D2.1 IACS Inventory and Harmonization documentation

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Revision and history chart

Version	Date	Main author(s)	Summary of changes
0.1	13.11.2024	Clemens Jänicke	Draft created
0.2	28.11.2024	Martin Rudbeck Jepsen	Revisions
0.3	29.11.2024	Jasmin Röseler, Franziska Wolf	Final quality check
0.4	29.11.2024	Jasmin Röseler	Inclusion of Annex 1
1.0	29.11.2024	Franziska Wolf	D2.1 submission to EU
1.1	03.03.2025	Martin Rudbeck Jepsen	Revised version addressing comments raised during first EU review

ABSTRACT

This document is a documentation of the collected and harmonized Integrated Administration and Control System (in short: IACS) data inventory related to Deliverable D2.1 produced in the frame of the Horizon Europe project Europe-LAND. This inventory is the first large-scale collection of field-level land use data, with farm information, information on animal husbandry and organic cultivation. The database covers almost the entire European Union and depending on the region provides time series of up to 20 years. It represents a great data source for analyzing land-use changes over larger areas and land-use behaviour of farms at field- and farm level. In this document, we summarize the current status of the spatial, temporal, and thematic coverage of the harmonized data and describe the harmonization workflow. Furthermore, we provide an overview of the data sources and describe data pre-processing steps undertaken per country. Due to data privacy regulations, we highlight which data we only collected for Europe-LAND internal usage and which data are shared publicly.

KEYWORDS

IACS, GSAA, land use, crop information, livestock number, organic certification, agri-environmental measures

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Further, we would like to explicitly acknowledge the valuable support of all our consortium partners in reaching out to their national, regional and local authorities to obtain IACS data. Finally, we appreciate very much the support of and thank all the data providing entities in EU member states that shared IACS data sets with us.

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List of Abbreviations and Acronyms

GSA	Geospatial Application
GSAA	Geospatial Aid Applications
HCAT	Hierarchical Crop and Agricultural Taxonomy (HCAT)
IACS	Integrated Administration and Control System
INSPIRE	Infrastructure for Spatial Information in the European Community
LPIS	Land Parcel Identification System
WP	Work Package

Purpose of this document

This report documents the data collection and harmonization workflow of the IACS harmonization and inventory from work package 2 (WP) of the Europe-LAND project.

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The Integrated Administration and Control System

The Integrated Administration and Control System (IACS) manages and controls the applications for agricultural subsidies in the European Union (EU). The IACS consists of several subsystems that relate to the identification of agricultural parcels, the application of subsidies, the monitoring of agricultural practices, the identification of beneficiaries, the control and penalty of payments, and a system for administering animal-based interventions. The Land Parcel Identification System (LPIS) identifies and localizes the agricultural land eligible for CAP payments within agricultural reference parcels. Reference parcels are blocks of land with stable land use (arable land, permanent crops, grassland) over time. Depending on the state, the reference parcels are either blocks of land separated by physical barriers (hedges, tree rows, streets), blocks of land farmed by a single farmer, or even cadastral parcels that indicate ownership. The Geo-Spatial Application (GSA) is the subsystem that relates to the application of subsidies for crop cultivation and animal husbandry. The Geospatial Aid Application (GSAA) is part of the GSA, which provides an interface for subsidy applicants to declare the parcels they manage every year. The applicants need to declare the spatial boundaries of their parcels, the crops they plant, ecological focus areas, organic certifications, and agri-environmental schemes they follow. Each applicant gets a unique identifier that allows to aggregate agricultural parcels to a single farm. Via the process of subsidy applications, very detailed data on agricultural land use and animal husbandry are collected and stored in the IACS.

However, the information in the data varies between member states and sometimes between their federal states (Germany) or regions (Belgium and Italy). Two major differences between the member states are the crop information provided per agricultural parcel and the definition of an agricultural parcel. Differences in crop information result from the crop classifications provided to the applicants by the national or regional agricultural agencies. Each member state, federal state, or region defines its crop classifications. Differences in the definition of agricultural parcels relate to the fact that in some countries, applicants can only declare one crop per parcel, while in others, they can declare multiple crops per parcel. In the former case, the parcels resemble agricultural fields, while in the latter case, an agricultural parcel can cover multiple fields. This is sometimes referred to as a field block and corresponds to units in the Land parcel identification System (LPIS). Additionally, the data content within the member states, federal states, or regions can vary across years. This is because the crop classifications or the option of whether farmers can declare one or multiple crops per parcel has been changed.

EU member states are required to make the IACS data publicly available for purposes of the Infrastructure for Spatial Information in the European Community (INSPIRE) or for monitoring of EU policies (Regulation (EU) 2021/2116, 2021). However, not all Member States have made the data publicly available by the time this report was written. This means that some data can be downloaded from national or regional geoportals, while others must be requested from the relevant authorities. In addition, often only the crop information per parcel is published, while other information (applicant IDs, agri-environmental measures, animal number, organic certification) must be requested separately. The authorities could not always be reached or refused to provide the requested information due to national legislative restrictions on data access or lack of resources to make the data available.

Harmonization workflow

To harmonize the IACS data across all member states, we developed a uniform data structure of the spatial information, and we harmonized the information on crops, organic information, animal husbandry (work in progress), and agri-environmental measures (work in progress). To restructure the data into a uniform format, we harmonized the column names of the geodata provided following the

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structure of Table 1. In cases where agricultural parcels covered multiple fields, the geospatial data only contained the crop information of one field, the field size refers to the entire parcel size, and the major crop area refers to the area of the crop covering the largest share of the parcel. The additional fields were saved into a supplementary table linked with the geospatial data via the parcel ID.

Table 1 Structure of the harmonized spatial data. Depending on the country and its data availability, not all columns are present in the harmonized version of the data. The requirement status indicates which columns are optional.

Column name	**Column description**	**Requirement status**
field_id	Unique identifier for each field per country, state, or region	Mandatory
farm_id	Unique identifier for each farm per country, state, or region	Optional
crop_code	The original, country-specific crop code	Mandatory
crop_name	The original, country-specific crop name	Mandatory
EC_trans_n	The original crop name translated into English	Mandatory
EC_hcat_n	The machine-readable Hierarchical Crop and Agricultural Taxonomy name of the crop	Mandatory
EC_hcat_c	The 10-digit HCAT code indicating the hierarchy of the crop	Mandatory
organic	Indicates whether a field was conventionally cultivated, organically cultivated, or is in conversion to organic cultivation. Values: [0, 1, 2]	Optional
field_size	Size of field in hectares	Mandatory
crop_area	Area in hectares of crop reported in crop columns. This occurs only if multiple crops are reported per parcel and is also in the supplementary tables, if crop shares were reported.	Optional

To harmonize crop codes and names, we build on the proposed crop harmonization of the EuroCrops project (Schneider et al., 2023). The EuroCrops project developed a Hierarchical Crop and Agricultural Taxonomy (HCAT) following EAGLE principles (Arnold, 2015) to harmonize all crop classifications. The HCAT classifies each crop into a 10-digit code and a related readable name. It consists of 6 nested levels, with higher levels containing broader information of land use and lower levels containing very detailed levels of crops. The crop classifications of the member states provide different levels of detail. Sometimes, the crop codes of a member state fall into higher levels of the HCAT, while in other cases, they fall into lower levels. We extended the HCAT by including almost all countries of the EU (except Bulgaria, Luxembourg, Malta, and Poland) and by including historical IACS data, in some cases going back to 2005. To allow for interoperability with the EuroCrops database, we used the same column names related to the HCAT.

Where the information was available, we also extended the data by adding columns for applicant IDs or information on whether the parcel was managed organically. In order to harmonize the information on organic farming, we have classified the parcels as conventional, organic, and in conversion using the codes in Table 2. This information was given per parcel in some countries, but in others, it was provided per farm. For the latter, we added the information to the parcels. In most cases, the data had a unique national parcel ID. However, in some cases, this ID was missing, therefore, we created a simple running ID.

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Table 2 Classification of the information on conventional and organic farming.

Code	Description
0	Conventional
1	Organic
2	In Conversion

Future versions of the harmonized database could include information on agri-environmental measures and animal numbers per farm. All geospatial data were transformed into a projected coordinate system (ETRS89-extended / LAEA Europe – EPSG:3035), and the files were saved as geoparquets for storage optimization and faster processing. The processing scripts of the workflow and the crop classification tables are publicly available in the GitHub repository: https://github.com/clejae/europe_land_iacs_prep.

Current and future status of the harmonized Europe-LAND IACS Inventory

Due to differences in the accessibility of the data, the spatial, temporal, and content coverage of the harmonized data varies strongly between member states, federal states, and regions. Furthermore, the option to share the data publicly also varies. This section provides a general overview of the inventory's spatial, temporal, and content coverage. Country-specific information is described in the country sections below, and a summarizing table is also provided in Appendix 1 that can be found in the ZENODO site (https://doi.org/10.5281/zenodo.14230621).

Updates of the IACS inventory are expected as new data becomes available. In some cases, crop codes will change over the years, and if data becomes available for new countries, these may include different crop codes and names which are currently not in the harmonization workflow. This is not expected to constitute a problem for the classification because the harmonization workflow automatically translates crop names from original language into English, which is then matched with existing crop names. Unmatched crop names will be assigned manually to an appropriate hierarchical level of the HCAT classification system. The manual work is limited, because the harmonization workflow is scripted in Python. This makes slight modifications and re-iterations of the harmonization easy to conduct.

Spatial, Temporal, and Content Coverage of the Inventory

The Europe-LAND IACS inventory includes 23 EU countries (Figure 1**Fehler! Verweisquelle konnte nicht gefunden werden.** left panel). Only Bulgaria, Luxembourg, Malta, and Poland are missing. For Bulgaria, Luxembourg, and Malta, only LPIS data were available, while for Poland, no data could be found or requested. In some member states, the data cover the entire country; in others, the subsidy applications are managed at lower administrative levels, and thus, the data are only available for federal states (Germany), regions (Belgium and Italy) or provinces (Spain). For Belgium and Spain, we collected the data for all regions and provinces. However, for Germany, we collected data for 5 federal states, and for eight federal states our data request is still pending or was positive, but the data still need to be sent to us. Only one federal state will not share the data due to data privacy issues, while two others do not collect the data. Lastly, for Italy, we were able to obtain data for three regions.

