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Joint Research Centre

Technical Guidelines on IACS Data Sharing (v2.0)

geoIACS

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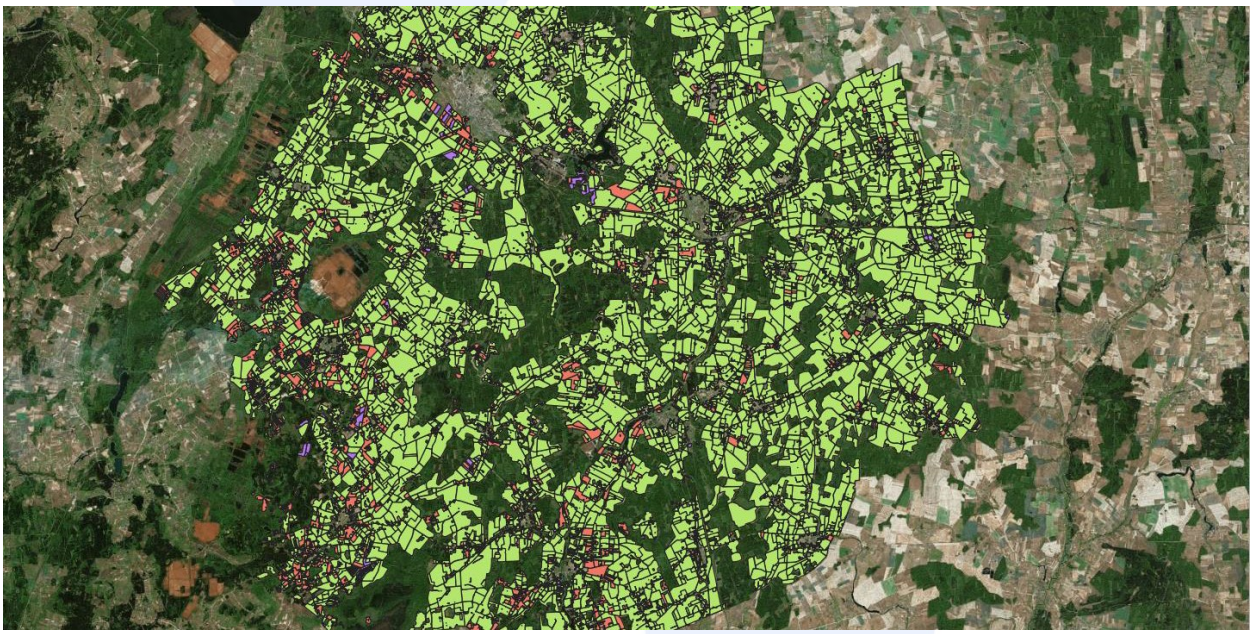

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1. Introduction

The effective sharing and reuse of spatial data within the Integrated Administration and Control System (IACS) across Europe is currently hindered by the lack of harmonisation, which in turns limits data interoperability and reuse. These technical guidelines (TG) aim to address this major obstacle by proposing a common solution for achieving interoperability and standardisation of IACS spatial (hereafter "geoIACS") data across Member States.

To this end, the TG introduce a unique data model for geoIACS datasets, accompanied by a comprehensive data specification aligned with the INSPIRE Data Specifications template. Besides a platform independent UML conceptual model, the TG provide also an associated GML application schema and a GeoPackage template to support the physical implementation of the conceptual data model. These technical artefacts are designed to overcome existing challenges in data sharing, promote interoperability and facilitate efficient IACS spatial data reuse.

This version 2.0 of the TG represents an updated version of the Technical Guidelines on IACS Data Sharing published in 2025[1] (Wojda, P., Martin Jimenez, J., De Medici, D., Scarpa, S. and Martirano, G., Technical Guidelines on IACS Data Sharing - geoIACS, European Commission, Ispra, 2025, JRC144416), which, in turn, updated and merged the two previous Technical Guidelines on Spatial Data Sharing[2] (Part 1 – Data discovery (Tóth and Milenov 2020), Part 2 – Data interoperability (Martirano and Toth 2023)). Appendix 1 of this TG contains recap of the changes introduced in the first version of the unique TG published in 2025 and a description of the updates introduced in this second version of the unique TG, emerged during a consultation process held with Member States in the first quarter of 2026 and documented in the geoIACS dedicated GitHub organisation[3].

Beyond resolving interoperability issues, the adoption of this TG by Member States is expected to reduce the administrative burden associated with various existing IACS-related obligations. In particular, geoIACS datasets conformant to the proposed specification qualify as High Value Datasets under Regulation 2023/138 and support the fulfilment of IACS Quality Assurance (QA) requirements. More details are provided in Appendices 2 and 3.

Moreover, harmonised geoIACS datasets will enhance the efficiency of European Commission (EC) services involved in IACS-related tasks, such as IACS statistics and the Farm Sustainability Data Network (FSDN). The TG also continue supporting conformance with INSPIRE obligations, preserving IACS-specific semantics while enabling alignment with INSPIRE data themes, namely Land Use (LU), Land Cover (LC), and Agricultural and Aquaculture Facilities (AF). More details are provided in Appendices 5, 6 and 7.

Possible confidentiality clauses required by geoIACS data providers willing to prevent disclosure of sensitive information contained in the harmonised datasets to non-authorised users have been dealt with.

The TG have been tested, producing harmonised datasets from non-harmonised data sources of three pilot Paying Agencies, as described in Appendix 4.

[1] https://geoiacs.github.io/technical-guidelines/tg/Technical_Guidelines_on_IACS_Data_Sharing.pdf

[2] https://github.com/INSPIRE-MIF/technical-guidelines/tree/main/iacs

[3] https://github.com/geoIACS

After the above-mentioned consultation phase held in the first quarter of 2026, the TG will now undergo a formal endorsement process, in collaboration with JRC, AGRI and the INSPIRE Maintenance and Implementation Group (MIG).

The on-going INSPIRE simplification process will be taken into due account, considering that geoIACS is ready to align with the final INSPIRE amendments, once the current proposal is ratified. Specifically, the TG are already following the simplification principles, e.g. fully adopting INSPIRE Good Practice on the use of GeoPackage as alternative encoding to gml. Moreover, geoIACS data provision through APIs and bulk download, in line with HVD Implementing Regulation, have been already successfully tested (as documented in Appendix 4).

TG maintenance will be part of an overall TG governance process and feedback from the community of users will continue to be collected in the geoIACS dedicated GitHub organisation.

As a final introductory remark, the structure of this report adheres to the structure of an INSPIRE data specification on a data theme, adopting for requirements and recommendations the styles shown below:

TG Requirement X. Notation and role

This style is used for requirements that shall be fulfilled by data providers to share spatial information according to these Technical Guidelines.

TG Recommendation Y. Notation and role

This style is used for recommendations that may help data providers to share spatial information according to these Technical Guidelines.

2. Overview

2.1. Name

Data specification for geoIACS datasets.

2.2. Informal description

Definition: geoIACS is an implementation of the IACS elements listed in Art. 66(1)(a) and Art. 66 (1)(b) of Regulation 2021/2116:

— an identification system for agricultural parcels

— a geo-spatial application system and, where applicable, an animal-based application system.

Description: geoIACS dataset is a spatial dataset containing reference parcels, agricultural areas, other eligible areas, eco-landscape elements and agricultural parcels. It contains also sites (places within a holding where agricultural activities related to animals are exercised). It can contain also ecological focus areas, but only for historical purposes, not being existing anymore in the new CAP.

Similarities with INSPIRE spatial data themes: There is a similarity in scope between certain geoIACS feature types and the feature types of the following INSPIRE spatial data themes:

— Appendix 5: Land Cover (LC): similarity between the geoIACS AgriculturalArea and EcoLandscapeElement feature types and the INSPIRE LC LandCoverUnit feature type.

— Appendix 6: Land Use (LU): similarity between geoIACS AgriculturalParcel feature type and INSPIRE LC ExistingLandUseObject feature types.

