POSITION PAPER

Cultivated biodiversity at the heart of the agroecological transition

Recognizing and supporting peasant seed systems in the Mediterranean

Photo : CARI

The Mediterranean basin is home to a **remarkable cultivated biodiversity,** shaped by millennia of adaptation of human societies to varied pedoclimatic conditions. From oasis systems to olive groves, from terraced crops to cereal plains, this cultivated biodiversity constitutes a living heritage, at once biological, cultural and alimentary. However, it is **weakened** by climate change, homogenization of agricultural systems, erosion of local varieties and gradual loss of associated knowledge.

This position paper aims to consider c**ultivated biodiversity as a major lever for the agroecological transition in the Mediterranean**. It proposes ways to better recognize, protect and enhance agricultural genetic resources, local varieties and peasant seed systems as essential elements of farm resilience, food security and territorial sovereignty.

KEYS MESSAGES

- Cultivated biodiversity is a central lever for resilience, food security and climate adaptation.
- In the Mediterranean, this living agricultural heritage is threatened by homogenization, loss of local varieties and erosion of peasant knowledge.
- Farmers' seed systems and collective mechanisms for the management of cultivated biodiversity must be better recognized and supported.
- Agricultural, climate and biodiversity policies must integrate cultivated biodiversity as a lever for agroecological transition.

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Cultivated biodiversity, a pillar of the agroecological transition for more resilient farms and territories

Mediterranean cultivated biodiversity result from millennia of adaptation of human societies to varied pedoclimatic conditions. It has emerged from continuous processes of domestication, selection, exchange and seed production by farmers and rural communities, and encompasses cultivated species, local varieties, agricultural genetic resources and the knowledge and practices associated with them.

Recognized within international agroecology frameworks, through the FAO's (2018) 'diversity' component and the HLPE's (2019) 'biodiversity' principle, cultivated biodiversity is a strategic resource for the agroecological transition. However, its role goes beyond the mere conservation of diversity: it contributes to synergies between crops, the resilience of farms, the co-creation of knowledge, food cultures and resource governance.

Cultivated biodiversity is thus a biological, socio-cultural and strategic resource.

Cultivated Biodiversity: A resource

Organic

Serves as a living reservoir of cultivated species, plant varieties, and populations, and strengthens the synergies and functioning of ecosystems

Strategic

Offers options for adapting to climate, economic, and food crises

Sociocultural

Is based on knowledge, practices, and food traditions, and strengthens social cohesion

In a context of growing climate, economic and food crises, cultivated biodiversity thus appears to be a major lever for the agroecological transition. It contributes to diversifying diets, improving the functioning and performance of agricultural systems, strengthening the resilience of farms to hazards, and supporting collective dynamics, farmers' knowledge and territorial governance of resources. Preserving cultivated biodiversity is therefore not only a matter of heritage conservation: it is a condition for maintaining agricultural systems capable of evolving, producing, feeding territories and coping with climate change.

A lever for the diversification of diets

Situated at the interface between agricultural production, food practices and resource management, cultivated biodiversity contributes to greater dietary diversity in households, particularly in family farming systems. By promoting a greater diversity of cereals, legumes, fruits, vegetables, local varieties and underutilized species, it can support diets of greater variety and nutritional quality (Bioversity International, 2017). This dietary diversity is one of the important dimensions of food security, which is based not only on the quantity of food available, but also on its quality, diversity and ability to meet the nutritional needs of populations (FAO, 2019).

This function is now weakened by the homogenization of food systems and the concentration of global production on a limited number of cultivated species, which are gradually reducing the dietary diversity available to consumers[1].

> **Diversifying crops means promoting a balanced diet and contributing to the food security of the territories**

[1] *Globally, more than 6,000 plant species have been grown for food, but fewer than 200 contribute today significantly to food production, and only 9 crops account for more than 66% of global crop production by weight (FAO, 2019)*

Cultivated biodiversity at the service of agroecological performance

Crop diversification helps to improve the overall functioning of agricultural systems. Species associations, rotations, varietal mixtures or plant cover promote complementarities between plants: better use of space, more efficient use of water and nutrients, soil cover, improved fertility and natural regulation of certain pests. These synergies make it possible, depending on the context, to maintain or improve productive performance while reducing dependence on external inputs (CIRAD, 2025; Noël, 2026).

