



DELIVERABLE 7.3

Key Performance Indicators elaborated for each WP

Call identifier: HORIZON-INFRA-2022-DEV-01-01

PRO-GRACE

Grant agreement no: 101094738

Promoting a plant genetic resource community for Europe

Deliverable No. D7.3

Key Performance Indicators elaborated for each WP

Contractual delivery date:

M6

Actual delivery date:

M6

Revised delivery date:

M16

Responsible partner:

ENEA

Contributing partners:

IPK, WR, MPG, INRAE, IPGRI, MAICH



This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No 101094738.

Grant agreement no.	Horizon Europe – 101094738
Project full title	PRO-GRACE – Promoting a plant genetic resource community for Europe

Deliverable number	D7.3
Deliverable title	Key Performance Indicators elaborated for each WP
Type	R
Dissemination level	PU
Work package number	
Author(s)	Giovanni Giuliano, Maria Grazia Petrillo, Stefan Weise, Theo van Hintum, Alisdair Fernie, Véronique Lefebvre, Ignazio Verde, Sandra Goritschnig, Panagiotis Kalaitzis
Keywords	Key performance Indicators, project management

The research leading to these results has received funding from the European Union’s Horizon Europe research and innovation programme under grant agreement No 101094738.

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1. Executive summary

The PRO-GRACE project aims to develop a European Research Infrastructure dedicated to plant genetic resources. The identified KPIs cover project-wide and work package-specific indicators, ensuring effective monitoring of progress and impact. The KPIs include timeliness, budget adherence, risk management, data completeness, conservation status, technology development, standardization of methods, and governance structure. Additionally, KPIs address regulatory compliance, financial planning, outreach, stakeholder satisfaction, intellectual property, and management team performance. The identified KPIs will enable the project to assess progress, ensure compliance, and achieve the predefined project objectives.

2. Introduction

Plants are the basis of all food, feed and renewable bioenergy production and are essential for the transition from a fossil-based to a bio-based economy. Plant genetic resources (PGR) play a key role in ensuring this transition, as well as food security and climate mitigation. More than 2 million plant accessions are preserved *ex situ* in 410 institutes in Europe and associated countries and listed in the EURISCO database; even more diversity is found *in situ* in European farmlands and wild habitats, where it contributes significantly to agricultural resilience and climate mitigation. Detailed information on *ex situ* accessions is, at best, fragmentary, while for *in situ* accessions it is almost non-existent. A considerable part of these resources could be lost over the coming decade due to limitations in the *ex situ* infrastructure and management, climate change, habitat loss, and invasive/alien species. The roadmap 2016 of the European Strategy Forum on Research Infrastructures (ESFRI) identifies a clear gap in the sector “Plant facilities – unlocking green power”, i.e., the lack of a European Research Infrastructure (RI) specifically dedicated to PGRs. PRO-GRACE will undertake the first step to fill this gap, by developing the concept of a novel (RI) dedicated to the conservation and study of PGRs. The concept will describe the proposed distributed structure, governance, economic plan and scientific services of the proposed RI, and will be the basis for a full proposal at the next ESFRI call. If implemented, this new RI will aim to catalog, describe, preserve, and enhance European plant agrobiodiversity, and make it accessible to users. It will translate the results into conservation practices and agricultural innovation and will collaborate with global organizations dedicated to PGR and with other established ESFRI RIs working on complementary fields. (eg ELIXIR, EMPHASYS, DISSCO, LIFEWATCH, MIRRI).

3. Methodology

The methodology used to identify the Key Performance Indicators (KPIs) for the PRO-GRACE work packages involved the following steps:

- Analysis of objectives and scope of the entire project and of each work package. This included identifying the overarching goals, specific aims, and desired outcomes of developing the research infrastructure concept.
- Identification of the potential stakeholders involved in or impacted by the project. This may include researchers, policymakers, funding agencies, plant breeders, farmers, industry representatives, and other relevant stakeholders. Understanding their perspectives, needs, and expectations related to the research infrastructure will be important for its conception.