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Temporally, the data coverage varies between 1 year (2023 for Romania) and 20 years (2005-2024 for Brandenburg, Germany). For 10 countries, federal states, or regions, we were able to obtain time series of up to 5 years, for another 10 up to 10 years, for 3 up to 15 years, and for 5 up to 20 years (Figure 1, right panel).

Among the countries and regions for which we were able to obtain the data, we lack applicant IDs for five EU member states (France, Belgium, Croatia, Lithuania, Finland) and one federal state in Germany (North Rhine-Westfalia) yet the team will continue to request access. The original national crop classifications vary between 15 classes for Croatia and more than 4,000 for Greece (Figure 2). The crop classification usually comes with a crop code and an assigned crop name. However, the meaning of crop codes can change between years; crop codes can be added or removed, and the crop names can be written differently. Therefore, we report the number of unique combinations of crop codes and crop names.

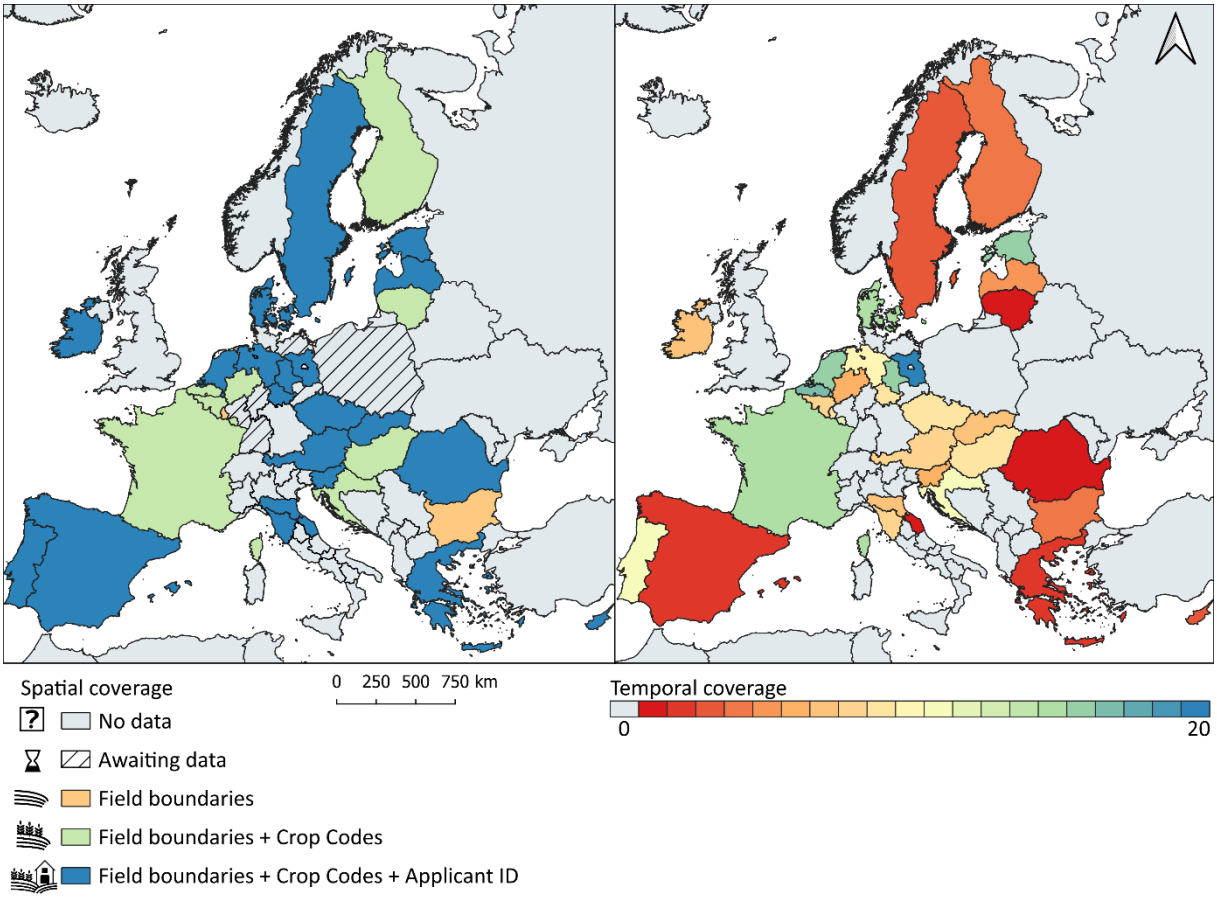

Figure 1 Overview of the spatial, temporal, and content coverage regarding crop codes and applicant IDs of the Europe-LAND IACS inventory.

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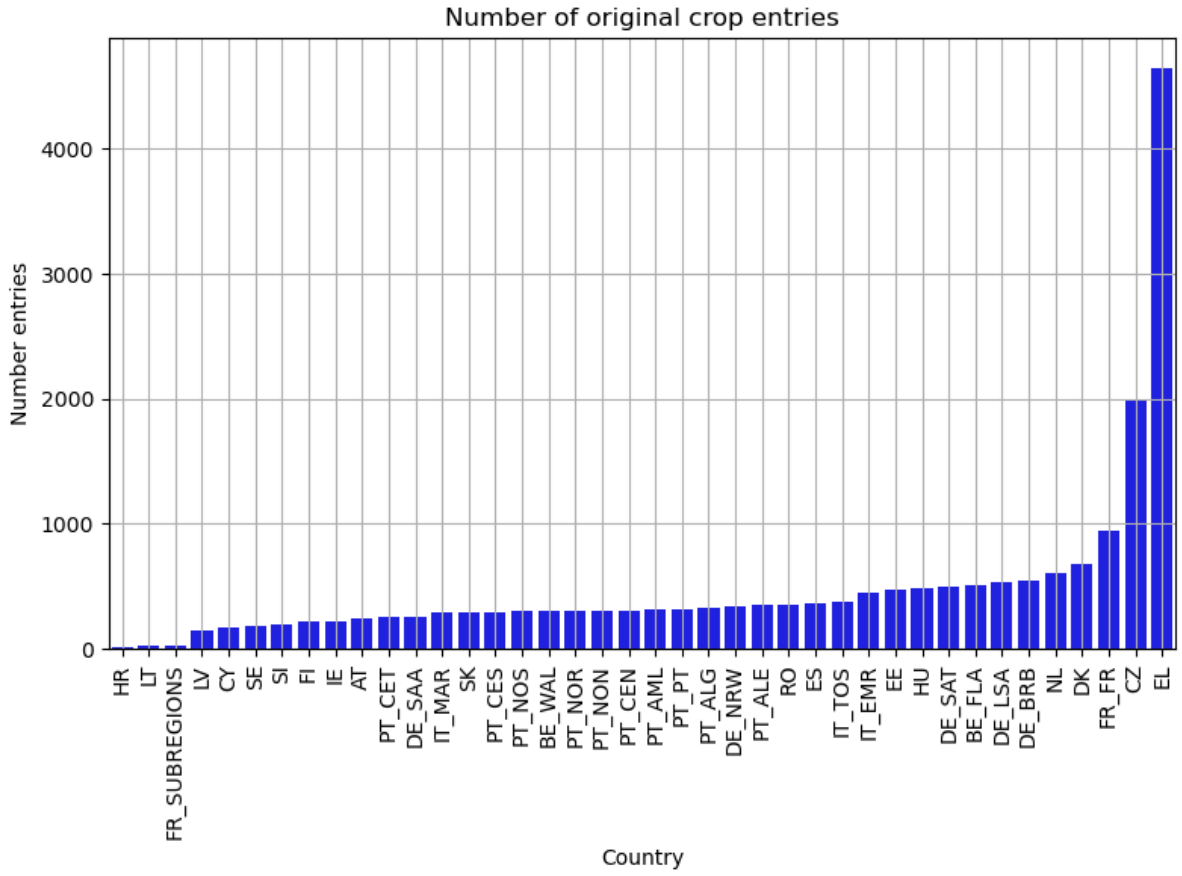

Figure 2 The number of different crop entries between the member states, federal states, and regions within our inventory.

Public database

We have made available all the harmonized data we are allowed to share in a public database, that is part of the Europe-LAND HE Project ZENODO Community (https://zenodo.org/communities/europeland/). The database will be updated at least annually as we acquire new data to add more detail and to cover more countries and years. However, the internal Europe-LAND WP2 inventory covers more countries, federal states, and regions. For 19 countries we can share the data publicly, however only 3 come with the applicant IDs and 2 with applicant IDs and organic information (Figure 3).

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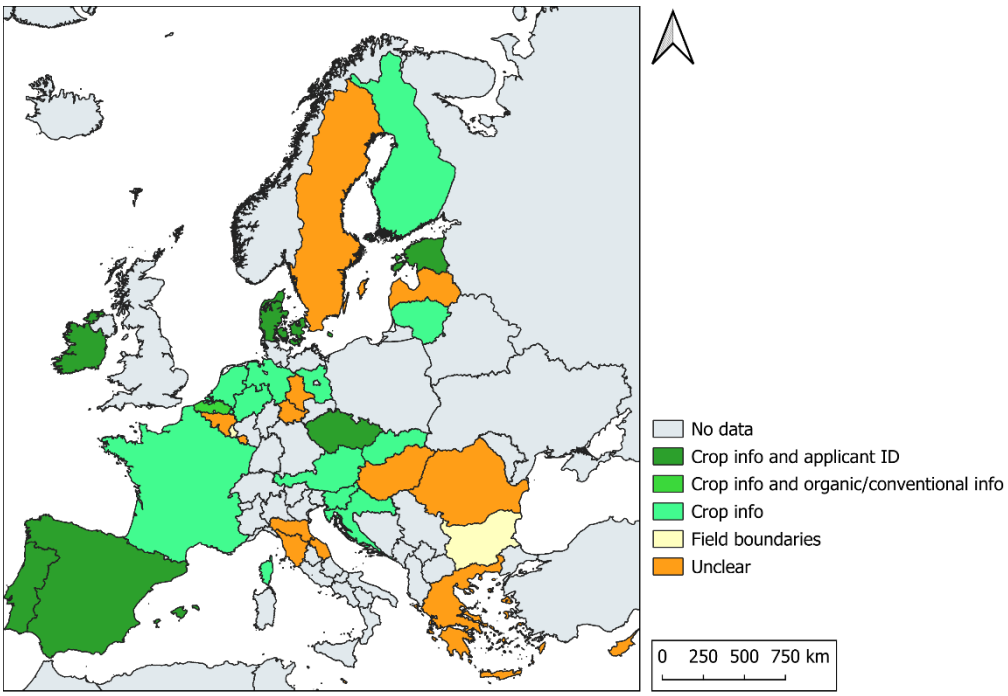

Figure 3 The map indicates which information can be shared publicly per country.

