**AGENT-BASED
SUPPORT TOOL FOR
THE DEVELOPMENT
OF AGRICULTURE POLICIES**

D1.4 Characterisation of Geo-referenced Datasets

agricore

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Disclaimer

Executive Summary

This deliverable presents the methodology defined within the AGRICORE project to characterise geo-referenced datasets. This methodology has been developed as part of the first of the work packages defined in the AGRICORE project aiming to characterise data sources useful for performing agricultural research analysis, and has been adapted to the characterisation of geo-referenced datasets within T1.4. AGRICORE is a research project proposing an innovative way to apply agent-based modelling to improve the capacities of policymakers to evaluate the impact of agricultural-related measurements under and outside the framework of the Common Agricultural Policy. This project was funded by the European Commission as a result of the RUR-04-2018 call, part of the H2020 programme.

Introduction presents the basis on which the methodology has been developed i.e., the ARDIT tool and the AGRICORE DCAT-AP 2.0 ontology. Then, the proposed methodology is detailed including also the definitions of all the fields to be filled while characterising a dataset in ARDIT. As a part of this methodology, also all the main challenges encountered during the characterisation of geo-referenced datasets have been explained, illustrating the proposed solutions. Also the methodology proposed to guarantee that the tool ARDIT remains efficiently working is described, relying on a continuous upgrade and maintenance of the data. Finally, some conclusions regarding the characterisation process and the need for a governance to ensure the survival of the ARDIT after the project are provided.

It is important to remark that although this deliverable has been developed in the framework of the AGRICORE project, the participating partners have aimed broader usage of the proposed methodology. As the final goal of this work package, the proposed EU Index Tool (now renamed as Agricultural Research Data Index Tool (ARDIT) aims to serve as a central entry point for locating useful datasets for agricultural research.

Abbreviations

Abbreviation	Full name
AgMIP	Agricultural Model Intercomparison and Improvement Project
AI	Artificial Intelligence
AP	Application Profile
API	Application Programming Interface
ARDIT	Agricultural Research Data Index Tool
DCAT	Data Catalogue
DCAT-AP	Data Catalogue Application Profile
EC	European Commission
EEA	European Economic Area
EGDIP	European Green Deal Investment Plan
EP	European Parliament
EU	European Union
EUROSTAT	European Statistical Office
FADN	Farm Accountancy Data Network
FAO	Food and Agriculture Organization of the United Nations
GeoDCAT-AP	A geospatial extension for the DCAT application profile for data portals in Europe
GeoPDF	Geo-Portable Document Format
GeoTIFF	Geo-Tag Image File Format
GUI	Graphic User Interface
ICT	Information and Communication Technologies
ISTAT	(Italian) National Institute for Statistics
JRC	Joint Research Centre
KPIs	Key Performance Indicators
LUCAS	Land Use/Land Cover Area Frame Survey
MS(s)	Member State(s)
NASA	National Aeronautics and Space Administration of the United States of America
OECD	Organization for Economic Cooperation and Development
POI	Point of Interest
SIPEA	Information System on Organic Production in Andalusia
UC(s)	Use Case(s)
UoA	Unit of Analysis
URL	Uniform Resource Locator
UTM	Urchin Tracking Module
VOCAB-DQV	Data Quality Vocabulary
WP	Work Package

Table of Contents

List of Tables

1 Introduction

The objective of the Agricultural Research Data Index Tool (ARDIT) is to support agricultural researchers in identifying the most suitable datasets based on model requirements and research questions without having to enter the resources of these databases. ARDIT's operation is envisioned as a great help for the researcher. Generally, just preliminary access to a dataset can result in a significant waste of time for a researcher in case the data may be inadequate (e.g. due to an undesired unit of analysis of the dataset or the lack of one or more key variables).. In addition, the amount of data necessary to be used in large-scale models, or combinations of multiple models, is likely to be significant. Therefore, properly organising the relevant datasets to be ready for use, by selecting or manipulating parts of them, could be a limiting factor for (some) researchers. Specifically, this activity has relied on having access to good and complete descriptions (i.e., metadata) of the contents of the dataset, especially on the characteristics of the variables included in them. The methodology presented in the following sections has been developed to provide a collection of all datasets relevant information that can be stored, manipulated and displayed by employing the AGRICORE ontology. Lastly, this information will be gathered and hosted in the ARDIT, which will be then used to allow researchers to identify useful data sources for them. It must be pointed out that ARDIT is hosted on a website, free and open - after registration - for everyone to access the tool.

The proposed methodology to characterise agricultural datasets is described through three main elements that are composed of:

The proposed ontology: The AGRICORE DCAT-AP 2.0 Extension

The ARDIT tool

The data governance process

This process has been applied within the project to characterise an extensive set of data sources covering EU-wide, national and regional datasets (especially those relevant to the three use cases foreseen in the AGRICORE project). Moreover, this methodology also describes the process that should be followed after the project to add more content in the proposed ARDIT.

As already been mentioned, one of the goals of the AGRICORE project is to provide the ARDIT as a tool for agricultural researchers to facilitate the task of identifying relevant and useful data for the needs of agricultural policy analysis. To do so, the AGRICORE partners proposed a characterisation methodology (detailed in the next sections) to describe the available data sources and their contents and to enable proper mapping and searching capabilities over the gathered information. To design such a methodology, one of the key elements is the definition and adoption of an ontology (or a set of them), which allows:

Sharing a **common understanding** of the structure of information among people or software agents.

Enabling the **reuse** of domain knowledge.

Making domain **assumptions explicit.**

Separating domain knowledge from the **operational** knowledge

Analysing domain knowledge

Securing the interoperability of datasets

All these motivations are present in the AGRICORE project. Indeed, for the reassurance of the long-term usefulness of the ARDIT platform - well beyond the scope of the AGRICORE project - the ARDIT has been critically developed in a way that is easy to be upgraded and maintained as well as carefully displaying its user-friendly interface for the whole research

community. Accordingly, during the first months of the project, consortium partners performed an analysis of existing ontologies that could be used for the development of the ARDIT.

In order to build the ontology, used for the characterisation of the datasets on the ARDIT, the ontology development environment Protégé 5 [1], was selected due to the large community deeming it a reliable and flexible collaborative tool available as an open-source product both for a desktop and web version. As reported by previous studies[1], it has a suite of tools to construct domain models and knowledge-based applications with ontologies. It implements a rich set of knowledge-modelling structures and actions that support the creation, visualisation and manipulation of ontologies in various representation formats. It can be customised to provide domain-friendly support to create knowledge models and to enter data. Furthermore, it can be extended by a plug-in architecture and Java-based API for building knowledge-base tools and applications. Protégé allows the definition of classes, class hierarchy's variables, variable-value restrictions, and the relationships between classes and the properties of these relationships.

Within the next phases of the AGRICORE project, the ontology will allow the application of semantic queries in ARDIT to enable searching datasets information and characterisations. Likewise, it will allow a continuous enrichment of the number and quality of datasets characterisations through the ARDIT Graphic User Interface (GUI) tailored to fit the data model structure described by the ontology.

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[1] http://protegeproject.github.io/protege/getting-started/

2   Georeferenced datasets

A dataset is characterised geo-referenced if the data that it contains are related to a geographic coordinate system or a geographical location. A geographical location can be defined in multiple spatial dimensions: 0-dimensional (points), 1-dimensional (lines), 2-dimensional (areas) and, rarely, 3-dimensional (bodies). These datasets usually derive from raster datasets, commonly obtained by scanning maps or collecting aerial photographs and satellite images, that have been completed with spatial reference information (i.e., geo-referenced). Geo-referencing raster data allow it to be viewed, queried and analyzed with other geographic data.

A geo-referenced dataset is usually the result of the process, called *matching,* of identifying geographical objects and assigning them to geographical locations*.* The term 'geographical object' refers to any kind of object or structure that can be reasonably related to a geographical location, such as points of interest (POIs), roads, places, bridges, buildings or agricultural areas. Often, the object to be referenced on a certain map originates from another map with its own geographic reference system. In this case, a matching delivers correspondences between these two maps which express commonalities as well as differences, i.e. the information which objects could and which could not (or only partially) be identified on both maps. Thus, to use some raster datasets in conjunction with other spatial data, it would be necessary to align or georeference them to a map coordinate system.

There are various definitions for the term 'geo-referencing'. For example, Sommer and Wade define georeferencing as 'aligning geographic data to a known coordinate system so it can be viewed, queried, and analysed with other geographic data[2]. This means that the internal coordinate system of a map or aerial photo image can be related to a geographic coordinate system. The relevant coordinate transforms are typically stored within the image file (GeoPDF and GeoTIFF are examples), though there are many possible mechanisms for implementing georeferencing. The most visible effect of georeferencing is that displayed software can show ground coordinates (such as latitude/longitude or UTM coordinates) and also measure ground distances and areas.

In other words, geo-referencing means associating a digital image file with locations in physical space. The term is commonly used in the geographic information systems field to describe the process of associating a physical map or raster image of a map with spatial locations. This often consists of assigning geographic coordinates to each pixel of the digital image. Geo-referencing may be applied to any kind of object or structure that can be related to a geographical location, such as POI's, roads, places, bridges, or buildings[3].

The combination of map data from several sources in order to create a new map is called *conflation*. Longley[4] defined conflation in the context of geographic information systems as 'the process of combining geographic information from overlapping sources so as to retain accurate data, minimize redundancy, and reconcile data conflicts'. Conflation is performed by using matching strategies for different structures (often nodes, segments and edges) to identify correspondences between maps in order to correlate and combine the data into a new map. According to a classification approach proposed by Yuan and Tao[5], conflation can be divided into *horizontal* (combining neighbouring areas) and *vertical* conflation (combining different maps of the same area). While horizontal conflation is usually done between vector maps, vertical conflation may also be performed between raster–vector or vector–raster pairings of maps[6].

The topics covered by a geo-referenced dataset can be various, but often they are related to land use, land cover and soil properties.

3 Methodology for the selection and characterisation

3.1 Selected datasets

In Task 1.4, the focus is on the characterisation of geo-referenced datasets. In order to define a general but complete methodology and to provide an extensive overview on how to characterise this kind of data source, the datasets are selected to cover a wide range of different features (e.g., different topics, different methodologies for the creation of the dataset itself, different data formats, different data structures, etc.).

The preliminary selection done during Task 1.1 was taken as starting point. Here, potential datasets were identified and some of these were part of a catalogue containing a highly diversified collection of datasets. In addition to these, partners involved in Task 4.1 were encouraged to also identify and characterise the datasets, not preliminary selected, exploiting their experience in the domain.

In the context of the AGRICORE project, 30 datasets have been characterised, some of which are part of a catalogue.

The dataset characterisation effort was distributed among partners in order to spur a more detailed examination of which datasets would be of real interest to the AGRICORE project and to the researchers engaged in agriculture policy impact assessment. This determined the list of datasets that was actually characterised and whose metadata populate the ARDIT.

The table below contains all the datasets that have been identified and characterised in the context of Task 1.4, depicting the provider and the location of the dataset in the institutional repository, in terms of the folder and sub-folder.

Table 1: List of datasets characterised within AGRICORE Task 1.4

Dataset Provider	Folder	Sub-Folder/Dataset Name
Agricultural Model Intercomparison and Improvement Project (AgMIP)	NA	AgCFSR Climate Forcing Dataset for Agricultural Modeling
Agricultural Model Intercomparison and Improvement Project (AgMIP)	NA	AgMERRA Climate Forcing Dataset for Agricultural Modeling
The European Environment Agency (EEA)	Biodiversity Information System for Europe (BISE)	Start of vegetation growing season 2000-2016
The European Environment Agency (EEA)	Biodiversity Information System for Europe (BISE)	Vegetation growing season length 2000-2016
The European Environment Agency (EEA)	Biodiversity Information System for Europe (BISE)	Annual start of vegetation growing season time-series 2000-2016
The European Environment Agency (EEA)	Biodiversity Information System for Europe (BISE)	European Forest Areas based on Copernicus data (2015)
The European Environment Agency (EEA)	Biodiversity Information System for Europe (BISE)	European Forest Areas based on Copernicus data (2012)
The European Environment Agency (EEA)	Biodiversity Information System for Europe (BISE)	European Mountain Areas
The European Environment Agency (EEA)	Biodiversity Information System for Europe (BISE)	CDDA Designated Area
The European Environment Agency (EEA)	CORINE Land Cover	CLC 1990
The European Environment Agency (EEA)	CORINE Land Cover	CLC 2006
The European Environment Agency (EEA)	CORINE Land Cover	CLC 2018

The European Environment Agency (EEA)	CORINE Land Cover	CHA 1990-2000
The European Environment Agency (EEA)	CORINE Land Cover	CHA 2012-2018
Joint Research Centre (JRC)	Agri4cast	Gridded Agro-Meteorological Data in Europe
Joint Research Centre (JRC)	Agri4cast	Monthly Heating and Cooling Degree Days in the European Union
Joint Research Centre (JRC)	Agri4cast	Yearly modeled crop area in EU at regional level
Joint Research Centre (JRC)	Agri4cast	Yearly modeled crop area in EU at grid level
Joint Research Centre (JRC)	Agri4cast	NetCDF Lat-Lon regular grid Meteorological data in Europe
Joint Research Centre (JRC)	Agri4cast	Distribution of irrigated crops in Europe
Joint Research Centre (JRC)	Agri4cast	Gridded Remote Sensing Data in Europe
Joint Research Centre (JRC)	Agri4cast	Gridded winter soft wheat phenological database for Europe
Eurostat	LUCAS	Land Use and Coverage Area frame Survey 2018
Eurostat	LUCAS	Topsoil Survey 2009
NASA	NA	Modern-Era Retrospective analysis for Research and Applications, Version 2 (MERRA-2)
Faculty of Geosciences/ Geography at Goethe-University	NA	MIRCA 2000
ISRIC — World Soil Information	NA	SoilGrids
Joint Research Centre (JRC)	NA	SoilHydroGrids
WorldClim	NA	WorldClim Version 2.1
Joint Research Centre (JRC)	NA	Soil pH in Europe

3.2 Characterisation within the project duration

During Task 1.1, project partners performed an initial characterisation of a number of datasets (listed in the table in Selection of Datasets Characterised so Far of D1.1) to identify the information that has to be captured by the ARDIT ontology and defined the necessary information required for further characterisation in ARDIT.

Consequently, the ARDIT backend was organised in 7 sections:

1. One **GENERAL** section where information such as the name of the table, the description, the type of dataset, the producer, issue date and last update ... are captured. In this category, the user can indicate the catalogue to which the dataset belongs (EUROSTAT, FAO, OECD, etc ...). Spatial resolution is a characteristic dedicated to geo-referenced datasets to depict the minimum spatial separation resolvable in a dataset, measured in meters, while the temporal resolution is intended to provide a summary indication of the temporal resolution of the data distribution as a single value. More complex descriptions of various aspects of temporal precision, accuracy, resolution and other statistics can be provided using the Data Quality Vocabulary [VOCAB-DQV][2]. In this section, we can also find the activities that generated or provided the business context for the creation of the dataset ("Was generated by"). An activity is something that occurs over a period of time and acts upon or with entities; it may include consuming, processing, transforming, modifying, relocating, using, or generating entities. The activity associated with the generation of a dataset will typically be an initiative, project, mission, survey, ongoing activity ("business as usual") etc.

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[2] https://www.w3.org/TR/vocab-dcat-2/#Property:dataset_temporal_resolution

Ultimately, if the dataset is cited in the literature, or on other datasets or used by some other related resources, such as publications, etc., this information can be depicted in the field "Is referenced by".

2. The second section is dedicated to the PURPOSE of the dataset, and define what kind of analysis the dataset was created for. The purpose property has been added in the AGRICORE ontology and it identifies the purpose of the dataset, i.e., for what kind of analysis that dataset has been created: there is an internal vocabulary of terms that will be enriched over time. In this section, we find information on the temporal extent of the data collection period, on the object of the dataset (i.e., the type of data that has been analysed and represented), on the purposes of the dataset and the data, and on the theme covered (derived from DCAT-AP).

3. The GEOGRAPHICAL COVERAGE section depicts the geographic features of a dataset. It's a spatial property. It's a list of spatial regions or named places. It can be represented using a controlled vocabulary or with geographic coordinates.

4. The DISTRIBUTION of a data set is the format in which the data can be retrieved. A dataset might be available in multiple formats, such as spreadsheet, pdf, CSV, etc. This section, besides information on the title, issue date and description, collects all data on access rights, byte size, procedures to access the data, URL and format.

5. The UNIT OF ANALYSIS (UoA) is the object to which the variables are referred. Every dataset has at least one UoA, but in one dataset there could be more than one UoA. The UoA is generally something spatially defined, such as the holdings, a region or a country, but it can also be something different such as a commodity. While defining a new Unit of Analysis, the following information will be captured: the temporal extent (that could have a different value from the one of the datasets), the aggregation level, unit or scale, whether the dataset is a census, the population coverage if not a census, the statistical representativeness or the number of elements in the sample (if known) and the downscaling strategy (if any).

6. Once the UoA has been created, the related variables are characterised by the introduction of the following properties: unit of measurement, temporal extent, mathematical representation, data frequency, aggregation level and the UoA to which the variable refers. In the case of price variables, currency, price type and size unit will be depicted as well.

7. In ARDIT there is also a section to list the KEYWORDS describing or representing the dataset.

Table 1Table 2 below depicts the list of fields to be filled while characterising a dataset in ARDIT.

Table 2: Template for the ARDIT Dataset Characterisation (Methodological Grid)

Characteristic captured and presented in ARDIT	Explanation/Example
GENERAL	This section regards general information and characteristics about the dataset.
Title	Name or identifier of the dataset.
Description	Short description of the dataset, its purpose or the type of data collected.
Issued	Indicates the date of the first formal issuance or publication of the specific dataset.
Last update	Indicates the most recent date on which the dataset was changed, updated or modified.
Dataset type	A dataset can be either geo-referenced or socioeconomic. The dataset type is usually determined by the type of its Units of Analysis or the type of its variables.
Producer	Indicates the institution/organisation which generated, published or maintains the dataset.
Link	Provides an URL to the landing page of the described dataset.
Language	Indicates the original language in which the data and metadata are available
Periodicity of the publication	Indicates the frequency with which the data (variables) is updated (between one issue and the following one).
Catalogues	Indicates the catalogue to which the dataset belongs (if any).
Temporal resolution	Indicates the shortest period of time between two consecutive samples of any of the variables contained within the dataset.
Spatial resolution	(Only for geo-referenced datasets) Indicates the smallest resolvable spatial separation (measured in metres) between neighbouring Units of Analysis, and thus between their corresponding geo-referenced variables.
Resource type	Indicates the nature or genre of the resource (e.g. collection, interactive resource)
Was generated by	Indicates the activities that generated or provided the business context for the creation of the dataset.
Is referenced by	Indicates other datasets or scientific publications that cite or (re)use data contained in the dataset being described.
PURPOSE	This section depicts what kind of analysis the dataset was created for.
Temporal extent	Indicates the time period for which data are available.
Subjects	Indicates the topics covered by the dataset.
Useful for the analysis of (purpose)	Indicates which types of analysis could be performed using the data contained in the dataset's variables.
Theme covered	Indicates the themes covered by the dataset.
GEOGRAPHICAL COVERAGE	This section describes the geographical scope of the dataset. It is therefore a property describing a particular physical or administrative spatial entity. It is possible to describe the geographical coverage using several alternatives (but only one of them at a time): list with 1+ physical continents *OR* list with 1+ countries *OR* list with 1+ NUTS1 entities *OR* list with 1+ NUTS2 entities *OR* list with 1+ NUTS3 entities *OR* list with 1+ ADM1 geo-entities *OR* list with 1+ ADM2 geo-entities. In future releases, it will be also possible to use a coordinates box for this.
DISTRIBUTIONS	The distributions of a dataset are the set of different formats/shapes in which the data can be retrieved. (e.g. pdf, CSV)
License	Indicates the legal framework under which the distribution is made available
Access right	Indicates a declaration on the rights that concerns how the distribution is accessed. (e.g. public, restricted)
Byte size	Indicates the memory size required to store the data contained in the dataset.
Procedures to access the data	Describes the guidelines and procedures required for accessing private datasets.
Access URL	Indicates the URL from where the data contained in the dataset can be accessed.
Download URL	Indicates the URL of the downloadable file in a given format (if exists).
Format	Indicates the file format of the raw data file (e.g. xls, csv, html, pc).
Compress format	Indicate the compression format (if any) of the downloadable file in which the data is contained.

