

# Building on Pro-GRACE outputs to strengthen ECPGR

Background document for the ECPGR 18<sup>th</sup> Steering Committee, 1–4 June 2026, Tbilisi, Georgia

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## 1. Introduction

Various efforts with ECPGR leadership and participation have addressed strategic issues on European genetic resources conservation and use over the past years. The ***Plant Genetic Resources Strategy for Europe***<sup>1</sup> (PGR Strategy) published in 2021 has become the basis for the ECPGR work programme for Phase XI (2024–2028), with prioritized activities identified in each strategic objective. The Horizon Europe project **Pro-GRACE** (Promoting a Plant Genetic Resource Community for Europe, 2023–2025) provided an opportunity to enhance implementation of the PGR Strategy through the development of a concept for a European Research Infrastructure (RI) dedicated to PGR. This specifically addressed Section 4.2 of the PGR Strategy, which recommended “*establishment of a comprehensive European infrastructure for ex situ and in situ PGR conservation and sustainable use, a European PGR documentation and information infrastructure and a European human capacity-building scheme*” to enable the transition to a fully functioning European system for the conservation and use of PGR. As part of the European Research Agenda, the European Commission supports strategic development of transnational European Research Infrastructures (RIs), to reduce fragmentation, enhance international collaboration, avoid duplication and ensure effective conservation and use of resources for innovation (**Box 1**)<sup>2</sup>.

This document presents the outputs and outcomes of the Pro-GRACE project in relation to the ECPGR programme, forming the basis for Steering Committee discussions on strategic actions to support implementation of the PGR Strategy, building on Pro-GRACE outcomes.

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<sup>1</sup> <https://www.ecpgr.org/pgrstrategy21>

<sup>2</sup> [https://research-and-innovation.ec.europa.eu/strategy/strategy-research-and-innovation/our-digital-future/european-research-infrastructures\\_en](https://research-and-innovation.ec.europa.eu/strategy/strategy-research-and-innovation/our-digital-future/european-research-infrastructures_en)

### Box 1: Definitions of Research Infrastructures:

**Infrastructure:** In the PGR strategy (section 4.2) “*infrastructure is understood in a wide sense, including resources (such as personnel, buildings, or equipment) required for an activity and/or the underlying foundation or basic framework (system or organization)*”.

**Research infrastructure:** The **European Strategy Forum on Research Infrastructures (ESFRI)** applies the definition: “*facilities that provide resources and services for the research communities to conduct research and foster innovation in their fields, including the associated human resources, major equipment or sets of instruments; knowledge-related facilities such as collections, archives or scientific data infrastructures; computing systems, communication networks and any other infrastructure of a unique nature and open to external users, essential to achieve excellence in R&I; they may, where relevant, be used beyond research, for example for education or public services and they may be single sited, virtual or distributed*” (<https://eur-lex.europa.eu/eli/reg/2021/695/oj>).

## 2. Pro-GRACE outputs and outcomes

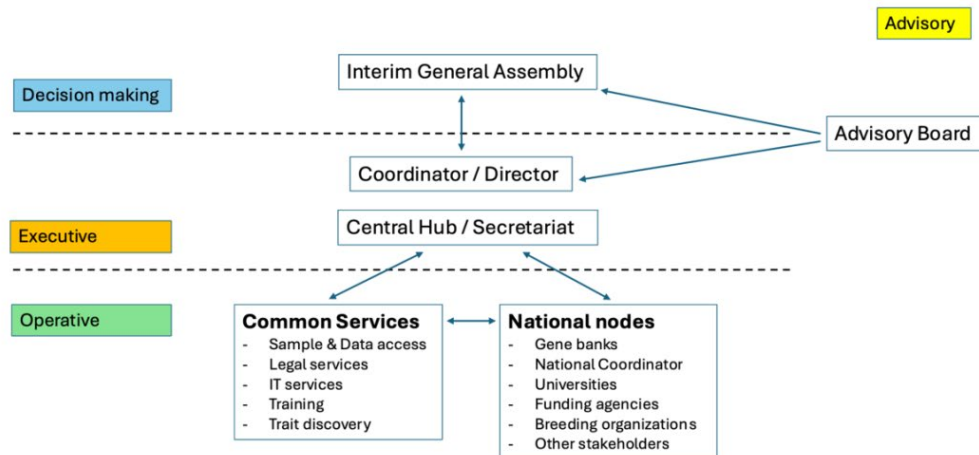
The Pro-GRACE consortium brought together 22 full and 9 associate partners from 17 countries, including national PGR conservation and research organizations as well as international organizations like the Global Crop Diversity Trust, the World Vegetable Center, the International Potato Center (CIP) and ECPGR. Among the partners were many ECPGR stakeholders, including five national coordinators (BG, CZ, DE, NL, SI), four Working Group Chairs (Documentation & Information, Leafy Vegetables, Crop Wild Relatives, Medicinal and Aromatic Plants) and the Chair and Vice-Chair of the Genebank Managers Network.

