efforts, the ECPGR now oversees a comprehensive online database, EURISCO, providing information on the 1.8 million "accessions" made available by European gene banks. Although the ECPGR has two thematic working groups related to *in situ* agrobiodiversity efforts: one on wild species conservation in genetic reserves and the other on on-farm conservation and management, the ECPGR's focus has remained the coordination of *ex situ* conservation efforts.

The picture is much more complex and disparate with regards to ***in situ* agrobiodiversity conservation**, and especially its management. A comprehensive mapping was carried out in the framework of the two "Preparatory actions on EU plant and animal genetic resources in agriculture" overseen by the European Commission from 2013 until 2018, with financial support from the European Parliament. These Preparatory Actions were launched in reaction to the European Genetic Resources Programme GENRES I, which ran from 1994 to 1999, and GENRES II, which ran from 2004 to 2009. Their independent evaluation stated that while the objectives of agrobiodiversity conservation, characterisation and collection were well achieved in the EU, greater participation of end-users would be needed to complete the programme's objective of using genetic resources more efficiently, striking a balance between *ex situ* and *in situ*/on farm conservation activities. The Preparatory Actions identified many actors relevant to agrobiodiversity conservation, which included consulting services, botanical gardens, breeders, experts in agricultural genetic resources, end-users, farmers, national governments, gardening organisations and amateur groups, NGO's and researchers. It broke the simpler, yet reductionist equation dominated by gene banks.

The DYNAVERSITY project has shone a greater light on the **increasing and multi-faceted role of seed networks and civil society actors** in the conservation and dynamic management of agrobiodiversity. Analysing nineteen actors involved in on farm agrobiodiversity conservation across different regions of Europe and two actors in the United States of America through the lens of transformative social innovation theory, the project has highlighted the **wide range of activities carried out by these actors, and their interlinkages**. While some initiatives remain centralised, others are structured as national or regional networks of local actors or individuals. Some initiatives put a greater emphasis on seed and know-how exchanges, like the Portuguese "Circuitos de Sementes", others are actively engaged in

farmer-led participatory breeding, like participants of the “Nordic Heritage Cereal Conference” or “Kultursaat”. In contrast, others prioritise the conservation of traditional or heirloom varieties through marketing, like the French “Kokopelli” or members of the “Croqueurs de Carottes”. Most of the mapped initiatives and networks had been gathering in informal forums since 2005, known as the “Let's Liberate Diversity! Forums”, organised by different associations. Building upon such informal cooperation bonds, the European Coordination for Let's Liberate Diversity! (EC-LLD), was established in 2012 as an international non-profit organisation aiming at coordinating the positions and actions of national networks and organisations that encourage, develop and promote the dynamic management of biodiversity on farm and in gardens. Comprising today of 15 member organisations from 12 European countries, the organisation also organises “Let's Cultivate Diversity” meetings, usually taking place on farm, involving farmers, processors and practitioners, and creating opportunities to exchange knowledge.

European seed networks and organisations are certainly a **leading actor of knowledge creation and dissemination around on farm conservation of PGRFA**, specifically their dynamic and collective management, bridging the divide between researchers and practitioners, while also communicating directly with the general public.

As the global regulatory framework assigns obligations to Member States to conserve and sustainably use PGRFA, a wide range of EU policies need to support the dynamic management of agrobiodiversity and its actors.

The conservation and sustainable use of biological diversity are considered complementary and necessary actions in international environmental law, as a central tenet of the 1992 Convention on Biological Diversity. Signed under the United Nations Food and Agricultural Organisation, the 2004 **International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA)** is the most pluralistic legal framework dealing with agrobiodiversity. Besides the Access and Benefit Sharing principles and its Multilateral System, the Treaty includes essential and too often overlooked mandatory provisions for the Contracting States about sustainable use of PGRFA (Article 6), their conservation (Article 5) and farmers' rights (Article 9). These provisions call for more reliable measures such as support for participatory plant breeding, crop and farming diversification, appropriate policies for farmers' involvement in breeding and decision-making processes.

Several policy initiatives aim to implement the ITPGRFA's provisions in the EU. Still, they have remained disparate and unequal, due to the complexity of the European governance construct, but also the inherent difficulties in coordinating action in a multi-faceted issue, which requires the engagement of different policies, in the absence of a dedicated authority. In the realm of seed marketing, derogatory regimes were established to allow for the **registration and marketing of so-called “conservation varieties”**, acknowledging that the conservation of varieties threatened by genetic erosion was more than a prerogative of scientific bodies, researchers, and *ex situ* gene banks. Even though the recognition of such reality dates back to 1998 in the seed marketing acquis, the actual conservation variety registration regime was only made operational ten years later. Its implementation by Member States remains unequal. This shortcoming has been recognised by both the EU Biodiversity Strategy post-2020 and the EU Farm to Fork Strategy; and is currently being assessed in a study carried out by the European Commission.

