B. Gioli & F. Miglietta, CNR Ibimet

AnaEE
Analysis and Experimentation on Ecosystems

ENVRI plus

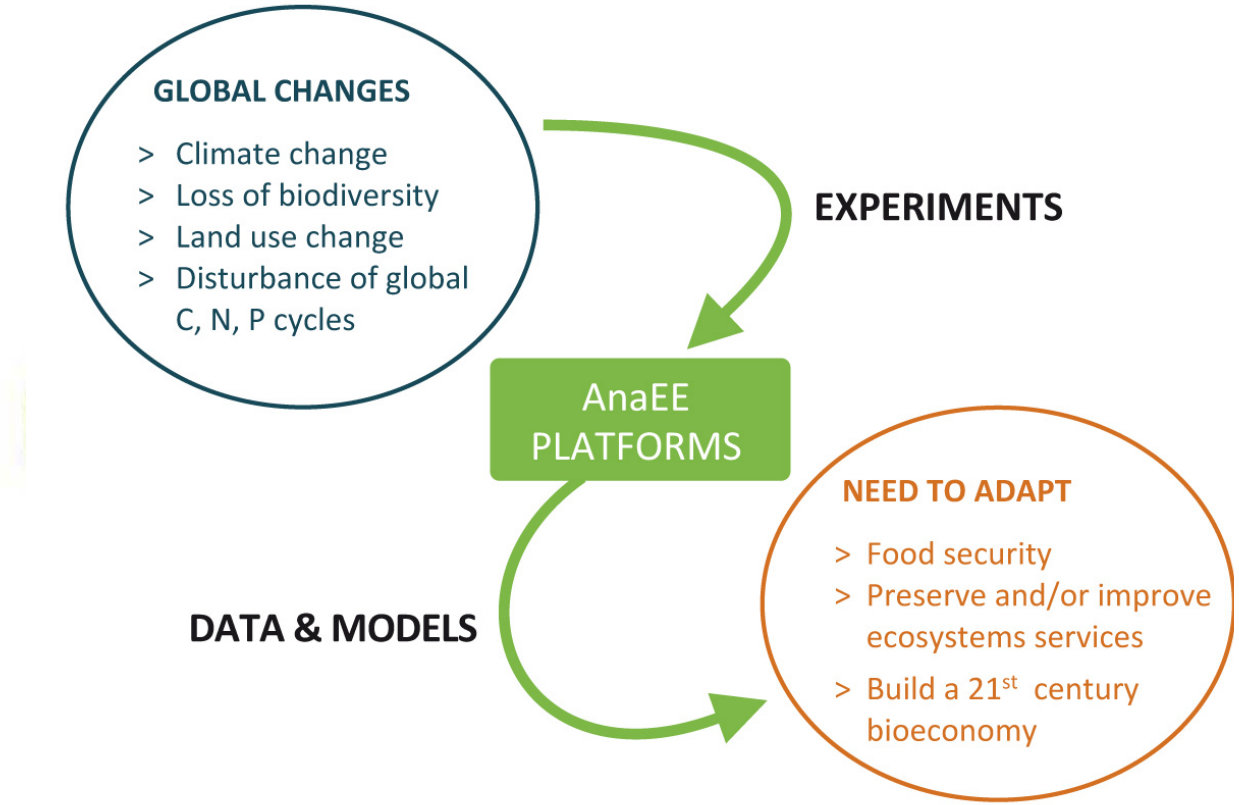
ESFRI

AnaEE offers **access** to experimental platforms and data on terrestrial and aquatic ecosystems across Europe

