

The JRC's role in agricultural and environmental research

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Joint Research Centre, DG JRC

D.5 Food security Unit

Agriculture & Environment & Climate Team

Science for policy



Our purpose

The Joint Research Centre provides independent, evidence-based knowledge and science, supporting EU policies to positively impact society.

JRC scientific publications

3.7% publications

in the top 1% most
cited worldwide

24.5% publications

in the top 10%

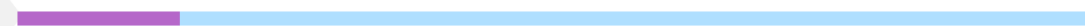
International Institute for Applied Systems Analysis – AT



University of Oxford – UK



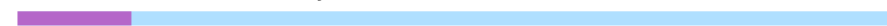
Joint Research Centre



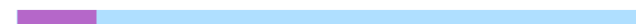
University of Cambridge – UK



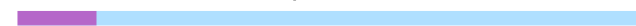
Max Planck Society – DE



National Institute of Standards and Technology – US



Chinese Academy of Sciences – CN



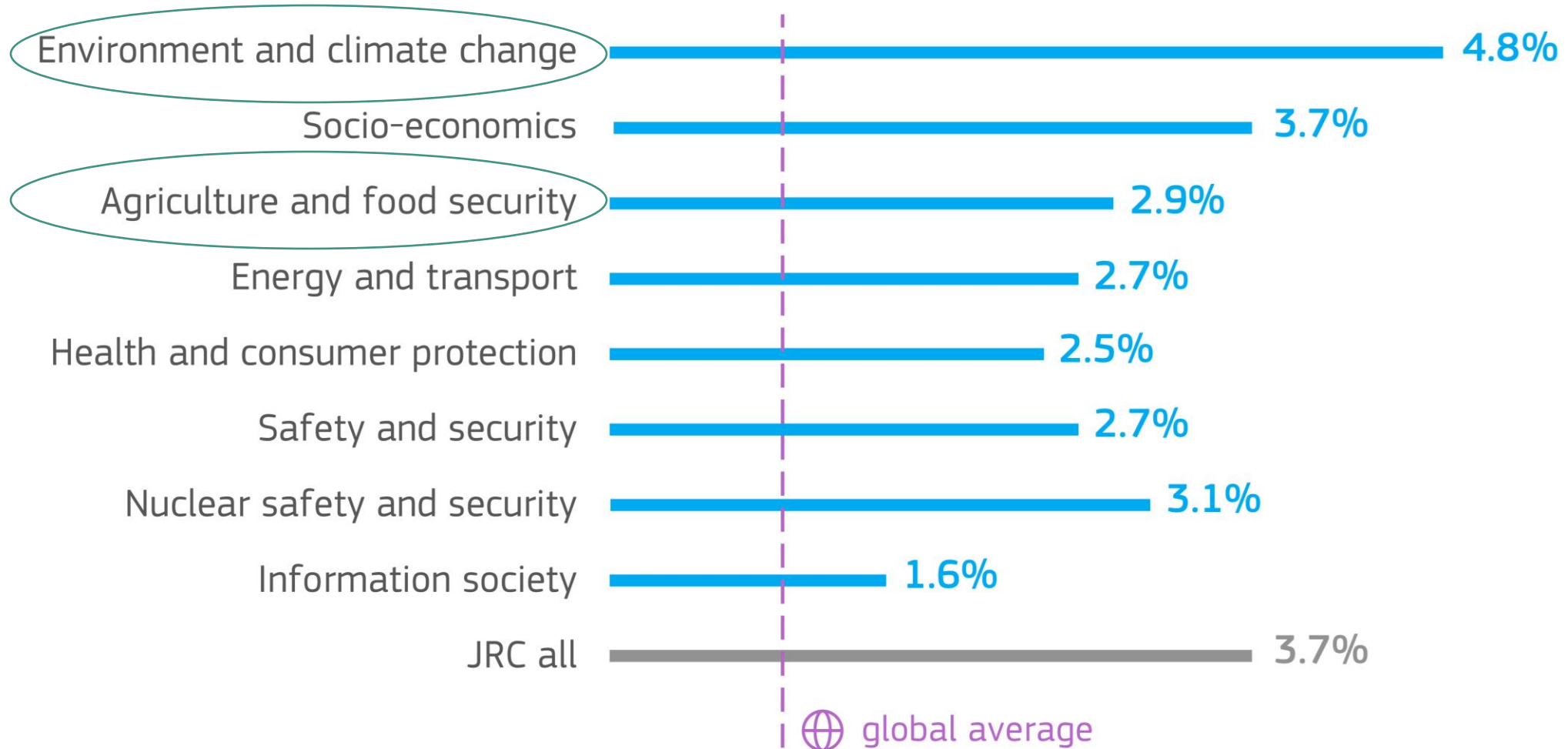
National Centre for Scientific Research – FR



5% publications



Percentage of JRC publications among the globally most cited 1% (2018-2022)

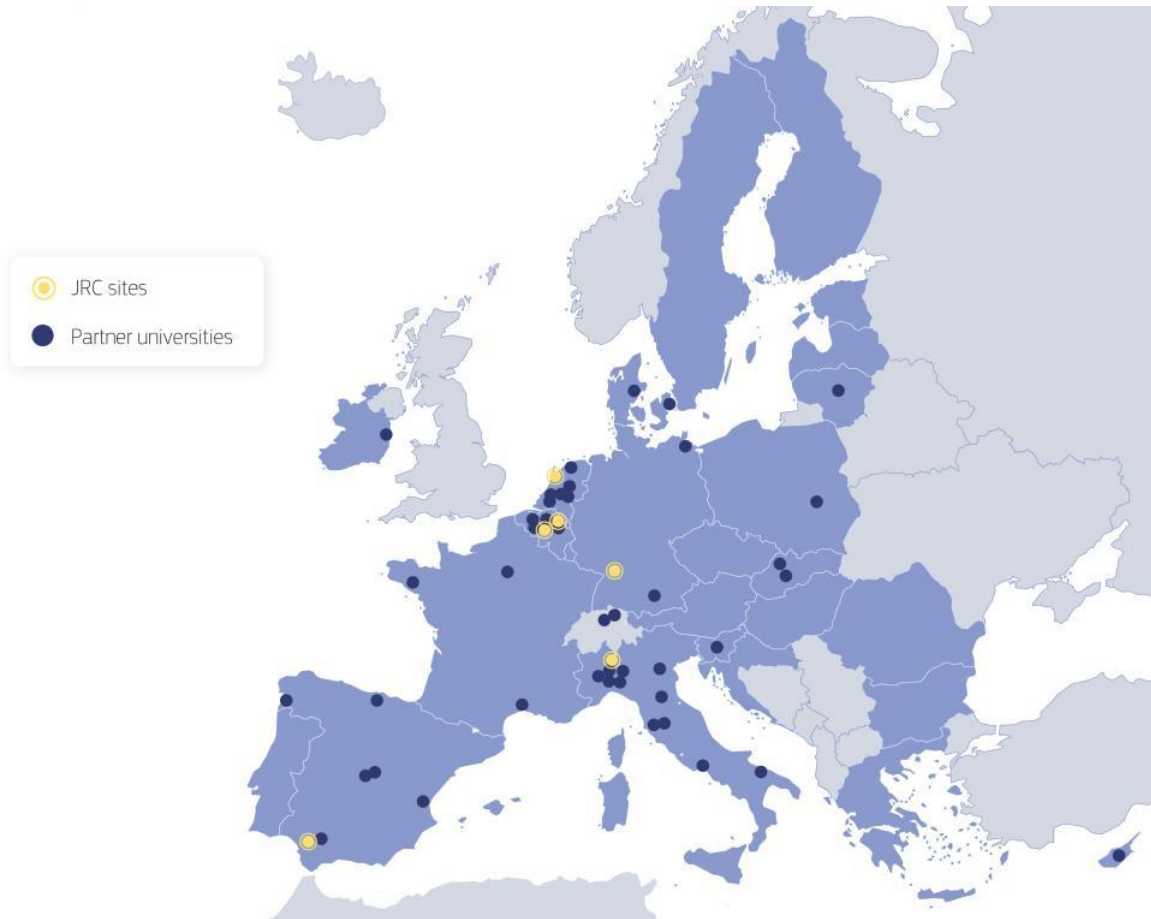


JRC in the Horizon Europe programme



- Non-nuclear **direct actions of the JRC**
under Pillar II 'Global Challenges and European Industrial Competitiveness'
- **Horizon Europe Work Programme Group**
- Where indicated in the work programme, **JRC may participate as** member of the selected consortium
Beneficiary with zero funding or associated partner.
- Can contribute with specific **platforms, EU-wide data, models and/or through knowledge centres**
e.g.
 - KC for Global Food and Nutrition Security
 - KC on Earth Observation
 - KC for Biodiversity
- Applicants are encouraged to consider possible contribution to JRC platforms.

