

Farm Sustainability Data Network

The possibilities offered by FSDN and its links with other datasets

Enabling robust environmental evaluation with harmonised microdata

**13 June 2025 – Hannover
Good Practice Workshop**

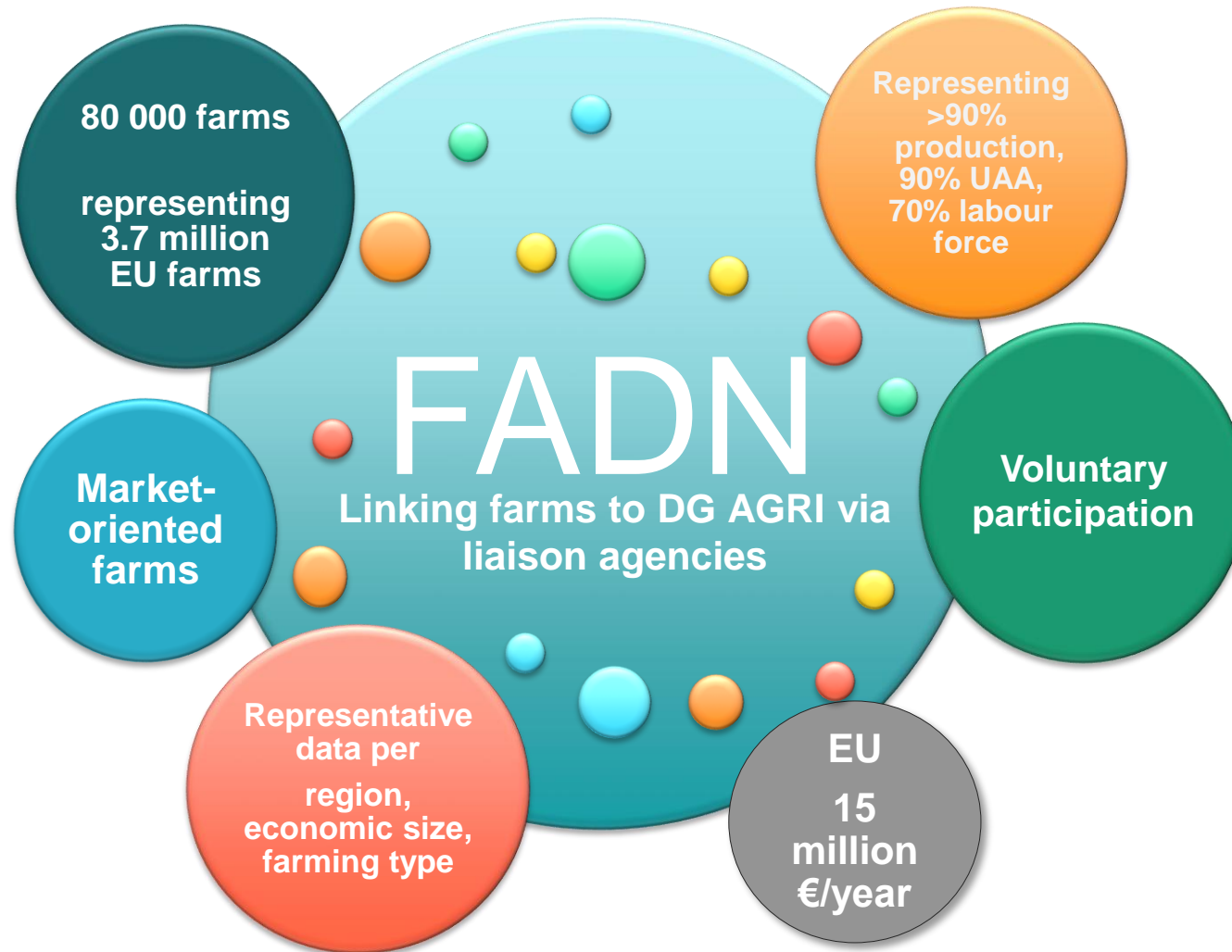
Raphael D'ANDRIMONT, DG AGRI

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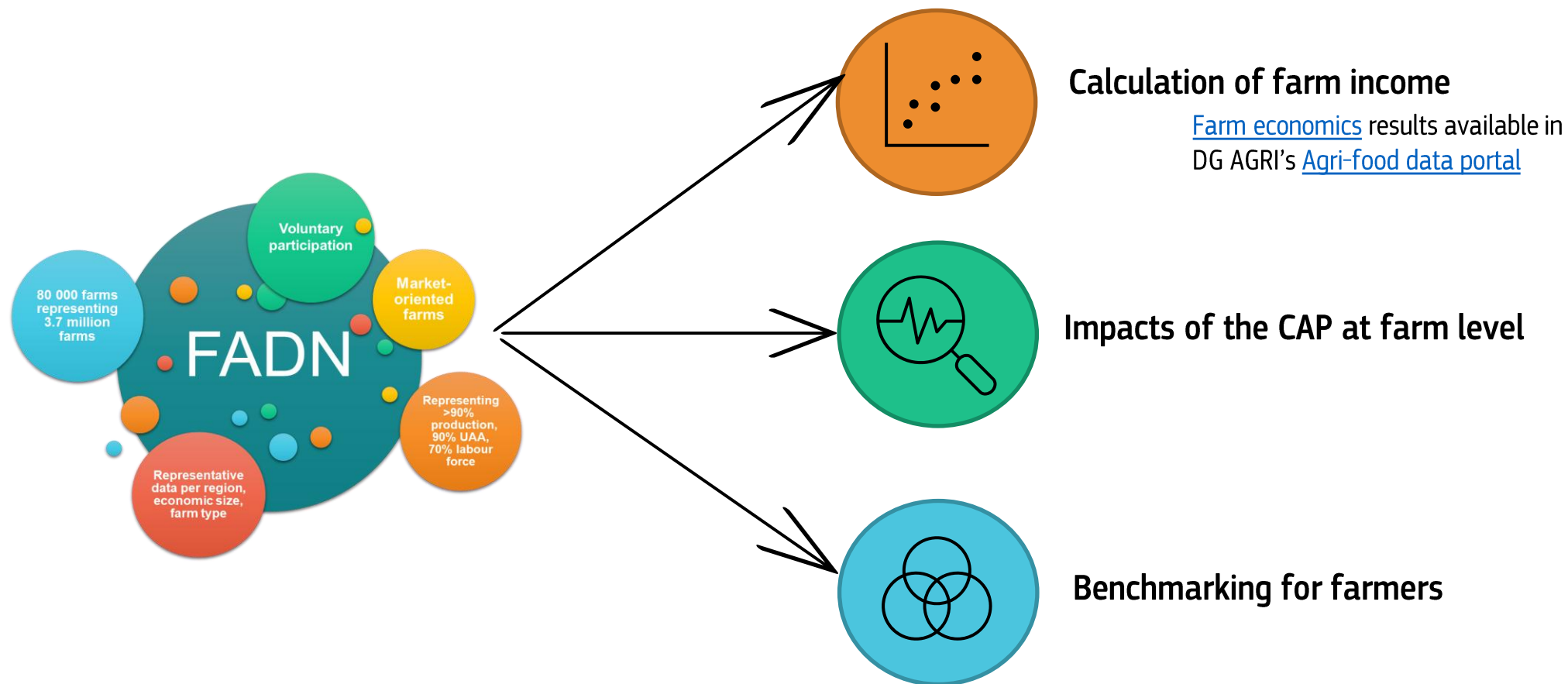
1. From accountancy (FADN) to sustainability (FSDN) farm-level data
2. What is Farm Sustainability Data Network (FSDN)?
3. Linkages with other datasets
4. Policy and research use cases
5. Conclusions and next steps

