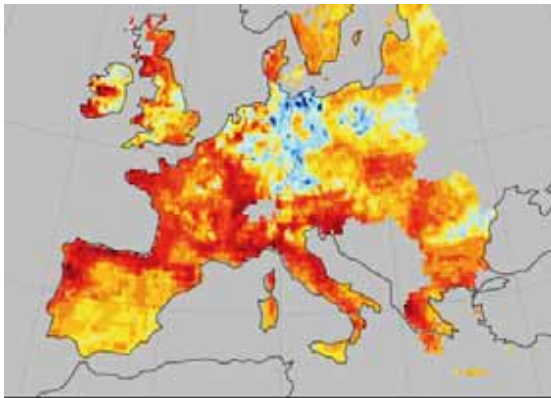


AnaEE

A European infrastructure for analysis
and experimentation on ecosystems

*Abad Chabbi, Coordinator
INRA France*

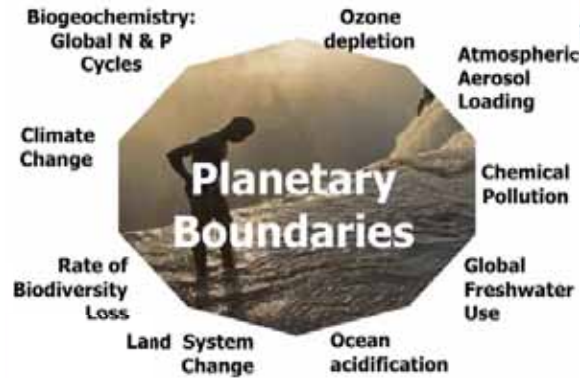




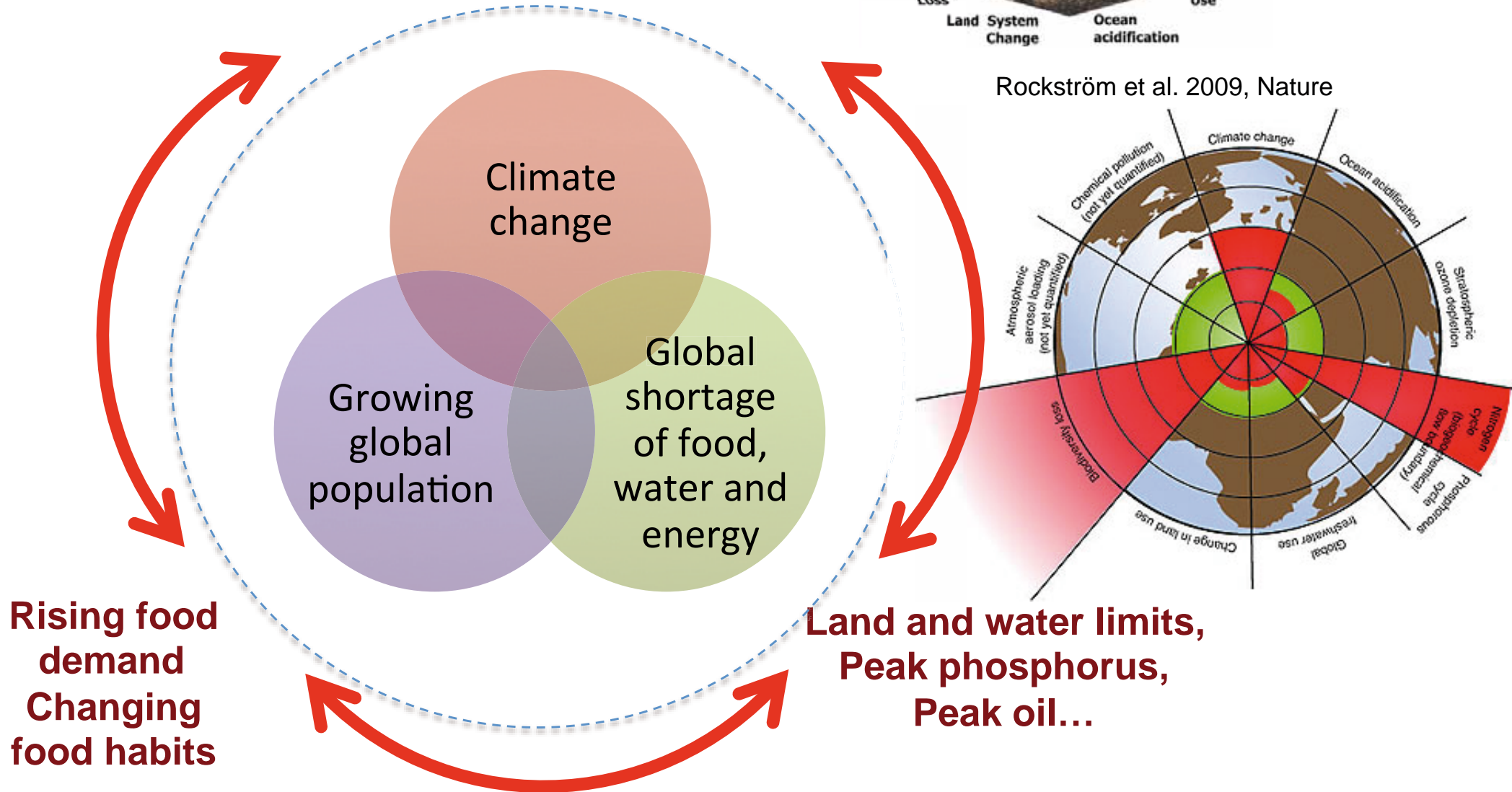
ESFRI

Addressing key scientific & societal challenges

**Disturbed C,N and P cycles
Soil degradation,
Biodiversity loss, Extreme events**



Rockström et al. 2009, Nature





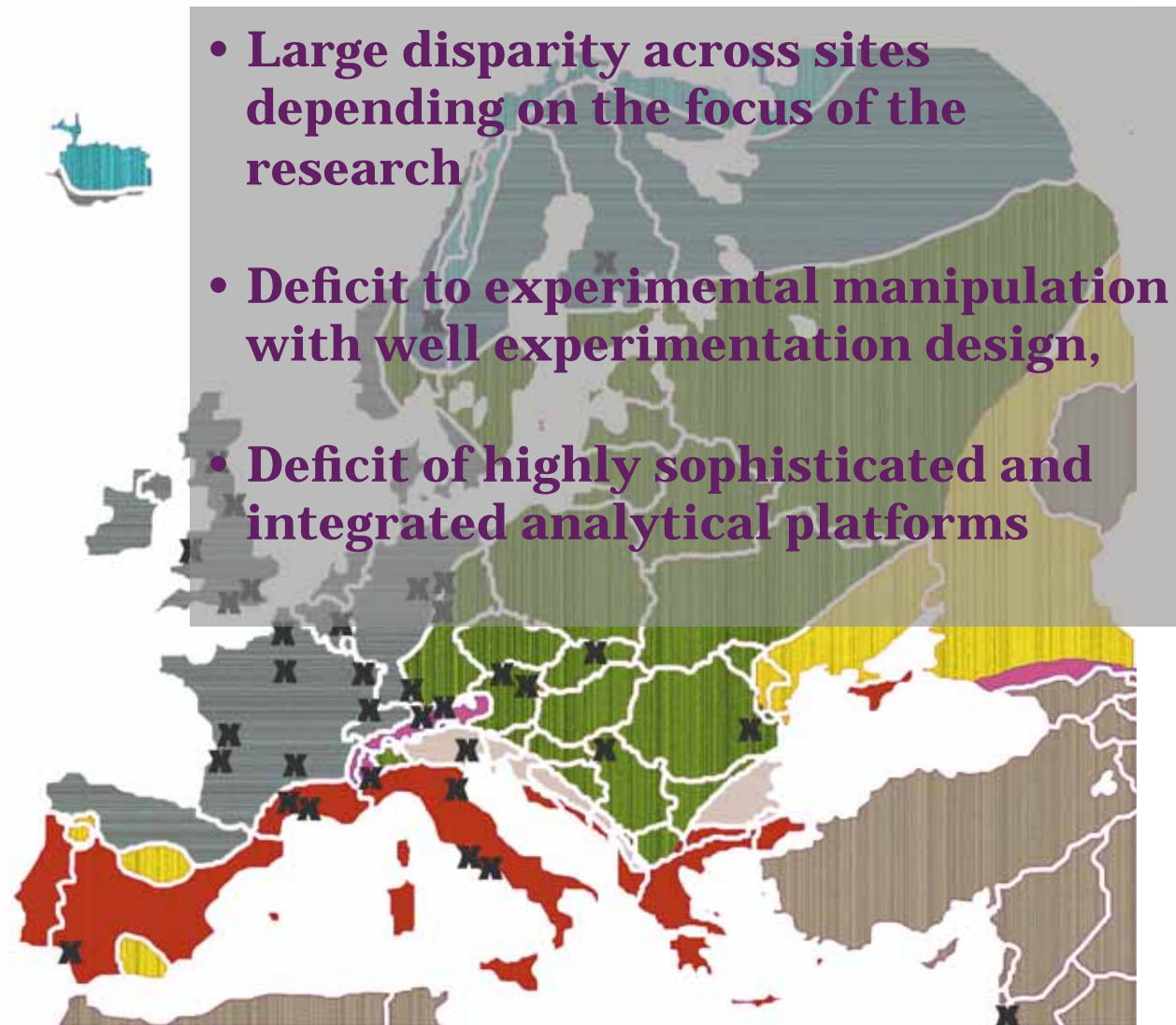
CEI Bioscience
H. Paganini, Ph.D.

