



The LifeWatch ERIC Biodiversity
& Ecosystem eScience Conference

PLOVDIV, BULGARIA

7-10 JULY 2026

Co-designing a Virtual Research Environment for
Agroecology through AgroServ: a Research Infrastructure
response to community-driven eScience needs

José M Avila - LifeWatch ERIC ICT Core



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Why AgroServ?

Agriculture, and food production are facing multiple challenges

- Climate change
- Biodiversity loss



Urgent need for a transition

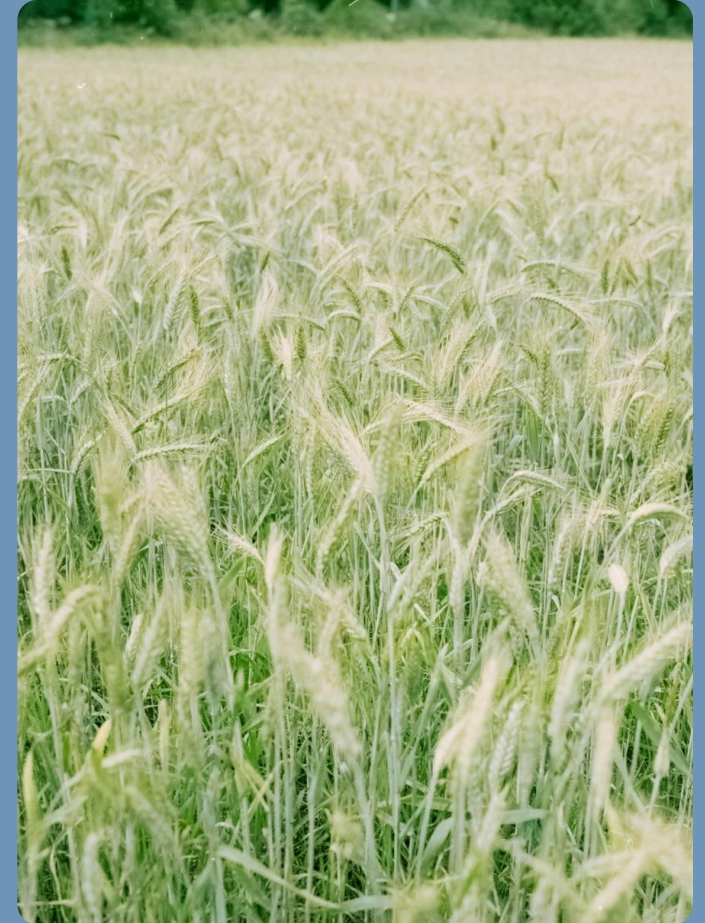
Sustainable food
production system

Sustainability of
rural communities

Quality of
food

One
Health

Green
Deal



Why AgroServ?

