Lorenzo Maggioni, ECPGR Secretariat

First Genebank Managers Network meeting, 14-15 May 2024, Braga, Portugal

What is an ESFRI Research Infrastructure?

Strategy Report on Research Infrastructures
ROADMAP 2021
Public Guide

European Strategy Forum
on Research Infrastructures
ESFRI

"Research infrastructure" means **facilities, resources and related services** that are **used by the scientific community to conduct top-level research** … and covers **major scientific equipment** or sets of instruments; knowledge-based resources such as **collections, archives or structures for scientific information**; **enabling Information and Communications Technology-based infrastructures** .., or **any other entity of a unique nature essential to achieve excellence in research**.

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ESFRI selects proposals of RIs in strategic areas of research and with an adequate level of maturity to become ESFRI Projects, and identifies successfully implemented RIs to become ESFRI Landmarks

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Europe funds a series of Research Infrastructures…

ESFRI PROJECTS

	NAME	FULL NAME	TYPE	LEGAL STATUS (Y)	ROADMAP ENTRY (Y)	OPERATION START (Y)	INVESTMENT COST (M€)	OPERATION COST (M€/Y)
DIGIT	EBRAINS	European Brain ReseArch INfrastructureS	distributed	AISBL, 2019	2021	2026*	323.8	19.8
	SLICES	Scientific Large-scale Infrastructure for Computing/Communication Experimental Studies	distributed		2021	2024*	137.7	6.5
	SoBigData++	European Integrated Infrastructure for Social Mining and Big Data Analytics	distributed		2021	2030*	130.5	5.0
ENERGY	IFMIF-DONES	International Fusion Materials Irradiation Facility - DEMO Oriented NEutron Source	single-sited		2018	2033*	884.0	56.0
	MARINERG-i	Marine Renewable Energy Research Infrastructure	distributed		2021	2030*	8.9	0.9
ENVIRONMENT	DANUBIUS-RI	International Centre for Advanced Studies on River-Sea Systems	distributed	ERIC Step1	2016	2024*	202.5	23.9
	DiSSCo	Distributed System of Scientific Collections	distributed		2018	2025*	420.3	12.1
	eLTER RI	Integrated European Long-Term Ecosystem, critical zone and socio-ecological system Research Infrastructure	distributed		2018	2026*	150.0	50.0
HEALTH & FOOD	EIRENE RI	Research Infrastructure for EnvIRonmental Exposure assessmeNt in Europe	distributed		2021	2031*	202.0	42.2
	EMPHASIS	European Infrastructure for Multi-scale Plant Phenomics and Simulation	distributed		2016	2021	160.0	3.6
	EU-IBISBA	European Industrial Biotechnology Innovation and Synthetic Biology Accelerator	distributed		2018	2025*	52.6	65.1
	METROFOOD-RI	Infrastructure for promoting Metrology in Food and Nutrition	distributed		2018	2020	102.4	31.0
PHYSICAL SCIENCES & ENGINEERING	EST	European Solar Telescope	single-sited		2016	2029*	200.0	12.0
	ET	Einstein Telescope	single-sited		2021	2035*	1,912.0	37.0
	EuPRAXIA	European Plasma Research Accelerator with Excellence in Applications	distributed		2021	2028*	569.0	30.0
	KM3NeT 2.0	KM3 Neutrino Telescope 2.0	distributed		2016	2020	196.0	3.0
SOCIAL & CULTURAL INNOVATION	E-RIHS	European Research Infrastructure for Heritage Science	distributed		2016	2025*	54.0	5.0
	EHRI	European Holocaust Research Infrastructure	distributed		2018	2025*	15.0	2.0
	GGP	The Generations and Gender Programme	distributed		2021	2028*	18.2	1.1
	GUIDE	Growing Up in Digital Europe: EuroCohort	distributed		2021	2032*	580.6	17.8
	OPERAS	OPen scholarly communication in the European Research Area for Social Sciences and Humanities	distributed	AISBL, 2019	2021	2029*	15.0	0.9
	RESILIENCE	REligious Studies Infrastructure: tooLs, innovation, Experts, conNections and Centres in Europe	distributed		2021	2034*	318.4	9.5