> Project Coc
Dr. Abad C

ExpeER Experiment
in Ecosystem Res

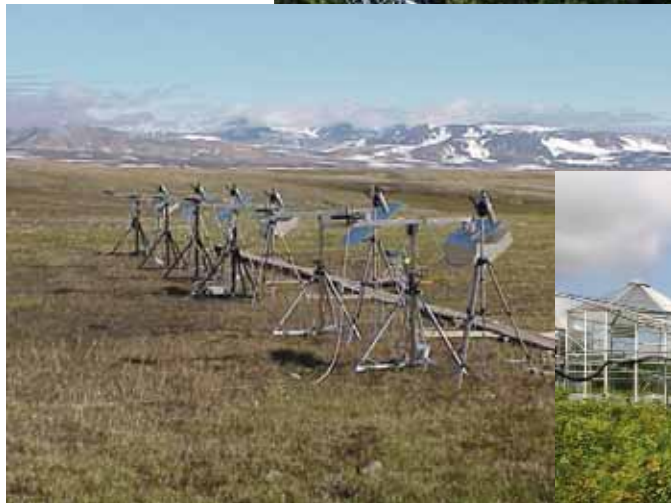


ExpeER brings together, for the first time, existing h
European infrastructures in the field of ecosystem resear
research capacity and to encourage their wider use.



- Large disparity across sites depending on the focus of the research
- Deficit to experimental manipulation with well experimentation design,
- Deficit of highly sophisticated and integrated analytical platforms

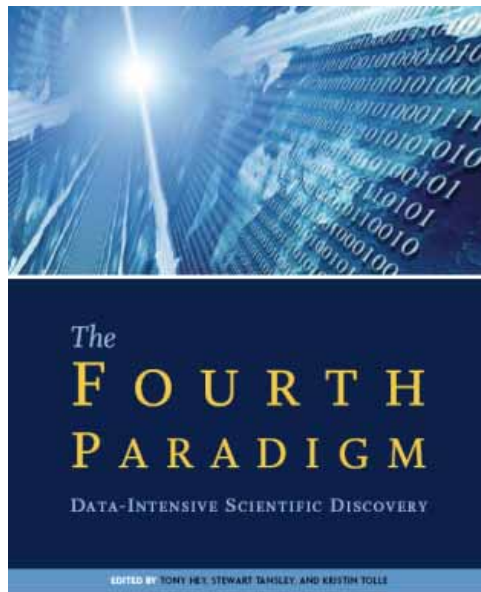
Current situation



Problems

- Research gaps
- Research duplication
- Insufficient critical mass
- Lack of multidisciplinary: separate processes
- Lack of standardization
- Lack of technology exchange
- Lack of analytical capacity
- Insufficient linkage of data and models
- Limited stakeholder involvement

▪



9/2008

3/2010

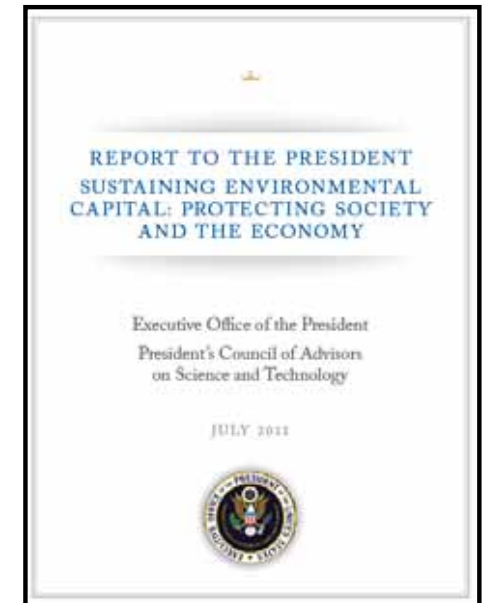
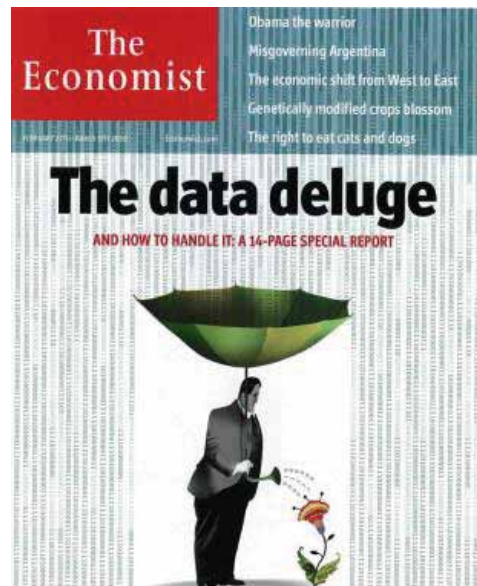


2/2011

7/2011



10/2009





ESFRI

What is ANAEE?

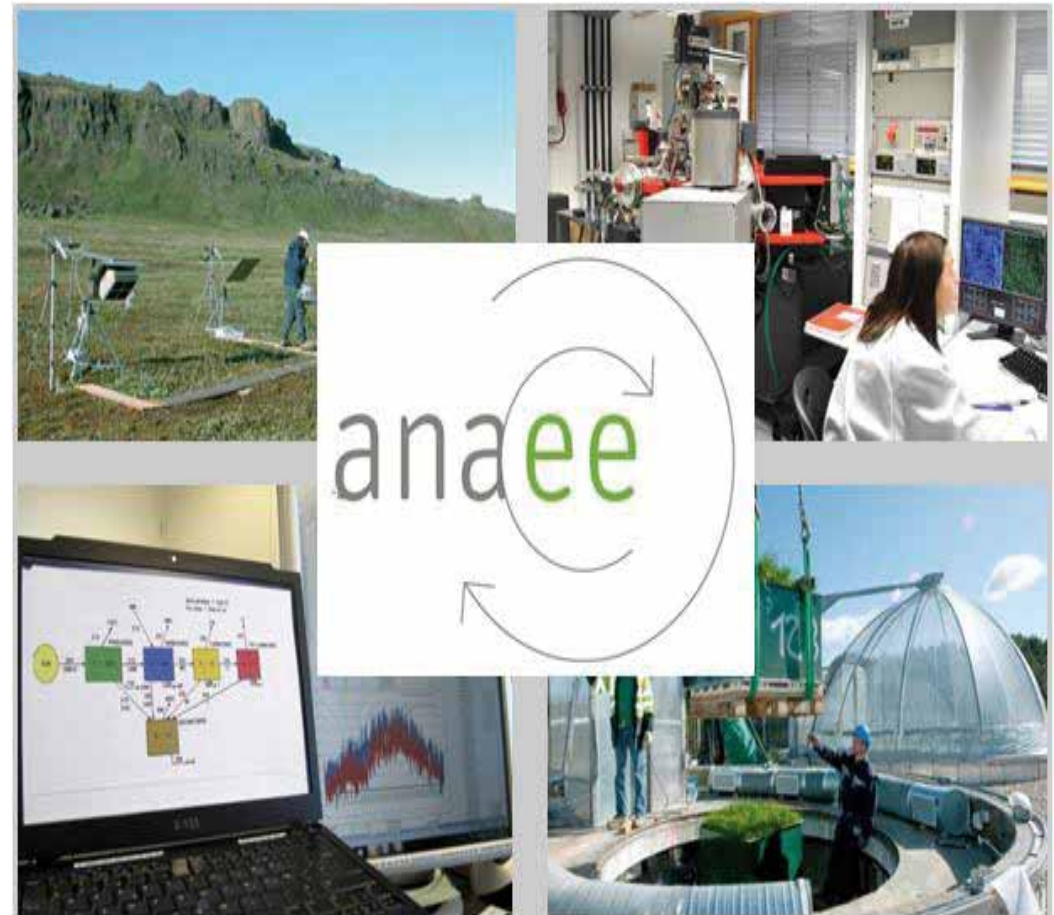
➤ A world-class distributed experimental infrastructure **for enabling ecosystem research**

➤ A coordinated set of experimental platforms across Europe to **analyse, test** and **forecast** the response of ecosystems to environmental and land use changes.

➤ ANAEE will be **the key instrument** for carrying out terrestrial ecosystem research within the European Research Area.