However, the specialization of production systems and varietal homogenization tend to impoverish these positive ecological interactions. They can lead to systems that are more dependent on inputs, less diversified and less able to exploit local resources.

> **Diversifying crops means strengthening the productive performance and functioning of cultivated ecosystems**

Combining crops in olive systems to increase production

In Tunisia, in the Siliana region, a participatory experiment conducted as part of the NATAE[2] project tested the introduction of a forage mixture between the rows of olive trees, compared to a fodder crop of oats alone. The objective was to evaluate the effects of this association on biomass production, forage quality, olive tree nutrition and olive production.
Initial results show that the forage mixture performed better than oats alone in the three plots monitored, with higher biomass production and better protein content. The association also seems to have had a positive effect on the nitrogen content of olive leaves and on olive production.

This example shows that crop diversification can improve both production, fertility and resilience of Mediterranean olive systems.

A lever for farm resilience

Cultivated biodiversity strengthens the capacity of farms to cope with climatic, health or economic shocks (Noël, 2026). Indeed, not all species and varieties react in the same way to droughts, diseases, pests or temperature variations. By combining species and varieties with different cycles, water needs and sensitivity periods, farmers can also better distribute risks during the agricultural year so that an episode of drought or climate stress does not affect all production at the same time, or with the same intensity (Bioversity International, 2017).

This diversity therefore provides farmers with a wider range of cultural, seed and technical options to adjust their practices when conditions become difficult (CIRAD, 2025).

Local varieties, which have evolved through long processes of selection and adaptation to the soil and climate conditions of the territories, are therefore precious resources. In the Mediterranean basin, where droughts, water scarcity and the degradation of natural resources are reducing the scope for action available to farms (Juffe-Bignoli *et al.*, 2025), their preservation and dissemination are becoming a strategic priority.

> **Diversifying crops and preserving local varieties means reducing risks and strengthening the capacity of farms to cope with shocks.**

Local varieties to cope with water stress

As part of the NATAE project, a participatory experiment conducted in Tizi Ouzou (Algeria) compared a local tomato variety to a hybrid variety, under two irrigation regimes corresponding to 80% and 100% of water needs. The objective was to assess their adaptation to water stress, high temperatures and natural disease pressure.
Initial results highlight that the local variety showed better growth, higher fruit production at the end of the cycle and better resistance to drought and mildew than the hybrid variety.
This experiment illustrates the strategic role of local varieties as adaptation resources for agricultural systems exposed to water scarcity.

[2] *NATAE – Agroecological transition in North Africa (2022–2026). Horizon Europe Program*

A lever to strengthen social cohesion

Cultivated biodiversity relies largely on peasant seed systems through the conservation, exchange and adaptation of seeds. In many countries in the Global South, up to 90% of seeds are saved by farmers (Degelo *et al.,* 2024). Seed saving thus plays an important role in social cohesion. Seed exchanges and experiments promote the circulation of knowledge, the intergenerational transmission of knowledge and the co-creation of solutions adapted to local contexts (CIRAD, 2025). These dynamics strengthen the links between farmers, but also between researchers, agricultural advisors and other actors in the territories, while promoting forms of shared governance around the management of agricultural genetic resources.

When local varieties disappear, it is not only genetic resources that are eroded: it is also knowledge, agricultural practices, food uses and forms of local autonomy that are weakened (CIRAD, 2025).