— Appendix 7: Agricultural and Aquaculture Facility (AF): similarity between geoIACS Site feature type and INSPIRE AF Site feature type.

These similarities allow new INSPIRE-compliant LC/LU/AF datasets to be derived from geoIACS datasets.

The related data transformations are described in Appendix 5-7.

High Value Datasets: geoIACS datasets contain the key attributes required for Reference parcels and Agricultural parcels by High Value Datasets Regulation 2023/138. A mapping table between HVD key attributes for Reference parcels and Agricultural Parcels and the related geoIACS attributes is provided in Appendix 2.

2.3. Normative References

Regulation (EU) 2021/2115, Regulation (EU) 2021/2116, Regulation (EU) 2023/138.

2.4. Terms and definitions

General terms and definitions helpful for understanding the INSPIRE data specification documents are defined in the INSPIRE Glossary[4] (INSPIRE glossary - INSPIRE registry n.d.).

The following geoIACS specific terms are defined:

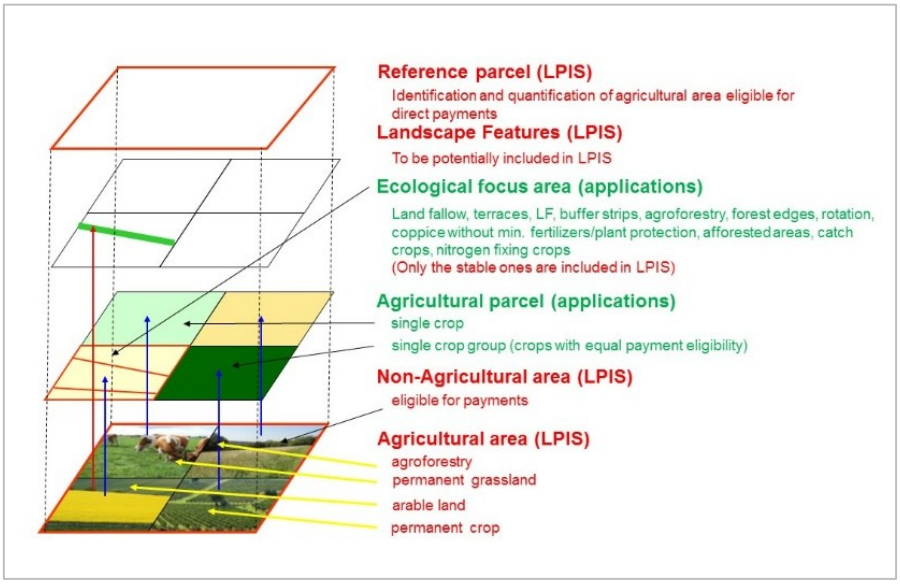
- **Agricultural area:** as defined in Article 4(3) of R (EU) 2021/2115.
- **Agricultural parcel:** according to Article 65(4)(d) of R (EU) 2021/2116, agricultural parcel means a unit, defined by Member States, of agricultural area as determined in accordance with Article 4(3) of R (EU) 2021/2115.
- **Eco Landscape Element**: From Article 4(4)(b) of R (EU) 2021/2115, any area of the holding which is: (i) covered by landscape features subject to the retention obligation under GAEC standard 8 listed in Annex III and (ii) for the duration of the relevant commitment by the farmer, established or maintained as a result of an eco-scheme referred to in Article 31. It shall be a landscape feature or an area interested by an area-based eco-scheme.
- **Ecological Focus Area**: Ecological focus areas as referred to in Article 46 of R (EU) 1307/2013 and its Delegated Regulation (EU) 639/2014(European Commission 2014) (areas contributing to practices beneficial for the climate and the environment as referred to in Art. 43(2)(c) of R (EU) 1307/2013). Ecological focus areas are not applicable for datasets issued after 2023.
- **Other eligible area**: From Article 4(4)(c) of R (EU) 2021/2115, any area of the holding which gives right to payments under Title III, Chapter II, Section 2, Subsection 2 of R (EU) 2021/2115 and which is not an Agricultural Area (as defined by Article 4(4)(a) of R (EU) 2021/2115) nor an EcoLandscapeElement (as defined by Article 4(4)(b) of R (EU) 2021/2115.
- **Reference parcel**: From Article 2(2) of Regulation (EU) 2022/1172, 'reference parcel' means a geographically delimited area retaining a unique identification as registered in the identification system for agricultural parcels referred to in Article 68 of Regulation (EU) 2021/2116. A reference parcel shall contain a unit of land representing agricultural area, as referred to in Article 4(3) of Regulation (EU) 2021/2115. Where appropriate, a reference parcel shall also contain other agricultural areas considered eligible by Member States for receiving the support for area-based interventions referred to in Article 65(2) and (3) of Regulation (EU) 2021/2116.
- **Site**: Place within a holding where agricultural activities related to animals are exercised.

Definition of additional terms are provided in section 3.3.2 (geoIACS Feature catalogue).

The above definitions describe the feature types (spatial object types) of IACS, which are subject of this technical guidelines. Their relation to the real world and the geoIACS spatial datasets are shown in **Figure 1**.

[4] https://inspire.ec.europa.eu/glossary

Figure 1.Spatial object (feature) types of IACS as abstracted from the real world.



3. Data content and structure

3.1. Application schemas – Overview

The types to be used for the exchange and classification of spatial objects from data sets related to the geoIACS spatial data theme are defined in the following application schema:

— geoIACS application schema, which contains the concepts of agricultural area, agricultural parcel, eco-landscape element, ecological focus area, other eligible area, reference parcel, site.

The application schema specifies requirements on the properties of each spatial object including its multiplicity, domain of valid values, constraints, etc.

Box 1. **TG Requirement 1**: Types for the Exchange and Classification of Spatial Objects

For the exchange and classification of spatial objects from data sets meeting the conditions laid down in Article 67 (3) and (4) of Regulation (EU) 2021/2116, Member States shall use the spatial object types and associated data types and code lists that are defined in this section.

In practice, TG requirement 1 means that geoIACS datasets shall be made available for data sharing according to the application schema defined in section 3.3 of this document.

As compared to the full information content of IACS datasets, the application schema defined in this section is restricted to the spatial object types and data types that are required to its spatial management. When publishing these datasets according to INSPIRE and HVD, additional feature and data types may be present, respecting the requirements of R (EU) 2016/679[5].

Box 2. **TG Requirement 2**: Multiplicity

Spatial object types and data types shall comply with the multiplicities defined for the attributes and association roles in this section.

Similarly, TG Requirement 2 means that the properties (attributes and association roles) for geoIACS datasets presented for data sharing shall comply with the multiplicities (i.e. cardinalities) defined in the application schema in section 3.3.

3.2. Basic notions

3.2.1. Notation

The application schema included in this section is specified in Unified Modelling Language (UML), version 2.3. The spatial object types, their properties and associated types are shown in UML class diagrams[6].

The use of a common conceptual schema language (i.e. UML) allows for an automated processing of application schemas and the encoding, querying and updating of data based on the application schema – across the different themes and different levels of detail.

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5 [GDPR] http://data.europa.eu/eli/reg/2016/679/oj

6 For an overview of the UML notation, see Annex D in [ISO 19103].

3.2.2. Voidable characteristics

Voidable stereotype is not used in this data specification.

3.2.3. Enumerations

No enumerations are used in this data specification.

3.2.4. Code lists

The purpose of a code list is to present an agreed set of codes with multilingual names, definitions and descriptions to be used as values of properties and which might be shared and reused by a wide audience. Code lists serve as controlled vocabularies for the values of object properties.

The benefits are:

— interoperability is improved through greater consistency and precision of data,

— data consumers (client applications) know and understand the values used by data providers,

— reuse of code values is promoted via adoption and integration by developers and users,

— searching and recovery of data items becomes more reliable,

— there is less variation in coding, minimising the duplication of datasets.[7]

Code lists are modelled as classes in the application schema. Their values, however, are managed outside of the application schema.