1. From FADN to FSDN

The Farm Accountancy Data Network, collection of microdata on a sample of EU agricultural holdings since 60-year



FADN, a unique farm-level dataset to measure economic performance, for evidence-based policy-making

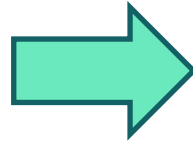


From FADN to FSDN – Farm Sustainability Data Network

Announced in the [May 2020 Farm to Fork Strategy](#)



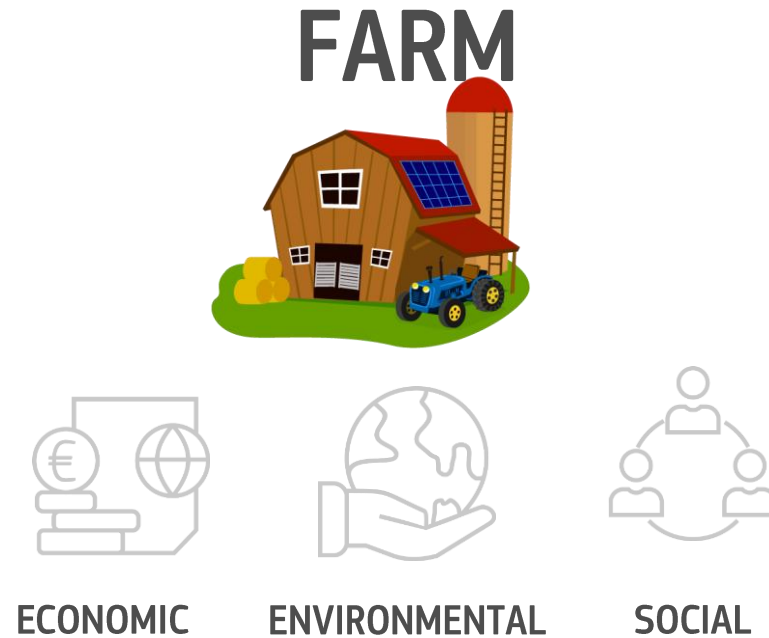
FADN
Born in 1965



FSDN
Born in 2023

2. What is FSDN?

FSDN is adding new domains to FADN



FSDN provides new variables from 2025



ECONOMIC

General information on the holding, Type of occupation, Assets and **investments**, Quotas and other rights, Debts/credits, Value added tax, Inputs, **Land use** and crops, Livestock production, Animal products and services, **Market integration**, **Quality products** – **Geographical indications**, **Membership in producer organisations**, **Risk management**, **Innovation and digitalisation**, Other gainful activities related to the holding, Subsidies, **Indicative share of off-farm income**



ENVIRONMENTAL

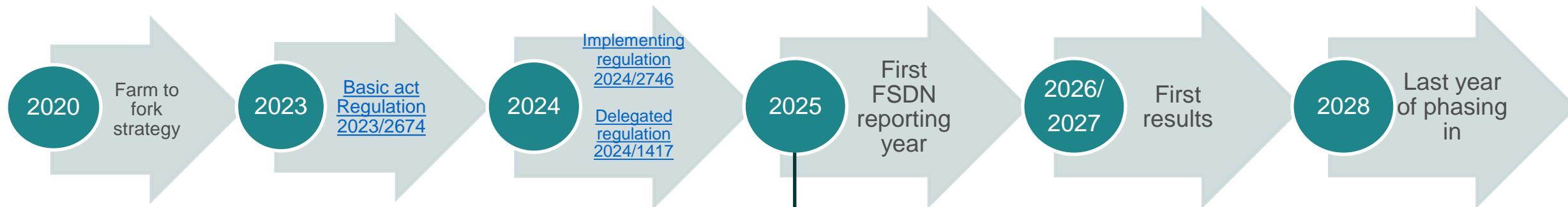
Farming practices, **Soil management**, **Nutrient use and management**, **Carbon farming**, **Greenhouse gas emissions and removals**, **Air pollution**, **Water use and management**, **Plant protection use**, **Antimicrobial use**, **Animal welfare**, **Biodiversity**, **Organic farming**, **Certification schemes**, **Energy consumption and energy production**, **Food loss on primary production level**, **Waste management**



SOCIAL

Labour, **Education**, Gender balance, **Working conditions**, **Social inclusion**, **Social security**, **Infrastructure and essential services**, **Generation renewal**

Timeline of the conversion



Under development:

- Guidelines data compilation / farm return
- Guidelines standard results (in particular GHG emissions)
- Metadata
- Coherence checks

Phasing-in period by topics

2025

- Current economic FADN topics (e.g. land use, outputs, inputs, assets, investments, debts, subsidies)
- Market integration
- Farming practices (partly)
- Biodiversity (partly)
- Nutrients
- Emissions
- Soil management
- Environmental certification schemes
- Animal welfare
- Social topics (labour, safety, social inclusion, services, generational renewal)

2027

- Innovation – digitalization
- Share of off-farm income
- Farming practices (partly)
- Biodiversity (partly)
- Water management
- Plant protection use
- Antimicrobial use
- Energy
- On-farm food/feed loss of production
- Training

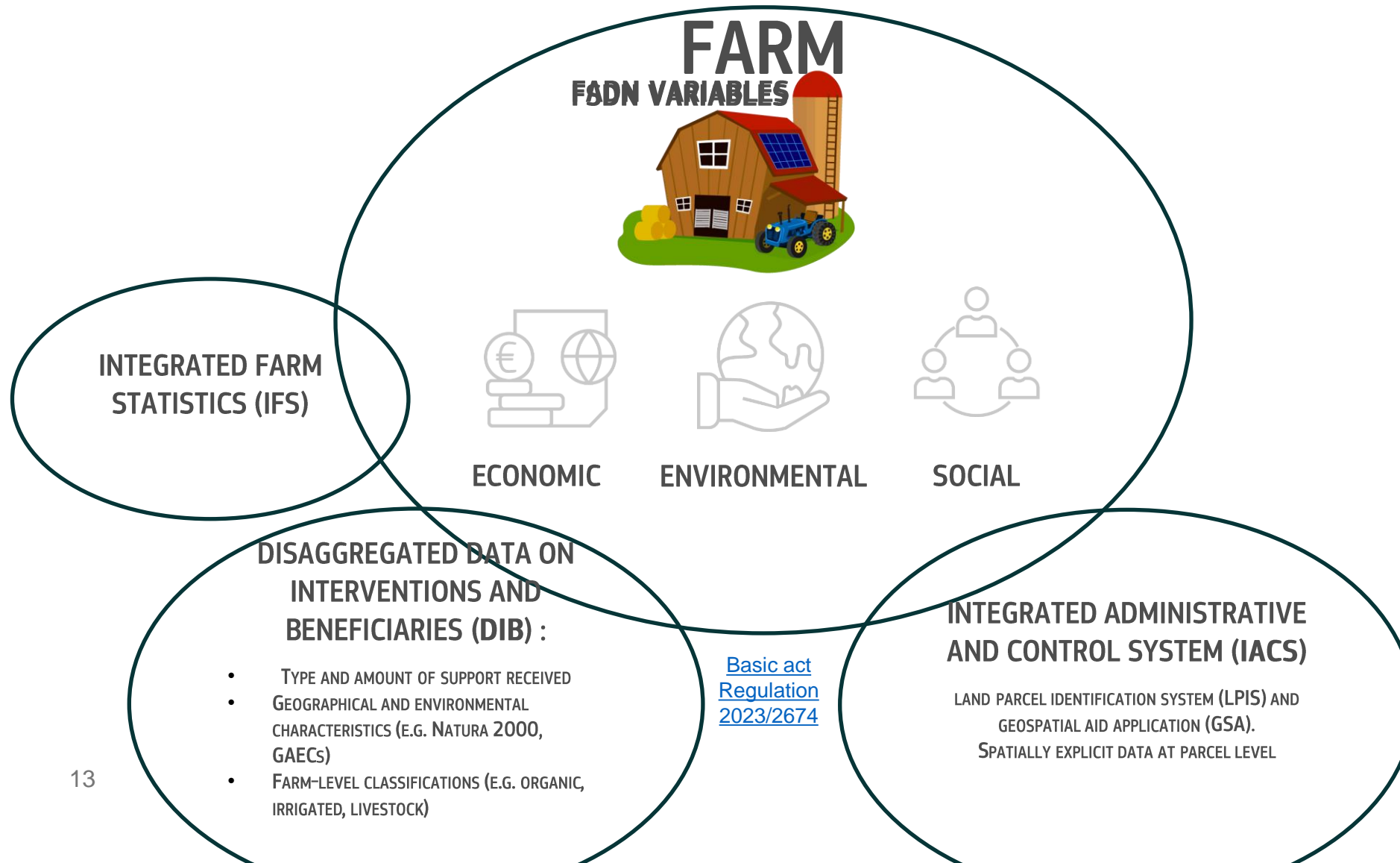
Some countries are planning early delivery of 2027 variables

