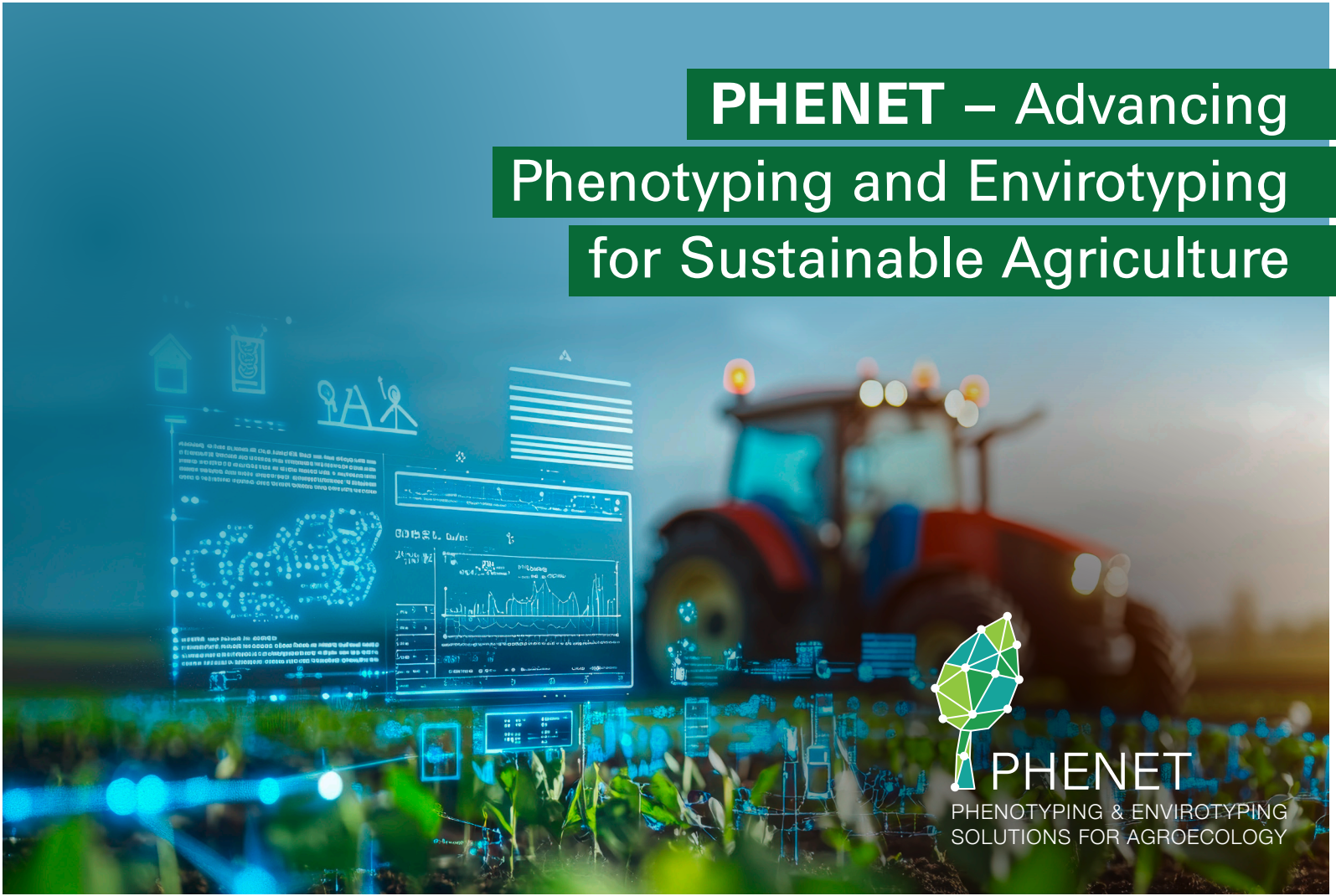
PHENET – Advancing Phenotyping and Envirotyping for Sustainable Agriculture



About PHENET

PHENET is an EU-funded project driving methodological advancements in European research infrastructures. By integrating new sensors and vectors from within the soil up to the satellites, AI-driven image analysis, data science and AI models, PHENET advances multi-scale phenotyping and envirotyping, and therefore the characterization and prediction of agro-ecosystems' performances and resilience.

The project fosters broad collaboration across sectors, including agricultural, crop breeders, technology developers, research infrastructures, industry, and farming communities to develop practical solutions to support European Research in addressing key societal, economic and environmental challenges.

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Key Insights

Innovative Phenotyping –
Utilizing AI, remote sensing, and high-throughput technologies to study plant and ecosystem traits.

Innovative Phenotyping –
Supporting climate adaptation through data-driven innovative breeding and crop management practices.

Collaborative Research –
Connecting scientists, farmers, and policymakers to bridge the gap between research and application.