Box 3. **TG Requirement 3**: Code Lists types

Code lists shall be of one of the following types: a) code lists whose allowed values comprise only the values specified in this TG; b) code lists whose allowed values comprise the values specified in this TG and narrower values defined by data providers; c) code lists whose allowed values comprise the values specified in this TG and additional values at any level defined by data providers.

The type of code list is represented in the UML model through the tagged value that describes its extensibility. It can take the following values:

— **none**, representing code lists whose allowed values comprise only the values specified in the TG (type a),

— **narrower**, representing code lists whose allowed values comprise the values specified in the TG and narrower values defined by data providers (type b),

— **open**, representing code lists whose allowed values comprise the values specified in the TG and additional values at any level defined by data providers (type c).

“Narrower” means a less aggregated value in a classification system. For example, durum wheat is a narrower value of cereals.

[7] Annex G of INSPIRE Generic Conceptual Model, v3.4

Box 4. TG Requirement 4: Code Lists extensibility

Additional values defined by data providers shall not replace or redefine any value already specified in the TG.

Box 5. TG Requirement 5: Code Lists registers

Where, for an attribute whose type is a code list as referred to in points (b) or (c) of TG Requirement 2, a data provider provides a value that is not specified in this TG, that value and its definition shall be made available in a publicly accessible register.

Regarding the code lists governance, two types of code lists are distinguished:

- Code lists that are governed by an EU organisation (e.g. DG-AGRI, Eurostat) (EU governed code lists). These code lists will be managed centrally in a dedicated EU code list register, publicly accessible at https://<Domain_name.eu>/codelist/<CodeListName>[8]. They will be available in SKOS/RDF, XML and HTML. The maintenance will follow the procedures defined in ISO 19135. This means that the only allowed changes to a code list are the addition, deprecation or supersession of values, i.e. no value will ever be deleted, but only receive different statuses (valid, deprecated superseded). Identifiers for values of EU governed code lists will be constructed using the pattern https://<Domain_name.eu>/codelist/<CodeListName>/<value>. The possibility that EU-governed code lists will be managed in the INSPIRE code list register will be investigated.
- Code lists that are governed by an organisation outside of DG-AGRI/Eurostat/INSPIRE (externally governed code lists). These code lists are managed by an organisation outside the Commission (e.g. the Paying Agencies). A typical example of externally governed code list is represented by national code lists which may extend with narrower values the parent values of AgriculturalAreaTypeValue code list. The externally governed code lists will be managed in dedicated code list registers publicly accessible at https://<Domain_name.xx>/codelist/<CodeListName>. They will be available in SKOS/RDF, XML and HTML. The maintenance will follow the procedures defined in ISO 19135. This means that the only allowed changes to a code list are the addition, deprecation or supersession of values, i.e. no value will ever be deleted, but only receive different statuses (valid, deprecated superseded). Identifiers for values of externally governed code lists will be constructed using the pattern https://<Domain_name.xx>/codelist/<CodeListName>/<value>.

Box 6. TG Recommendation 1: Code Lists encoding

Code list values should be encoded using http URIs and labels, to be generated according to the relevant rules specified by the organizations managing the code lists registers and encoded following the rules applicable to the data format used. When appropriate, encodings also may use a short value (i.e. a code) only.

EXAMPLE 1. Encoding http URIs and labels in GML:

<geoIACS:mainCrop xlink:href="http://dd.eionet.europa.eu/vocabulary/eurostat/crops/C0000T" xlink:title="C0000T">C0000T</geoIACS:mainCrop>

EXAMPLE 2. Short value encoding in GeoPackage:

[8] The link will be updated as soon as a final or temporary agreement is reached concerning the location of the registries.

The cell containing a code list value only has to contain the code C0000T. The code list URI has to be documented in the schema documentation.

Regarding code list multilingualism, in order to preserve semantic interoperability, code lists values belonging to both types of code lists above described (EU and externally governed code lists) will be provided in English. Where data providers are willing to use code lists values in their national language, they will have to add the related national language translations in the original code list in English.

Box 7. TG Requirement 6: Code Lists multilingualism

Code lists values of all types of code lists shall be provided in English. Code lists values provided in national languages may be used. In this case, their national language translations will be added in the original code lists in English.

3.2.5. Consistency between spatial data sets

Currently, there are no consistency rules other than those defined within the application schema. Taking into account that the geoIACS implementations of the MS can follow different conceptual design in terms of the reference parcel type, the consistency with the parent dataset used for the production (e.g. cadastral parcels, orthoimagery) should be preserved.

3.2.6. Identifier management

geoIACS spatial objects identifiers are managed by means of character string type attributes in the relevant feature types (AAid, APid, OEAid, RPid, ELEid, SiteId, EFAid).

Box 8. TG Requirement 7: Unique and persistent identifiers

geoIACS identifiers shall be unique and shall not change during the life-cycle of a spatial object.

Box 9. TG Recommendation 2: Syntax of unique and persistent identifiers

To ensure uniqueness of the identifiers across Europe, PAs or other custodians of the related data should use a unique syntax for the identifiers according to the principles set in the INSPIRE Generic Conceptual Model.

3.2.7. Geometry representation

Box 10. TG Requirement 8: Geometry representation

The value domain of spatial properties defined in this TG shall be restricted to the Simple Feature spatial schema as defined in OGC 06-103r4, *OpenGIS Implementation Standard for Geographic Information Simple feature access - Part 1: Common architecture*. Version 1.2.1. 28[9] (EU 2016) May 2011.

The specification restricts the spatial schema to 0-, 1-, 2-, and 2,5-dimensional geometries where all curve interpolations are linear and surface interpolations are planar.

[9] http://portal.opengeospatial.org/files/?artifact_id=25355

The topological relations of two spatial objects based on their specific geometry and topology properties can in principle be investigated by invoking the operations of the types defined in ISO 19107 (or the methods specified in OGC 06-103r4).

3.2.8. Temporality representation

To record the lifespan of a spatial object, the attributes "beginLifespanVersion" and "endLifespanVersion" are used.

The attribute "beginLifespanVersion" specifies the date and time at which this version of the spatial object was inserted or changed in the spatial dataset. The attribute "endLifespanVersion" specifies the date and time at which this version of the spatial object was superseded or retired in the spatial dataset.

The attribute specifies the beginning of the lifespan of the version in the spatial data set itself, which is different from the temporal characteristics of the real-world phenomenon described by the spatial object. This lifespan information supports mainly two requirements: First, knowledge about the spatial data set content at a specific time; second, knowledge about changes to a data set in a specific time frame.

Changes to the attribute "endLifespanVersion" does not trigger a change in the attribute "beginLifespanVersion".

Box 11. **TG Requirement 9:** Life-cycle of Spatial Objects

Where the attribute endLifespanVersion is used, its value shall not be before the value of beginLifespanVersion.

EXAMPLE. A reference parcel was created on 03 August 2004. This date is its beginLifespanVersion value. Then this parcel has been split due to a construction of a highway that intersects it. This change is registered in LPIS on 25 November 2007. This date is the value of the endLifespaVersion attribute of the original parcel, which is naturally later, then the date of creation.

To record the validity of the real-world phenomenon represented by a spatial object, the attributes "validFrom" and "validTo" are used.

The attribute "validFrom" specifies the date and time at which the real-world phenomenon became valid in the real world. The attribute "validTo" specifies the date and time at which the real-world phenomenon is no longer valid in the real world.

Box 12. **TG Requirement 10:** Temporal validity of Spatial Objects

Where the attribute validTo is used, its value shall not be before the value of validFrom.

3.3. Application schema geoIACS

3.3.1. Narrative description and UML overview

geoIACS application schema consists of seven spatial objects:

— ReferenceParcel

— AgriculturalParcel

— AgriculturalArea

— OtherEligibleArea

— EcoLandscapeElement

— Site

— EcologicalFocusArea

whose definitions are provided in section 2.4. Each of these spatial objects is made of a series of object-specific attributes (of different types), constraints and relationships.