FLEXIBILITY: 2 milestones for gradual implementation and adapt to the national context

- Member States asked for exemptions on specific tables until 2027-2028
- Revision clause to assess implementation by 30 September 2027

3. Linking with other datasets

FSDN includes data sharing of DIB and IACS



New FSDN tools – data sharing (Article 4 of Regulation (EC) No 1217/2009)

Member States LEVEL

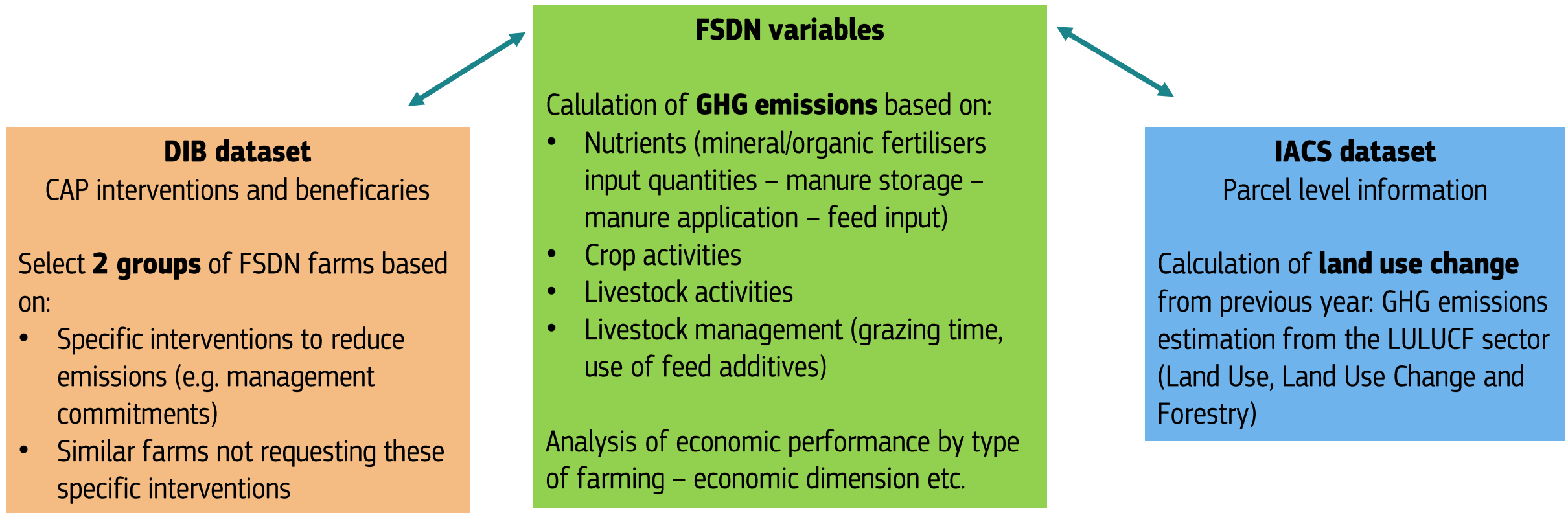
- **Compile FSDN information** from other national datasets (e.g. **IACS** including CAP **interventions**, livestock database). **IFS** data can be used at national level to feed FSDN variable (Study managed by EUROSTAT on interoperability IFS – FSDN (including IACS) is finalized, see [final report](#) including country recommendations)

EU LEVEL

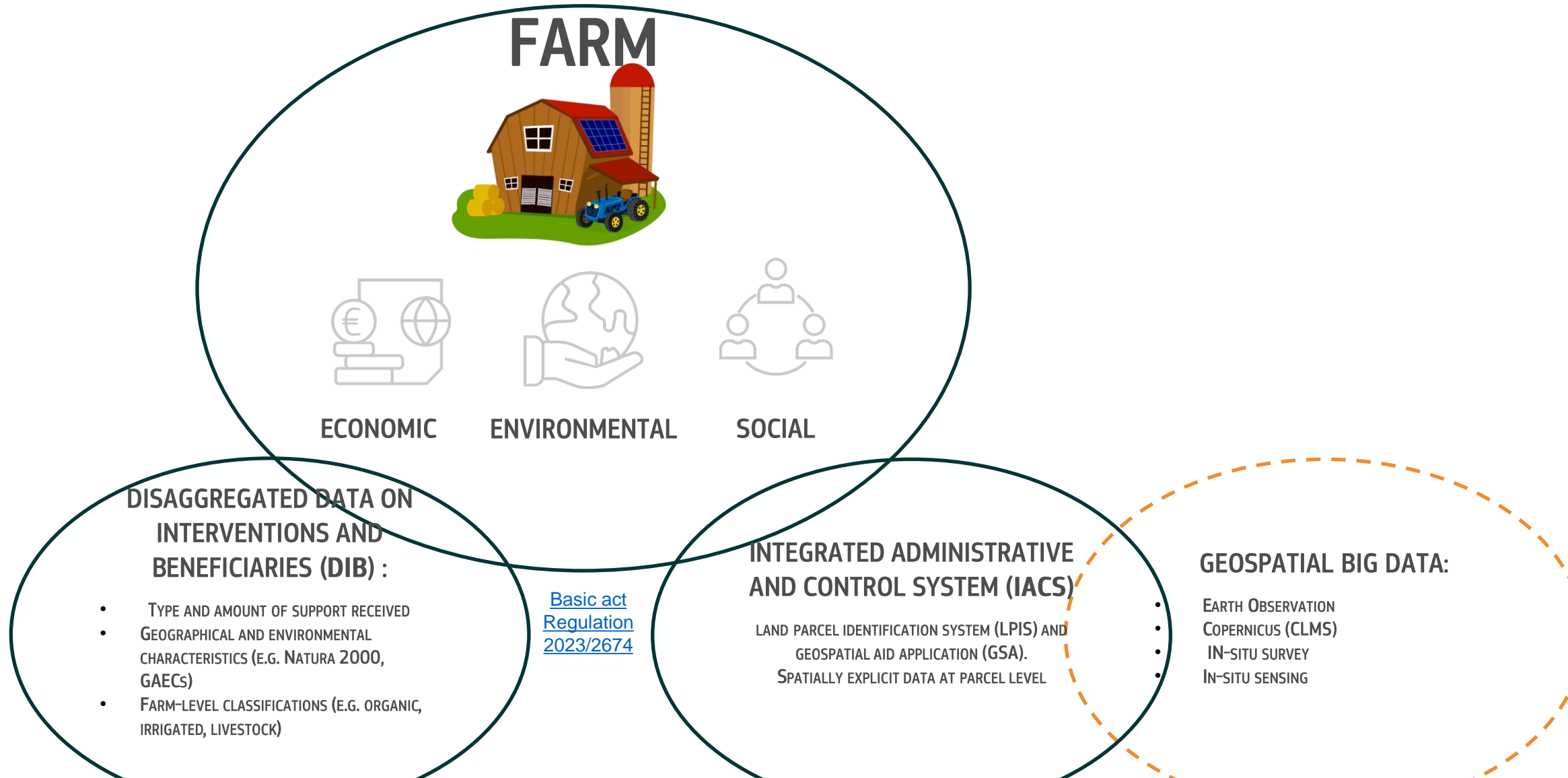
- **Improve the analysis potential**, complementing FSDN data with 2 datasets at EU level
 - **Data for monitoring and evaluation – database for intervention and beneficiaries (DIB):**
 - **IACS data sharing:** based on INSPIRE directive, geographical data (parcels geometry, land use/crops, organic, landscape features)
- Key points:
 - identify the **same holding** in the 3 datasets
 - New FSDN variables **complementary** to these datasets
- Timeline: links FSDN - DIB available in **2027** / links FSDN - IACS data sharing available in **2028**

