

# Focus Group 'Local plant genetic resources in view of climate change and biodiversity loss'

Madrid, Spain  
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# Starting paper

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## EU CAP Network Focus Group 'Local plant genetic resources in view of climate change and biodiversity loss'

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the European Union

## Purpose of the starting paper

### Coordinating expert profile:

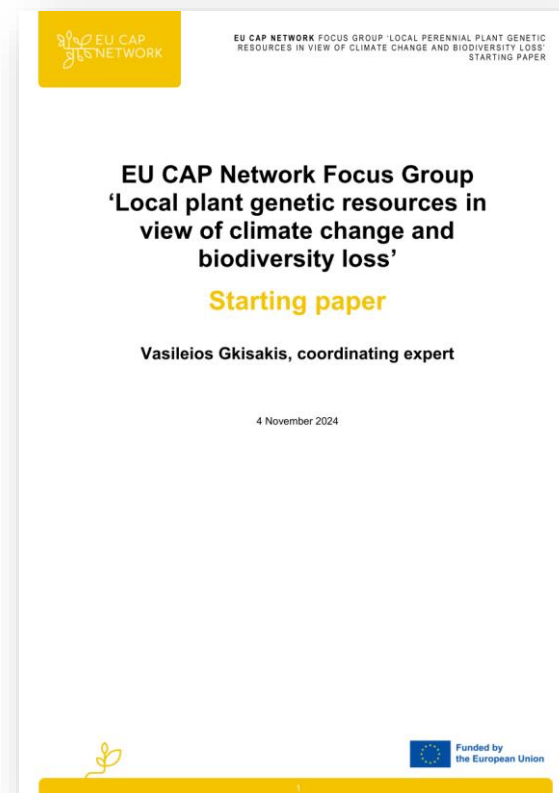
Dr. Vasileios Gkisakis

- **Researcher (C')** in Institute of Olive, subtropical crops & viticulture (IOSV), **ELGO – DIMITRA**, Kalamata, **Greece**.  
**Topics:** Olive & mediterranean tree crops, Agrobiodiversity, Sustainability, Agroecology
- Assigned member of Greek **national Technical Committee of Plant Propagating Material**
- Adjunct professor of **Agrobiodiversity** at **CIHEAM-MAICh** / MSc programme on **Sustainable agriculture**
- Board member of **Agroecology Europe Association**, moderator of **Greek Agroecological Network** & member of **ISHS Commission of Agroecology & Organic farming systems**



➤ **Preparatory material, describing the state of the art from research & practice point of view**

providing a **general framework** for the different tasks awaited to be accomplished by participating experts





# Perennial crops in the EU's farming sector: Facts & figures

➤ **Most important role for European farming sector:**  
**1.5 million holdings** | **3.7 million ha** | **€27.3 billion value**  
 (Eurostat, 2024)

## ➤ Fruit and Nut Trees

(Olive, Citrus, apple & pears, nuts)

