

2. Understanding IACS data:
structure, evolution and relevance for LULUCF

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Two complementary inventory questions, increasing data needs

Land-use tracking

How much land is agricultural, and how does it change over time?

Soil organic carbon

How agricultural land is managed, and how does it affect soil carbon stocks?

ENHANCED REQUIREMENTS BY THE GOVERNANCE REGULATION (2018/1999, Annex V, Part 3)

Geographically explicit land-use monitoring

Where do changes occur?

Higher-tier GHG estimates

- 2021-2025 - Minimum Tier 1, Tier 2 for significant pools in key categories
- 2028 - Minimum Tier 2
- 2030 - Tier 3 for specified land units

How to better reflect specific land conditions?

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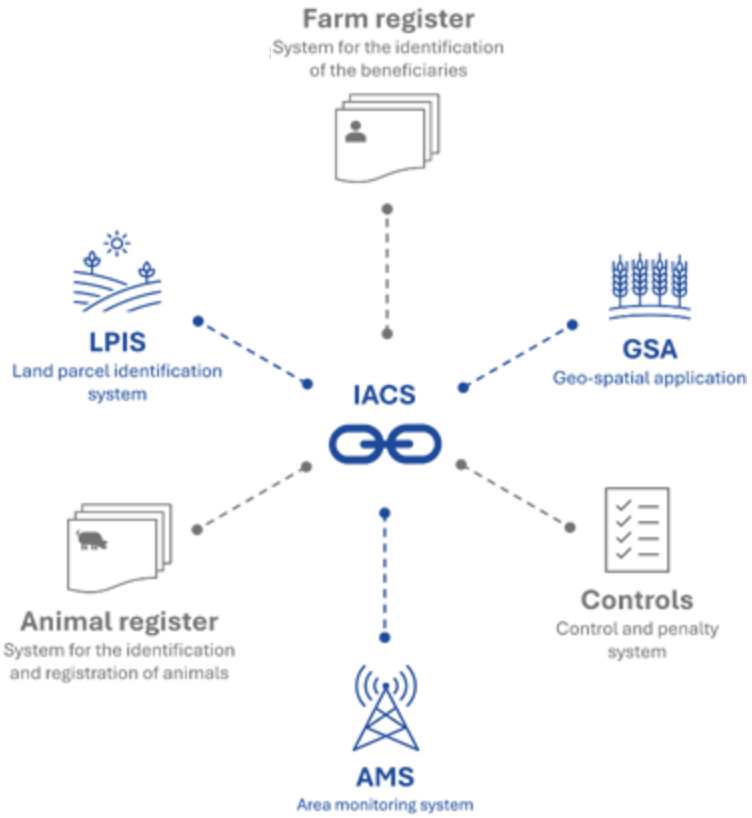
Growing need for detailed, consistent, spatial and temporal data

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Potential contribution of IACS datasets

European Environment Agency

IACS, an ecosystem of datasets



	Land Parcel Identification System (LPIS)	Geo-spatial application (GSA)	Area Monitoring System (AMS)
Main function	Spatial reference system for eligible land	Annual farmers' declarations	Monitoring/control system
Spatial unit	Reference parcel	Agricultural parcel	Parcel/or part of parcel
Update frequency	Relatively stable, updated max every 3y	Annual	Annual
LULUCF relevance	Land use categories	Declared uses	Selected practices and land-cover evidence

Source: Jänicke et al., 2025

IACS are vary from one Member State to another (40 LPIS in EU-27)

LPIS and GSA: spatial reference and annual declarations



LPIS reference parcels locate agricultural land eligible for CAP payments.



GSA agricultural parcels represent areas declared by a farmer for a given year, within the boundaries of reference parcel from the LPIS.

LPIS - Reference parcel typology (1/3)



Declared parcels (GSA)

Physical/topographical block (PB)



Cadastral parcel (CP)



	Physical/topographical block (PB)	Cadastral parcel (CP)
Meaning of boundaries	Stable landscape features, topographical units	Legal land ownership
Temporal stability	Stable	Relatively stable (land tenure cycle)
Relationship with GSA	May contain one to several declared parcels	May contain one to several declared parcels
LU information	Potentially heterogeneous: may contain several crop types, non eligible (agricultural) area	Potentially heterogeneous: may contain several crop types, non eligible (agricultural) area

Reference parcel typology (1/3)