Some attributes and relationships are mandatory, some others are optional.

To preserve the semantic harmonisation and interoperability of geoIACS datasets, the type of those attributes providing information about different classification systems is a code list.

In terms of relationships among the five main spatial objects:

— each AgriculturalParcel, AgriculturalArea, OtherEligibleArea and EcoLandscapeElement has to be mandatorily associated with one ReferenceParcel, whilst each ReferenceParcel is mandatorily associated with one or many AgriculturalParcel(s) or many AgriculturalArea(s) or OtherEligibleArea(s) or EcoLandscapeElement(s).

— Site and EcologicalFocusArea spatial objects are not associated with any of the five main spatial objects.

An overview of the geoIACS UML model is given in **Figure 2**, whilst the details are provided in the figures from **Figure 3** to **Figure 12**. A complete and detailed description of all the application schema elements is contained in the geoIACS Feature Catalogue (section 3.3.2).

Figure 2. geoIACS UML model – overview.

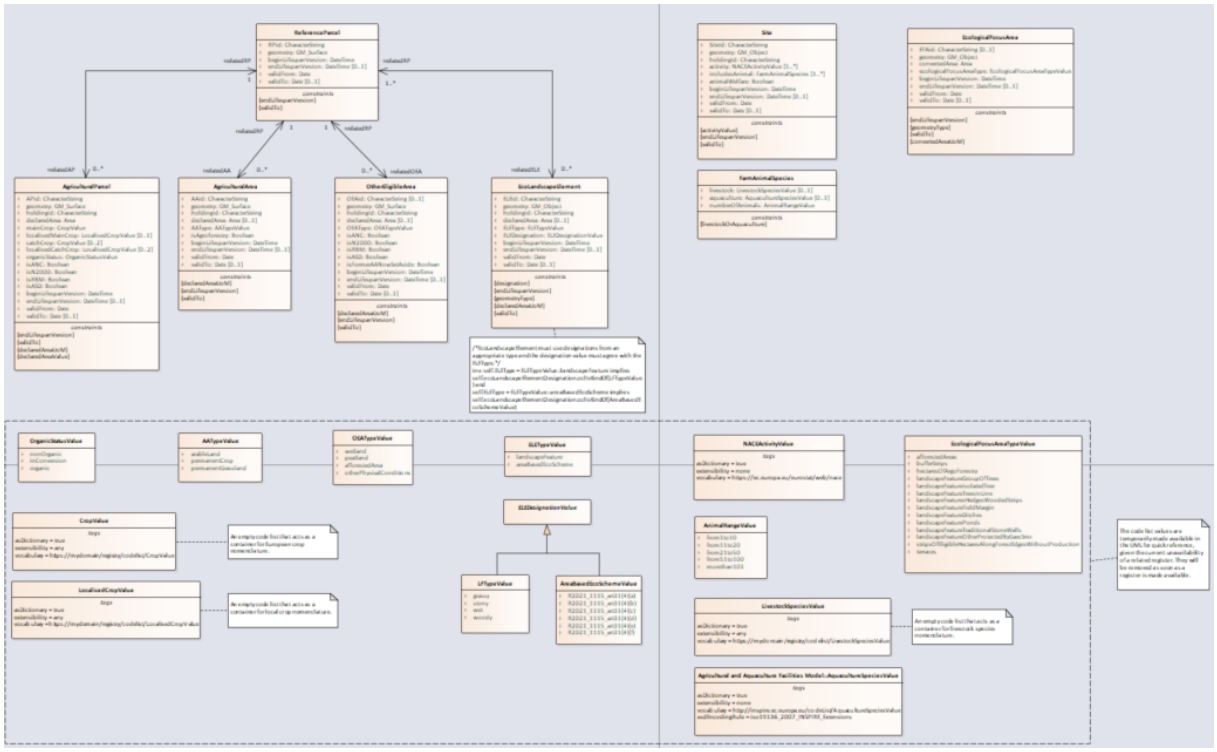


Figure 3. geoIACS UML model – ReferenceParcel, AgriculturalParcel, AgriculturalArea, OtherEligibleArea and EcoLanscapeElement class diagrams and relationships.

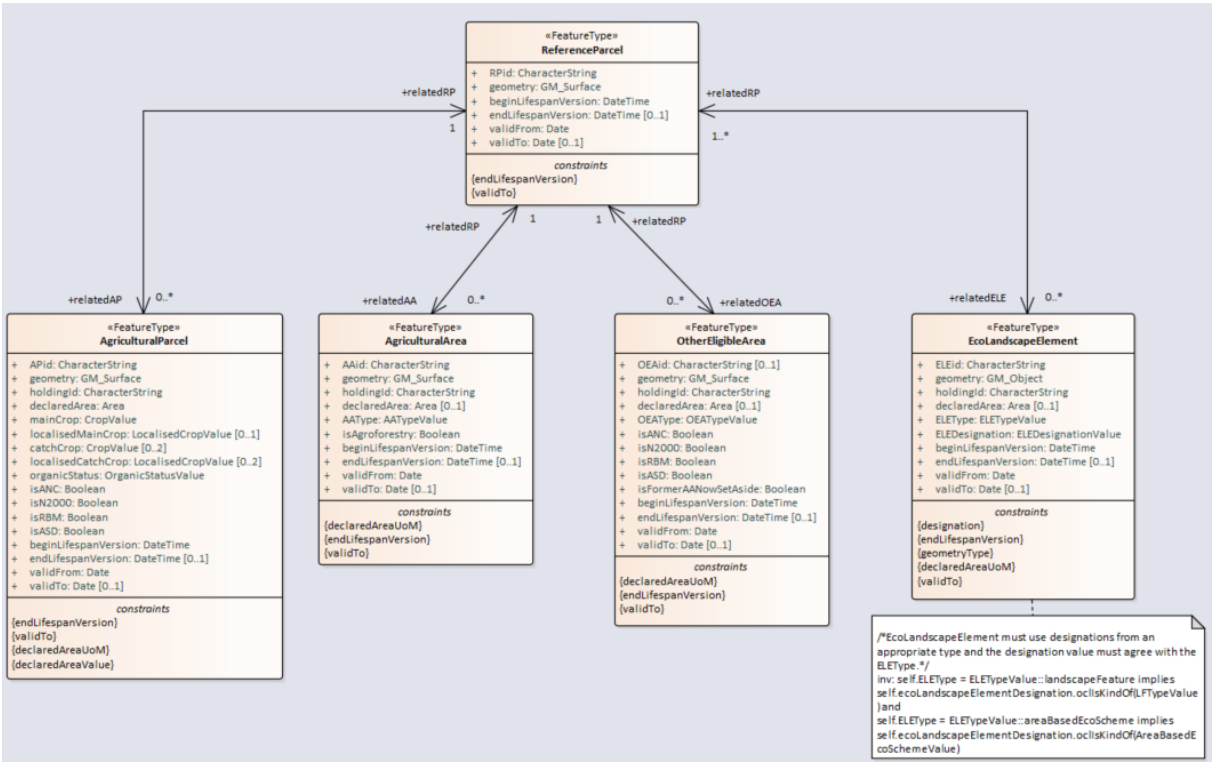


Figure 4. geoIACS UML model – Site and EcologicalFocusArea class diagrams.

