PRO-GRACE
PROMOTING A PLANT GENETIC RESOURCE COMMUNITY FOR EUROPE

Funded by the European Union

Building capacity of stakeholders in PGR conservation and use

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Objectives

- Intro: Why capacity building?
- *Ex situ* conservation
- *In situ/on farm* conservation
- Questionaire

Introduction

- GBs play a pivotal role in ensuring the long-term conservation and accessibility of PGR for a wide range of users.
- To fulfil this mandate, the adoption of a comprehensive quality management system is essential

Introduction

- GBs nearly in all EU countries
- Over 2 mil acc. listed in EURISCO
- But - very different levels of naintenance, viability and availability
- *In situ*: none or under development, in childhood stage, facing many problems

- Capacity building is needed
  - To increase the level of PGR c
  - To standardize processes

Therefore a Deliverable was proposed under the WP2 PRO-Grace project

- Deliverable No. D2.4
- A blueprint for a capacity building programme for genebanks and *in situ*/on-farm conservation networks

- Authors and contributors
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Collecting mission to Slovenia and Hungary

Who Requires Training?

All key stakeholders engaged in PGR conservation

GBs, as well as **specialised germplasm collections**, including those managed by non-governmental organisations.

Primary beneficiary groups:

1. professional PGR practitioners
2. trainers of PGR professionals
3. other PGR stakeholders.

The Scope of the Capacity Building Blueprint

- It is relevant across all modes of conservation*:* ***ex situ, in situ***, and **on-farm.**
- A critical component of this training initiative is **to raise public awareness about PGR conservation**

Ex situ conservation / GBs

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Program Components of Capacity Building

1. **Genebank Assessment**

- To conduct comprehensive assessments of GB to identify specific needs and gaps through structured peer reviews
- **Site visits:and Stakeholder interviews**
- **Data analysis:** Identify strengths, weaknesses, and areas for improvement;
- **Report findings** - Produce a detailed report with recommendations

2. **Capacity Building** - targeted support GBs, based on assessment

- General capacity building for genebanking
- Quality management system
- Genebanking operations,
- Tailored genebank management plans
- Training in operations and strategic management,
- Addressing specific needs identified in peer reviews

The Quality Management System in GBs

- The **act of all activities, tasks and processes** that are required to maintain a desired level of quality
- Several genebanks have adopted the ISO 9001 standard for quality management, ensuring compliance with established protocols incl. risk mitigation
- FAO **Genebank Standards** (FAO, 2014) define a set of essential requirements for GBs
- **Manual of Seed Handling in Genebanks** (Kameswara Rao et al., 2006).
- These do not show, how to raise the complex level
- The proposed capacity building should **transparency** in, GB management, operation and all processes of genebanking

Regeneration cages, Olomouc

Genebanking and genebank operations

Genebanking: describes the processes of seed handling in genebanks, including:

- GB processes: outlines the procedures for seed handling in genebanks to achieve the highest longevity.
- Required conditions: discusses the necessary environmental conditions, such as temperature, humidity, and light, for seed storage.
- Standard and threshold values: explains the standard and threshold values for seed quality, including germination rates, purity, and viability.

Regeneration processes: covers the planning and execution of regeneration cycles, including:

- Planning regeneration cycles
- Keeping viability germination threshold
- Minimum number of seeds in storage
- Biologically safe regeneration under phytosanitary control and seed handling
- Isolation methods (self-crossing, outcrossing, auto-incompatibility)
- Pollination methods (wind pollination, insect pollination)

Documentation system: emphasizes the importance of documenting PGR data, incl:

- Passport data
- Characterization and evaluation data
- Seed storage data
- Documentation of regeneration trials

Capacity building in PGR gathering: CWR, WFP, WHP

Collecting missions:

- International x domestic, specialized x general,
- compliance with international documents (MoU, Nagoya, SMTA)
- Planning, timing, collecting techniques,
- Material treatment and management
- Division of materials among parties
- Material transport, phytosanitary requirements

Regeneration of collected materials:

- Isolation methods (self-crossing, outcrossing, autoincompatibility)
- Pollination methods
- Germination improvement methods (e.g.gibberelin)

Documentation of colleting missions: :

- Collecting notebook, collecting database
- Data collecting from sites (GPS, habitat/ekology, geology, vegetation, land use,....)
- Optional: collecting of basic characterization data