In addition to the public inventory, we provide country fact sheets (see section Country fact sheets) with information on the data content, the data sources, the metadata, and the licensing of the available data. Each sheet also includes statistics on the area covered by the data, the number of applicants, and the number of fields in the dataset. We assumed that each geographic feature in the GSA data represents a field with a single crop per year; only in cases where field blocks were used did we count the number of reported crops; for example, if three different crops were reported per field block, we assumed three fields within these blocks. Additionally, we compared the total area of the data with the reported total utilized agricultural area and the number of farms reported in official statistics (Eurostat, 2024a; Eurostat, 2024b; Destatis 2024) as an indicator of the coverage of our inventory. Differences between the data statistics and the official statistics are not unusual. Potential reasons are, for example, that not all farmers apply for subsidies, not all areas are eligible for subsidies (often there is a minimum threshold), the official reported statistics could include different land use categories not present in the data, and the GSA data sometimes include landscape elements that are not present in the official statistics.

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Country fact sheets

In this section, we present country-specific information on the spatial, temporal, and content coverage, the data sources, and information on crop harmonization. We also document pre-processing steps, unique features of the data, and the possibility of publicly sharing the data.

Austria

Table 3 General information on the IACS data in the Europe-LAND inventory of Austria.

Country code	AT
Spatial coverage	Entire country
Temporal coverage	2015-2024
Number of different crop entries in national crop classification over the entire time series	243
Number of different crops in harmonized inventory	98
Crops per parcel [single/multiple]	Single
Applicant ID	Yes
Animal numbers	Yes
Organic information	Yes
Agri-environmental measures	Yes
Sharing option	Crop information can be shared.
Data sources	Parcel boundaries, crop information, and from 2022 onwards organic information are available at https://www.opendataportal.at/. Applicant IDs, animal number, and agri-environmental measures were acquired from the Austrian Federal Ministry of Agriculture, Forestry, Regions and Water Management.
Metadata	https://geometadatensuche.inspire.gv.at/metadatensuche/inspire/api/records/f77c993f-f70f-4c88-9b6c-582429b48405/formatters/xml
License	Creative Commons license CC-BY-AT 4.0

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Table 4 The number of fields, the total area, and the number of applicants covered by the data compared to the total utilized agricultural area and number of farms reported in Eurostat for Austria. The Eurostat statistics for Austria exclude areas not counted as arable land or permanent grassland, such as landscape elements, uncultivated peatlands, farm buildings, etc. Sources: IACS data, Eurostat (2024a), Eurostat (2024b)

Year	Number of fields	Total area of data [ha]	Agricultural area in official statistics [ha]	Number applicants	Number of farms in official statistics
2015	2,499,260	3,227,516	2,720,400	114,284	
2016	2,491,998	3,223,715	2,688,830	113,017	130,050
2017	2,503,061	3,217,856	2,655,560	111,634	
2018	2,521,737	3,209,559	2,653,840	110,471	
2019	2,527,641	3,199,432	2,652,220	109,407	
2020	2,614,509	3,197,568	2,646,960	112,522	110,780
2021	2,610,896	3,187,737	2,602,490	111,472	
2022	2,604,179	3,179,038	2,599,510	110,336	
2023	2,947,738	3,154,827			
2024	2,948,871	3,153,015			

Special features of the data

Some of the largest fields are designated as pastures. Their size exceeds 3000 ha in some cases. However, these fields are located in the mountains and are very rocky (Figure 4).

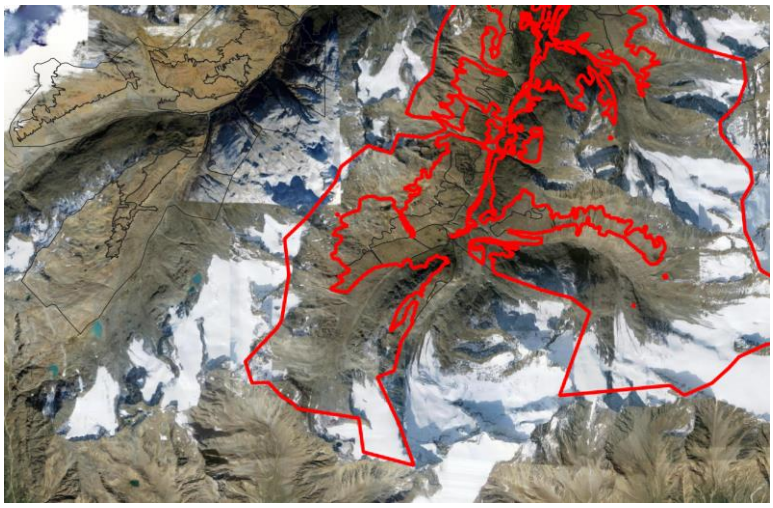

Figure 4 Example screenshot of very large parcels in the Austrian data. Basemap: Google, ©2024.

The organic farming information is provided at the farm level. The farms are separated into main farms and partial farms. Partial farms are subsidiaries of the main farm. The organic farming information is provided for main and partial farms.

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Belgium

The IACS is operated separately in the two Belgian regions of Flanders and Wallonia; therefore, the data are also stored separately.

Flanders

Table 5 General information on the IACS data in the Europe-LAND inventory of Flanders, Belgium.

Country code + region code	BE_FLA
Spatial coverage	Region
Temporal coverage	2008-2024
Number of different crop entries in national crop classification over the entire time series	510
Number of different crops in harmonized inventory	130
Crops per parcel [single/multiple]	Single
Applicant ID	No
Animal numbers	No
Organic information	Yes
Agri-environmental measures	Yes (2022 – 2023)
Sharing option	Crop information, organic management information, and agri-environmental measures can be shared.
Data sources	Agentschap Landbouw en Zeevisserij: https://landbouwcijfers.vlaanderen.be/open-geodata-landbouwgebruikspercelen Contains government information obtained under the Model License for Free Reuse Flanders v1.0
Metadata	https://metadata.vlaanderen.be/srv/dut/catalog.search#/metadata/ae94435d-1ffb-451b-9c8b-d7e8c2d42dc2 (Example for 2022)
License	Re-use is regulated by the model licence for free re-use (cf. Title II, chapter 4 of the Management Decree). Any commercial or non-commercial indefinite re-use is allowed, without any charge. The only condition of use is that the source must be mentioned. (translated from Dutch) https://www.vlaanderen.be/digitaal-vlaanderen/onze-diensten-en-platformen/open-data/voorwaarden-voor-het-hergebruik-van-overheidsinformatie/modellicentie-gratis-hergebruik

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Special feature of the data

For 2008 to 2018, the field boundaries from 2022 were used; thus, field boundaries and numbers can deviate from the actual condition.

Wallonia

Table 6 General information on the IACS data in the Europe-LAND inventory of Wallonia, Belgium.

Country code + region code	BE_WAL
Spatial coverage	Region
Temporal coverage	2015-2022
Number of different crop entries in national crop classification over the entire time series	302
Number of different crops in harmonized inventory	101
Crops per parcel [single/multiple]	Single
Applicant ID	No
Animal numbers	No
Organic information	No
Agri-environmental measures	No
Sharing option	According to the "Conditions Utilisation" document coming along with the data, redistribution of the data is not allowed. However, the data can be downloaded publicly and with the workflow and crop classifications in our GitHub repository, the data can be harmonized by user
Data sources	https://geoportail.wallonie.be/catalogue/49294570-2a8d-49ca-995c-1b0890672bc8.html
Metadata	
License	No information

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Table 7 The number of fields and the total area covered by the data compared to the total utilized agricultural area reported in Eurostat for Wallonia and Flanders, Belgium. Sources: IACS data, Eurostat (2024a), Eurostat (2024b)

Year	Number of fields – Flanders	Number of fields – Wallonia	Total area of data [ha] - Flanders	Total area of data [ha] - Wallona	Total area of data [ha] - Belgium	Agricultural area in official statistics [ha]
2008	502,196		708,408			
2009	500,848		699,046			
2010	505,776		700,305			
2011	510,914		69,9037			
2012	516,154		697,876			
2013	521,273		694,788			
2014	524,002		694,397			
2015	527,931	338,213	694,007	815,060	1,509,067	1,330,880
2016	516,561	338,733	693,467	814,686	1,508,153	1,352,950
2017	518,156	341,654	691,905	815,694	1,507,599	1,329,150
2018	515,747	344,053	689,327	815,524	1,504,851	1,356,080
2019	521,395	340,899	691,591	811,611	1,503,202	1,358,700
2020	525,860	343,118	690,238	809,580	1,499,818	1,367,080
2021	591,904	339,536	678,633	805,288	1,483,921	1,368,310
2022	585,083	341,968	674,835	801,105	1,475,940	1,361,910
2023	588,193		672,046			
2024	591,978		675,183			

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Croatia

Table 8 General information on the IACS data in the Europe-LAND inventory of Croatia.

Country code + region code	HR
Spatial coverage	Entire country
Temporal coverage	2011-2023
Number of different crop entries in national crop classification over the entire time series	19
Number of different crops in harmonized inventory	11
Crops per parcel [single/multiple]	Single
Applicant ID	No
Animal numbers	No
Organic information	No
Agri-environmental measures	No
Sharing option	Crop information can be shared.
Data sources	https://www.apprrr.hr/prostorni-podaci-servisi/
Metadata	https://narodne-novine.nn.hr/clanci/sluzbeni/2020_02_22_547.html
License	In accordance with the National Spatial Data Infrastructure Strategy 2020, the Strategic Plan of the National Spatial Data Infrastructure for the period 2017-2020 and the National Spatial Data Infrastructure Act (OG 56/13, 52/18), the Agency for Payments in Agriculture, Fisheries and Rural Development (hereinafter: the Paying Agency) is registered as a subject of the NSDI, with the obligation to provide spatial data within the competence of the institution to the interested public for search, review and download. In accordance with the stated obligation, the Paying Agency enables all interested users to view and retrieve spatial data from the ARKOD system.