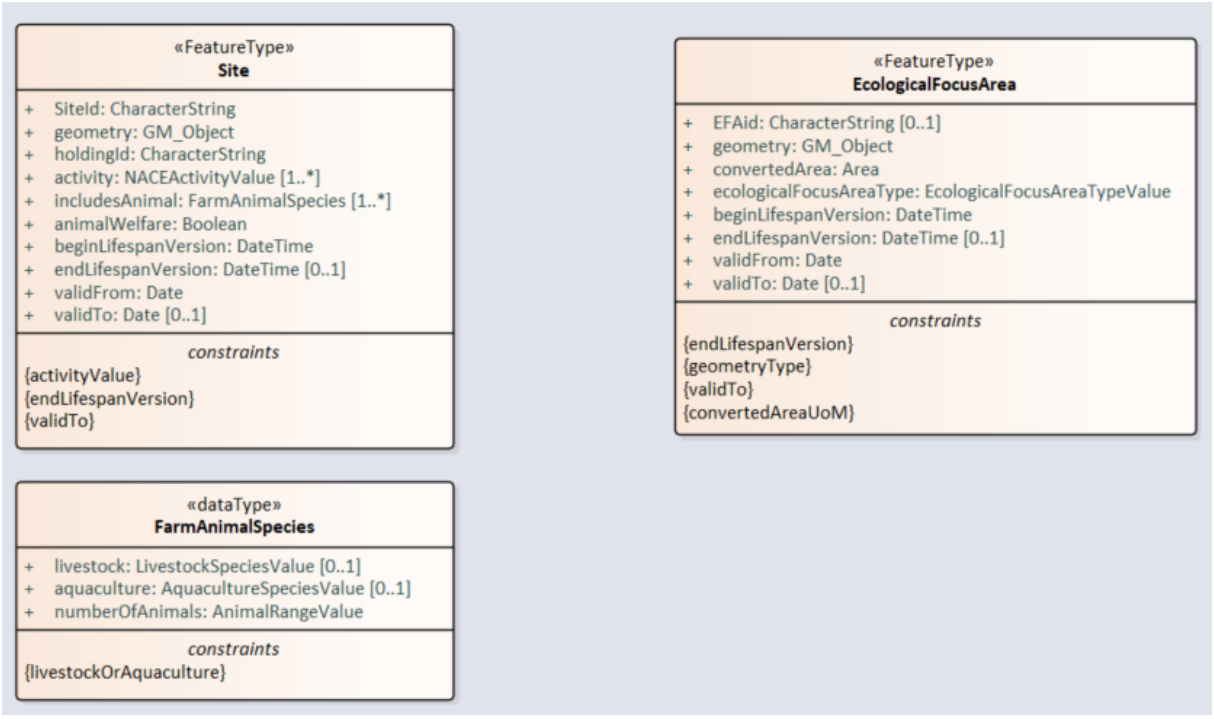


Figure 5. geoIACS UML model - AgriculturalAreaType code list.

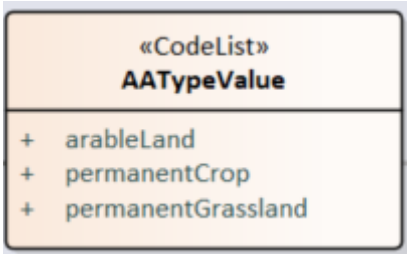


Figure 6. geoIACS UML model – Crop and LocalisedCrop code lists.

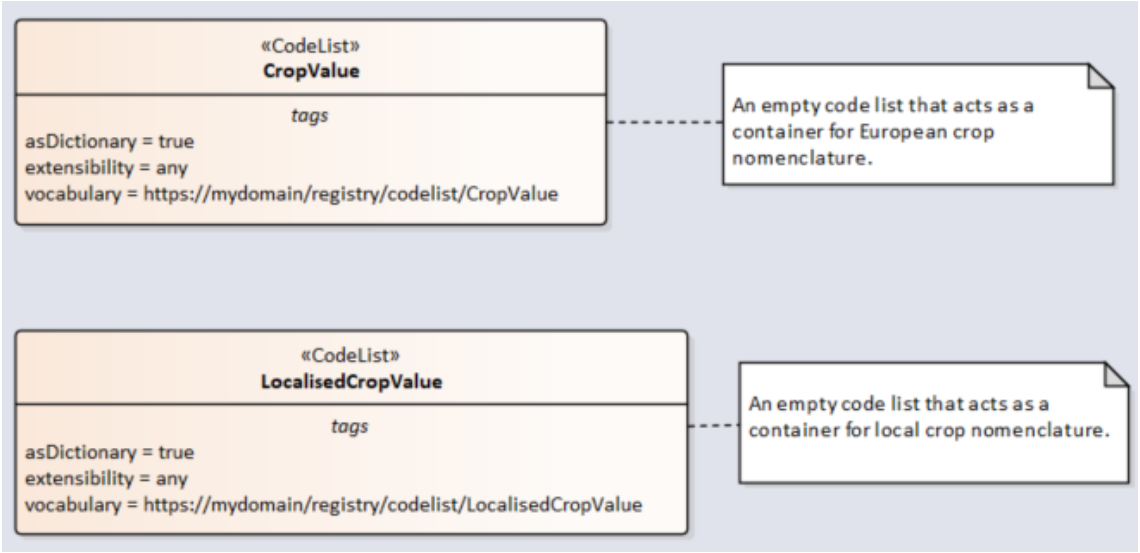


Figure 7. geoIACS UML model - OtherEligibleArea associated code list.

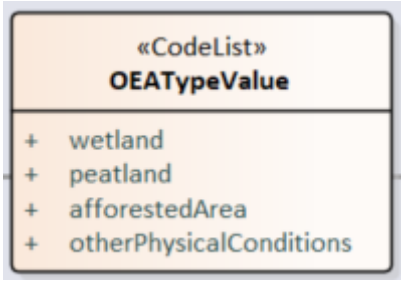


Figure 8. geoIACS UML model - EcoLandscapeElementType code list.

Figure 9. geoIACS UML model - EcoLandscapeElementDesignation, LandscapeFeature and AreaBasedEcoScheme code lists.

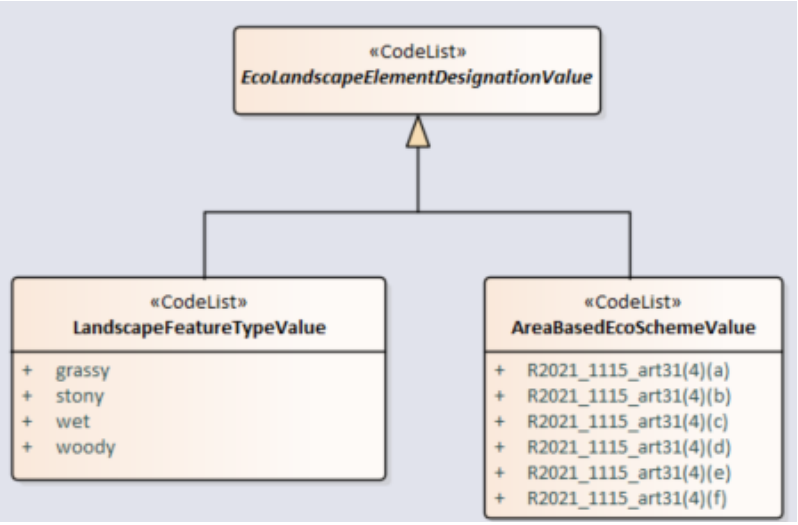


Figure 10. geoIACS UML model - NACEActivity code list.

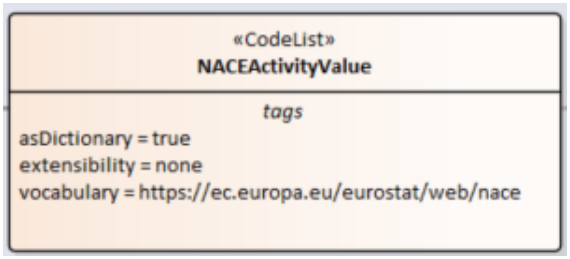


Figure 11. geoIACS UML model – LivestockSpecies, AquacultureSpecies and AnimalRangeValue code lists.