## ➤ Grapes

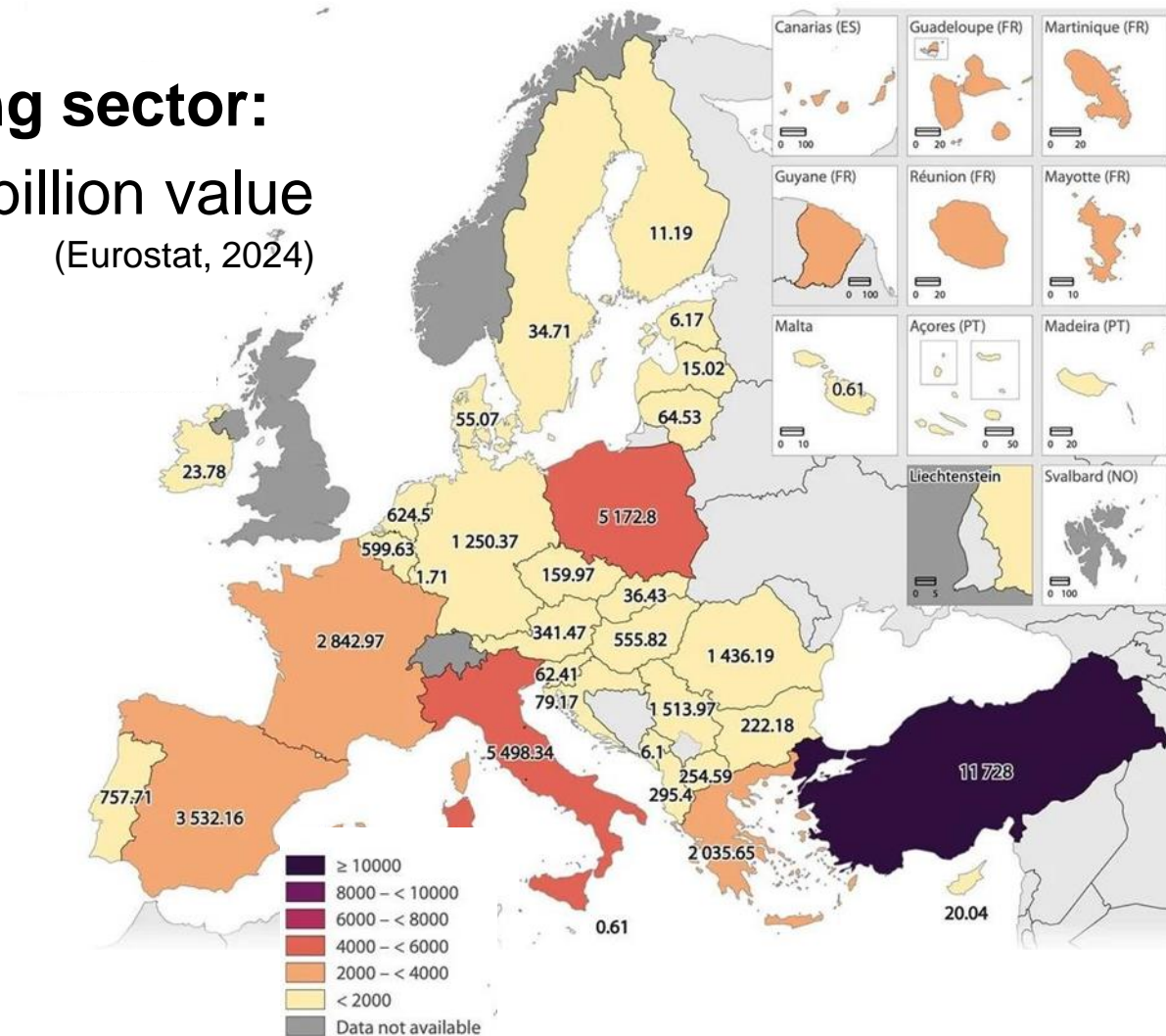
## ➤ Berries

(Strawberries, raspberries, blueberries)

## ➤ Medicinal & aromatic plants

## ➤ Energy crops

(Miscanthus & Switchgrass)

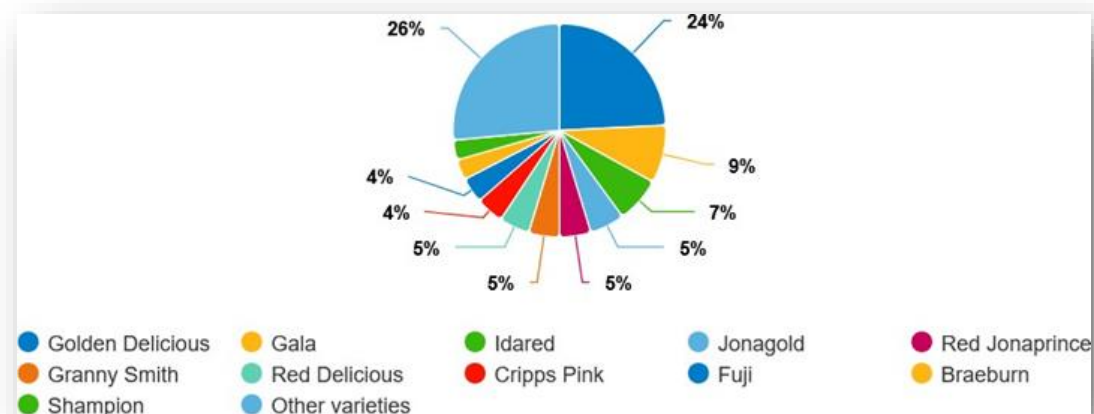


Production fruits, berries and nuts (in million tonnes) in EU for 2002 (source: Eurostat)

## Local & under-utilised perennial crops

- › Important yet **overlooked** resource promoting **agroecosystem services**, diversification, sustainability, food security and holding a **potential for climate change adaptation, resilience & mitigation**
- › **Under-utilised** due to rise of **commercial, competitive cultivars**
- › **Very small fraction** actively **commercialized**

Apples: 2000 R(EU)/38 C | Pears 2365 R(EU)/15 C | Grapes: 1271 R(WW)/ 15 C | Olives: 1237 R(EU)/8 C



Apple stock (n 1000 tonnes) in EU in 2021 (source: TasteAtlas)