- Comprehensive review and benchmarking of existing literature, reports, and case studies on similar research infrastructures or projects. Identification of best practices, lessons learned, and KPIs used in similar contexts.
- Development of a conceptual framework, based on the objectives, stakeholder needs, and literature review, serving as a guide for KPI identification.
- Mapping of the conceptual framework to potential KPIs that align with the objectives and desired outcomes of the project and individual WPs, considering both qualitative and quantitative indicators that can effectively measure progress, impact, and success. Ensuring that the identified KPIs are specific, measurable, attainable, relevant, and time-bound (SMART).
- Expert consultation and validation: seeking feedback and validation from domain experts and WP leaders, incorporating their input and refining the KPIs as necessary.

4. Project-wide KPIs

Several KPIs apply to all WPs in the project. These are:

- Timeliness (Weight: 2/10). It can be measured by the ability of the work package to deliver project milestones, reports, and deliverables within agreed-upon timeframes. This can include tracking the percentage of tasks completed on time and the frequency of delays. Timeliness is calculated as follows: $100\% - \left(\frac{n. \text{ of months in delay}}{\text{planned delivery month}} \times 100 \right)$.
- Use of resources (Weight: 1/10). It can be measured by comparing actual efforts made by different partners against the initial planned effort.

For each WP, the use of resources performance is calculated as follows:

$$\left(\frac{\text{number of person months used in period}}{\text{period duration in months}} \times \text{project duration in months} \right)$$

If the result is less than or equal to the initial planned effort, the performance will be 100%.

- Risk management (Weight: 2/10). It can be measured through the adoption of effective risk mitigation strategies, that limit deviations to a minimum. It is distinct from the timeliness KPI.

5. WP-specific KPIs

5.1 WP1 Inventory and information system

The specific KPIs for this work package are the following:

- Phenotyping and Image Standards Development Completion Indicator (Weight: 1/10). This KPI assesses the thoroughness and detail of the standards developed for collecting and displaying phenotypic data and images, focusing on their clarity, comprehensiveness, and readiness for potential future implementation by the GRACE-RI. The measure is based on the completion and documentation quality of the standards as outlined in the deliverable D1.1, ensuring they encompass all planned aspects such as metadata standardization, vocabulary standardization, and data exchange formats. It evaluates the preparedness of the project outputs to be utilized by the future GRACE-RI by assessing the extent to which the deliverable meets the initial goals and specifications detailed in the Grant Agreement. This indicator emphasizes the deliverable's alignment with project objectives and its potential utility for the

future GRACE-RI, reflecting PRO-GRACE's commitment to laying a solid foundation for standardizing PGR data collection and accessibility.

- Progress in Proposing Solutions for Standardising and Integrating Genetic Data with Plant Genetic Resources (Weight: 1/10). This KPI measures progress in the development of proposed solutions for the standardisation and integration of genetic data on plant genetic resources (PGR) within the PRO-GRACE project. The KPI is based on the objective of D1.2 to identify feasible approaches to improve interoperability, data quality and efficiency in the management of PGR-related genetic data between participating organisations. Progress in proposing solutions is monitored through key indicators, such as the completion of solution proposals, stakeholder validation activities, technical evaluations, and the availability of comprehensive documentation.
- Progress in Proposing a System for Describing, Managing and Accessing In Situ Conserved Populations and Interfacing them with EURISCO (Weight: 1/10). This KPI measures progress in the development of (i) a publication that will serve as a guideline for those working with and managing in situ conserved PGR and that aggregates all the relevant in situ related descriptors for describing, managing and monitoring in situ conserved crop wild relatives (CWR) and wild food plants (WFP) and on-farm conserved landraces, and (ii) a system that integrates the PGR in situ / on-farm conserved populations related data stored at the national level to EURISCO. This measure is based on the percentage (%) of completion of (i) and (ii). It emphasizes the potential utility of the future GRACE-RI in supporting and guiding the European in situ / on-farm conservation efforts of PGR.
- Data Standard Development Completion Rate (Weight: 1/10). This metric assesses the progress in developing a minimum information data standard for plant genetic resources, focusing on the inclusion of essential data domains, viz. *ex situ* and *in situ* passport data, phenotypic and genotypic information, and image documentation. Calculation involves dividing the number of fully developed information categories that meet the minimum required standards by the total number of essential categories. This provides a direct measure of the standard's completeness and its potential to support the conservation and sustainable use of plant genetic resources.
- PGR Data Inventory Coverage (Weight: 1/10). This measures the extent of inventory activities aimed at identifying a wide range of PGR data from plant germplasm holders across Europe not yet represented in EURISCO. It is calculated as the percentage of plant germplasm holders contacted relative to the total number of identified potential sources possessing PGR data outside the current scope of EURISCO. This underscores the breadth of inventory activities and the diversity of PGR data sought for inclusion. These efforts directly correlate to the enhancement of EURISCO, in line with the overarching goals of the project.