Packaging format	Indicates the packaging format of the distribution when several data files are grouped together.
Data service	Indicates the data service that gives access to the distribution of the dataset.
Publisher	The entity responsible for making the data service available.
Creator	The entity responsible for producing the data service.
UNIT OF ANALYSIS	It's the object to which the variables refer. Every dataset has at least one UoA.
Area size	(Only for geo-referenced datasets) Indicates the spatial magnitude of the unit of analysis.
Area size unit	(Only for geo-referenced datasets) Indicates the physical unit corresponding to the magnitude of area size of the UoA.
Aggregation Level	Number of Units of Analysis for which the data is aggregated / Area size for which the Units of Analysis are aggregated.
Aggregation Level Unit	Political-Administrative or physical unit of the aggregation level (e.g. the Unit of Analysis can be the Agricultural Holdings, whose results are aggregated at a national (country) level).
Census	Boolean property that indicates whether the dataset is a census (100% of Units of Analysis were polled to gather the data).
Population coverage	Indicates (when known) the proportion of Units of Analysis sampled with respect to the size of the total population of Units of Analysis. Could be either a float between 0 and 1 or a percentage between 0 and 100.
Unit of analysis number	Indicates the total number of Units of Analysis that form the sample.
Statistical representativeness	Provides information on how the sample was built. It is a value between 0 and 1 that refers to what percentage of the total real population of units of analysis is represented by the sample used to generate the dataset.
Available stratification criteria & suggested downscaling methodologies	Indicates which additional stratification levels are resolvable within the dataset (i.e. the criteria to filter among Units of Analysis and their possible values). Additionally, for data available at higher (geographical or administrative) scale levels, methodologies can be suggested to generate data at smaller scales.
VARIABLES INCLUDED	It lists all the variables contained within the dataset. Those variables can be geo-referenced or socioeconomic, depending on the dataset and Unit of Analysis types.
Name	Identifier of the variable.
Unit of Measurement	Physical unit in which the variable is displayed.
Temporal extent	Indicates the time period for which data are available. Normally it has the same value as the dataset's temporal extent, but it might be also different (shorter) for some variables.
Mathematical representation	Indicates whether the value of the variable is an instantaneous value, or an extreme value (maximum, minimum), or the average of several values, etc.
Data frequency	To indicate the frequency with which data are collected and processed during the "temporal extent". (e.g.: dataset with two variables for temperature, one is the monthly average, another one is the maximum annual temperature)
Aggregation level	To indicate the spatial units of the data (e. g., NUTS1, NUTS2, NUTS3 or other administrative regions/units, 50000 (e.g., 1:50000 scale map), 0.25 degrees). It refers to the level of detail of the data set/ analysis. It shall be expressed as a set of zero to many resolution distances (typically for gridded data and imagery-derived products) or equivalent scales (typically for maps or map-derived products).
Data origin	Indicates whether the values of the variable have been obtained by actual physical measurements or surveys (measured), *OR* by qualitative observation (observed), *OR* by calculations on other raw variables (calculated), *OR* are predictions obtained using models or other forecasting techniques (forecast).
Reference Values	Sometimes variables are coded (or modified) using value identifiers generated by the dataset producers themselves. This property may include such codes and their meaning (or their modifying value) in natural language.
Unit of analysis	Indicates the UoA the variable is related to.
KEYWORDS	This section is to indicate the keywords regarding the dataset.

This characterisation was performed by the committee formed by representatives of STAM, UNIPR and IDENER. The objective of this committee was to continuously monitor the characterisation process and identify the relevant aspects that might require a modification of the ontology or of the ARDIT itself. The characterisation process mainly consisted in finding and defining the matches between the ARDIT platform and the datasets' features. In practice, this consisted in creating on the ARDIT a module that described the main features of the different datasets by fulfilling its sections. These were established starting from the defined ontology and then updated during the whole characterisation process (see the Methodology section). Indeed, while looking for matching between the ARDIT and the datasets, if some features/properties resulted impossible to be described, the ARDIT was updated in order to meet the characterisation's needs. During this process, the committee assured that the ontology and the ARDIT allow to adequately characterize all the datasets (the ARDIT's GUI was used to ensure and enforce meeting the requirements established in the ontology). The necessary changes could be caused by misdefinitions at two different levels:

ARDIT level: the missing/wrong features/properties were defined correctly in the ontology, but not in the ARDIT;

ontology level: the missing/wrong features/properties were not defined or defined incorrectly in the ontology, and consequently also in the ARDIT.

Once the reason has been identified, the error can be fixed by modifying the ARDIT and/or the ontology accordingly, in order to be able to clearly and correctly characterise the dataset. The characterisation of geo-referenced datasets was then an iterative process that consisted in the repetition of the following steps:

compilation of the modules on the ARDIT;

identification of weaknesses and inconsistencies in the ontology and/or ARDIT structure;

correction of these defects;

repeat.

For some datasets, metadata were available. In these cases, metadata provided useful information that simplified the process of characterisation of the datasets. Indeed, metadata is "data that provide information about other data"[3], but not the content of the data, such as the text of a message or the image itself.

In this framework, STAM took care of keeping the ontology updated, while IDENER was in charge of communicating the required changes and adaptations both to the ARDIT developers and to the data providers (people performing the characterisations). UNIPR was in charge of the characterisation of the socioeconomic datasets, STAM was in charge of the characterisation of the geo-referenced datasets and IDENER took the role of supervisor and reviewer of the work done.

3.3 Characterisation challenges

During the characterisation process of geo-referenced datasets, data providers came across several challenges, mostly related to the translation of datasets' characteristics into the ontology's and the ARDIT's features. Indeed, each dataset presented unique characteristics and, hence, needed a deep analysis and understanding before being able to make dedicated considerations for its characterisation. This was also reflected in the difficulties encountered to

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[3] Merriam Webster

develop ARDIT as we went along with the characterisations so that it could adapt to the peculiarities of each dataset.

One of the most common challenges, especially during the first phases, was the identification and definition of the geo-referenced units of analysis. These are crucial for the right characterisation of the dataset and to describe its "structure". Indeed, the geo-referenced unit of analysis represents what has been analysed within the datasets in geographical terms, i.e., the geographical portion to which the data of the variables are related. Hence, to define the geo-referenced unit of analysis, a clear understanding of the dataset's construction and architecture is needed. To achieve this, it is often necessary to search and read all the documentation related to the dataset itself, which can be time-consuming.

An example of challenges related to the definition of the geo-referenced unit of analysis has been the determination of the area size of the unit of analysis itself. Indeed, area size is a mandatory feature of geo-referenced units of analysis and represents the spatial extension of the unit of analysis. However, in some cases (e.g., the dataset Information System on Organic Production in Andalusia (SIPEA)) the area size is different for each unit of analysis, even if the unit of analysis itself is the same (e.g. plot, polygon area, etc.). In these cases and when defining a geo-referenced unit of analysis for each unit is too demanding (e.g., more than one hundred units of analysis), we solved the problem by characterising the dataset with one unit of analysis with an area size equal to the minimum area size (if known), or to zero, and a variable "area size" related to the unit of analysis to express that for each unit of analysis the area size is known.

Another challenge that occurred still related to the determination of the unit(s) of analysis was the presence of "sub-units" of analysis that were associated with one unit of analysis but presented some characteristics that differentiated them from each other. In these cases, the problem was solved by creating a unit of analysis for each sub-unit trying to reflect the associated unit of analysis by including it in the name of the created unit of analysis (e.g. unit of analysis = area occupied by farms; sub-units = area occupied by farms smaller than 1 ha, area occupied by farms between 1 and 2 ha, area occupied by farms between 2 and 5 ha and so on). This information has been included in the box 'Available stratification criteria & suggested downscaling methodologies' in many characterisations.

In general, finding all the information needed to properly characterise the datasets often represented a demanding activity: not always metadata is available and not always the related documentation is clear and/or sufficient. In some cases, accessing the data is necessary to understand the structure of the dataset and consequently its unit(s) of analysis and variable(s). However, accessing the dataset can also be problematic: indeed, in some cases, the dataset is not available at the moment of the characterisation, as happened for the Soil Survey of LUCAS, or can demand a long access request process.

3.4 Characterisation after the project

By the end of the AGRICORE project, when the ARDIT will be accessible on the public internet, researchers interested in using and contributing to the tool with the characterisation of new datasets will be able to do so by means of the same functionality employed by project partners in the lifetime of the project. It is obvious that for ensuring the survival of the developed portal, a continuous upgrade and maintenance of the data included should be promoted. To do so, a clear governance structure should be defined.

Although the final version of such governance will be established later in the project (as this relies on the activities pertaining to other WPs and tasks, such as WP8, Exploitation, clustering and open sourcing, and WP9 with the PEDR and DMP), an initial potential governance structure is already under discussion.

The ARDIT tool will be developed to include a Datasource Life Cycle Management System. This system, among other things, will establish a set of roles within the platform which will be linked to specific responsibilities. The corresponding roles will be defined within the project by both AAT and IDENER and the people assigned with them will be identified; initially within the personnel of such companies. However, project activities already include efforts to increase the adoption and interest in the project tools (including ARDIT) and external requests from potential contributors are expected.

4   Conclusions

Agricultural researchers often rely on datasets to carry out their research. However, since the number of datasets related to the agricultural sector is very high, the identification of the right datasets to be used is often a hard and time-consuming activity. For this reason, the tool ARDIT developed within the AGRICORE project aims to gather and provide information about the content of the datasets in the most efficient way, both timely and functionally. Deliverable 1.1 provided evidence that the use of ontologies represents the best solution to capture and systematise rich domains of knowledge, such as agriculture.

For the AGRICORE project, due to the lack of existent ontologies capable of identifying the relevant information on key variables contained in (a) dataset(s), and the relationships among them, a dedicated ontology, the AGRICORE DCAT-AP 2.0 ontology, has been developed (Task 1.1). Within Task 1.3-4-5-6 this ontology has been adapted to the needs that turned out during the characterisation process. In particular, within Task 1.4 the ontology, and consequently also the ARDIT that has to translate the ontology into fields to be completed by end-users, has been elaborated and improved to allow a suitable characterisation of geo-referenced datasets.

To ensure that the ARDIT and the ontology are suitable to characterise all the features that a geo-referenced dataset can present, the datasets to be characterised have been selected in order to cover the large majority of all these possible aspects. Specifically, 30 geo-referenced datasets have been characterised by STAM and the other partners involved in the task. These characterisations have been included as an ANNEX to this deliverable. Additionally, the JSON file containing all the characterisations corresponding to tasks T1.3, T1.4, T1.5 and T1.6 of the AGRICORE Project has been uploaded to ZENODO[4].

During the characterisations, several challenges occurred to ensure that the functionalities of the data were translated into the ARDIT and respected the objectives of the project. However, these allowed the committee to optimise the ARDIT tool itself and the ontology. In addition, to ensure the survival of the developed portal, a continuous upgrade and maintenance of the data included is crucial. To do so, a clear governance structure is being developed, aiming to guarantee the quality of the process during the project phase but also for further management, information provisioning and maintenance.

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[4] Zenodo is a general purpose open access repository developed under the European OpenAIRE programme and operated by CERN.

5 References

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[2]^ T. Wade, E. Sommer S, and others, A to Z GIS, An illustrated dictionary of geographic information systems. Esri Press, 2006.

[3]^ A. Hackeloeer, K. Klasing, J. M. Krisp, and L. Meng, "Georeferencing: a review of methods and applications," Annals of GIS, vol. 20, no. 1, pp. 61–69, 2014.

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[6]^ M. Zhang, "Methods and implementations of road-network matching," 2009.

For preparing this report, the following deliverables have been taken into consideration:

Deliverable Number	Deliverable Title	Lead beneficiary	Type	Dissemination Level	Due date
D1.1	Standardised Methodology and Set of Ontologies for the Characterisation of Data Sources	UNIPR	Report	Public	M09
D1.3	EU statistics datasets	STAM	Report	Public	M29
D1.5	National and Regional datasets	UNIPR	Report	Public	M29
D1.6	Previous research results as information sources	UNIPR	Report	Public	M29
D10.1	Project Management Handbook	IDE	Report	Confidential	M01

ANNEX: Characterised geo-referenced datasets

SoilGrids250m 2.0

General information

Description: SoilGridsTM (hereafter SoilGrids) is a system for global digital soil mapping that uses state-of-the-art machine learning methods to map the spatial distribution of soil properties across the globe. SoilGrids prediction models are fitted using over 230 000 soil profile observations from the WoSIS database and a series of environmental covariates. Covariates were selected from a pool of over 400 environmental layers from Earth observation derived products and other environmental information including climate, land cover and terrain morphology. The outputs of SoilGrids are global soil property maps at six standard depth intervals (according to the GlobalSoilMap IUSS working group and its specifications) at a spatial resolution of 250 meters.

Producer: ISRIC — World Soil Information

Link: https://www.isric.org/explore/soilgrids

Languages: English

Catalogue:

Subjects: soil resources, sample survey, chemical compound, Geographical grid systems, Soil

Useful for the analysis of: Environmental policy, Agriculture policy

Themes covered:

Spatial resolution (in meters): 250.0

Temporal resolution:

Resource type: Dataset

Was generated by: https://data.isric.org/geonetwork/srv/eng/catalog.search#/metadata/ca880bd4-cff8-11e9-8046-0cc47adaa92c

Is referenced by:

Geographical coverage: Africa, America, Antarctica, Asia, Europe, Oceania

Dataset type: GEOREFERENCED

Characterization last update: January 14, 2022

Characterization created at: April 13, 2021

Issued:

Last update: May 1, 2020

Periodicity: Irregular

Temporal extent: May, 2020 - May, 2020

Keywords: soil, soil properties

Distributions

Title	Format	Access rights	Access URL	Compress format	Data service
WebDAV	XML	Public	https://files.isric.org/soilgrids/latest/data/	XML	False

Units of analysis

Name	Temporal extent	Aggregation level unit	Area size	Area size unit
Soil 250m x 250m	May, 2020 - May, 2020		250	square metre
Soil Depth Interval I (0-5 cm)	May, 2020 - May, 2020		5	centimetre
Soil Depth Interval II (5-15 cm)	May, 2020 - May, 2020		10	centimetre
Soil Depth Interval III (15-30 cm)	May, 2020 - May, 2020		15	centimetre
Soil Depth Interval IV (30-60 cm)	May, 2020 - May, 2020		30	centimetre
Soil Depth Interval V (60-100 cm)	May, 2020 - May, 2020		40	centimetre
Soil Depth Interval VI (100-200 cm)	May, 2020 - May, 2020		100	centimetre

Variables included

Name	Type	Unit of measurement	Temporal extent	Mathematical representation	Data frequency	Unit of analysis
Proportion of clay particles	Georeferenced variable	g/kg	May, 2020 - May, 2020			Soil 250m x 250m, Soil Depth Interval I (0-5 cm), Soil Depth Interval II (5-15 cm), Soil Depth Interval III (15-30 cm), Soil Depth Interval IV (30-60 cm), Soil Depth Interval V (60-100 cm)
Cation exchange capacity (CEC)	Georeferenced variable	mmol(c)/kg	May, 2020 - May, 2020			Soil 250m x 250m, Soil Depth Interval I (0-5 cm), Soil Depth Interval II (5-15 cm), Soil Depth Interval III (15-30 cm), Soil Depth Interval IV (30-60 cm), Soil Depth Interval V (60-100 cm)
Total nitrogen	Georeferenced variable	cg/kg	May, 2020 - May, 2020			Soil 250m x 250m, Soil Depth Interval I (0-5 cm), Soil Depth Interval II (5-15 cm), Soil Depth Interval III (15-30 cm), Soil Depth Interval IV (30-60 cm), Soil Depth Interval V (60-100 cm)
Organic carbon density	Georeferenced variable	hg/m^3	May, 2020 - May, 2020			Soil 250m x 250m, Soil Depth Interval I (0-5 cm), Soil Depth Interval II (5-15 cm), Soil Depth Interval III (15-30 cm), Soil Depth Interval IV (30-60 cm), Soil Depth Interval V (60-100 cm)
Organic carbon stock	Georeferenced variable	t/ha	May, 2020 - May, 2020			Soil Depth Interval III (15-30 cm), Soil 250m x 250m, Soil Depth Interval I (0-5 cm), Soil Depth Interval II (5-15 cm), Soil Depth Interval IV (30-60 cm), Soil Depth Interval V (60-100 cm)
Soil pH	Georeferenced variable	None	May, 2020 - May, 2020			Soil 250m x 250m, Soil Depth Interval I (0-5 cm), Soil Depth Interval II (5-15 cm), Soil Depth Interval III (15-30 cm), Soil Depth Interval IV (30-60 cm), Soil Depth Interval V (60-100 cm)

Soil organic carbon content	Georeferenced variable	dg/kg	May, 2020 - May, 2020			Soil 250m x 250m, Soil Depth Interval I (0-5 cm), Soil Depth Interval II (5-15 cm), Soil Depth Interval III (15-30 cm), Soil Depth Interval IV (30-60 cm), Soil Depth Interval V (60-100 cm)
Bulk density	Georeferenced variable	cg/cm^3	May, 2020 - May, 2020			250m x 250m cell, Depth Interval I (0-5 cm), Depth Interval II (5-15 cm), Depth Interval III (15-30 cm), Depth Interval IV (30-60 cm), Depth Interval V (60-100 cm)
Volumetric fraction of coarse fragments	Georeferenced variable	cm3/dm3 (vol%)	May, 2020 - May, 2020			Soil 250m x 250m, Soil Depth Interval I (0-5 cm), Soil Depth Interval II (5-15 cm), Soil Depth Interval III (15-30 cm), Soil Depth Interval IV (30-60 cm), Soil Depth Interval V (60-100 cm)
Proportion of sand particles	Georeferenced variable	g/kg	May, 2020 - May, 2020			Soil 250m x 250m, Soil Depth Interval I (0-5 cm), Soil Depth Interval II (5-15 cm), Soil Depth Interval III (15-30 cm), Soil Depth Interval IV (30-60 cm), Soil Depth Interval V (60-100 cm)
Proportion of silt particles	Georeferenced variable	g/kg	May, 2020 - May, 2020			Soil 250m x 250m, Soil Depth Interval I (0-5 cm), Soil Depth Interval II (5-15 cm), Soil Depth Interval III (15-30 cm), Soil Depth Interval IV (30-60 cm), Soil Depth Interval V (60-100 cm)

Start of vegetation growing season 2000-2016

General information

Description: The raster files are the time series of the start of the vegetation growing season (day of the year) and the derived linear trends (in day / year). The start of the growing season time-series is based on the time series of the Plant Phenology Index (PPI) derived from the MODIS BRDF-Adjusted Reflectance product (MODIS MCD43 NBAR). The PPI index is optimized for efficient monitoring of vegetation phenology and is derived from the source MODIS data using radiative transfer solutions applied to the reflectance in visible-red and near infrared spectral domains. The start of season indicator is based on calculating the start of the vegetation growing season from the annual PPI temporal curve using the TIMESAT software for each year between and including 2000 and 2016.