Management of vegetatively propagated crops

- Methodology - proper management of vegetatively propagated ex situ collections (Field nurseries, orchards, vineyards, hop plantations, bulbs, tubers,)
- minimum/optimum numbers, evaluation, regeneration, pest management, sample distribution
- *In vitro* techniques: methodology, general and specific protocols, media, temperature, passaging, replications, distribution
- Cryo preservation as safety duplication for mainly vegetatively propagated crops, principles, methodology, general and specific protocols, regeneration capacity

Additional/optional capacity building :

- In genebanks: **Seed science and longevity**
- Vegetatively prop collections: Physiology, cryobiology
- Pest management

Capacity building towards certification of GBs

- To **equip GBs with the necessary requirements for certification**
- **Quality Management**
  - comprehensive **Document Management Systems.**
  - Adherence to **Standard Operating Procedures (SOPs).**, **staff training.**
- **Technical Protocols**
  - Standardized procedures for **seed storage**, **regeneration** (and **cryo**),
  - Monitoring and control of **physical storage conditions**
- **Data Management**
  - robust **PGR documentation system, data backup, data exchange,** international standards**.**
- **Infrastructure**
  - **GB** operational efficiency, **security infrastructure**, **equipment maintenance.**
- **Compliance**
  - with international agreements (e.g. FAO ITPGRFA).
  - Regular **internal reviews,** updates to keep with evolving standards

In situ conservation

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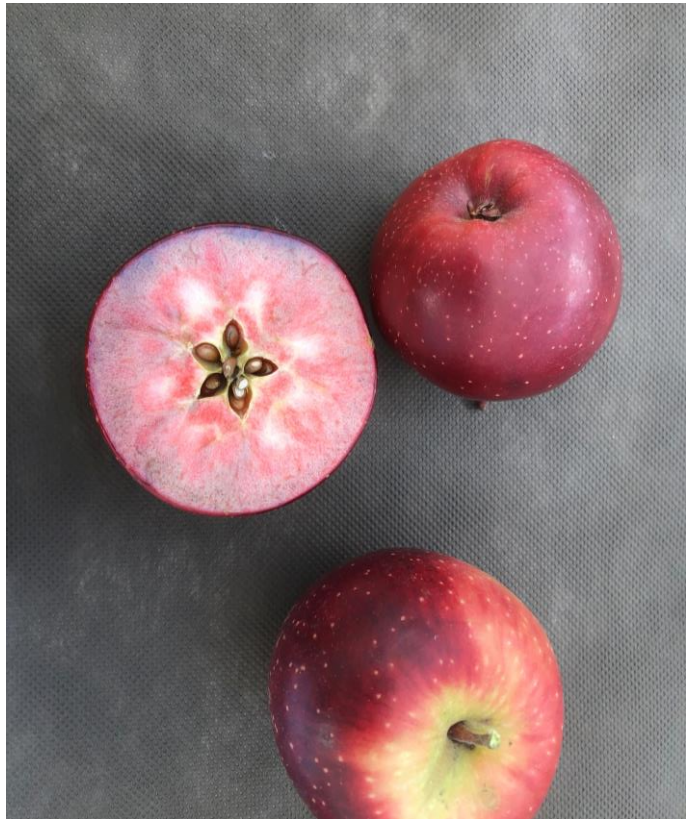
Program Components of Capacity Building for *in situ*/on-farm coll.

1. In Situ/On-Farm Assessment

- **To form knowledgabble assessment team:** Include genetic resource specialists conservation practitioners, botanists,agroecologists
  - to conduct comprehensive assessments of *in situ*/on farm
- **Conduct conservation site visits:and stakeholder interviews**
- **Data analysis:** Identify strengths, weaknesses, and areas for improvement
- **Report findings** Produce a detailed report with **specific, actionable recommendations**

2. **Capacity Building** - targeted support of *in situ*/on farm collections, incl supervising GBs

- Tailored quality **Conservation and Management plan**
- **Training in all theoretical points and practical operations**
- Addressing **specific needs** identified in peer reviews incl **national conditions/limitations**
- Capacity building may lead to a kind of certification



Krvavka moravská (Bloody Moravian Apple

Training and workshop program

On-farm conservation: the basic principles of on-farm conservation, auspices of National programme or national genebank):

- Dynamic versus static conservation
- Using preferably traditional farming systems
- On-farm as primary or secondary conservation (backup)
- Material availability directly or via liason institution (GB)
- Introduction and re-introduction of PGR in a value chain (sustainable use)