5.2 WP2 Quality-certified *ex situ* and *in situ* management

The specific KPIs for this work package are the following:

- Overview of standards for *ex situ* genebanks (Weight 1/10): Can be assessed by evaluating the establishment of the overview of the current use of standards and quality management systems, and need for new or improved standards.
- Design of a genebank certification system (Weight 1/10): Estimates the level at which the blueprint for a genebank certification system has been established in terms of required elements and plans for the establishment of these elements.

- Overview of standards for *in situ* management of PGR (Weight 1/10): Can be assessed by evaluating the establishment of the overview of the current use of and need for standards in the management of crop wild relatives (CWR), wild food plants (WFP) and resources on-farm.
- Design of a capacity building programme (Weight 1/10): Is assessed by evaluation the level at which a blueprint for a capacity building programme has been established that will support genebanks and *in situ* actors (incl. on farm) in reaching minimum quality standards and allowing genebanks to become certified.
- Creation of various supporting elements (Weight 1/10): Estimates the level at which (1) a blueprint of national inventories of *in situ* PGR has been established (50%) and (2) a system for unique identification of PGR has been designed.

5.3 WP3 Technologies and scientific services

The specific KPIs for this work package are the following:

- Technology development (Weight: 1/10). It can be assessed by the number of new technologies or protocols developed, patents filed, or research publications resulting from the technological advancements.
- Potential for service utilization (Weight: 2/10). It can be measured by interest for the various technologies and scientific services developed, assessed through feedback received at project workshops.
- Quality and accuracy (Weight: 2/10). It can be measured by indicators such as the reliability of the data generated through the services, the adherence to standard operating procedures and quality control measures, and the feedback received during ring-testing regarding the quality and accuracy of the protocols developed.

5.4 WP4 Evaluation and valorisation

The specific KPIs for this work package are the following:

- Standardization of evaluation methods (Weight: 2/10). It can be measured by the number of descriptors and evaluation protocols standardized, and the extent of their alignment with international standards or guidelines, such as ECPGR descriptors and protocols, MIAPPE standards, and protocols developed by other RIs, such as EMPHASIS.
- Method validation (Weight: 1/10). It can be measured by publication or dissemination of the protocols standardized.
- Data quality and completeness (Weight: 1/10). It can be measured by the adherence to standardized data collection protocols, and the use of quality control measures (for instance control germplasms for one species) to minimize errors or bias.
- Efficiency and time-saving (Weight: 1/10). It can be measured by indicators such as the reduction in evaluation time compared to previous methods (same terms, same ontologies for the traits, same scoring methods, same scale, same controls, same phenology stage) to facilitate the interoperability of evaluation datafiles from the different phenotypic databases.