AnaEE Concept

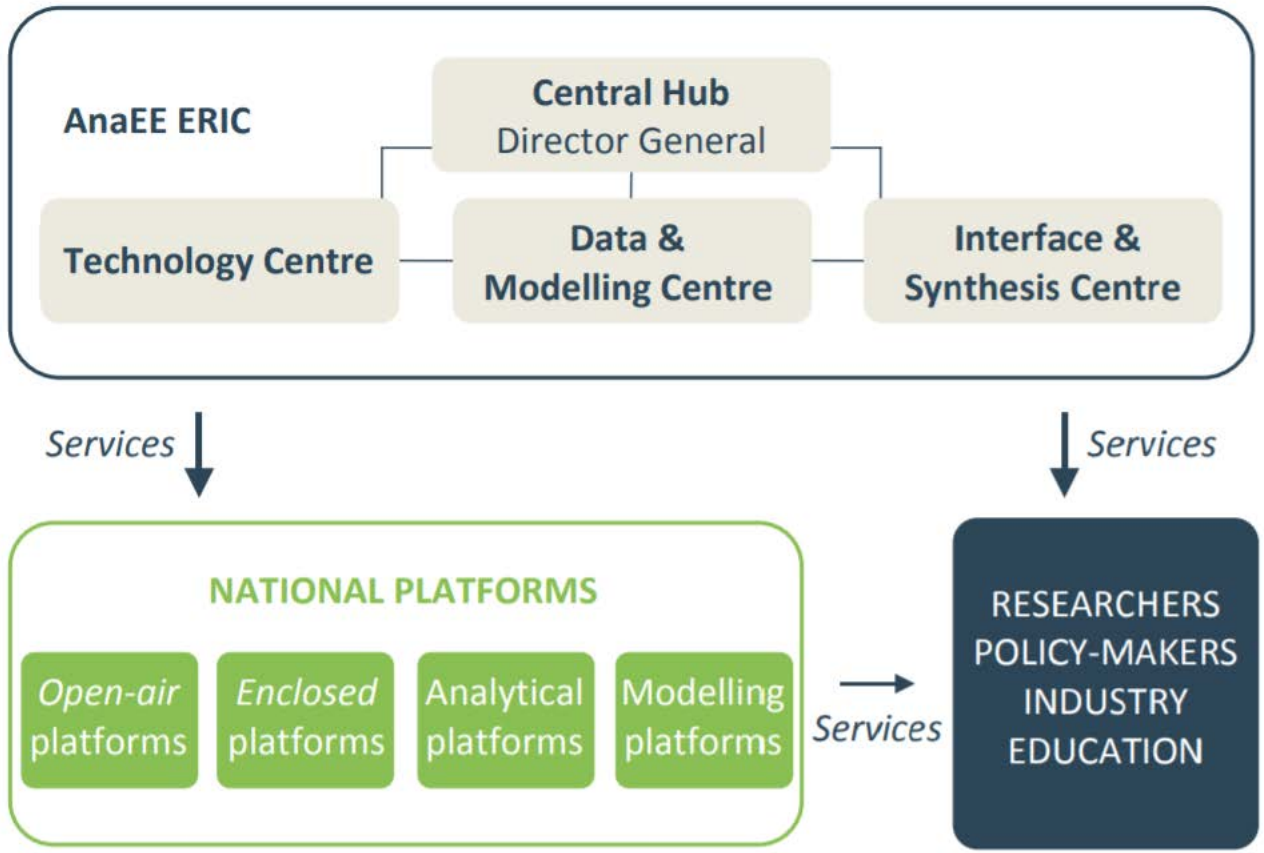
To enable experiment on managed and unmanaged terrestrial and aquatic ecosystems

providing data and models addressing the challenges of food production, ecosystem services and bio-economy



AnaEE Structure

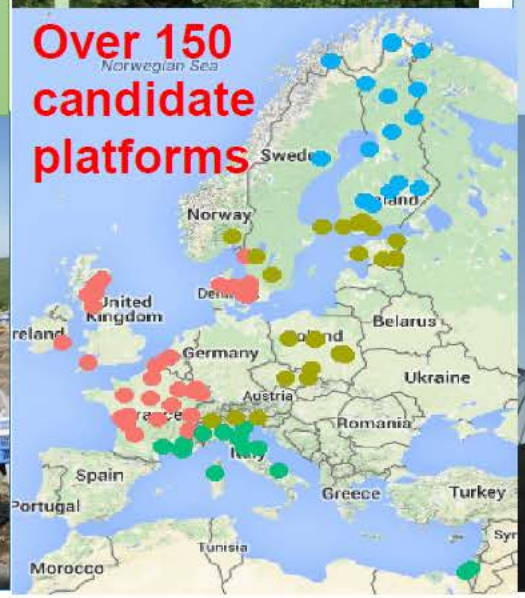
National platforms and Supra-national Hub and Service Centres