Table 9 The number of fields, the total area, and the number of applicants covered by the data compared to the total utilized agricultural area and number of farms reported in Eurostat for Croatia. Sources: IACS data, Eurostat (2024a), Eurostat (2024b)

Year	Number of fields	Total area of data [ha]	Agricultural area in official statis-tics [ha]	Number applicants	Number of farms in official statistics
2011	1,293,144	1,009,026			
2012	1,303,512	1,020,858	1,330,970		

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2013	1,313,071	1,032,765	1,300,810		157,440
2014	1,319,618	1,042,773	1,240,870		
2015	1,283,594	1,130,158	1,537,630		
2016	1,297,604	1,152,516	1,564,050		134,440
2017	1,333,770	1,158,834	1,496,660		
2018	1,356,429	1,168,278	1,485,650		
2019	1,379,446	1,178,223	1,504,450		
2020	1,377,155	1,186,323	1,506,210		143,920
2021	1,380,679	1,204,126	1,476,350		
2022	1,373,892	1,202,286	1,447,920		
2023	1,367,991	1,203,737	1,486,050		

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Cyprus

Table 10 General information on the IACS data in the Europe-LAND inventory of Cyprus.

Country code + region code	CY
Spatial coverage	Entire country
Temporal coverage	2023-2023
Number of different crop entries in national crop classification over the entire time series	169
Number of different crops in harmonized inventory	89
Crops per parcel [single/multiple]	Single
Applicant ID	Yes
Animal numbers	No
Organic information	No
Agri-environmental measures	No
Sharing option	A redistribution of the data is not allowed
Data sources	The data were acquired from the Cyprus Agricultural Payments Organization (CAPO) https://www.capo.gov.cy/capo/capo.nsf/capo01_en/capo01_en?OpenDocument
Metadata	n/a
License	No information

Table 11 The number of fields, the total area, and the number of applicants covered by the data compared to the total utilized agricultural area and number of farms reported in Eurostat for Cyprus. Sources: IACS data, Eurostat (2024a), Eurostat (2024b)

Year	Number of fields	Total area of data [ha]	Agricultural area in official statistics [ha]	Number applicants	Number of farms in official statistics
2021	339,306	137,119	121,780	32,990	34,050 (for 2020)
2022	337,641	136,194	122,790	32,481	
2023	331,338	133,569	121,600	31,601	

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Czechia

Table 12 General information on the IACS data in the Europe-LAND inventory of Czechia.

Country code + region code	CZ
Spatial coverage	Entire country
Temporal coverage	2015-2023
Number of different crop entries in national crop classification over the entire time series	1,979
Number of different crops in harmonized inventory	159
Crops per parcel [single/multiple]	Single
Applicant ID	Yes
Animal numbers	No
Organic information	No
Agri-environmental measures	No
Sharing option	Crop information can be shared. Applicant IDs can also be shared for the years 2023-2024 (see note in section "special features of the data).
Data sources	https://mze.gov.cz/public/portal/mze/farmar/LPIS/export-lpis-rocni-shp The data were acquired from the Czech State Agricultural Intervention Fund (SZIF) to cover a longer time series.
Metadata	n/a
License Terms	https://mze.gov.cz/public/portal/mze/pristupnost

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Table 13 The number of fields, the total area, and the number of applicants covered by the data compared to the total utilized agricultural area and number of farms reported in Eurostat for Czechia. Sources: IACS data, Eurostat (2024a), Eurostat (2024b)

Year	Number of fields	Total area of data [ha]	Agricultural area in official statistics [ha]	Number applicants	Number of farms in official statistics
2015	633,434	4,546,483	3,493,720	34,856	
2016	636,743	4,467,430	3,488,790	35,477	26,530
2017	638,512	4,519,702	3,521,330	35,539	
2018	647,408	4,514,277	3,523,220	35,624	
2019	658,569	4,539,121	3,523,660	35,617	
2020	675,369	4,906,137	3,523,870	35,538	
2021	695,268	5,224,456	3,529,800	35,534	
2022	696,444	5,136,640	3,530,420	35,468	
2023	746,079	5,791,948	3,534,410	35,206	28,910

Special features of the data

The crop codes come in a separate table from the geospatial data. We needed to combine both. However, there are less than half of the parcels in the Excel file than in the vector file across all years (e.g., for 2023, there are 392,925 in the table, but 746,079 in the geospatial data, and only 353,603 could be matched).

The land user ID (ID_UZ) is stored in the LPIS data (Díly půdních bloků) online. By matching the LPIS parcels with the GSA parcels (Plodiny), it is possible to identify the applicant per parcel for the years 2023-2024.

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Denmark

Table 14 General information on the IACS data in the Europe-LAND inventory of Denmark.

Country code + region code	DK
Spatial coverage	Entire country
Temporal coverage	2010-2024 (2008 and 2009 are also available but do not have crop information)
Number of different crop entries in national crop classification over the entire time series	684
Number of different crops in harmonized inventory	136
Crops per parcel [single/multiple]	Single
Applicant ID	Yes
Animal numbers	Yes
Organic information	Yes
Agri-environmental measures	Yes
Sharing option	All information can be shared.
Data sources	https://landbrugsgeodata.fvm.dk/
Metadata	https://geodata-info.dk/srv/dan/catalog.search#/metadata/cb286ce0-202b-40ab-b34d-c247652292c2
License Terms	CC0 1.0 Universiel Public Domain

Table 15 The number of fields, the total area, and the number of applicants covered by the data compared to the total utilized agricultural area and number of farms reported in Eurostat for Denmark. Sources: IACS data, Eurostat (2024a), Eurostat (2024b)

Year	Number of fields	Total area of data [ha]	Agricultural area in official statistics [ha]	Number appli-cants	Number of farms in official statistics
2010	642,992	2,722,374		49,256	41,360
2011	623,830	2,696,180		45,319	
2012	618,149	2,690,709	2,663,600	46,265	
2013	615,237	2,687,331	2,627,800	45,070	38,280
2014	604,312	2,670,783	2,652,000	43,250	
2015	599,008	2,675,575	2,632,950	41,558	
2016	599,981	2,670,452	2,625,100	40,351	35,050
2017	592,807	2,666,831	2,631,300	39,405	
2018	594,433	2,665,644	2,632,500	38,623	
2019	587,473	2,660,165	2,626,000	37,902	

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2020	583,937	2,658,350	2,620,000	37,185	37,090
2021	579,879	2,662,623	2,618,400	36,570	
2022	576,835	2,659,836	2,624,250	35,345	
2023	606,618	2,658,590.	2,620,950	33,822	
2024	614,511	2,655,971		32,541	

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Estonia

Table 16 General information on the IACS data in the Europe-LAND inventory of Estonia.

Country code + region code	EE
Spatial coverage	Entire country
Temporal coverage	2008-2023
Number of different crop entries in national crop classification over the entire time series	469
Number of different crops in harmonized inventory	160
Crops per parcel [single/multiple]	Single
Applicant ID	Yes
Animal numbers	No
Organic information	No
Agri-environmental measures	Yes
Sharing option	All information can be shared.
Data sources	https://data.europa.eu/data/datasets/pria-pollud?locale=en
Metadata	https://data.europa.eu/api/hub/repo/datasets/pria-pollud.n3?useNormalizedId=true&locale=en
License Terms	Andmete kasutamisel nõustute Creative Commons 3.0 litsentsiga: https://creativecommons.org/licenses/by-sa/3.0/ee/legalcode

Table 17 The number of fields, the total area, and the number of applicants covered by the data compared to the total utilized agricultural area and number of farms reported in Eurostat for Estonia. Sources: IACS data, Eurostat (2024a), Eurostat (2024b)

Year	Number of fields	Total area of data [ha]	Agricultural area in official statistics [ha]	Number applicants	Number of farms in official statistics
2008	650	4,209		11	
2009	5,014	35,505		87	
2010	25,560	199,768		398	19,610
2011	32,844	247,849		562	
2012	55,200	397,686	955,900	989	
2013	86,863	583,163	965,900	1,596	19,190
2014	122,561	783,083	974,800	2,105	
2015	157,493	931,391	993,600	2,931	
2016	165,345	956,910	1,003,510	3,064	16,700
2017	170,430	963,722	981,830	3,280	

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2018	172,387	966,897	984,670	3,404	
2019	174,284	970,149	988,410	3,518	
2020	175,963	972,681	985,460	3,693	11,370
2021	176,117	973,982	986,670	3,835	
2022	175,976	973,637	986,210	3,936	
2023	169,921	943,016	987,790	3,921	

Special features of the data

The data can be downloaded via a Web Feature Service (WFS). We used a script to do that (see GitHub repository).

It seems that subsidies were only requested for a small proportion of the parcels in the early years. The data only contain a few thousand parcels. However, the number of fields has grown to a few hundred thousand over the years.

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Finland

Table 18 General information on the IACS data in the Europe-LAND inventory of Finland.

Country code + region code	FI
Spatial coverage	Entire country
Temporal coverage	2020-2023
Number of different crop entries in national crop classification over the entire time series	213
Number of different crops in harmonized inventory	95
Crops per parcel [single/multiple]	Single
Applicant ID	No
Animal numbers	No
Organic information	No
Agri-environmental measures	No
Sharing option	Crop information can be shared.
Data sources	https://www.ruokavirasto.fi/en/about-us/published-datasets/spatial-data-sets/ https://www.ruokavirasto.fi/en/about-us/open-information/inspire/
Metadata	https://www.paikkatietoikkuna.fi
License Terms	Creative Commons BY 4.0

Table 19 The number of fields, the total area, and the number of applicants covered by the data compared to the total utilized agricultural area and number of farms reported in Eurostat for Finland. Sources: IACS data, Eurostat (2024a), Eurostat (2024b)

Year	Number of fields	Total area of data [ha]	Agricultural area in official statistics [ha]	Number applicants	Number of farms in official statistics
2020	1,088,750	2,331,908	2,270,000		45,630
2021	1,086,365	2,330,647	2,268,000		
2022	1,086,995	2,329,533	2,266,400		
2023	1,006,584	2,312,759	2,266,400		

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France

Table 20 General information on the IACS data in the Europe-LAND inventory of France.