Data sharing at EU level – improved analysis example

Comparison between farms applying for GHG emission reduction CAP interventions and similar farms not applying



Making geospatial big data work via location Interoperability



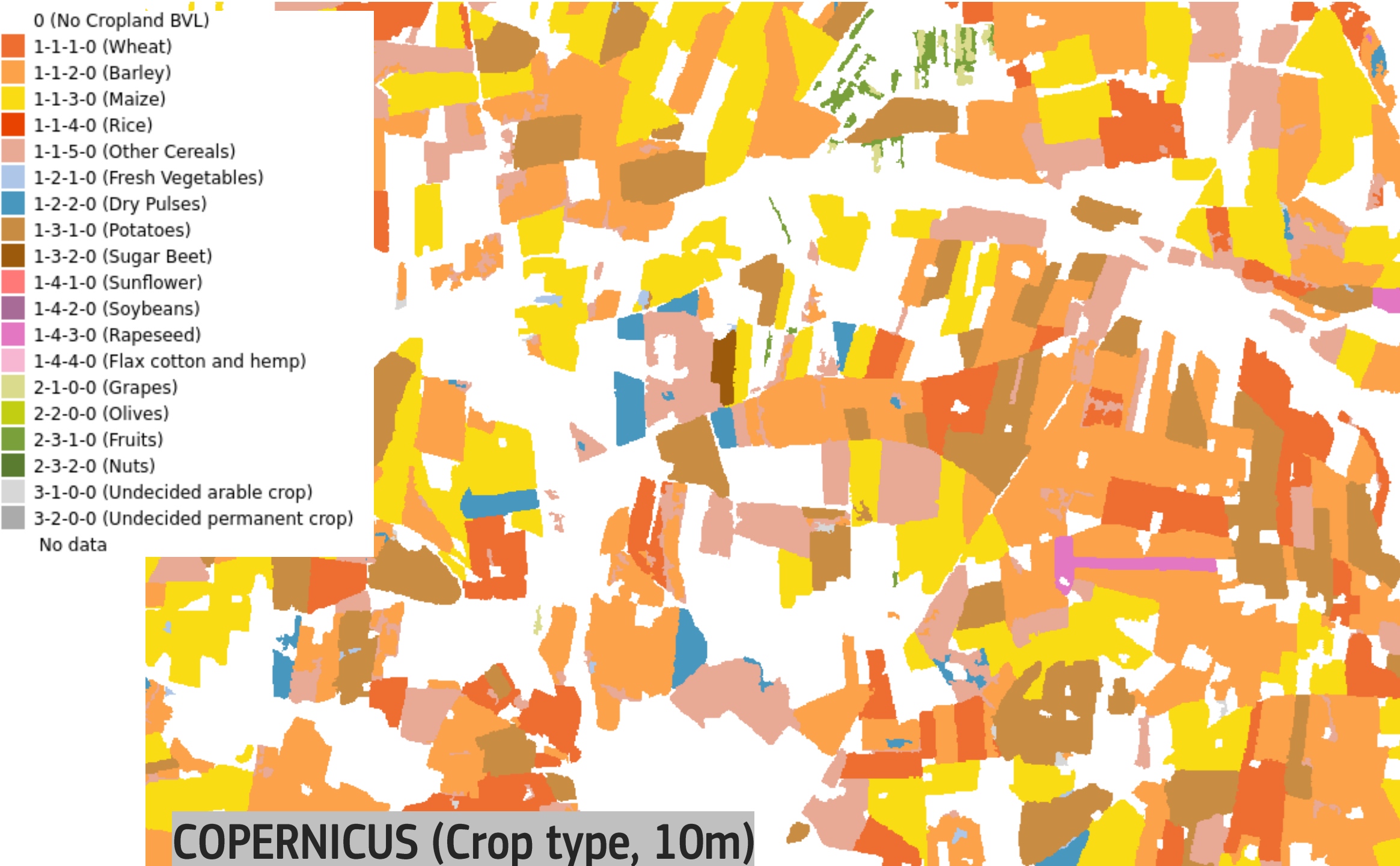
Example showing the interoperability challenges