Collaborative Doctoral Partnership (CDP) programme



Joint doctoral research between Higher Education Institutions (HEI), such as universities, and the JRC

Build and strengthen long-term relationships

Collaborative Doctoral Partnership (CDP) programme
- The Joint Research Centre: EU Science Hub



JRC Directorate D – Sustainable Resources

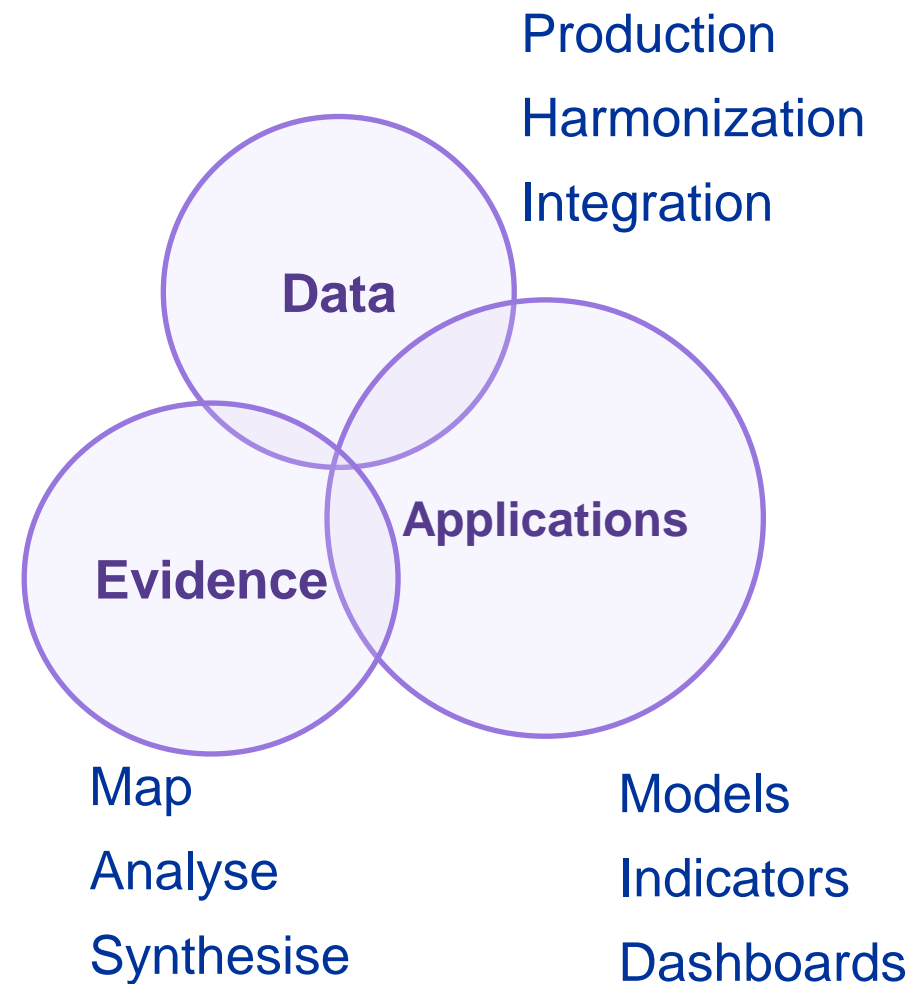
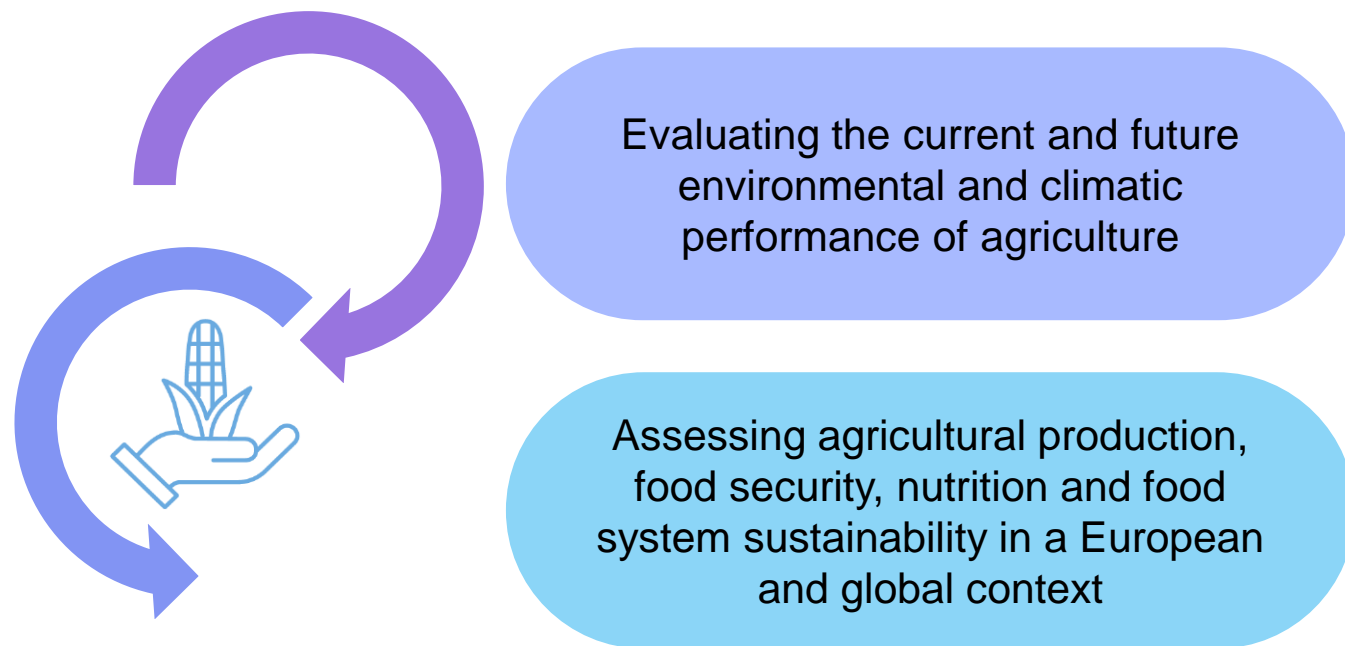
Our mission

to provide independent scientific evidence to support the development, implementation, evaluation and coherence of EU policies in the areas of

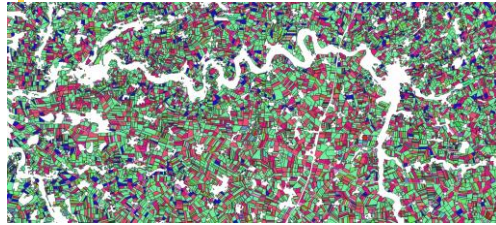
- agriculture and rural development,
- international development cooperation,
- environment and climate change,
 - blue growth and fisheries,
 - the bioeconomy,
 - industry and trade.