AnaEE offers

1) open access for public and industry scientists to a wide range of experimental ecosystem platforms :

Open-air ecosystem platforms
covering various land uses and transecting Europe's climatic zones



Enclosed ecosystem platforms
to enable higher environmental control and intensive process measurements

AnaEE offers

2) open access for public and industry scientists to experimental support facilities:

Analytic Platforms
advanced biological, physical, chemical and isotopic analyses for a deeper insight into processes

Modelling Platforms
Models and model factories to improve experimental design, data analysis and generalisation as well as predictions

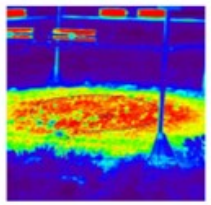
AnaEE more than a network: added value through 4 supra-national entities

Central Hub

strategy, coordination, communication (AnaEE portal) and administration

Technology Centre

harmonization of procedures and instruments, improvement of the quality of their data, technological development, transfer of innovation



Data & Modelling Centre

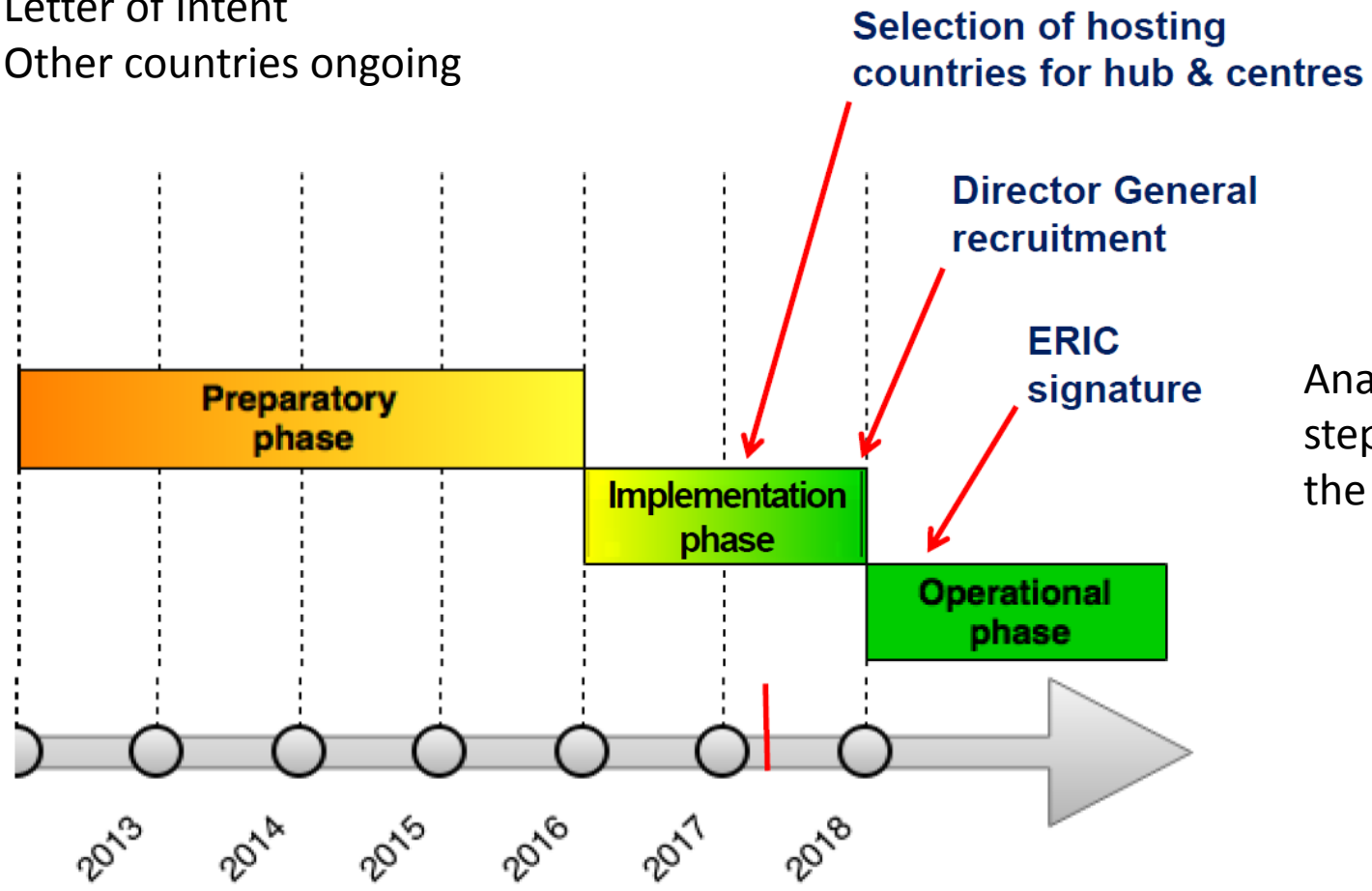
access to the data of the platforms (metadata and data standards)
access to and use of modelling solutions and models factories