**In natura
experimentation**

**Bench analytical
platforms**

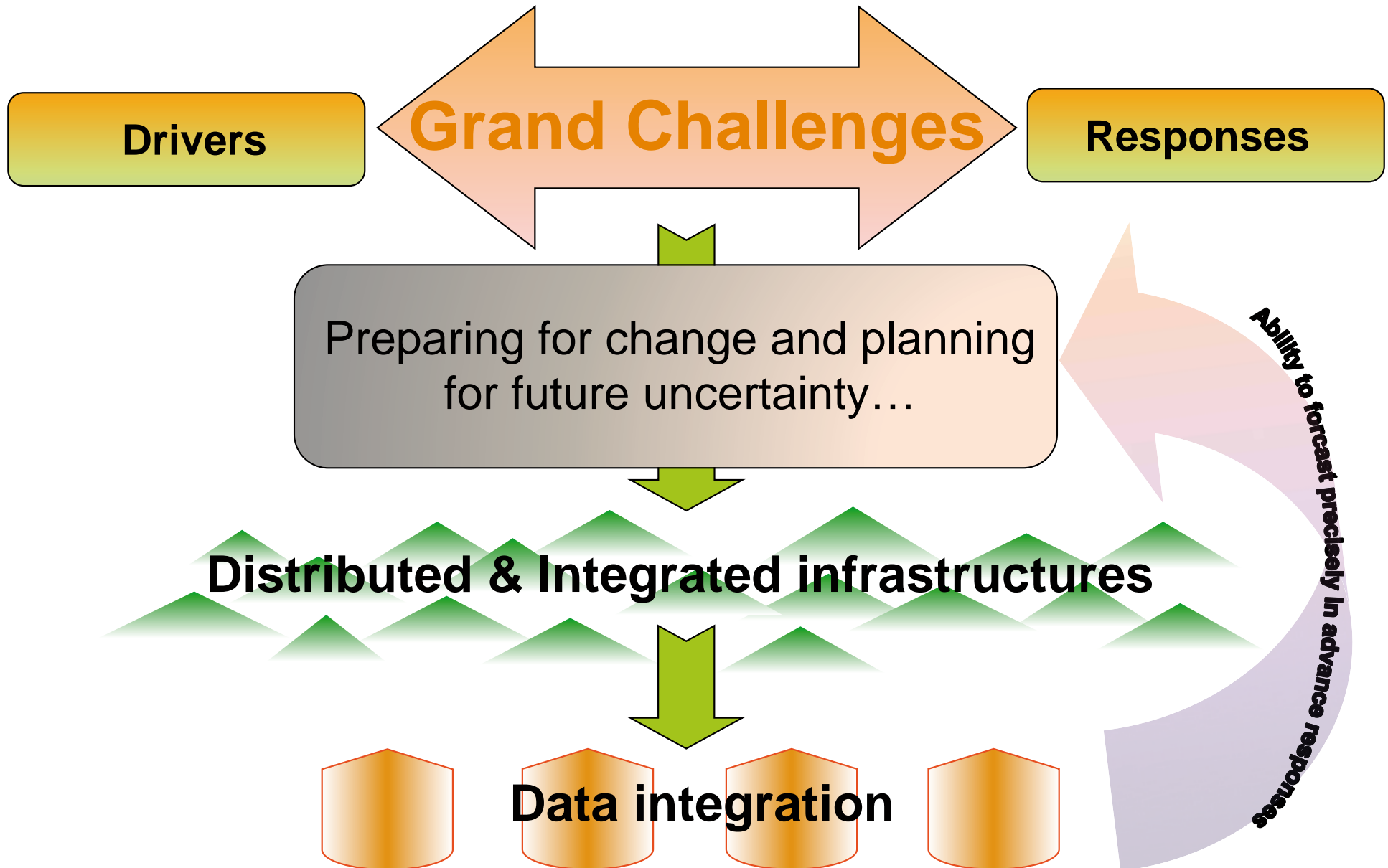


Modeling platform

**In vitro
experimentation**

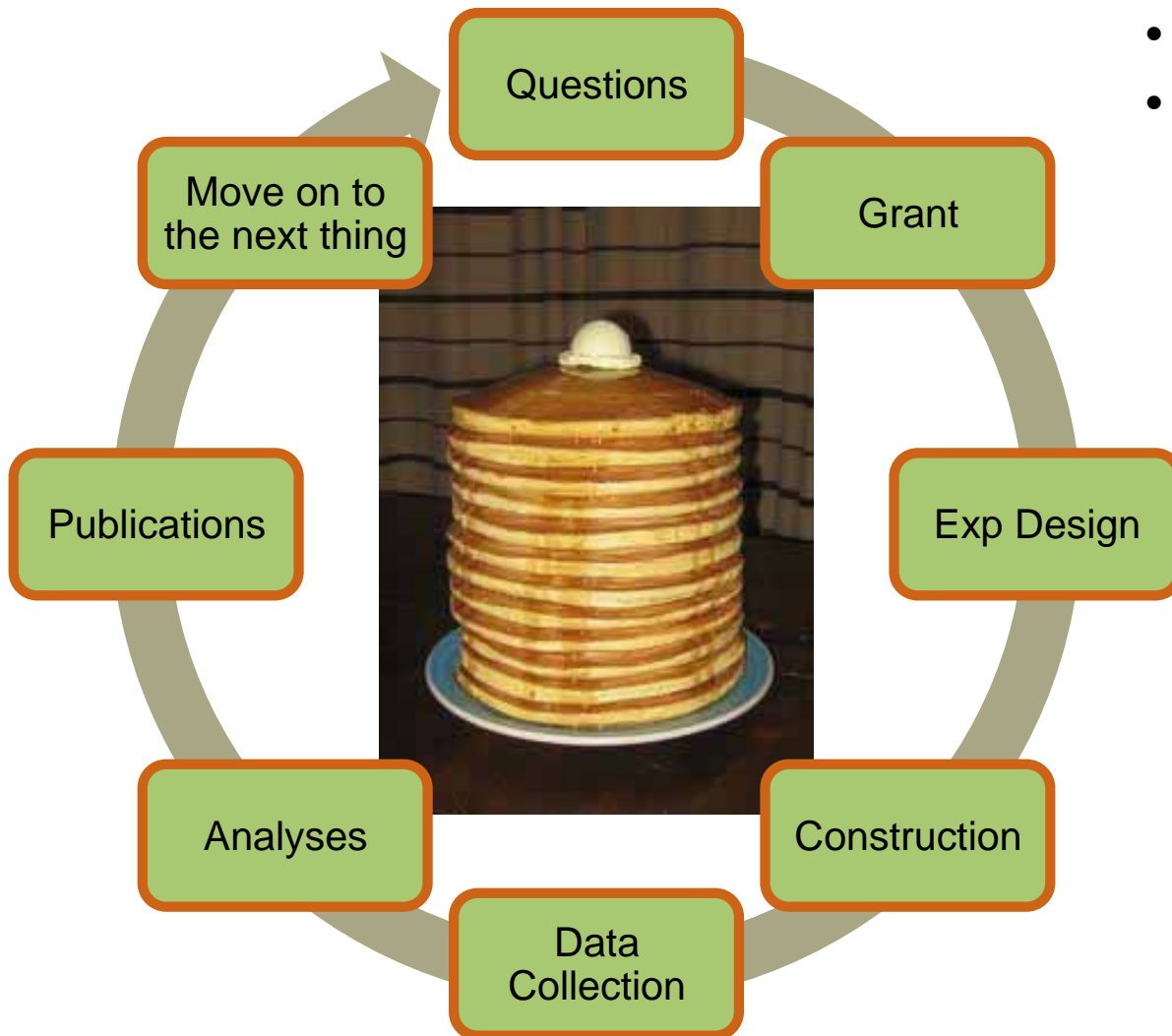
- Scale: **Europe** including full range of **Europe's ecosystems and climate zones**
- Wide range of environmental and societal implications for **policymakers**