***In situ* conservation**: basic principles of *in situ* conservation (Maxted et al):

- In protected areas or outside
- Question of protected and Red list ssp - - need agreement of ENVI
- Collaboration with ENVI sector but CWR are desired by AGRI sector,
- Requirements for *in situ*
- Research and monitoring of populations and sites (population structure, phyrtosociologic
- Selection of the Most Approprite Populations
- Responsible institutions
- Back up in GB or regular ex situ
- Distribution of samples
- Periodical monitoring

In situ of chive, *Allium schoenoprasu*

Nessary To respect: National environment, conditions, limitations

Means of Capacity building

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Means of Capacity Building

- **Training Courses and Workshops**
- **Online Courses and Webinars**
- **Networking and Collaboration Activities**
- **Development of self e-learning materials**
- Annual meetings, expert exchanges, bilateral joint initiatives
- Mentorship and Internship Programs

Public awarnes raising

- Presentation in media
- Policy breefs, information to ministies and government

Mentorship

Survey on Capacity Building for GBs

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Questionaire for capacity building

A key step in designing an effective capacity building programme is validating the **actual needs of stakeholders.**

- A structured questionnaire was developed covering 7 core thematic areas

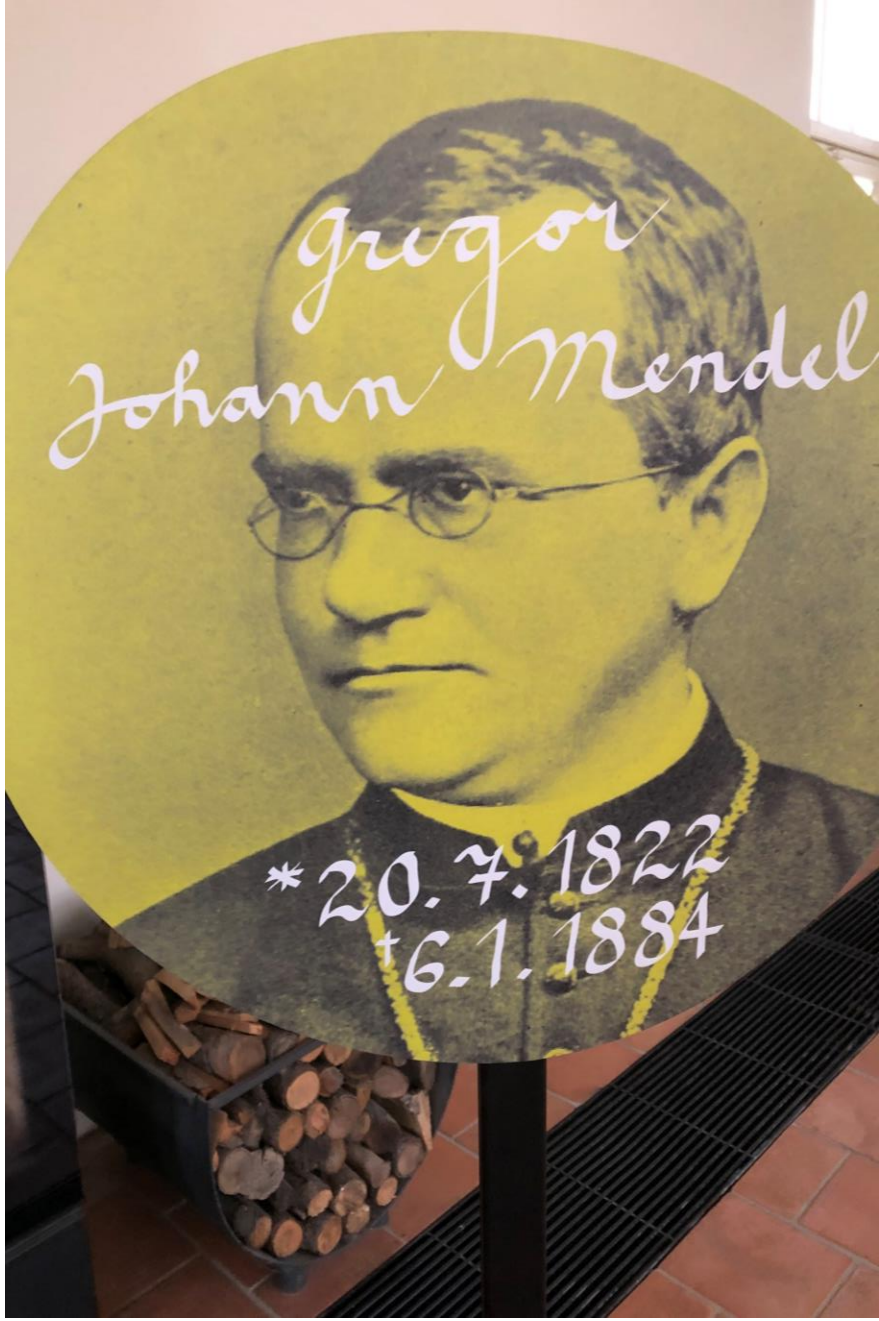
Questiones:

- "Do you **NEED** training in…?")
- "Can you **PROVIDE** training in…?").