This transition needs to include

Research for
sustainable
food system

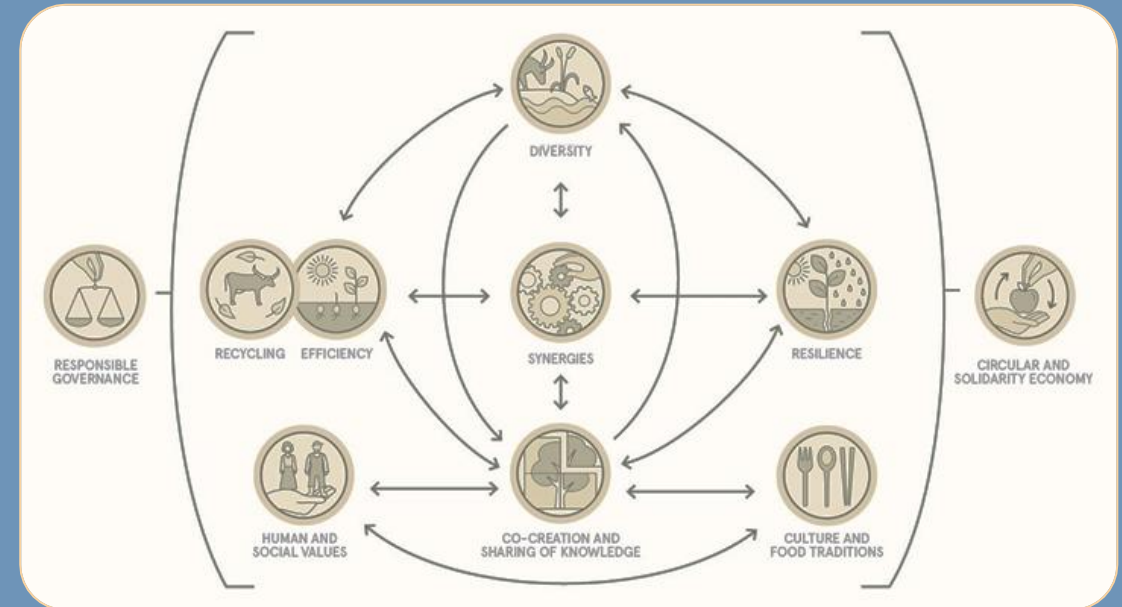
Producers
and
consumers

All aspects
of the
agroecological
transition

Transdisciplinary
approach

- Scientific
- Social

The 10 elements of Agroecology (FAO 2019)



Why AgroServ?

A large project

- **5yrs** (started 04/2022)
- **15M€ EU funded** (HE)
- **11 pan-European Research Infrastructures**
- **73 beneficiaries**
- Coordination **AnaEE-ERIC**

Large offer of services for research

- **143 transnational and virtual services**
- From the **molecule** and micro-organism to the **ecosystem and field**, to the **society and economy**
- AgroServ / EU **supports access costs**, travel and subsistence



Why AgroServ?

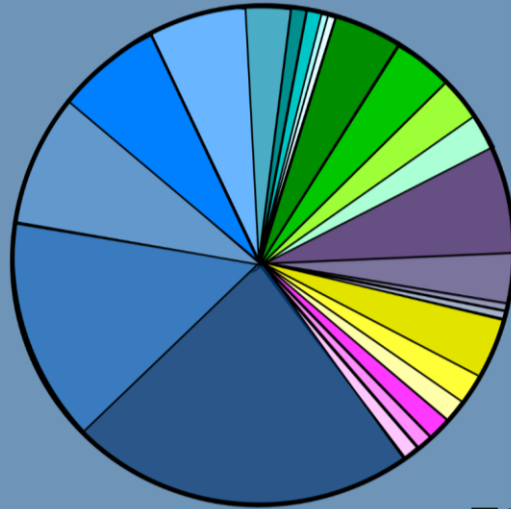
Provide access to innovative and efficient services for interdisciplinary research for sustainable and resilient food systems

Data and modelling services relevant for human, plants and animal health and well-being; support for evidence-based policy making

Higher integration of Research Infrastructure services by interdisciplinarity, co-creation, generating new services