Pro-GRACE developed several relevant output documents, including various standards, case studies, peer-review papers, reports and blueprints for future activities related to PGR conservation (*ex situ*, *in situ* and integrated), data and information management, characterization and evaluation, application of novel -omics tools and ethical and legal aspects. Short summaries of technical Pro-GRACE deliverables and relevant peer-reviewed publications are provided in **Annex 1**, while their contributions to implementing the PGR Strategy are summarized in the background document [ECPGR Secretariat evaluation of progress in the implementation of the PGR Strategy targets and the corresponding ECPGR priorities \(April 2026\)](#)<sup>3</sup>. Notably, D2.2 *Blueprint for a genebank quality certification system*, has been taken on by the Crop Trust who is currently undertaking a feasibility study for the concept.

The ECPGR Secretariat led the work package in which the concept of a future European PGR infrastructure, combining project outputs to propose a service portfolio, a governance structure

<sup>3</sup> [https://www.ecpgr.org/fileadmin/templates/ecpgr.org/upload/SC\\_2026\\_Georgia/ECPGR\\_Progress\\_Evaluation\\_PGR\\_Strategy\\_Priorities\\_2026.pdf](https://www.ecpgr.org/fileadmin/templates/ecpgr.org/upload/SC_2026_Georgia/ECPGR_Progress_Evaluation_PGR_Strategy_Priorities_2026.pdf)

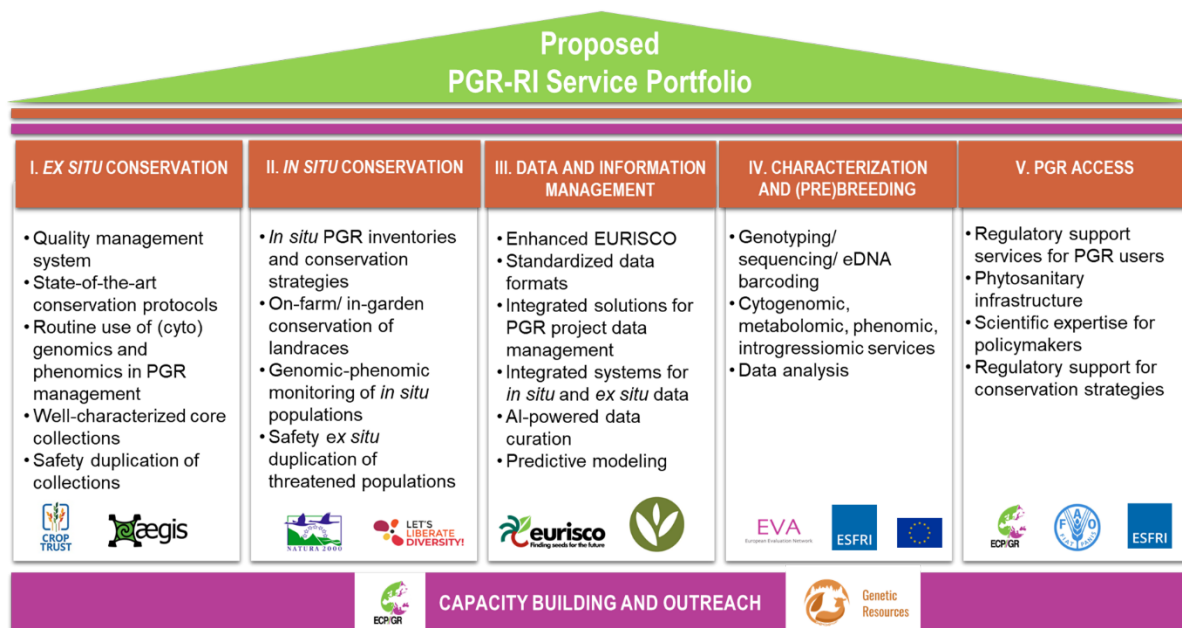
and a financial plan for the preparation of a European PGR-RI was developed. Resembling the existing ECPGR network, the European PGR-RI was envisioned as a distributed RI with a central coordination office (the Central Hub) and national nodes in member countries. The proposed **governance structure** of the European PGR-RI included decision-making, executive, operative and advisory levels, following examples from existing RIs (Figure 1).