# Local & under-utilised perennial crops

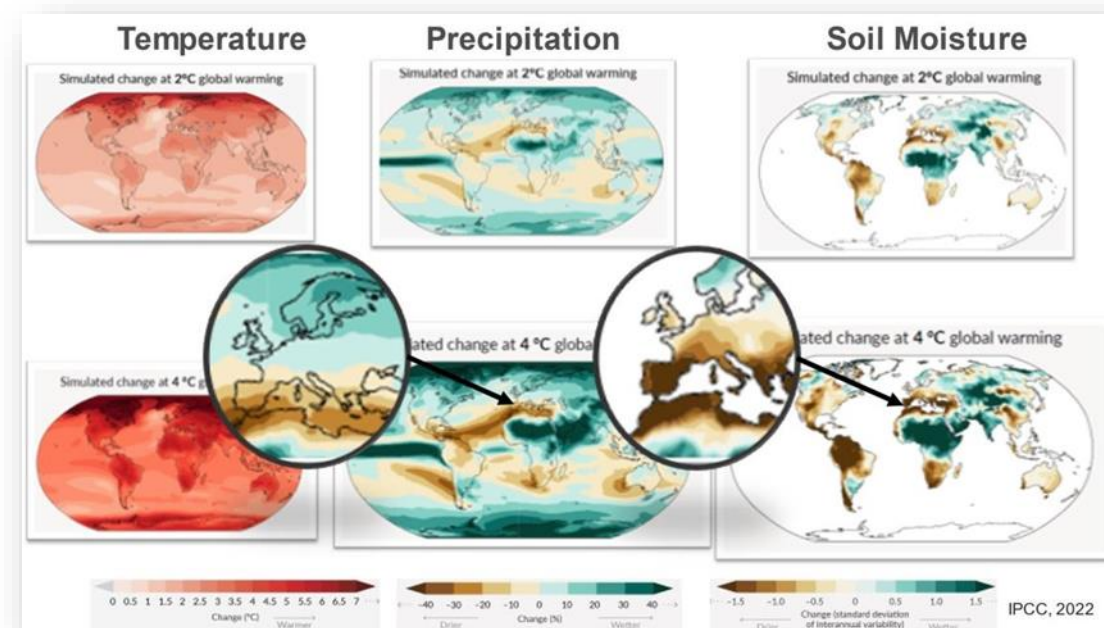
## Importance & value

### Main aspects:

#### > Climate change adaptation, resilience & mitigation

- Inherently **well-adjusted to local micro-climates**, becoming **resistant to environmental stresses** (drought, temperature fluctuations, pests)
- **Diversification** by inclusion of appropriate adapted varieties create **robust & well-functioning agroecosystem**, improving **resilience to climate stresses**
- **Sequestration** of greater **C fraction**
- **Lower input** requirements
- **Reduced soil disturbance**, improving soil health & enhancing carbon sequestration

**Examples:** “Assyrtiko” grape variety; Santorini, Greece, highly resistant to drought and thriving in nutrient-poor soils now tested in other Mediterranean countries,  
 “Rambour Franc” apple variety; eastern France & Germany drought-tolerant & well-suited to warmer conditions, considered with high potential to support crop stability, especially in areas prone to water stress, under climate change conditions



Maps indicating global temperature, precipitation & soil moisture, according to future climate change global warming scenarios of 2°C & 4°C until year 2100  
 (Source: IPCC)



## Local & under-utilised perennial crops

### a. Importance & value

#### > Agroecosystem diversification

- Diversity at **gene, species & landscape** level to **maintain ecosystem functioning** as important **resilience strategy & toolkit**, for **reversing biodiversity loss**
- Contribution to enhancing **important agroecosystem services** (e.g. pollination & pest control)

#### > Low-input farming

- **Adapted** to conditions of **minimal agricultural inputs**. e.g. synthetic fertilizers or pesticides; particularly **attractive for agroecological farming systems**

#### > Plant breeding

- **Critical resources for farmers & breeders** to develop new crop varieties with desirable traits and meet current & evolving challenges

#### > Nutritional & health benefits

- **High** nutritional value & contain compounds **beneficial for human health**

#### > Cultural & Economic Importance

- Special **cultural significance** & part of **traditional diets**





## Local & under-utilised perennial crops

### b. Conservation & sustainable use

- ❖ Critical for addressing issues of **biodiversity loss & climate change adaptation**, together with food insecurity, and poverty alleviation
- ❖ ITPGRFA prioritises, as a **legally binding instrument**, the **facilitation of conservation & sustainable use** of plant genetic resources and **fair & equitable sharing of benefits** derived, in harmony with **CBD**

### Key approaches:

#### ➤ On-farm (In Situ) conservation

- Maintenance **within natural ecosystems** or traditional farming landscapes, allowing to evolve alongside local **environmental & cultural changes**.
- Foreseeing **farming community involvement** as local farmers play a **crucial role** in conserving perennial traditional varieties & respective farming practices

**Example:** “Biofru” organic farm, Kastoria, Greece, part of the “Aegilops” network, conserving more than 100 hundred local & underutilised varieties of apples and 60 pear varieties, most of them endangered due to abandonment by commercial farmers



*Open farm days in Biofru organic farm, Greece presenting the local apple varieties collection (source: Biofru)*



## Local & under-utilised perennial crops

### b. Conservation & sustainable use

#### › Ex-situ conservation

- Preservation **outside** natural environment: on-field collections (institutional or farm community level), botanical gardens, but also seed banks.

#### › Breeding

- **Essential investment** in research on advantages of agronomic & physiological attributes
- **Participatory plant breeding (PPB)** integrating end users into varietal development process

**Practical example:** “**apfel:gut**” project specializing in organic on-farm breeding of **pome fruits** through collaborative approach & involving diverse group of practitioners, advisors, breeders & researchers within the organic fruit growing sector

#### › Nutritional value

- Can boost consumer interest & support conservation efforts, due to **nutrient-density** related attributes and offer potential as functional foods



## Local & under-utilised perennial crops

### c. Successful initiatives

#### › Valorisation & value chain creation

- Requiring multifaceted approaches, incorporating sustainable farming, economic incentives, consumer awareness, also policy support.

Main such **approaches**:

- Promoting **local agricultural knowledge & traditional practices**
- Implementation of **sustainable farming practices** based on **agroecological principles**
- Economic aspects of **value-added production** taking advantage of **special attributes** of local genetic resources
- Participatory approaches** in research, especially breeding
- Networking & collaboration**

**Example:** “Mavrelia” (or Mavrolia), a local & under-utilised olive-oil producing variety, as valorised by the “Nileas” Farmers Group, Chora Messinias, Greece (Poster)

**Use of « Mavrelia» local olive variety to valorise olive oil production**  
NILEAS FARMERS GROUP



**DESCRIPTION OF THE CASE**  
Nileas Group of Farmers, based in the Peloponnese region of Greece, is known for its innovative use of local olive varieties, such as “Mavrelia” variety, an under-utilized, local perennial olive variety with unique characteristics, such as early ripening largely neglected in favor of more commercial olive varieties but offering opportunities for sustainable agriculture, economic growth, and biodiversity conservation.