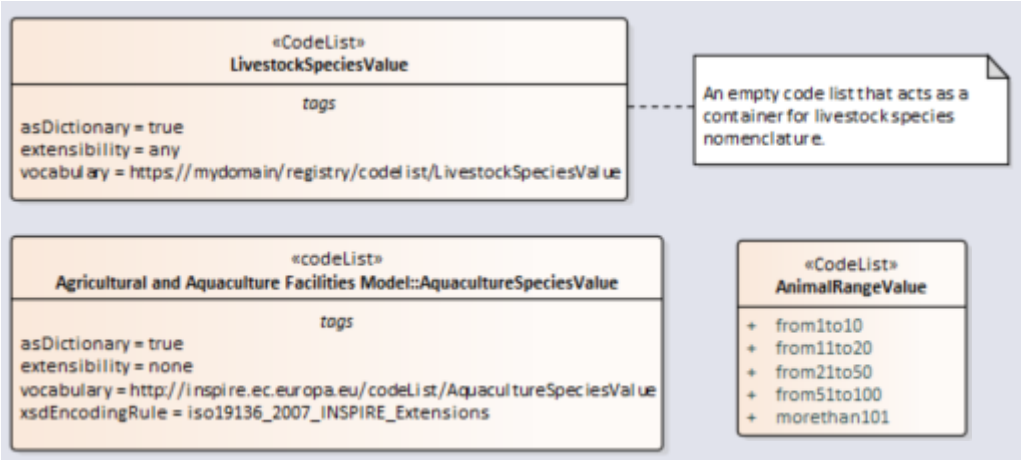
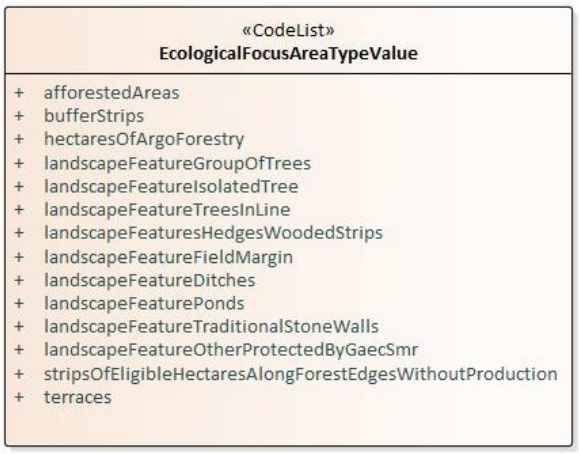


Figure 12. geoIACS UML model - EcologicalFocusAreaType associated code list.



3.3.2. geoIACS Feature catalogue

Table 1. Types defined in the geoIACS feature catalogue.

Type	Package	Stereotypes
ReferenceParcel	geoIACS	featureType
AgriculturalParcel	geoIACS	featureType
AgriculturalArea	geoIACS	featureType
OtherEligibleArea	geoIACS	featureType
EcoLandscapeElement	geoIACS	featureType
Site	geoIACS	featureType
EcologicalFocusArea	geoIACS	featureType
FarmAnimalSpecies	geoIACS	dataType
AATypeValue	geoIACS	codeList
OEATypeValue	geoIACS	codeList
cropValue	geoIACS	codeList
localisedCropValue	geoIACS	codeList
EcoLandscapeElementTypeValue	geoIACS	codeList
EcoLandscapeElementDesignationValue	geoIACS	codeList
LandscapeFeatureTypeValue	geoIACS	codeList
AreaBasedEcoSchemeValue	geoIACS	codeList
EcologicalFocusAreaTypeValue	geoIACS	codeList
NACEActivityValue	geoIACS	codeList
LivestockSpeciesValue	geoIACS	codeList
AquacultureSpeciesValue	geoIACS	codeList
AnimalRangeValue	geoIACS	codeList

3.3.2.1. Feature types

3.3.2.1.1. ReferenceParcel

--**Name**--

Reference parcel

-- **Definition** --

From Article 2(2) of Regulation (EU) 2022/1172, 'reference parcel' means a geographically delimited area retaining a unique identification as registered in the identification system for agricultural parcels referred to in Article 68 of Regulation (EU) 2021/2116. A reference parcel shall contain a unit of land representing agricultural area, as referred to in Article 4(3) of Regulation (EU) 2021/2115. Where appropriate, a reference parcel shall also contain other agricultural areas considered eligible by Member States for receiving the support for area-based interventions referred to in Article 65(2) and (3) of Regulation (EU) 2021/2116.

-- **Description** --

Basic spatial unit for the administration and geographical localization of agricultural parcels. May contain one or more declared agricultural parcels in IACS and may be cultivated by one or more farmers (or producers association). The reference parcels shall serve as basis to support beneficiaries in submitting geo-spatial applications for area-based interventions referred to in Article 65(2) and (3) of Regulation (EU) 2021/2116 [Art. 2(3) of Regulation (EU) 2022/1172]. Member States shall delimit the reference parcels in such a way as to ensure that each parcel is stable in time, measurable, enables the unique and unambiguous localisation of each agricultural parcel and unit of land of non-agricultural areas considered eligible by the Member States for receiving the support for the area-based interventions referred to in Article 65(2) and (3) of Regulation (EU) 2021/2116 declared annually [Art. 2(4) of Regulation (EU) 2022/1172].

NOTE. Definition in the past. Reference parcel - a continuous area of agricultural land (production block) grouping together a number of neighboring agricultural parcels (production units) cultivated by one or more farmer(s) and delineated by most stable boundaries. Subtypes (used in the past): CadParcel, AgrParcel, FarBlock, PhyBlock, TopoBlock and MixedParcelType. It current model it is not implemented, since these concepts are not core elements of current IACS model.

Table 2. Attributes of ReferenceParcel feature type

Name	**Type**	**Notes**
RPid	CharacterString	--**Name**-- Reference parcel ID -- **Definition**-- Unique ID of reference parcel referred to in Art. 68 (2)(a) of R (EU) 2021/2116. -- **Description**-- European unique alphanumerical thematic identification code of reference parcel. It should follow the rules of INSPIRE when delivered for EU use. -- **Multiplicity**-- 1

Name	Type	Notes
geometry	GM_Surface	--**Name**-- Geometry -- **Definition** -- Spatial representation of the reference parcel as referred to in Art. 2(2) of R (EU) 2022/1172. -- **Multiplicity**-- 1
beginLifespanVersion	DateTime	-- **Name**-- Begin life span version --**Definition**-- Set of properties of an object/feature that describes the temporal characteristics of a version or the changes between versions. [Adapted from INSPIRE Generic Conceptual Model] -- **Description** -- Date and time at which this version of the feature was inserted or changed in the dataset. -- **Multiplicity**-- 1
endLifespanVersion	DateTime	--**Name** -- End life span version --**Definition** -- Set of properties of an object/feature that describe the temporal characteristics of a version or the changes between versions [Adapted from INSPIRE Generic Conceptual Model] -- **Description** --

Name	Type	Notes
		Date and time at which this version of the feature was superseded or retired in the dataset. -- **Multiplicity**-- 0..1
validFrom	Date	--**Name**— Valid from -- **Definition** – Official date when the object / feature has been (will be) in situ or legally established. -- **Multiplicity**-- 1
validTo	Date	--**Name** – Valid to --**Definition** – Official date at which the feature in situ (or legally) ceased (will cease) to be used. -- **Multiplicity**-- 0..1

Table 3. Constraints of ReferenceParcel feature type

Name	Notes
endLifespanVersion	/* If set, the date endLifespanVersion shall be later than beginLifespanVersion. */
validTo	/* If set, the date validTo shall be equal or later than validFrom. */

Table 4. Relationships of ReferenceParcel feature type

Association	**Notes**
RelatedAP	--**Name**-- Association role between ReferenceParcel and AgriculturalParcel. -- **Definition** -- Semantic relationship (association) between ReferenceParcel and AgriculturalParcel feature types. -- **Description** -- One reference parcel can be composed of one or more agricultural parcels. Each agricultural parcel shall be related to only one reference parcel. -- **Multiplicity**-- 0..*
RelatedAA	--**Name**-- Association role between ReferenceParcel and AgriculturalArea. -- **Definition** -- Semantic relationship (association) between ReferenceParcel and AgriculturalArea feature types. -- **Description** -- One reference parcel can be composed of one or more agricultural area types. Each agricultural area shall be related to only one reference parcel. -- **Multiplicity**-- 0..*
RelatedOEA	--**Name**-- Association role between ReferenceParcel and OtherEligibleArea. -- **Definition** --