AnaEE approach



Balancing Scientific Creativity with Baseline measurements

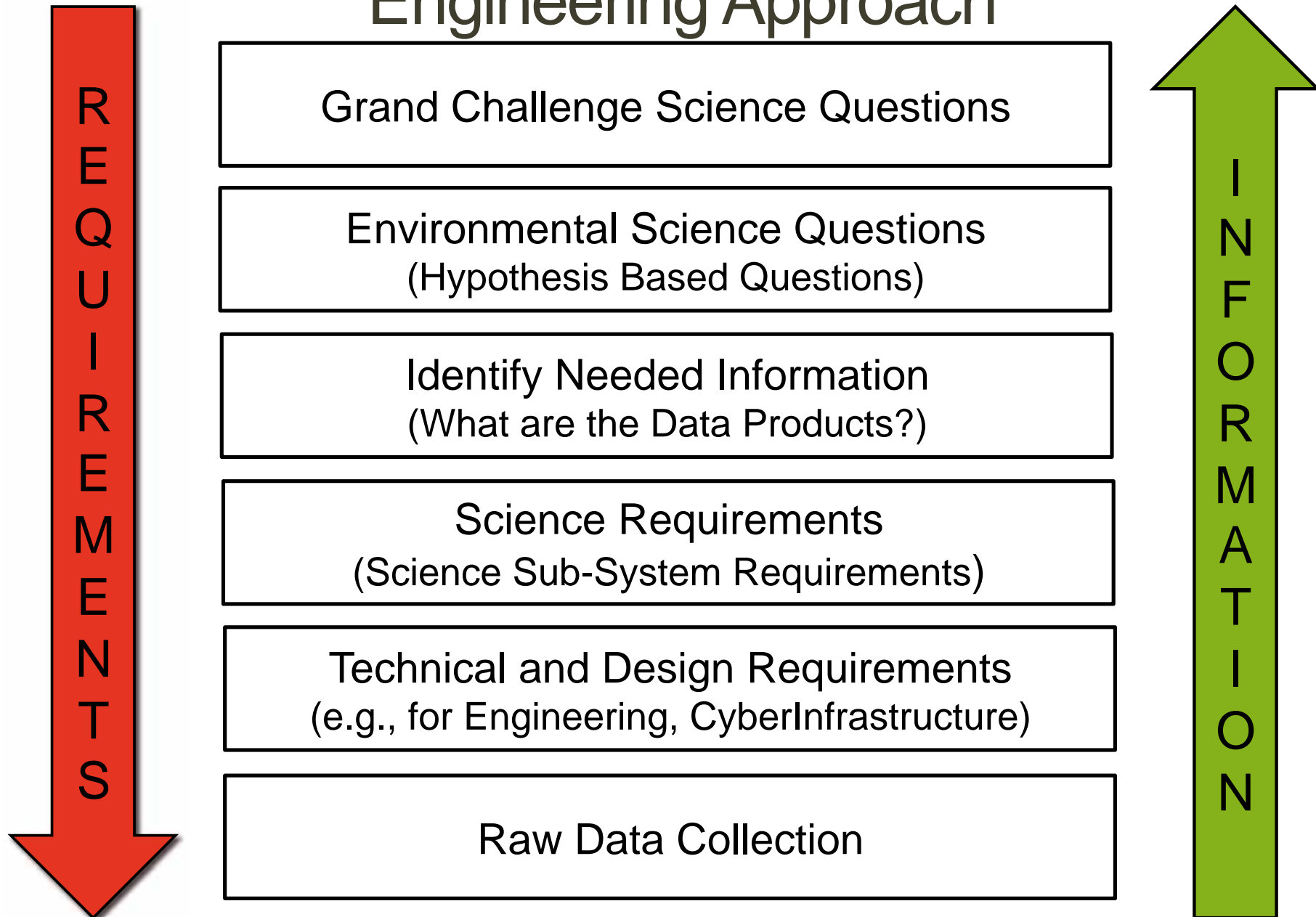
Scientist's Approach to Project Science



- Hypotheses testing: 'what can we do?'
- Rationale for long term observations
- Capabilities-based (network development)
- Additional organizational complexity is often layered

Pro	Con	
✓		Scientific creativity
✓	✗	Comfort-level for scientists and bottom-up approaches
	✗	Complexity becomes open-ended problem
	✗	Governance is often difficult, and not extensible
	✗	Difficult planning for Program Officers/Sponsors
	✗	Problematic for long term sustainability

AnaEE Scientific / System Engineering Approach



Balancing Scientific Creativity with Baseline measurements

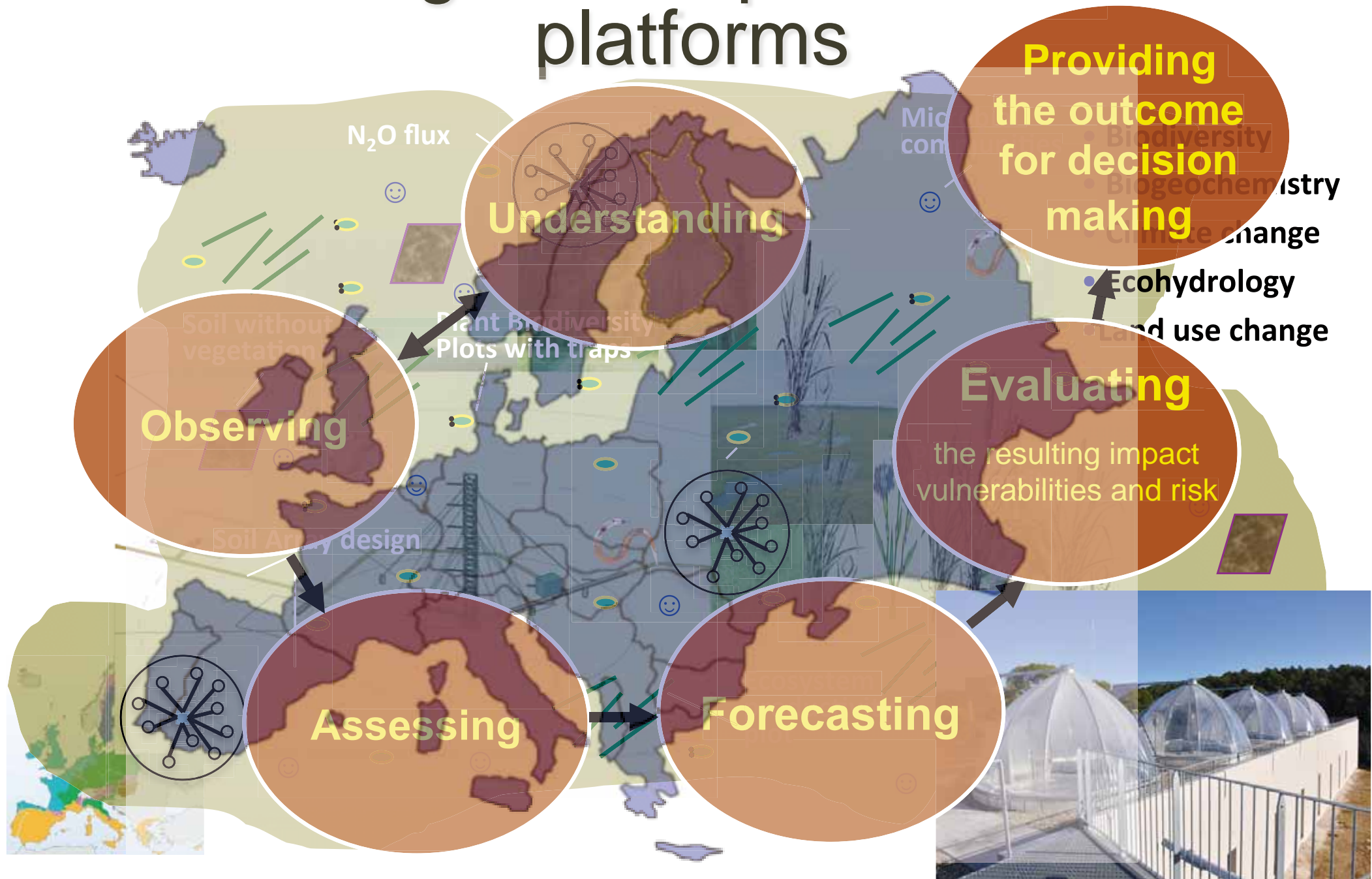
Systems Engineering Approach



- Formalized hierarchical requirements
- Asks ‘what must be done?’
- Measurements are considered baseline
- Steps are parsed out (see diagram)

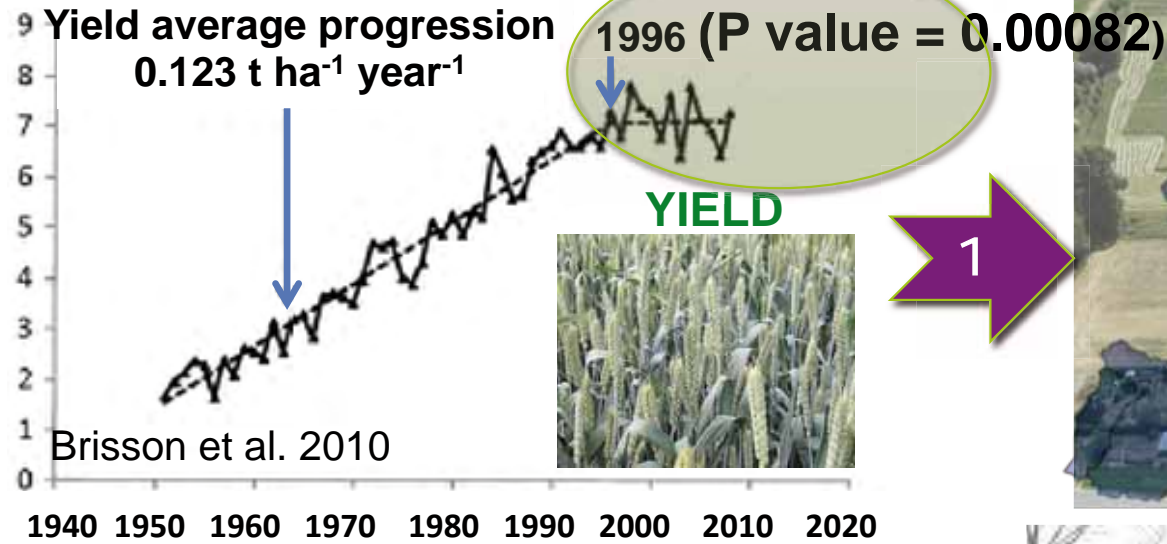
Pro	Con	
✓		New roles for scientists, both internally and externally
✓		Clearly defines scope, budget, schedule, risks
✓		Complexity is inherently planned for
✓		Develops planning horizons for Program Officers/Sponsors
✓		Fosters long term sustainability
✓	✗	Requirement approach does not necessarily impose a single unique solution