Country code + region code	For entire country: FR_FR Régions are differentiated with a 3-digit code, e.g. "FR_XXX"
Spatial coverage	Régions (for years 2007-2014), Entire country (for years 2015-2023)
Temporal coverage	2007-2023
Number of different crop entries in national crop classification over the entire time series	29 (2007-2014) 944 (2015-2023)
Number of different crops in harmonized inventory	23 (2007-2014) 175 (2015-2023)
Crops per parcel [single/multiple]	Multiple (for years 2007-2014), Single (for years 2015-2023)
Applicant ID	No
Animal numbers	No
Organic information	No
Agri-environmental measures	No
Sharing option	Crop information can be shared.
Data sources	https://geoservices.ign.fr/rpg
Metadata	https://geoservices.ign.fr/rpg
License Terms	https://www.etalab.gouv.fr/wp-content/uploads/2014/05/Licence_Ouverte.pdf

Table 21 The number of fields, the total area, and the number of applicants covered by the data compared to the total utilized agricultural area and number of farms reported in Eurostat for France. Sources: IACS data, Eurostat (2024a), Eurostat (2024b)

Year	Number of fields	Total area of data [ha]	Agricultural area in official statistics [ha]	Number applicants	Number of farms in official statistics
2007	6,089,860	27,426,783			
2008	6,007,281	27,409,314			
2009	6,013,837	27,488,526			
2010	8,521,148	32,605,124			516,100
2011	8,473,404	32,591,527			
2012	8,353,682	32,304,350	29,000,830		
2013	8,561,535	33,214,400	29,146,020		472,210
2014	6,089,860	27,426,783	29,070,820		
2015	9,434,672	27,856,573	29,058,270		
2016	9,334,043	27,876,776	29,101,110		455,390

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2017	9,393,747	27,890,010	29,101,330		
2018	9,517,878	27,917,447	29,020,160		
2019	9,604,463	27,960,148	29,024,180		
2020	9,778,397	27,998,170	28,689,860		393,030
2021	9,855,653	28,021,954	28,697,570		
2022	9,896,777	28,009,308	28,597,500		
2023	9,797,405	27,770,030	28,577,100		

Special features of the data

The data for the years 2007-2014 are provided as separate files for all regions of France; from 2015 onwards, the data has been aggregated into a single file for the entire country.

The data of the years 2007-2014 come in field blocks (îlot), i.e., often multiple fields are aggregated to a block, and only the major crop is provided in the vector data, but the other crops are listed in the accompanying table file with the area of cultivated land. However, for 2007-2009, the accompanying table was unavailable, and only the area of the major crop was provided.

The data for the years 2007-2014 only distinguishes 25 different crops, and in some cases, they do not fit very well with the EuroCrops classification.

We excluded all overseas regions of France from our inventory.

Some of the largest parcels are designated as pastures. Their size exceeds 1000 ha in some cases. However, these parcels are located in the mountains and are very rocky (Figure 5).

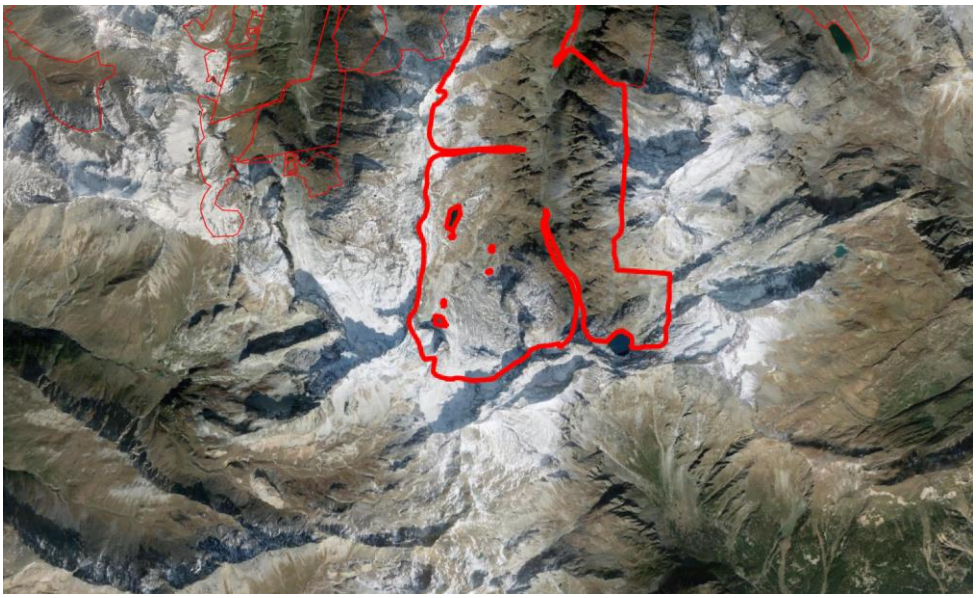

Figure 5 Example screenshot of very large parcels in the French data. Basemap: Google, ©2024

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Germany

The IACS is operated separately in the German federal states; therefore, the data are also stored separately.

Brandenburg

Table 22 General information on the IACS data in the Europe-LAND inventory of Brandenburg, Germany.

Country code + region code	DE_BRB
Spatial coverage	Federal state
Temporal coverage	2005-2024
Number of different crop entries in national crop classification over the entire time series	544
Number of different crops in harmonized inventory	135
Crops per parcel [single/multiple]	Single
Applicant ID	Yes
Animal numbers	Yes
Organic information	Yes
Agri-environmental measures	Yes
Sharing option	Crop information can be shared for 2010-2024.
Data sources	https://geobroker.geobasis-bb.de/gbss.php?MODE=GetProductInformation&PRODUCTID=996f8fd1-c662-4975-b680-3b611fcb5d1f (data 2010-2024 only with crop information). „Ministerium für Landwirtschaft, Umwelt und Klimaschutz des Landes Brandenburg (MLUK)“ (data for 2005-2024 with applicant IDs, animal numbers and information on organic farming).
Metadata	
License Terms	Data licence Germany Attribution 2.0

Table 23 The number of fields, the total area, and the number of applicants covered by the data compared to the total utilized agricultural area and number of farms reported in DESTATIS and Eurostat for Brandenburg, Germany. Sources: IACS data, Eurostat (2024a), Destatis (2024)

Year	Number of fields	Total area of data [ha]	Agricultural area in official statistics [ha]	Number applicants	Number of farms in official statistics
2005	157,713	1,324,467		6,293	
2006	156,638	1,318,513		6,082	
2007	157,366	1,323,507		6,032	
2008	156,160	1,314,856		5,911	
2009	155,557	1,312,316		5,860	

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2010	156,755	1,312,852		5,716	5,570
2011	160,258	1,308,442		5,651	
2012	159,597	1,304,809		5,604	
2013	157,784	1,301,999		5,556	5,400
2014	156,944	1,296,809		5,546	
2015	159,904	1,304,645		5,648	
2016	159,043	1,307,460	1,446,886	5,642	5,410
2017	161,454	1,308,965	1,445,898	5,611	
2018	166,476	1,328,411	1,444,975	6,034	
2019	212,693	1,333,254	1,442,613	6,048	
2020	272,777	1,335,712	1,437,113	6,080	5,410
2021	277,801	1,334,215	1,432,847	6,102	
2022	286,850	1,331,061	1,423,323	6,071	
2023	286,403	1,330,566			
2024	290,499	1,331,202			

Lower Saxony

Table 24 General information on the IACS data in the Europe-LAND inventory of Lower-Saxony, Germany.

Country code + region code	DE_LSA
Spatial coverage	Federal state
Temporal coverage	2015-2024
Number of different crop entries in national crop classification over the entire time series	528
Number of different crops in harmonized inventory	170
Crops per parcel [single/multiple]	Single
Applicant ID	No
Animal numbers	No
Organic information	No
Agri-environmental measures	No
Sharing option	Crop information can be shared for the years 2023-2024.
Data sources	https://sla.niedersachsen.de/landentwicklung/LEA/ “Niedersächsische Ministerium für Ernährung, Landwirtschaft und Verbraucherschutz (ML)“
Metadata	
License Terms	https://www.govdata.de/dl-de/by-2-0

Table 25 The number of fields, and the total area covered by the data compared to the total utilized agricultural area and number of farms reported in DESTATIS and Eurostat for Brandenburg, Germany. The data for the years

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2015 to 2019 are not yet harmonized. The next version of the inventory will include them. Sources: IACS data, Eurostat (2024a), Destatis (2024)

Year	Number of fields	Total area of data [ha]	Agricultural area in official statistics [ha]	Number applicants	Number of farms in official statistics
2023	889,326	2,572,341	2,759,321 (2022)		
2024	900,541	2,562,994			

Special features of the data

The website provides parcels (Schläge) and partial parcels (Teilschläge). We decided to use the parcels for our inventory.

The original data come with a FLIK and SCHLAGNR. Together, they should make a unique ID. However, there are still more parcels than unique entries after combining both. Therefore, we added another running number at the end.

North Rhine-Westphalia

Table 26 General information on the IACS data in the Europe-LAND inventory of North Rhine-Westphalia, Germany.

Country code + region code	DE_NRW
Spatial coverage	Federal state
Temporal coverage	2019-2024
Number of different crop entries in national crop classification over the entire time series	344
Number of different crops in harmonized inventory	197
Crops per parcel [single/multiple]	Single
Applicant ID	No
Animal numbers	No
Organic information	No
Agri-environmental measures	No
Sharing option	Crop information can be shared.
Data sources	https://www.opengeodata.nrw.de/produkte/umwelt_klima/bodennutzung/landwirtschaft/ “Landwirtschaftskammer Nordrhein-Westfalen”
Metadata	
License Terms	https://www.govdata.de/dl-de/by-2-0

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Table 27 The number of fields, and the total area covered by the data compared to the total utilized agricultural area and number of farms reported in DESTATIS and Eurostat for North Rhine-Westphalia, Germany. Sources: IACS data, Eurostat (2024a), Destatis (2024)

Year	Number of fields	Total area of data [ha]	Agricultural area in official statistics [ha]	Number applicants	Number of farms in official statistics
2019	268,391	552,265	1,607,848		
2020	734,160	1,492,366	1,602,960		
2021	734,782	1,489,977	1,598,225		
2022	738,587	1,483,411	1,595,091		
2023	748,095	1,472,719			
2024	761,139	1,466,066			

Saarland

Table 28 General information on the IACS data in the Europe-LAND inventory of Saarland, Germany.