Nonetheless, agrobiodiversity's dynamic management is much **more wide-scoped than the issue of access to the seed market, as it is directly engaged in agricultural production and food systems.** Networks involved in these activities indeed share the desire to provide various sustainable alternatives to mainstream agricultural production systems, which have been one of the main drivers of biodiversity loss. That is why **all policy mechanisms that are set in place to support the transition into more sustainable food systems in Europe need to provide support for these networks** and include their wide yet largely uncodified and unrecognised knowledge. These mechanisms range from the Common Agricultural Policy, the EU research agenda, and the new food systems governance mechanism to be set out following the EU Farm to Fork Strategy.

4. CHALLENGES AND BOTTLENECKS: Integrating Different Biological and Social Realities in Policy

On farm conservation and management of agrobiodiversity poses technical and political challenges due to its multi-faceted scope, faced with an institutional structure predominantly constructed to fit the needs of the *ex situ* conservation paradigm.

The dynamic management of agrobiodiversity needs **more inclusiveness and more coordinated support at the European level, cascading down to local collective projects,** to help the set-up and sustainable development of multiple new initiatives adapt to the consequences of climate change while ensuring the maintenance and the renewal of local heritage. This dire reality is further heightened by the **division of scientific domains and policy fields** relating to environmental conservation sciences, agricultural studies and collective action dynamics. Actors traditionally linked to biodiversity conservation such as natural parks, are for instance, seemingly little aware of the conservation work undertaken by social actors engaged in the on-farm management of agrobiodiversity, and vice-versa.

In the absence of a European Plant Germplasm Conservation Agency truly bringing these actors together and overseeing the implementation of the full range of rules and regulations that impact agrobiodiversity, the different **adjustments made in specific policy areas will continue to unmistakably fail to assess their overall contribution** to the overarching policy goals of agrobiodiversity conservation and sustainable use. An inclusive and multi-disciplinary policy approach should also bring concrete answers to agrobiodiversity loss and develop the resilience needed to mitigate climate change effects.

The development of current on farm agrobiodiversity conservation and management networks is hindered by the lack of policy coherence in the absence of a dedicated EU agency, but also the internal complexity of social actors.

To efficiently support on farm conservation and management activities, it is paramount to move beyond the mere identification and selection of best sites for PGRFA conservation but **englobe the wide array of existing actors** that have been identified in the aforementioned EU Preparatory Actions, which means the inclusion of researchers, seed networks, civil society actors and citizens in the equation.

However, it is **difficult to engage and leverage real social and territorial dynamics truly.** As living constructs, social actors each have their unique internal organisational mechanisms, values, and priorities. Networks cannot simply be seen as tools for uniting dedicated sites and the individual actors

operating inside them at national, EU or worldwide levels, as they would fail to reflect that agrobiodiversity is not only a biological, but also a socio-cultural resource.

That is why a **significant co-design effort is needed amongst social, scientific and policy actors** to ensure efficient agrobiodiversity conservation and sustainable use strategies, with direct impacts in farmers' fields and consumers' plates.

5. ROAD TO THE FUTURE: Towards dynamic and self-sustainable *in situ* network(s) aiming at increasing diversity in food chains

European seed networks are a critical partner of any effort to integrate on farm agrobiodiversity conservation and its management.

This integration needs to be supported both technically and politically to be accepted, thus requiring a **multi-actor, interdisciplinary and decentralised, locally-based approach**. The farming communities engaged within the networks, as many organic or biodynamic farmers anywhere, are already likely to be contributing to the conservation of all forms of crop diversity in their fields, thanks to their continuous efforts to reduce the impacts of their production systems on the environment and to construct sustainable and diverse agroecosystems. Besides cultivated types, their contribution to wild plants' conservation is likely to be happening haphazardly, taking care of the environment by their organic management, and not in a coordinated or systematic manner if such activities are detached from existing social networks and those actors coordinating largely decentralised on farm agrobiodiversity conservation systems.

Key success factors of agrobiodiversity networks include (1) the involvement of all **actors**, whether public, private, economic and non-economic ones (i.e. civil society, social actors and consumers), which each have a specific agenda and objectives; (2) their commitment to building **trust** among organisations ; (3) their support of PGRFA conservation but also their dynamic **management**; (4) the establishment of links to **local heritage**, short supply chains, valorising agrobiodiversity through its use all along the food chain; and (5) the **outreach** to the critical mass, connecting their activities to citizens.

As a result, the comprehensive, yet largely uncodified and unrecognised knowledge of agrobiodiversity management networks should be included in the policy mechanisms set in place to conserve agrobiodiversity and support the transition into more sustainable food production systems in Europe. This inclusion should be made operational either through the establishment of a truly inclusive genetic resources governance system, or through a strong collaboration mechanism.