Producer: European Environment Agency

Link: https://www.eea.europa.eu/data-and-maps/data/annual-start-of-vegetation-growing

Languages: English

Catalogue: BISE - Biodiversity Information System for Europe

Subjects: crop production, agricultural holdings, agricultural product, plant breeding, Agriculture, fisheries, forestry and food, Environment

Useful for the analysis of: Crop production, Farm structure, land use, production indices, Social Sustainability - Work force characteristics, Use of agricultural area, Use of water

Themes covered:

Spatial resolution (in meters): 500.0

Temporal resolution: Annual

Resource type: Dataset

Was generated by:

Is referenced by:

Geographical coverage: Kosovo, Albania, Austria, Belgium, Bulgaria, Bosnia and Herzegovina, Switzerland, Cyprus, Czechia, Germany, Denmark, Spain, Estonia, Finland, France, United Kingdom, Greece, Croatia, Hungary, Ireland, Iceland, Italy, Liechtenstein, Lithuania, Luxembourg, Latvia, North Macedonia, Malta, Montenegro, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Sweden, Turkey

Dataset type: GEOREFERENCED

Characterization last update: January 13, 2022

Characterization created at: December 13, 2021

Issued: March 12, 2019

Last update: May 17, 2021

Periodicity: Irregular

Temporal extent: January, 2000 - December, 2016

Keywords: phenology, growing season, vegetation, biomass, season, agricultural sector, biodiversity, land cover

Distributions

Title	Format	Access rights	Access URL	Compress format	Data service
Annual start of vegetation growing season time-series 2000-2016, version 1, Mar. 2019	BIL	Public	https://sdi.eea.europa.eu/data/f4b01c76-29f7-4075-b13f-5dc5a9c18ae2	BIL	False
Annual start of vegetation growing season time-series 2000-2016, version 1, Mar. 2019	HDR	Public	https://sdi.eea.europa.eu/data/f4b01c76-29f7-4075-b13f-5dc5a9c18ae2	HDR	False
Annual start of vegetation growing season time-series 2000-2016, version 1, Mar. 2019	PDF	Public	https://sdi.eea.europa.eu/catalogue/srv/eng/catalog.search#/metadata/f4b01c76-29f7-4075-b13f-5dc5a9c18ae2	PDF	False
Annual start of vegetation growing season time-series	XML	Public	https://sdi.eea.europa.eu/catalogue/srv/eng/catalog.search#/metadata/f4b01c76-29f7-	XML	False

2000-2016, version 1, Mar. 2019			4075-b13f-5dc5a9c18ae2		

Units of analysis

Name	Temporal extent	Aggregation level unit	Area size	Area size unit
square grid	January, 2000 - December, 2016		25	hectare

Variables included

Name	Type	Unit of measurement	Temporal extent	Mathematical representation	Data frequency	Unit of analysis
Start of season indicator	Georeferenced variable		January, 2000 - December, 2016		Annual	square grid

European Forest Areas based on Copernicus data (2012)

General information

Description: These data sets show the European forest area in 2012 and in 2015 at 100m spatial resolution, covering EEA39 countries. They are based on Copernicus HRL forest products at 20m spatial resolution and comply with the FAO forest definition (i.e. minimum mapping unit of 0.5 ha, minimum coverage of 10% and excluding land that is predominantly under agricultural or urban land use). After the selection of those pixels identified as forest by the HRL forest products and also compliant with FAO criteria, the forest area dataset at 100m was computed as a Boolean product (i.e. forest / non-forest). The value 1 (forest area) corresponds to the pixels where the forest is the major coverage; otherwise, the pixel value is 0 (non-forest area).

Producer: European Environment Agency

Link: https://sdi.eea.europa.eu/catalogue/srv/eng/catalog.search#/metadata/2588fc43-d855-439b-a6e9-941a59a0e50e

Languages: English

Catalogue: BISE - Biodiversity Information System for Europe

Subjects: forest, land use, Environment, Agriculture, fisheries, forestry and food, Land cover, Land use

Useful for the analysis of: Climate change, Forestry output

Themes covered:

Spatial resolution (in meters): 100.0

Temporal resolution: Annual

Resource type: Dataset

Was generated by:

Is referenced by:

Geographical coverage: Kosovo, Albania, Andorra, Austria, Belgium, Bulgaria, Bosnia and Herzegovina, Switzerland, Cyprus, Czechia, Germany, Denmark, Spain, Estonia, Finland, France, United Kingdom, Greece, Croatia, Hungary, Ireland, Iceland, Italy, Liechtenstein, Lithuania, Luxembourg, Latvia, North Macedonia, Malta, Montenegro, Netherlands, Norway, Poland, Portugal, Romania, San Marino, Serbia, Slovakia, Slovenia, Sweden, Turkey

Dataset type: GEOREFERENCED

Characterization last update: January 13, 2022

Characterization created at: December 16, 2021

Issued: October 30, 2018

Last update: July 10, 2020

Periodicity: Irregular

Temporal extent: January, 2012 - December, 2012

Keywords: environment

Distributions

Title	Format	Access rights	Access URL	Compress format	Data service
Forest Area 2012 based on Copernicus HRL Forest products - version 1, Oct. 2018	XML	Public	https://sdi.eea.europa.eu/catalogue/srv/eng/catalog.search#/metadata/2588fc43-d855-439b-a6e9-941a59a0e50e	XML	False
Forest Area 2012 based on Copernicus HRL Forest products - version 1, Oct. 2018	PDF	Public	https://sdi.eea.europa.eu/catalogue/srv/eng/catalog.search#/metadata/2588fc43-d855-439b-a6e9-941a59a0e50e	PDF	False
Forest Area 2012 based on Copernicus HRL Forest products - version 1, Oct. 2018	GeoTIFF	Public	https://sdi.eea.europa.eu/data/2588fc43-d855-439b-a6e9-941a59a0e50e	GeoTIFF	False

Units of analysis

Name	Temporal extent	Aggregation level unit	Area size	Area size unit
square grid	January, 2012 - December, 2012		1	hectare

Variables included

Name	Type	Unit of measurement	Temporal extent	Mathematical representation	Data frequency	Unit of analysis
forest area	Georeferenced variable	boolean	January, 2012 - December, 2012			square grid

Modern-Era Retrospective analysis for Research and Applications, Version 2 (MERRA-2)

General information

Description: The Modern-Era Retrospective Analysis for Research and Applications, version 2 (MERRA-2), is the latest atmospheric reanalysis of the modern satellite era produced by NASA's Global Modeling and Assimilation Office (GMAO). MERRA-2 assimilates observation types not available to its predecessor, MERRA, and includes updates to the Goddard Earth Observing System (GEOS) model and GSI analysis scheme

Producer: NASA/GMAO

Link: https://disc.gsfc.nasa.gov/datasets?project=MERRA-2

Languages: English

Catalogue:

Subjects: meteorology, Environment, Atmospheric conditions, Environmental monitoring facilities, Geographical grid systems, Meteorological geographical features, Natural risk zones

Useful for the analysis of: Air emissions intensities, Climate change, Environmental policy, Temperature change

Themes covered:

Spatial resolution (in meters): 10000.0

Temporal resolution: hourly

Resource type: Dataset

Was generated by: NASA/GMAO MERRA2 project

Is referenced by: MERRA-2 Overview: The Modern-Era Retrospective Analysis for Research and Applications, Version 2 (MERRA-2), Ronald Gelaro, et al., 2017, J. Clim., doi: 10.1175/JCLI-D-16-0758.1, The American Meteorological Society has a special collection of articles relevant to MERRA-2. This collection, coordinated by Mike Bosilovich, is available at http://journals.ametsoc.org/collection/MERRA2.

Geographical coverage: World

Dataset type: GEOREFERENCED

Characterization last update: January 14, 2022

Characterization created at: December 30, 2021

Issued: September 25, 2015

Last update: December 1, 2021

Periodicity: Continuous

Temporal extent: January, 1980 - December, 2021

Keywords:

Distributions

Title	Format	Access rights	Access URL	Compress format	Data service
M2SMNXEDI	NetCDF	Public	https://disc.gsfc.nasa.gov/datasets?project=MERRA-2	NetCDF	False

Units of analysis

Name	Temporal extent	Aggregation level unit	Area size	Area size unit
Daily Single-Level Diagnostics	January, 1980 - December, 2021	hour	510100000	square kilometre
Hourly Land and Air Surface Diagnostics	January, 1980 - December, 2021	hour	510100000	square kilometre

Variables included

Name	Type	Unit of measurement	Temporal extent	Mathematical representation	Data frequency	Unit of analysis
surface downwelling par diffuse flux	Georeferenced variable	W m-2	January, 1980 - December, 2021	Average		Hourly Land and Air Surface Diagnostics

surface downwelling par beam flux	Georeferenced variable	W m-2	January, 1980 - December, 2021	Average		Hourly Land and Air Surface Diagnostics
snowfall land; bias corrected	Georeferenced variable	kg m-2 s -1	January, 1980 - December, 2021	Average		Hourly Land and Air Surface Diagnostics
total precipitation land; bias corrected	Georeferenced variable	kg m-2 s -1	January, 1980 - December, 2021	Average		Hourly Land and Air Surface Diagnostics
water profile	Georeferenced variable	m-3 m-3	January, 1980 - December, 2021	Average		Hourly Land and Air Surface Diagnostics
Soil water infiltration rate	Georeferenced variable	kg m-2 s -1	January, 1980 - December, 2021	Average		Hourly Land and Air Surface Diagnostics
overland runoff including throughflow	Georeferenced variable	kg m-2 s -1	January, 1980 - December, 2021	Average		Hourly Land and Air Surface Diagnostics
water root zone	Georeferenced variable	m-3 m-3	January, 1980 - December, 2021	Average		Hourly Land and Air Surface Diagnostics
water surface layer	Georeferenced variable	m-3 m-3	January, 1980 - December, 2021	Average		Hourly Land and Air Surface Diagnostics
Sensible heat flux land	Georeferenced variable	W m-2	January, 1980 - December, 2021	Average		Hourly Land and Air Surface Diagnostics
Snowmelt flux land	Georeferenced variable	kg m-2 s-1	January, 1980 - December, 2021	Average		Hourly Land and Air Surface Diagnostics
snow depth	Georeferenced variable	m	January, 1980 - December, 2021	Average		Hourly Land and Air Surface Diagnostics
Total snow storage land	Georeferenced variable	kg m-2	January, 1980 - December, 2021	Average		Hourly Land and Air Surface Diagnostics
rate of spurious land energy source	Georeferenced variable	W m-2	January, 1980 - December, 2021	Average		Hourly Land and Air Surface Diagnostics

rate of spurious snow energy	Georeferenced variable	W m-2	January, 1980 - December, 2021	Average		Hourly Land and Air Surface Diagnostics
rate of spurious land water source	Georeferenced variable	kg m-2 s-1	January, 1980 - December, 2021	Average		Hourly Land and Air Surface Diagnostics
Net shortwave land	Georeferenced variable	W m-2	January, 1980 - December, 2021			Hourly Land and Air Surface Diagnostics
Total energy storage land	Georeferenced variable	J m-2	January, 1980 - December, 2021			Hourly Land and Air Surface Diagnostics
surface temperature of snow	Georeferenced variable	K	January, 1980 - December, 2021			Hourly Land and Air Surface Diagnostics
surface temperature of saturated zone	Georeferenced variable	K	January, 1980 - December, 2021			Hourly Land and Air Surface Diagnostics
soil temperatures layer 1	Georeferenced variable	K	January, 1980 - December, 2021			Hourly Land and Air Surface Diagnostics
soil temperatures layer 2	Georeferenced variable	K	January, 1980 - December, 2021			Hourly Land and Air Surface Diagnostics
soil temperatures layer 3	Georeferenced variable	K	January, 1980 - December, 2021			Hourly Land and Air Surface Diagnostics
soil temperatures layer 4	Georeferenced variable	K	January, 1980 - December, 2021			Hourly Land and Air Surface Diagnostics
soil temperatures layer 5	Georeferenced variable	K	January, 1980 - December, 2021			Hourly Land and Air Surface Diagnostics

soil temperatures layer 6	Georeferenced variable	K	January, 1980 - December, 2021			Hourly Land and Air Surface Diagnostics
surface temperature of land incl snow	Georeferenced variable	K	January, 1980 - December, 2021			Hourly Land and Air Surface Diagnostics
surface temperature of unsaturated zone	Georeferenced variable	K	January, 1980 - December, 2021			Hourly Land and Air Surface Diagnostics
time-during an hour with no precipitation	Georeferenced variable	s	January, 1980 - December, 2021	Average	Daily	Daily Single-Level Diagnostics
2-meter max air temperature	Georeferenced variable	K	January, 1980 - December, 2021	Max		Daily Single-Level Diagnostics
2-meter mean air temperature	Georeferenced variable	K	January, 1980 - December, 2021	Max	Daily	Daily Single-Level Diagnostics
2-meter min air temperature	Georeferenced variable	K	January, 1980 - December, 2021	Min	Daily	Daily Single-Level Diagnostics
Maximum precipitation rate during the period	Georeferenced variable	kg m-2 s -1	January, 1980 - December, 2021		Daily	Daily Single-Level Diagnostics
baseflow flux	Georeferenced variable	kg m-2 s -1	January, 1980 - December, 2021	Average		Hourly Land and Air Surface Diagnostics
rate of change of total land energy	Georeferenced variable	W m-2	January, 1980 - December, 2021	Average		Hourly Land and Air Surface Diagnostics
Evaporation land	Georeferenced variable	kg m-2 s -1	January, 1980 - December, 2021	Average		Hourly Land and Air Surface Diagnostics

interception loss energy flux	Georeferenced variable	W m-2	January, 1980 - December, 2021	Average		Hourly Land and Air Surface Diagnostics
snow ice evaporation energy flux	Georeferenced variable	W m-2	January, 1980 - December, 2021	Average		Hourly Land and Air Surface Diagnostics
baresoil evap energy flux	Georeferenced variable	W m-2	January, 1980 - December, 2021	Average		Hourly Land and Air Surface Diagnostics
transpiration energy flux	Georeferenced variable	W m-2	January, 1980 - December, 2021	Average		Hourly Land and Air Surface Diagnostics
fractional area of saturated zone	Georeferenced variable	1	January, 1980 - December, 2021	Average		Hourly Land and Air Surface Diagnostics
fractional area of land snowcover	Georeferenced variable	1	January, 1980 - December, 2021	Average		Hourly Land and Air Surface Diagnostics
fractional area of unsaturated zone	Georeferenced variable	1	January, 1980 - December, 2021	Average		Hourly Land and Air Surface Diagnostics
fractional area of wilting zone	Georeferenced variable	1	January, 1980 - December, 2021	Average		Hourly Land and Air Surface Diagnostics
Ground heating land	Georeferenced variable	W m-2	January, 1980 - December, 2021	Average		Hourly Land and Air Surface Diagnostics
greeness fraction	Georeferenced variable	1	January, 1980 - December, 2021	Average		Hourly Land and Air Surface Diagnostics
ave prof soil moisture	Georeferenced variable	1	January, 1980 - December, 2021	Average		Hourly Land and Air Surface Diagnostics
root zone soil wetness	Georeferenced variable	1	January, 1980 - December, 2021	Average		Hourly Land and Air Surface Diagnostics
surface soil wetness	Georeferenced variable	1	January, 1980 - December, 2021	Average		Hourly Land and Air Surface Diagnostics

leaf area index	Georeferenced variable	1	January, 1980 - December, 2021	Average		Hourly Land and Air Surface Diagnostics
Latent heat flux land	Georeferenced variable	W m-2	January, 1980 - December, 2021	Average		Hourly Land and Air Surface Diagnostics
Net longwave land	Georeferenced variable	W m-2	January, 1980 - December, 2021	Average		Hourly Land and Air Surface Diagnostics
Avail water storage land	Georeferenced variable	kg m-2	January, 1980 - December, 2021			Hourly Land and Air Surface Diagnostics
surface temperature of wilted zone	Georeferenced variable	K	January, 1980 - December, 2021			Hourly Land and Air Surface Diagnostics
rate of change of total land water	Georeferenced variable	kg m-2 s -1	January, 1980 - December, 2021			Hourly Land and Air Surface Diagnostics

LUCAS - Topsoil survey 2009

General information

Description: Datset containing soil properties data (clay, silt and sand content, coarse fragments, pH, organic carbon content, CaCO3, nitrogen, phosphorous, potassium, cation exchane capacity) and multispectral absorbance data. This database has extensively used for modelling purposes and the development or validation of ten datasets in European scale: Soil Organic carbon content in Europe, Multispectral reflectance data in EU soil, Soil erodibility (K-factor), Soil organic carbon (SOC) stocks, Soil water erosion, Physical properties, Threats to soil biodiversity in EU, wind erosion modelling, N2O emissions in EU and future SOC stocks.

Producer: Joint Research Council (JRC)

Link: https://ec.europa.eu/eurostat/web/lucas

Languages: English

Catalogue: LUCAS

Subjects: soil pollution, soil resources, Environment

Useful for the analysis of: Environmental policy, Agriculture policy

Themes covered:

Spatial resolution (in meters): 2000.0

Temporal resolution:

Resource type: Dataset

Was generated by: Topsoil samples

Is referenced by:

Geographical coverage: Austria, Belgium, Bulgaria, Cyprus, Czechia, Germany, Denmark, Spain, Estonia, Finland, France, United Kingdom, Greece, Croatia, Hungary, Ireland, Italy, Lithuania, Luxembourg, Latvia, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Sweden

Dataset type: GEOREFERENCED

Characterization last update: January 14, 2022

Characterization created at: October 7, 2021

Issued: September 1, 2013

Last update: September 1, 2013

Periodicity: Irregular

Temporal extent: January, 2009 - December, 2009

Keywords: topsoil

Distributions

Title	Format	Access rights	Access URL	Compress format	Data service

Units of analysis

Name	Temporal extent	Aggregation level unit	Area size	Area size unit
Topsoil sample	January, 2009 - January, 2009		0	kilometre

Variables included

Name	Type	Unit of measurement	Temporal extent	Mathematical representation	Data frequency	Unit of analysis
Coarse fragments	Georeferenced variable	Percentage	January, 2009 - December, 2009			Topsoil sample
Clay content	Georeferenced variable	Percentage	January, 2009 - December, 2009			Topsoil sample
Silt content	Georeferenced variable	Percentage	January, 2009 - December, 2009			Topsoil sample
Sand content	Georeferenced variable	Percentage	January, 2009 - December, 2009			Topsoil sample
pH in CaCl2	Georeferenced variable		January, 2009 - December, 2009			Topsoil sample

pH in H2O	Georeferenced variable		January, 2009 - December, 2009			Topsoil sample
Organic carbon	Georeferenced variable	g/kg	January, 2009 - December, 2009			Topsoil sample
Carbonate content	Georeferenced variable	g/kg	January, 2009 - December, 2009			Topsoil sample
Phosphorous content	Georeferenced variable	mg/kg	January, 2009 - December, 2009			Topsoil sample
Total nitrogen content	Georeferenced variable	g/kg	January, 2009 - December, 2009			Topsoil sample
Extractable potassium content	Georeferenced variable	mg/kg	January, 2009 - December, 2009			Topsoil sample
Cation exchange capacity	Georeferenced variable	cmol(+)/kg	January, 2009 - December, 2009			Topsoil sample
Multispectral properties	Georeferenced variable		January, 2009 - December, 2009			Topsoil sample

Global Summary of the Day (GSOD)

General information

Description: Global summary of day data for 18 surface meteorological elements are derived from the synoptic/hourly observations contained in USAF DATSAV3 Surface data and Federal Climate Complex Integrated Surface Hourly (ISH). Historical data are generally available for 1929 to the present, with data from 1973 to the present being the most complete. For some periods, one or more countries' data may not be available due to data restrictions or communications problems.