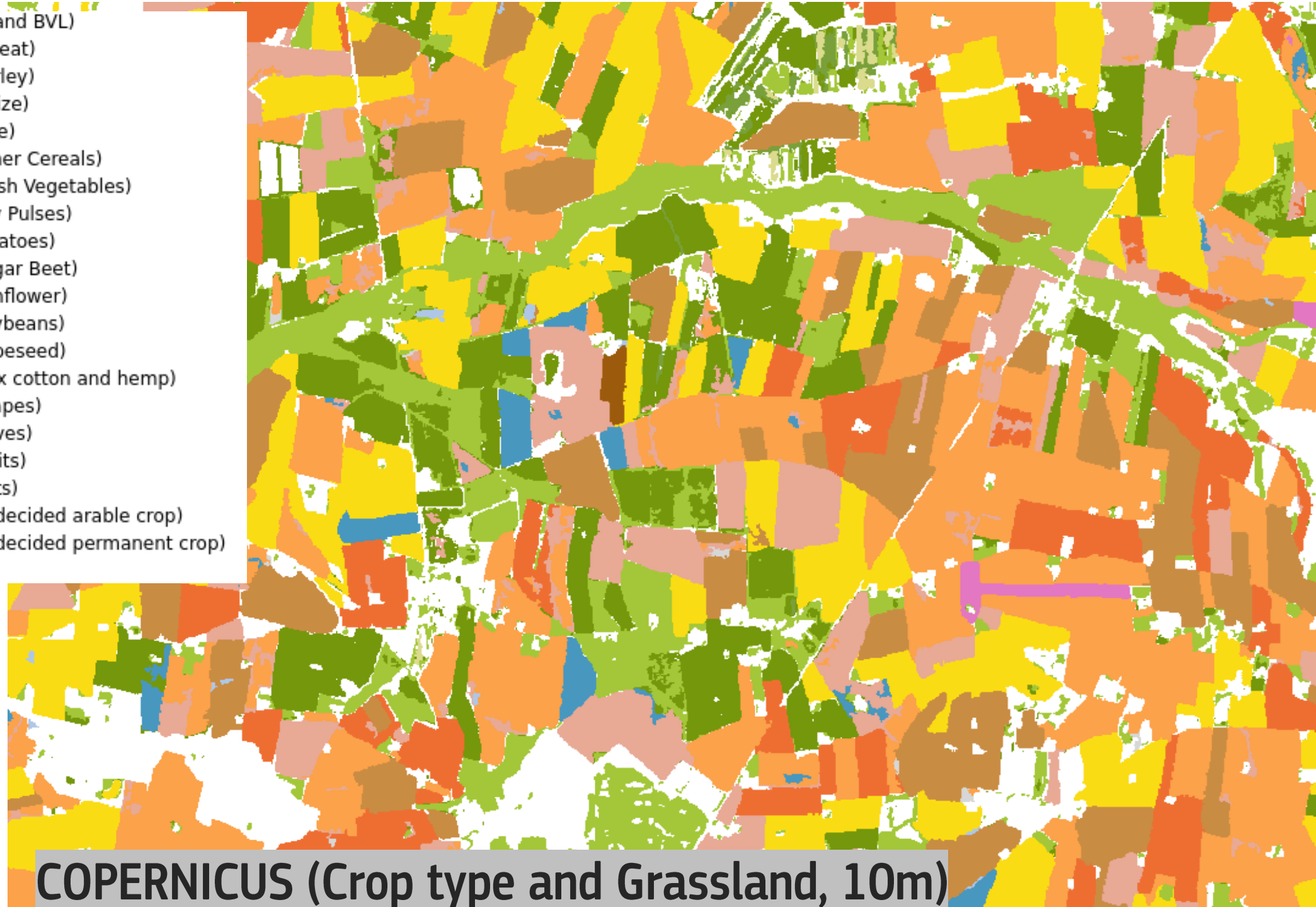
LANDSCAPE



FSDN FARMS



0 (No Cropland BVL)
1-1-1-0 (Wheat)
1-1-2-0 (Barley)
1-1-3-0 (Maize)
1-1-4-0 (Rice)
1-1-5-0 (Other Cereals)
1-2-1-0 (Fresh Vegetables)
1-2-2-0 (Dry Pulses)
1-3-1-0 (Potatoes)
1-3-2-0 (Sugar Beet)
1-4-1-0 (Sunflower)
1-4-2-0 (Soybeans)
1-4-3-0 (Rapeseed)
1-4-4-0 (Flax cotton and hemp)
2-1-0-0 (Grapes)
2-2-0-0 (Olives)
2-3-1-0 (Fruits)
2-3-2-0 (Nuts)
3-1-0-0 (Undecided arable crop)
3-2-0-0 (Undecided permanent crop)
No data

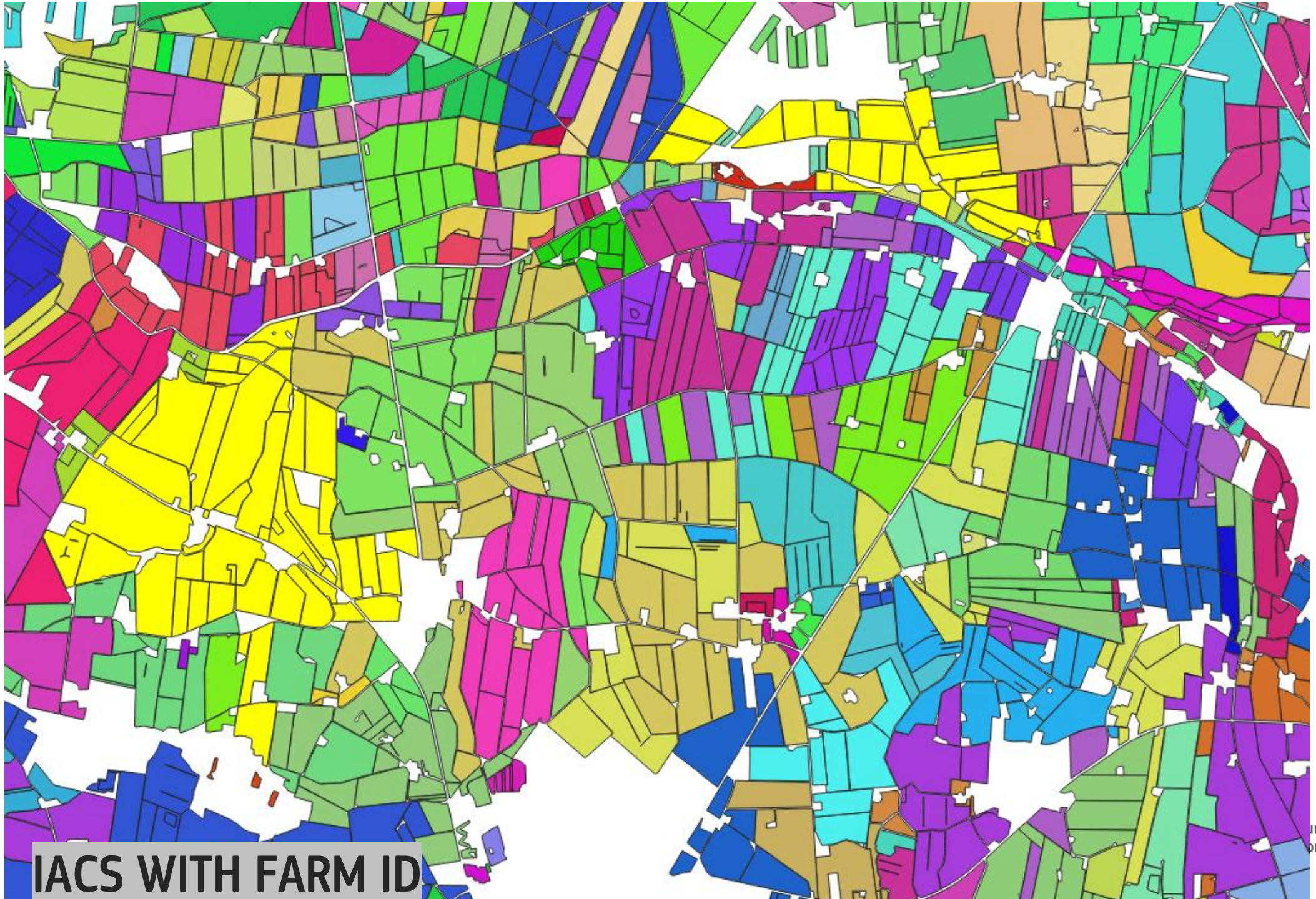


COPERNICUS (Crop type and Grassland, 10m)