It was distributed by email to a broad European PGR stakeholder network, targeting three main groups:

- Forum of Genebank Managers
- On-Farm Conservation Working Group (ECPGR)
- In Situ Conservation of Crop Wild Relatives (CWR) Working Group (ECPGR)

Response Rate:
A total of 28 responses were received from stakeholders across the European region.

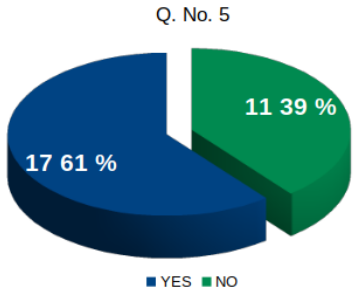


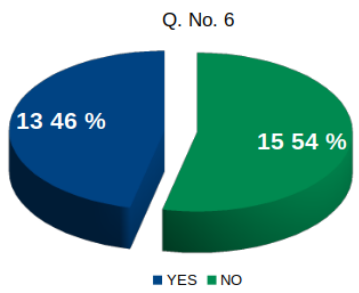
Questionaire for capacity building

Topic no. Question no	Topics
1	**General information on PGR** conservation needs, international agreements (CBD, FAO, ITPGRFA, ECPGR,...)
2	**Ex situ conservation of seed** propagated spp. (Quality management of genebank collections)
2.2	seed handling processes, standards and thresholds in genebanks
2.3	Regeneration processes for self and outcrossing spp, isolation, pollination, pollinators
2.4	Characterization and evaluation: Plot size, descriptor lists, replication, uploading, storing of data
3 3.1	**Ex situ conservation of vegetatively** propagated spp. Quality management: of vegetatively propagated collections
3.2	Field nurseries, orchards, vineyards, hop plantations, Methodology, evaluation, pest management, distribution
3.3	In vitro techniques: methodology, general and specific protocols. Cryopreservation
4	**Documentation**: Passport, characterization and evaluation data, seed storage data, regeneration cycles, documentation of plots/trees of vegetatively propagated spp.
5	**On-farm conservation** - Basic principles, different methodologies, national specificities, main or secondary collection to ex situ, distribution
6	**In situ conservation** - Basic principles, within/ouside of protected areas, collaboration with environmental sector, availability of samples, availability via liaison institute/Genebank, via ex situ, monitoring
7	**Technical support, equipment and staff** needs Equipment for sustainable PGR conservation: advice for necessary minimum or advanced equipment

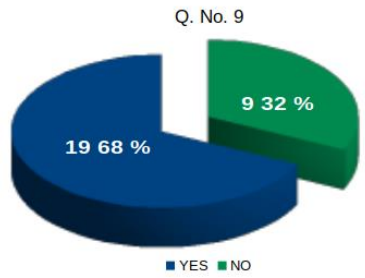
Results of questionaire: „Need“ versus „Can provide“

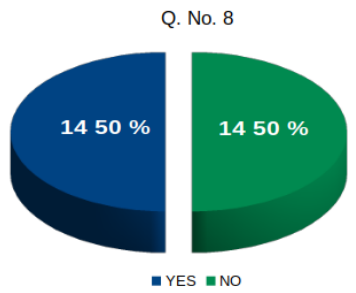
General topics, mainly for new and young staff



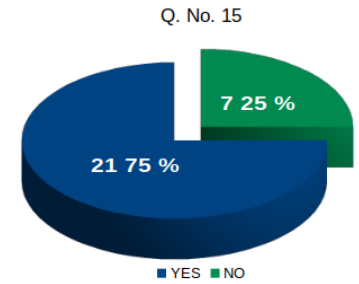


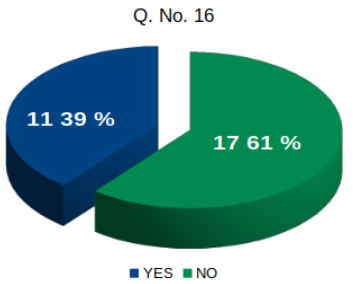
Ex situ conservation of seed propagated plants