Producer: National Climatic Data Center (NCDC) of National Oceanic and Atmospheric Administration (NOAA)

Link: ftp://ftp.ncdc.noaa.gov/pub/data/gsod

Languages: English

Catalogue:

Subjects: agricultural research, climate change, Atmospheric conditions

Useful for the analysis of: Crop production

Themes covered:

Spatial resolution (in meters):

Temporal resolution: daily

Resource type: Dataset

Was generated by: World Weather Watch Program according to WMO Resolution 40

Is referenced by:

Geographical coverage: World

Dataset type: GEOREFERENCED

Characterization last update: December 22, 2021

Characterization created at: December 20, 2021

Issued:

Last update: December 21, 2021

Periodicity: Daily

Temporal extent: January, 1929 - December, 2021

Keywords: weather observation

Distributions

Title	Format	Access rights	Access URL	Compress format	Data service
GSOD distribution	CSV	Public	https://www7.ncdc.noaa.gov/CDO/cdoselect.cmd?datasetabbv=GSOD&countryabbv=&georegionabbv=	CSV	False

Units of analysis

Name	Temporal extent	Aggregation level unit	Area size	Area size unit
GSOD non-gridded data	January, 1929 - December, 2021	Geonames	1	Geonames

Variables included

Name	Type	Unit of measurement	Temporal extent	Mathematical representation	Data frequency	Unit of analysis
Mean temperature	Georeferenced variable	Fahrenheit	January, 1929 - December, 2021	Average	Daily	GSOD non-gridded data
Mean dew point	Georeferenced variable	Fahrenheit	January, 1929 - December, 2021	Average	Daily	GSOD non-gridded data
Mean sea level pressure	Georeferenced variable	mb	January, 1929 - December, 2021	Average	Daily	GSOD non-gridded data
Mean station pressure	Georeferenced variable	mb	January, 1929 - December, 2021	Average	Daily	GSOD non-gridded data

Mean visibility	Georeferenced variable	miles	January, 1929 - December, 2021	Average	Daily	GSOD non-gridded data
Mean wind speed	Georeferenced variable	knots	January, 1929 - December, 2021	Average	Daily	GSOD non-gridded data
Maximum sustained wind speed	Georeferenced variable	knots	January, 1929 - December, 2021	Max	Daily	GSOD non-gridded data
Maximum wind gust	Georeferenced variable	knots	January, 1929 - December, 2021	Max	Daily	GSOD non-gridded data
Maximum temperature	Georeferenced variable	Fahrenheit	January, 1929 - December, 2021	Max	Daily	GSOD non-gridded data
Minimum temperature	Georeferenced variable	Fahrenheit	January, 1929 - December, 2021	Min	Daily	GSOD non-gridded data
Precipitation amount	Georeferenced variable	inches	January, 1929 - December, 2021	Sum	Daily	GSOD non-gridded data
Snow depth	Georeferenced variable	inches	January, 1929 - December, 2021	Average	Daily	GSOD non-gridded data
Indicator for occurrence of Fog	Georeferenced variable	-	January, 1929 - December, 2021	Instant value	Daily	GSOD non-gridded data
Indicator for occurrence of Rain or Drizzle	Georeferenced variable	-	January, 1929 - December, 2021	Instant value	Daily	GSOD non-gridded data
Indicator for occurrence of Snow or Ice Pellets	Georeferenced variable	-	January, 1929 - December, 2021	Instant value	Daily	GSOD non-gridded data
Indicator for occurrence of Hail	Georeferenced variable	-	January, 1929 - December, 2021	Instant value	Daily	GSOD non-gridded data

Indicator for occurrence of Thunder	Georeferenced variable	-	January, 1929 - December, 2021	Instant value	Daily	GSOD non-gridded data
Indicator for occurrence of Tornado/Funnel Cloud	Georeferenced variable	-	January, 1929 - December, 2021	Instant value	Daily	GSOD non-gridded data

AgCFSR Climate Forcing Dataset for Agricultural Modeling

General information

Description: The AgCFSR climate forcing dataset was created as an element of the Agricultural Model Intercomparison and Improvement Project (AgMIP) to provide consistent, daily time series over the 1980-2010 period with global coverage of climate variables required for agricultural models. These datasets were designed to be useful for AgMIP's coordinated, protocol-based studies of agricultural impacts ranging from biophysical process studies to global agricultural economic models.

Producer: AgMIP, Alexander Ruane

Link: https://data.giss.nasa.gov/impacts/agmipcf/agcfsr/

Languages: English

Catalogue:

Subjects: agricultural research, climate change, Atmospheric conditions

Useful for the analysis of: Crop production

Themes covered:

Spatial resolution (in meters): 25000.0

Temporal resolution: daily

Resource type: Dataset

Was generated by: Agricultural Model Intercomparison and Improvement Project (AgMIP)

Is referenced by: Ruane, A.C., R. Goldberg, and J. Chryssanthacopoulos, 2015: AgMIP climate forcing datasets for agricultural modeling: Merged products for gap-filling and historical climate series estimation, Agr. Forest Meteorol., 200, 233-248

Geographical coverage: World

Dataset type: GEOREFERENCED

Characterization last update: December 22, 2021

Characterization created at: December 20, 2021

Issued:

Last update: August 18, 2014

Periodicity: Irregular

Temporal extent: January, 1980 - December, 2010

Keywords: weather observation

Distributions

Title	Format	Access rights	Access URL	Compress format	Data service
AgCFSR data distribution	NetCDF	Public	https://data.giss.nasa.gov/impacts/agmipcf/agcfsr/	NetCDF	False

Units of analysis

Name	Temporal extent	Aggregation level unit	Area size	Area size unit
AgCFSR 25km	January, 1980 - December, 2010	kilometre	625	square kilometre
AgCFSR 50km	January, 1980 - December, 2010	kilometre	2500	square kilometre
AgCFSR 100km	January, 1980 - December, 2010	kilometre	10000	square kilometre

Variables included

Name	Type	Unit of measurement	Temporal extent	Mathematical representation	Data frequency	Unit of analysis
Mean temperature	Georeferenced variable	°C	January, 1980 - December, 2010	Average	Irregular	AgCFSR 50km
Minimum temperature	Georeferenced variable	°C	January, 1980 - December, 2010	Min	Irregular	AgCFSR 50km
Maximum temperature	Georeferenced variable	°C	January, 1980 - December, 2010	Max	Irregular	AgCFSR 50km

Precipitation	Georeferenced variable	mm/day	January, 1980 - December, 2010	Sum	Irregular	AgCFSR 25km
Solar Radiation	Georeferenced variable	MJ/m2/day	January, 1980 - December, 2010	Sum	Irregular	AgCFSR 100km
Relative Humidity at Time of Max Temp	Georeferenced variable	%	January, 1980 - December, 2010	Instant value	Irregular	AgCFSR 25km
Wind Speed	Georeferenced variable	m/s	January, 1980 - December, 2010	Average	Irregular	AgCFSR 25km

CORINE Land Cover - CLC 1990

General information

Description:

Producer: European Environment Agency (EEA)

Link: https://land.copernicus.eu/pan-european/corine-land-cover/clc-1990

Languages: English

Catalogue: CORINE

Subjects: land use, environmental research, Agriculture, fisheries, forestry and food, Environment, Regions and cities, Geographical grid systems, Protected sites, Geology, Land cover, Agricultural and aquaculture facilities, Area management/restriction/regulation zones and reporting units, Bio-geographical regions, Land use

Useful for the analysis of: Energy use in agriculture, Climate change, Environmental policy, Greenhouse gas emissions

Themes covered:

Spatial resolution (in meters): 100.0

Temporal resolution:

Resource type: Dataset

Was generated by:

Is referenced by:

Geographical coverage: Austria, Belgium, Bulgaria, Czechia, Germany, Denmark, Spain, Estonia, France, Greece, Croatia, Hungary, Ireland, Italy, Lithuania, Luxembourg, Latvia, Malta, Montenegro, Netherlands, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Sweden, Turkey

Dataset type: GEOREFERENCED

Characterization last update: January 14, 2022

Characterization created at: March 29, 2021

Issued: June 14, 2019

Last update: May 13, 2020

Periodicity: Irregular

Temporal extent: January, 1986 - December, 1998

Keywords:

Distributions

Title	Format	Access rights	Access URL	Compress format	Data service
SQLite Database	SQL	Public	https://land.copernicus.eu/pan-european/corine-land-cover/clc-1990?tab=download	SQL	False
ESRI Geodatabase	Esri File Geodatabase	Public	https://land.copernicus.eu/pan-european/corine-land-cover/clc-1990?tab=download	Esri File Geodatabase	False
100m GeoTiff	GeoTIFF	Public	https://land.copernicus.eu/pan-european/corine-land-cover/clc-1990?tab=download	GeoTIFF	False

Units of analysis

Name	Temporal extent	Aggregation level unit	Area size	Area size unit
MMU	January, 1986 - December, 1998		25	hectare

Variables included

Name	Type	Unit of measurement	Temporal extent	Mathematical representation	Data frequency	Unit of analysis
Artificial Surfaces	Georeferenced variable	hectare	January, 1986 - December, 1998	Instant value	Irregular	MMU
Agricultural Areas	Georeferenced variable	hectare	January, 1986 - December, 1998	Instant value	Irregular	MMU
Forest and Seminatural Areas	Georeferenced variable	hectare	January, 1986 - December, 1998	Instant value	Irregular	MMU
Wetlands	Georeferenced variable	hectare	January, 1986 - December, 1998	Instant value	Irregular	MMU
Water Bodies	Georeferenced variable	hectare	January, 1986 - December, 1998	Instant value	Irregular	MMU

IMGW-PIB climate-related dataset for Poland

General information

Description: Database containing systematic measurements and hydrological and meteorological observations from the network of IMGW-PiB meteorological stations. It contained hourly, day, and monthly data from the period 1951-2019, together with a list and numbers of meteorological stations.

Producer: Institute of Meteorology and Water Management (IMGW-PIB)

Link: https://danepubliczne.imgw.pl/

Languages: Polish

Catalogue:

Subjects: agricultural research, climate change, Atmospheric conditions

Useful for the analysis of: Crop production

Themes covered:

Spatial resolution (in meters): 0.0

Temporal resolution: hourly

Resource type: Dataset

Was generated by: Institute of Meteorology and Water Management (IMGW-PIB) statutory activity

Is referenced by:

Geographical coverage: Poland

Dataset type: GEOREFERENCED

Characterization last update: December 23, 2021

Characterization created at: December 20, 2021

Issued:

Last update: December 10, 2021

Periodicity: Monthly

Temporal extent: January, 1951 - October, 2021

Keywords: weather observation

Distributions

Title	Format	Access rights	Access URL	Compress format	Data service
IMGW distribution	CSV	Restricted	https://danepubliczne.imgw.pl	CSV	False

Units of analysis

Name	Temporal extent	Aggregation level unit	Area size	Area size unit
IMGW unit of analysis	January, 1951 - October, 2021	Geonames	128	square kilometre

Variables included

Name	Type	Unit of measurement	Temporal extent	Mathematical representation	Data frequency	Unit of analysis
Maximum daily temperature	Georeferenced variable	°C	January, 1951 - October, 2021	Max	Daily	IMGW unit of analysis
Average daily water vapor pressure	Georeferenced variable	hPa	January, 1951 - October, 2021	Average	Daily	IMGW unit of analysis
Average daily pressure at the station level	Georeferenced variable	hPa	January, 1951 - October, 2021	Average	Daily	IMGW unit of analysis
Insolation	Georeferenced variable	h	January, 1951 - October, 2021	Sum	Daily	IMGW unit of analysis
Average daily wind speed	Georeferenced variable	m/s	January, 1951 - October, 2021	Average	Daily	IMGW unit of analysis

Average daily general cloudiness	Georeferenced variable	octant	January, 1951 - October, 2021	Average	Daily	IMGW unit of analysis
Daily precipitation sum	Georeferenced variable	mm	January, 1951 - October, 2021	Sum	Daily	IMGW unit of analysis
Height of snow cover	Georeferenced variable	cm	January, 1951 - October, 2021	Average	Daily	IMGW unit of analysis
Ground condition	Georeferenced variable		January, 1951 - October, 2021	Mode	Daily	IMGW unit of analysis
Duration of rainfall	Georeferenced variable	h	January, 1951 - October, 2021	Sum	Daily	IMGW unit of analysis
Average daily temperature	Georeferenced variable	°C	January, 1951 - October, 2021	Average	Daily	IMGW unit of analysis
Minimum daily temperature	Georeferenced variable	°C	January, 1951 - October, 2021	Min	Daily	IMGW unit of analysis
Minimum ground temperature	Georeferenced variable	°C	January, 1951 - October, 2021	Min	Daily	IMGW unit of analysis
Average daily relative humidity	Georeferenced variable	%	January, 1951 - October, 2021	Average	Daily	IMGW unit of analysis
Average daily pressure at sea level	Georeferenced variable	hPa	January, 1951 - October, 2021	Average	Daily	IMGW unit of analysis
Duration of wind >= 10m	Georeferenced variable	h	January, 1951 - October, 2021	Sum	Daily	IMGW unit of analysis
Duration of wind > 15m	Georeferenced variable	h	January, 1951 - October, 2021	Sum	Daily	IMGW unit of analysis
Type of precipitation	Georeferenced variable		January, 1951 - October, 2021	Mode	Daily	IMGW unit of analysis

Total rainfall per day	Georeferenced variable	mm	January, 1951 - October, 2021	Sum	Daily	IMGW unit of analysis
Total rainfall per night	Georeferenced variable	mm	January, 1951 - October, 2021	Sum	Daily	IMGW unit of analysis
Water equivalent of snow	Georeferenced variable	mm/cm	January, 1951 - October, 2021	Sum	Daily	IMGW unit of analysis
Occurrence of snow cover	Georeferenced variable		January, 1951 - October, 2021	Mode	Daily	IMGW unit of analysis
Lower isotherm	Georeferenced variable	cm	January, 1951 - October, 2021	Min	Daily	IMGW unit of analysis
Upper isotherm	Georeferenced variable	cm	January, 1951 - October, 2021	Max	Daily	IMGW unit of analysis
Actinometry	Georeferenced variable	J/cm2	January, 1951 - October, 2021	Average	Daily	IMGW unit of analysis
Duration of snowfall	Georeferenced variable	h	January, 1951 - October, 2021	Sum	Daily	IMGW unit of analysis
Duration of rainfall with snow	Georeferenced variable	h	January, 1951 - October, 2021	Sum	Daily	IMGW unit of analysis
Duration of hail	Georeferenced variable	h	January, 1951 - October, 2021	Sum	Daily	IMGW unit of analysis
Duration of fog	Georeferenced variable	h	January, 1951 - October, 2021	Sum	Daily	IMGW unit of analysis
Duration of haze	Georeferenced variable	h	January, 1951 - October, 2021	Sum	Daily	IMGW unit of analysis
Duration of hoar-frost	Georeferenced variable	h	January, 1951 - October, 2021	Sum	Daily	IMGW unit of analysis
Duration of glaze	Georeferenced variable	h	January, 1951 - October, 2021	Sum	Daily	IMGW unit of analysis

Duration of low snowstorm	Georeferenced variable	h	January, 1951 - October, 2021	Sum	Daily	IMGW unit of analysis
Duration of high snowstorm	Georeferenced variable	h	January, 1951 - October, 2021	Sum	Daily	IMGW unit of analysis
Duration of turbidity	Georeferenced variable	h	January, 1951 - October, 2021	Sum	Daily	IMGW unit of analysis
Duration of storm	Georeferenced variable	h	January, 1951 - October, 2021	Sum	Daily	IMGW unit of analysis
Duration of dew	Georeferenced variable	h	January, 1951 - October, 2021	Sum	Daily	IMGW unit of analysis
Duration of frost	Georeferenced variable	h	January, 1951 - October, 2021	Sum	Daily	IMGW unit of analysis
Lightning strike	Georeferenced variable		January, 1951 - October, 2021	Mode	Daily	IMGW unit of analysis

CRU TS (Climatic Research Unit Time-series) dataset v. 4.04

General information

Description: The CRU TS dataset was developed and has been subsequently updated,

improved and maintained with support from a number of funders,

principally the UK's Natural Environment Research Council (NERC) and the

US Department of Energy. Long-term support is currently provided by the

UK National Centre for Atmospheric Science (NCAS), a NERC collaborative

centre.

Producer: Natural Environment Research Council (NERC)

Link: https://crudata.uea.ac.uk/cru/data/hrg/cru_ts_4.04/

Languages: English

Catalogue:

Subjects: climate change, Environment

Useful for the analysis of: Climate change

Themes covered:

Spatial resolution (in meters):

Temporal resolution:

Resource type:

Was generated by:

Is referenced by:

Geographical coverage: Austria, Belgium, Bulgaria, Cyprus, Czechia, Germany, Denmark, Spain, Estonia, Finland, France, Greece, Croatia, Hungary, Ireland, Italy, Lithuania, Luxembourg, Latvia, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Sweden

Dataset type: GEOREFERENCED

Characterization last update: January 7, 2022

Characterization created at: January 7, 2022

Issued: April 1, 2020

Last update: April 1, 2020

Periodicity: Annual

Temporal extent: January, 1901 - December, 2019

Keywords: environment, climate data

Distributions

Title	Format	Access rights	Access URL	Compress format	Data service
CRU TS Version 4.04	ASCII	Public	https://crudata.uea.ac.uk/cru/data/hrg/cru_ts_4.04/	ASCII	False

Units of analysis

Name	Temporal extent	Aggregation level unit	Area size	Area size unit

Variables included

Name	Type	Unit of measurement	Temporal extent	Mathematical representation	Data frequency	Unit of analysis

Annual start of vegetation growing season time-series 2000-2016

General information

Description: The raster files are the time series of the start of the vegetation growing season (day of the year) and the derived linear trends (in day / year). The start of the growing season time-series is based on the time series of the Plant Phenology Index (PPI) derived from the MODIS BRDF-Adjusted Reflectance product (MODIS MCD43 NBAR). The PPI index is optimized for efficient monitoring of vegetation phenology and is derived from the source MODIS data using radiative transfer solutions applied to the reflectance in visible-red and near infrared spectral domains. The start of season indicator is based on calculating the start of the vegetation growing season from the annual PPI temporal curve using the TIMESAT software for each year between and including 2000 and 2016.