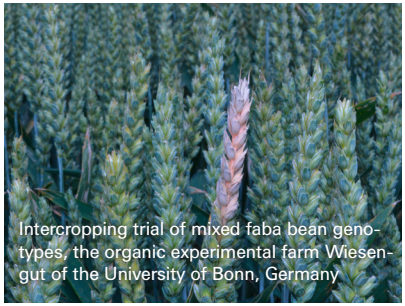
PHENET Work Packages – Unlocking bottlenecks

To enlarge the range of data used for agro-ecosystems assessment, PHENET's tasks aim to develop new phenotyping and envirotyping devices, satellite-based services, data exchange workflows and digital twin, which can be used to study natural and agricultural ecosystems. PHENET also promotes training on and dissemination of the tools and methods developed.

Spring wheat and soybean strip intercropping, Wiesengut, Germany

PHENET Use Cases – Bringing Innovation to the Field

PHENET's 9 Use Cases showcase how advanced phenotyping and envirotyping technologies can be applied in real-world agricultural research:



Intercropping trial of mixed faba bean genotypes, the organic experimental farm Wiesengut of the University of Bonn, Germany

Biotic Interactions in Agroecosystems

- **AI-Driven Plant Stress Detection**
  Using AI to identify plants' early signs of biotic stress.
- **Bumble Bee Colonies Activity as Bioindicators**
  Allowing for in-time assessment of forest health.
- **Intercropping database**
  Performing a meta-analysis to better understand constraints and opportunities for intercropping deployment.

Phenomobile at work in the Apple Refpop at Laimburg Research Centre

Across-Scale Genotype X Environment Interactions

- **Genotype X environment interactions in perennial orchards**
  Deploying phenotyping robots in the same apple tree reference population across several sites in Europe.
- **Genotype X environment interactions in cereal plants**
  Integrating ground-based, drone, and satellite imaging for phenotyping and envirotyping data fusion across scales in wheat.

Wheat ears analysis by visible and near-infrared hyperspectral imaging in the field

Assessment of crops and forests across scales

- **Farms-2-Platform**
  Leveraging on a network of farmers in transition towards agroecology to challenge RI services for practical solutions.
- **Doler Valley**
  Digging into the challenges faced by the Vosges valley facing climate change, and land use transitions.

A literal perch to detect BYDV in a barley field

Digging into the complexity of soil components

- **Soil Health**
  Developing a portable sensor for in situ soil organic carbon and soil health evaluation.
- **Soil Phenology**
  Developing methods to capture soil phenological mismatch among organisms under climate change.

PHENET Partners & Involved Research Infrastructures (RIs)

PHENET is a collaborative effort involving key research infrastructures and institutions across Europe. The project integrates expertise from multiple domains to enhance phenotyping and envirotyping capabilities and drive agricultural innovation through research.

Join the conversation on PHENET's Slack workspace and collaborate with experts in plant phenotyping and envirotyping.

Scan the QR Code to join!

Research Infrastructures (RIs) of PHENET

EMPHASIS –
European infrastructure for multi-scale plant phenotyping.

AnaEE-ERIC –
Analysis and experimentation on ecosystems.

eITER –
Integrated European long-term ecosystem, critical zone and socio-ecological research.

ELIXIR –
Data infrastructure and bioinformatic resources for life science.

Participants and Partners

- Universite Catholique De Louvain
- Forschungszentrum Jülich GmbH
- Wageningen University
- Universität für Bodenkultur Wien
- Hiphen
- Universite D'angers
- Helmholtz-Zentrum für Umweltforschung GmbH - Ufz
- Inrae Transfert Sas
- Rheinische Friedrich-Wilhelms-Universität Bonn
- Centre Wallon De Recherches Agronomiques
- Universiteit Hasselt
- Soil Capital Belgium
- Uppsala Universitet
- Universite D'aix Marseille
- Centro Di Sperimentazione Laimburg
- Analysis And Experimentation On Ecosystems Eric
- Groupe D'etude Et De Controle Des Varietes Et Des Semences
- Universidade Nova De Lisboa
- Centre De Cooperation Internationale En Recherche Agronomique Pour Ledeveloppement - C.I.R.A.D. Epic
- Geosys
- Universidade Do Porto
- Stichting Wageningen Research
- Stichting Egi
- Better3fruit Nv
- Institut De Recerca I Tecnologia Agroalimentaries
- Centre National De La Recherche Scientifique Cnrs
- Protisvalor Mediterranee Sas
- Eidgenössische Technische Hochschule Zürich
- Eidgenössisches Departement für Wirtschaft, Bildung und Forschung
- S4 Mobile Laboratories

PHENET

PHENOTYPING & ENVIROTYPING
SOLUTIONS FOR AGROECOLOGY

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