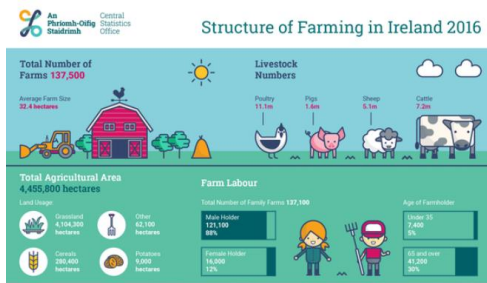
JRC's agri-environmental research



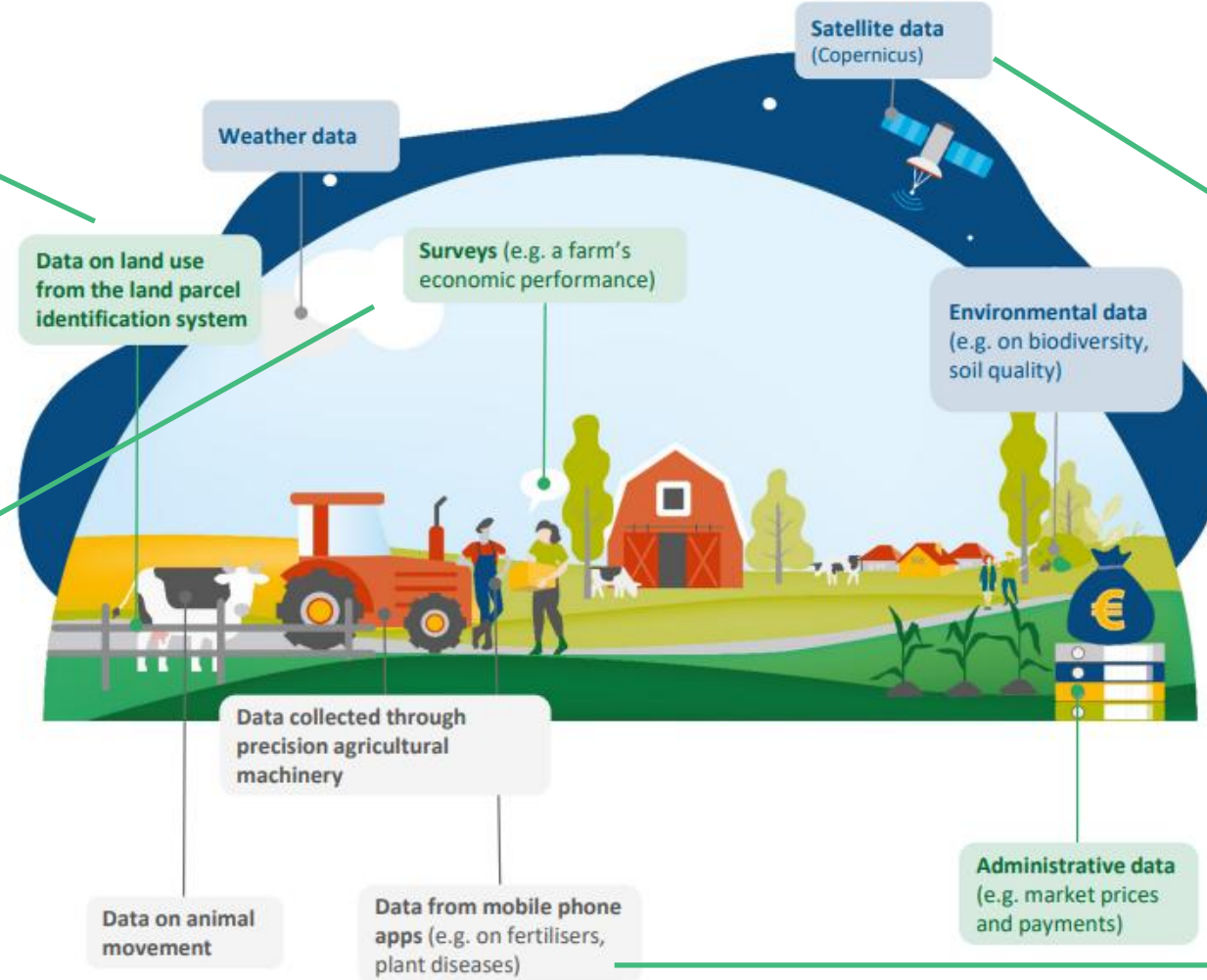
Stats & data collected & created around the farm



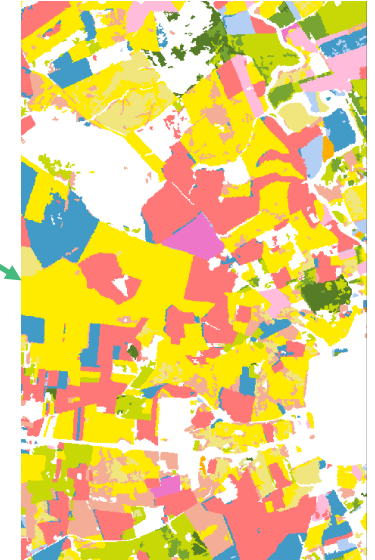
Parcel and holding data - IACS



Farm holding data



Source: ECA.



Pixel data



Available, comparable, interoperable, used, fit?

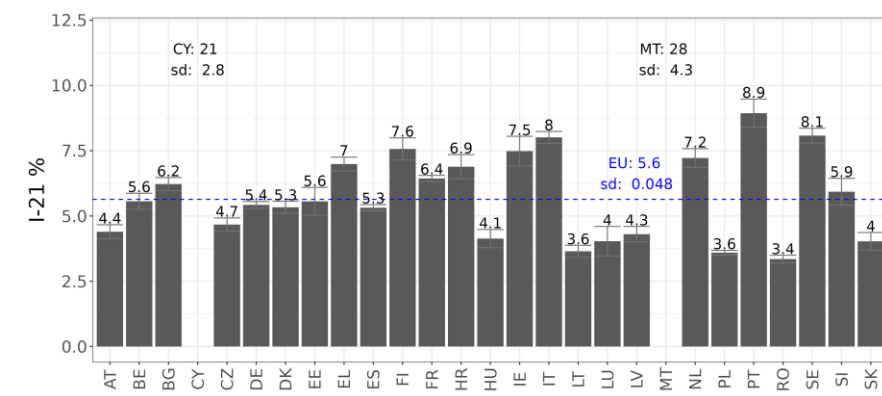


Strengthening EU monitoring schemes

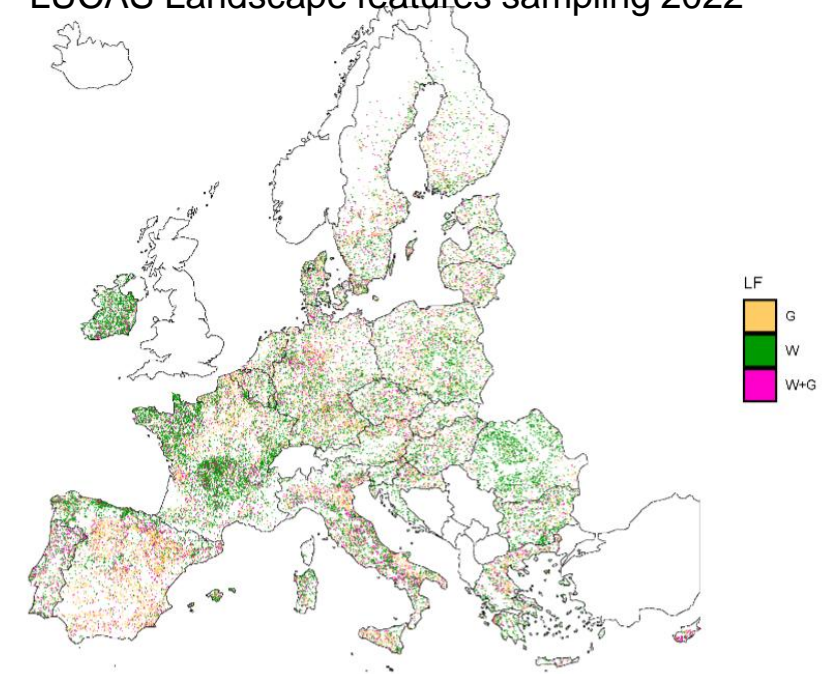
LUCAS: EU's Land Use/ Land Cover Survey

LUCAS Landscape Features

- LF in 93,000 LUCAS quadrats of 100x100m
- Spatial representativeness at MS level (possibly NUTS2)
- Consistent quantification of LFs for the EU and MS level
- Information on different types of landscape features



LUCAS Landscape features sampling 2022



Musavi et al., *in preparation*

Monitoring of biodiversity in Agricultural Landscapes (EMBAL)



- In all 27 EU MSs
- 3000 plots
- 500 x 500 m
- Plot, parcels, transects
- Land cover, landscape elements, habitat types, biodiversity and pollination resources