ESFRI LANDMARKS

NAME	FULL NAME	TYPE	LEGAL STATUS (Y)	ROADMAP ENTRY (Y)	OPERATION START (Y)	INVESTMENT COST (M€)	OPERATION COST (M€/Y)
PRACE	Partnership for Advanced Computing in Europe	distributed	AISBL, 2010	2006	2010	712.8	NA
ECCSEL ERIC	European Carbon Dioxide Capture and Storage Laboratory Infrastructure	distributed	ERIC, 2017	2008	2016	1,000.0	0.9
EU-SOLARIS	European Solar Research Infrastructure for Concentrated Solar Power	distributed	ERIC Step2	2010	2022*	7.0	0.1
JHR	Jules Horowitz Reactor	single-sited	JHR CA, 2007	2006	2030*	1,800.0	NA
ACTRIS	Aerosol, Clouds and Trace Gases Research Infrastructure	distributed	ERIC Step2	2016	2025*	698.0	93.0
EISCAT_3D	Next generation European Incoherent Scatter radar system	single-sited	EISCAT SA, 1975	2008	2023*	79.3	4.9
EMSO ERIC	European Multidisciplinary Seafloor and water-column Observatory	distributed	ERIC, 2016	2006	2016	100.0	20.0
EPOS ERIC	European Plate Observing System	distributed	ERIC, 2018	2008	2023*	500.0	18.0
EURO-ARGO ERIC	European contribution to the international Argo Programme	distributed	ERIC, 2014	2006	2014	10.0	8.0
IAGOS	In-service Aircraft for a Global Observing System	distributed	AISBL, 2014	2006	2014	9.2	7.0
ICOS ERIC	Integrated Carbon Observation System	distributed	ERIC, 2015	2006	2016	116.0	24.2
LifeWatch ERIC	e-Infrastructure for Biodiversity and Ecosystem Research	distributed	ERIC, 2017	2006	2017	150.0	12.0
AnaEE	Analysis and Experimentation on Ecosystems	distributed	ERIC Step2	2010	2021	41.9	1.1
BBMRI ERIC	Biobanking and BioMolecular Resources Research Infrastructure	distributed	ERIC, 2013	2006	2014	NA	NA
EATRIS ERIC	European Advanced Translational Research Infrastructure in Medicine	distributed	ERIC, 2013	2006	2013	500.0	2.5
ECRIN ERIC	European Clinical Research Infrastructure Network	distributed	ERIC, 2013	2006	2014	5.0	5.0
ELIXIR	A distributed infrastructure for life-science data	distributed	ELIXIR CA, 2013	2006	2014	47.6	5.4
EMBRC ERIC	European Marine Biological Resource Centre	distributed	ERIC, 2018	2008	2017	164.4	11.2
ERINHA	European Research Infrastructure on Highly Pathogenic Agents	distributed	AISBL, 2017	2008	2018	5.8	0.7
EU-OPENSCREEN ERIC	European Infrastructure of Open Screening Platforms for Chemical Biology	distributed	ERIC, 2018	2008	2021	82.3	1.2
Euro-BioImaging ERIC	European Research Infrastructure for Imaging Technologies in Biological and Biomedical Sciences	distributed	ERIC 2019	2008	2016	270.0	1.6
INFRAFRONTIER	European Research Infrastructure for the generation, phenotyping, archiving and distribution of mouse disease models	distributed	GmbH, 2013	2006	2013	180.0	80.0
INSTRUCT ERIC	Integrated Structural Biology Infrastructure	distributed	ERIC, 2017	2006	2017	450.0	30.0
MIRRI	Microbial Resource Research Infrastructure	distributed	ERIC Step2	2010	2021	NA	0.7
CTA	Cherenkov Telescope Array	single-sited	gGmbH, 2014	2008	2024*	400.0	20.0
ELI ERIC	Extreme Light Infrastructure	single-sited	ERIC, 2021	2006	2018	850.0	80.0
ELT	Extremely Large Telescope	single-sited	ESO[a]	2006	2027*	1,309.0	48.0
EMFL	European Magnetic Field Laboratory	distributed	AISBL, 2015	2008	2014	170.0	20.0
ESRF EBS	European Synchrotron Radiation Facility Extremely Brilliant Source	single-sited	ESRF[a]	2016	2020	128.0	82.0
European Spallation Source ERIC	European Spallation Source	single-sited	ERIC, 2015	2006	2026*	3,009.0	140.0
European XFEL	European X-Ray Free-Electron Laser Facility	single-sited	European XFEL[a]	2006	2017	1,540.0	137.0
FAIR	Facility for Antiproton and Ion Research	single-sited	GmbH, 2010	2006	2025*	NA	NA
HL-LHC	High-Luminosity Large Hadron Collider	single-sited	CERN[a]	2016	2027*	1,408.0	136.0
ILL	Institut Max von Laue - Paul Langevin	single-sited	ILL[a]	2006	2012	188.0	100.0
SKAO	Square Kilometre Array Observatory	single-sited	SKAO, 2011	2006	2027*	1,986.0	77.0
SPIRAL2	Système de Production d'Ions Radioactifs en Ligne de 2e génération	single-sited	GANIL	2006	2019	307.3	5.2
CESSDA ERIC	Consortium of European Social Science Data Archives	distributed	ERIC, 2017	2006	2013	117.0	39.0
CLARIN ERIC	Common Language Resources and Technology Infrastructure	distributed	ERIC, 2012	2006	2012	NA	14.0
DARIAH ERIC	Digital Research Infrastructure for the Arts and Humanities	distributed	ERIC, 2014	2006	2019	NA	0.7
ESS ERIC	European Social Survey	distributed	ERIC, 2013	2006	2013	117.5	6.4
SHARE ERIC	Survey of Health, Ageing and Retirement in Europe	distributed	ERIC, 2011	2006	2011	NA	17.0

