AGENT

Global Access to Plant Genetic Resources

Experiences from EU Horizon AGENT project

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About project

- to establish a global genebank network to sustainably unlock the genetic diversity of food crops for future generations and make them intuitively accessible for modern breeding programmes.

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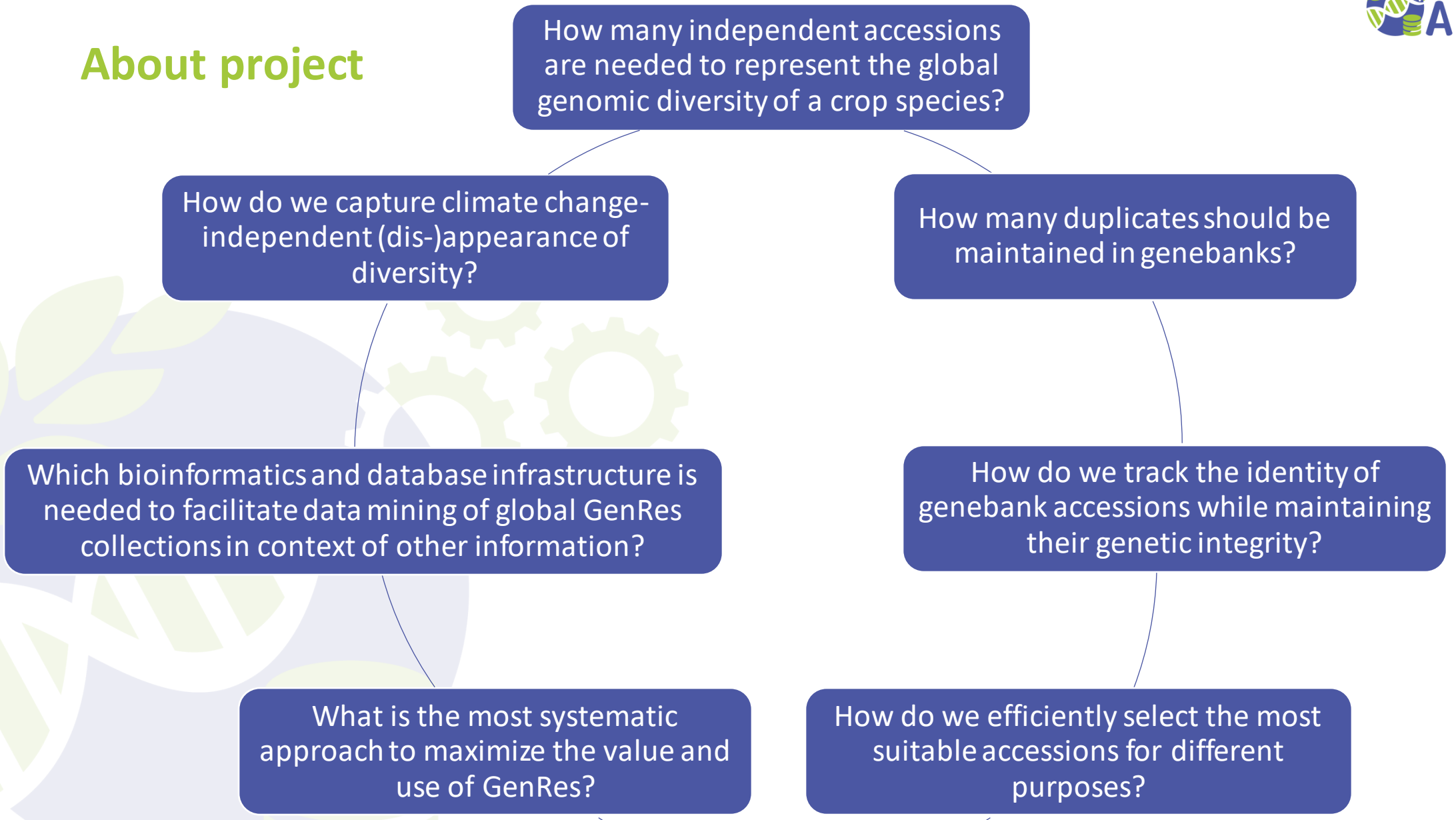
18 partners
15 countries

