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Promoting climate resilience in the agricultural sector with native seeds and better-adapted crops in Navarre, Spain

Advice on collecting, multiplying, and conserving native plant seeds supports adapted agricultural practices

Navarre is proactively preserving vegetable varieties and showcasing the best-adapted cereals and other crops to each agricultural climate in the region.

Key Learnings

- **Recovering Local Varieties:** Recovering nearly a hundred local vegetable seed varieties, many adapted to the specific regional agroclimatic conditions, has enabled preserving species cultivated over generations. These adapted varieties represent an opportunity for future crops under new climatic conditions.
- **Best adapted plant material selection:** Developing a platform, which includes a public “ADAPTATION” module, allows transferring the most relevant plant-related information to advisers and professionals. The platform – GEXPER – developed by the public company Institute of Agri-food Technologies and Infrastructures of Navarre ([INTIA](#)) enabled selecting the best-adapted plant material for the given location.
- **Knowledge transfer** has supported other initiatives, such as the "[Libraries and Seeds](#)" project, which has facilitated public access to these varieties, to promote local species variety cultivation and preservation in both urban and rural gardens.

About the region

The Navarre region, located in northern Spain, spans approximately 10,400 km² and has a population of about 680,000. Navarre has a great climatic diversity, which in turn creates a wide variety of ecological, landscape, and land use. Agriculture is one of the region's most important sectors, both economically and in terms of its impact on the rural environment and the region's identity.

Climate Hazards

Extreme Heat, Extreme Cold, Droughts,
Flooding

Sector

Agriculture, Biodiversity protection

Key System

Ecosystem and Nature-based Solutions,
Land use and Food systems,
Local Economic System



Figure 1: Location of the Navarre region within Spain and Europe.

Climate Threats

Changing climatic conditions pose a challenge to agricultural (eco) systems in Navarre due to the loss of genetic variability, and for food security. Projections made in the [Climate Variability study](#) revealed that the average temperature is expected to increase by 3.5°C by 2080 compared to 1991 under the highest emission scenario (RCP 8.5). Changing rainfall patterns, along with an increase in the frequency and duration of droughts, will require better agricultural resilience.

Agricultural Seed and Variety Preservation

Preserving local agricultural species and their varieties is crucial to ensuring ecosystem resilience under the effects of climate change. Those species are essential for biodiversity protection, food security and sustainable resource management. The loss of native varieties adapted to local conditions can compromise the ability of agricultural systems to cope with extreme events such as droughts, floods, and temperature fluctuations. Preserving and promoting their use protects genetic and cultural heritage. It also strengthens the adaptive capacity of territories and supports ecosystem regeneration, contributing to mitigating and adapting to climate change impacts. Good advice when choosing the crop varieties best suited to each agricultural climate (agro-climatic) zone is vital to maintain a strong, profitable and competitive agricultural sector.

Climate Adaptation in Navarre's Agriculture

The Chartered Community of Navarre is currently implementing the [Climate Change Roadmap for Navarre](#) (CCRN-KLINA), which integrates both mitigation and adaptation measures. Since 2018, the region has placed particular emphasis on strengthening climate resilience in key sectors, especially agriculture.

As part of the integrated European project [LIFE-IP NAdapta-CC](#), the public company INTIA supports farmers with independent, science-based advice on selecting the plant varieties best suited to local conditions, while also promoting the recovery of traditional crops. A dedicated online tool helps users identify the most suitable plant material based on agroclimatic zones, supporting informed decision-making at farm level. In parallel, fieldwork has also helped to locate, identify, and preserve more than sixty local seed varieties with high natural value and has enabled the creation of a guide to local varieties.

Recovering ancient crop varieties to strengthen climate resilience

The evolution of agriculture and society has led to the global standardisation and commercialisation of seeds by large, specialised companies. This shift has favoured high-yield varieties and production specialisation, significantly increasing agricultural output and helping feed a growing population. However, it has also caused a significant loss of varietal and genetic diversity within crops.

Amid this trend, some farmers have preserved ancient seeds in their villages and gardens, driven by perseverance and family tradition passed down through generations. Today, their efforts represent a valuable source of resilience. These locally adapted varieties may play a vital role in strengthening food security and enabling agriculture to cope with changing environmental conditions. Showcasing these varieties and their specific characteristics is key to promoting the fight against genetic erosion.

As climate change intensifies agricultural challenges, experts have renewed their interest in these ancient seeds, which are well adapted to their local environments and have demonstrated long-term resistance to diseases and extreme weather. Within this context, a core focus of the LIFE-IP NAdapta-CC project has been the recovery of ancient and local horticultural varieties maintained by farmers across Navarre. Thanks to the work of INTIA and the generous collaboration of many farmers and individuals, nearly one hundred horticultural varieties have been recovered.



Figure 2: The guide to local horticultural varieties of Navarre, in its paper version. Image Credit: NADAPTA.

Some of the recovered varieties are presented in the Guide to Local Horticultural Varieties of Navarre ([Guía de variedades locales de Navarra](#)), published in Spanish and Basque (Figure 2). This free resource, available in both

print and PDF format, describes the characteristics of each species and encourages their continued use and conservation.

Long-term preservation of native seed varieties

Besides preserving crop varieties, preserving bean, lettuce, and tomato species also contributes to adapting agriculture. Delivering these seeds to the Horticultural Germplasm Bank of the [Centre for Agricultural and Food Technology Research](#) (CITA) in Zaragoza, and storing them at -18°C, enables their long-term preservation. Germination tests to ensure seed quality and viability, and sending a portion of them to the [INIA-CSIC Phylogenetic Resources Centre](#) in Alcalá de Henares provides a safety duplicate. Similar work is done regarding watermelons with seeds that have not been planted since the 1970s.