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…but none of them is dedicated to the conservation and improvement of the plants that feed humanity

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A European research infrastructure for PGR should:

- Enable user access to specific services relevant to their work on PGR
- Complement existing services offered by other RI
- Create relevant synergies with other European RIs
- Connect users and providers of services relevant to PGR

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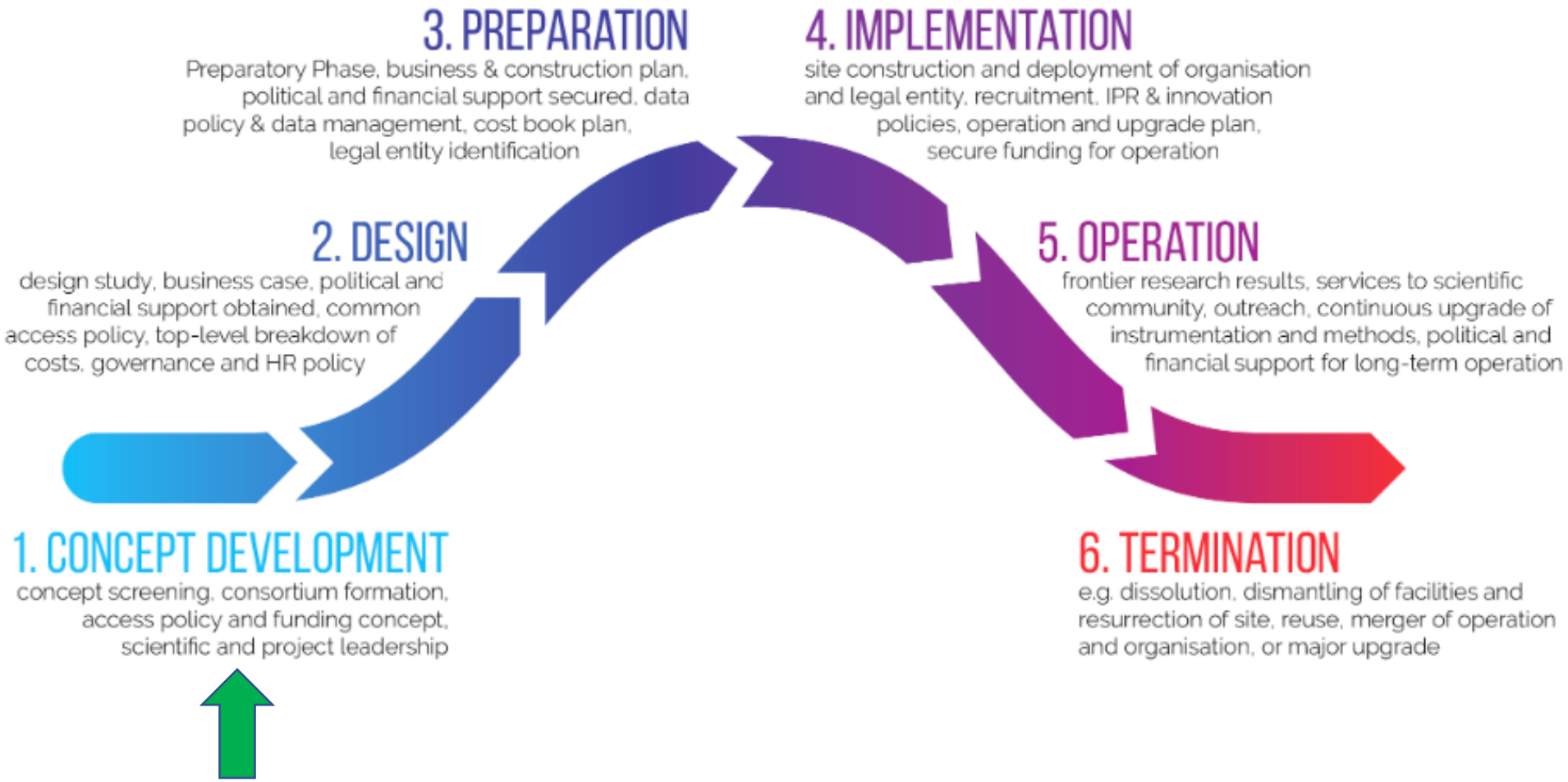
Concept development of the future GRACE-RI