13 genebanks
5 bioinformatics centres

About project



Objectives

1. establish an actively cooperating genebank network, collecting new data and working on agreed standards and protocols for the use of passively stored GenRes information
2. implement the FAIR ("Findable/Accessible/Interoperable/Reusable") principles to improve management and impact of new and existing GenRes data for breeding and conservation
3. generate new genotypic information for European barley and wheat to create a roadmap for a comprehensive global wheat and barley biodiversity atlas
4. use this extensive genotypic information to evaluate the quality and redundancy of existing GenRes collections as a basis for new quality control and management pathways
5. establish coordinated GenRes training populations for phenotyping of independent collections as a foundation for a pan-European, genome-wide prediction
6. mine new and historic genotypic and phenotypic information to drive the discovery of genes, traits and knowledge for future missions
7. establish a stakeholder network of breeders, farmers and NGOs to work on the phenotypic evaluation of AGENT GenRes, increase data density on collections and disseminate the societal impact of GenRes
8. provide the community with a new database and novel data-mining tools to facilitate a well-informed selection of GenRes for different purposes
9. use and complement existing information for wheat and barley and the new data standards and infrastructure to foster an improved management of GenRes for other crop species across European genebanks

Project structure

- WP1 – Project management and scientific coordination
- WP2 – A European crop GenRes diversity atlas of wheat and barley
- WP3 – A European atlas of phenotypic information on GenRes
- WP4 – Exploiting genetic and phenotypic information to drive discovery and future collection missions
- WP5 – Development of standards and technology for data interoperability
- WP6 – GenRes data infrastructure
- WP7 – Innovation management: Promoting use, sharing resources, capacity building and communication and dissemination of results
- WP8 – Ethics Requirements

WP7 – Innovation management: Promoting use, sharing resources, capacity building and communication and dissemination of results

TASK 7.1.: GB community capacity building

- AEGIS adopts a blueprint for a GB monitoring system to be tested with European wheat and barley collection holders within AGENT project.
- The system aims for broader application across the European network.
- WR handles technical coordination; IPGRI manages logistic coordination.
- Curators from 11 gene banks will evaluate each other's facilities using standardized protocols.
- Four groups of three GBs will visit each other annually over four years:
  - CRI, IPK, NPPC in year 1
  - INIA, IPGR-Sadovo, WR in year 2
  - Millenium Seed Bank, NordGen, WR in year 3
  - CREA-CI, IHAR, WBF-Agroscope in year 4
- Visits and evaluations will lead to reports with recommendations for operational improvements.
- These reports will help in seeking funding for targeted capacity building (documented in D7.5).

Genebank Manuals

Template

- Template for the preparation of operational genebank manuals (Final version formally approved by the AEGIS Advisory Committee - 24.09.2010) [Word] (425,5 KB)

Associate Members' Genebank Manuals

Bulgaria	Operational genebank manual of the National Genebank of Bulgaria, Institute of Plant Genetic Resource 'K. Malkov' (February 2023) (429,2 KB)
Czech Republic	Operational genebank manual of the Crop Research Institute (CRI), Czech Republic (March 2022) (438,2 KB)
	Operational genebank manual of the Potato Research Institute (PRI), Czech Republic (March 2016) (373,1 KB)
Estonia	Operational genebank manual of the Estonian Crop Research Institute (ECRI), Estonia (April 2024) (952,2 KB)
Germany	Operational genebank manual of Leibniz Institute of Plant Genetics and Crop Plant Research (IPK), Germany (February 2011) (230,0 KB)

AQUAS: Quality System for AEGIS

- AQUAS: Quality System for AEGIS
- Principles
- Operational framework
- Genebank standards
- Policies
- Genebank Manuals
- Genebank capacity building peer visits

Operational genebank manual of the Crop Research Institute(CRI), Prague, Czech Republic

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https://www.ecpgr.cgiar.org/fileadmin/templates/ecpgr.org/upload/AEGIS/Documents/Procedures_examples/Genebank_manuals/CRI_Operational_genebank_manual_ed_2022.pdf

AGENT Cycle

Additional mutual visits are taking place under the framework of the AGENT - Activated GEnebank NeTwork project. The following genebanks have been involved so far:

- Centre for Genetic Resources (CGN), the Netherlands
- Crop Research Institute (CRI), Czech Republic
- Institute of Plant Genetic Resources (IPGR), Sadovo, Bulgaria
- Leibniz Institute of Plant Genetics and Crop Plant Research (IPK), Germany
- Millennium Seed Bank, Ardingly, UK
- National Agricultural and Food Centre (NPPC), Slovakia
- National Institute for Agricultural and Food Research and Technology (INIA), Spain
- Nordic Genetic Resource Center (NordGen), Alnarp, Sweden

Individual genebank reports

1st Cycle - 2022

- Report of the Peer Review of the Crop Research Institute (CRI) Genebank, Prague, Czech Republic, 12-13 May 2022 (209,0 KB)
- Report of the Peer Review of the Genebank of the Leibniz Institute of Plant Genetics and Crop Plant Research (IPK), Gatersleben, Germany, 19-20 July 2022 (188,9 KB)
- Report of the Peer Review of the National Agricultural and Food Centre - Research Institute of Plant Production Piešťany (NPPC), Slovakia, 23-24 August 2022 (720,4 KB)

2nd Cycle - 2022

- Report of the Peer Review of the Centro Nacional de Recursos Fitogenéticos (CRF), Madrid, Spain, 7-8 July 2022 (126,7 KB)
- Report of the Peer Review of the Centre for Genetic Resources (CGN) Genebank, Wageningen, The Netherlands, 19-20 July 2022 (162,4 KB)
- Report of the Peer Review of the Genebank of the Institute of Plant Genetic Resources 'Konstantin Malkov', Bulgaria, 6-7 October 2022 (165,6 KB)

3rd Cycle - 2023

- Report of the Peer Review of the Nordic Genetic Resource Center (NordGen), Alnarp, Sweden, 29-30 June 2023 (155,7 KB)
- Report of the Peer Review of the Millennium Seed Bank, Ardingly, UK, 6-7 July 2023 (168,5 KB)
- Report of the Peer Review of the Centre for Genetic Resources (CGN), Wageningen, The Netherlands, 21-22 September

https://www.ecpgr.cgiar.org/fileadmin/templates/ecpgr.org/upload/AEGIS/PEER_REVIEWS/AGENT_Project_Genebank_Review_CRI_May2022.pdf

Results of review visit

- **Recommendation 1**
  - Stable and long-term funding is needed to sustain PGRs.
- **Recommendation 2**
  - Splitting in an active and base sample as well as full safety duplication is suggested. For base samples and safety duplicates it is better to use aluminum bags under vacuum conditions. This needs lower amount of space and prolongs the seed longevity.
- **Recommendation 3**
  - Prepare a barcode strategy, which barcode is necessary, for what the barcode will be used later on. It would be more appropriate to rework the bar code with the sample line registered in the GRIN Czech system.

Results of review visit

- **Recommendation 4**
  - It should be checked whether all the material that is in the genebank can be regenerated and preserved. If this is not possible, a strategy should be developed as to which material is more important due to uniqueness, rare material, etc. For maize, a link to the EVA maize consortium could be helpful. Cooperation with breeding companies for regeneration should also be explored.
- **Recommendation 5**
  - It could be helpful to have also herbarium specimens and seed samples for the other crops as a reference collection.
- **Recommendation 6**
  - Review the organization of germination testing and sample management; priority should be given to the 'base sample' of accessions without any viability data.

Results of review visit

- **Recommendation 7**
  - In order to have unique identifiers for the accessions digital object identifiers (DOIs) should be implemented.
- **Recommendation 8**
  - From our opinion, a plant passport is necessary; at least some relevant species are in your collection. Check with the plant health inspection office the necessity of a plant passport.
- **Recommendation 9**
  - From the monitored *in situ* samples a safety backup should be taken and stored in the genebank.

Thank you for your attention

More information:

- https://www.gzr.cz/?lang=en
- https://agent-project.eu/
- https://www.ecpgr.cgiar.org/aegis/aquas/genebank-manuals
- https://www.ecpgr.cgiar.org/aegis/aquas/peer-visits