> **Diversifying cultures means strengthening social ties, collective knowledge and the capacity for action of territories.**

The conservation and transmission of local seeds: testimony of a farmer in Laghouat, Algeria

Ismaël remembers well the arrival of commercial seeds in Laghouat in the 90s. « At that time, seed companies started selling very good quality hybrids at very low prices, he says. Farmers bought them and got used to them: these seeds allowed them to really increase their yields. But over the years, they have seen the quality drop. They were more susceptible to disease and could not tolerate the conditions of the region well while they were becoming more and more expensive. » Without his father, he too might have fallen into the trap. « He acted as a bulwark,» he explains. He knew the value of local seeds, their flavor, their quality. »
[...] Over time, disappointed market gardeners turned to him.
[...] « I really feel it is my duty to raise awareness amongst farmers about reviving these local seeds, which used to have real flavour and aroma and kept well," he explains. "That is the service I want to offer my community today.»

Excerpt from the book «Noël and Demay (2026). Farmers and agroecology. Travel diaries in North Africa» produced under the coordination of CARI as part of the NATAE project

Photo: Saci Lazhari

Promoting the living management of cultivated biodiversity: farmers' seed systems, collective mechanisms and conditions for success

For cultivated biodiversity to fully contribute to the agroecological transition, it must remain alive, meaning cultivated, selected, exchanged, consumed and adapted in the territories. Its preservation cannot rely solely on ex situ conservation devices, seed banks or collections. It also depends on farmers' practices, local seed systems, associated knowledge and collectives capable of circulating these resources.

Promoting this living management presupposes first of all recognising the role of peasant seed systems in the conservation, selection, multiplication and exchange of seeds. It also involves supporting collective mechanisms (seed houses, networks of conservative farmers, experimentation platforms or participatory breeding programs) capable of documenting, experimenting, transmitting and promoting local varieties.

Finally, these dynamics cannot develop sustainably without animation, training, clear governance, access to genetic resources and frameworks conducive to the exchange and development of farmers' seeds.

Recognizing the role of farmer seed systems

Farmers' seed systems play an essential role in the conservation, selection, multiplication and circulation of seeds. They are based on farmers' networks, local knowledge, rules of exchange and continuous adaptation practices.

However, farmers' seed saving practices are poorly recognized and constrained by regulatory frameworks designed for standardized seeds (Degelo *et al.,* 2024). Peasant seed systems should not be opposed to formal seed systems, but recognized as complementary systems, particularly important for local varieties, underutilized crops and territories subject to strong climatic constraints.

> **Recognizing peasant seed systems means recognizing the ability of territories to conserve, adapt and disseminate their cultivated biodiversity.**

Supporting collective management mechanisms for cultivated biodiversity

Seed houses, community banks, seed fairs, networks of farmers, experimentation platforms and participatory breeding programs are all mechanisms for circulating and promoting cultivated biodiversity.

These initiatives are not limited to seed saving. They make it possible to document local varieties, to organise their multiplication and dissemination, to share associated knowledge, to strengthen the quality of seeds and to create links between farmers, researchers, consumers, processors and territories.

> **The management of cultivated biodiversity is based on collectives capable of conserving, experimenting, transmitting and enhancing.**

Creating the conditions for success

The conservation and enhancement of cultivated biodiversity presupposes that local varieties can continue to evolve with the pedoclimatic conditions, agricultural practices and food needs of the territories. It also strengthens farmers' capacity to experiment, adapt and transmit useful resources in the face of crises (Degelo *et al.*, 2024).

These mechanisms cannot function sustainably without animation, training, clear governance, technical support and institutional recognition. They also require easier access to genetic resources, spaces for experimentation and frameworks conducive to the exchange and development of local seeds (Ygaunin, 2023).

Supporting cultivated biodiversity therefore implies investing as much in seeds as in the people, knowledge, organizations and rules that make it possible to sustain them.