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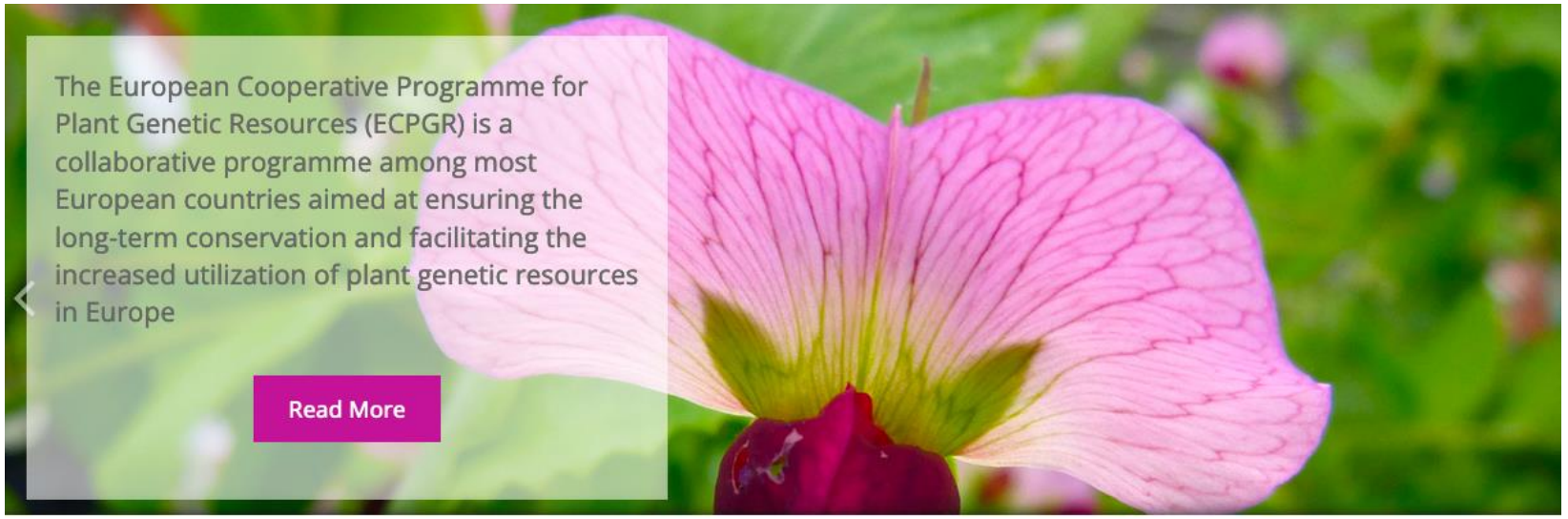
We’re not starting from scratch



European Cooperative Programme for Plant Genetic Resources
ECP/GR

eurisco
Finding seeds for the future

The **European Search Catalogue for Plant Genetic Resources** (EURISCO) provides information on >**2 million accessions** of crop plants and their wild relatives, preserved *ex situ* by about **400 institutes** from **43 member countries**. EURISCO contains **passport** and **phenotypic data**.

>10 EU-funded projects have generated genetic resources and associated knowledge on important crop plant families (Cereals, Solanaceae, Legumes).