Country code + region code	DE_SAA
Spatial coverage	Federal state
Temporal coverage	2012-2023
Number of different crop entries in national crop classification over the entire time series	261
Number of different crops in harmonized inventory	111
Crops per parcel [single/multiple]	Single
Applicant ID	No
Animal numbers	No
Organic information	Yes (2023 only)
Agri-environmental measures	No
Sharing option	A redistribution of the data is not allowed.
Data sources	„Ministerium für Umwelt, Klima, Mobilität, Agrar und Verbraucherschutz“
Metadata	
License Terms	

Table 29 The number of fields, and the total area covered by the data compared to the total utilized agricultural area and number of farms reported in DESTATIS and Eurostat for Saarland, Germany. Sources: IACS data, Eurostat (2024a), Destatis (2024)

Year	Number of fields	Total area of data [ha]	Agricultural area in official statistics [ha]	Number applicants	Number of farms in official statistics
2012	57,440	78,459			

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2013	56,702	78,384			
2014	56,458	78,451			
2015	56,256	78,512			
2016	57,378	79,185	110,416		
2017	56,065	79,010	110,374		
2018	64,905	80,716	110,320		
2019	63,686	80,723	110,252		
2020	63,135	80,681	110,085		
2021	62,655	80,962	107,073		
2022	63,458	80,948	103,226		
2023	63,002	80,681			

Saxony-Anhalt

Table 30 General information on the IACS data in the Europe-LAND inventory of Saxony-Anhalt, Germany.

Country code + region code	DE_SAT
Spatial coverage	Federal state
Temporal coverage	2008-2023
Number of different crop entries in national crop classification over the entire time series	501
Number of different crops in harmonized inventory	143
Crops per parcel [single/multiple]	Single
Applicant ID	Yes
Animal numbers	Yes
Organic information	Yes
Agri-environmental measures	Yes
Sharing option	A redistribution of the data is not allowed.
Data sources	„Ministerium für Wirtschaft, Tourismus, Landwirtschaft und Forsten (MWL)“
Metadata	
License Terms	

Table 31 The number of fields, and the total area covered by the data compared to the total utilized agricultural area and number of farms reported in DESTATIS and Eurostat for Saxony-Anhalt, Germany. Sources: IACS data, Eurostat (2024a), Destatis (2024)

Year	Number of fields	Total area of data [ha]	Agricultural area in official statistics [ha]	Number applicants	Number of farms in official statistics
2008	102,212	935,442		2,788	

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2009	128,784	1,162,383		4,252	
2010	133,314	1,171,922		5,048	4,220
2011	136,146	1,169,395		5,081	
2012	132,580	1,163,187		4,967	
2013	133,416	1,170,409		5,082	4,230
2014	132,753	1,163,207		4,774	
2015	137,071	1,159,040		4,724	
2016	133,423	1,154,306	1,237,688	4,407	4,330
2017	133,534	1,151,056	1,236,799	4,366	
2018	157,748	836,379	1,235,020	5,033	
2019	161,147	1,196,360	1,233,446	5,023	
2020	164,298	1,198,884	1,231,827	5,010	4,340
2021	165,677	1,197,434	1,230,265	5,006	
2022	138,990	1,186,906	1,228,671	4,928	
2023	149,021	1,185,376		4,812	

Special features of the data

Some parcels seem duplicated and on top of each other, which is not visible when visualizing the layers. For analysis purposes, they should be identified and deleted.

Thuringia

Table 32 General information on the IACS data in the Europe-LAND inventory of Thuringia, Germany.

Country code + region code	DE_THU
Spatial coverage	Federal state
Temporal coverage	2007-2019
Number of different crop entries in national crop classification over the entire time series	The data for Thuringia have not yet been harmonized. The next version of the inventory will include them.
Number of different crops in harmonized inventory	The data for Thuringia have not yet been harmonized. The next version of the inventory will include them.
Crops per parcel [single/multiple]	Single
Applicant ID	Yes
Animal numbers	Yes
Organic information	Yes
Agri-environmental measures	Yes
Sharing option	A redistribution of the data is not allowed.
Data sources	„Thüringer Landesamt für Landwirtschaft und Ländlichen Raum (TLLLR)“
Metadata	

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Greece

Table 33 General information on the IACS data in the Europe-LAND inventory of Greece.

Country code + region code	EL
Spatial coverage	Country
Temporal coverage	2022-2023
Number of different crop entries in national crop classification over the entire time series	4651
Number of different crops in harmonized inventory	513
Crops per parcel [single/multiple]	Multiple
Applicant ID	Yes
Animal numbers	Yes
Organic information	No
Agri-environmental measures	No
Sharing option	A redistribution of the data is not allowed.
Data sources	The data were acquired from the Greek Payment and Control Agency for Guidance and Guarantee Community Aid (OPEKEPE).
Metadata	
License Terms	

Table 34 The parcel count, and the total area covered by the data compared to the total utilized agricultural area and number of farms reported in Eurostat for Greece. Sources: IACS data, Eurostat (2024a), Eurostat (2024b)

Year	Number of fields	Total area of data [ha]	Agricultural area in official statistics [ha]	Number applicants	Number of farms in official statistics
2022	6,235,228	3,547,499	5,371,560	629,069	530.680 (2020)
2023	6,196,691	3,541,385	5,282,430	621,991	

Special features of the data

The data come in field blocks, i.e., often multiple fields are aggregated to a block, and only the major crop is provided in the vector data, but the other crops are listed in the accompanying table file. However, only the area of the block is provided and it is impossible to tell how much area each crop covers. The area of the block is provided in the vector file.

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Hungary

Table 35 General information on the IACS data in the Europe-LAND inventory of Hungary.

Country code + region code	HU
Spatial coverage	Country
Temporal coverage	2016-2024
Number of different crop entries in national crop classification over the entire time series	486
Number of different crops in harmonized inventory	169
Crops per parcel [single/multiple]	Multiple
Applicant ID	No
Animal numbers	No
Organic information	No
Agri-environmental measures	No
Sharing option	A redistribution of the data is not allowed.
Data sources	The data were acquired from the Hungarian State Treasury (Magyar Államkincstár)
Metadata	
License Terms	

Table 36 The number of fields, and the total area covered by the data compared to the total utilized agricultural area and number of farms reported in Eurostat for Hungary. Sources: IACS data, Eurostat (2024a), Eurostat (2024b)

Year	Number of fields	Total area of data [ha]	Agricultural area in official statistics [ha]	Number applicants	Number of farms in official statistics
2016	777,197	3,355,960	5,348,970		430,000
2017	740,380	3,381,311	5,352,280		
2018	735,427	3,389,154	5,343,780		
2019	734,063	3,413,853	5,309,520		
2020	725,444	3,411,725	4,997,880		232,060
2021	753,852	3,460,584	5,049,010		
2022	752,372	3,480,209	5,081,050		
2023	769,172	3,458,806			

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Special features of the data

Because of general data protection regulations, the geographical boundaries of the vector data are from the LPIS. They do not represent the delineated fields from GSA. The crop information is attached to the LPIS parcel and, therefore, multiple crops per parcel were declared.

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Ireland

Table 37 General information on the IACS data in the Europe-LAND inventory of Ireland.

Country code + region code	IE
Spatial coverage	Country
Temporal coverage	2017-2024
Number of different crop entries in national crop classification over the entire time series	214
Number of different crops in harmonized inventory	111
Crops per parcel [single/multiple]	Single
Applicant ID	Yes
Animal numbers	No
Organic information	Yes
Agri-environmental measures	Yes
Sharing option	All data can be shared.
Data sources	https://opendata.agriculture.gov.ie/organization/bps-and-rural-development-schemes
Metadata	
License Terms	Creative Commons - Attribution 4.0 International (CC BY 4.0)

Table 38 The number of fields, and the total area covered by the data compared to the total utilized agricultural area and number of farms reported in Eurostat for Ireland. Sources: IACS data, Eurostat (2024a), Eurostat (2024b)

Year	Number of fields	Total area of data [ha]	Agricultural area in official statistics [ha]	Number applicants	Number of farms in official statistics
2017	1,359,951	1,1046,707	4,532,290	128,312	
2018	1,359,113	1,1097,404	4,477,640	126,946	
2019	1,358,347	1,1222,523	4,465,380	125,756	
2020	1,362,738	1,1274,024	4,430,970	125,215	130,190
2021	1,365,073	1,1287,777	4,460,900	124,567	
2022	1,505,892	1,1439,120	4,489,210	127,140	
2023	1,541,160	1,1566,691	4,516,040	125,194	

Special features of the data

Originally, there were two files: one file contained the claimed areas, and the other file contained the officially excluded areas as designated by the authorities. Our harmonized version is based only on the claimed areas.

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Italy

The IACS is operated separately in the Italian regions; therefore, the data are also stored separately.

Emilia-Romagna

Table 39 General information on the IACS data in the Europe-LAND inventory of Emilia-Romagna, Italy.

Country code + region code	IT_EMR
Spatial coverage	Region
Temporal coverage	2018-2024
Number of different crop entries in national crop classification over the entire time series	450
Number of different crops in harmonized inventory	186
Crops per parcel [single/multiple]	Single
Applicant ID	Yes
Animal numbers	No
Organic information	Yes
Agri-environmental measures	No
Sharing option	A redistribution of the data is not allowed.
Data sources	The data were acquired from the Italian agricultural payments agency (AGEA)
Metadata	
License Terms	

Table 40 The number of fields, and the total area covered by the data in comparison to the number of farms as reported in Eurostat for Emilia-Romagna, Italy. We were not able to find the information on the website of the Italian National Institute of Statistics for agricultural area. Sources: IACS data, Eurostat (2024a), Eurostat (2024b)

Year	Number of fields	Total area of data [ha]	Agricultural area in official statistics [ha]	Number applicants	Number of farms in official statistics
2018	2,422,846	1,185,781		44,786	
2019	2,483,169	1,205,972		44,148	
2020	2,874,273	1,384,071		44,225	53,630
2021	2,948,077	1,249,139		45,447	
2022	3,830,552	1,285,413		44,655	
2023	3,669,515	1,318,231		44,576	
2024	1,843,806	964,850		32,704	

Special features of the data

For the year 2024, one province is missing (Piacenza), leading to a smaller coverage of the data.

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The data until including 2020 distinguish between organic and conventional production. Afterward there is a distinction between organic, conventional, in conversion, and integrated production. We classified integrated production as conventional farming. It only occurs in 2021 in our data.

Marche

Table 41 General information on the IACS data in the Europe-LAND inventory of Marche, Italy.