Integrated experimental platforms



Hypothesis/observation testing

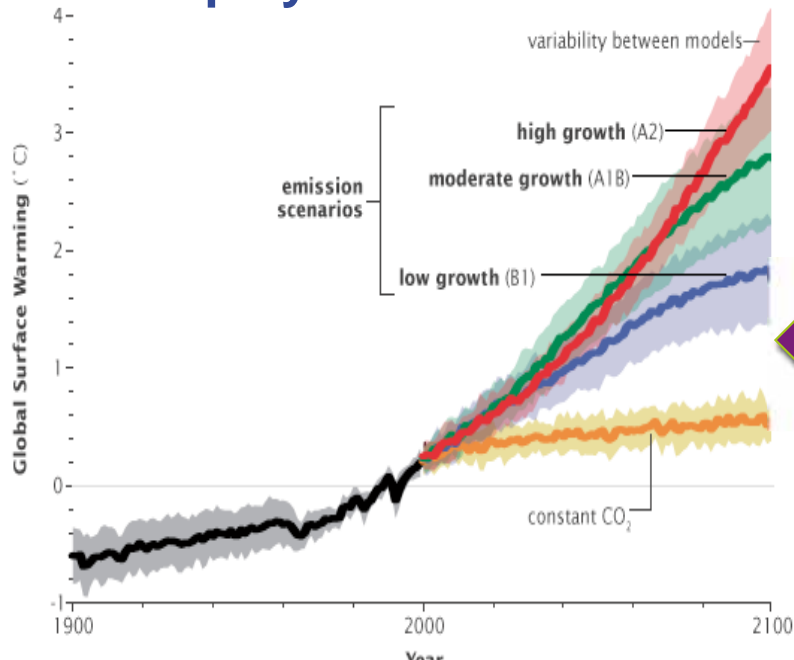
t ha⁻¹



In natura experimentation

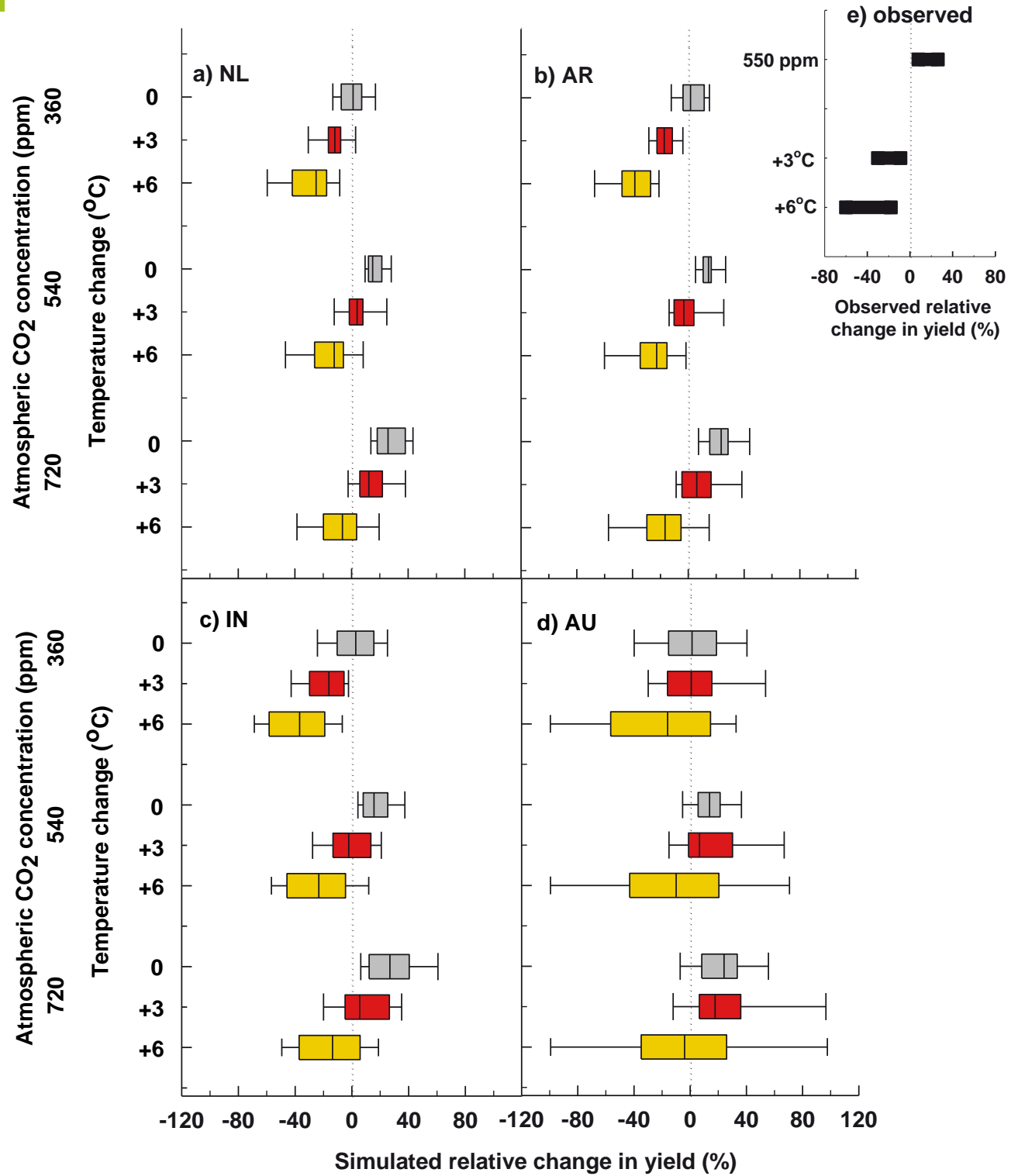


Crops yields forecasts



In vitro experimentation

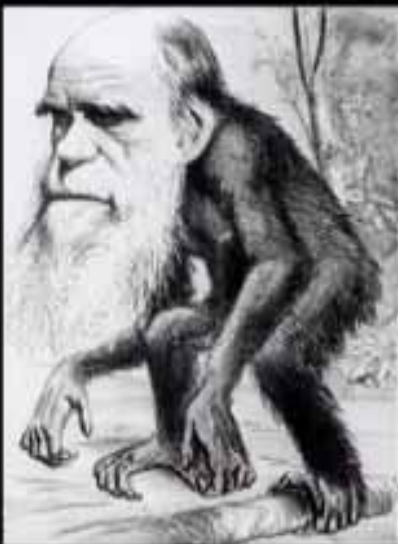
AgMIP wheat model inter-comparison



Our vision



- *Preparing for change and planning for future uncertainty to fulfil the promise of a plentiful food supply and ecosystem sustainability in the face of a changing climate*
- *Shaping the pathways of social-ecological systems to enhance ecosystem resilience and human well being*



Evolution and the Anthropocene

Darwin's insights about the origin of humans - that we are apes, a part of nature (not above it) - challenged deeply held beliefs about the human-environment relationship.

Our strategic objectives

Research

- Enable researchers to carry out excellent and breakthrough research and thus strengthen the European research area in ecosystem science.

Innovation and education

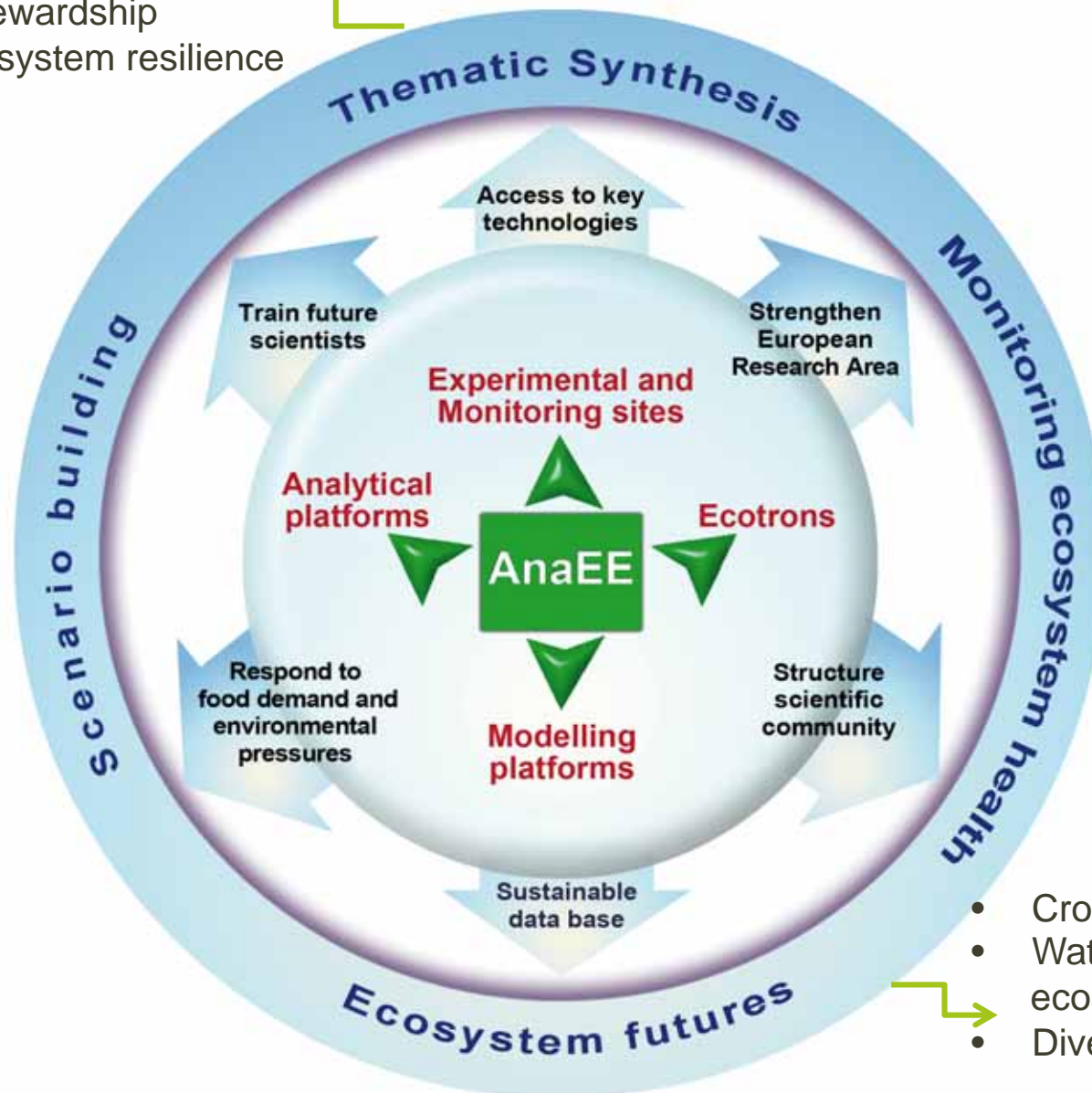
- Building the science of people with nature

Policy Relevance

- Be a key tool for policy planning to adapt to environmental pressures and mitigate harmful effects on ecosystem services.