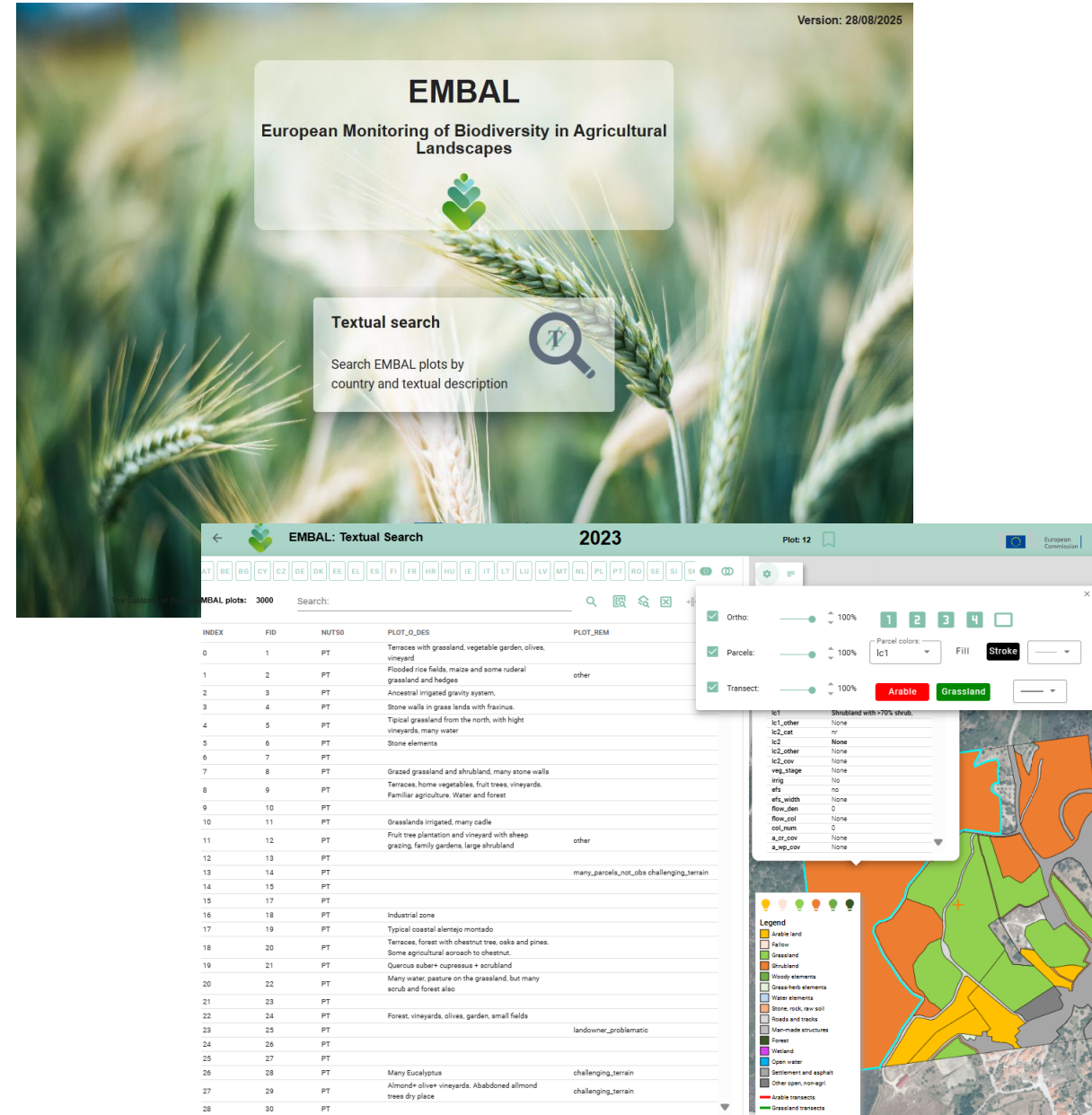
EMBAL dataset in JRC Data Catalogue

1. Geo-anonymized viewer

- Access with ECAS account

2. Full version with plots, transects, photos accessible after

- approved research proposal and
- signature of Confidentiality Agreement



Version: 28/08/2025

EMBAL
European Monitoring of Biodiversity in Agricultural Landscapes

Textual search
Search EMBAL plots by country and textual description

EMBAL plots: 3000

2023

Plot: 12

INDEX	FID	HUTSO	PLOT_O_DES	PLOT_REM
0	1	PT	Terraces with grassland, vegetable garden, olives, vineyard.	
1	2	PT	Flooded rice fields, maize and some ruderal grassland and hedges	other
2	3	PT	Ancestral irrigated gravity system.	
3	4	PT	Stone walls in grass lands with fraxinus.	
4	5	PT	Typical grassland from the north, with high vineyards, many water	
5	6	PT	Stone elements	
6	7	PT		
7	8	PT	Grazed grassland and shrubland, many stone walls	
8	9	PT	Terraces, home vegetables, fruit trees, vineyards, Familiar agriculture. Water and forest	
9	10	PT		
10	11	PT	Grasslands irrigated, many cattle	
11	12	PT	Fruit tree plantation and vineyard with sheep grazing, family gardens, large shrubland	other
12	13	PT		
13	14	PT		many_parcels_not_sbs challenging_terrain
14	15	PT		
15	16	PT		
16	17	PT	Industrial zone	
17	18	PT	Typical coastal elemento montado	
18	19	PT	Terraces, forest with chestnut tree, oaks and pines. Some agricultural orchard to chestnut.	
19	20	PT	Quercus suber+ cupressus + scrubland	
20	21	PT	Many water, pasture on the grassland, but many scrub and forest also	
21	22	PT		
22	23	PT	Forest, vineyards, olives, garden, small fields	landowner_problematic
23	24	PT		
24	25	PT		
25	26	PT	Many Eucalyptus	challenging_terrain
26	27	PT	Almond+ olive vineyards. Abandoned almond trees dry place	challenging_terrain
27	28	PT		
28	29	PT		
29	30	PT		

Legend

- Arable land
- Forest
- Grassland
- Shrubland
- Wetland
- Open water
- Barren land and asphalt
- Other open, non-agri
- Arable transects
- Grassland transects

Geospatial data from agricultural census

Spatially gridding the Integrated Farm Statistics

EUROSTAT and JRC

- New method for disclosure control guaranteeing privacy of data
- Multi-resolution grids
 - 1-5-10-20-40-80 km

Organic farming

Farm size

Agricultural area

Livestock

Training of farm manager

Manager age

Gender gap

Organic farming

Irrigable land

Labour force

Organic farming

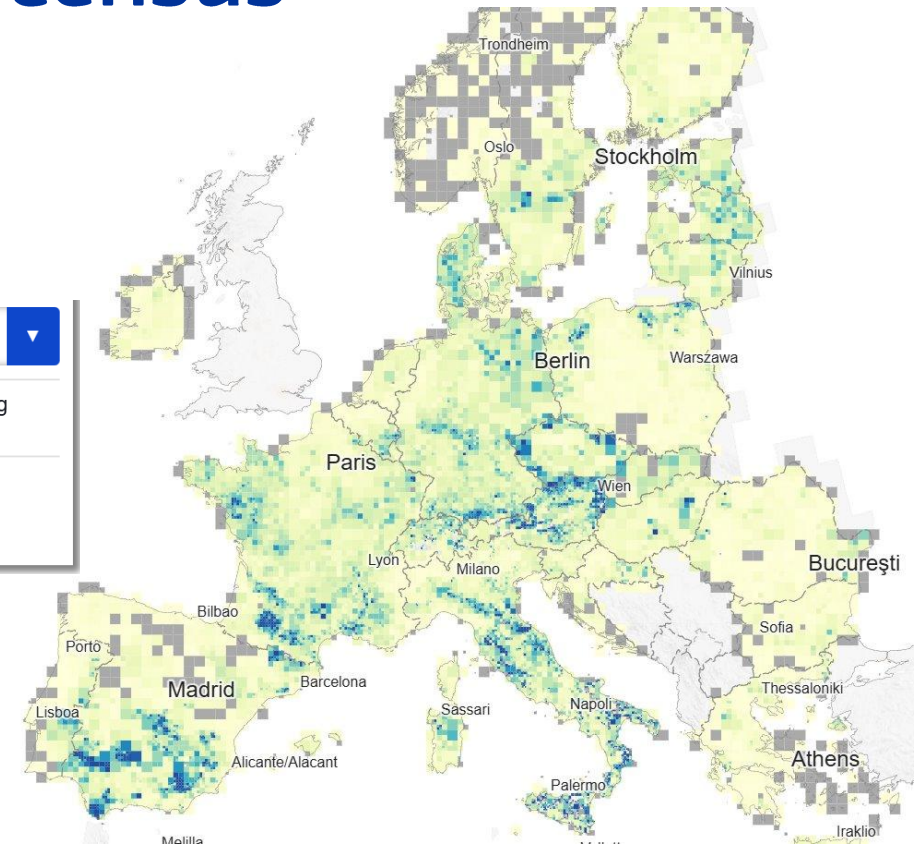
☒ Area under organic farming

☐ Share of organic farming

☒ City names

☒ Boundaries

☐ Background



Skoien et al., 2025 [A flexible approach for statistical disclosure control in geospatial data | Journal of Geographical Systems](#)

Lampach et al., 2025 [ESSDD - Statistical Atlas of European Agriculture: Gridded Data from the Agricultural Census 2020 and the Spatial Distribution of CAP Contextual Indicators](#)

[Geospatial data from agricultural census - Experimental statistics - Eurostat](#)

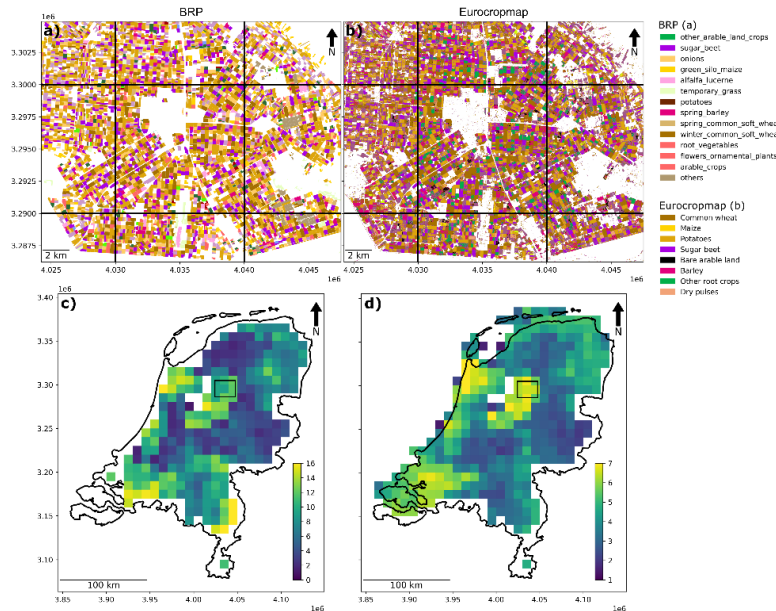


Innovative geospatial agri-environmental monitoring

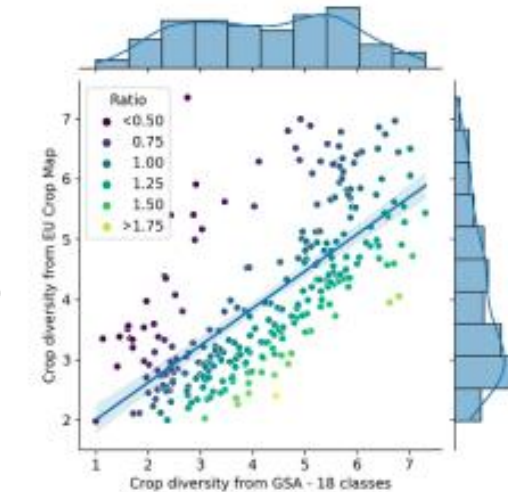
Integrating in-situ observations, statistics, and Earth Observation with advanced analytics