Country code + region code	IT_MAR
Spatial coverage	Region
Temporal coverage	2023
Number of different crop entries in national crop classification over the entire time series	292
Number of different crops in harmonized inventory	156
Crops per parcel [single/multiple]	Single
Applicant ID	Yes
Animal numbers	No
Organic information	No
Agri-environmental measures	No
Sharing option	A redistribution of the data is not allowed.
Data sources	The data were acquired from the Italian agricultural payments agency (AGEA)
Metadata	
License Terms	

Table 42 The number of fields, and the total area covered by the data in comparison to the number of farms as reported in Eurostat for Marche, Italy. We were not able to find the information on the website of the Italian National Institute of Statistics for agricultural area. Sources: IACS data, Eurostat (2024a), Eurostat (2024b)

Year	Number of fields	Total area of data [ha]	Agricultural area in official statistics [ha]	Number applicants	Number of farms in official statistics
2023	1,044,808	554,329		26,912	33,660 (2020)

Toscana

Table 43 General information on the IACS data in the Europe-LAND inventory of Toscana, Italy.

Country code + region code	IT_TOS
Spatial coverage	Region
Temporal coverage	2016-2023

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Number of different crop entries in national crop classification over the entire time series	374
Number of different crops in harmonized inventory	170
Crops per parcel [single/multiple]	Single
Applicant ID	Yes
Animal numbers	No
Organic information	No
Agri-environmental measures	No
Sharing option	A redistribution of the data is not allowed.
Data sources	The data were acquired from the Italian agricultural payments agency (AGEA)
Metadata	
License Terms	

Table 44 The number of fields, and the total area covered by the data in comparison to the number of farms as reported in Eurostat for Toscana, Italy. We were not able to find the information on the website of the Italian National Institute of Statistics for agricultural area. Sources: IACS data, Eurostat (2024a), Eurostat (2024b)

Year	Number of fields	Total area of data [ha]	Agricultural area in official statistics [ha]	Number applicants	Number of farms in official statistics
2016	728,182	838,508		38,939	45,120
2017	690,638	830,402		36,602	
2018	711,800	871,058		37,632	
2019	724,916	868,971		36,470	
2020	712,230	840,281		36,575	52,110
2021	706,564	846,016		36,406	
2022	809,312	1,041,995		36,457	
2023	617,115	841,849		35,550	

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Latvia

Table 45 General information on the IACS data in the Europe-LAND inventory of Latvia.

Country code + region code	LV
Spatial coverage	Country
Temporal coverage	2019-2023
Number of different crop entries in national crop classification over the entire time series	152
Number of different crops in harmonized inventory	104
Crops per parcel [single/multiple]	Single
Applicant ID	Yes
Animal numbers	No
Organic information	No
Agri-environmental measures	No
Sharing option	A redistribution of the data is not allowed.
Data sources	The data were acquired from the Rural Support Service of Latvia (RSS)
Metadata	
License Terms	

Table 46 The number of fields, and the total area covered by the data compared to the total utilized agricultural area and number of farms reported in Eurostat for Latvia. Sources: IACS data, Eurostat (2024a), Eurostat (2024b)

Year	Number of fields	Total area of data [ha]	Agricultural area in official statistics [ha]	Number applicants	Number of farms in official statistics
2019	440,062	1,759,788	1,959,400	57,019	
2020	441,638	1,777,805	1,969,000	56,578	68,980
2021	436,197	1,783,304	1,970,100	55,072	
2022	430,143	1,781,958	1,970,400	53,431	
2023	424,782	1,775,804	1,970,700	51,339	

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Lithuania

Table 47 General information on the IACS data in the Europe-LAND inventory of Lithuania.

Country code + region code	LT
Spatial coverage	Country
Temporal coverage	2016-2024
Number of different crop entries in national crop classification over the entire time series	24
Number of different crops in harmonized inventory	22
Crops per parcel [single/multiple]	Single
Applicant ID	No
Animal numbers	No
Organic information	No
Agri-environmental measures	No
Sharing option	Crop information can be shared.
Data sources	https://www.geoportal.lt/geoportal/web/en/national-paying-agency_download#savedSearchId={097F1ABC-AFCB-4015-AFB2-D4C5A973F3D9}&collapsed=true (An account needs to be created and the data officially ordered).
Metadata	https://www.geoportal.lt/metadata-catalog/catalog/search/resource/details.page?uuid=%7BD34C8274-4644-4ABE-A238-CD8651EA95AC%7D
License Terms	Teisiniai apribojimai (1) (Legal Constraints (1)) Metaduomenys (Metadata) / Duomenų resursas (1) (Data Identification (1)) / Teisiniai apribojimai (1) (Legal Constraints (1)) Naudojimo ribotumas (Use Limitation): Tik nekomerciniam naudojimui (Non-commercial use only) Prieigos apribojimai (Access Constraints): Autoriaus teisės (Copyright) Naudojimo apribojimai (Use Constraints): Autoriaus teisės (Copyright)

Table 48 The number of fields, and the total area covered by the data compared to the total utilized agricultural area and number of farms reported in Eurostat for Lithuania. Sources: IACS data, Eurostat (2024a), Eurostat (2024b)

Year	Number of fields	Total area of data [ha]	Agricultural area in official statistics [ha]	Number applicants	Number of farms in official statistics
2024	1,213,520	2,912,898	2,872,410 (2023)		132,080 (2020)

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Special features of the data

Because of general data protection regulations, the geographical boundaries of the vector data are from the LPIS. They do not represent the delineated fields from GSA. The crop information is attached to the LPIS parcel; therefore, multiple crops per parcel were declared.

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Netherlands

Table 49 General information on the IACS data in the Europe-LAND inventory of the Netherlands.

Country code + region code	NL
Spatial coverage	Country
Temporal coverage	2009-2024
Number of different crop entries in national crop classification over the entire time series	611
Number of different crops in harmonized inventory	149
Crops per parcel [single/multiple]	Single
Applicant ID	Yes (2009-2023)
Animal numbers	Yes (2009-2023)
Organic information	Yes (2015-2023)
Agri-environmental measures	No
Sharing option	Crop information can be shared.
Data sources	https://service.pdok.nl/rvo/brpgewaspercelen/atom/v1_0/basisregistratie_gewaspercelen_brp.xml Applicant IDs, animal number, and organic information were acquired from the Netherlands Enterprise Agency (RVO)
Metadata	https://www.nationaalgeoregister.nl/geonetwork/srv/dut/csw?service=CSW&version=2.0.2&request=GetRecordById&outputschema=http://www.isotc211.org/2005/gmd&elementsetname=full&id=44e6d4d3-8fc5-47d6-8712-33dd6d244eef
License Terms	CC0 1.0 Universeel - https://creativecommons.org/publicdomain/zero/1.0/deed.nl

Table 50 The number of fields, and the total area covered by the data compared to the total utilized agricultural area and number of farms reported in Eurostat for the Netherlands. Sources: IACS data, Eurostat (2024a), Eurostat (2024b)

Year	Number of fields	Total area of data [ha]	Agricultural area in official statistics [ha]	Number applicants	Number of farms in official statistics
2009	839,399	1,957,701		75,430	
2010	827,504	1,970,411		72,928	72,320
2011	817,109	1,937,219		70,745	
2012	806,950	1,922,181	1,841,600	68,015	
2013	809,109	1,909,150	1,847,600	66,160	67,480
2014	804,807	1,887,761	1,839,000	64,209	
2015	824,773	1,879,692	1,845,750	60,610	

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2016	834,180	1,879,608	1,796,260	58,197	55,680
2017	836,056	1,890,794	1,789,990	55,898	
2018	825,588	1,883,435	1,822,400	54,484	
2019	825,992	1,879,693	1,816,320	53,441	
2020	826,515	1,878,448	1,814,450	52,374	52,640
2021	808,701	1,875,634	1,811,910	50,937	
2022	822,821	1,865,666	1,804,370	50,216	
2023	2,597,932	1,926,990	1,803,000	49,344	
2024	2,472,059	1,913,304			

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Portugal

Table 51 General information on the IACS data in the Europe-LAND inventory of Portugal.

Country code + region code	For entire country: PT_PT Regions are differentiated with a 3-digit code, e.g. "PT_XXX"
Spatial coverage	Regions (for years 2007-2014), Entire country (for years 2015-2023)
Temporal coverage	2011-2024
Number of different crop entries in national crop classification over the entire time series	348 (2011-2019) 317 (2020-2024)
Number of different crops in harmonized inventory	95 (2011-2019) 97 (2020-2024)
Crops per parcel [single/multiple]	Multiple (for years 2011-2022), Single (for years 2023-2024)
Applicant ID	Yes (2020-2024)
Animal numbers	No
Organic information	No
Agri-environmental measures	No
Sharing option	Crop information can be shared for all years, applicant IDs can be shared for the years 2020-2024.
Data sources	https://www.ifap.pt/isip/ows/ (direct download – used for 2011-2019) https://www.ifap.pt/isip/ows/isip.data/wms (download via wfs– used for 2020-2024)
Metadata	
License Terms	CC BY 4.0 Attribution 4.0 International

Table 52 The number of fields, and the total area covered by the data compared to the total utilized agricultural area and number of farms reported in Eurostat for Portugal. Due to spatial overlaps in the files of the years 2011-2019, we only report statistics for the years 2020-2024. Sources: IACS data, Eurostat (2024a), Eurostat (2024b)

Year	Number of fields	Total area of data [ha]	Agricultural area in official statistics [ha]	Number applicants	Number of farms in official statistics
2020	4,589,251	6,817,481	3,970,410	169,522	290,230
2021	4,697,288	6,852,125	3,981,220	171,137	
2022	4,757796	6,884,798	3,935,910	172,260	
2023	3,280445	5,808,915	3,986,110	169,328	
2024	3,328607	5,822,060	3,970,410	170,731	

Special features of the data

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For the years 2011-2019 the data are available for separated regions of Portugal, with 2020 onwards the data come for the entire country in a single file.

For the years 2011-2016 the data contain only broad land use classes.

All years until 2022 come as field blocks, sometimes covering multiple fields with different crops. For the years 2017-2020 there are accompanying tables with additional crops reported per field block. However, the areas per crop are not provided in the original data, therefore, we only can report the area of the field block.

In some cases, the subregions Norte Norte, Norte Sud, Centro Norte, and Centro Sud are separated, in other cases they are aggregated to Norte and Centro.