Producer: European Environment Agency (EEA)

Link: https://www.eea.europa.eu/data-and-maps/data/annual-start-of-vegetation-growing

Languages: English

Catalogue: BISE - Biodiversity Information System for Europe

Subjects: plant breeding, vegetable, agricultural product, agricultural research, agricultural region, Agriculture, fisheries, forestry and food, Geographical grid systems

Useful for the analysis of: Environmental policy

Themes covered:

Spatial resolution (in meters): 500.0

Temporal resolution: Annually

Resource type:

Was generated by:

Is referenced by:

Geographical coverage: Kosovo, Albania, Austria, Belgium, Bulgaria, Bosnia and Herzegovina, Switzerland, Cyprus, Czechia, Germany, Denmark, Spain, Estonia, Finland, France, United Kingdom, Greece, Croatia, Hungary, Ireland, Iceland, Italy, Liechtenstein, Lithuania, Luxembourg, Latvia, North Macedonia, Malta, Montenegro, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Sweden, Turkey

Dataset type: GEOREFERENCED

Characterization last update: January 14, 2022

Characterization created at: April 7, 2021

Issued: March 12, 2019

Last update: December 18, 2019

Periodicity: Irregular

Temporal extent: January, 2000 - December, 2016

Keywords:

Distributions

Title	Format	Access rights	Access URL	Compress format	Data service
ESRI REST	Esri REST	Public		Esri REST	False
HDR	HDR	Public	https://sdi.eea.europa.eu/data/f4b01c76-29f7-4075-b13f-5dc5a9c18ae2	HDR	False
BIL	BIL	Public	https://sdi.eea.europa.eu/data/f4b01c76-29f7-4075-b13f-5dc5a9c18ae2	BIL	False

Units of analysis

Name	Temporal extent	Aggregation level unit	Area size	Area size unit
500m grid	January, 2000 - December, 2016	square metre	250000	square metre

Variables included

Name	Type	Unit of measurement	Temporal extent	Mathematical representation	Data frequency	Unit of analysis

Day of the year (date) of start of vegetation growing	Georeferenced variable	None	January, 2000 - December, 2016	Instant value	Annual	500m grid

AgMERRA Climate Forcing Dataset for Agricultural Modeling

General information

Description: The AgMERRA climate forcing dataset was created as an element of the Agricultural Model Intercomparison and Improvement Project (AgMIP) to provide consistent, daily time series over the 1980-2010 period with global coverage of climate variables required for agricultural models. These datasets were designed to be useful for AgMIP's coordinated, protocol-based studies of agricultural impacts ranging from biophysical process studies to global agricultural economic models.

Producer: AgMIP, Alexander Ruane

Link: https://data.giss.nasa.gov/impacts/agmipcf/agmerra/

Languages: English

Catalogue:

Subjects: agricultural research, climate change, Atmospheric conditions

Useful for the analysis of: Crop production

Themes covered:

Spatial resolution (in meters): 25000.0

Temporal resolution: daily

Resource type: Dataset

Was generated by: Agricultural Model Intercomparison and Improvement Project (AgMIP)

Is referenced by: Ruane, A.C., R. Goldberg, and J. Chryssanthacopoulos, 2015: AgMIP climate forcing datasets for agricultural modeling: Merged products for gap-filling and historical climate series estimation, Agr. Forest Meteorol., 200, 233-248

Geographical coverage: World

Dataset type: GEOREFERENCED

Characterization last update: December 23, 2021

Characterization created at: December 21, 2021

Issued:

Last update: August 18, 2014

Periodicity: Irregular

Temporal extent: January, 1980 - December, 2010

Keywords: weather observation

Distributions

Title	Format	Access rights	Access URL	Compress format	Data service
AgMERRA data distribution	NetCDF	Public	https://data.giss.nasa.gov/impacts/agmipcf/agmerra/	NetCDF	False

Units of analysis

Name	Temporal extent	Aggregation level unit	Area size	Area size unit
AgMERRA 25km	January, 1980 - December, 2010	kilometre	625	square kilometre
AgMERRA 50km	January, 1980 - December, 2010	kilometre	2500	square kilometre
AgMERRA 100km	January, 1980 - December, 2010	kilometre	10000	square kilometre

Variables included

Name	Type	Unit of measurement	Temporal extent	Mathematical representation	Data frequency	Unit of analysis
Precipitation	Georeferenced variable	mm/day	January, 1980 - December, 2010	Sum	Irregular	AgMERRA 25km
Mean temperature	Georeferenced variable	°C	January, 1980 - December, 2010	Average	Irregular	AgMERRA 50km
Minimum temperature	Georeferenced variable	°C	January, 1980 - December, 2010	Min	Irregular	AgMERRA 50km

Maximum temperature	Georeferenced variable	°C	January, 1980 - December, 2010	Max	Irregular	AgMERRA 50km
Solar Radiation	Georeferenced variable	MJ/m2/day	January, 1980 - December, 2010	Sum	Irregular	AgMERRA 100km
Relative Humidity at Time of Max Temp	Georeferenced variable	%	January, 1980 - December, 2010	Instant value	Irregular	AgMERRA 25km
Wind Speed	Georeferenced variable	m/s	January, 1980 - December, 2010	Average	Irregular	AgMERRA 25km

European Climate Assessment & Dataset

General information

Description: Presented is information on changes in weather and climate extremes, as well as the daily dataset needed to monitor and analyse these extremes. ECA&D was initiated by the ECSN in 1998 and has received financial support from the EUMETNET and the European Commission.

Producer: EUMETNET

Link: https://www.ecad.eu/

Languages: English

Catalogue:

Subjects: environmental monitoring, Environment

Useful for the analysis of: Environmental policy

Themes covered:

Spatial resolution (in meters):

Temporal resolution:

Resource type:

Was generated by:

Is referenced by:

Geographical coverage: Austria, Belgium, Bulgaria, Cyprus, Czechia, Germany, Denmark, Spain, Estonia, Finland, France, Greece, Croatia, Hungary, Ireland, Italy, Lithuania, Luxembourg, Latvia, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Sweden

Dataset type: GEOREFERENCED

Characterization last update: January 7, 2022

Characterization created at: January 7, 2022

Issued: November 30, 2021

Last update: November 30, 2021

Periodicity: Continuous

Temporal extent: January, 2003 - November, 2021

Keywords: climate data

Distributions

Title	Format	Access rights	Access URL	Compress format	Data service
European Climate Assessment & Dataset	Encapsulated Postscript	Provisional data	https://surfobs.climate.copernicus.eu/dataaccess/access_eobs.php	Encapsulated Postscript	False

Units of analysis

Name	Temporal extent	Aggregation level unit	Area size	Area size unit

Variables included

Name	Type	Unit of measurement	Temporal extent	Mathematical representation	Data frequency	Unit of analysis

CORINE Land Cover - CLC 2006

General information

Description: CLC2006 is one of the Corine Land Cover (CLC) datasets produced within the frame the Copernicus Land Monitoring Service referring to land cover / land use status of year 2006. CLC service has a long-time heritage (formerly known as "CORINE Land Cover Programme"), coordinated by the European Environment Agency (EEA). It provides consistent and thematically detailed information on land cover and land cover changes across Europe.

Producer: European Environment Agency (EEA)

Link: https://land.copernicus.eu/pan-european/corine-land-cover/clc-2006

Languages: English

Catalogue: CORINE

Subjects: land use, environmental research, Agriculture, fisheries, forestry and food, Environment, Regions and cities, Geographical grid systems, Protected sites, Geology, Land cover, Agricultural and aquaculture facilities, Area management/restriction/regulation zones and reporting units, Bio-geographical regions, Land use

Useful for the analysis of: Energy use in agriculture, Climate change, Environmental policy, Greenhouse gas emissions

Themes covered:

Spatial resolution (in meters): 100.0

Temporal resolution:

Resource type: Dataset

Was generated by:

Is referenced by:

Geographical coverage: Kosovo, Albania, Austria, Belgium, Bulgaria, Bosnia and Herzegovina, Switzerland, Cyprus, Czechia, Germany, Denmark, Spain, Estonia, Finland, France, United Kingdom, Greece, Croatia, Hungary, Ireland, Iceland, Italy, Liechtenstein, Lithuania, Luxembourg, Latvia, North Macedonia, Malta, Montenegro, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Sweden, Turkey

Dataset type: GEOREFERENCED

Characterization last update: January 14, 2022

Characterization created at: March 29, 2021

Issued: June 14, 2019

Last update: May 13, 2020

Periodicity: Irregular

Temporal extent: January, 2005 - December, 2007

Keywords:

Distributions

Title	Format	Access rights	Access URL	Compress format	Data service
SQLite Database	SQL	Public	https://land.copernicus.eu/pan-european/corine-land-cover/clc-2006?tab=download	SQL	False
ESRI Geodatabase	Esri File Geodatabase	Public	https://land.copernicus.eu/pan-european/corine-land-cover/clc-2006?tab=download	Esri File Geodatabase	False
100m GeoTiff	GeoTIFF	Public	https://land.copernicus.eu/pan-european/corine-land-cover/clc-2006?tab=download	GeoTIFF	False

Units of analysis

Name	Temporal extent	Aggregation level unit	Area size	Area size unit
MMU	January, 2005 - December, 2007		25	hectare

Variables included

Name	Type	Unit of measurement	Temporal extent	Mathematical representation	Data frequency	Unit of analysis
Artificial Surfaces	Georeferenced variable	hectare	January, 2005 - December, 2007	Instant value	Irregular	MMU
Agricultural Areas	Georeferenced variable	hectare	January, 2005 - December, 2007	Instant value	Irregular	MMU
Forest and Seminatural Areas	Georeferenced variable	hectare	January, 2005 - December, 2007	Instant value	Irregular	MMU
Wetlands	Georeferenced variable	hectare	January, 2005 - December, 2007	Instant value	Irregular	MMU
Water Bodies	Georeferenced variable	hectare	January, 2005 - December, 2007	Instant value	Irregular	MMU

Distribution of irrigated crops in Europe

General information

Description: This dataset describes the distribution of main irrigated crop classes in Europe in 10 km x 10km spatial resolution. Additionally, two distinctive classes are provided for irrigated areas (without crop differentiation): IA (area irrigated at least once a year), and TIA (total irrigable area, defined as area equipped for irrigation). The maps of irrigated crops were obtained by disaggregating regional statistics on irrigated areas by crop type, collected during the Farm Structure Survey 2010 (EUROSTAT 2010) into the EEA reference grid.

Producer: MARS-AGRI4CAST

Link: https://agri4cast.jrc.ec.europa.eu/dataportal/

Languages: English

Catalogue: Agri4Cast

Subjects: means of agricultural production, agricultural holdings, agricultural equipment, agricultural statistics, water, water policy, aquaculture, Agriculture, fisheries, forestry and food, Environment, Farm Structure, Agricultural and aquaculture facilities, Environmental monitoring facilities, Hydrography

Useful for the analysis of: Agriculture policy, Climate change, Crop production, Environmental policy, Farm structure, Freshwater abstractions, Use of water, Water change

Themes covered:

Spatial resolution (in meters): 10000.0

Temporal resolution:

Resource type: Dataset

Was generated by:

Is referenced by:

Geographical coverage: Europe

Dataset type: GEOREFERENCED

Characterization last update: January 13, 2022

Characterization created at: December 14, 2021

Issued: March 26, 2021

Last update: March 26, 2021

Periodicity: Irregular

Temporal extent: January, 2010 - January, 2010

Keywords:

Distributions

Title	Format	Access rights	Access URL	Compress format	Data service
Distribution of irrigated crops in Europe	ZIP	Restricted	https://agri4cast.jrc.ec.europa.eu/DataPortal/Index.aspx?o=	ZIP	False

Units of analysis

Name	Temporal extent	Aggregation level unit	Area size	Area size unit
square grid	January, 2010 - December, 2010		100	square kilometre

Variables included

Name	Type	Unit of measurement	Temporal extent	Mathematical representation	Data frequency	Unit of analysis
Cereals (excluding maize and rice)	Georeferenced variable	irrigated hectare	January, 2010 - December, 2010			square grid
Maize (grain and green)	Georeferenced variable	irrigated hectare	January, 2010 - December, 2010			square grid
Pulses	Georeferenced variable	irrigated hectare	January, 2010 - December, 2010			square grid

Potatoes	Georeferenced variable	irrigated hectare	January, 2010 - December, 2010			square grid
Sugarbeet	Georeferenced variable	irrigated hectare	January, 2010 - December, 2010			square grid
Turniprape	Georeferenced variable	irrigated hectare	January, 2010 - December, 2010			square grid
Sunflower (number of days)	Georeferenced variable	irrigated hectare	January, 2010 - December, 2010			square grid
FIELD_VEGE (fresh vegetables, melons, strawberries - open field)	Georeferenced variable	irrigated hectare	January, 2010 - December, 2010			square grid
Grass (day of year)	Georeferenced variable	irrigated hectare	January, 2010 - December, 2010			square grid
Vines	Georeferenced variable	irrigated hectare	January, 2010 - December, 2010			square grid
Citrus (day of year)	Georeferenced variable	irrigated hectare	January, 2010 - December, 2010			square grid
Olives (number of days)	Georeferenced variable	irrigated hectare	January, 2010 - December, 2010			square grid
Rice (number of days)	Georeferenced variable	irrigated hectare	January, 2010 - December, 2010			square grid
IA (number of days)	Georeferenced variable	irrigated hectare	January, 2010 - December, 2010			square grid
TIA (number of days)	Georeferenced variable	irrigated hectare	January, 2010 - December, 2010			square grid
NUTS_IDS	Georeferenced variable	NUTS2 code	January, 2010 - December, 2010			square grid

| GRIDS_IDS | Georeferenced variable | NUTS_IDS + undrscore + EEA reference grid ID | January, 2010 - December, 2010 | | | square grid |

Gridded Remote Sensing Data in Europe

General information

Description: Remote Sensing data for vegetation monitoring in Europe. The aggregation procedure considers only pixels with a given threshold of land cover according to Genovese et al. methodology [2001 - Agronomie 21, 91–111].

Producer: Directorate D - Sustainable resources / Unit 05 - Food security

Link: https://agri4cast.jrc.ec.europa.eu/DataPortal/Index.aspx?o=

Languages: English

Catalogue: Agri4Cast

Subjects: land use, agricultural holdings, vegetable, Agriculture, fisheries, forestry and food

Useful for the analysis of: Agriculture policy, land use

Themes covered:

Spatial resolution (in meters): 25000.0

Temporal resolution:

Resource type:

Was generated by:

Is referenced by:

Geographical coverage: Albania, Andorra, Armenia, Austria, Azerbaijan, Belgium, Bulgaria, Bosnia and Herzegovina, Belarus, Switzerland, Cyprus, Czechia, Germany, Denmark, Algeria, Egypt, Spain, Estonia, Finland, France, Faroes, Georgia, Guernsey, Gibraltar, Greece, Croatia, Hungary, Isle of Man, Ireland, Israel, Italy, Jersey, Lebanon, Libya, Liechtenstein, Lithuania, Luxembourg, Latvia, Morocco, Monaco, Moldova, North Macedonia, Malta, Montenegro, Netherlands, Norway, Poland, Portugal, Romania, Russia, San Marino, Serbia, Slovakia, Slovenia, Sweden

Dataset type: GEOREFERENCED

Characterization last update: January 13, 2022

Characterization created at: December 15, 2021

Issued: December 31, 2016

Last update: December 31, 2016

Periodicity: Irregular

Temporal extent: March, 2007 - December, 2016

Keywords:

Distributions

Title	Format	Access rights	Access URL	Compress format	Data service
Gridded Remote Sensing Data in Europe	CSV	Restricted	https://agri4cast.jrc.ec.europa.eu/DataPortal/Index.aspx?o=	CSV	False

Units of analysis

Name	Temporal extent	Aggregation level unit	Area size	Area size unit
square grid	December, 2016 - December, 2016		625	square kilometre

Variables included

Name	Type	Unit of measurement	Temporal extent	Mathematical representation	Data frequency	Unit of analysis
Normalized Difference Vegetation Index	Georeferenced variable		December, 2016 - December, 2016	Average		square grid
Fraction of Absorbed PAR-Radiation	Georeferenced variable		December, 2016 - December, 2016	Average		square grid
Normalized Difference Vegetation	Georeferenced variable		December, 2016 - December, 2016	Average		square grid

Index (Smoothed)						
Fraction of Absorbed PAR-Radiation (Smoothed)	Georeferenced variable		December, 2016 - December, 2016	Average		square grid

CORINE Land Cover - CLC 2018

General information

Description: CLC2018 is one of the Corine Land Cover (CLC) datasets produced within the frame the Copernicus Land Monitoring Service referring to land cover / land use status of year 2018. CLC service has a long-time heritage (formerly known as "CORINE Land Cover Programme"), coordinated by the European Environment Agency (EEA). It provides consistent and thematically detailed information on land cover and land cover changes across Europe.

Producer: European Environment Agency (EEA)

Link: https://land.copernicus.eu/pan-european/corine-land-cover/clc2018

Languages: English

Catalogue: CORINE

Subjects: land use, environmental research, Agriculture, fisheries, forestry and food, Environment, Regions and cities, Geographical grid systems, Protected sites, Geology, Land cover, Agricultural and aquaculture facilities, Area management/restriction/regulation zones and reporting units, Bio-geographical regions, Land use

Useful for the analysis of: Energy use in agriculture, Climate change, Environmental policy, Greenhouse gas emissions

Themes covered:

Spatial resolution (in meters):

Temporal resolution:

Resource type: Dataset

Was generated by:

Is referenced by:

Geographical coverage: Kosovo, Albania, Austria, Belgium, Bulgaria, Bosnia and Herzegovina, Switzerland, Cyprus, Czechia, Germany, Denmark, Spain, Estonia, Finland, France, United Kingdom, Greece, Croatia, Hungary, Ireland, Iceland, Italy, Liechtenstein, Lithuania, Luxembourg, Latvia, North Macedonia, Malta, Montenegro, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Sweden, Turkey

Dataset type: GEOREFERENCED

Characterization last update: January 14, 2022

Characterization created at: March 26, 2021

Issued: June 14, 2019

Last update: May 13, 2020

Periodicity: Irregular

Temporal extent: January, 2017 - December, 2018

Keywords:

Distributions

Title	Format	Access rights	Access URL	Compress format	Data service
SQLite Database	SQL	Public	https://land.copernicus.eu/pan-european/corine-land-cover/clc2018?tab=download	SQL	False
ESRI Geodatabase	Esri File Geodatabase	Public	https://land.copernicus.eu/pan-european/corine-land-cover/clc2018?tab=download	Esri File Geodatabase	False
100m GeoTiff	GeoTIFF	Public	https://land.copernicus.eu/pan-european/corine-land-cover/clc2018?tab=download	GeoTIFF	False

Units of analysis

Name	Temporal extent	Aggregation level unit	Area size	Area size unit
MMU	January, 2017 - December, 2018	hectare	25	hectare

Variables included

Name	Type	Unit of measurement	Temporal extent	Mathematical representation	Data frequency	Unit of analysis
Artificial Surfaces	Georeferenced variable	hectare	January, 2017 - December, 2018	Instant value	Irregular	MMU
Agricultural Areas	Georeferenced variable	hectare	January, 2017 - December, 2018	Instant value	Irregular	MMU
Forest and Seminatural Areas	Georeferenced variable	hectare	January, 2017 - December, 2018	Instant value	Irregular	MMU
Wetlands	Georeferenced variable	hectare	January, 2017 - December, 2018	Instant value	Irregular	MMU
Water Bodies	Georeferenced variable	hectare	January, 2017 - December, 2018	Instant value	Irregular	MMU

Subnational crop statistics of the European Union

General information

Description: Harmonised subnational crop statistics on area, production, and yield, collected for the EU from National Statistical Institutes and the Eurostat REGIO DB. Crop statistics available for soft, durum and total wheat.