Association	Notes
	Semantic relationship (association) between ReferenceParcel and OtherEligibleArea feature types. -- **Description** -- One reference parcel can be composed of one or more other eligible area types. Each other eligible area shall be related to only one reference parcel. -- **Multiplicity**-- 0..*
RelatedELE	--**Name**-- Association role between reference parcel and eco landscape element. -- **Definition** -- Semantic relationship (association) between ReferenceParcel and EcoLandscapeElement feature types. -- **Description** -- One reference parcel can be composed of one or more eco landscape element types. Each eco landscape element shall be related to only one reference parcel. -- **Multiplicity**-- 0..*

3.3.2.1.2. AgriculturalParcel

--**Name**--

Agricultural parcel

-- **Definition** --

According to Article 65(4)(d) of R (EU) 2021/2116, Agricultural parcel means a unit, defined by Member States, of agricultural area as determined in accordance with Article 4(3) of R (EU) 2021/2115.

-- **Description** --

Agricultural parcel declared by farmer.

NOTE: A series of boolean attributes (isANC, isN2000, isRBM, is ASD) indicate if an Agriultural Parcel is eligible also for area-based payments under Title III, Chapter IV of R (EU) 2021/2115 to compensate beneficiaries for additional costs and income foregone related to natural or other area-specific constraints (art. 71) or related to area-specific disadvantages (art. 72).

Table 5. Attributes of AgriculturalParcel feature type

Name	**Type**	**Notes**
APid	CharacterString	--**Name**-- Agricultural parcel ID -- **Definition** -- Unique ID of agricultural parcel. -- **Description** -- European unique alphanumerical identification code of agricultural parcel. It should follow the rules of INSPIRE when delivered for EU use. -- **Multiplicity**-- 1
geometry	GM_Surface	--**Name**-- Geomety -- **Definition** -- Spatial representation of agricultural parcel. -- **Multiplicity**-- 1
holdingId	CharacterString	--**Name**-- Holding ID **-- Definition --** Unique ID of the holding, The holding, as defined in Article 3(2) of R (EU) 2021/2115, means all the units used for agricultural activities and

Name	Type	Notes
		managed by a farmer situated within the territory of the same Member State. **-- Description --** Europe-wide unique alphanumerical identification code of agricultural parcel. It should follow the rules of INSPIRE when delivered for EU use. NOTE This attribute, when covered by confidentiality clauses set by the data providers, will be shared only to authorised and authenticated users (e.g. EC services) under specific conditions laid down in written terms of use. -- **Multiplicity**-- 1
declaredArea	Area	--**Name**-- Area declared -- **Definition** -- Value for the quantification of area as referred to in Art. 8 (2)(b) of R (EU) 1173/2022. -- **Multiplicity**-- 1
organicStatus	OrganicStatusValue	**--Name--** organicStatus **--Definition--** Parcel status with respect to the commitments for fulfilling conditions of R (EU) 2018/848 on organic production. **--Description--** Organic production is an overall system of farm management and food production that combines best environmental and climate action practices, a high level of biodiversity and the preservation of natural

Name	Type	Notes
		resources. Organic farming promotes sustainable food production and preserving natural environment. -- **Multiplicity**-- 1
mainCrop	CropValue	--**Name**-- mainCrop **-- Definition --** Main crop grown within the campaign year (growing season). **-- Description --** Crop occupying the parcel in most of the time of the growing season. It also includes fallow land. -- **Multiplicity**-- 1
localised mainCrop	LocalisedCropValue	--**Name**-- Localised MainCrop **-- Definition --** Main crop not present in EU crop codelists and present in codelists containing local nomenclatures. -- **Multiplicity**-- 0..1
catchCrop	CropValue	--**Name**-- catchCrop **-- Definition --**

Name	Type	Notes
		Fast-growing crop that is grown between successive plantings of a main crop. **-- Description --** Crop used for N fixing, as green manure, etc. -- **Multiplicity**-- 0..2
localised catchCrop	LocalisedCropValue	--**Name**-- Localised cathcCrop **-- Definition --** Catch crop not present in EU crop codelists and present in codelists containing local nomenclatures. -- **Multiplicity**-- 0..2
isANC	Boolean	**--Name--** isANC **--Definition--** Boolean attribute whose value is 1 (true) if the agricultural parcel is eligible also for area-based payments under Title III, Chapter IV of R (EU) 2021/2115 to compensate beneficiaries for additional costs and income foregone related to natural or other area-specific constraints (art. 71). -- **Multiplicity**-- 1
isN2000	Boolean	**--Name--** isN2000 **--Definition--**

Name	Type	Notes
		Boolean attribute whose value is 1 (true) if the agricultural parcel is eligible for area-based payments under Title III, Chapter IV of R (EU) 2021/2115 to compensate beneficiaries for additional costs and income foregone related to Natura2000 areas (art. 72(3)(a)). -- **Multiplicity**-- 1
isRBM	Boolean	**--Name--** isRBM **--Definition--** Boolean attribute whose value is 1 (true) if the agricultural parcel is eligible for area-based payments under Title III, Chapter IV of R (EU) 2021/2115 to compensate beneficiaries for additional costs and income foregone related to agricultural areas included in river basin management plans (art. 72(3)(c)). -- **Multiplicity**-- 1
isASD	Boolean	**--Name--** isASD **--Definition--** Boolean attribute whose value is 1 (true) if the agricultural parcel is eligible for area-based payments under Title III, Chapter IV of R (EU) 2021/2115 to compensate beneficiaries for additional costs and income foregone related to areas characterised by area-specific disadvantages resulting from certain mandatory requirements set in art. 72, different from those set in art. 72(3)(a) and art. 72(3)(c). -- **Multiplicity**-- 1
beginLifespanVersion	DateTime	-- **Name**-- Begin life span version

Name	Type	Notes
		--**Definition**-- Set of properties of an object/feature that describes the temporal characteristics of a version or the changes between versions. [Adapted from INSPIRE Generic Conceptual Model] -- **Description** -- Date and time at which this version of the feature was inserted or changed in the dataset. -- **Multiplicity**-- 1
endLifespan Version	DateTime	--**Name** -- End life span version --**Definition** -- Set of properties of an object/feature that describe the temporal characteristics of a version or the changes between versions [Adapted from INSPIRE Generic Conceptual Model] -- **Description** -- Date and time at which this version of the feature was superseded or retired in the dataset. -- **Multiplicity**-- 0..1
validFrom	Date	--**Name**— Valid from -- **Definition** – Official date when the object / feature has been (will be) in situ or legally established. -- **Multiplicity**--

Name	Type	Notes
		1
validTo	Date	--**Name** – Valid to --**Definition** – Official date at which the feature in situ (or legally) ceased (will cease) to be used. -- **Multiplicity**-- 0..1

Table 6. Constraints of AgriculturalParcel feature type

Name	Notes
declaredAreaUoM	/* Value of declaredArea shall be given in hectars. */
declaredAreaValue	As regards the area-related direct payment, each Member State shall determine the minimum size of agricultural parcels in respect of which an application may be made. However, the minimum size shall not exceed 0,3 ha. After decision is done - it must be followed.
endLifespanVersion	/* If set, the date endLifespanVersion shall be later than beginLifespanVersion. */
validTo	/* If set, the date validTo shall be equal or later than validFrom. */

Table 7. Relationships of AgriculturalParcel feature type

Association	Notes
relatedRP	--**Name**-- Association role between ReferenceParcel and AgriculturalParcel. -- **Definition**-- Semantic relationship (association) between ReferenceParcel and AgriculturalParcel feature types.