There are spatial overlaps in some years between the regions. Norte Norte and Norte Sud seem to cover the same area in 2017 and 2019. In 2018 Norte Norte covers some additional areas, but still overlaps with Norte Sud

We excluded all overseas regions of Portugal from our inventory.

Large discrepancies exist between the official statistics and the GSA data in the total agricultural area. The GSA data seem to cover almost double the area. We suspect certain areas are excluded from the official statistics, e.g., permanent pastures in the GSA data cover more than 2,000,000 ha and until 2022 the data include almost 1,000,000 ha of unknown and other areas.

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Romania

Table 53 General information on the IACS data in the Europe-LAND inventory of Romania.

Country code + region code	RO
Spatial coverage	Entire country
Temporal coverage	2023
Number of different crop entries in national crop classification over the entire time series	353
Number of different crops in harmonized inventory	110
Crops per parcel [single/multiple]	Single
Applicant ID	Yes
Animal numbers	No
Organic information	No
Agri-environmental measures	No
Sharing option	A redistribution of the data is not allowed.
Data sources	The data were acquired from the Romanian Payment and Intervention Agency for Agriculture (APIA)
Metadata	
License Terms	

Table 54 The number of fields, and the total area covered by the data compared to the total utilized agricultural area and number of farms reported in Eurostat for Romania. Sources: IACS data, Eurostat (2024a), Eurostat (2024b)

Year	Number of fields	Total area of data [ha]	Agricultural area in official statistics [ha]	Number applicants	Number of farms in official statistics
2023	5,837,939	9,956,480	12,714,620	736,599	2,887,070 (2020)

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Slovakia

Table 55 General information on the IACS data in the Europe-LAND inventory of Slovakia.

Country code + region code	SK
Spatial coverage	Entire country
Temporal coverage	2018-2024
Number of different crop entries in national crop classification over the entire time series	293
Number of different crops in harmonized inventory	140
Crops per parcel [single/multiple]	Single
Applicant ID	Yes (2018-2023)
Animal numbers	Yes (2019-2023)
Organic information	Yes (2018-2023)
Agri-environmental measures	No
Sharing option	Crop information can be shared.
Data sources	https://data.slovensko.sk/datasety https://data.slovensko.sk/datasety/cc261225-7153-44a3-8ebf-05af207515c9 Applicant IDs, animal number, and organic information were acquired from the Slovakian Agricultural Payment Agency (APA)
Metadata	
License Terms	No license provided

Table 56 The number of fields, and the total area covered by the data compared to the total utilized agricultural area and number of farms reported in Eurostat for Slovakia. Sources: IACS data, Eurostat (2024a), Eurostat (2024b)

Year	Number of fields	Total area of data [ha]	Agricultural area in official statistics [ha]	Number applicants	Number of farms in official statistics
2018	240,683	1,849,386	1,919,540	17,545	
2019	247,574	1,840,621	1,915,730	17,406	
2020	249,418	1,832,755	1,910,040	17,136	19,630
2021	255,726	1,824,140	1,856,130	17,099	
2022	264,086	1,810,157	1,849,190	17,159	
2023	275,578	1,787,492	1,825,250	15,847	
2024	274,467	1,781,929		14,006	

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Slovenia

Table 57 General information on the IACS data in the Europe-LAND inventory of Slovenia.

Country code + region code	SI
Spatial coverage	Entire country
Temporal coverage	2018-2023
Number of different crop entries in national crop classification over the entire time series	193
Number of different crops in harmonized inventory	111
Crops per parcel [single/multiple]	Single
Applicant ID	Yes
Animal numbers	Yes
Organic information	Yes
Agri-environmental measures	No
Sharing option	Crop information can be shared.
Data sources	https://rkg.gov.si/vstop/ Applicant IDs, animal number, and organic information were acquired from the Slovenian Ministry of Agriculture, Forestry and Food (MKGP)
Metadata	
License Terms	Publicly available data, no limitation of use, citation of source required

Table 58 The number of fields, and the total area covered by the data compared to the total utilized agricultural area and number of farms reported in Eurostat for Slovenia. Sources: IACS data, Eurostat (2024a), Eurostat (2024b)

Year	Number of fields	Total area of data [ha]	Agricultural area in official statistics [ha]	Number applicants	Number of farms in official statistics
2018	816,078	467,075	477,930	57,327	
2019	820,151	468,438	479,820	56,885	
2020	820,271	469,861	484,060	56,482	72,470
2021	825,061	470,725	479,490	56,137	
2022	826,994	471,382	479,430	55,757	
2023	830,856	469,158	477,930	54,661	

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Spain

Table 59 General information on the IACS data in the Europe-LAND inventory of Spain.

Country code + region code	ES
Spatial coverage	Entire country, but the data are separated into 50 provinces. For 2022 three provinces are missing: Balearic Islands, Ciudad Real and Granada
Temporal coverage	2022-2023 (The data for 2024 are online available, but come without the crop information).
Number of different crop entries in national crop classification over the entire time series	368
Number of different crops in harmonized inventory	152
Crops per parcel [single/multiple]	Single
Applicant ID	Yes
Animal numbers	No
Organic information	No
Agri-environmental measures	No
Sharing option	All information can be shared.
Data sources	Fondo Español de Garantía Agraria: https://www.fega.gob.es/atom/
Metadata	
License Terms	This data can be used freely and free of charge in any case as long as the Spanish Agricultural Guarantee Fund (FEGA) is mentioned as the author and owner of the information. Spanish Agricultural Guarantee Fund (FEGA) https://www.fega.gob.es/ unidad-de-apoyo@fega.es

Table 60 The number of fields, and the total area covered by the data compared to the total utilized agricultural area and number of farms reported in Eurostat for Spain. Sources: IACS data, Eurostat (2024a), Eurostat (2024b)

Year	Number of fields	Total area of data [ha]	Agricultural area in official statistics [ha]	Number applicants	Number of farms in official statistics
2022	16,281,336	38,501,362	24,692,570	608,380	914,870 (2020)
2023	17,775,452	42,349,667	24,867,310	656,151	

Special features of the data

Some of the largest fields are pastures that are larger than 300ha. These fields seem to be very heterogeneous in their land cover in the satellite images (Figure 6), and there are also very large fields of shrubbery.

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Large discrepancies exist between the official statistics and the GSA data in the total agricultural area. The GSA data seem to cover almost double the area. We suspect certain areas are excluded from the official statistics, e.g., permanent pastures in the GSA data cover more than 15,000,000 ha, not known and other areas cover 2,000,000 ha and forested areas are also included in the dataset.

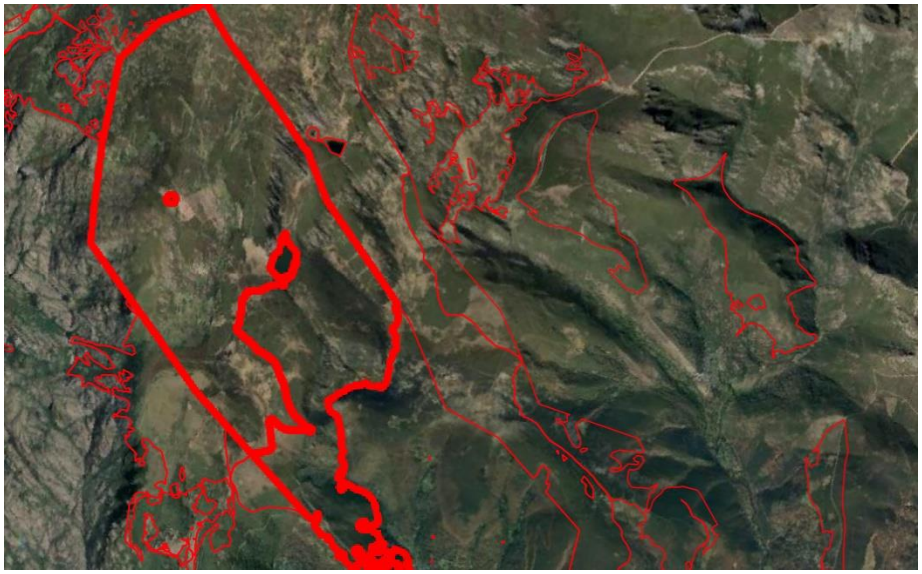

Figure 6 Example screenshot of very large parcels in the Spanish data. Basemap: Google, ©2024.

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Sweden

Table 61 General information on the IACS data in the Europe-LAND inventory of Sweden.

Country code + region code	SE
Spatial coverage	Entire country
Temporal coverage	2015-2023
Number of different crop entries in national crop classification over the entire time series	187
Number of different crops in harmonized inventory	83
Crops per parcel [single/multiple]	Single
Applicant ID	Yes
Animal numbers	No
Organic information	Yes
Agri-environmental measures	No
Sharing option	Crop information can be shared.
Data sources	https://jordbruksverket.se/e-tjanster-databaser-och-appar/e-tjanster-och-databaser-stod/kartor-och-gis#h-Laddanerkartskikt Applicant IDs and organic information were acquired from Swedish Board of Agriculture (Jordbruksverket)
Metadata	
License Terms	Attribution 4.0 International (CC BY 4.0)

Table 62 The number of fields, and the total area covered by the data compared to the total utilized agricultural area and number of farms reported in Eurostat for Sweden. Sources: IACS data, Eurostat (2024a), Eurostat (2024b)

Year	Number of fields	Total area of data [ha]	Agricultural area in official statistics [ha]	Number applicants	Number of farms in official statistics
2015	1,091,146	2,661,994	3,028,350		
2016	1,127,793	2,731,540	3,020,920		62,940
2017	1,125,651	2,721,890	3,011,370		
2018	1,119,587	2,738,345	3,000,390		
2019	1,125,696	2,756,498	3,004,780		
2020	1,211,064	3,020,309	3,005,540	57,937	58,790
2021	1,213,428	3,015,931	3,002,910	57,495	
2022	1,212,073	3,010,383	2,995,180	56,711	
2023	1,205,533	2,993,533	2,982,430	55,153	

Special features of the data

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There is a main crop and a sub-crop code that comes with additional information; we combined both to get most information content from the data.

There are no crop code lists for 2015-2019. We assumed that the crop codes of 2020 are valid.

There are large fields that are not entitled to farm compensation support and are categorized as not_known_and_others. These cases should be identified and removed when using the data.

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