Interface & Synthesis Centre

interactions with scientists (projects developments) and stakeholders; foresight and synthesis activities; production of outreach materials

Towards an ESFRI operational infrastructure

Belgium, Czech Republic, Denmark, France, Israel and Italy have signed a Letter of Intent
Other countries ongoing



AnaEE has submitted the first step of its ERIC application to the European Commission.

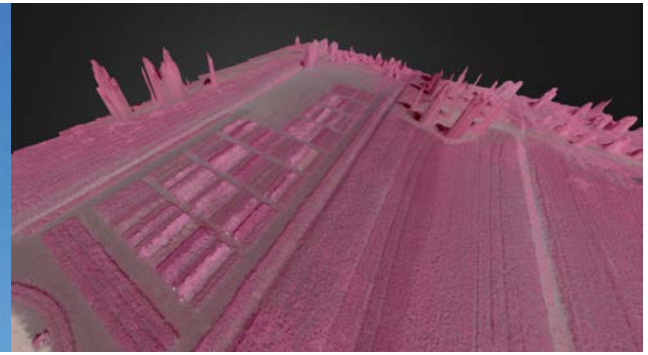
AeroLab (AnaEE Italy analytical facility, mobile)

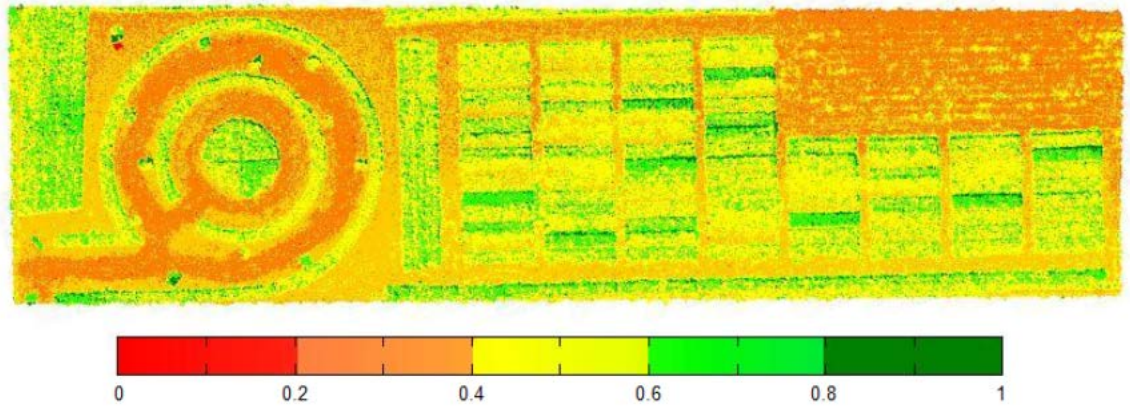
Drones platform for Ecosystems & Environmental Monitoring