Our Services

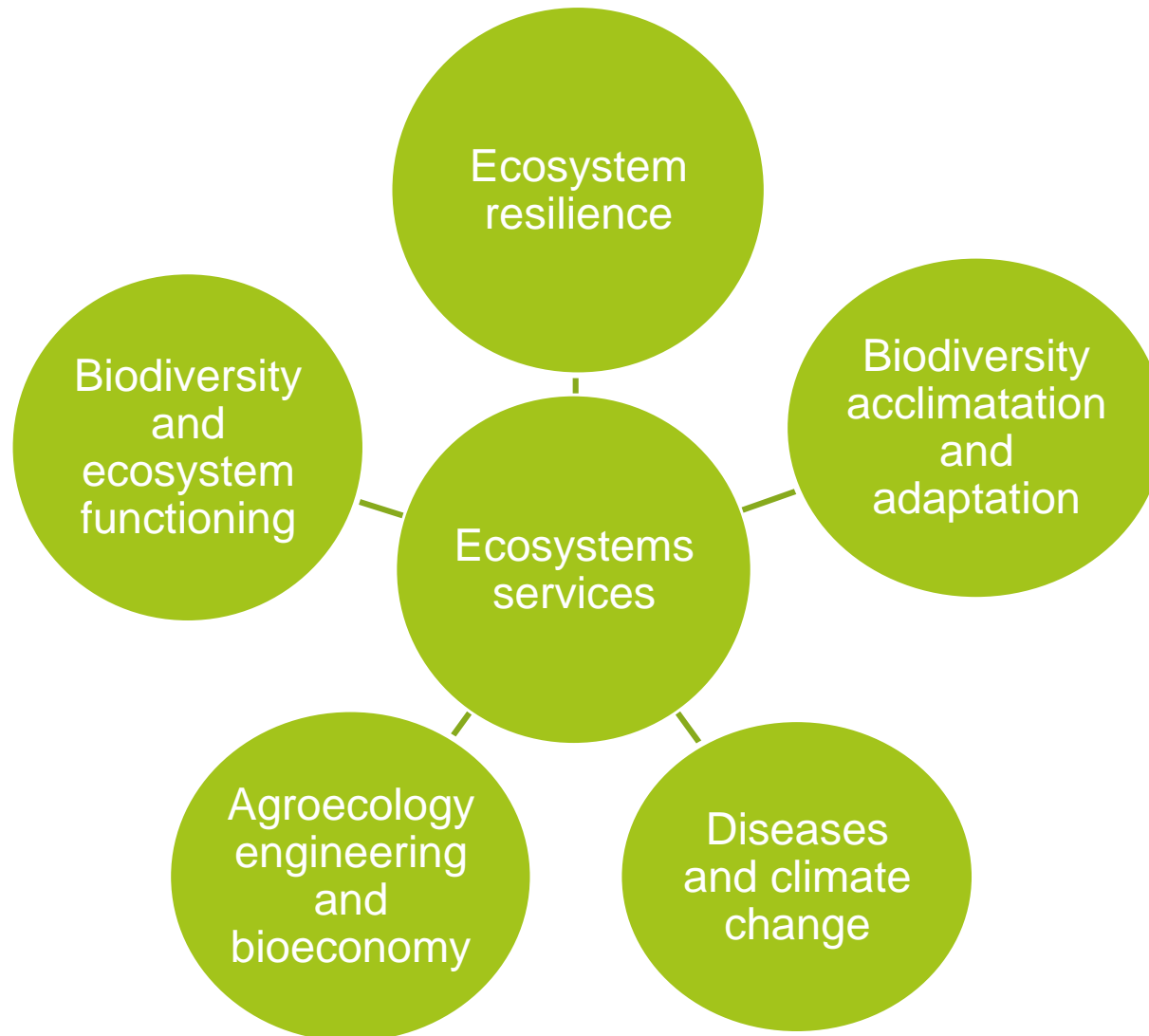
- Ecosystem services dynamics
- Management options for ecosystem stewardship
- Managed ecosystem resilience



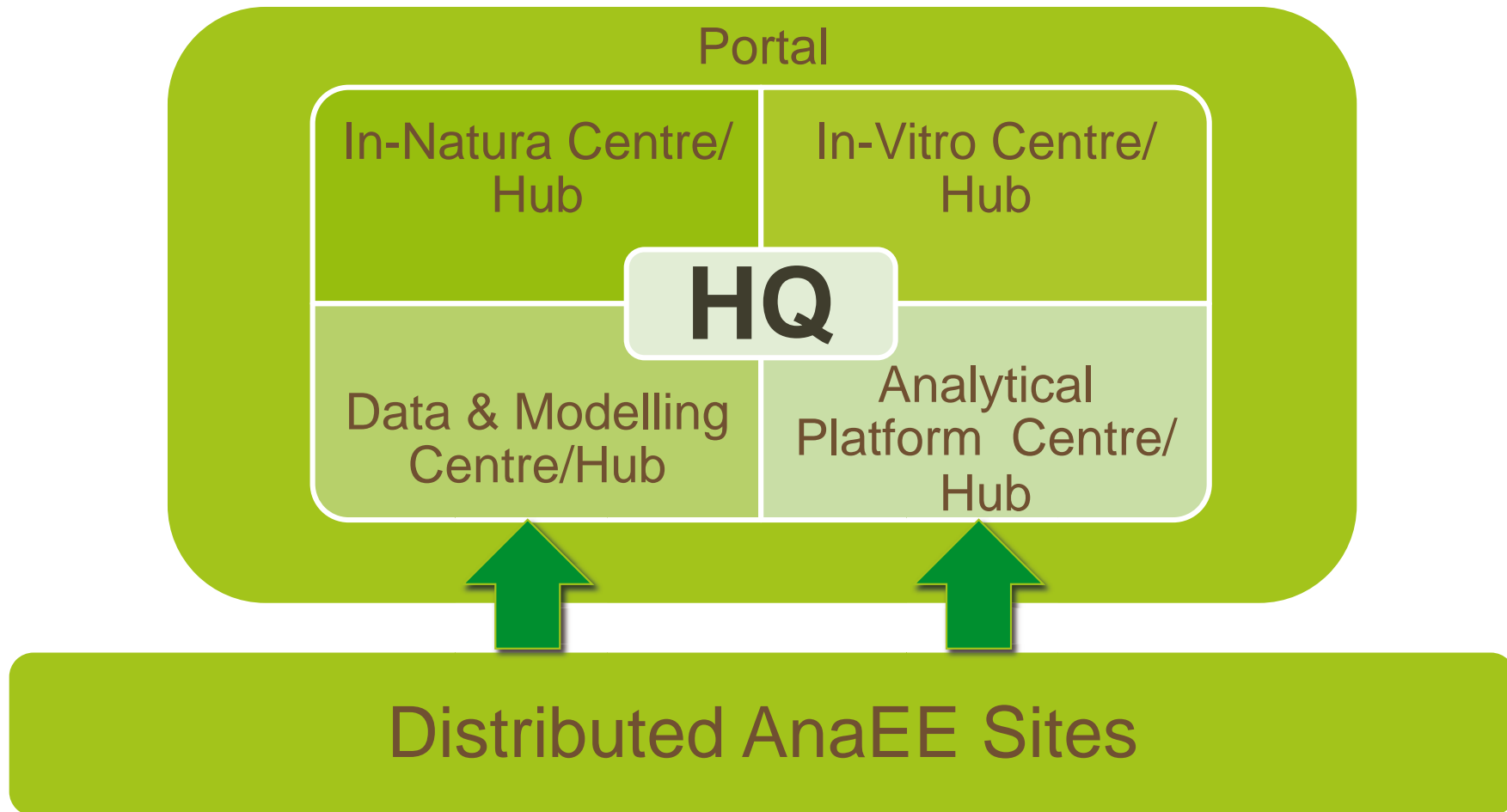
- Monitoring variability and extremes (pulse and release)

- Crops and pastures yields forecasts
- Water supply by managed ecosystems
- Diversity loss