Producer: Food Security Unit of the Joint Research Center (JRC.D.5)

Link: https://agri4cast.jrc.ec.europa.eu/dataportal/

Languages: English

Catalogue: Agri4Cast

Subjects: agricultural region, crop production, Agriculture, fisheries, forestry and food, Land use

Useful for the analysis of: Crop production, Farm size, land use, production indices, Use of agricultural area

Themes covered:

Spatial resolution (in meters):

Temporal resolution: Annual

Resource type: Dataset

Was generated by:

Is referenced by:

Geographical coverage: SE33, HR02, FI1A, SE32, FI13, FI19, SE31, FI20, FI18, SE11, SE12, EE00, SE23, SE21, DK05, LV00, DK04, SE22, DK01, DE80, PL34, PL42, PL61, NL11, DE50, NL12, DE93, NL13, DE94, NL31, PL41, DE92, NL22, NL33, DEA4, PL12, DE42, PL11, DE91, DEA3, CZ04, NL41, PL31, NL34, DEE0, DED3, DEA1, BE21, PL52, DEA5, PL33, DED2, NL42, BE24, PL51, BE22, FR30, NL23, DE30, IE02, NL21, DE41, NL32, PL43, DK03, DK02, LT00, PL62, PL63, IE01, DEF0, DE60, RO12, FR53, ITC2, HR01, SI01, SI02, ITD4, FR63, RO42, FR72, ITC4, BE10, BE25, BE23, DE73, DEA2, BE31, CZ02, DE72, DED1, DEG0, BE33, BE32, BE35, CZ08, CZ05, LU00, CZ01, PL22, DEB1, DE24, DEB2, PL32, DE26, PL21, BE34, FR22, DE71, CZ03, CZ06, CZ07, FR23, DEC0, DEB3, DE25, DE23, SK04, FR25, SK03, FR10, DE11, SK02, FR21, SK01, DE12, DE22, FR41, AT13, FR42, FR52, HU31, AT31, AT12, DE13, DE14, DE21, DE27, HU32, HU10, AT34, HU21, AT11, RO11, FR43, AT32, FR24, AT22, FR26, AT33, ITD1, FR51, HU22, RO21, HU33, AT21, ITD2, HU23, ITE2, FR81, BG34, ES23, ES11, ITF1, FR83, BG41, BG42, ITF2, ITE4, ITF4, GR13, GR12, PT16, GR14, ITG2, ES43, ES42, GR21, ES53, ES52, PT17, ES62, ITF6, GR24, PT18, GR23, GR22, PT20, ES51, ES24, ES30, ES41, PT11, ITF3, ITF5, GR11, FR71, ITD3, ITC1, RO22, RO41, RO32, RO31, ITD5, ITC3, FR82, ES12, FR61, BG33,

ES13, BG31, ES22, ITE3, FR62, ES21, ITE1, BG32, HR03, GR41, PT15, GR25, ITG1, ES61, GR30, MT00, ES63, GR42, CY00, GR43, ES64, PT30, ES70, FR91, FR92, FR93, FR94

Dataset type: GEOREFERENCED

Characterization last update: January 13, 2022

Characterization created at: December 13, 2021

Issued: March 15, 2021

Last update: March 15, 2021

Periodicity: Annual

Temporal extent: January, 1975 - December, 2019

Keywords:

Distributions

Title	Format	Access rights	Access URL	Compress format	Data service
Subnational crop statistics of the European Union	CSV	Restricted	https://agri4cast.jrc.ec.europa.eu/dataportal/	CSV	False

Units of analysis

Name	Temporal extent	Aggregation level unit	Area size	Area size unit
NUTS 2 Region	January, 1975 - December, 2019		1	NUTS2
Crop name	January, 1975 - December, 2019		1	NUTS2

Variables included

Name	Type	Unit of measurement	Temporal extent	Mathematical representation	Data frequency	Unit of analysis

Area	Georeferenced variable	hectare	January, 1975 - December, 2019	Sum	Annual	NUTS 2 Region, Crop name
Production	Georeferenced variable	tonne	January, 1975 - December, 2019	Sum	Annual	NUTS 2 Region, Crop name
Yield	Georeferenced variable	tonnes/hectare	January, 1975 - December, 2019	Sum	Annual	NUTS 2 Region, Crop name
Data source	Georeferenced variable		January, 1975 - December, 2019		Annual	NUTS 2 Region, Crop name
Region Transformation	Georeferenced variable		January, 1975 - December, 2019		Annual	NUTS 2 Region, Crop name
Crop Transformation	Georeferenced variable		January, 1975 - December, 2019		Annual	NUTS 2 Region, Crop name
Calculated Value	Georeferenced variable		January, 1975 - December, 2019		Annual	NUTS 2 Region, Crop name
Coherence Between Indicators	Georeferenced variable		January, 1975 - December, 2019		Annual	NUTS 2 Region, Crop name
Zero Set as Null	Georeferenced variable		January, 1975 - December, 2019		Annual	NUTS 2 Region, Crop name
Coherence Between Crops	Georeferenced variable		January, 1975 - December, 2019		Annual	NUTS 2 Region, Crop name

European mountain areas

General information

Description: The delineation of European mountain areas was carried out by using digital elevation models, considering different criteria combination of thresholds of altitude, climate, and topography variables (IP2008 8.2.7 Regional and territorial development of mountain areas, ETC/LUSI - EEA). This dataset was created in 2008, covers the full European continent and is a reference layer for the EEA Report No 6/2010 on Europe's ecological backbone: recognising the true value of our mountain.

Producer: European Environment Agency

Link: https://sdi.eea.europa.eu/catalogue/srv/eng/catalog.search#/metadata/60c8302b-35cd-4376-9cda-865dd42fab7b

Languages: English

Catalogue: BISE - Biodiversity Information System for Europe

Subjects: mountain region, Environment, Agriculture, fisheries, forestry and food, Geographical grid systems, Soil

Useful for the analysis of: Climate change

Themes covered:

Spatial resolution (in meters):

Temporal resolution: Annual

Resource type: Dataset

Was generated by: the EEA Report No 6/2010 on Europe's ecological backbone: recognising the true value of our mountain

Is referenced by:

Geographical coverage: Kosovo, Albania, Andorra, Austria, Belgium, Bulgaria, Bosnia and Herzegovina, Switzerland, Cyprus, Czechia, Germany, Denmark, Spain, Estonia, Finland, France, United Kingdom, Greece, Croatia, Hungary, Ireland, Iceland, Italy, Liechtenstein, Lithuania, Luxembourg, Latvia, North Macedonia, Malta, Montenegro, Netherlands, Norway, Poland, Portugal, Romania, San Marino, Serbia, Slovakia, Slovenia, Sweden, Turkey

Dataset type: GEOREFERENCED

Characterization last update: January 13, 2022

Characterization created at: December 2, 2021

Issued: December 12, 2008

Last update: October 13, 2020

Periodicity: Irregular

Temporal extent: January, 2008 - December, 2008

Keywords: environment

Distributions

Title	Format	Access rights	Access URL	Compress format	Data service
European mountain areas - version 1, Dec. 2008	XML	Public	https://sdi.eea.europa.eu/catalogue/srv/eng/catalog.search#/metadata/60c8302b-35cd-4376-9cda-865dd42fab7b	XML	False
European mountain areas - version 1, Dec. 2008	PDF	Public	https://sdi.eea.europa.eu/catalogue/srv/eng/catalog.search#/metadata/60c8302b-35cd-4376-9cda-865dd42fab7b	PDF	False
European mountain areas - version 1, Dec. 2008	Esri Shape	Public	https://sdi.eea.europa.eu/catalogue/srv/eng/catalog.search#/metadata/60c8302b-35cd-4376-9cda-865dd42fab7b	Esri Shape	False

Units of analysis

Name	Temporal extent	Aggregation level unit	Area size	Area size unit

| 10x10 square kilometre | January, 2008 - December, 2008 | | 10 | square kilometre |

Variables included

Name	Type	Unit of measurement	Temporal extent	Mathematical representation	Data frequency	Unit of analysis

European Forest Areas based on Copernicus data (2015)

General information

Description: These data sets show the European forest area in 2012 and in 2015 at 100m spatial resolution, covering EEA39 countries. They are based on Copernicus HRL forest products at 20m spatial resolution and comply with the FAO forest definition (i.e. minimum mapping unit of 0.5 ha, minimum coverage of 10% and excluding land that is predominantly under agricultural or urban land use). After the selection of those pixels identified as forest by the HRL forest products and also compliant with FAO criteria, the forest area dataset at 100m was computed as a Boolean product (i.e. forest / non-forest). The value 1 (forest area) corresponds to the pixels where the forest is the major coverage; otherwise, the pixel value is 0 (non-forest area).

Producer: European Environment Agency

Link: https://sdi.eea.europa.eu/catalogue/srv/eng/catalog.search#/metadata/afe358ed-2c31-4176-8a83-13a530c57091

Languages: English

Catalogue: BISE - Biodiversity Information System for Europe

Subjects: forest, land use, Environment, Agriculture, fisheries, forestry and food, Land cover, Land use

Useful for the analysis of: Climate change, Forestry output

Themes covered:

Spatial resolution (in meters): 100.0

Temporal resolution: Annual

Resource type: Dataset

Was generated by:

Is referenced by:

Geographical coverage: Kosovo, Albania, Andorra, Austria, Belgium, Bulgaria, Bosnia and Herzegovina, Switzerland, Cyprus, Czechia, Germany, Denmark, Spain, Estonia, Finland, France, United Kingdom, Greece, Croatia, Hungary, Ireland, Iceland, Italy, Liechtenstein, Lithuania, Luxembourg, Latvia, North Macedonia, Malta, Montenegro, Netherlands, Norway, Poland, Portugal, Romania, San Marino, Serbia, Slovakia, Slovenia, Sweden, Turkey

Dataset type: GEOREFERENCED

Characterization last update: January 14, 2022

Characterization created at: December 16, 2021

Issued: October 30, 2018

Last update: July 10, 2020

Periodicity: Irregular

Temporal extent: January, 2015 - December, 2015

Keywords: environment

Distributions

Title	Format	Access rights	Access URL	Compress format	Data service
Forest Area 2015 based on Copernicus HRL Forest products - version 1, Oct. 2018	XML	Public	https://sdi.eea.europa.eu/catalogue/srv/eng/catalog.search#/metadata/afe358ed-2c31-4176-8a83-13a530c57091	XML	False
Forest Area 2015 based on Copernicus HRL Forest products - version 1, Oct. 2018	PDF	Public	https://sdi.eea.europa.eu/catalogue/srv/eng/catalog.search#/metadata/afe358ed-2c31-4176-8a83-13a530c57091	PDF	False
Forest Area 2015 based on Copernicus HRL Forest products - version 1, Oct. 2018	GeoTIFF	Public	https://sdi.eea.europa.eu/data/afe358ed-2c31-4176-8a83-13a530c57091	GeoTIFF	False

Units of analysis

Name	Temporal extent	Aggregation level unit	Area size	Area size unit
square grid	January, 2015 - December, 2015		1	hectare

Variables included

Name	Type	Unit of measurement	Temporal extent	Mathematical representation	Data frequency	Unit of analysis
forest area	Georeferenced variable	boolean	January, 2015 - December, 2015			square grid

CORINE Land Cover - CHA 1990-2000

General information

Description: CHA9000 is one of the Corine Land Cover (CLC) datasets produced within the frame the Copernicus Land Monitoring Service referring to land cover / land use status between the years 1990 and 2000. CLC service has a long-time heritage (formerly known as "CORINE Land Cover Programme"), coordinated by the European Environment Agency (EEA). It provides consistent and thematically detailed information on land cover and land cover changes across Europe.

Producer: European Environment Agency (EEA)

Link: https://land.copernicus.eu/pan-european/corine-land-cover/lcc-1990-2000

Languages: English

Catalogue: CORINE

Subjects: land use, environmental research, Agriculture, fisheries, forestry and food, Environment, Regions and cities, Geographical grid systems, Protected sites, Geology, Land cover, Agricultural and aquaculture facilities, Area management/restriction/regulation zones and reporting units, Bio-geographical regions, Land use

Useful for the analysis of: Energy use in agriculture, Climate change, Environmental policy, Greenhouse gas emissions

Themes covered:

Spatial resolution (in meters): 100.0

Temporal resolution:

Resource type: Dataset

Was generated by:

Is referenced by:

Geographical coverage: Austria, Belgium, Bulgaria, Czechia, Germany, Denmark, Spain, Estonia, France, Greece, Croatia, Hungary, Ireland, Italy, Liechtenstein, Lithuania, Luxembourg, Latvia, Malta, Montenegro, Netherlands, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Turkey

Dataset type: GEOREFERENCED

Characterization last update: January 14, 2022

Characterization created at: March 30, 2021

Issued: June 14, 2019

Last update: May 13, 2020

Periodicity: Irregular

Temporal extent: January, 1986 - December, 2001

Keywords:

Distributions

Title	Format	Access rights	Access URL	Compress format	Data service
SQLite Database	SQL	Public	https://land.copernicus.eu/pan-european/corine-land-cover/lcc-1990-2000?tab=download	SQL	False
ESRI Geodatabase	Esri File Geodatabase	Public	https://land.copernicus.eu/pan-european/corine-land-cover/lcc-1990-2000?tab=download	Esri File Geodatabase	False
100m GeoTiff	GeoTIFF	Public		GeoTIFF	False

Units of analysis

Name	Temporal extent	Aggregation level unit	Area size	Area size unit
MMU	January, 1986 - December, 2001	hectare	5	hectare

Variables included

Name	Type	Unit of measurement	Temporal extent	Mathematical representation	Data frequency	Unit of analysis

Artificial Surfaces	Georeferenced variable	hectare	January, 1986 - December, 2001	Instant value	Irregular	MMU
Agricultural Areas	Georeferenced variable	hectare	January, 1986 - December, 2001	Instant value	Irregular	MMU
Forest and Seminatural Areas	Georeferenced variable	hectare	January, 1986 - December, 2001	Instant value	Irregular	MMU
Wetlands	Georeferenced variable	hectare	January, 1986 - December, 2001	Instant value	Irregular	MMU
Water Bodies	Georeferenced variable	hectare	January, 1986 - December, 2001	Instant value	Irregular	MMU

Monthly Heating and Cooling Degree Days in the European Union

General information

Description: Monthly Heating and Cooling Degree Days in the European Union. The time series starts in 1979 until 2020, the 1978 year contains the long-term average that covers the period 1979-2020.

Producer: Joint Research Center (JRC)

Link: https://agri4cast.jrc.ec.europa.eu/DataPortal/Index.aspx?o=

Languages: English

Catalogue: Agri4Cast

Subjects: energy consumption, meteorology, Energy, Environment, Atmospheric Conditions and meteorological geographical features

Useful for the analysis of: Environmental policy

Themes covered:

Spatial resolution (in meters):

Temporal resolution:

Resource type:

Was generated by:

Is referenced by:

Geographical coverage: Austria, Belgium, Bulgaria, Switzerland, Cyprus, Czechia, Germany, Denmark, Spain, Estonia, Finland, France, United Kingdom, Greece, Croatia, Hungary, Ireland, Italy, Lithuania, Luxembourg, Latvia, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Sweden

Dataset type: GEOREFERENCED

Characterization last update: January 14, 2022

Characterization created at: March 18, 2021

Issued: January 15, 2021

Last update:

Periodicity: Annual

Temporal extent: January, 1979 - December, 2020

Keywords:

Distributions

Title	Format	Access rights	Access URL	Compress format	Data service
CSV	CSV	Public		CSV	False

Units of analysis

Name	Temporal extent	Aggregation level unit	Area size	Area size unit
Country	January, 1979 - December, 2020	NUTS3	1	Country
NUTS1	January, 1979 - December, 2020	NUTS3	1	NUTS1
NUTS2	January, 1979 - December, 2020	NUTS3	1	NUTS2
NUTS3	December, 1979 - December, 2020	NUTS3	1	NUTS3

Variables included

Name	Type	Unit of measurement	Temporal extent	Mathematical representation	Data frequency	Unit of analysis
Monthly Cooling Degree Day	Georeferenced variable	Degrees	January, 1979 - December, 2020	Sum	Monthly	Country, NUTS1, NUTS2, NUTS3
Monthly Heating Degree Day	Georeferenced variable	Degrees	January, 1979 - December, 2020	Sum	Monthly	Country, NUTS1, NUTS2, NUTS3

Yearly modeled crop area in EU at regional level

General information

Description: Yearly modeled crop area in EU at regional level

Producer: Directorate D - Sustainable resources / Unit 05 - Food security

Link: https://agri4cast.jrc.ec.europa.eu/DataPortal/Index.aspx?o=d

Languages: English

Catalogue: Agri4Cast

Subjects: crop production, agricultural statistics, Agriculture, fisheries, forestry and food, Land cover

Useful for the analysis of: Environmental policy

Themes covered:

Spatial resolution (in meters):

Temporal resolution: Year

Resource type:

Was generated by:

Is referenced by:

Geographical coverage: Europe

Dataset type: GEOREFERENCED

Characterization last update: January 14, 2022

Characterization created at: March 18, 2021

Issued: September 12, 2017

Last update:

Periodicity: Annual

Temporal extent: January, 1975 - December, 2017

Keywords:

Distributions

Title	Format	Access rights	Access URL	Compress format	Data service
Text	Plain text	Public	https://agri4cast.jrc.ec.europa.eu/DataPortal/Index.aspx?o=	Plain text	False
CSV	CSV	Public	https://agri4cast.jrc.ec.europa.eu/DataPortal/Index.aspx?o=	CSV	False

Units of analysis

Name	Temporal extent	Aggregation level unit	Area size	Area size unit
NUTS 1	January, 1975 - December, 2017		1	NUTS1
NUTS2	January, 1975 - December, 2017		1	NUTS2
NUTS3	January, 1975 - December, 2017		1	NUTS3

Variables included

Name	Type	Unit of measurement	Temporal extent	Mathematical representation	Data frequency	Unit of analysis
Crop	Georeferenced variable		January, 1975 - December, 2017			NUTS 1, NUTS2, NUTS3
Modeled Crop Area	Georeferenced variable		January, 1975 - December, 2017			NUTS 1, NUTS2, NUTS3
Weight Ratio	Georeferenced variable		January, 1975 - December, 2017			NUTS 1, NUTS2, NUTS3

CORINE Land Cover - CHA 2012-2018

General information

Description: CHA1218 is one of the Corine Land Cover (CLC) datasets produced within the frame the Copernicus Land Monitoring Service referring to land cover / land use status between the years 2012 and 2018. CLC service has a long-time heritage (formerly known as "CORINE Land Cover Programme"), coordinated by the European Environment Agency (EEA). It provides consistent and thematically detailed information on land cover and land cover changes across Europe.

Producer: European Environment Agency (EEA)

Link: https://land.copernicus.eu/pan-european/corine-land-cover/lcc-2012-2018

Languages: English

Catalogue: CORINE

Subjects: land use, environmental research, Agriculture, fisheries, forestry and food, Environment, Regions and cities, Geographical grid systems, Protected sites, Geology, Land cover, Agricultural and aquaculture facilities, Area management/restriction/regulation zones and reporting units, Bio-geographical regions, Land use

Useful for the analysis of: Energy use in agriculture, Climate change, Environmental policy, Greenhouse gas emissions

Themes covered:

Spatial resolution (in meters):

Temporal resolution:

Resource type: Dataset

Was generated by:

Is referenced by:

Geographical coverage: Kosovo, Albania, Austria, Belgium, Bulgaria, Bosnia and Herzegovina, Switzerland, Cyprus, Czechia, Germany, Denmark, Spain, Estonia, Finland, France, United Kingdom, Greece, Croatia, Hungary, Ireland, Iceland, Italy, Liechtenstein, Lithuania, Luxembourg, Latvia, North Macedonia, Malta, Montenegro, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Sweden, Turkey

Dataset type: GEOREFERENCED

Characterization last update: January 14, 2022

Characterization created at: March 29, 2021

Issued: June 14, 2019

Last update: May 13, 2020

Periodicity: Irregular

Temporal extent: January, 2011 - December, 2018

Keywords: land cover, copernicus, satellite image interpretation, corine

Distributions

Title	Format	Access rights	Access URL	Compress format	Data service
100m GeoTiff	GeoTIFF	Public	https://land.copernicus.eu/pan-european/corine-land-cover/lcc-2012-2018?tab=download	GeoTIFF	False
ESRI Geodatabase	Esri File Geodatabase	Public	https://land.copernicus.eu/pan-european/corine-land-cover/lcc-2012-2018?tab=download	Esri File Geodatabase	False
SQLite Database	SQL	Public	https://land.copernicus.eu/pan-european/corine-land-cover/lcc-2012-2018?tab=download	SQL	False

Units of analysis

Name	Temporal extent	Aggregation level unit	Area size	Area size unit
MMU	January, 2011 - December, 2018	hectare	5	hectare

Variables included

Name	Type	Unit of measurement	Temporal extent	Mathematical representation	Data frequency	Unit of analysis
Agricultural Areas	Georeferenced variable	hectare	January, 2011 - December, 2018	Instant value	Irregular	MMU
Forest and Seminatural Areas	Georeferenced variable	hectare	January, 2011 - December, 2018	Instant value	Irregular	MMU
Wetlands	Georeferenced variable	hectare	January, 2011 - December, 2018	Instant value	Irregular	MMU
Water Bodies	Georeferenced variable	hectare	January, 2011 - December, 2018	Instant value	Irregular	MMU
Artificial Surfaces	Georeferenced variable	hectare	January, 2011 - December, 2018	Instant value	Irregular	MMU

WorldClim Version 2.1

General information

Description: There are monthly climate data for minimum, mean, and maximum temperature, precipitation, solar radiation, wind speed, water vapor pressure, and for total precipitation. There are also 19 "bioclimatic" variables.