Custom developed drones

State of art payloads and data processing chains

→ Advanced monitoring capability is deployed at the user experimental site

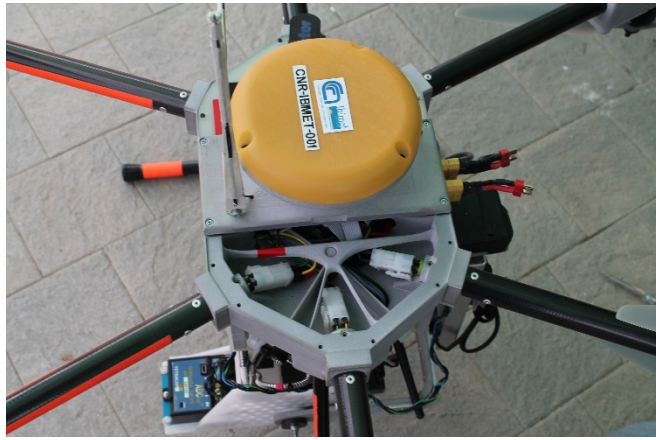




Activities	Payloads
Precision Agriculture	multispectral & thermal RS
Stress and desease detection	hyperspectral RS
Canopy structure	Visible 3D imaging
Field Phenotyping	Laser scanning

National Research Council of Italy

AeroLab – The fleet

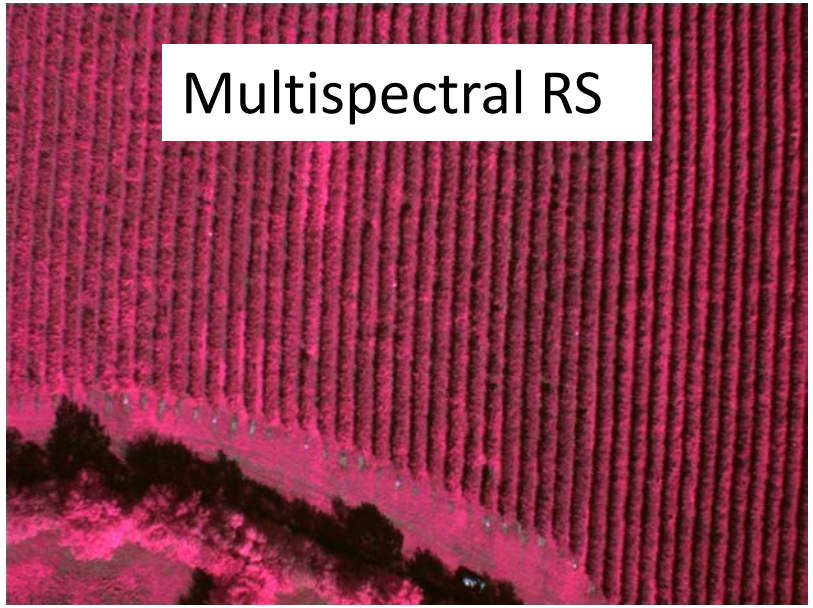


CNR-IBIMET-001

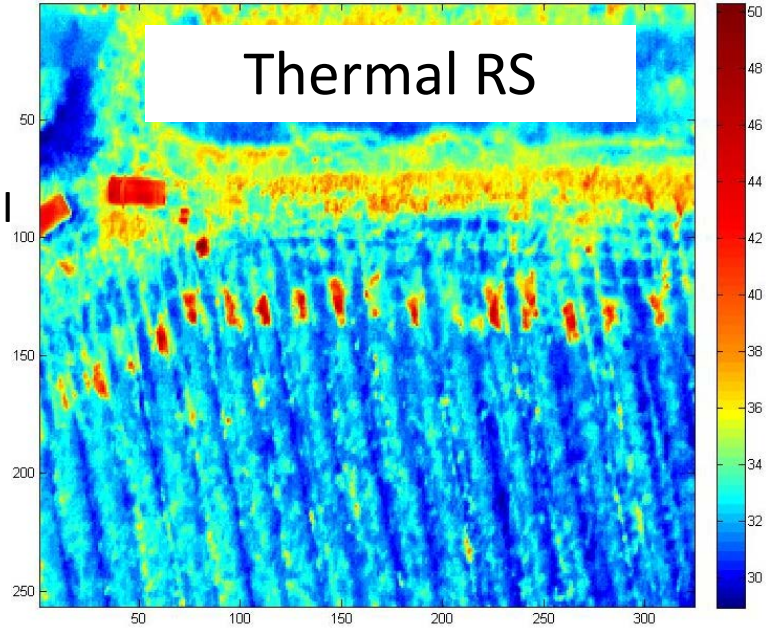
- laser sintering 3D model
- 12 engines: 14pol Brushless Outrunner High Torque
- maximum take off weight: 12 kg
- endurance: 17 min (payload dependent)