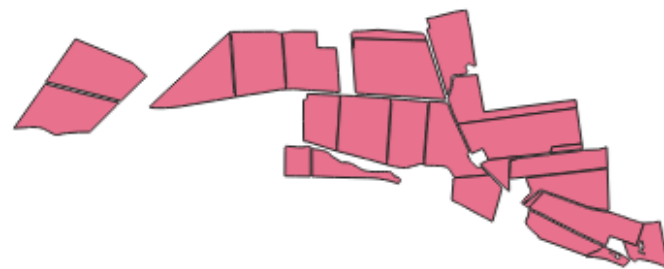
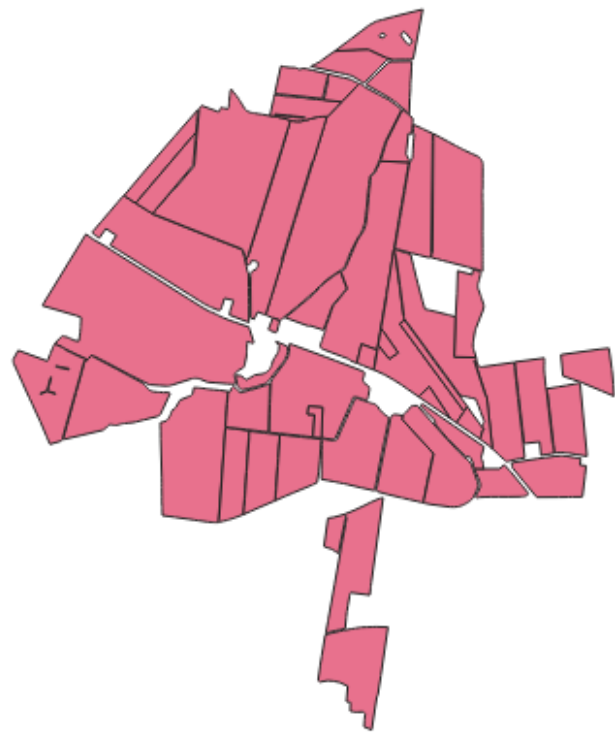
IACS AND FSDN FARMS

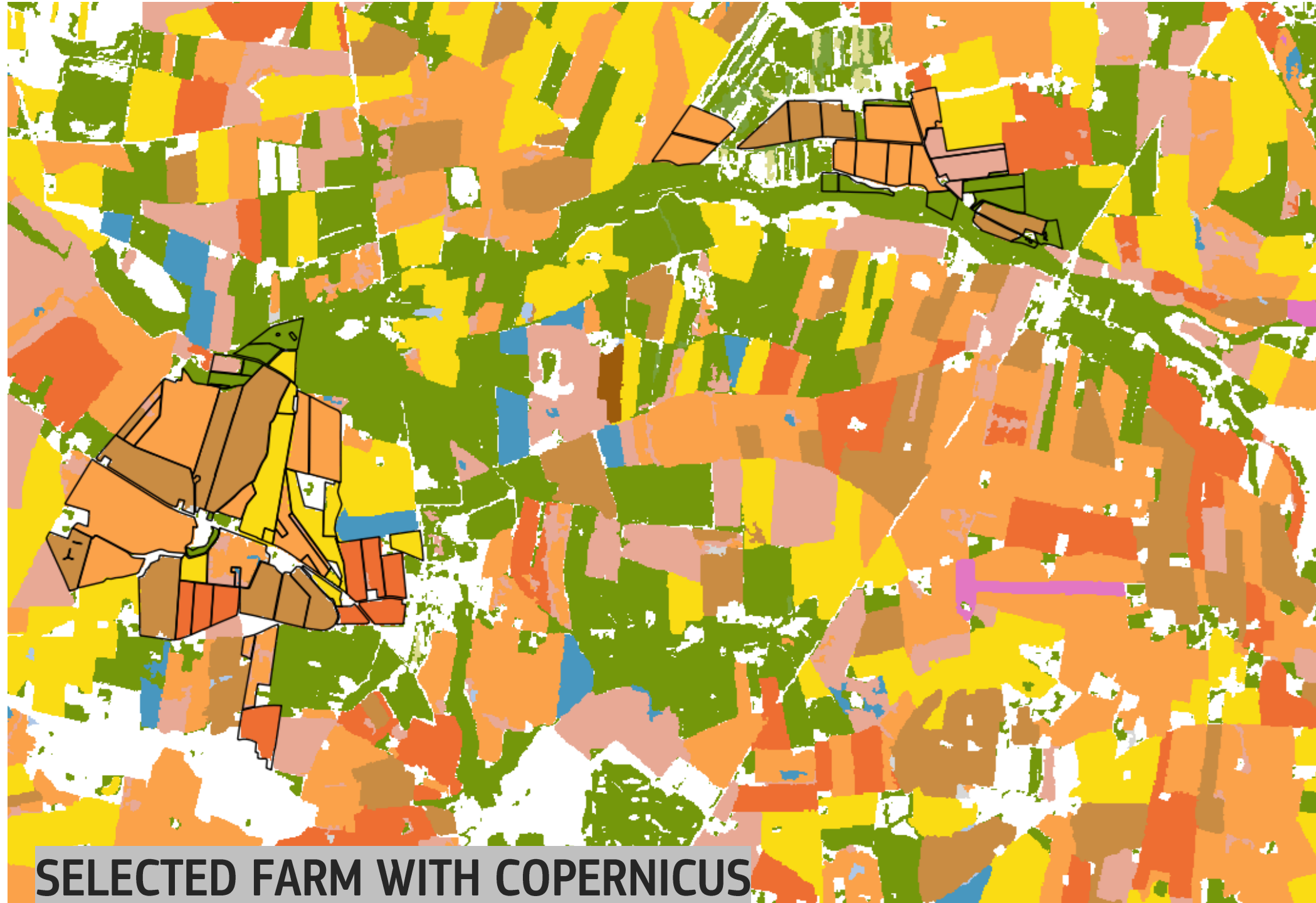


IACS WITH FARM ID

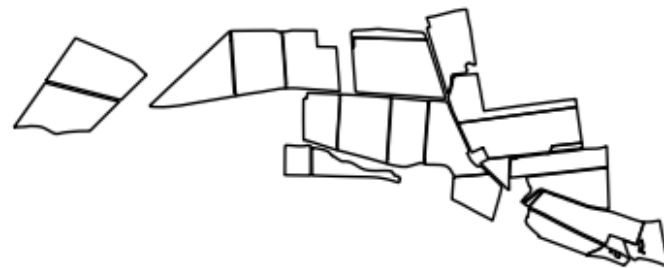
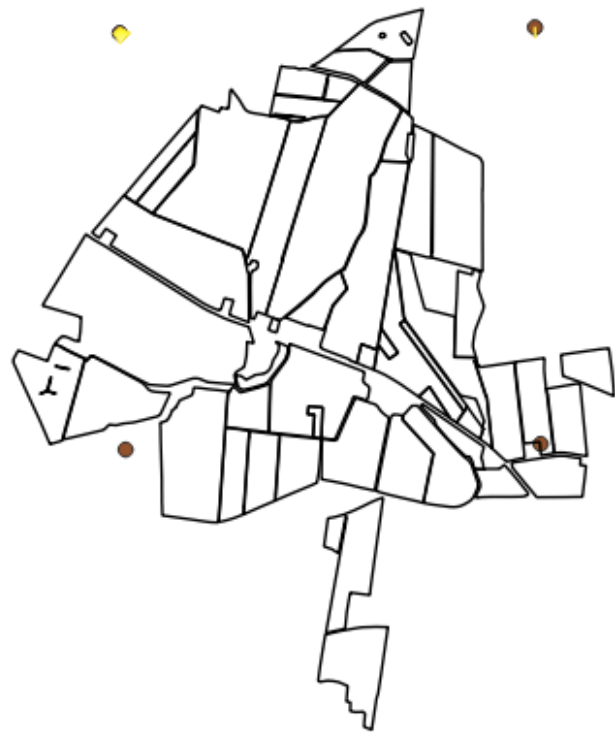


SELECTED FARM





SELECTED FARM WITH COPERNICUS



SELECTED FARM WITH IN-SITU DATA (LUCAS)