Nexus with health, environment and food security

An integrated catalogue with 143 Transnational/Virtual access services



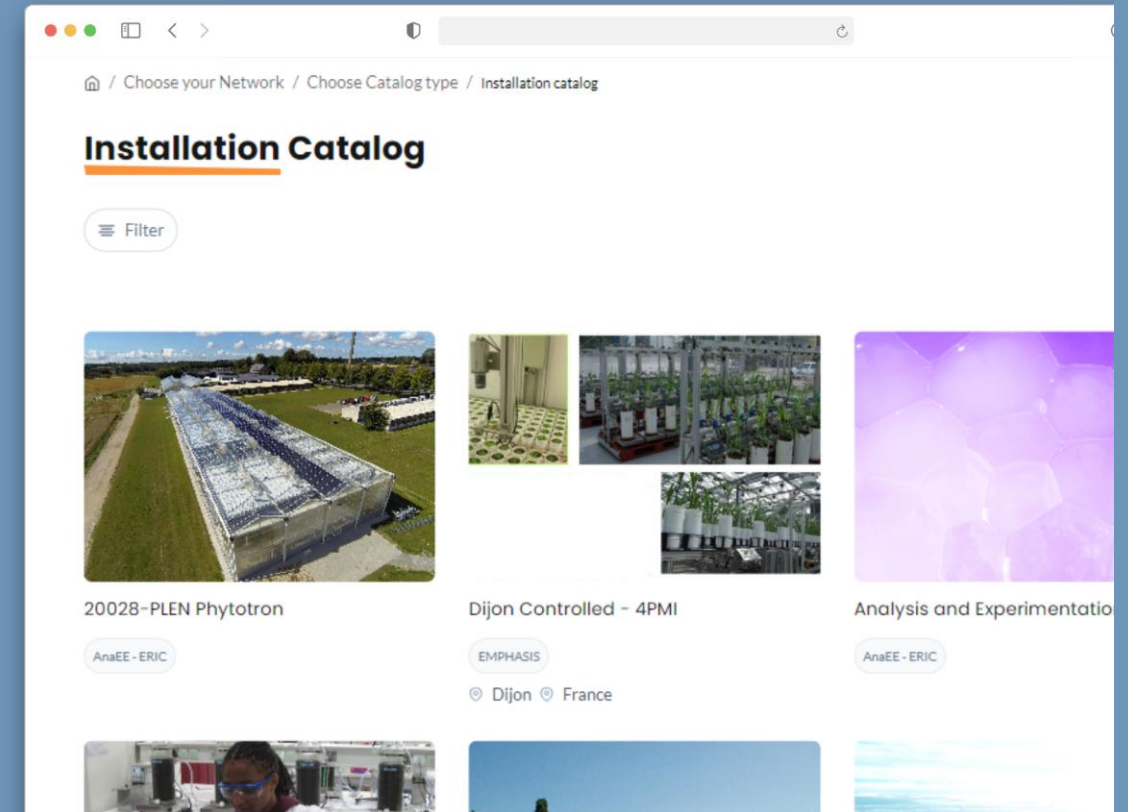
Biological & Medical Sciences

-  Agronomy, Forestry, Plant Breeding
-  Biomedical Imaging
-  Animal Facilities
-  Genomics, Transcriptomics, Proteomics & Metabolomics
-  Biological Engineering & Biotechnology/Nanotechnology
-  Collections of Biological Resources
-  Bioinformatics
-  Cell Culture
-  Translational Research
-  Computational Biology

-  Environmental Management
-  In Situ Marine/Freshwater Observatories
-  Atmospheric Measurement
-  Earth, Ocean, Marine, Freshwater & Atmosphere Data

Information Science & Technology

-  Software Service
-  Complex Data
-  Communication Networks



-
- VA1 ELIXIR
 - TA1 EMPHASIS
 - TA/VA3 Euro-Biolmaging
 - TA/VA1 EMBRC
 - VA2 LifeWatch
 - TA2 AnaEE
 - TA5 EU-OPENSOURCE
 - TA7 Socioeconomics
 - TA6 MIRRI
 - TA3 Metrofood-RI
 - TA/VA2 SmartCow
 - TA4 IBISBA

Widespread in
scale and diversity

- Agricultural practices incl. bio-tech
- Climate zones and ecosystem types
- Multi-scale services

The VREfA service request

Building useful tools for agroecological transition: a Virtual Research Environment for Agroecology - VREfA



Sergio Salazar
Manuel González
de Molina
Gloria Guzmán
...