TRADITOM
AGENT
FORGENIUS
G2P-SOL
INCREASE
Farmer’s Pride
Breeding Value
HARNESSTOM
GEN4OLIVE
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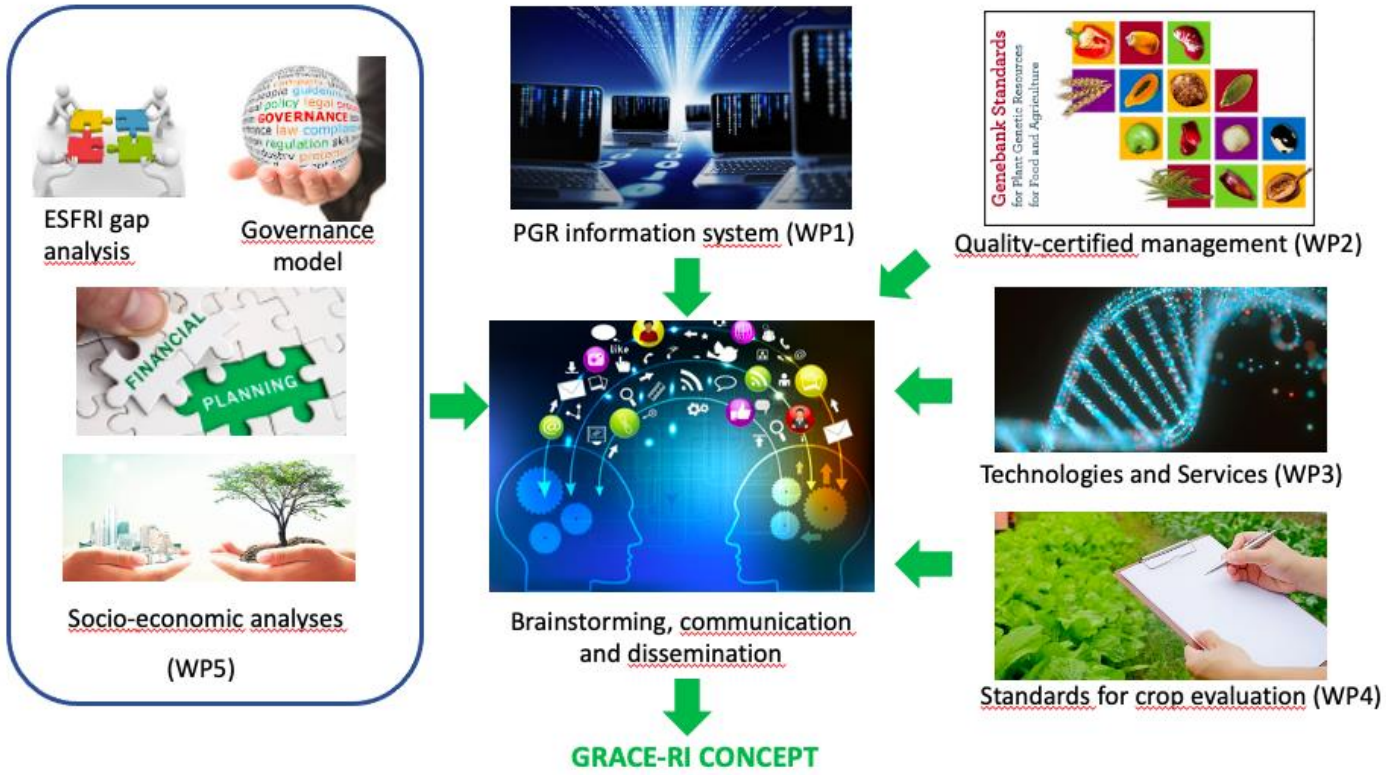
The PRO-GRACE project

Topic: Research infrastructure concept development (HORIZON-INFRA-2022-DEV-01-01)
Duration: 1st January 2023 – 30 June 2025
Funding: 2.85 M€ EU + 0.37 Assoc. partners
Coordinator: Giovanni Giuliano, ENEA; giovanni.giuliano@enea.it
Website: **www.grace-ri.eu**

WP n.	WP title
WP1	Inventory and information system
WP2	Quality-certified ex situ and in situ management
WP3	Technologies and scientific services
WP4	Evaluation and valorisation
WP5	RI concept, social and regulatory aspects, governance and financial plan
WP6	Communication, dissemination, exploitation and training
WP7	Scientific coordination and management



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WP1 – Inventory and information system (IPK)

OBJECTIVES

- **Further strengthening of EURISCO** as a central catalogue for European PGR
- Developing standards for decentralised databases and their interfacing with EURISCO
- **Developing harmonised standards** for phenotypic, image and genetic data sharing
- Developing methods and standards for passport description, inventorying, and population management of *in situ* / on-farm-maintained PGR

SOME DELIVERABLES

- D1.1 Standards for collecting and displaying phenotypic data and images (Nov 2023)
- D1.2 Standards for collecting and displaying genetic data (Nov 2023)
- D1.4 “Minimum Information About a Biological Collection” standard (Aug 2024)

WP2 - Quality-certified *ex situ* and *in situ* PGR management (WUR-CGN)

OBJECTIVES

- To improve the current infrastructure of conservation and access to PGR, **a framework for quality-certified management of *ex situ* and *in situ* collections** will be created.

SOME DELIVERABLES

- D2.1 Minimum quality standards for genebank operations (Jan. 2024)
- D2.2. A blueprint for a **quality certification system** comprising the quality standards from D2.1, a quality management system and an auditing and certification system. These components will incorporate, as appropriate already available standards and systems (FAO Genebank Standards, ECPGR's AQUAS, Crop Trust's experiences in the CGIAR Genebank Platform, IPK, CGN), as well as standards for quality management systems (ISO 9001) (Oct. 2024)
- D2.4 A blueprint for a **capacity building** programme, supporting genebanks and in situ/on farm conservation networks in reaching minimum quality standards and allowing genebanks to become certified. These standards will be discussed and finalized at the second workshop on plant genetic resources (Feb 2025)

WP3 Technologies and scientific services (MPG)

- OBJECTIVES
- Identify and validate genomic, metabolomic, bioinformatic and phytosanitary technologies and scientific services **useful** for collection **holders, the scientific community, and end-users**.