Achieving data integration through Interoperability

- Unlocking the full value of FSDN requires **linking farms across datasets**.
- To assess environmental and policy impacts, we must connect farm-level data (FSDN) with spatial datasets (IACS, EO) and policy data (DIB).
- **Four interoperability dimensions** (based on the European Interoperability Framework – EIF):
 - **Legal**: Data-sharing rights and GDPR compliance
 - **Organisational**: Coordination across Member States and EU bodies
 - **Semantic**: Shared definitions (e.g. farm, parcel, beneficiary)
 - **Technical**: Compatible systems, formats, and identifiers
- **Location interoperability** is a practical and essential enabler for data integration. It allows different datasets to be linked through spatial identifiers, enabling policy evaluation and big data analysis—but **operational challenges remain** as illustrated

4. Policy and research use cases

FADN/FSDN enhanced analysis

Dashboards and briefs built internally in DG AGRI and in collaboration with JRC

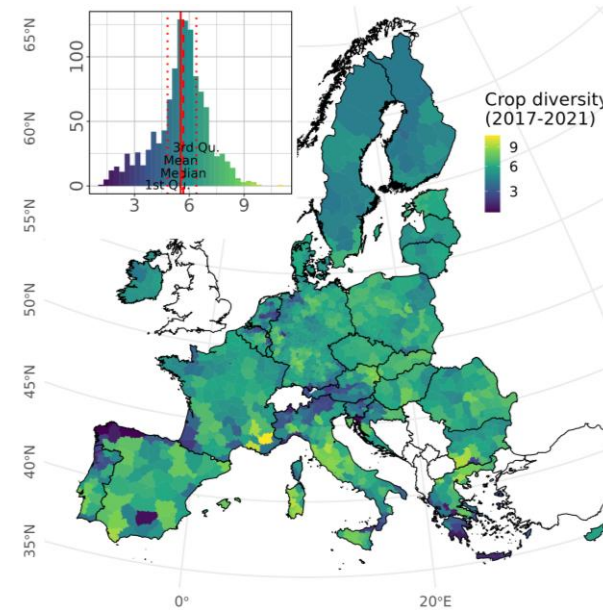
- [Market brief on organic farming](#): including a chapter on economic sustainability
- [Fertilisers use and costs dashboard](#): N – P – K quantities (from year ____)
- [Areas with Natural Constraints brief](#): definitions, CAP support, FADN analysis of ANC and non-ANC farms
- [FADN representativeness dashboard](#): analyse representativeness of the FADN results and comparison with IFS 2020

Upcoming analysis

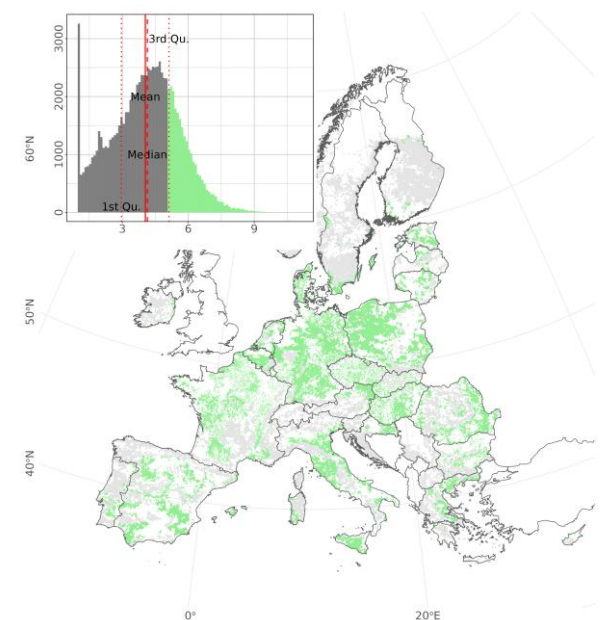
- Economic viability brief: FADN farms classified in 4 categories based on their possibility to cover production costs
- Management intensity brief: FADN farms classified based on their management intensity, high and low intensity farms analysed by distribution of direct payments and rural development from 2001 to 2022
- Grassland brief: definitions, quantifications, CAP plans management, FADN analysis
- Crop diversity: merged analysis of crop diversity between Copernicus dataset and FADN, (crop lists harmonization ongoing)

Monitoring crop diversity by linking FADN and satellite data

- **Policy Context:** Crop diversity and rotation are key environmental goals in the CAP 2023–2027, addressed through **conditionality** and **eco-schemes**.
- **Objective:** Assess crop diversity at farm level by combining economic data from **FADN** with spatial indicators from **satellite-based (Copernicus HRL VLCC) as context information**.
- **Methodological Innovation:** Match **FADN farms** with their geolocation. Derive crop diversity metrics from **HRL VLCC crop type layers (2017–2021)**. Link with farm typology and support data to detect structural and regional patterns.
- **Added Value**
 - Demonstrates the potential of **EO–socioeconomic data fusion**.
 - Supports **evidence-based CAP implementation** at both EU and national levels.



Crop diversity distribution across NUTS3 (2017–2021 average)



LAUs with more than 5.12 crop types in 2021, highlighting regions with high crop diversity

Modelling the behaviour of farmers using FADN data for policy impact analysis



- IFM-CAP is an optimization model that simulates the decision making of the EU individual farmers
- Uses **FADN** data for 80,000 EU farms:
 - Area, Yield and Prices for 38 crop and 15 livestock activities
 - Cost of various inputs (PPP, Fertilizers, Water, Energy, Feed)
 - Subsidies data (CAP policy)
- Calibrates (reproduces) on a specific situation observed in FADN (baseyear) to construct a business-as-usual future (baseline) and compare with alternative situation (policy scenario)
- Used to inform **policy-makers** (DG AGRI) about the **economic** and **environmental** impacts of changes in the CAP and other related policies



FSDN EU tool for feedback to farmers




Feedback on sustainability performance

- Tables and graphs based on FADN data, to be enriched with FSDN variables.
- Targeted to farmers/farm advisors and open to any of them.
- **Input data:** farmers will be able to identify themselves and compare their results to the average of the reference group (same MS, Type of Farming, Economic dimension + possible additional criteria).
- **Output results:** organized in 4 views on farm structure, economic, environmental and social data.

Emission calculator tool

- calculate emission balance at farm level, when FSDN data will be available

FSDN EU tool for feedback to farmers

**Farm Sustainability Data Network (FSDN) – comparative results**
AGRICULTURE AND RURAL DEVELOPMENT

?

EN

Select input variables <

Year *

2022

Country *

Germany

Main farm activity *

Fieldcrops

Economic size class *

100 000 - < 500 000 EUR

Currency *

EUR

National Currency Rate *

1

Reset form

Export PDF

Export XLSX

ⓘ Your results are compared with 1 035 (15 996 farms represented) similar sample farms