**AGRONOMIC & ENVIRONMENTAL VALUE:**  
The use of Mavrelia variety for commercial olive oil production enhances:  
**Biodiversity Conservation:** The cultivation of “Mavrelia” helps conserve genetic diversity in olive production. By promoting a lesser-known variety, the farmers contribute to maintaining local biodiversity, which is critical in an era of increasing monoculture.  
**Adaptation to local conditions:** As a native variety, Mavrelia is naturally adapted to the local climate and soil conditions. This reduces the need for water, fertilizers, and chemical pesticides, minimizing the environmental footprint of farming.  
**Soil and Water Management:** By using organic farming practices, the Nileas Group focuses on maintaining soil health through crop rotations and composting, preventing erosion, and promoting water retention in drought-prone regions.

**GEOGRAPHICAL LOCATION:**  
Messinia area, Peloponnese, Greece

**INVOLVED ACTORS:**  
NILEAS Farmers Group

**SOURCES OF INFORMATION, REFERENCES, WEBSITES:**  
<https://nileas.gr/>

**SOCIO-ECONOMIC VALORIZATION**  
Commercialization of the Mavrelia olive variety have opened an economic opportunity for the Nileas farmers through:  
i) **Premium Product Marketing:** Mavrelia’s unique flavor profile & early-ripening attribute successfully positions Mavrelia olive oil as a niche, high-value product;  
ii) **Branding:** By emphasizing the local, traditional, and ecological aspects of Mavrelia production, the Nileas Group has tapped into markets that value sustainability, heritage, and artisanal products.  
The conservation & use of Mavrelia has a potential positive social impact on the local farming community through:  
i) **Community Cohesion:** By promoting collective farming activities, bringing together small-scale farmers to share resources, knowledge approach it strengthens the local community’s resilience.  
ii) **Traditional olive farming:** By reviving a traditional olive variety, the farmers are helping to preserve cultural heritage and pass on agricultural knowledge to younger generations.

**SUCCESS FACTORS:**  
**Collective Action:** Nileas operates as a cooperative, allowing farmers to pool resources, share risks, and collectively access markets.  
**Market Differentiation:** By focusing on the unique characteristics of the Mavrelia variety, the group has successfully differentiated its product in a competitive olive oil market.  
**Sustainability Focus:** The group’s commitment to organic farming and environmental sustainability resonates with modern consumers who are increasingly concerned with the ecological impact of the products they purchase.

**CHALLENGES & OPPORTUNITIES:**  
Challenges include factors related to marketing as access to premium markets requires investment. Also, further research is required with regards to the agronomic characteristics of the variety, regarding early ripening, optimization of harvest time, response to low input conditions, as well as market research & branding. Opportunities appear though regarding market positioning as a premium artisanal product based on the use of local genetic resources.








# Local & under-utilised perennial crops

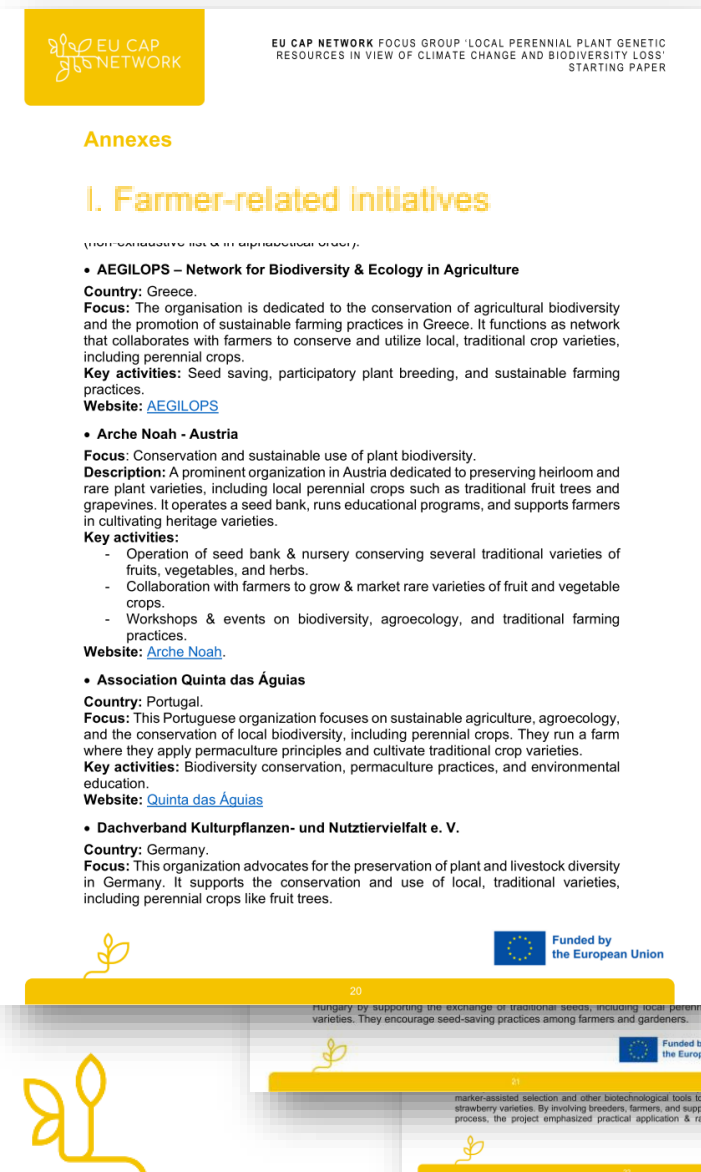
## c. Successful initiatives

### > Farmer-related collective initiatives

- Several initiatives across EU currently working to **conserve & promote the sustainable use** of local and under-utilized perennial crops.
- These are **non-institutional** networks & organizations, working in **direct collaboration with farmers & civic society**, focusing on conserving biodiversity, but **also promoting agroecological practices**, enhancing **food security**