**Figure 1.** Proposed governance structure of the European PGR-RI during its preparation phase.

The proposed **service portfolio** of the European PGR-RI (Figure 2), which would be implemented by the Central Hub and the national nodes, comprised five main pillars – ‘*Ex situ* conservation’, ‘*In situ* conservation’, ‘Data and information management’, ‘Characterization and (pre)breeding services’ and ‘PGR access’, together with transversal ‘Capacity building and outreach’. In practice, many of the envisioned services represented direct or evolved versions of existing ECPGR functions developed over the past decades, and also matched the objectives of the PGR Strategy (Figure 2). The main service providers within national nodes were identified as genetic resource centres (genebanks and other PGR collections) and public research centres, who – alongside private and public sector breeders – would also be primary users.

The Pro-GRACE outputs were used in the development of a proposal for adding the PGR-RI to the 2026 ESFRI Roadmap. However, due to a lack of political and financial support for the concept, as well as missing documentation on feasibility and impact and disagreements on the role of ECPGR and the service portfolio, the submission was not finalized.



**Figure 2.** Summary of proposed European PGR-RI Service portfolio, with connections to existing ECPGR initiatives and other transnational cooperation opportunities highlighted. (Adapted from Pro-GRACE D5.5)

### 3. ECPGR's role in European PGR-RI leadership

During discussions within the Pro-GRACE consortium and with stakeholders, including the ECPGR community, the scope of the European PGR-RI was debated, questioning to what extent the RI should conduct research on PGR versus providing the necessary PGR infrastructure to researchers and breeders, and how it would relate to existing ECPGR services. Importantly, in the initial gap analysis of the European RI ecosystem for PGR, ECPGR was not considered (it not being on the official ESFRI roadmap), even though the Pro-GRACE concept was intended to build on and involve ECPGR and its governing body (the Steering Committee). Consequently, the concept including governance, financial plan and description of proposed activities within the service portfolio remained vague and not well-defined. Furthermore, the added value of developing a new European PGR-RI over the existing ECPGR network remained unclear, making it difficult to build a convincing lobbying message.

The ECPGR Executive Committee (ExCo) and Secretariat prepared proposals to formalize cooperation and transition between ECPGR and a European PGR-RI, combining governance structures and complementary activities, while safeguarding existing ECPGR processes. In these proposals, ECPGR would maintain its central role in European coordination of PGR conservation and use, while the RI would focus on research aspects and linkages to European funding mechanisms and other ESFRIs. However, in the ESFRI application, the Pro-GRACE coordinating team did not take ECPGR sufficiently into account within the scope and concept

of the PGR-RI. Consequently, the ExCo decided not to seek SC support for signing the letter of support for the ESFRI application.

Following the failed ESFRI application, a so-called GRACE-RI Memorandum of Understanding (MoU) was prepared to formalize continued collaboration of interested Pro-GRACE partners and stakeholders after Pro-GRACE with the aim of further developing the portfolio, lobbying for support and preparing a future ESFRI application, based on in-kind contributions and operating outside the existing ECPGR framework. Seven organizations from three countries (Bulgaria, Czech Republic and Greece) are considered full members, as their Research Ministries signed the letter of support for the ESFRI application, while another 16 genetic resource centres and research organizations from 12 countries are associate members without voting rights. ECPGR has not signed the MoU. The GRACE-RI MoU members held their first general assembly on 10 October 2025, electing Panos Kalaitzis (MAICH, Greece) as their Executive Chair and Katya Uzundzhaliyeva (IPGR, Bulgaria) and Dagmar Janovska (CARC, Czech Republic) as co-Vice Chairs. In January 2026, the ECPGR Secretariat received an invitation to join the Advisory Board of this new consortium; a decision has been deferred pending Steering Committee discussion.