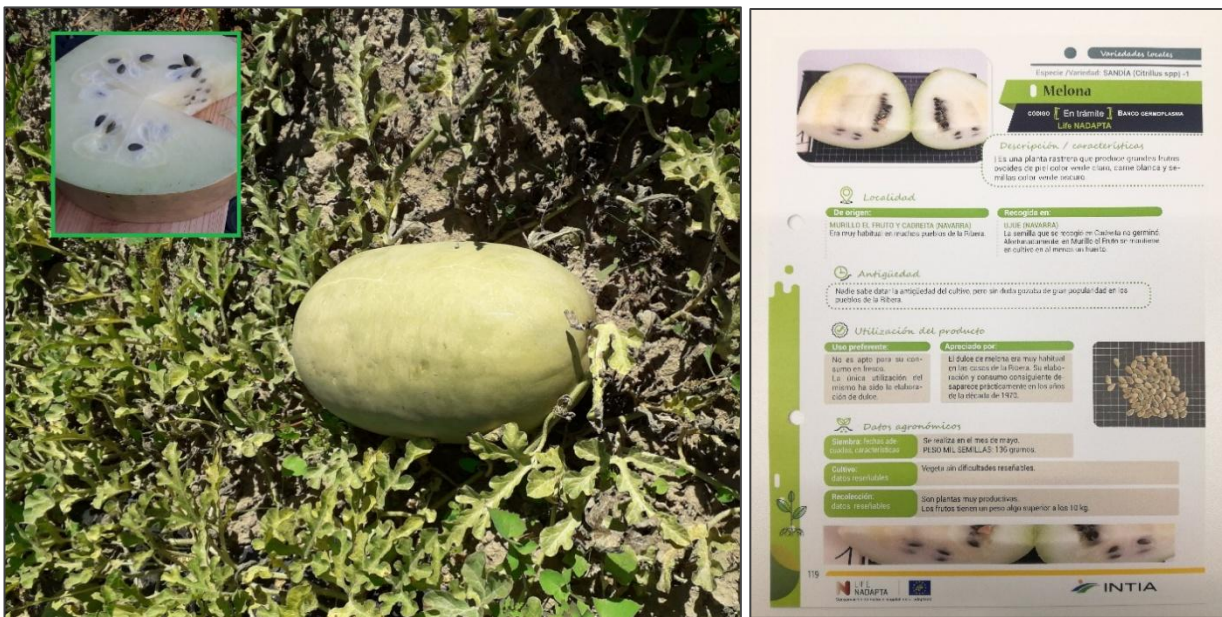


Figure 3: A native melon, next to its technical sheet in the guide. Image Credit: LIFE-IP NAdapta-CC.

GEXPER, the experimental manager platform of INTIA

The public company INTIA's own digital platform, [GEXPER](#), monitors, stores and exploits all the information it generates within the tests INTIA conducts through demonstrative actions in the field. This platform enables transferring some of the most relevant results in selecting the best-adapted plant material (facilitating the analysis of the information) to the agricultural sector and in studying historical data series. The results of each season inform the platform, which is undergoing improvement by incorporating historical data. Currently, information on soft wheat and barley varieties for adaptation purposes is available [online](#) (in Spanish only), but information on other crops will be available soon.



Figure 4: A screenshot from the GEXPER platform. Image Credit: LIFE-IP NAdapta-CC.

Several newspaper articles, special report recordings and interviews over the years reflect great media attention about the preservation work and its progress. In recent years, INTIA has continuously received collaboration offers from individuals who have been preserving various seed species for decades, which has allowed it to inform and expand the recovery catalogue. The “Libraries and Seeds” (“[Bibliotecas y semillas. Liburutegiak eta haziak](#)”) project of the Public Libraries Network of Navarre collaborates with the [Seed Network of Navarre](#). To date, the seed lending service has incorporated almost fifty local horticultural varieties recovered in recent years. This service enables the public to use and reproduce these varieties in urban and rural gardens, thus contributing to the preservation of agricultural biodiversity and encouraging community participation. The success of the initiative is linked to the high level of citizen collaboration, the number of local seeds collected, and the subsequent communication, dissemination, and knowledge transfer.

Summary

Climate change is driving biodiversity loss, degrading ecosystems, and threatening the long-term viability of agriculture. Preserving and recovering local varieties, better adapted to their environments than many commercial ones, helps address these challenges and strengthens the territory's resilience. Through the [LIFE-IP NAdapta-CC](#) project, multiple seed species have been collected and identified across several areas of the Navarre region thanks to close collaboration between the project team and local citizens. INTIA has classified, multiplied, and sent these seeds for conservation in the regional plant material bank. It has also developed [GEXPER](#), a digital platform that includes a public ADAPTATION module designed to share key information with farmers and support the selection of the best-adapted plant material. This knowledge transfer has also contributed to a free public guide on vegetable varieties and inspired related initiatives such as Libraries and Seeds, both of which benefit from the project's ongoing work.

Further information

The work presented within this adaptation story is part of the [LIFE-IP NAdapta-CC](#) project.

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- Climate Change Roadmap for Navarre (CCRN- KLINA): [Website](#)
- GEXPER: [Website](#)

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