SOME DELIVERABLES

- D3.1 Plant Sample Collection and Shipment for Multi-omic Analyses and Phytosanitary Evaluation (Dec 2023)
- D3.4 Refinement and demonstration of phytosanitary methods for surveillance during PGR *ex situ* and *in situ* management and phytosanitation of contaminated unique material (Feb 2025)

WP4 ‘Evaluation and valorization’ (CREA)

OBJECTIVES

- Develop and disseminate **crop-specific methods for crop evaluation**, based on existing standards and protocols

SOME DELIVERABLES

- D4.1 Unified, crop-specific standards and protocols for the evaluation of the phenotypes and agronomic characteristics of PGR (December 2024, v.2)
- D4.2 **Workshop on the evaluation of *in situ* and *ex situ* PGR collections** organized in collaboration with EMPHASIS (Brussels, June 2024)
- D4.4 - Interconnection of the different phenotype databases with the central EURISCO information system (April 2025)

WP5 RI concept, social and regulatory aspects, governance, and financial plan (ECPGR)

OBJECTIVES

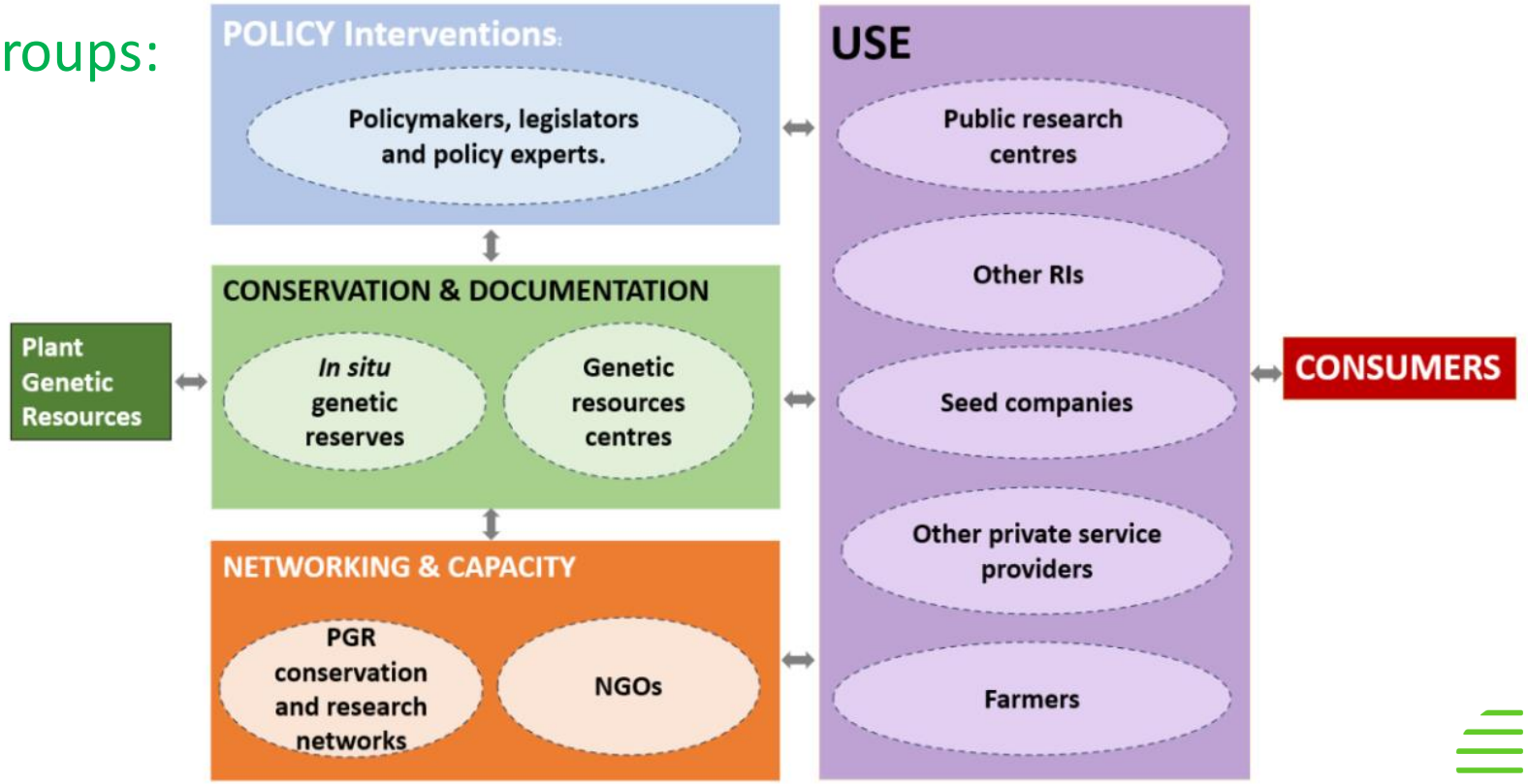
Identify the main stakeholders, constituents, and customers of the proposed GRACE-RI, propose a structure for, and services provided by, the proposed GRACE-RI. Propose a governance and financial plan for the proposed GRACE-RI