Given the reliance on institutional support and in-kind contributions alone, with very limited governmental support, it is questionable whether the GRACE-RI consortium can be a sustainable and effective framework to support promoting or implementing the PGR Strategy. Approaches to further realizing the PGR Strategy should therefore rather build on the ECPGR framework and leverage its existing network, which can provide the structure for further effective exploitation of the outputs and lessons learned from Pro-GRACE.

The project has shown that there is a clear need to better connect ECPGR with the research and breeding community, evidenced by the 50+ letters of support for the ESFRI proposal from organizations (even without a fully developed concept or political support). It also highlighted existing synergies and opportunities for enhanced engagement with other organizations and infrastructures that could be leveraged to increase the effectiveness and efficiency of resource use in PGR conservation and research. As highlighted in **Box 2**, ECPGR could already be considered a PGR-RI involving more than 30 European national PGR programmes and providing centralized services to members and stakeholders through its core initiatives. While ECPGR does not have the legal status to be an ESFRI, its existing governance structure and wide membership (extending beyond the European research area) provide a solid foundation for European cooperation. Rebranding itself as the critical European infrastructure on PGR that it already is, ECPGR could increase its profile and visibility, demonstrate its value and attract the necessary investment to implement the step change mentioned in the PGR Strategy. This will ensure that the objectives of the PGR Strategy across all member states are achieved, that practical conservation goals are met, and that PGR users are better served.

## Box 2: ECPGR as research supportive infrastructure

Considering the definitions of both the PGR Strategy and the EU on (research) infrastructures (Box 1), the ECPGR network and initiatives could be considered an existing distributed infrastructure promoting research on PGR. Over the past 45 years, ECPGR has provided a platform for networking, collaborative research and capacity building via its 24 Working Groups and has developed a series of products and centralized services to support PGR conservation and use, including the European Search Catalogue for Plant Genetic Resources (EURISCO), the European Genebank Integrated System (AEGIS), the European Evaluation Network (EVA) and the *Genetic Resources* journal. The ECPGR Secretariat acts as a Central Hub, coordinating centralized services and initiatives, while its member countries could be considered national nodes with their national organizations and networks contributing to the ECPGR priority objectives as outlined in the PGR Strategy. All services are in principle open to external users: PGR access is governed by international agreements, data in EURISCO and all ECPGR publications are available with open access, participation in AEGIS and EVA are open to organizations signing appropriate agreements. Member countries finance the budget of the ECPGR Secretariat via their membership fees, which allows their organizations' participation in projects and initiatives and thus a return on investment. ECPGR has a well-established governance structure and a sustainable business model, using Membership contributions to sustain regular operations, supplemented by in-kind contributions and project-based financing to advance specific aspects and initiatives.

## 4. Activities towards enhancing ECPGR

Given the continued dangers of climate change, genetic erosion and the fragmentation and fragility of current PGR conservation systems, ECPGR should build on its pivotal role in European PGR and leverage the outputs created by Pro-GRACE to strengthen and enhance the infrastructure necessary for PGR conservation. Standards, guidelines and blueprints developed in the project should be used by the appropriate ECPGR bodies to support implementation of the PGR Strategy objectives. Other recent activities and external projects have already greatly enhanced ECPGR initiatives, and with adequate funding, these could be scaled up to more effectively implement the PGR Strategy and support member countries and organizations.

ECPGR should advocate for recognition of PGR research as a priority at national and EU level and highlight its relevance in implementing diverse biodiversity goals and international obligations (SDGs, Nagoya Protocol, International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA), etc.). Collaborations with other European RIs (e.g. Elixir, Emphasis, BBMRI) and relevant European and global partners (e.g. Euroseeds, Crop Trust, ITPGRFA, CGIAR) should be strengthened, building on existing synergies and MoUs.