Release, apply, and collaborate to generate EU wide data, analyses and indicators

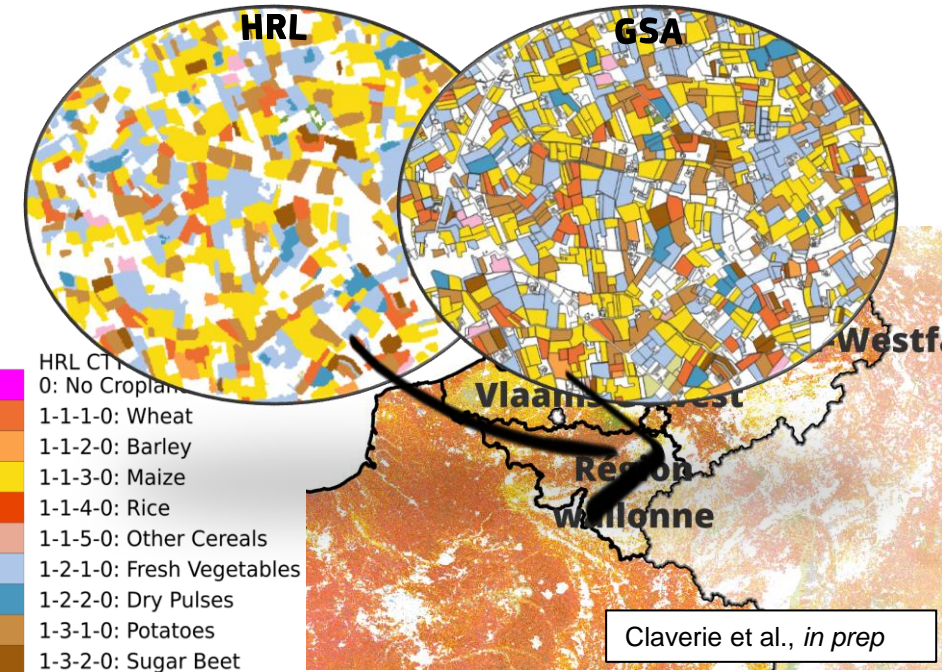
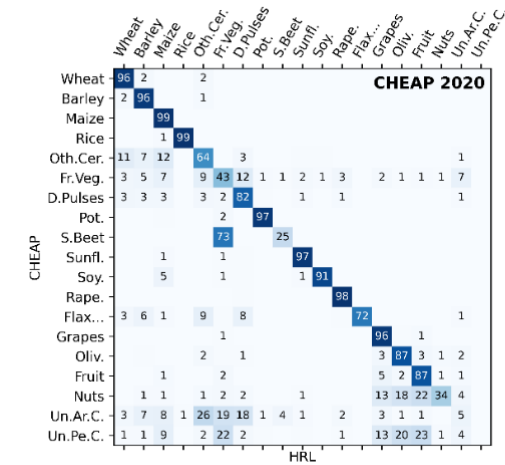
Farmers' declarations compared to Earth Observation



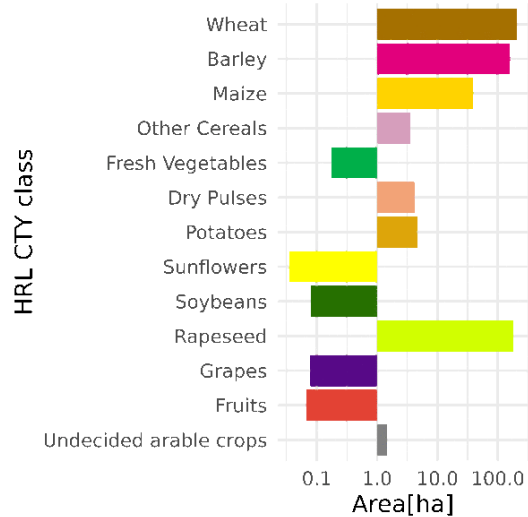
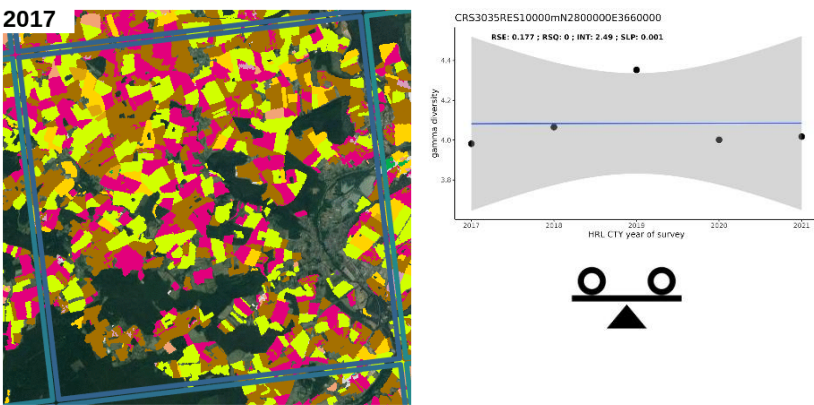
EO ↑



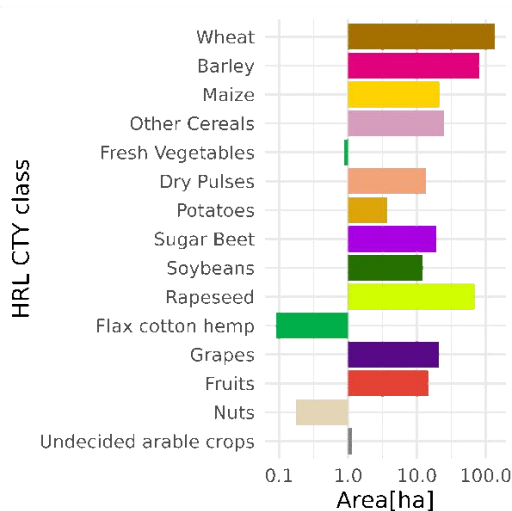
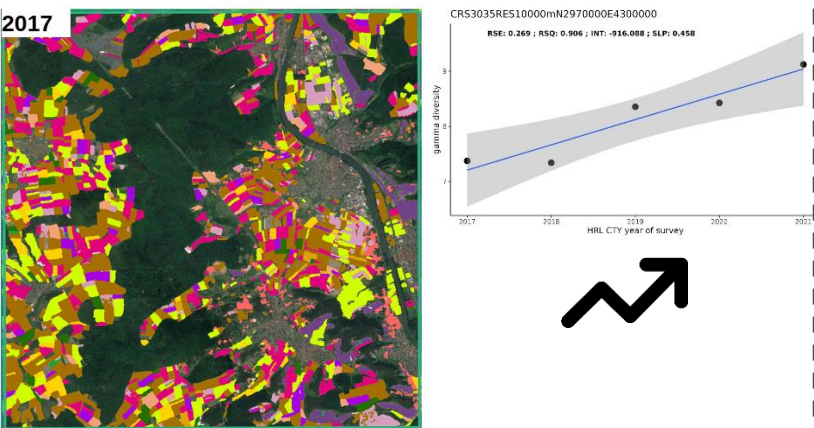
Farmers' declarations →