**Initiative example: Let's Liberate Diversity! (LLD):** European Network established in 2005, collectively working on conservation and sustainable use of agricultural biodiversity through **farmer-led initiatives & participatory seed systems**. Connecting a wide range of **stakeholders**, including **farmers, researchers, breeders, civil society organizations, and policymakers**, to advocate recognition & protection of **farmers' rights** on biodiversity conservation & use. LLD's key activities include i) Hosting annual **forums & events**, ii) Supporting **community-level activities**, iii) **Advocating** for farmers' rights, iv) Encouraging **Participatory Plant Breeding**, and vi) Raising **awareness & training**.

*List of representative initiatives at EU level, including details found in paper's Annex 1*



# Local & under-utilised perennial crops

## c. Successful initiatives

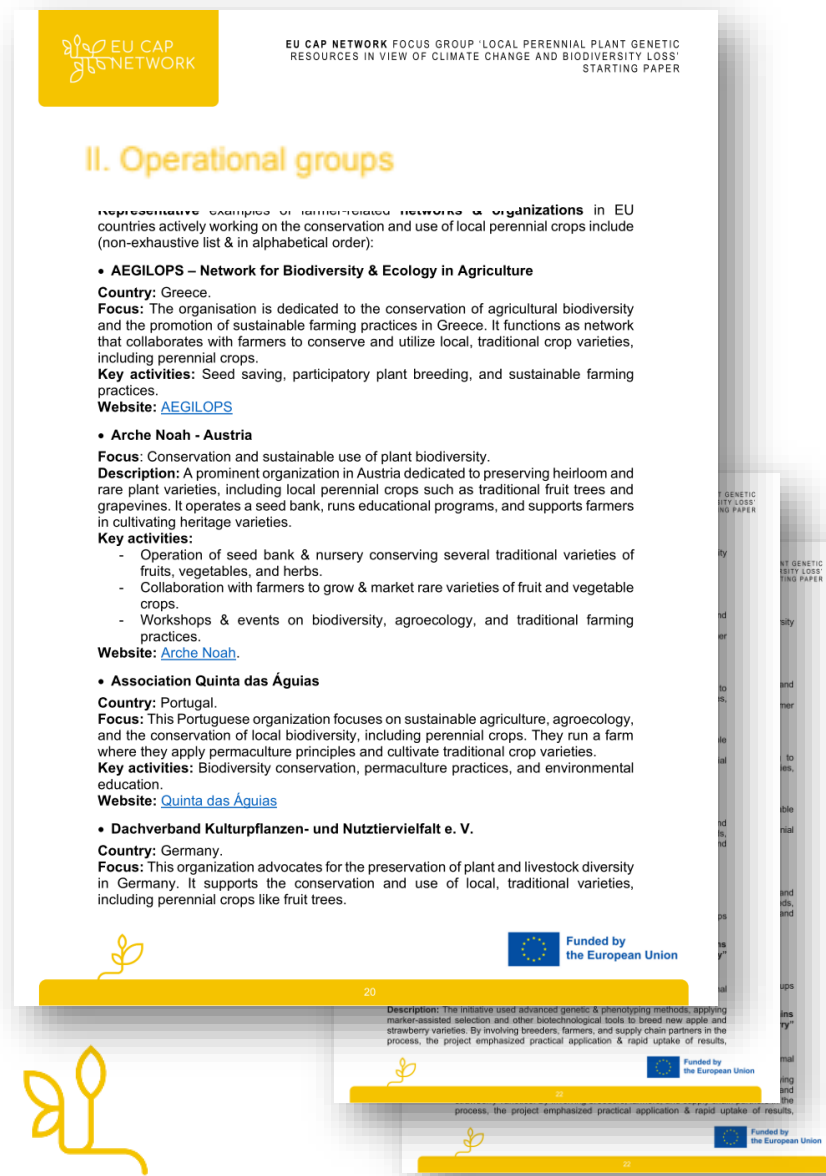
### ➤ Innovative practice-oriented projects: Operational groups

- EIP-AGRI Operational Group projects (OGs): **groups of stakeholders** with complementary knowledge to **co-create practical solutions** for agriculture, forestry and rural communities in an innovation project.
- Several EU-funded OGs **dedicated to the topic** of conserving & using local and under-utilised perennial crops

**OG example: Biodiversamente Castagno:** “Guidelines for the preservation and enhancement of biodiversity the chestnut in Emilia Romagna”, Italy (2017-2020). OG aimed to protect & promote diversity of chestnut varieties in Emilia Romagna region, targeting specifically varieties at risk of genetic erosion. Characterized chestnut groves’ biodiversity & developed sustainable conservation practices. Also, involved mapping & genetic characterization of local chestnut varieties as well as studying soil biodiversity. Established guidelines to conserve chestnut germplasm & engaged local producers as biodiversity custodians, while supporting eco-friendly farming practices.