The data is available at the four spatial resolutions, between 30 seconds (~1 km2) to 10 minutes (~340 km2). Each download is a "zip" file containing 12 GeoTiff (.tif) files, one for each month of the year (January is 1; December is 12).

Producer: Geospatial and Farming Systems Consortium of the Sustainable Intensification Innovation Lab

Link: https://worldclim.org/data/worldclim21.html

Languages: English

Catalogue:

Subjects: meteorology, Environment, Geographical grid systems, Atmospheric conditions, Bio-geographical regions, Meteorological geographical features, Atmospheric Conditions and meteorological geographical features

Useful for the analysis of: Climate change, Environmental policy, Energy use in agriculture

Themes covered:

Spatial resolution (in meters):

Temporal resolution: Monthly

Resource type: Dataset

Was generated by: SRTM elevation data

Is referenced by: https://rmets.onlinelibrary.wiley.com/doi/abs/10.1002/joc.5086

Geographical coverage: Africa, America, Antarctica, Asia, Europe, Oceania

Dataset type: GEOREFERENCED

Characterization last update: January 14, 2022

Characterization created at: April 12, 2021

Issued: January 1, 2020

Last update:

Periodicity: Irregular

Temporal extent: January, 1970 - January, 2000

Keywords: climate data

Distributions

Title	Format	Access rights	Access URL	Compress format	Data service
GeoTIFF	GeoTIFF	Public	https://worldclim.org /data/worldclim21.ht ml#google_vignette	GeoTIFF	False

Units of analysis

Name	Temporal extent	Aggregation level unit	Area size	Area size unit
Grid (30 seconds)	January, 1970 - December, 2000		1	square kilometre
Grid (2,5 minutes)	January, 1970 - January, 2000		21	square kilometre
Grid (5 minutes)	January, 1970 - January, 2000		86	square kilometre
Grid (10 minutes)	January, 1970 - January, 2000		340	square kilometre

Variables included

Name	Type	Unit of measurement	Temporal extent	Mathematical representation	Data frequency	Unit of analysis
Precipitation of Driest Month	Georeferenced variable	mm	January, 1970 - December, 2000	Min	Annual	Grid (30 seconds), Grid (2,5 minutes), Grid (5 minutes), Grid (10 minutes)

Precipitation Seasonality	Georeferenced variable	mm	January, 1970 - December, 2000	Variance	Annual	Grid (30 seconds), Grid (2,5 minutes), Grid (5 minutes), Grid (10 minutes)
Precipitation of Wettest Quarter	Georeferenced variable	mm	January, 1970 - December, 2000	Sum	Annual	Grid (30 seconds), Grid (2,5 minutes), Grid (5 minutes), Grid (10 minutes)
Precipitation of Driest Quarter	Georeferenced variable	mm	January, 1970 - December, 2000	Sum	Annual	Grid (30 seconds), Grid (2,5 minutes), Grid (5 minutes), Grid (10 minutes)
Precipitation of Warmest Quarter	Georeferenced variable	mm	January, 1970 - December, 2000	Sum	Annual	Grid (30 seconds), Grid (2,5 minutes), Grid (5 minutes), Grid (10 minutes)
Precipitation of Coldest Quarter	Georeferenced variable	mm	January, 1970 - December, 2000	Sum	Annual	Grid (30 seconds), Grid (2,5 minutes), Grid (5 minutes), Grid (10 minutes)
Mean Temperature of Warmest Quarte	Georeferenced variable	Celsius	January, 1970 - December, 2000	Average	Annual	Grid (30 seconds), Grid (2,5 minutes), Grid (5 minutes), Grid (10 minutes)
Mean Temperature of Coldest Quarter	Georeferenced variable	Celsius	January, 1970 - December, 2000	Average	Annual	Grid (30 seconds), Grid (2,5 minutes), Grid (5 minutes), Grid (10 minutes)
Precipitation of Wettest Month	Georeferenced variable	mm	January, 1970 - December, 2000	Max	Annual	Grid (30 seconds), Grid (2,5 minutes), Grid (5 minutes), Grid (10 minutes)
Minimum temperature	Georeferenced variable	Celsius	January, 1970 - December, 2000	Average	Monthly	Grid (30 seconds), Grid (2,5 minutes), Grid (5 minutes), Grid (10 minutes)
Maximum temperature	Georeferenced variable	Celsius	January, 1970 - December, 2000	Average	Monthly	Grid (30 seconds), Grid (2,5 minutes), Grid (5 minutes), Grid (10 minutes)
Average temperature	Georeferenced variable	Celsius	January, 1970 - December, 2000	Average	Monthly	Grid (30 seconds), Grid (2,5 minutes), Grid (5 minutes), Grid (10 minutes)
Precipitation	Georeferenced variable	mm	January, 1970 - December, 2000	Sum	Monthly	Grid (30 seconds), Grid (2,5 minutes), Grid (5 minutes), Grid (10 minutes)
Solar radiation	Georeferenced variable	kJ m-2 day-1	January, 1970 - December, 2000	Average	Monthly	Grid (30 seconds), Grid (2,5 minutes), Grid (5 minutes), Grid (10 minutes)

Wind speed	Georeferenced variable	m/s	January, 1970 - December, 2000	Average	Monthly	Grid (30 seconds), Grid (2,5 minutes), Grid (5 minutes), Grid (10 minutes)
Water vapor pressure	Georeferenced variable	kPa	January, 1970 - December, 2000	Average	Monthly	Grid (30 seconds), Grid (2,5 minutes), Grid (5 minutes), Grid (10 minutes)
Annual Mean Temperature	Georeferenced variable	Celsius	January, 1970 - December, 2000	Average	Annual	Grid (30 seconds), Grid (2,5 minutes), Grid (5 minutes), Grid (10 minutes)
Mean Diurnal Range	Georeferenced variable	Celsius	January, 1970 - December, 2000	Average	Annual	Grid (30 seconds), Grid (2,5 minutes), Grid (5 minutes), Grid (10 minutes)
Isothermality	Georeferenced variable	Celsius	January, 1970 - December, 2000	Average	Annual	Grid (30 seconds), Grid (2,5 minutes), Grid (5 minutes), Grid (10 minutes)
Temperature Seasonality	Georeferenced variable	Celsius	January, 1970 - December, 2000	Standard deviation	Annual	Grid (30 seconds), Grid (2,5 minutes), Grid (5 minutes), Grid (10 minutes)
Max Temperature of Warmest Month	Georeferenced variable	Celsius	January, 1970 - December, 2000	Max	Annual	Grid (30 seconds), Grid (2,5 minutes), Grid (5 minutes), Grid (10 minutes)
Min Temperature of Coldest Month	Georeferenced variable	Celsius	January, 1970 - December, 2000	Min	Annual	Grid (30 seconds), Grid (2,5 minutes), Grid (5 minutes), Grid (10 minutes)
Temperature Annual Range	Georeferenced variable	Celsius	January, 1970 - December, 2000	Average	Annual	Grid (30 seconds), Grid (2,5 minutes), Grid (5 minutes), Grid (10 minutes)
Mean Temperature of Wettest Quarter	Georeferenced variable	Celsius	January, 1970 - December, 2000	Average	Annual	Grid (30 seconds), Grid (2,5 minutes), Grid (5 minutes), Grid (10 minutes)
Mean Temperature of Driest Quarter	Georeferenced variable	Celsius	January, 1970 - December, 2000	Average	Annual	Grid (30 seconds), Grid (2,5 minutes), Grid (5 minutes), Grid (10 minutes)
Annual Precipitation	Georeferenced variable	mm	January, 1970 - December, 2000	Sum	Annual	Grid (30 seconds), Grid (2,5 minutes), Grid (5 minutes), Grid (10 minutes)

Land Use and Coverage Area frame Survey 2018

General information

Description: LUCAS stands for the Land Use and Coverage Area frame Survey. Eurostat has carried out this survey every 3 years since 2006 to identify changes in the European Union in: land use, meaning the socioeconomic use of land (for instance, agriculture, forestry, recreation or residential use), and land cover, for instance crops, grass, broad-leaved forest, or built-up area.

Producer: EUROSTAT

Link: https://ec.europa.eu/eurostat/web/lucas/overview

Languages: English

Catalogue: LUCAS

Subjects: land use, Agriculture, fisheries, forestry and food, Land cover, Land use, Environment, Agricultural and aquaculture facilities, Area management/restriction/regulation zones and reporting units, Bio-geographical regions, Geographical grid systems, Hydrography, Population distribution — demography, Protected sites, Sea regions, Statistical units

Useful for the analysis of: Environmental policy, Climate change, Agriculture policy

Themes covered:

Spatial resolution (in meters): 2000.0

Temporal resolution:

Resource type: Dataset

Was generated by:

Is referenced by:

Geographical coverage: Austria, Belgium, Bulgaria, Cyprus, Czechia, Germany, Denmark, Spain, Estonia, Finland, France, United Kingdom, Greece, Croatia, Hungary, Ireland, Italy, Lithuania, Luxembourg, Latvia, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Sweden

Dataset type: GEOREFERENCED

Characterization last update: January 14, 2022

Characterization created at: March 2, 2021

Issued: April 1, 2019

Last update: April 1, 2019

Periodicity: Triennial

Temporal extent: January, 2018 - December, 2018

Keywords:

Distributions

Title	Format	Access rights	Access URL	Compress format	Data service
LUCAS photos	ISO image	Public	https://ec.europa.eu/eurostat/web/lucas/data/primary-data/order-form	ISO image	False
LUCAS micro data	CSV	Public	https://ec.europa.eu/eurostat/web/lucas/data/primary-data/2018	CSV	False
Land cover overview by NUTS 2 regions	TSV	Public		TSV	False

Units of analysis

Name	Temporal extent	Aggregation level unit	Area size	Area size unit
Geo-referenced points	March, 2018 - November, 2018		2	square kilometre

Variables included

Name	Type	Unit of measurement	Temporal extent	Mathematical representation	Data frequency	Unit of analysis
Land Cover	Georeferenced variable	Percentage	January, 2018 - December, 2018	Instant value		Geo-referenced points

Land use - square kilometres	Georeferenced variable	Square kilometres	January, 2018 - December, 2018			Geo-referenced points
Land use	Georeferenced variable	Percentage	January, 2018 - December, 2018			Geo-referenced points
Land Cover - square kilometres	Georeferenced variable	Square kilometres	January, 2018 - December, 2018	Instant value		Geo-referenced points

(IDENER Dry Run) LUCAS - Land Topsoil Survey 2018

General information

Description: The LUCAS soil module is coordinated by the European Commission's Joint Research Centre (JRC). This survey represents the first attempt to construct a pan-European topsoil database, which can serve as a baseline for EU-wide soil monitoring.

Producer: Joint Research Council (JRC)

Link: https://ec.europa.eu/eurostat/web/lucas/overview

Languages: English

Catalogue: LUCAS

Subjects: soil pollution, soil resources, Environment

Useful for the analysis of: Environmental policy

Themes covered:

Spatial resolution (in meters): 2000.0

Temporal resolution:

Resource type: Dataset

Was generated by:

Is referenced by:

Geographical coverage: Austria, Belgium, Bulgaria, Cyprus, Czechia, Germany, Denmark, Spain, Estonia, Finland, France, United Kingdom, Greece, Croatia, Hungary, Ireland, Italy, Lithuania, Luxembourg, Latvia, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Sweden

Dataset type: GEOREFERENCED

Characterization last update: September 28, 2021

Characterization created at: September 21, 2021

Issued: April 1, 2019

Last update: April 1, 2019

Periodicity: Triennial

Temporal extent: March, 2018 - November, 2018

Keywords:

Distributions

Title	Format	Access rights	Access URL	Compress format	Data service

Units of analysis

Name	Temporal extent	Aggregation level unit	Area size	Area size unit
Geo-referenced Points	January, 2018 - December, 2018		2	square kilometre

Variables included

Name	Type	Unit of measurement	Temporal extent	Mathematical representation	Data frequency	Unit of analysis

CDDA DesignatedArea

General information

Description: The dataset contains data on individual nationally Designated Areas and corresponding Protected Site spatial features in EEA member and collaborating countries.

Producer: European Environment Agency (EEA)

Link: https://www.eea.europa.eu/data-and-maps/data/nationally-designated-areas-national-cdda-15/cdda/cdda-csv-files

Languages: English

Catalogue: BISE - Biodiversity Information System for Europe

Subjects: fragile region or state, Protected sites

Useful for the analysis of: Environmental policy

Themes covered:

Spatial resolution (in meters):

Temporal resolution:

Resource type:

Was generated by:

Is referenced by:

Geographical coverage: Kosovo, Albania, Austria, Belgium, Bulgaria, Bosnia and Herzegovina, Switzerland, Cyprus, Czechia, Germany, Denmark, Spain, Estonia, Finland, France, United Kingdom, Greece, Croatia, Hungary, Ireland, Iceland, Italy, Liechtenstein, Lithuania, Luxembourg, Latvia, North Macedonia, Malta, Montenegro, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Sweden, Turkey

Dataset type: GEOREFERENCED

Characterization last update: January 14, 2022

Characterization created at: March 26, 2021

Issued: June 8, 2021

Last update:

Periodicity: Annual

Temporal extent: January, 2020 - December, 2020

Keywords:

Distributions

Title	Format	Access rights	Access URL	Compress format	Data service
CDDA (GeoPackage file)	SQL	Public	https://www.europa.eu/data-and-maps/data/nationally-designated-areas-national-cdda-16/cdda/cdda-geopackage-file	SQL	False
CDDA DesignatedArea (CSV file)	CSV	Public	https://www.europa.eu/data-and-maps/data/nationally-designated-areas-national-cdda-16/cdda/cdda-csv-files	CSV	False

Units of analysis

Name	Temporal extent	Aggregation level unit	Area size	Area size unit
Polygon	January, 2020 - December, 2020			
Point	January, 2020 - December, 2020			

Variables included

Name	Type	Unit of measurement	Temporal extent	Mathematical representation	Data frequency	Unit of analysis
Designition Type Category	Georeferenced variable	None	January, 2020 - December, 2020	Instant value	Annual	Polygon, Point
Major Ecosystem Type	Georeferenced variable	None	January, 2020 - December, 2020	Instant value	Annual	Polygon, Point
IUCN Category	Georeferenced variable	None	January, 2020 - December, 2020	Instant value	Annual	Polygon, Point

Gridded Agro-Meteorological Data in Europe

General information

Description: The JRC MARS Meteorological Database contains meteorological observations from weather stations interpolated on a 25x25 km grid, on a daily basis from 1979 to the last calendar year completed, for the European Union and neighbouring countries.

Producer: Food Security Unit of the Joint Research Center (JRC.D.5)

Link: https://agri4cast.jrc.ec.europa.eu/DataPortal/Index.aspx?o=

Languages: English

Catalogue: Agri4Cast

Subjects: meteorology, statistical method, Atmospheric Conditions and meteorological geographical features

Useful for the analysis of: Climate change, Environmental policy, Energy use in agriculture, Greenhouse gas emissions

Themes covered:

Spatial resolution (in meters): 25000.0

Temporal resolution: Day

Resource type:

Was generated by:

Is referenced by:

Geographical coverage: Kosovo, Albania, Andorra, Armenia, Austria, Azerbaijan, Belgium, Bulgaria, Bosnia and Herzegovina, Belarus, Switzerland, Cyprus, Czechia, Germany, Denmark, Algeria, Egypt, Spain, Estonia, Finland, France, United Kingdom, Georgia, Guernsey, Greece, Croatia, Hungary, Isle of Man, Ireland, Italy, Jersey, Libya, Liechtenstein, Lithuania, Luxembourg, Latvia, Morocco, Monaco, Moldova, North Macedonia, Malta, Montenegro, Netherlands, Norway, Poland, Portugal, Romania, San Marino, Serbia, Slovakia, Slovenia, Sweden, Tunisia, Turkey, Ukraine

Dataset type: GEOREFERENCED

Characterization last update: January 14, 2022

Characterization created at: March 17, 2021

Issued: January 15, 2021

Last update: January 15, 2021

Periodicity: Annual

Temporal extent: January, 1979 - December, 2020

Keywords: weather observation

Distributions

Title	Format	Access rights	Access URL	Compress format	Data service
CSV	CSV	Restricted	https://agri4cast.jrc.ec.europa.eu/DataPortal/RequestDataResource.aspx?idResource=7&o=d	CSV	False

Units of analysis

Name	Temporal extent	Aggregation level unit	Area size	Area size unit
25x25 square kilometre	January, 1979 - December, 2020		25	square kilometre

Variables included

Name	Type	Unit of measurement	Temporal extent	Mathematical representation	Data frequency	Unit of analysis
Minimum air temperature	Georeferenced variable	Degrees	January, 1979 - December, 2020	Min	Daily	25x25 square kilometre
Total global radiation	Georeferenced variable	KJ/m2/day	January, 1979 - December, 2020	Sum	Daily	25x25 square kilometre
Vapour pressure	Georeferenced variable	hPa	January, 1979 - December, 2020	Average	Daily	25x25 square kilometre

Maximum air temperature	Georeferenced variable	Degrees	January, 1979 - December, 2020	Max	Daily	25x25 square kilometre
Mean air temperature	Georeferenced variable	Degrees	January, 1979 - December, 2020	Average	Daily	25x25 square kilometre
Mean wind speed at 10m	Georeferenced variable	m/s	January, 1979 - December, 2020	Average	Daily	25x25 square kilometre
Precipitation	Georeferenced variable	mm/day	January, 1979 - December, 2020	Sum	Daily	25x25 square kilometre
Potential evapotranspiration from a crop canopy	Georeferenced variable	mm/day	January, 1979 - December, 2020	Sum	Daily	25x25 square kilometre

MIRCA 2000

General information

Description: The global data set of monthly irrigated and rainfed crop areas around the year 2000 (MIRCA2000) consists of Monthly Growing Area Grids (unit: hectare) of 26 irrigated (MGAG-I) and rainfed crops (MGAG-R), related Condensed Crop Calendars for irrigated (CCC-I) and rainfed crops (CCC-R) for 402 national and sub.national units, Cropping Period Lists (CPL, CCC on grid cell level), and Maximum Monthly Growing Area Grids of 26 irrigated (MMGAG-I) and rainfed grids (MMGAG-R).