5.5 WP5 RI concept, social and regulatory aspects, governance and financial plan

The specific KPIs for this work package are the following:

- **KPI5.1 - Positioning of GRACE-RI in the ESFRI environment through gap analysis and identification of RI focus and services (1/10).** This is measured through progress towards completion of deliverables D5.1, 5.2 and 5.5 as well as milestone MS7. Interaction with other RIs, stakeholder engagement through workshops and surveys and consideration of outputs from other WPs will continue throughout the project and feed into the deliverables.
- **KPI5.2 - Identification and mapping of relevant stakeholders of GRACE-RI (1/10).** This KPI is measured through completion of deliverables D5.2 and 5.5 and MS9, specifically the identification of the main stakeholders, constituents, and customers of the proposed GRACE-RI. Stakeholder groups will be populated with relevant contacts and continuous engagement with them will be measured through assessing participation to surveys and events organized by the project.
- **KPI5.3 - Proposed governance structure for next phases of GRACE-RI development (1/10).** This is measured through progress towards completion of deliverable D5.4, taking into account the following inputs and processes: desk review of governance model options, stakeholder engagement through workshops and surveys, development of draft governance model, feedback from consortium partners and agreement on governance structure through validation mechanism.
- **KPI5.4 - Business plan for next phases of GRACE-RI development (1/10).** This is measured through progress towards completion of deliverable D5.3, taking into account the following inputs and processes: desk review of available business cases, stakeholder engagement through workshops and surveys, budget estimates of RI services and governance (in close collaboration with D5.4), development of financial sustainability strategy in alignment with funding mechanisms, feedback from consortium partners and validation of financial plan by consortium. Continuous engagement with national political decisionmakers can be measured through MS8, which will be updated by partners where relevant throughout the project.
- **KPI5.5 - Analysis of ethical, social and regulatory aspects of a future GRACE-RI (1/10).** This is measured through progress towards completion of deliverable D5.6, taking into account the following inputs and processes: desk review of current ESR statuses and projected issues, stakeholder engagement through surveys and interviews, development of draft document and collection of feedback from project partners.

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5.6 WP6 Communication, dissemination, exploitation and training

The specific KPIs for this work package are the following:

- Outreach, visibility, interaction, and intellectual property (Weight: 1/10). It can be measured by the number and citations obtained by publications, number of conference presentations, media mentions, website traffic, social media followers, and downloads of project materials.
- Direct communication with and impact on stakeholders (Weight: 1/10). It can be measured by the number of participants in workshops, webinars, and other events organized by the project, the feedback received, as well as the number of comments, shares, and likes on social media posts or blog articles related to the project.
- Communication and impact via social media, other media, and the project website (Weight: 1/10). It can be measured by the number of patents/new varieties registered, licenses granted,

spin-off companies established based on project results, or revenue generated from commercialization activities.

- Effectiveness of the training/capacity building activities (Weight: 2/10). It can be measured by the numbers of applicants/attendees to courses, or training sessions organized by the project; the quality and effectiveness of the training and capacity building activities, assessed by feedback questionnaires imparted at the end of the courses; and by the extent to which trainees have successfully implemented the newly acquired knowledge or skills in their work or research projects, assessed by feedback questionnaires imparted 1-2 years after the end of the courses.

5.7 WP7 Scientific coordination and management

The specific KPIs for this work package are the following:

- Communication effectiveness within the project and with the EU (Weight: 2.5/10). It can be measured by the quality and efficiency of communication within the project and with the EU; This can include measuring the frequency and clarity of project updates, the level of engagement and collaboration among team members, the numbers of interactions with the EU and the timely submission of project deliverables and reports.
- Management team performance and compliance with project requirements (Weight: 2.5/10). This can be measured by evaluating individual and collective outputs, tracking the completion of assigned tasks, monitoring the adherence to project processes and procedures, providing assistance to individual teams, and ensuring that the coordination and management work package adheres to project-specific requirements, such as contractual obligations, ethical guidelines, legal regulations, and applicable standards.

4. Conclusions

The above-identified KPIs will assist the Coordinator, WP leaders and project participants to assess the progress of the PRO-GRACE project and of individual WPs against the pre-set project objectives.