## 6. Questions to the Steering Committee and topics for discussion

The Steering Committee is invited to consider the following topics for strategic discussions during a workshop session:

- What are the strengths, weaknesses, opportunities and threats of the current ECPGR framework?
- What adjustments to the existing ECPGR framework could better support effective and efficient PGR conservation and use at the European and member country level?
- How could outputs and lessons learned from Pro-GRACE and other European projects inform objectives, priorities and activities of ECPGR in its next Phase XII?
- What initiatives at national and regional level are needed to ensure recognition of PGR as critical for food security?
- What investment is needed for the step change of ECPGR to enhance implementation of the PGR Strategy and support member countries?
- What outreach activities could be pursued by the ECPGR Secretariat and Steering Committee to enhance visibility, create synergies and attract necessary investment?
- What activities drawing on common interests and complementary capacities could we undertake to better leverage existing MoUs (with Crop Trust, Euroseeds, ITPGRFA)?
- What background work will be necessary to incorporate the above suggestions into ECPGR work planning for Phase XII?

# Annex 1. Pro-GRACE outputs

A) **Technical deliverables of the Pro-GRACE project, with associated URLs and short content summaries.** All public deliverables are available on the EU Cordis website <https://cordis.europa.eu/project/id/101094738/results>.

#	Deliverable title	Summary
D1.1	<a href="#">Standards for collecting and displaying phenotypic data and images</a>	This report summarized the main standards for metadata, ontologies and data exchange adopted in phenotypic and image data collection and dissemination. In addition, it proposed a series of recommendations to integrate phenotyping and image data in EURISCO.
D1.2	<a href="#">Standards for collecting and displaying genetic data</a>	This report summarized databases and semantic standards for genetic data on PGR, providing recommendations on how to link them with EURISCO and how to ensure community adoption.
D1.3	<a href="#">System for describing, managing and accessing <i>in situ</i> conserved populations and interfacing them with EURISCO</a>	This report reviews the value of PGR diversity with a focus on CWR, WFP and landraces, outlining conservation strategies and techniques and including a horizon scanning of future <i>in situ</i> conservation priorities. It proposes access to <i>in situ</i> and on farm conserved material and associated data through better links and backups with the <i>ex situ</i> community and EURISCO and recommends next steps to implement complementary conservation.
D1.4	<a href="#">“Minimum Information about a Plant Genetic Resource” standard</a>	This report presents an integrative framework (MI-PGR), that proposes a coherent and harmonized set of guidelines for data collection, representation, annotation, and reporting to better describe and understand a PGR accession. It also outlines actionable steps for its implementation.
D1.5	<a href="#">Inventory of PGR information not yet represented in EURISCO and unified strategy for the interfacing of different information systems with EURISCO</a>	This report systematically examined current gaps in EURISCO's coverage and analyzes underlying factors contributing to these shortfalls. It discusses which PGR information and materials should be catalogued within EURISCO and presents a coordinated strategy for a hybrid federated infrastructure that preserves EURISCO's core focus while establishing efficient connections to complementary specialized repositories, proposing steps for further implementation.
D2.1	<a href="#">Minimum quality standards for genebank operations</a>	This report inventoried existing operational genebank standards and surveyed implementation of QMS among ECPGR and project partner genebanks. It highlights the need and willingness to implement appropriate quality standards, as a basis for D2.2.
D2.2	<a href="#">Blueprint for a genebank quality certification system</a>	Building on the surveys in D2.1, this report proposes a robust certification system incorporating QMS, minimum standards and performance indicators and independent auditing and certification to enhance operational quality and transparency in genebank operations. This blueprint is being taken forward by the Crop Trust in a feasibility study.
D2.3	<a href="#">Methods and minimum quality standards for <i>in situ</i> management of PGR, including CWR and WFP</a>	This report describes the essential data types required to effectively document <i>in situ</i> conservation of PGR, suggesting an extensive list of descriptors and minimum standards, and providing recommendations for their effective use and further development.
D2.4	<a href="#">A blueprint for a capacity building programme for genebanks and <i>in situ</i>/on farm conservation networks</a>	This report presents an in-depth analysis of strategies aimed at supporting relevant stakeholders in achieving established quality standards through targeted capacity-building interventions. The blueprint is applicable to all relevant stakeholders worldwide, addressing their specific needs. It also highlights the value of peer-to-peer knowledge exchange as practiced by ECPGR.