List of representative OGs at EU level, including details found in paper’s Annex I



## Local & under-utilised perennial crops

### c. Successful initiatives

#### > Research

- **EU biodiversity strategy for 2030: Several research activities at EU-wide** aiming at halting further loss of genetic diversity & face important environmental **challenges generated by climate change**

### Main focusing axes:

#### > Enhancing diversity of crops & cropping systems

- Focus on advancing **monitoring, characterization, conservation & use** of perennial plant genetic resources, to promote crop improvement, sustainable farming & meet demands of food security & better nutrition.

#### Examples:

**FRUITDIV:** focusing on potential of diversity of fruit tree Crop Wild Relatives (CWR);

**DiverIMPACTS:** promoting diversification of cropping systems for improved productivity, ecosystem services & resource-efficient and sustainable value chains;

**EUFORGEN program:** focusing primarily on forest species but also on under- utilized perennial tree crops





## Local & under-utilised perennial crops

### c. Successful initiatives

#### > Climate-resistant & resilient farming

- Focus on the **reality of increasing climate stresses** & respective need for perennial crops **capable of capturing resources more efficiently and being resilient** to abiotic & biotic stresses.
- **Main objective:** breeding of crops **adapted to the challenging growth conditions** to increase the use of genetic resources to broaden the genetic base of crops and create new breeding opportunities.

#### Examples:

**BreedingValue:** To improve the genetic diversity and breeding efficiency of berry crops;

**CLIMED- FRUIT:** Developing climate-resilient farming strategies for Mediterranean fruit trees,

**DREAM4FRUIT:** To improve resilience to climate change, functional biodiversity sustainability of small farming systems in the Mediterranean;

**GEN4OLIVE:** To enhance olive breeding for productivity, resilience, and climate change adaptation



## Local & under-utilised perennial crops

### c. Successful initiatives

#### > Adaptation and boosting of low input & organic production

- Aiming to enhance the shift towards low-input & organic production systems, helping to boost organic farming in Europe through use of biodiversity

##### Examples:

**Ecobreed:** focusing on breeding under-utilized crops, including certain non-fruit perennials, for improved organic & low-input farming systems

**InnObreed:** aiming to foster organic crop breeding & improve performance of fruit sector, by enhancing innovative organic fruit breeding & uses

#### > Sustainable value chain

- Focus on whole supply chain enhancement, emphasis given on value added by crop diversification along with new openings for regional, high-quality products & economic development

##### Examples:

**BIOVALUE:** Development of an agent-based simulation tool, analysing links among biodiversity, agri-food value chain, environment, consumer's preferences & health

**Diversifood:** Enhance description & evaluation of local varieties to increase performance, resilience and quality

**RADIANT:** Develop solutions & tools to promote under-utilised crops, agrobiodiversity, sustainable diets & dynamic value chains

# Local & under-utilised perennial crops

## c. Successful initiatives

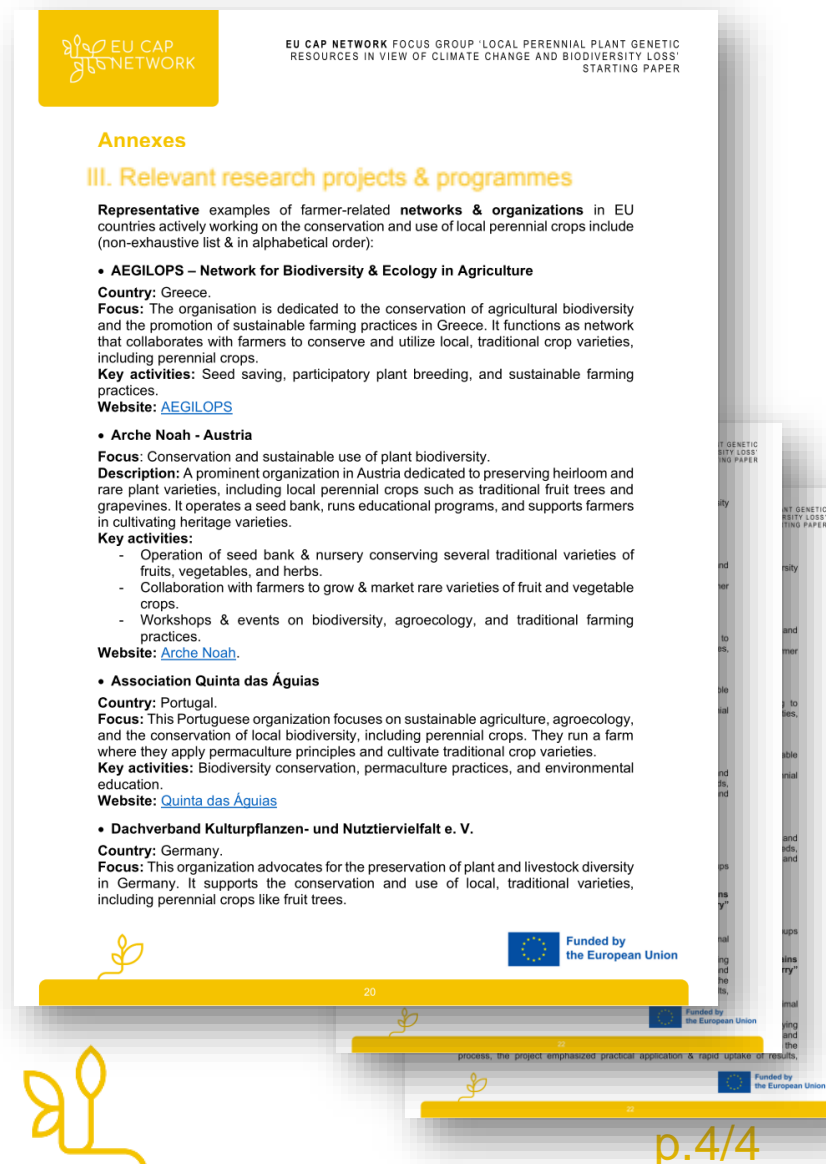
### ➤ Capacity building for genetic resources conservation