Our measures



AnaEE Working Structure

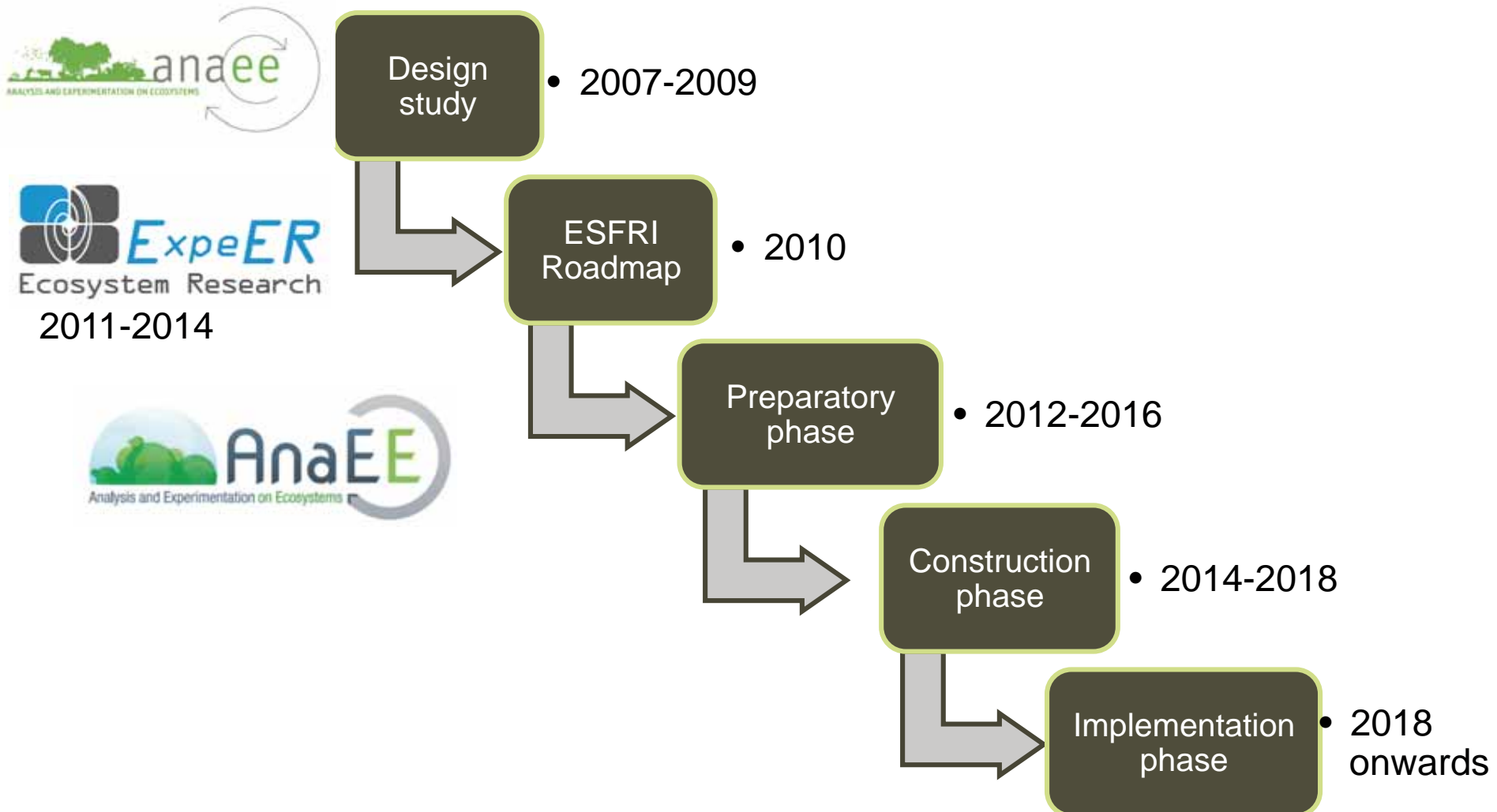




The logo for ESFRI (European Science Facility for Research Infrastructure) is a dark blue square with the letters 'ESFRI' in white, bold, sans-serif font.

How we are building AnaEE

The agenda to build AnaEE



Current partners from 10 European countries



French National Institute for Agricultural Research (INRA), France

Biotechnology and Biological Sciences Research Council (BBSRC), UK

Norwegian Institute for Agricultural and Environmental Research (Bioforsk), Norway