Jose M Avila
Xavier Rotllán
Eduardo García
Ana Mellado
Iria Soto



Tiziana Tota
Ivana Cavoski
Roula Khadra
Aymen Sawassi
Claudio Bogliotti



VREfA

Virtual Research Environment
for Agroecology

DATA SOURCES



Satellite & Remote Sensing
NDVI, EVI, LST,
Soil moisture



Land Use & Soil Maps
Parcels, soils,
topography



Crop Statistics & Yields
Production, areas,
management



Climate Data
Precipitation,
temperature,
ET_o, extremes



Field & Parcel Data
Management, inputs,
irrigation, phenology

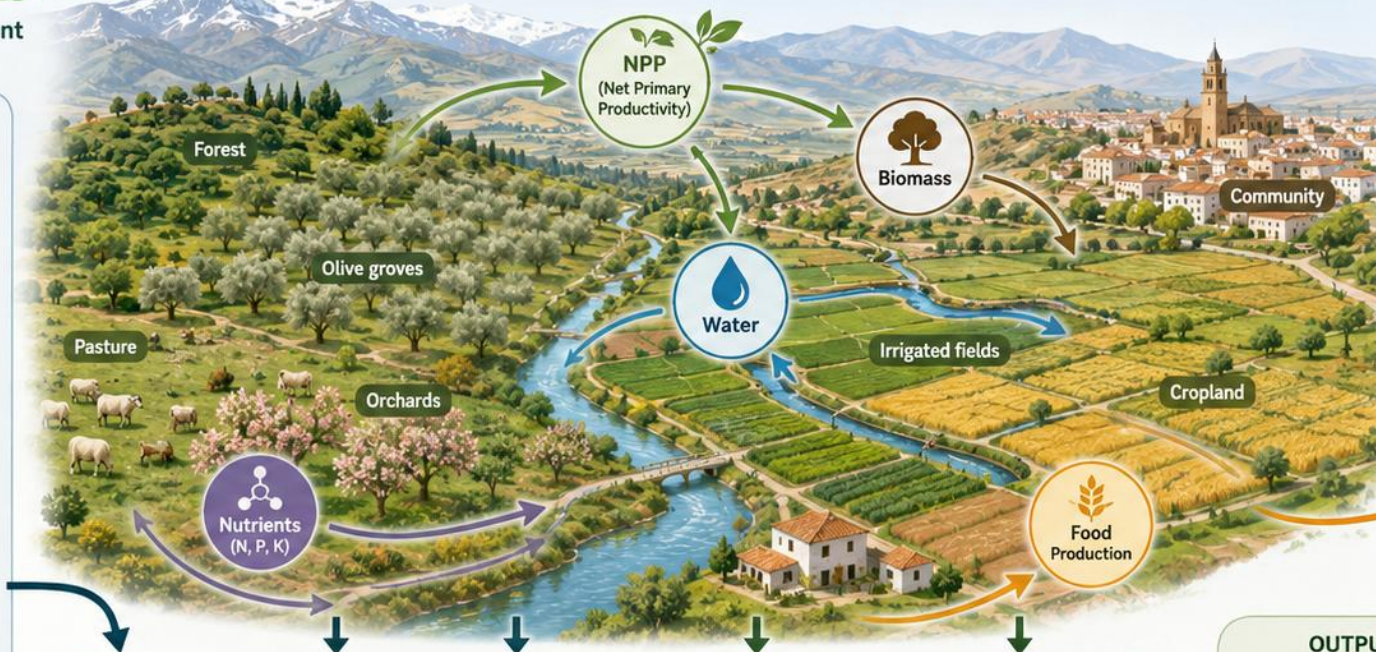


Biodiversity & Environment
Habitats, fauna,
water quality

- Biological flows (NPP, biomass)
- Water flows
- Nutrient flows
- Food & socio-economic flows

TERRITORY: La Vega de Granada (Spain)

A mosaic Mediterranean agroecosystem



PEOPLE & FOOD SYSTEM



Healthy Diet

Local, diverse, sustainable

- Human Health & Well-being
- Local Markets & Economy
- Agroecological Transition