About LU information of physical/topographical blocks and cadastral parcels…

Additional spatial layers are available to:

- to delineate the eligible agricultural areas inside reference parcels
- to delineate non-eligible areas or eligible non-agricultural areas inside reference parcels (see below)



Reference parcel typology (2/3)



Declared parcels (GSA)

Agricultural parcel



Farmer's block



Meaning of boundaries	A single declared agricultural parcel	Contiguous agricultural parcels declared by a single farmer
Temporal stability	Updated every year	Annual (or multiannual)
Relationship with GSA	LPIS geometries = GSA geometries 1 geometry = 1 declared parcel = 1 crop type	May contain one to several declared parcels
LU information	Homogeneous	Potentially heterogeneous

Reference parcel typology (2/3)

About the temporal stability of agricultural parcels and farmer's blocks geometries…

Annual variations do not necessarily mean changes in land use.

Year n



Year n+1

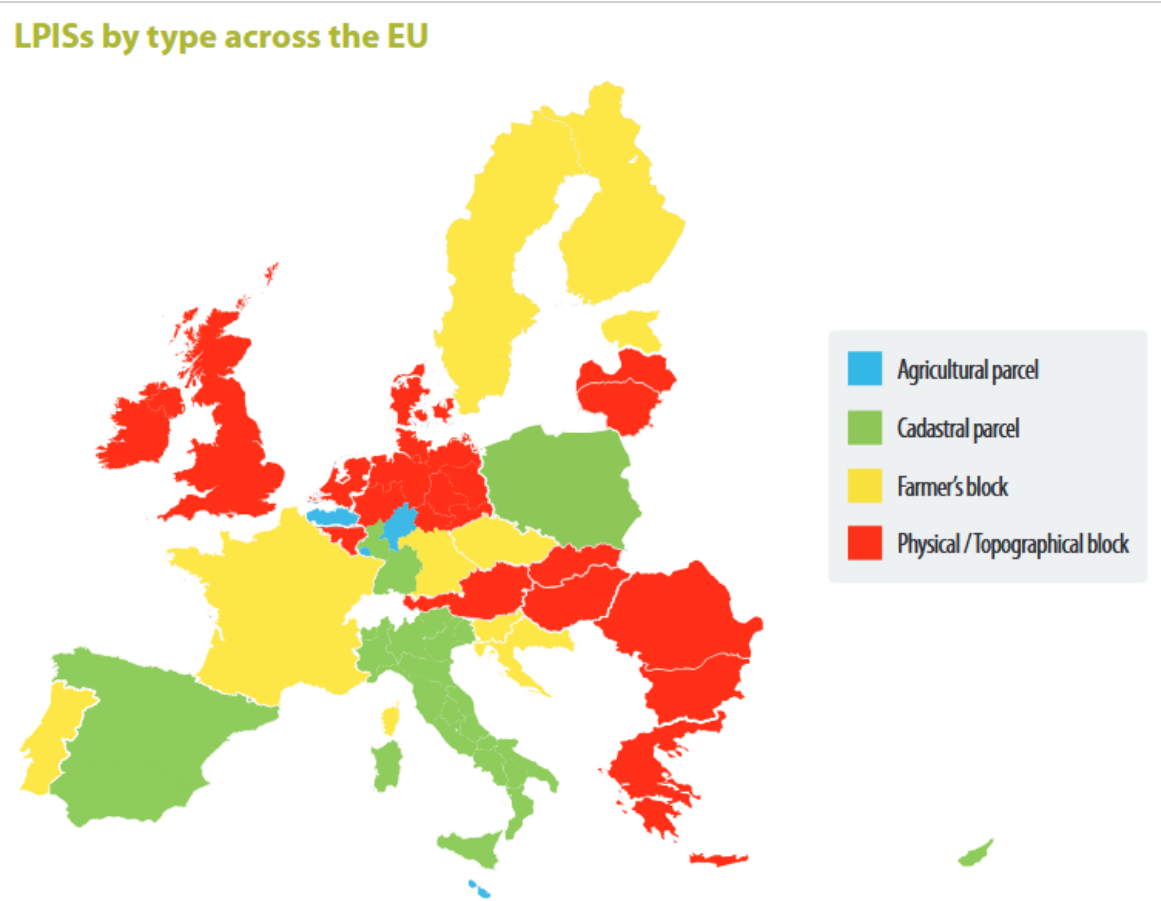


Year n+2



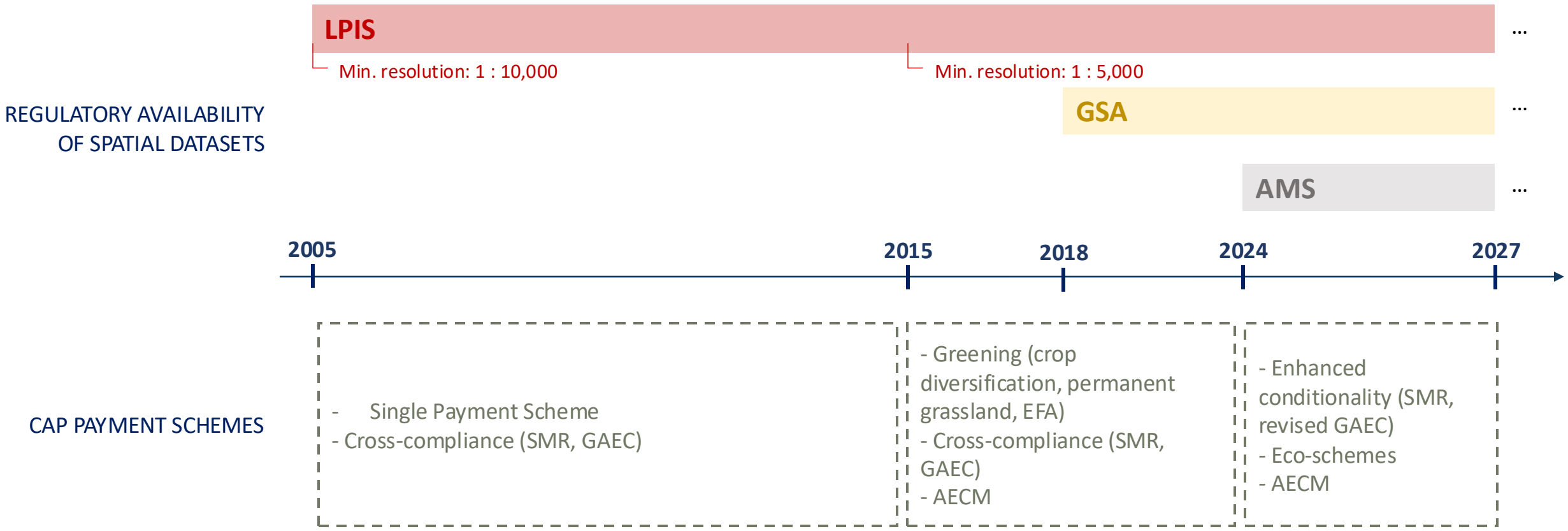
➡ Need to understand what spatial units (and which granularity of land-use information) are available and how stable they are over time before building time series

Reference parcel typology (3/3)



Source: ECA, 2016

Successive CAP reforms have enriched IACS data



What makes IACS valuable for LULUCF inventories?

Fine spatial resolution

Geometries locate/delineate eligible agricultural land

Rich thematic information

Land type, crop types and potentially management-related information

Long-standing product updated frequently

Repeated declarations can help build land-use time series



Originally designed for CAP administration,
IACS datasets are not inventory-ready land-use and management data.

Towards wider accessibility of IACS spatial data

Three different questions for an inventory compiler:

- **Data existence** – produced and held by a public authority
- **Data availability** – can be obtained, potentially on request
- **Public online accessibility** – freely retrievable via portal/API

INSPIRE Directive (2007/2/EC)

Provides the technical infrastructure for the discoverability of public datasets (The European Data Portal): standardised metadata, harmonised discovery services and potentially access points

→ LPIS and GSA are not explicitly named among the 34 INSPIRE themes, the use of the INSPIRE infrastructure is recommended by JRC Technical Guidelines

High-Value Datasets Regulation (2023/138)

Requires specific datasets to be made available free of charge, published under an open licence, accessible in a machine-readable format through APIs and bulk download, and provided in their most up-to-date version

→ Reference parcels (LPIS) and agricultural parcels (GSA) are explicitly covered: a minimum set of mandatory attributes is specified

Reality check: Europe-LAND project (Version 1.3, February 18, 2026) shows uneven GSA availability (**Harmonized IACS inventory | Zenodo**)


European
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Agency
Thank you!