AeroLab – Payloads for Precision Farming & photosynthesis

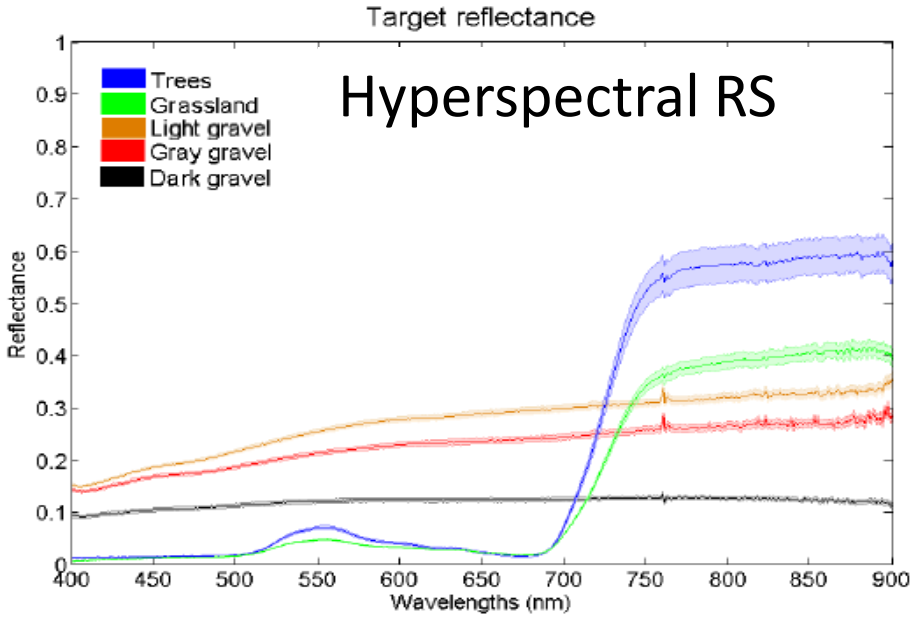
2. Tetracam ADC SNAP



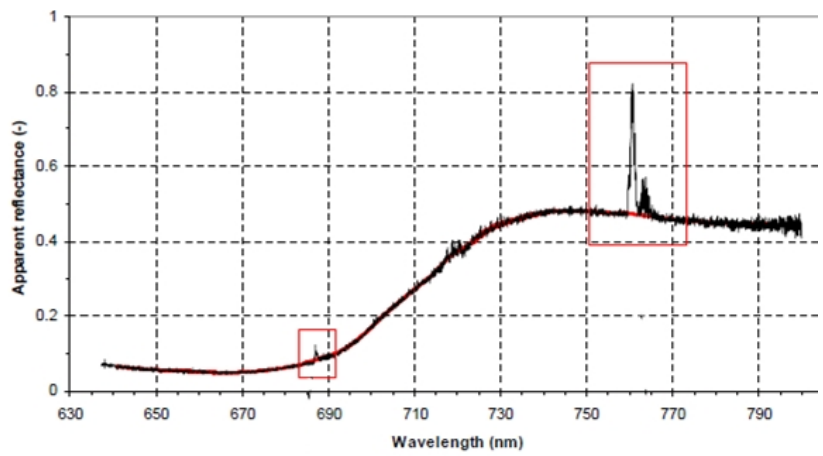
1. FLIR TAU I



4. Ocean Optics USB2000



3. OceanOptics HR4000



AeroLab → Precision Agriculture → Field Phenotyping

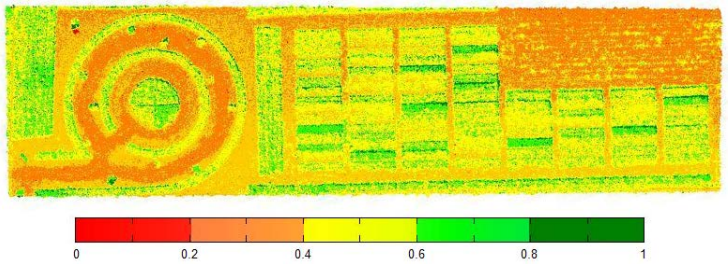
Grapevine

Precision viticulture activities
Management zones definition
Crop water stress identification
Disease monitoring
3D photogrammetry

Olive

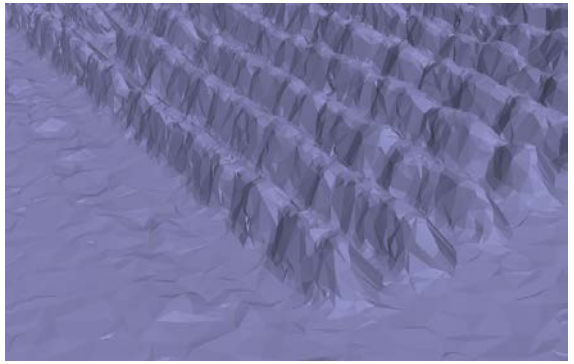
Spatial variability combining thermal, and multispectral remote sensing from UAV platform

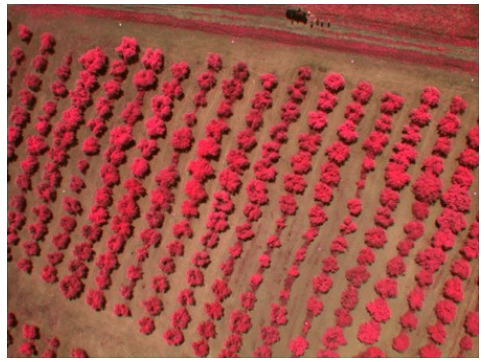
Cereals: Wheat, Barley

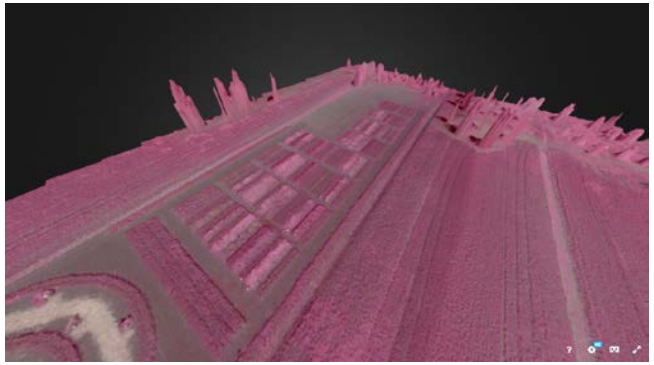


Plant phenotyping

WHEAt and barley **L**egacy for **B**reeding **I**mprovement PROJECT







AnaEE vs EMPHASIS

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Comment | Published: 05 October 2017

European infrastructures for sustainable agriculture

Jacques Roy, François Tardieu, Michèle Tixier-Boichard & Ulrich Schurr

Nature Plants **3**, 756–758 (2017) | Download Citation

The European infrastructures EMPHASIS and AnaEE aim to collaborate in bringing innovative solutions for a sustainable intensification of agriculture. By integrating the study of plant phenomics and agricultural ecology they hope to foster the development of novel scientific concepts, sensors and integrated models.