Deliverable 5.2

D5.2: Identification of the scientific services, stakeholders, promoters, and utilizers of the proposed RI (v.1) (M11)

Four main activity categories link stakeholders and services of GRACE-RI:

PGR Stakeholder groups:



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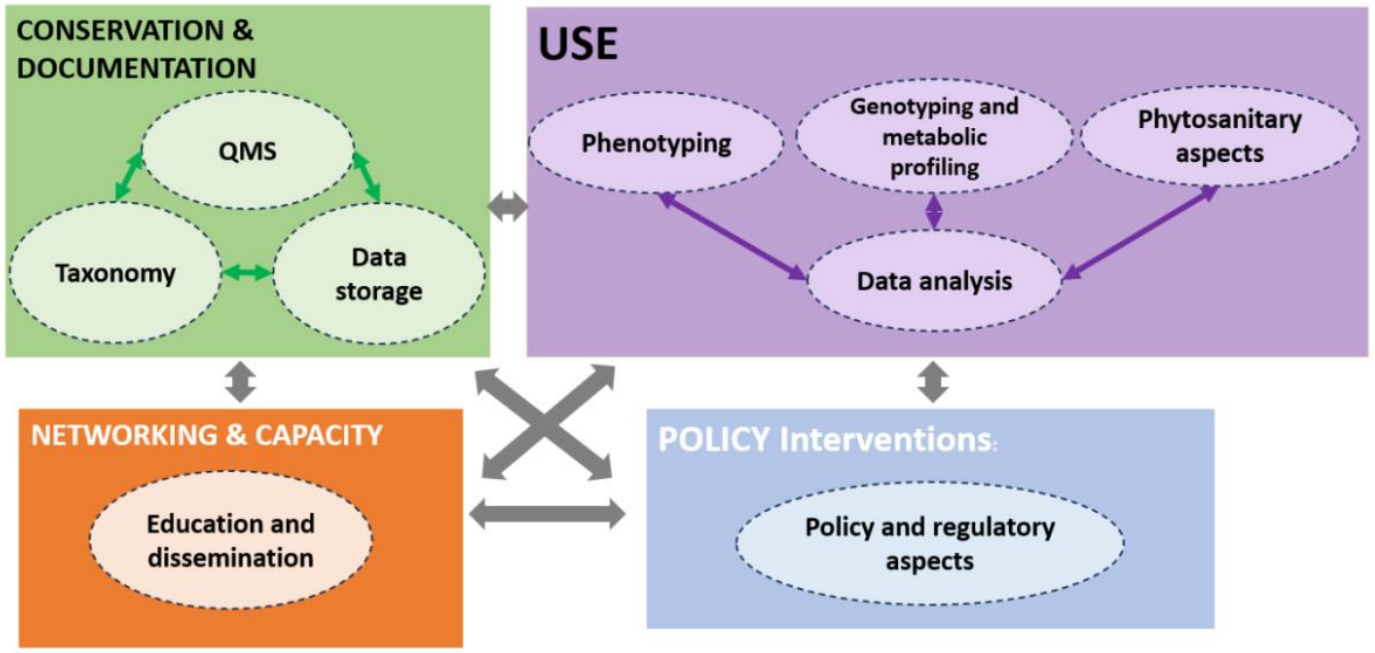
Deliverable 5.2

D5.2: Identification of the scientific services, stakeholders, promoters, and utilizers of the proposed RI (v.1) (M11)

Four main activity categories link stakeholders and services of GRACE-RI:

PGR Service groups:



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Deliverable 5.4

D5.4 Governance structure of the proposed infrastructure - NordGen (Dec 2024)

- Attribute **clear responsibilities and reporting lines to each partner**, and include international supervisory and relevant external advisory bodies
- Have a unique **access policy** and provide for a single point of access for all users
- Have a **user programme** absorbing a relevant fraction of the total capacity of the RI
- Identify and adopt **measurable Key Performance Indicators** addressing both excellence of scientific services and sustainability
- Have a **human resources policy** adequate to the operation of the Central Hub supporting the research, users programme, education and training, … and a **joint investment strategy** …