> **Cultivated biodiversity needs favourable social and institutional contexts to become a lever for agroecological transition.**

In Laghouat (Algeria), a local dynamic in favor of cultivated biodiversity

In the M'Zi valley, in Laghouat, the El Argoub association, with the support of the NATAE and PAOMA projects[3], une dynamique locale de préservation et de valorisation de la biodiversité cultivée. Cette démarche associe agriculteurs, acteurs locaux et institutions de recherche autour d'un objectif commun : maintenir les variétés locales en usage et renforcer leur contribution à la transition agroécologique du territoire.

is promoting a local dynamic of preservation and enhancement of cultivated biodiversity. This approach brings together farmers, local actors and research institutions around a common objective: to maintain local varieties in use and strengthen their contribution to the agroecological transition of the territory.
Several actions are undertaken: characterization of local cultivated biodiversity, experiments on the performance of local varieties of cereals and market gardening with the support of INRAA[4] and partner farmers, training in seed selection and multiplication techniques, and reflections on the establishment of a seed house.

This dynamic also contributes to national debates on the recognition of farmers' seeds and the legislative frameworks necessary for their conservation, exchange and valorization.

The example of Laghouat shows how a territorial approach can link the conservation of local varieties, farmers' experimentation, scientific research and advocacy for farmers' seed systems.

[3] PAOMA – *Program for the Preservation and Economic Development of Oasis Agrobiodiversity in the M'Zi Valley in Algeria (2022–2027). AFD financing*
[4] *INRAA : National Institute of Agronomic Research of Algeria*

What are the recommendations for strengthening cultivated biodiversity in the Mediterranean agroecological transition?

Strengthening cultivated biodiversity in the Mediterranean agroecological transition requires a coordinated mobilization of many actors. Public authorities, research, agricultural organisations, civil society, donors and Mediterranean networks (such as the MEDAE network[5]) each have a role to play in better recognising, conserving, using and enhancing local varieties and farmers' seed systems.

The following recommendations aim to create the political, technical, economic and social conditions that allow cultivated biodiversity to become a concrete lever for the agricultural resilience of territories in the face of climatic, socio-economic and political challenges.

For national and local public authorities: cultivated biodiversity must become a concrete object of agricultural, climate and food policies.

- Explicitly integrate cultivated biodiversity, local varieties and peasant seed systems into agricultural, food, climate and biodiversity policies.
- Identify the regulatory obstacles to the conservation, exchange, multiplication and valorization of local and peasant seeds.
- Support dynamic conservation on the farm, in addition to seed banks and institutional collections.
- Finance territorial mechanisms for the management of cultivated biodiversity: seed houses, test platforms, networks of conservative farmers

For research, training and agricultural advice: the agroecological transition requires skills capable of linking seeds, agricultural practices, food and territories.

- Document local varieties, their uses, their agronomic, food and cultural characteristics, as well as the associated peasant knowledge.
- Develop participatory breeding programs involving farmers, researchers, agricultural advisors, processors and consumers.
- Support agricultural advisors to support farmers in diversifying cropping species, varieties and systems.

For agricultural organisations, civil society organisations and Mediterranean networks: bringing cultivated biodiversity to life requires collectives capable of conserving, experimenting, transmitting and enhancing.

- Support the creation and animation of collective mechanisms for the management of cultivated biodiversity
- Organize seed exchanges, farmer training, cross-visits, local fairs and spaces for the transmission of knowledge.
- Promote products from local varieties through territorial markets, short circuits, collective catering, artisanal processing and quality approaches.
- Capitalize on and disseminate Mediterranean experiences in the management of cultivated biodiversity.
- Carry out joint advocacy in international spaces related to biodiversity, climate, desertification, agriculture and food.

For donors and international organisations: make cultivated biodiversity a lever for development for Mediterranean agricultural resilience.

- Finance long-term programs dedicated to cultivated biodiversity, peasant seed systems and the agroecological transition.
- Support pilot projects in oases, drylands, mountains, cereal plains, agro-sylvo-pastoral systems and other vulnerable Mediterranean territories.
- Promote exchanges between territories, countries and networks of actors committed to the preservation and enhancement of local varieties.

[5] *MEDAE - Réseau multi-acteur sur l'agroécologie en Méditerranée*

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Transforming Agriculture in North Africa

PAOMA
Agrobiodiversité de la vallée du M'Zi

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