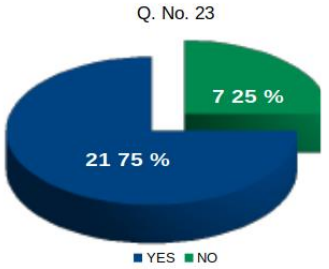


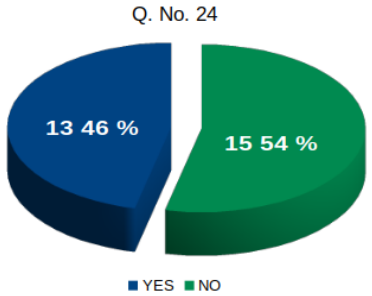
Ex situ conservation of vegetatively propagated plants



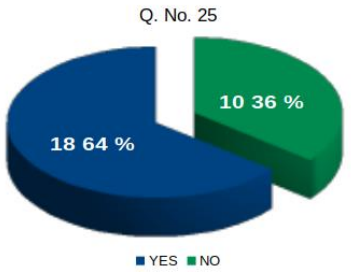


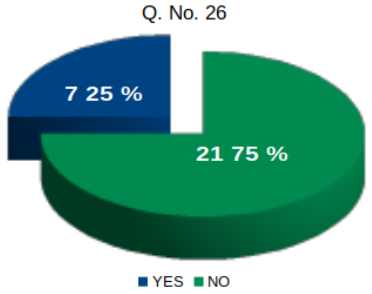
Documentation



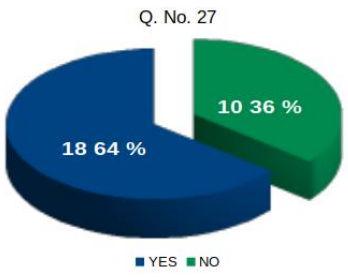


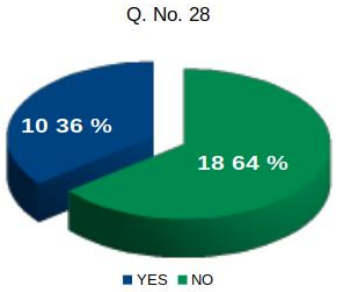
On farm conservation



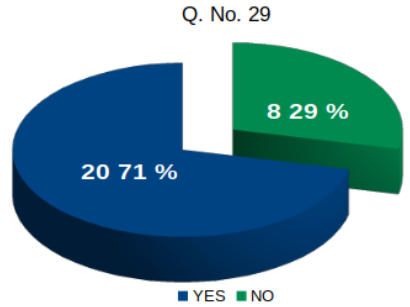


In situ conservation





Technical support



The survey revealed not only the **needs for capacity building** but also a significant and perhaps underutilized **potential for peer-led knowledge exchange** within the European PGR community.

Insights from the Survey

- Many respondents reported **both** a broad need for capacity building **and** the ability to contribute to it.
- This duality underscores the value of a **community-based training model**, where knowledge-sharing is embedded and reciprocal.
- These findings support a strategic approach in which the capacity building programme:
  - **Identifies and mobilizes internal expertise**, especially within the European region
  - **Promotes knowledge exchange between experienced and early-career professionals**
  - **Builds on national and regional strengths**, incorporating unique traditions and contexts into training design

Flax statue (*Linum usitatissimum*)

Expected Outcomes

A holistic and integrated conservation strategy, bridging *ex situ, in situ*, and on-farm approaches

Improved management of national genebanks, leading to more effective conservation practices and **enhanced user access** to high-quality, well-documented genetic material.

Adoption and implementation of best practices in genebank operations

Increased efficiency and effectiveness of conservation efforts through training, technical support, and shared methodologies.

Enhanced protection of landraces, traditional varieties, and crop wild relatives (CWR) in their natural habitats, contributing to biodiversity conservation.

Capacity development of researchers and stakeholders, leading to well-connected community of PGR professionals.

Creation of reusable, high-quality training materials, adaptable for use within national programmes

Introduction of technical and organizational innovations in the management of PGR collections, as well as the **development of new user-oriented services**.

Increased public awareness and appreciation of the significance of PGR and their role in food security and climate resilience.

Improved coordination and collaboration within European and global PGR networks, such as ECPGR, FAO, and ITPGRFA, enhancing regional coherence and international alignment.

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THANK YOU

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