National Centre for Scientific Research (CNRS), France

Technical University of Denmark (DTU), Denmark

Istanbul Technical University (ITU), Turkey

Fondazione Edmund Mach (FEM), Italy

Global Change Research Centre, Czech Academy Of Science (CVGZ), Czech Republic

University of Antwerp (UA), Belgium

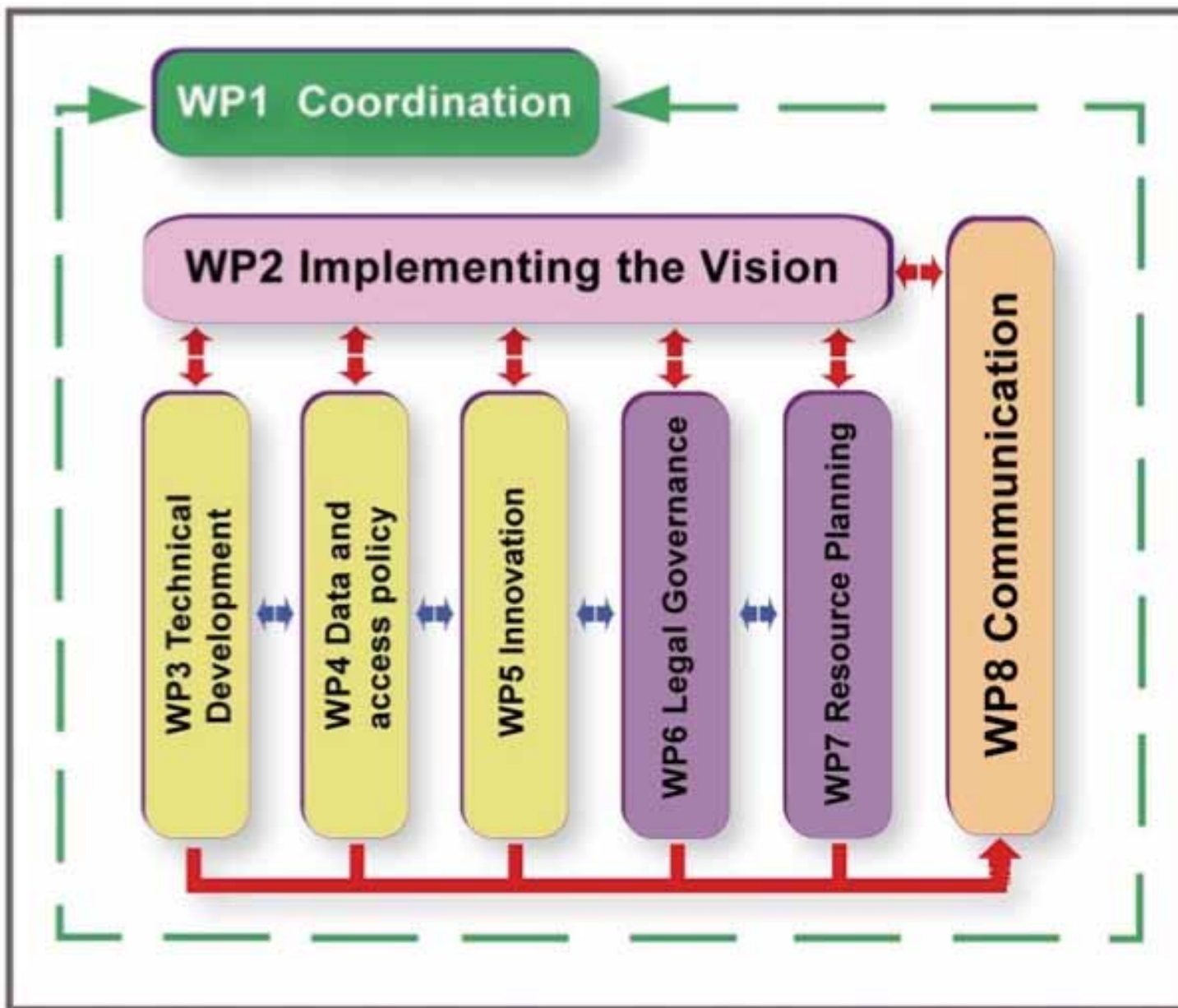
University of Helsinki (UHel), Finland

Umea University (UU), Sweden

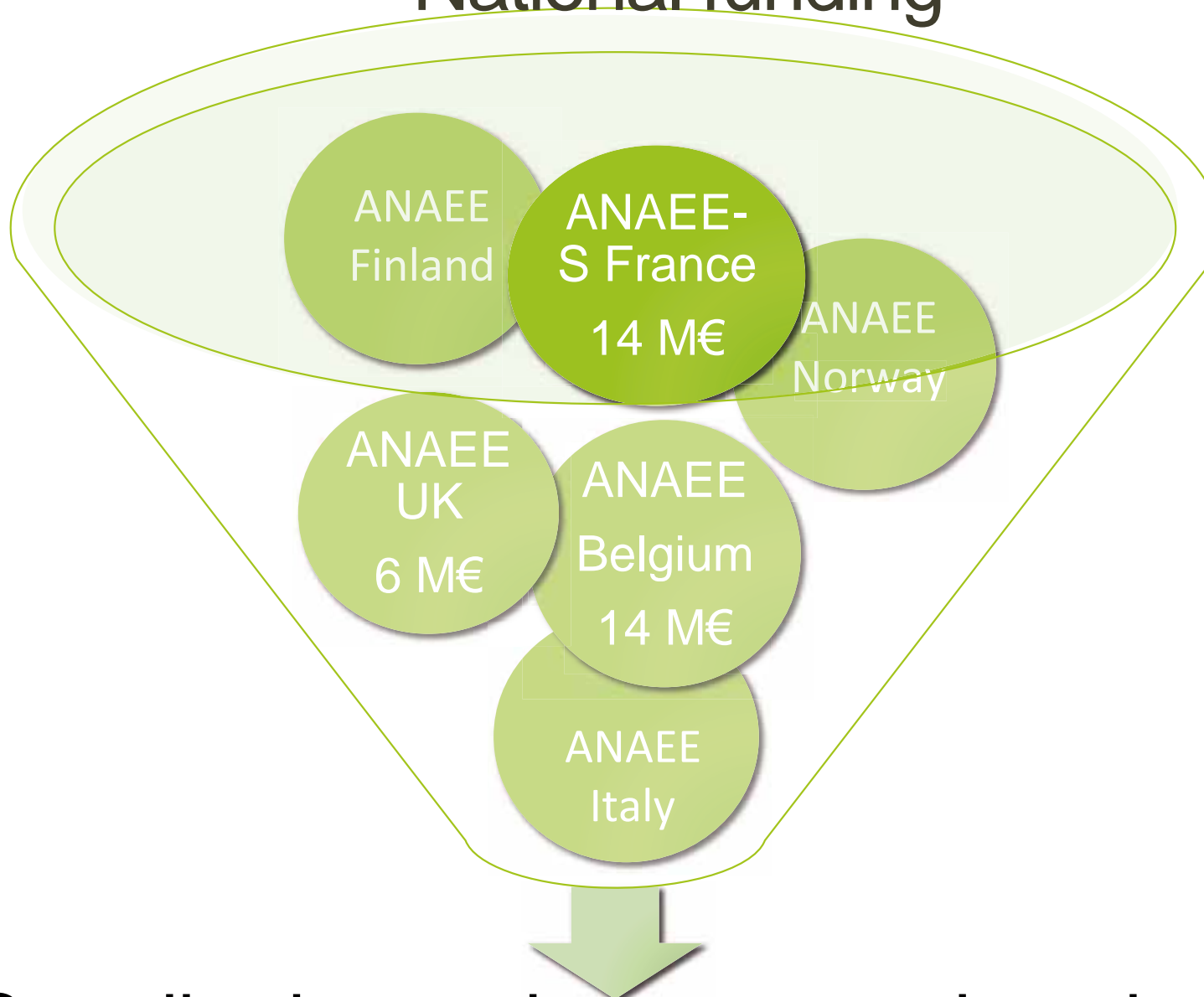
Rothamsted Research (RRes), UK

INRA Transfert (IT), France





AnaEE a means of leveraging National funding



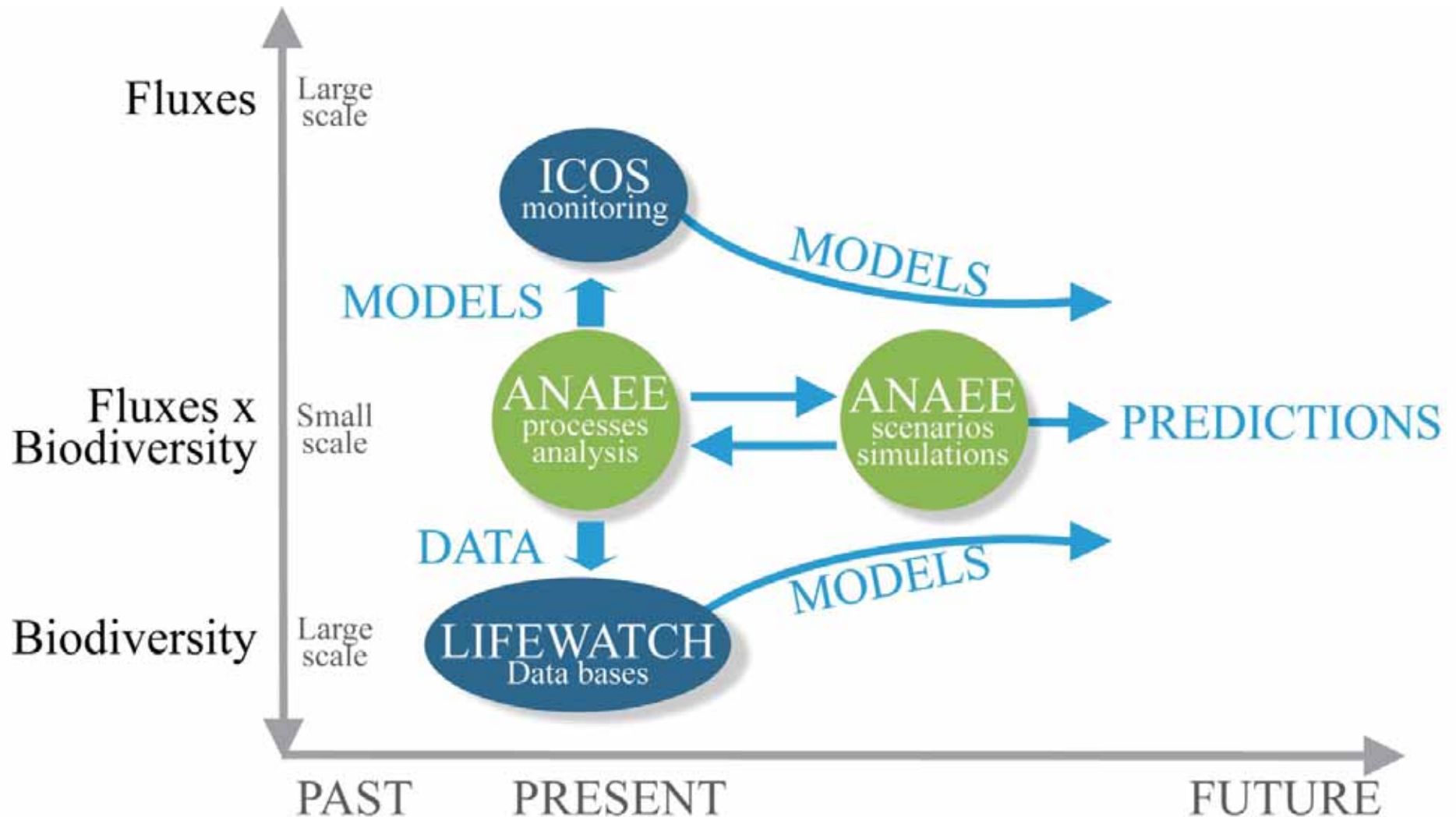
Contributing to the construction phase



ESFRI

ANAEE: Links to other Ris

Links to ICOS and Lifewatch



Links with global networks



Summary

- AnaEE as a game-changer :
big opportunities and big responsibilities
- ◆ **Legacy and Culture:** Collaboration/multidisciplinary approach from the International
- ◆ **Vision:** Strategically sampling across Europe
Strategically sampling environmental and ecosystem *change*. Changes need to be **understood and projected**

◆ **Cohesion:** AnaEE one-stop-shop for emergencies = the "hot=line"

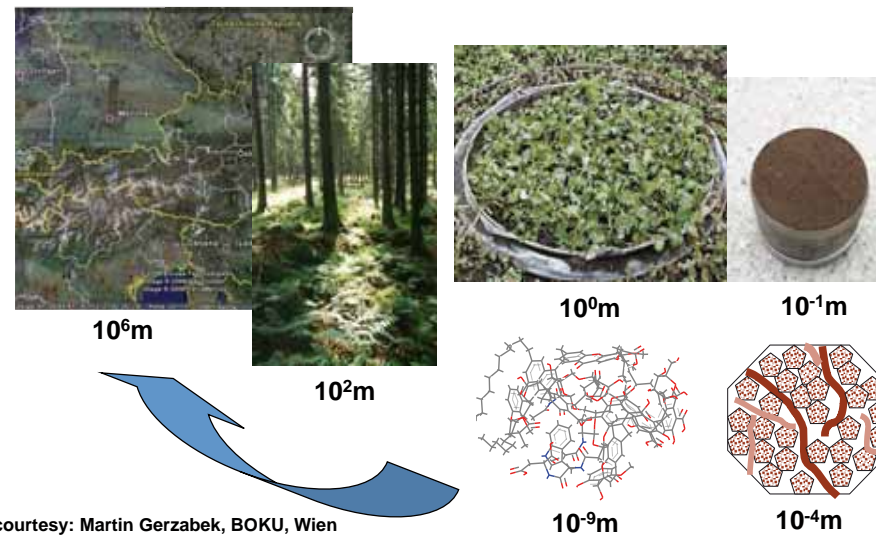


The red phone!
 Rapid responses,
 we need to find
 sites/
 infrastructure to
 provide answers
 to particular
 questions



- ◆ **Scaling**: local scale for adaptation: global scale for impact of feedbacks etc.

Questions in ecosystem research – matter of scales



- ◆ Handling **surprises**: fire, flood, pests, diseases...

Insect pest outbreak damage



Fire

Many thanks for your attention!

Find out more

www.anaee.com

Evan O'Connell

Communication/Lobbying Officer

+33 (0) 6 03 34 23 79

evan.oconnell@lusignan.inra.fr