#	Deliverable title	Summary
D2.5	<u><a href="#">A blueprint for constructing national inventories of <i>in situ</i> resources</a></u>	This report provides a harmonized methodological framework for building and maintaining National Inventories of CWR and on farm landraces, at taxonomic and population level, and presents an overview of the status and implementation of such inventories across Europe, laying the groundwork for a Europe-wide approach to <i>in situ</i> conservation planning.
D2.6	<u><a href="#">A system for the unique identification of PGR based both on DOIs and DNA barcoding</a></u>	This report proposes a combined solution to ensure each PGR accession is both digitally traceable (via use of DOIs in EURISCO) and genetically identified (via use of genetic barcodes in recognized sequence repositories), elaborating a practical workflow applicable to different PGR types and feasible for most European genebanks.
D3.1	<u><a href="#">Simplified sample collection protocols amenable to use by non-specialized personnel</a></u>	This report provides protocols for sample collection for DNA flow cytometry, genomics, metabolomics and phytosanitary testing, which have also been published: <a href="https://doi.org/10.1002/cpz1.952">https://doi.org/10.1002/cpz1.952</a>
D3.2	<u><a href="#">Demonstration of DNA barcoding, reduced representation sequencing/resequencing and cytogenomic methods and services</a></u>	This deliverable provides an overview of different DNA sequencing and cytogenomics methods and gives case studies for their use on <i>Solanaceae</i> and banana collections, highlighting their utility in PGR management and research.
D3.3	<u><a href="#">Demonstration of metabolomic methods and services for the identification of metabolites relevant for plant performance and food/feed quality, such as nutritional/antinutritional/toxic metabolites in CWR/WFP material and CWR introgressions</a></u>	This deliverable aimed to refine, demonstrate, and apply advanced metabolomic techniques across a diverse range of crop species and germplasm types. It presents optimized protocols for LC-MS and GC-MS and provides metabolomic datasets and analysis methods with case studies on rice, citrus and pepper, highlighting the potential use for crop improvement and biodiversity valorisation.
D3.4	Demonstration of methods and services for <i>ex situ</i> and <i>in situ</i> phytosanitary surveillance and phytosanitation of contaminated unique material	This deliverable highlights the importance of complying with phytosanitary regulations and provides examples to manage phytosanitary risks in genebanks, seed distribution and <i>in situ</i> conservation. Case studies illustrate practical adaptations to regulatory challenges. Because some of the methods were considered sensitive, the report is not publicly available.
D3.5	<u><a href="#">Demonstration of bioinformatic methods and services for kinship/population structure/pedigree determination, gap analyses, GWAS and QTL analyses</a></u>	The deliverable describes advanced bioinformatic workflows for the analysis of C&E data, demonstrating standardized pipelines for various genetic diversity and association analyses.
D4.1	<u><a href="#">Unified, crop-specific standards and protocols for the evaluation of the phenotypes and agronomic characteristics of PGR, incorporating the ECPGR, MIAPPE, Crop Ontology, EMPHASIS and final user recommendations and methodologies</a></u>	This deliverable aimed to review and map current initiatives in plant phenotyping and related ontologies, focusing on four crop groups (fruit trees, fruit vegetables, leafy vegetables, grains) and priority trait groups (yield, quality, resilience, morphology) to establish criteria for generating a harmonized system of standards and descriptors for phenotypic data and their related ontologies.
D4.3	<u><a href="#">Unified, crop-specific standards, protocols and descriptors for the evaluation of the phenotypes and agronomic characteristics of</a></u>	Building on D4.1, this report analyses observed challenges and gaps in the existing phenotypic data frameworks. It emphasizes FAIR principles and suggests