- Formulation of **decentralised networks of stakeholders** to increase awareness, communication and competences regarding the conservation & sustainable use of crop genetic resources.

#### Examples:

**FARMERS PRIDE:** creating a network of stakeholders to conserve & utilize local plant diversity & promote the sustainable use of under-utilized perennial crops in local farming systems

**DYNAVERSITY:** building a network of stakeholders to facilitates exchange and integration of scientific as well as practical knowledge on how to best manage diversity in agriculture and in the entire food chain





## Local & under-utilised perennial crops

### d. Challenges & constraints

#### > Innovative practice-oriented projects: Operational groups

- ❖ **Several challenges and constraints**, hindering their potential to contribute to climate resilience, biodiversity loss, and eventually food security.
- ❖ **Both technical & socio-economic**; Addressing them would require **integrated approaches** involving farming, research, and market-related aspects.

### Main challenges & constraints :

#### > Genetic erosion & diversity loss

- Local perennial crops often overlooked in breeding programs as **studies of yields, resilience, and market potential of local perennial crops are relatively rare**.
- Results to slow adoption by farmers who might otherwise benefit.
- Conservation efforts often neglected, particularly in **regions where financial and technical resources are scarce**.
- Global trend towards intensive monoculture and the use of uniform, high-yielding crop varieties



## Local & under-utilised perennial crops

### d. Challenges & constraints

#### > Loss of Traditional Agricultural Knowledge (TAK) & lack of formal training

- Farmers' knowledge often neglected, due to **dominance of modern, industrialised farming practices** not fitting to non-competitive varieties generating under-utilisation of crops that have long provided resilience and sustainability in local farming systems
- Farmers frequently **lack access to formal agricultural training services** related to technical knowledge of conserving & using local perennial crops sustainably.

#### > Research gaps

- Local perennial crops **rather not well-studied with regards to important aspects** and potentiality for promoting their sustainable use, like agronomic behaviour, nutritional profiles, pest resistance and adaptation to climatic stress.
- Conservation initiatives mostly **disjointed or project- based, with limited long-term funding or integration** into national agricultural development plans.

*Condition of scarcity created for farmers for finding high-quality genetic material, limiting their attractiveness & integration into modern farming systems.*



## Local & under-utilised perennial crops

### d. Challenges & constraints

#### > Market & Economic Constraints

- Limited market demand due to **unfamiliarity among consumers & limited promotion**. Therefore, farmers may favour higher-productivity or more commercially viable varieties, due to their faster return.
- **Absence of infrastructure for processing or value-adding**, may limit economic viability of local perennial crops, reducing incentive for farmers to prefer them.





## Main discussion points

**key outputs** expected for the FG is related to a **main question**:

*How can conservation & use of local under-utilised varieties of perennial crops be **attractive & profitable** for farmers & thereby **contribute to biodiversity-friendly sustainable farming under climate change**?*

A series of **escalated questions** related to FG's tasks to be addressed & debated:

- Which are the most **successful on-farm examples** of conservation & use practices, categorized per crop & pedo-climatic zones, in different EU countries?
  - How they are **valorised**, in terms of economic outcome & environmental benefit?
- Which are the **most effective practices of conservation & use**, f.i farming methods, promotion & commercialization of related products, as well collective efforts of farmers, networks, NGOs & scientists?
  - Which of the above **most feasible** to be adapted & widely mainstreamed?
- Which are **main barriers & challenges** in conserving & using local perennial crops? How can they be overcome?
  - Which are the main respective **opportunities**? How they could be succeeded?



## Main discussion points

- What are the most important **tangible benefits & opportunities** for agriculture & ecosystems regarding the use of conservation & use of local perennial crops?
- Which are better **valorised** regarding adaptation to climate stresses & for enhancing farming system diversification?

In the **long-term**, also the following topics will be addressed:

- Identify further **research needs** from practice, and possible gaps in **technical knowledge**?
- How could **research outcomes & traditional knowledge** on local, underutilized perennial crops be integrated into effective conservation & use strategies?  
Are there successful examples of **capacity building**, stemming from both academic & farmer community-based initiatives?