VREfA – VIRTUAL RESEARCH ENVIRONMENT

Integrating data, models and knowledge for agroecological insights

HARMONISED DATA



Standardised &
Interoperable
Datasets

WORKFLOWS & MODELS



Hydrology, NPP,
Nutrients, Yields,
Biodiversity,
Socio-economics

INDICATORS



Productivity,
Efficiency,
Resilience,
Biodiversity,
Water Quality

VISUALISATIONS



Maps, Dashboards,
Time series,
Reports, Notebooks



OUTPUTS & USES



SCENARIOS
What-if analysis of management
and climate futures



INDICATORS & MONITORING
Track progress and impacts



PLANNING & MANAGEMENT
Land & water planning, crop
choices, conservation



DECISION SUPPORT
For researchers, advisors,
policy makers & farmers



Researchers



Farmers



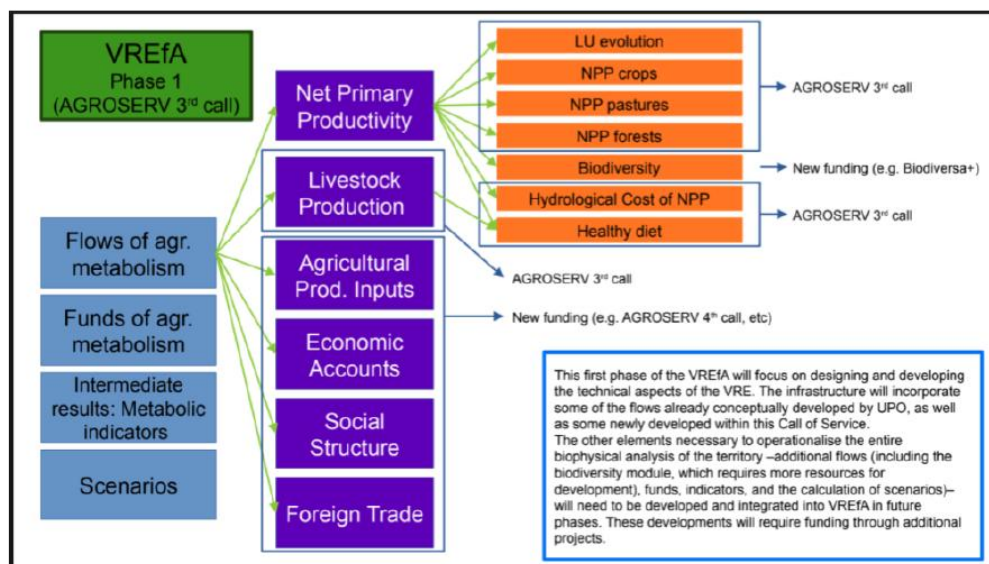
Policy Makers



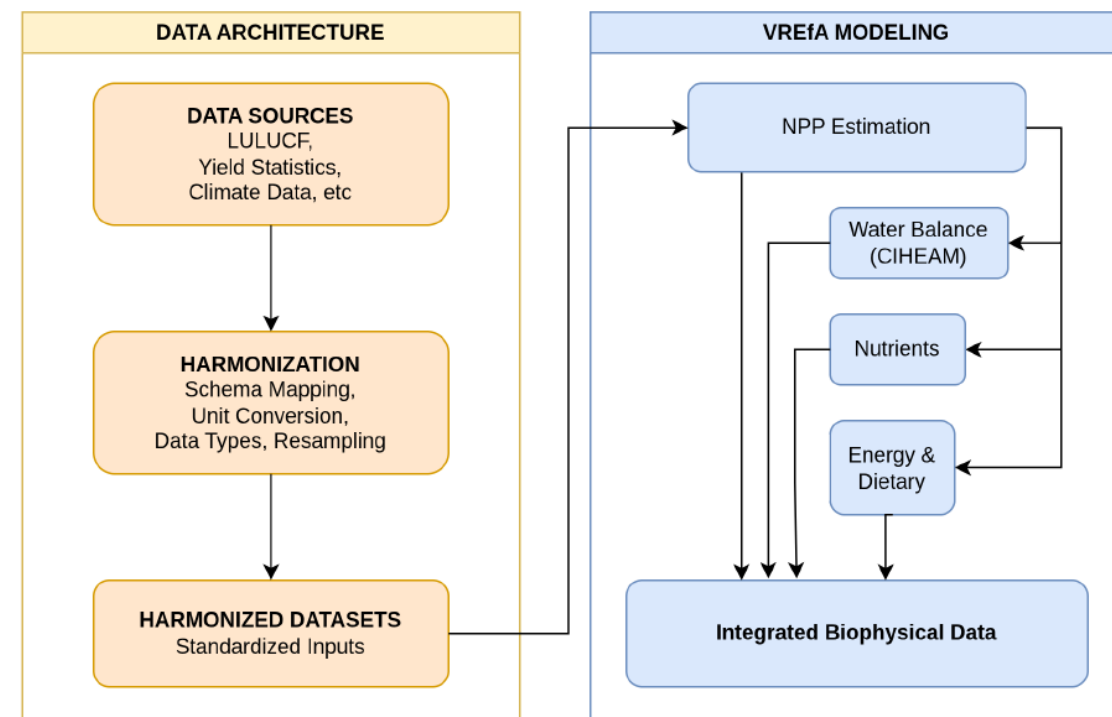
Local Community

VREfA Current Status

From the Overall VREfA...



... to a data and modelling architecture focus...



Before modelling, scientific concepts must become data requirements

Data sources: LULC, crop production, yields, climate, SIGPAC, ESYRCE, INE, Copernicus.

Main challenges:

- different spatial and temporal resolutions,
- irregular historical coverage,
- crop-level detail vs scalable datasets,
- harmonisation of land-use and crop classes.

LifeWatch ERIC role: data architecture, harmonisation layer, reusable workflows, guide researchers to take decisions to produce useful, standardise and FAIR tools

Co-design means making trade-offs explicit

- Granada-specific prototype **vs** transferable VRE
- Crop/cultivar detail **vs** harmonised crop groups
- Indicator-based workflows **vs** process-based modelling
- Scientific complexity **vs** feasible MVP
- What should be automated, parameterised or documented for future phases?

Take-home messages

- AgroServ enables co-developed RI services.
- VREfA starts from a real research-community need.
- LifeWatch ERIC translates scientific requirements into FAIR data flows, workflows and VRE architecture.
- Current phase: co-design and first implementation.
- Expected value: a Granada pilot plus reusable components for future agroecology services.



**Take
home message*





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THANK YOU!

Questions?

josem.avila@lifewatch.eu