#	Deliverable title	Summary
	<u>PGR, incorporating the ECPGR, MIAPPE, Crop Ontology EMPHASIS and final user recommendations and methodologies (version 2)</u>	recommendations for experimental planning and metadata collection, including an extended metadata template (building on MIAPPE, EVA and EMPHASIS examples).
<b>D4.4</b>	<u>Interconnection of the different phenotype databases with the central EURISCO information system</u>	This report outlines the conceptual basis and technical infrastructure requirements for connecting distributed data with EURISO, providing as a case study an API link between the INRAE wheat database and EURISCO. It also lists recommendations for interconnecting phenotypic databases with EURISCO.
<b>D5.1</b>	Gap analysis of the present European RI ecosystem, including an analysis of the possible synergies with existing RIs	This report provides an overview of current ESFRIs related to plant research and identifies a gap and synergies for a new PGR RI. The existing ECPGR network was not considered in the analysis. A publication based on the deliverable is available here: <a href="https://doi.org/10.1093/aob/mcaf092">https://doi.org/10.1093/aob/mcaf092</a>
<b>D5.2</b>	<u>Identification of the scientific services, stakeholders, promoters, and utilizers of the proposed RI (v1)</u>	In a first iteration, this deliverable listed potential services and stakeholders of a PGR RI, in four main areas of activity: conservation and documentation, policy interventions, networking and capacity, and use, as the basis for developing a service portfolio in D5.5.
<b>D5.4</b>	<u>Governance structure of the proposed infrastructure</u>	This deliverable elaborates the scope and structure of a possible GRACE-RI and explored frameworks for governance. It proposes governance structures during the preparation phase and implementation phase and identifies the overlap with ECPGR, providing no clear guidance for resolution. See also section 2.1.
<b>D5.5</b>	<u>Identification of the scientific services, stakeholders, promoters, and utilizers of the proposed RI (v2)</u>	In its second iteration, the deliverable develops a potential service portfolio for the RI and groups relevant stakeholders as providers, users and collaborators. See also section 2.1.
<b>D5.6</b>	<u>An analysis of the ethical, social and regulatory aspects of the transition of the present PGR system to an integrated pan-European Research Infrastructure</u>	This report surveyed current regulatory framework for PGR, its implementation via EU and national legislation, surveying challenges, needs and opportunities. It identifies establishment of an RI as an opportunity to improve the management of ethical, legal and social issues on PGR.

**B) Relevant peer-review publications of Pro-GRACE outlining needs and opportunities for strengthened European PGR conservation and use through enhanced collaboration and integration:**

Bocci R, Bartha B, Maierhofer H, Arndorfer M, Salvan M. Community seedbanks in Europe: their role between ex situ and on-farm conservation. *GenResJ (S2)*:147-61. <https://doi.org/10.46265/genresj.OHMK3179>

De Paola D, Taranto F, Mousavi S, Mercati F, Sabetta W, Tumolo M, Islam S, Pieruschka R, Scaloni A, Adam-Blondon AF, Maggioni L, Goritschnig S, Guzzon F, Ianigro M, Vendramin GG, Giuliano G, Bucci G. A gap and synergy analysis of the European research infrastructure (RI) ecosystem: advancing the novel GRACE-RI dedicated to plant genetic resources. *Ann Bot.* 2025; 136(2):275–285. <https://doi.org/10.1093/aob/mcaf092>

Goritschnig S, Weise S, Guzzon F, Maggioni L, van Hintum T, Steffensen LL, Stein N and Giuliano G. Strengthening European Research Cooperation on Plant Genetic Resources Conservation and Use. *Genetic Resources* 2025; S2:119-34. <https://doi.org/10.46265/genresj.LUZJ7324>

Maxted N, Adam-Blondon AF, Aguilar CH, Barata AM, Bartha B, Bocci R, De Paola D, Fitzgerald HS, Fresta LJ, Fusani P, Giuliano G, Guzzon F, Holzherr P, Holubec V, Iriando Alegría JM, Labokas J, Maggioni L, Magos Brehm J, Palmé A, Phillips J, Prohens J, Raggi L, Ralli P, Ruņģis D, Sarikyan K, Šuštar-Vozlič J, Thormann I and Zdunić G. A significantly enhanced role for plant genetic resource centres in linking in situ and ex situ conservation to aid user germplasm access. *Genetic Resources* 2025; S2:203–23. <https://doi.org/10.46265/genresj.UNVV5571>

van Hintum T, Bartha B, Niggli C, Avagyan A, Vogl S, Achathaler L, Holubec V, Papouskova L, Ferrari F, Rossi G, Simon A, Horvath L, Kowalik R, Boczkowka M, Weise S, Oppermann M, van Zonneveld M, Obreza M, Wijnker E, Chayut N, Chairi F, Axelsson J, Steffensen LL, Guzzon F. A proposal for genebank metrics to enhance collection management. *Plant Genetic Resources: Characterization and Utilization.* 2025, pp. 1–11. <https://doi.org/10.1017/S147926212510021X>

van Hintum, T. and Wijk, E. (2024) “Quality management in a genebank environment: Principles and experiences at the Centre for Genetic Resources, The Netherlands (CGN)”, *Genetic Resources*, (S2), pp. 6–12. <https://doi.org/10.46265/genresj.RFXB3570>