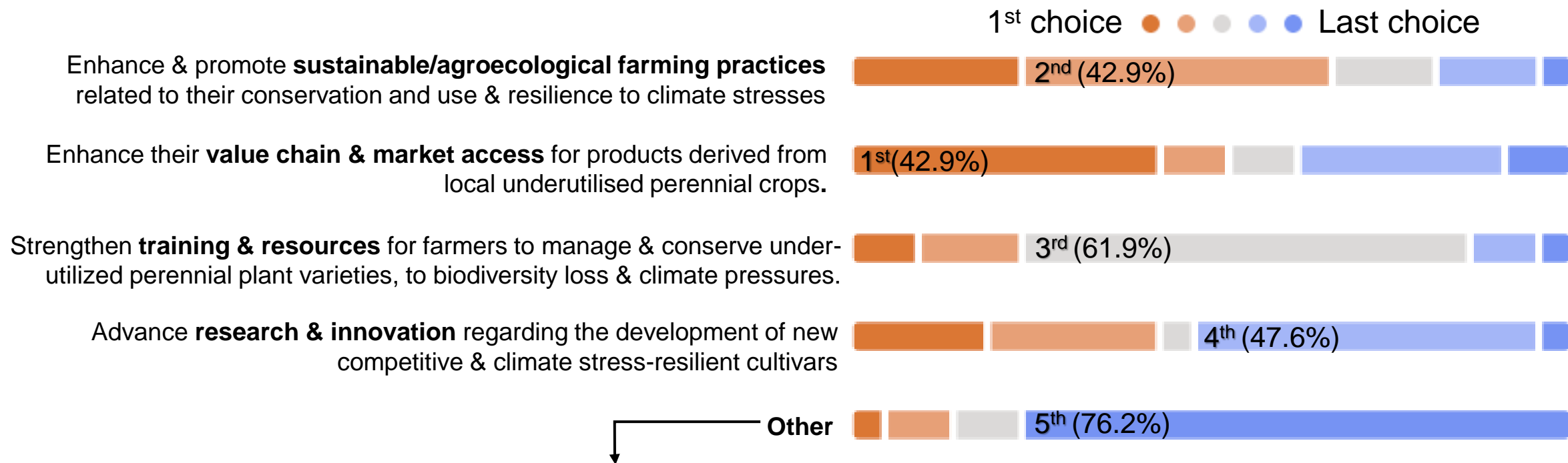


# Survey results

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Coordinating expert  
EIP-AGRI support facility



## Most important **priorities** in terms of conservation & use of local perennial plant genetic resources, in view of climate change & biodiversity loss?



Improve **availability** for farmers; enhance **access** increasing capacity of germplasm banks & multiplication nurseries

Support **farmers' seed system**/not heavily regulated; Better measure for young farmers

farmers & research continuous **connection**

**Consumer education**

**Technologies** for integration in cropping systems

Promote **regional added value**: tourism & image building, **cultural identity**

**Mapping** of varieties

Use to enhance **landscape** & promote **green infrastructure**

develop profitable **valorization** through direct selling

Facilitate **free access** following Nagoya context

**market access**

Enhance **cooperation** for wider use of germplasm

Supportive **Policies & Institutional Frameworks** for farmers



# Main issue to resolve so conservation & use of local & under-utilised perennial crops will be considered by farmers as an attractive & profitable option?

Connect with **market value specialists**

**Bridge gap** between economic incentives & long-term environmental benefits

Increase **profitability**; clear **market vision**

**Testing** in (different) regions under climatic stress

**Economic convenience** to match current & future environmental, market & consumers scenario

Direct **economic benefits** or further **entrepreneurial advantages** as positive regional marketing/communication and market differentiation.

Tolerant varieties to **reduce pesticides reliance**

Effective **communication** on quality & diversity added to value chain & highlight **market benefits**

Market **behavior**;

**Small-scale** farming; **agroecological** transition

Reverse **limited cooperation** between farmers & collections (gene banks)

**Demonstrate** to farmers value of these crops

Strengthen farmers' **sales channels**

**Commercialization** enhancement & support by financing programmes

Long-term stability of farming operation with **lower external resources input**

**Joint participation** in research projects with an emphasis on **practical** applications

Enhance **overall knowledge** on benefits, use and respective cropping systems

**Access** to genetic material

Provide to farmers growing tools & market opportunities for valorization

Encourage market by linking to heritage, biodiversity, environmental resilience concepts

## Good farming practices to enhance conservation & sustainable use of local, under-utilised varieties of perennial crops in view of climate change & biodiversity loss.?



# FGs expectations & contributions by participants

Establish ideas for **financial programs** to support small farmers

Receive expertise in **innovation management**

Exchange examples of **good practices, valorization & branding**

Share the **experiences**

Exchange of **knowledge & answers**

Examples from **personal experience**

To know **context & perception** from different countries & actors

Share **practical, research-backed** approaches

Foster a better understanding of **economic & ecological advantages**

To know the **problems & opinions** of other target groups

Play a role in developing **tangible strategies** that can be implemented across Europe

Deliver knowledge & perspectives by collaborating & exchanging with other disciplines

Share **experiences, knowledge & insights** with a broad range on stakeholders

Create a set of clear **guidelines, opinions & advices**

Expand **knowledge & exchange/evolve opinions** with experts & farmers

Stronger **recognition & support** for local perennial crops

# **EU CAP Network Focus Group**

## **‘Local plant genetic resources in view of climate change and biodiversity loss’**

27-28 November 2024 | **Madrid, Spain**

All information on the Focus Group is available on the webpage:

<https://eu-cap-network.ec.europa.eu/focus-group-local-perennial-plant-genetic-resources-view-climate-change-and-biodiversity-loss>