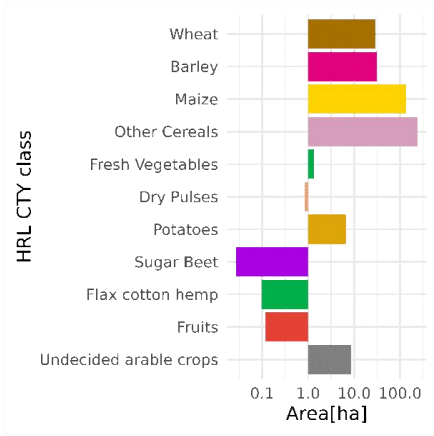
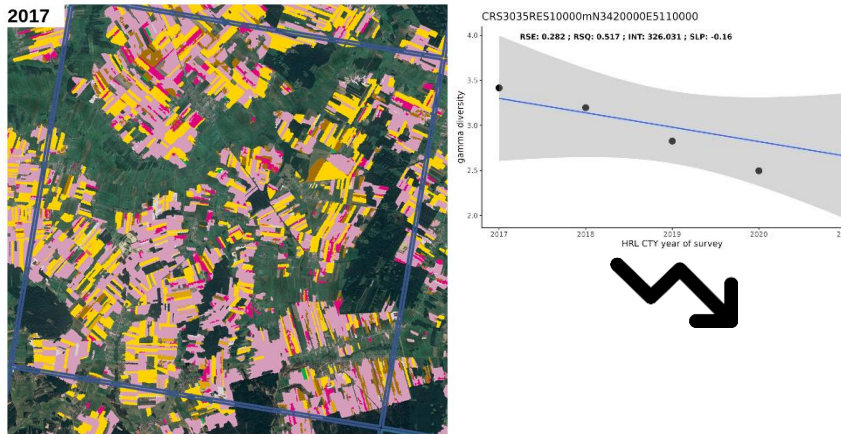
Crop diversity as a time-series



Centre-Val de Loire (FRB0),
France



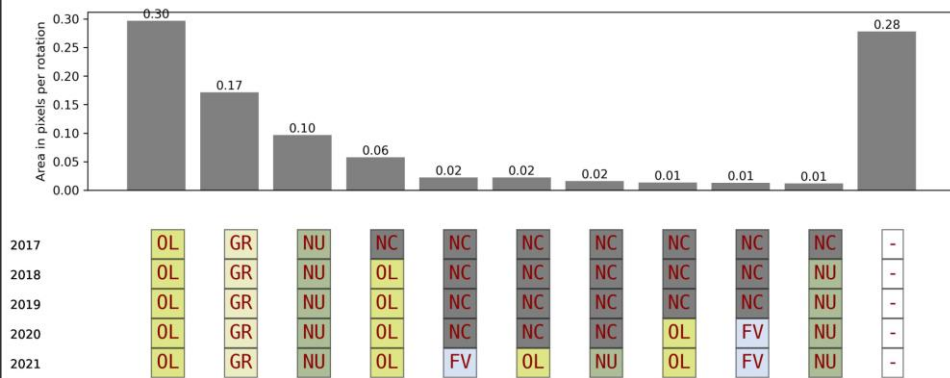
Unterfranken (DE26),
Germany



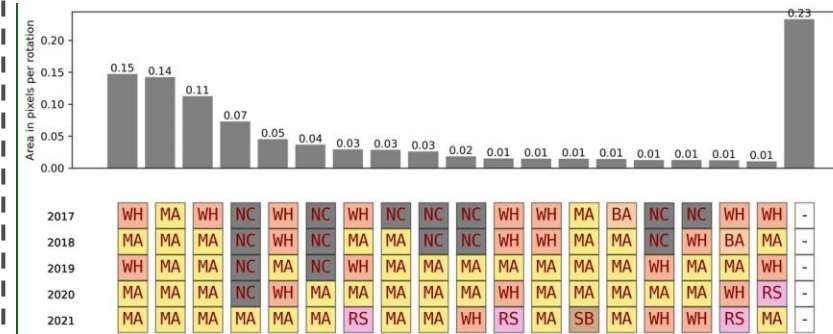
Podlaskie (PL84),
Poland



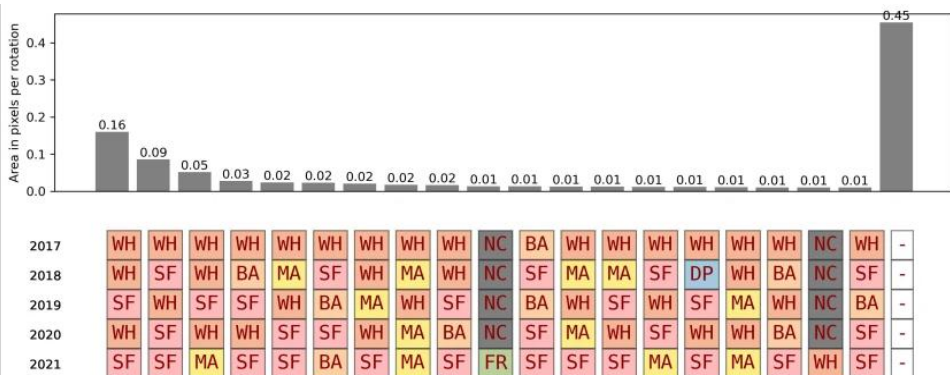
Examples of most common rotations at LAU4



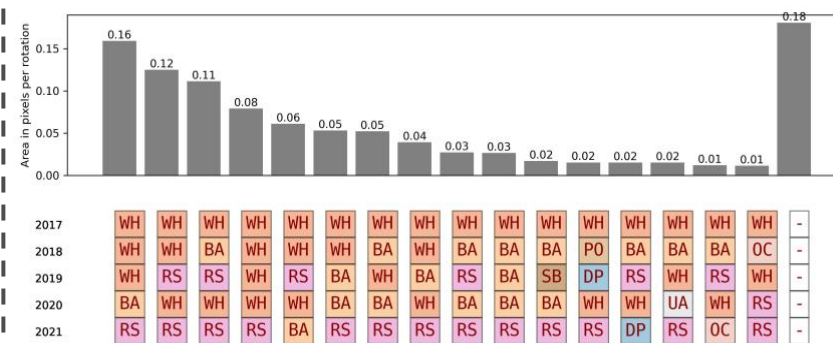
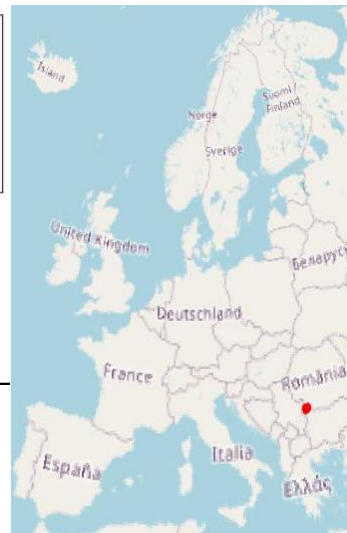
Mainly permanent crops: Olive trees, Grapes and nuts (south of Spain)



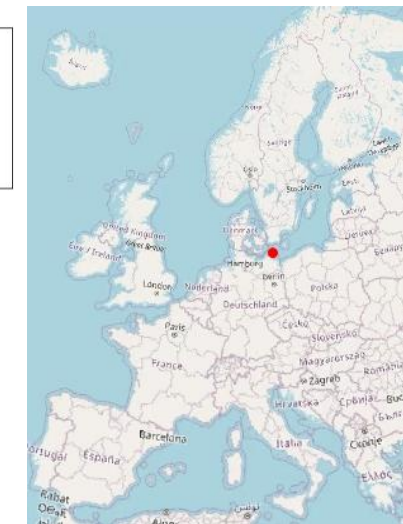
Cereals : Wheat- Maize – Rapeseed (West of France)



Wheat – sunflower –barley (South of Romania)



Wheat – barley -rapeseed (North of Germany)



Earth observation for improved monitoring of woody features?

- Compare EMBAL data against new EU-wide 3m EO Trees Outside of Forest product (*collaboration with University of Copenhagen*)
- Highly detailed simulations of woody features restoration based on parcel boundaries and Copernicus Small Woody Features (Marcantonio et al., 2025)