Structural information

Economic dimension

Environmental dimension

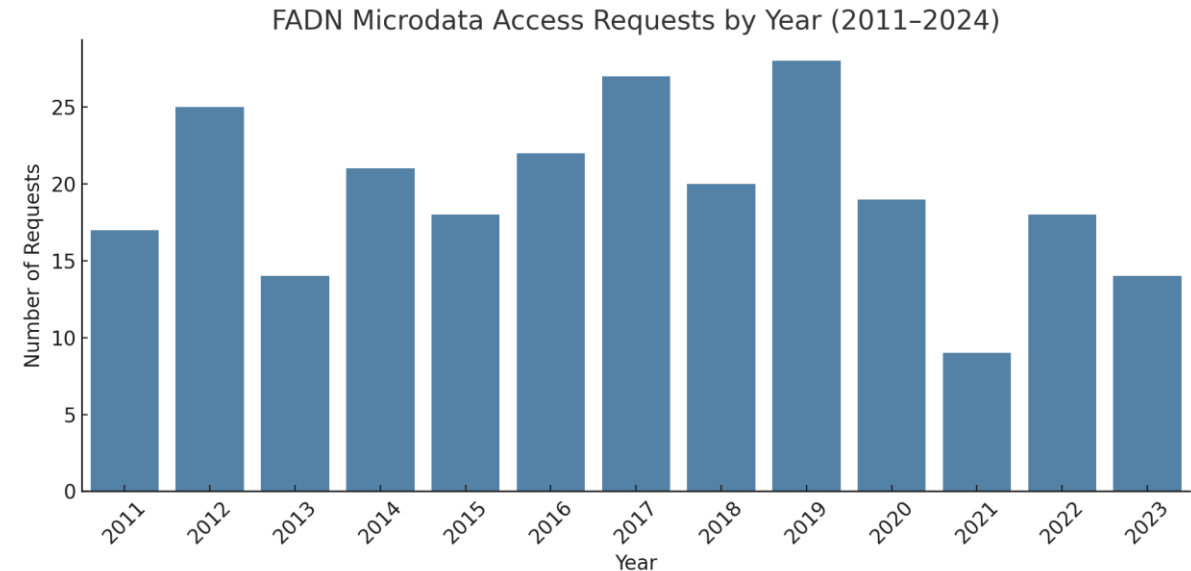
Social dimension

Environmental benchmarking	Unit	Average farm	Enter your value	Benchmark	Performance		
Quantity of mineral nitrogen used	100 kilogrammes	134,4	100	74 %	Below 33%	33% - 67%	Above 67%
Mineral nitrogen input intensity	Kilogrammes per hectare	95,78	80	84%	Below 33%	33% - 67%	Above 67%
Plant protection products (PPP) cost	EUR	21 761	18 500	85 %	Below 33%	33% - 67%	Above 67%
PPP cost intensity	EUR per hectare	155,08	148	95%	Below 33%	33% - 67%	Above 67%
Livestock density	Livestock units per hectare	0,05	0,12	222%	Below 33%	33% - 67%	Above 67%
Energy cost	EUR	26 809	32 000	119 %	Below 33%	33% - 67%	Above 67%
Total cost of feed for grazing livestock	EUR	1 652		0%	Below 33%	33% - 67%	Above 67%
Of which cost of home-grown feed for grazing livestock	EUR	1 200		0%	Below 33%	33% - 67%	Above 67%

european
ommission

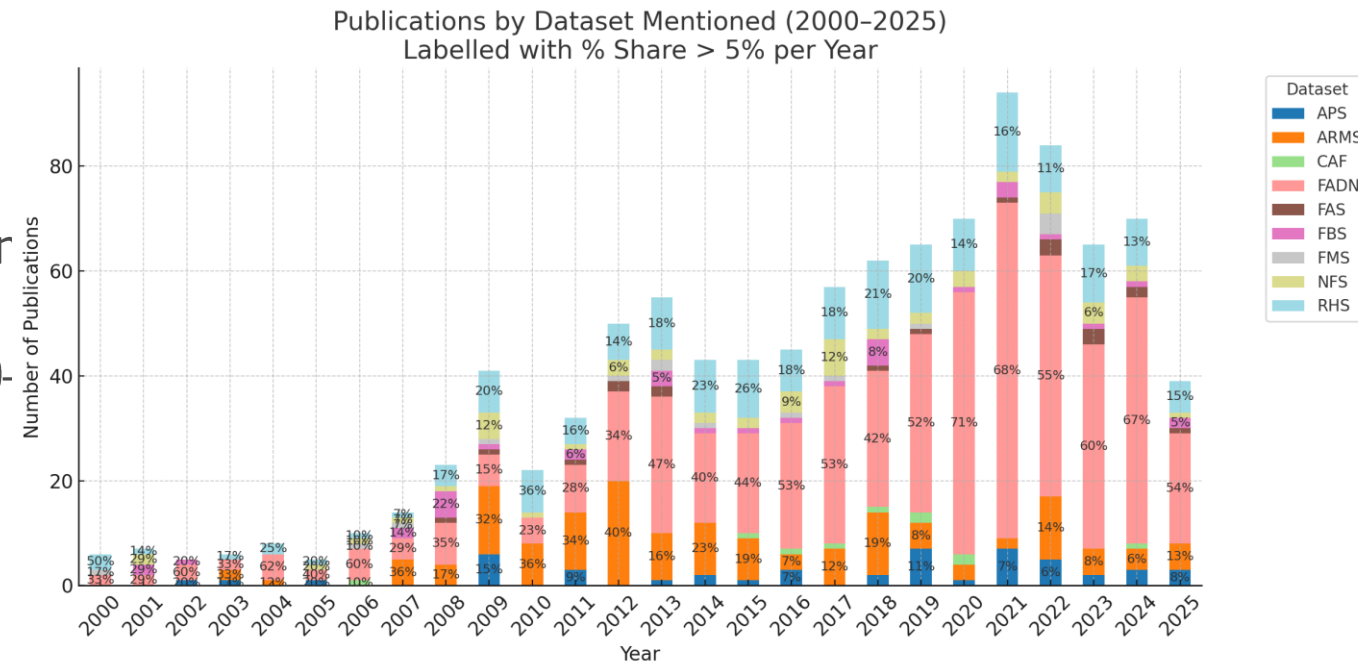
FADN data access is managed by DG AGRI

- **Over 200 microdata access requests** have been received by DG AGRI since 2011. The peak occurred between **2016 and 2019**, with nearly 30 requests per year.
- The majority of requests (**around 70%**) come from **external research institutions**, followed by EU bodies and internal Commission services.
- The topics addressed range from **farm income** and **productivity** to **climate** policy, illustrating the growing importance of FADN as a basis for evidence-based policy and applied research.



FADN is the leading farm-level dataset in research outputs

- **FADN is the leading farm-level dataset in research**, (525 scientific publications identified in Scopus on 1034 containing APS, ARMS, CAF, FADN, FAS, FBS, FMS, NFS, RHS, SSAE*, representing **50.7 %**
- **FADN is consistently the most-used farm dataset annually**, maintaining a dominant position in academic outputs since 2012.
- A review of the 525 FADN-related publications (2000-2025) shows key research topics include:
 - **Data envelopment analysis** (~10%)
 - **Technical efficiency** (~9%)
 - **Common Agricultural Policy** (~8%)
 - **Farm income** (~7%)
 - **Stochastic frontier analysis** (~6%)
 - **Organic farming** and **dairy farming** (~5% each)



5. Conclusions

Conclusions and way forward

- **FADN's legacy and evolution:** With over 60 years of harmonised farm-level data, FADN has been instrumental in supporting evidence-based agricultural policy in the EU. Its ongoing transition to FSDN aims to capture the full sustainability spectrum—economic, environmental, and social—at farm level.
- **Growing policy relevance and research demand:** The increasing number and diversity of data access requests and academic publications underline the growing reliance on FADN data to assess CAP performance, sustainability metrics, and economic resilience of farms.
- **Integration potential remains high:** Linking FSDN with IACS, DIB, EO and other administrative datasets can offer new analytical capabilities for policy design, monitoring, and evaluation—especially at farm and landscape level. Addressing the **five interoperabilities** is challenging (**Legal, Organisational, Semantic, Technical and location**)
- From data to decision-making: Use cases such as IFM-CAP demonstrate how microdata can directly feed into quantitative models for scenario simulation and impact assessments, influencing CAP reform.

Thank you!

USEFUL LINKS ON FADN – FSDN

FSDN national liaison agencies:

<https://europa.eu/nJVvc3>

FIND OUT MORE about the FSDN:

https://agriculture.ec.europa.eu/data-and-analysis/farm-structures-and-economics/fsdn_en

[FSDN Leaflet](#) available in English, German, French, Portuguese