Producer: Faculty of Geosciences/ Geography at Goethe-University

Link: https://www.uni-frankfurt.de/45217893/5__Monthly_irrigated_and_rainfed_crop_areas

Languages: English

Catalogue:

Subjects: agricultural region, crop production, Agriculture, fisheries, forestry and food, Geographical grid systems

Useful for the analysis of: Environmental policy

Themes covered:

Spatial resolution (in meters): 9260.0

Temporal resolution:

Resource type:

Was generated by:

Is referenced by:

Geographical coverage: Africa, America, Antarctica, Asia, Europe, Oceania

Dataset type: GEOREFERENCED

Characterization last update: January 14, 2022

Characterization created at: April 19, 2021

Issued: January 1, 2009

Last update: January 1, 2011

Periodicity: Irregular

Temporal extent: January, 1998 - December, 2002

Keywords: land cover, irrigation, irrigated areas, rainfed agriculture, agriculture, water use, virtual water , blue water , green water , land use, global map

Distributions

Title	Format	Access rights	Access URL	Compress format	Data service
ASCII	Esri ASCII grid	Public	https://hessenbox-a10.rz.uni-frankfurt.de/getlink/fiNi1Uao6mAXtjkubCkziuPv/monthly_growing_area_grids	Esri ASCII grid	False
Binary Data	Binary Data	Public	https://www.uni-frankfurt.de/45218031/Data_download_center_for_MIRCA2000	Binary Data	False

Units of analysis

Name	Temporal extent	Aggregation level unit	Area size	Area size unit
5 arc-minutes grid cell	January, 1998 - December, 2002		84	square kilometre
30 arc-minutes grid cell	January, 1998 - December, 2002		3080	square kilometre
spatial unit	January, 1998 - December, 2002			

Variables included

Name	Type	Unit of measurement	Temporal extent	Mathematical representation	Data frequency	Unit of analysis

Monthly growing area	Georeferenced variable	hectare	January, 1998 - December, 2002		Monthly	5 arc-minutes grid cell, spatial unit
Monthly totals of irrigated and rainfed crops	Georeferenced variable	hectare	January, 1998 - December, 2002	Sum	Monthly	5 arc-minutes grid cell
Month in which the growing period starts	Georeferenced variable		January, 1998 - December, 2002		Monthly	5 arc-minutes grid cell, 30 arc-minutes grid cell, spatial unit
Month in which the growing period ends	Georeferenced variable		January, 1998 - December, 2002		Monthly	5 arc-minutes grid cell, 30 arc-minutes grid cell, spatial unit
Code of spatial units	Georeferenced variable		January, 1998 - December, 2002			spatial unit
Name of spatial units	Georeferenced variable		January, 1998 - December, 2002			spatial unit
Crop class	Georeferenced variable		January, 1998 - December, 2002			

EU-SoilHydroGrids ver1.0

General information

Description:

Producer: European Soil Data Centre - JRC

Link: https://esdac.jrc.ec.europa.eu/content/3d-soil-hydraulic-database-europe-1-km-and-250-m-resolution#tabs-0-description=0

Languages: English

Catalogue:

Subjects: Geographical grid systems, Hydrography, Soil

Useful for the analysis of:

Themes covered:

Spatial resolution (in meters):

Temporal resolution:

Resource type:

Was generated by:

Is referenced by:

Geographical coverage: Africa, America, Antarctica, Asia, Europe, Oceania

Dataset type: GEOREFERENCED

Characterization last update: January 14, 2022

Characterization created at: April 19, 2021

Issued:

Last update:

Periodicity: Irregular

Temporal extent: January, 2017 - December, 2017

Keywords:

Distributions

Title	Format	Access rights	Access URL	Compress format	Data service
GeoTIFF	GeoTIFF	Non-public		GeoTIFF	False

Units of analysis

Name	Temporal extent	Aggregation level unit	Area size	Area size unit
250mx250m cell	January, 2017 - December, 2017	square metre		

Variables included

Name	Type	Unit of measurement	Temporal extent	Mathematical representation	Data frequency	Unit of analysis
θ_r parameter of the hydraulic conductivity curve (HCC_thr)	Georeferenced variable	cm3 cm-3	January, 2017 - December, 2017			250mx250m cell
θ_s parameter of the hydraulic conductivity curve (HCC_ths)	Georeferenced variable	cm3 cm-3	January, 2017 - December, 2017			250mx250m cell
θ_s parameter of the moisture retention curve (MRC_ths)	Georeferenced variable	cm3 cm-3	January, 2017 - December, 2017			250mx250m cell
α parameter of the moisture retention curve (MRC_alp)	Georeferenced variable	cm-1	January, 2017 - December, 2017			250mx250m cell

n parameter of the moisture retention curve (MRC_n)	Georeferenced variable		January, 2017 - December, 2017			250mx250m cell
α parameter of the hydraulic conductivity curve (HCC_alp)	Georeferenced variable	cm-1	January, 2017 - December, 2017			250mx250m cell
n parameter of the hydraulic conductivity curve (HCC_n)	Georeferenced variable		January, 2017 - December, 2017			250mx250m cell
m parameter of the hydraulic conductivity curve (HCC_m)	Georeferenced variable		January, 2017 - December, 2017			250mx250m cell
K0 parameter of the hydraulic conductivity curve (HCC_K0)	Georeferenced variable	cm day−1	January, 2017 - December, 2017			250mx250m cell
L parameter of the hydraulic conductivity curve (HCC_L)	Georeferenced variable		January, 2017 - December, 2017			250mx250m cell
Saturated water content (THS)	Georeferenced variable	cm3 cm-3	January, 2017 - December, 2017			250mx250m cell
Water content at field capacity (FC)	Georeferenced variable	cm3 cm-3	January, 2017 - December, 2017			250mx250m cell
Water content at wilting point (WP)	Georeferenced variable	cm3 cm-3	January, 2017 - December, 2017			250mx250m cell

Saturated hydraulic conductivity (KS)	Georeferenced variable	cm3 day-1	January, 2017 - December, 2017			250mx250m cell
θr parameter of the moisture retention curve (MRC_thr)	Georeferenced variable	cm3 cm-3	January, 2017 - December, 2017			250mx250m cell
m parameter of the moisture retention curve (MRC_m)	Georeferenced variable		January, 2017 - December, 2017			250mx250m cell

(IDENER Dry Run) LUCAS - Land Use and Coverage Area frame Survey 2018

General information

Description: LUCAS stands for the Land Use and Coverage Area frame Survey. Eurostat has carried out this survey every 3 years since 2006 to identify changes in the European Union in:

land use

meaning the socioeconomic use of land (for instance, agriculture, forestry, recreation or residential use).

land cover:

for instance crops, grass, broad-leaved forest, or built-up area.

The latest published LUCAS survey dates from 2018. It provides observations at more than 330 000 points surveyed in the EU Member States.

The LUCAS 2018 survey started in March 2018 and ended in November 2018. The photos will be available in June 2019 with other results available in the 1st quarter of 2020.

Producer: Eurostat

Link: https://ec.europa.eu/eurostat/web/lucas/overview

Languages: English

Catalogue: LUCAS

Subjects: land use, soil pollution, soil resources, soil protection, Land cover, Soil, Land use, Orthoimagery

Useful for the analysis of: Climate change, Environmental policy

Themes covered:

Spatial resolution (in meters): 2000.0

Temporal resolution:

Resource type: Dataset

Was generated by: Landscape survey

Is referenced by:

Geographical coverage: Austria, Belgium, Bulgaria, Cyprus, Czechia, Germany, Denmark, Spain, Estonia, Finland, France, United Kingdom, Greece, Croatia, Hungary, Ireland, Italy, Lithuania, Luxembourg, Latvia, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Sweden

Dataset type: GEOREFERENCED

Characterization last update: October 7, 2021

Characterization created at: March 2, 2021

Issued: April 1, 2019

Last update: April 1, 2019

Periodicity: Triennial

Temporal extent: January, 2006 - December, 2018

Keywords:

Distributions

Title	Format	Access rights	Access URL	Compress format	Data service
Lucas micro data 2018	CSV	Public	https://ec.europa.eu/eurostat/web/lucas/data/primary-data/2018	CSV	False
ISO image	ISO image	Public		ISO image	False

Units of analysis

Name	Temporal extent	Aggregation level unit	Area size	Area size unit

Geo-referenced points	January, 2018 - December, 2018	square kilometre	2	square kilometre

Variables included

Name	Type	Unit of measurement	Temporal extent	Mathematical representation	Data frequency	Unit of analysis
Land Cover 1	Georeferenced variable	Percentage	March, 2018 - November, 2018	Instant value	Triennial	Geo-referenced points
Land Use 1	Georeferenced variable	Own Coding	March, 2018 - November, 2018	Instant value		Geo-referenced points
Land Use 1 Species	Georeferenced variable	Own Coding	March, 2018 - November, 2018	Instant value		Geo-referenced points
Land Use 1	Georeferenced variable	Percentage	March, 2018 - November, 2018	Instant value		Geo-referenced points
Land Cover 1	Georeferenced variable	Own Coding	March, 2018 - November, 2018	Instant value	Triennial	Geo-referenced points
Land Cover Species	Georeferenced variable	Own Coding	March, 2018 - November, 2018	Instant value		Geo-referenced points

Soil pH in Europe

General information

Description: A quantitative map of estimated soil pH values across Europe from a compilation of 12,333 soil pH measurements from 11 different sources, and using a geo-statistical framework based on Regression-Kriging. Fifty-four (54) auxiliary variables in the form of raster maps at 5km resolution were used to explain the differences in the distribution of soil pH (CaCl2) and the kriged map of the residuals from the regression model was added.

Producer: JOINT RESEARCH CENTRE EUROPEAN SOIL DATA CENTRE (ESDAC)

Link: https://esdac.jrc.ec.europa.eu/content/soil-ph-europe

Languages: English

Catalogue:

Subjects: soil resources, Soil

Useful for the analysis of: Environmental policy, Use of agricultural area

Themes covered:

Spatial resolution (in meters): 5000.0

Temporal resolution:

Resource type: Image

Was generated by:

Is referenced by:

Geographical coverage: Austria, Belgium, Bulgaria, Cyprus, Czechia, Germany, Denmark, Spain, Estonia, Finland, France, Greece, Croatia, Hungary, Ireland, Italy, Lithuania, Luxembourg, Latvia, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Sweden

Dataset type: GEOREFERENCED

Characterization last update: January 7, 2022

Characterization created at: December 9, 2021

Issued: January 1, 2010

Last update: January 1, 2010

Periodicity: Annual

Temporal extent: January, 2010 - January, 2010

Keywords: soil, soil properties

Distributions

Title	Format	Access rights	Access URL	Compress format	Data service
Soil Ph	ArcGIS Map Service	Public		ArcGIS Map Service	False

Units of analysis

Name	Temporal extent	Aggregation level unit	Area size	Area size unit

Variables included

Name	Type	Unit of measurement	Temporal extent	Mathematical representation	Data frequency	Unit of analysis
Ph	Georeferenced variable	Number	January, 2010 - January, 2010	Instant value	Annual	

Vegetation growing season length 2000-2016

General information

Description: The raster files are the annual above ground growing season length time-series and the derived linear trends for the period 2000-2016. The data set addresses trends in the season length of land surface vegetation derived from remote sensing observed time series of vegetation indices. The vegetation index used in the indicator is the Plant Phenology Index (PPI, Jin and Eklundh, 2014). PPI is based on the MODIS Nadir BRDF-Adjusted Reflectance product (MODIS MCD43 NBAR. The product provides reflectance data for the MODIS "land" bands (1 - 7) adjusted using a bi-directional reflectance distribution function. This function models values as if they were collected from a nadir-view to remove so called cross-track illumination effects. The Plant Phenology Index (PPI) is a new vegetation index optimized for efficient monitoring of vegetation phenology. It is derived from radiative transfer solution using reflectance in visible-red (RED) and near-infrared (NIR) spectral domains.

Producer: European Environment Agency

Link: https://www.eea.europa.eu/data-and-maps/data/annual-above-ground-vegetation-season

Languages: English

Catalogue: BISE - Biodiversity Information System for Europe

Subjects: crop production, agricultural holdings, agricultural product, plant breeding, Agriculture, fisheries, forestry and food, Environment, Land use

Useful for the analysis of: Crop production, Farm structure, land use, production indices, Social Sustainability - Work force characteristics, Use of agricultural area, Use of water

Themes covered:

Spatial resolution (in meters): 500.0

Temporal resolution: Annual

Resource type: Dataset

Was generated by:

Is referenced by:

Geographical coverage: Kosovo, Albania, Austria, Belgium, Bulgaria, Bosnia and Herzegovina, Switzerland, Cyprus, Czechia, Germany, Denmark, Spain, Estonia, Finland, France, United Kingdom, Greece, Croatia, Hungary, Ireland, Iceland, Italy, Liechtenstein, Lithuania, Luxembourg, Latvia, North Macedonia, Malta, Montenegro, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Sweden, Turkey

Dataset type: GEOREFERENCED

Characterization last update: January 13, 2022

Characterization created at: December 13, 2021

Issued: March 12, 2019

Last update: May 17, 2021

Periodicity: Irregular

Temporal extent: January, 2000 - December, 2016

Keywords: land cover, agricultural sector, phenology, growing season, vegetation, biomass, season, biodiversity, season length

Distributions

Title	Format	Access rights	Access URL	Compress format	Data service
Annual above ground vegetation season length time-series 2000-2016 - version 1, Aug. 2018	XML	Public	https://sdi.eea.europa.eu/catalogue/srv/eng/catalog.search#/metadata/1be91ed4-2eb1-46d6-8453-5246c9e9d446	XML	False
Annual above ground vegetation season length time-series 2000-2016 - version 1, Aug. 2018	PDF	Public	https://sdi.eea.europa.eu/catalogue/srv/eng/catalog.search#/metadata/1be91ed4-2eb1-46d6-8453-5246c9e9d446	PDF	False
Annual above ground vegetation season length time-series 2000-2016 - version 1, Aug. 2018	HDR	Public	https://sdi.eea.europa.eu/data/1be91ed4-2eb1-46d6-8453-5246c9e9d446	HDR	False
Annual above ground vegetation season	BIL	Public	https://sdi.eea.europa.eu/data/1be91ed4-	BIL	False

| length time-series 2000-2016 - version 1, Aug. 2018 | | | 2eb1-46d6-8453-5246c9e9d446 | | |

Units of analysis

Name	Temporal extent	Aggregation level unit	Area size	Area size unit
square grid	January, 2000 - December, 2016		25	hectare

Variables included

Name	Type	Unit of measurement	Temporal extent	Mathematical representation	Data frequency	Unit of analysis
Length of the growing season	Georeferenced variable	month	January, 2000 - December, 2016		Annual	square grid

Yearly modeled crop area in EU at grid level

General information

Description: Yearly modeled crop area in EU at grid level

Producer: Directorate D - Sustainable resources / Unit 05 - Food security

Link: https://agri4cast.jrc.ec.europa.eu/dataportal/

Languages: English

Catalogue: Agri4Cast

Subjects:

Useful for the analysis of:

Themes covered:

Spatial resolution (in meters): 25000.0

Temporal resolution: Annual

Resource type: Dataset

Was generated by:

Is referenced by:

Geographical coverage: ES2, ES3, ES1, ES6, ES7, ES4, ES5, ITE, ITD, ITC, ITG, ITF, LV0, LT0, CY0, AT1, AT3, AT2, DEF, DE6, DE8, DE5, DE3, DEE, DE4, DE9, DEA, DED, DEG, DE7, DEC, DEB, DE1, DE2, NL1, NL3, NL4, NL2, PT1, PT3, PT2, MT0, HR0, HU1, HU3, HU2, BE1, BE2, BE3, FR3, FR1, FR4, FR2, FR5, FR7, FR6, FR8, FR9, SE3, SE1, SE2, RO1, RO2, RO3, RO4, CZ0, BG3, BG4, IE0, LU0, EE0, PL1, PL2, PL3, PL4, PL5, PL6, SI0, SK0, FI1, FI2, GR3, GR4, GR1, GR2

Dataset type: GEOREFERENCED

Characterization last update: January 13, 2022

Characterization created at: December 13, 2021

Issued: September 26, 2017

Last update:

Periodicity: Annual

Temporal extent: January, 1975 - December, 2017

Keywords:

Distributions

Title	Format	Access rights	Access URL	Compress format	Data service
Yearly modeled crop area in EU at grid level	CSV	Restricted	https://agri4cast.jrc.ec.europa.eu/dataportal/	CSV	False

Units of analysis

Name	Temporal extent	Aggregation level unit	Area size	Area size unit
Crop name	January, 1975 - December, 2017		625	square kilometre
Square grid	January, 1975 - December, 2017		625	square kilometre

Variables included

Name	Type	Unit of measurement	Temporal extent	Mathematical representation	Data frequency	Unit of analysis
Modeled Crop Area	Georeferenced variable		January, 1975 - December, 2017		Annual	Square grid, Crop name
Absolute Ratio	Georeferenced variable		January, 1975 - December, 2017		Annual	Square grid, Crop name

NetCDF Lat-Lon regular grid Meteorological data in Europe

General information

Description: The 0.31x0.31 degrees lat-lon regular grid data is mainly designed for meteo-climate applications/users. This resource is based on the 25X25km gridded agro-meteorological data set.

Producer: Food Security Unit of the Joint Research Center (JRC.D.5)

Link: https://agri4cast.jrc.ec.europa.eu/DataPortal/Index.aspx

Languages: English

Catalogue: Agri4Cast

Subjects: climate change, climate change policy, atmosphere, Environment, Atmospheric conditions, Meteorological geographical features

Useful for the analysis of: Climate change, Temperature change, Environmental policy

Themes covered:

Spatial resolution (in meters): 25000.0

Temporal resolution:

Resource type: Dataset

Was generated by:

Is referenced by:

Geographical coverage: Afghanistan, Albania, Andorra, Austria, Azerbaijan, Belgium, Bulgaria, Bosnia and Herzegovina, Belarus, Switzerland, China, Cyprus, Czechia, Germany, Denmark, Algeria, Egypt, Spain, Estonia, Finland, France, Faroes, United Kingdom, Georgia, Greece, Croatia, Hungary, Ireland, Iran, Iraq, Israel, Italy, Jordan, Kazakhstan, Kyrgyzstan, Kuwait, Lebanon, Libya, Liechtenstein, Lithuania, Luxembourg, Latvia, Morocco, Monaco, Moldova, North Macedonia, Malta, Montenegro, Netherlands, Norway, Poland, Portugal, Romania, Russia, Saudi Arabia, Serbia, Slovakia, Slovenia, Sweden, Syria, Tajikistan, Turkmenistan, Tunisia, Turkey, Ukraine, Uzbekistan

Dataset type: GEOREFERENCED

Characterization last update: January 14, 2022

Characterization created at: December 14, 2021

Issued: May 25, 2020

Last update: May 25, 2020

Periodicity: Annual

Temporal extent: January, 1979 - December, 2019

Keywords:

Distributions

Title	Format	Access rights	Access URL	Compress format	Data service
NetCDF Lat-Lon regular grid Meteorological data in Europe	CSV	Restricted	https://agri4cast.jrc.ec.europa.eu/DataPortal/Index.aspx?o=	CSV	False

Units of analysis

Name	Temporal extent	Aggregation level unit	Area size	Area size unit
square grid	January, 1979 - December, 2019		625	square kilometre

Variables included

Name	Type	Unit of measurement	Temporal extent	Mathematical representation	Data frequency	Unit of analysis
Sum of precipitation	Georeferenced variable	milimetre per day	January, 1979 - December, 2019	Sum	Daily	square grid
Total global radiation	Georeferenced variable	Mega Joule/square metre/day	January, 1979 - December, 2019	Sum	Daily	square grid
Maximum air temperature	Georeferenced variable	Celsius	January, 1979 - December, 2019	Max	Daily	square grid

Minimum air temperature	Georeferenced variable	Celsius	January, 1979 - December, 2019	Min	Daily	square grid
Mean air temperature	Georeferenced variable	Celsius	January, 1979 - December, 2019	Average	Daily	square grid
Mean daily wind speed at 10m	Georeferenced variable	metre per second	January, 1979 - December, 2019	Average	Daily	square grid