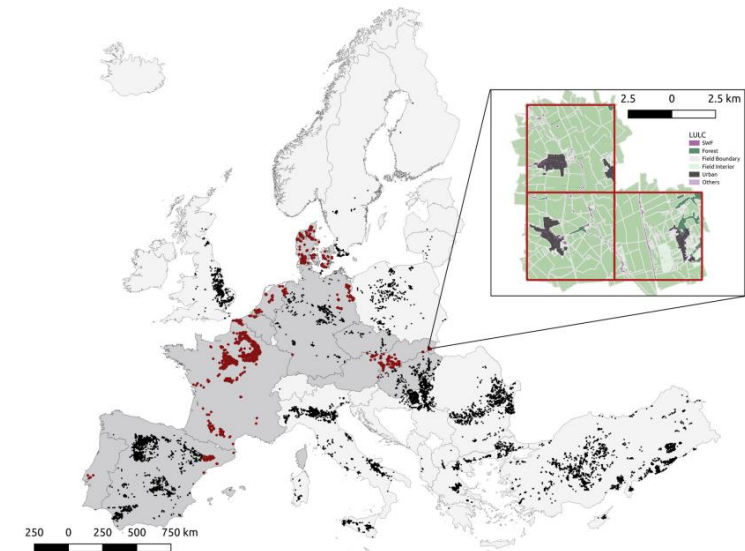
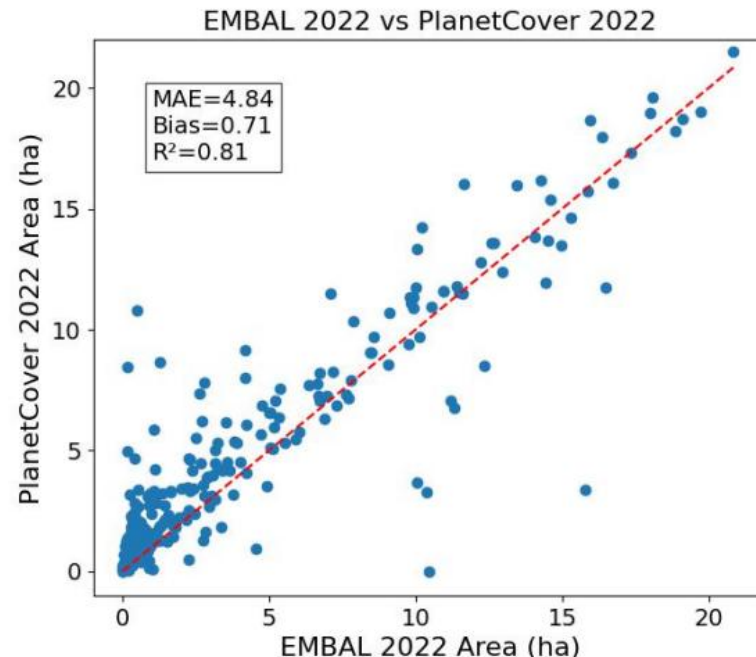
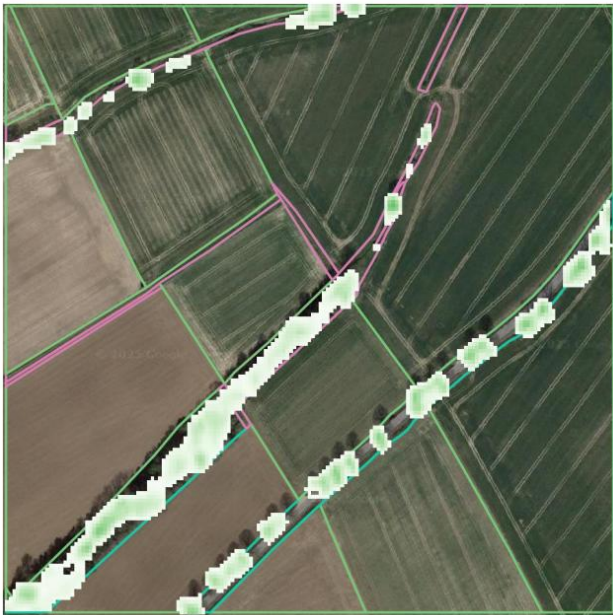


Fig. 1 Overview of the subset of 5×5 km grid cells for the 27 EU Member States selected for the simulations. Black cells represent cells with crop surface > 90%, red cells the subset of these cells with GSA parcel boundaries, which are shown

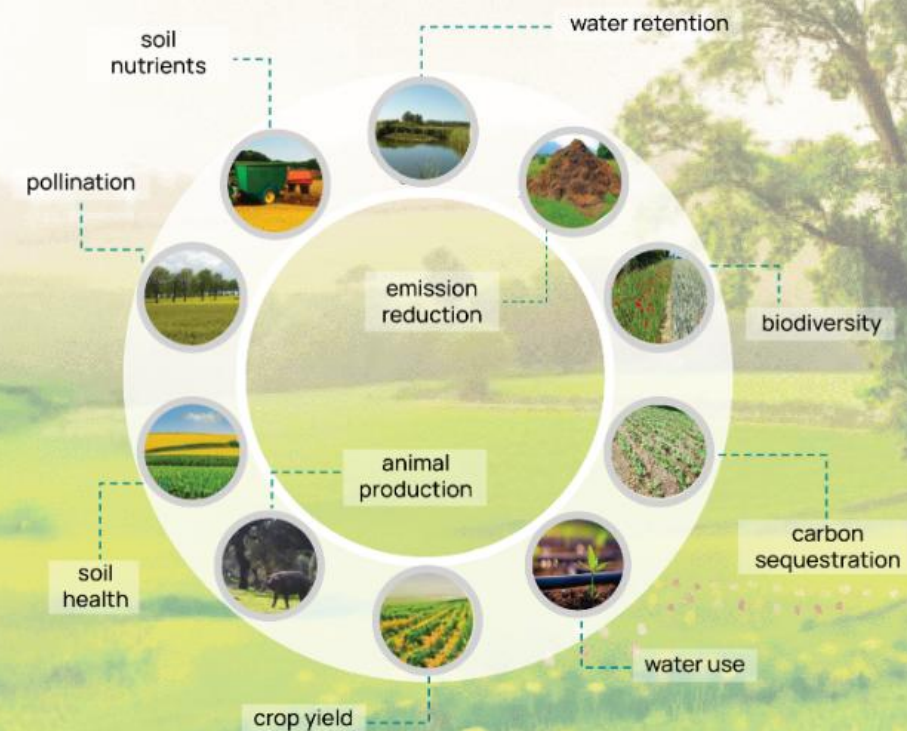
(in grey) in the example inset together with the other land use/cover categories. The countries coloured in darker grey are those represented in the final set of cells



Welcome to the JRC Farming practices Evidence Library

This library synthesizes a large amount of scientific evidence to assess the **effects of farming practices on sustainability outcomes**, mainly regarding the environment, the climate, and agricultural productivity.

How to cite this library: [10.2760/9473570](#)

[Explore the Library](#)

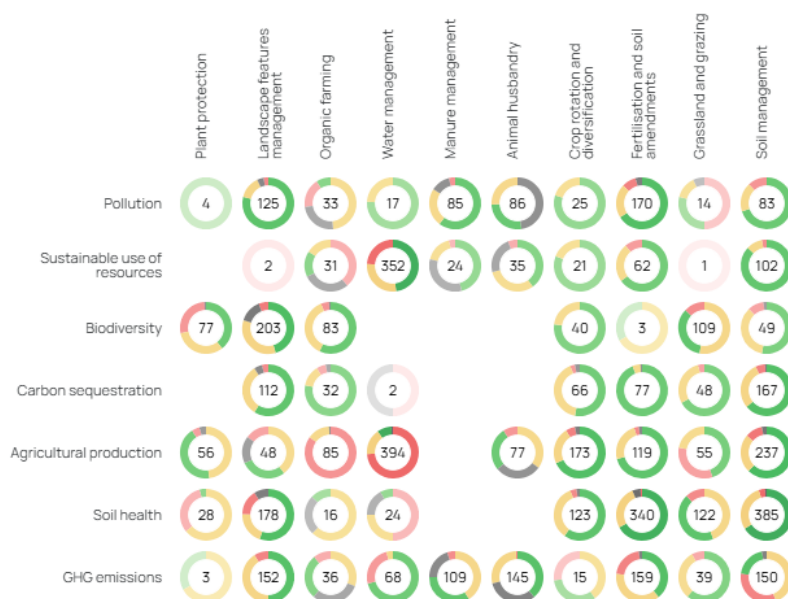
JRC Farming practices Evidence Library

JRC-Farming-Practices dataset (version 2023)

- systematic screening of peer-reviewed meta-analyses
- 34 categories of sustainable farming practices
- 3700 records

The chart illustrates, for the selected combination of classes of practices and sustainability outcomes, the distribution of results showing significant **positive** or **negative** effects, **non-significant** effect or **non-statistically-tested** results. Numbers represent the count of available results.

↓ Sustainability Outcomes / Farming Practices →



scientific **data**

OPEN

DATA DESCRIPTOR

Evidence library of meta-analytical literature assessing the sustainability of agriculture – a dataset

Andrea Schievano¹, Marta Pérez-Soba¹, Simona Bosco¹, Ana Montero-Castaño¹, Rui Catarino¹, Mathilde Chen², Giovanni Tamburini³, Beatrice Landoni⁴, Otho Mantegazza⁴, Irene Guerrero¹, Maria Bielza⁵, Michael Assouline¹, Renate Koeble⁶, Frank Dentener¹, Marijn Van der Velde⁷, Carlo Rega⁷, Andrea Furlan⁷, Maria Luisa Paracchini¹, Franz Weiss¹, Vincenzo Angileri¹, Jean-Michel Terres¹ & David Makowski²

https://data.jrc.ec.europa.eu/dataset/4e3c371a-be72-4ea0-aa0b-45f8cdda2064



Joint Research Centre Data Catalogue

Home Datasets Collections About

European Commission > EU Science Hub > JRC Data Catalogue > Datasets > JRC-Farming-Practices dataset (version 2023) – An ...