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Deliverable 5.3

D5.3 A financial plan for the proposed infrastructure, covering the design and preparation phases - CREA (Dec. 2024)

- **Identify the main products and customers** of the future RI and define the business case
- Assess the product potential and indicate **paths to secure institutional support and resource commitment** for the RI
- Plan and **define a user strategy** as well as **costs and revenues** of each component of the RI
- Include a risk analysis

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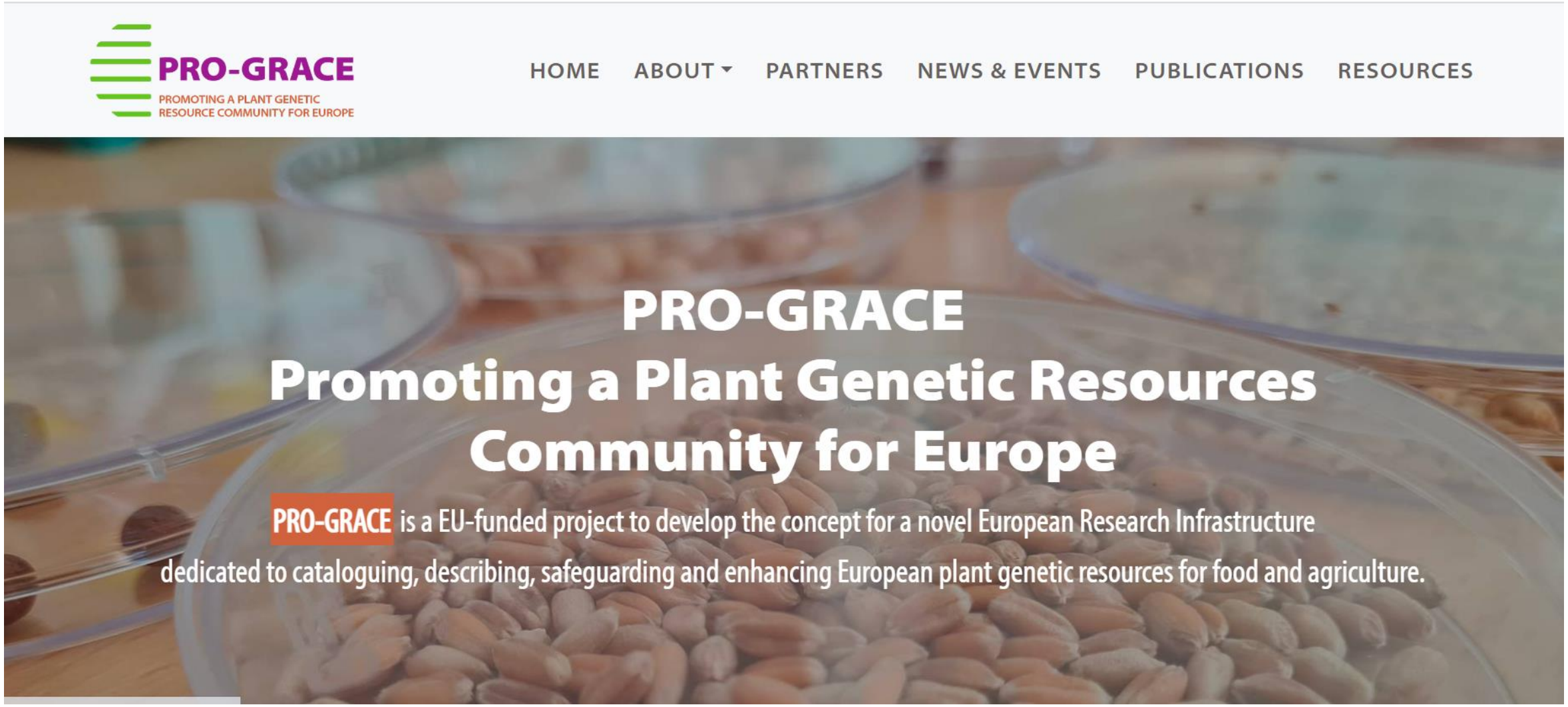

www.grace-ri.eu/pro-grace

Discussion on Pros and Cons

PROS

- EU-funded process to consolidate PGR Networking in Europe
- Entire sector aligns towards professionality, efficiency, standardization, addressing shared research targets
- Research enterprise: Build the Atlas of Crop Diversity?!

CONS

- Long and challenging process (need of many like-minded people working in the same direction for several years)
- RIs requirements may deviate from simple to complex effort