AnaEE vs EMPHASIS

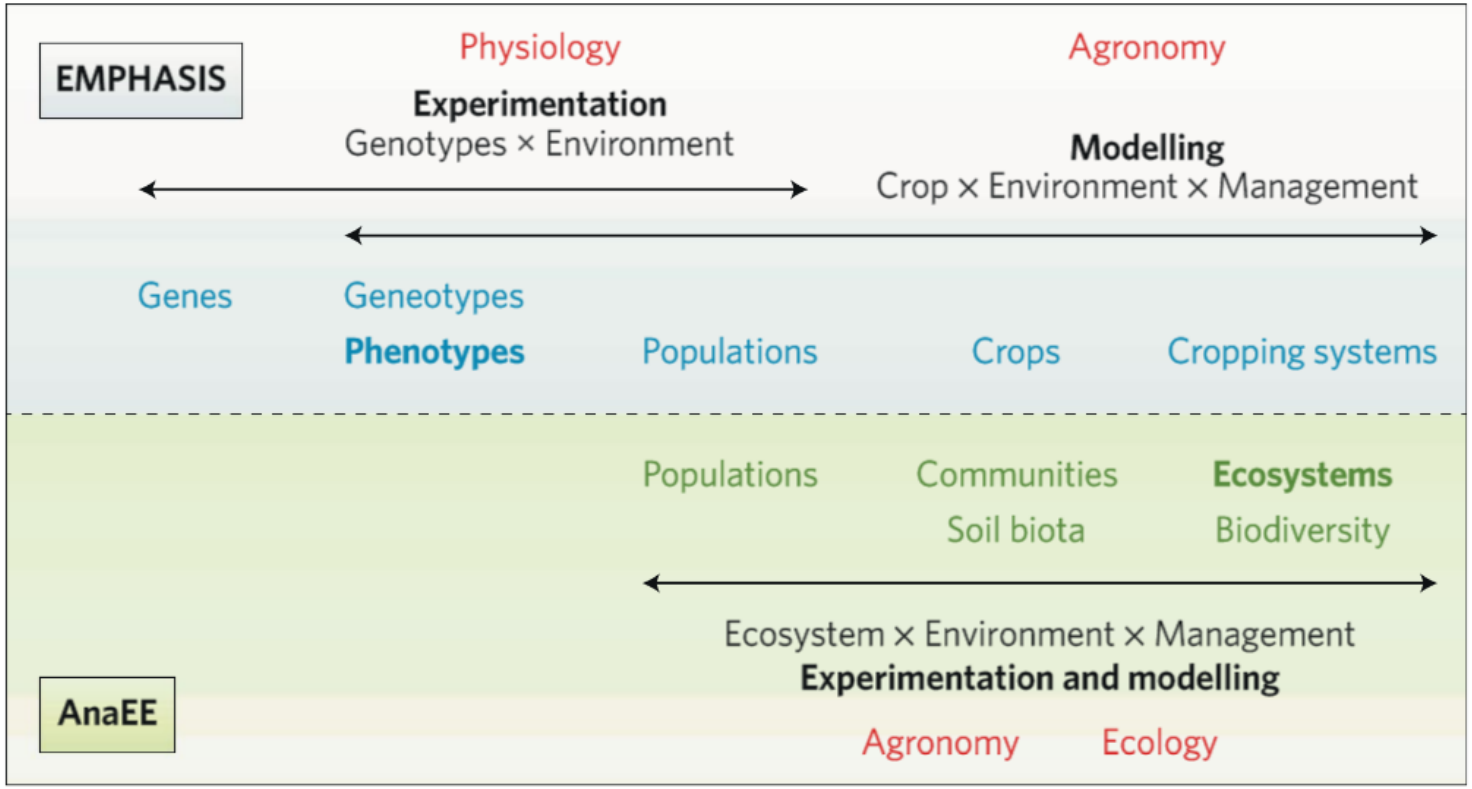

Fig. 1 | EMPHASIS and AnaEE domains. EMPHASIS deals primarily with individual plant phenotypes and models their functioning in cropping systems. ANAEE deals primarily with ecosystems, including cropping ones, where interactions between populations of plant phenotypes and soil are crucial.

Roy et al 2017, Nature Plants

AnaEE vs EMPHASIS

- EMPHASIS investigates the **phenomes of crop genotypes** in the diversity of current and future environments
- AnaEE probes the **functional responses of ecosystems** in such environments.
- Distinct in **focus** and **timescales** (plant phenotypes over months to years versus ecosystem processes over years to tens of years) and with specific experimental and modelling platforms,
- Many sinergies / potential interactions (sensors, models, …) and common objectives of food security and sustainable agriculture.