DATASET

JRC-Farming-Practices dataset (version 2023) – An evidence library of the effects of Farming Practices on the environment and the climate

Collection:

JRC-FP-dataset : JRC-Farming-Practices data collection – An evidence library of the effects of Farming Practices on the environment and the climate >

Classification scheme of farming practices

ISSN 1831-9424



A classification scheme based on farming practices

A tool for labelling interventions with environmental and climate-related commitments in Common Agricultural Policy strategic plans

Angileri, V., Guerrero, I., Weiss, F.

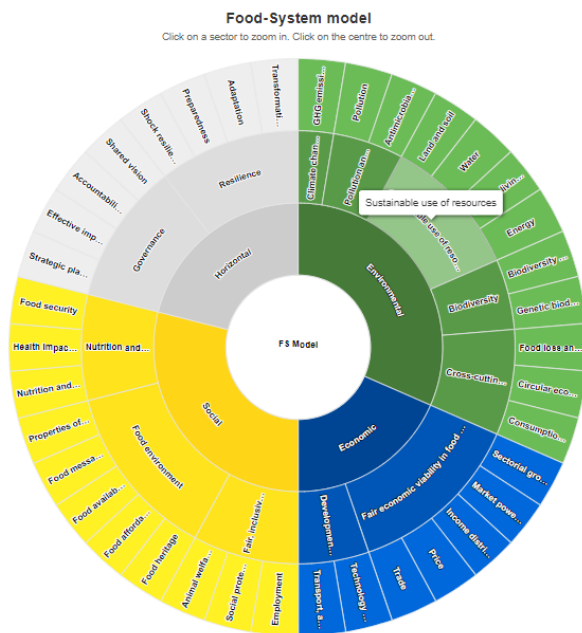
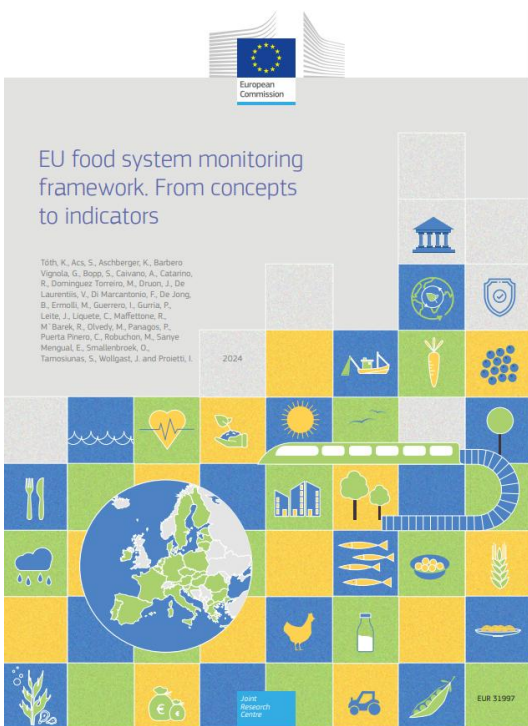
2024



Comprehensive classification scheme to
systematise interventions in CAP Strategic Plans



European Union Food System Monitoring



EU Food System Monitoring Dashboard

Home Methodology EU overview Country Profile Help

You can visualize here data of one indicator at a time for all EU in the form of map or bar chart, with manual or auto-play options to change the year.

Full screen

FS model Supply chain component

Select indicators grouped by the dimension and supply chain component. Please note that some indicators fall into several chain components.

Search indicators

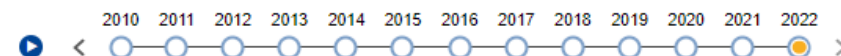
	Environmental	37	^
	Primary food production	17	^
	Food processing	7	^
	Food distribution	5	^

	Common farmland birds indicator	1	
	Consumption Footprint - Food	1	
	Consumption Footprint - Food (biodiversity loss)	1	
	Food loss and waste	1	
	GHG food system emissions	1	
	Food consumption	8	^
	Economic	27	^
	Social	19	^

Consumption Footprint - Food (biodiversity loss)

Assessment of the potential biodiversity loss per capita due to the use of resources and to emissions, along the entire EU food supply chain.

This is an extensive indicator: original values depend on the extent of the country.



EU-27
14.78k
species.yr

Force denomination

OFF ☐ ON ☒

Switch ON to divide by Population

Map Bar chart Timeline Table

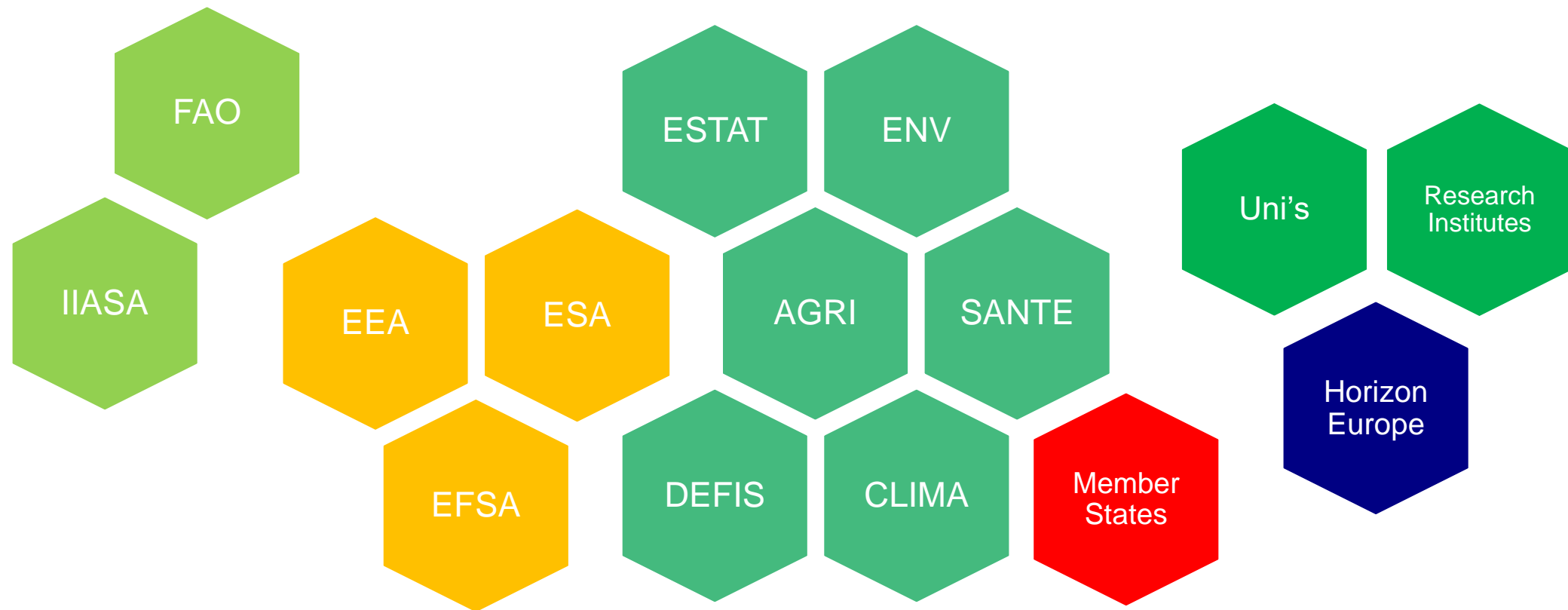
Consumption Footprint - Food (biodiversity loss)

2022



species.yr
2.96k
24.79

Network and collaboration essential for our work



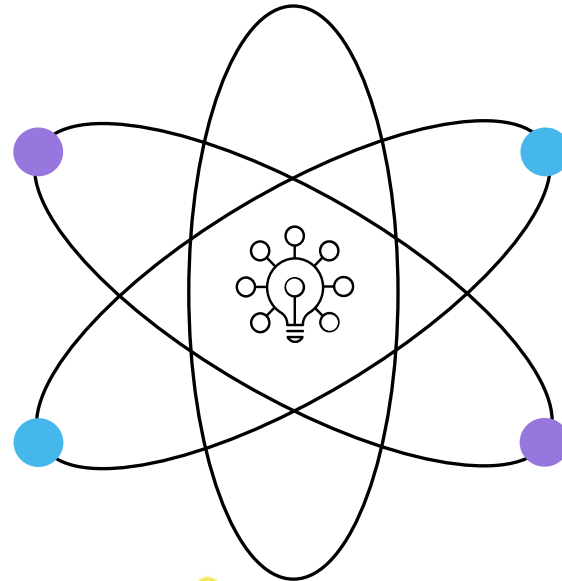
Cooperation with Horizon Europe projects



Modern approaches to the monitoring of biodiversity



Towards Sustainable Land-Use in Europe



Innovating crop rotations for climate-resilient agriculture

Achieving Ecological Resilient Dynamism for the European food system through consumer-driven policies

BIOCLIMA

Improving Monitoring for Better Integrated Climate and Biodiversity Approaches, Using Environmental and Earth Observations



Thank you



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