Association	Notes
	-- **Description**-- One reference parcel can be composed of one or more agricultural parcels. Each agricultural parcel shall be related to only one reference parcel. -- **Multiplicity**-- 1

3.3.2.1.3. AgriculturalArea

-- **Name** --

Agricultural area

-- **Definition** --

Agricultural areas as defined in Art. 4(3) of R (EU) 2021/2115.

Table 8. Attributes of AgriculturalArea feature type

Name	Type	Notes
AAid	CharacterString	--**Name**-- Agricultural eligible area ID -- **Definition** -- Unique ID of agricultural area. -- **Description** -- European unique alphanumerical identification code of agricultural area. It should follow the rules of INSPIRE when delivered for EU use. -- **Multiplicity**-- 1
geometry	GM_Surface	--**Name**-- Geometry

Name	Type	Notes
		-- **Definition** -- Spatial representation of other agricultural eligible area. -- **Multiplicity**-- 1
holdingId	CharacterString	--**Name**-- Holding ID **-- Definition --** Unique ID of the holding, The holding, as defined in Article 3(2) of R (EU) 2021/2115, means all the units used for agricultural activities and managed by a farmer situated within the territory of the same Member State. **-- Description --** Europe-wide unique alphanumerical identification code of agricultural parcel. It should follow the rules of INSPIRE when delivered for EU use. NOTE This attribute, when covered by confidentiality clauses set by the data providers, will be shared only to authorised and authenticated users (e.g. EC services) under specific conditions laid down in written terms of use. -- **Multiplicity**-- 1
declaredArea	Area	--**Name**-- Area declared -- **Definition** -- Value for the quantification of area as referred to in Art. 8 (2)(b) of R (EU) 1173/2022.

Name	Type	Notes
		-- **Multiplicity**-- 0..1
AAType	AATypeValue	--**Name**-- Agricultural area type **-- Definition --** Types of agricultural area (arable land, permanent crops and permanent grassland), as defined in art4(3) of R (EU) 2021/2115. -- **Multiplicity**-- 1
isAgroforestry	Boolean	--**Name**-- isAgroforestry **-- Definition --** Boolean attribute whose value is 1 (true) if the AA forms agroforestry systems as referred to in Art. 4(3) of R (EU) 2021/2115 and as defined in Recital 14 of Regulation "... agroforestry systems, where trees are grown in agricultural parcels on which agricultural activities are carried out to improve the sustainable use of the land." -- **Multiplicity**-- 1
beginLifespanVersion	DateTime	-- **Name**-- Begin life span version --**Definition**-- Set of properties of an object/feature that describes the temporal characteristics of a version or the changes between versions. [Adapted from INSPIRE Generic Conceptual Model] -- **Description** --

Name	Type	Notes
		Date and time at which this version of the feature was inserted or changed in the dataset. -- **Multiplicity**-- 1
endLifespanVersion	DateTime	--**Name** -- End life span version --**Definition** -- Set of properties of an object/feature that describe the temporal characteristics of a version or the changes between versions [Adapted from INSPIRE Generic Conceptual Model] -- **Description** -- Date and time at which this version of the feature was superseded or retired in the dataset. -- **Multiplicity**-- 0..1
validFrom	Date	--**Name**— Valid from -- **Definition** – Official date when the object / feature has been (will be) in situ or legally established. -- **Multiplicity**-- 1
validTo	Date	--**Name** – Valid to

Name	Type	Notes
		--**Definition** – Official date at which the feature in situ (or legally) ceased (will cease) to be used. -- **Multiplicity**-- 0..1

Table 9. Constraints of AgriculturalArea feature type

Name	Notes
declaredAreaUoM	/* Value of declaredArea shall be given in hectars. */
endLifespanVersion	/* If set, the date endLifespanVersion shall be later than beginLifespanVersion. */
validTo	/* If set, the date validTo shall be equal or later than validFrom. */

Table 10. Relationships of AgriculturalArea feature type

Association	Notes
relatedRP	--**Name**-- Association role between ReferenceParcel and AgriculturalArea. -- **Definition** -- Semantic relationship (association) between ReferenceParcel and AgriculturalArea feature types. -- **Description** -- One reference parcel can be composed of one or more agricultural area types. Each agricultural area shall be related to only one reference parcel. -- **Multiplicity**-- 1

3.3.2.1.4. OtherEligibleArea

-- **Name** --

Other eligible area

-- **Definition** --

From Article 4(4)(c) of R (EU) 2021/2115, any area of the holding which gives right to payments under Title III, Chapter II, Section 2, Subsection 2 of R (EU) 2021/2115 and which is not an Agricultural Area (as defined by Article 4(4)(a) of R (EU) 2021/2115) nor an EcoLandscapeElement (as defined by Article 4(4)(b) of R (EU) 2021/2115.

NOTE: A series of boolean attributes (isANC, isN2000, isRBM, is ASD) indicate if a OEA is eligible also for area-based payments under Title III, Chapter IV of R (EU) 2021/2115 to compensate beneficiaries for additional costs and income foregone related to natural or other area-specific constraints (art. 71) or related to area-specific disadvantages (art. 72).

Table 11. Attributes of OtherEligibleArea feature type

Name	Type	Notes
OEAid	CharacterString	--**Name**-- Other eligible area ID -- **Definition** -- Unique ID of other eligible area. -- **Description** -- European unique alphanumerical identification code of other eligible area. It should follow the rules of INSPIRE when delivered for EU use. -- **Multiplicity**-- 1
geometry	GM_Surface	--**Name**-- Geomety -- **Definition** -- Spatial representation of other eligible area. -- **Multiplicity**--

Name	Type	Notes
		1
holdingId	CharacterString	--**Name**-- Holding ID **-- Definition --** Unique ID of the holding, The holding, as defined in Article 3(2) of R (EU) 2021/2115, means all the units used for agricultural activities and managed by a farmer situated within the territory of the same Member State. **-- Description --** Europe-wide unique alphanumerical identification code of agricultural parcel. It should follow the rules of INSPIRE when delivered for EU use. NOTE This attribute, when covered by confidentiality clauses set by the data providers, will be shared only to authorised and authenticated users (e.g. EC services) under specific conditions laid down in written terms of use. -- **Multiplicity**-- 1
declaredArea	Area	--**Name**-- Area declared -- **Definition** -- Value for the quantification of area as referred to in Art. 8 (2)(b) of R (EU) 1173/2022. -- **Multiplicity**-- 0..1
OEAType	OEATypeValue	--**Name**-- Other eligible area type

Name	Type	Notes
		-- Definition -- Types of other eligible area, according to art. 4(4)(c) of R (EU) 2021/2115. -- **Multiplicity**-- 1
isANC	Boolean	**--Name--** isANC **--Definition--** Boolean attribute whose value is 1 (true) if the other eligible area is eligible also for area-based payments under Title III, Chapter IV of R (EU) 2021/2115 to compensate beneficiaries for additional costs and income foregone related to natural or other area-specific constraints (art. 71). -- **Multiplicity**-- 1
isN2000	Boolean	**--Name--** isN2000 **--Definition--** Boolean attribute whose value is 1 (true) if the other eligible area is eligible for area-based payments under Title III, Chapter IV of R (EU) 2021/2115 to compensate beneficiaries for additional costs and income foregone related to Natura2000 areas (art. 72(3)(a)). -- **Multiplicity**-- 1
isRBM	Boolean	**--Name--** isRBM **--Definition--**

Name	Type	Notes
		Boolean attribute whose value is 1 (true) if the other eligible area is eligible for area-based payments under Title III, Chapter IV of R (EU) 2021/2115 to compensate beneficiaries for additional costs and income foregone related to agricultural areas included in river basin management plans (art. 72(3)(c)). -- **Multiplicity**-- 1
isASD	Boolean	**--Name--** isASD **--Definition--** Boolean attribute whose value is 1 (true) if the other eligible area is eligible for area-based payments under Title III, Chapter IV of R (EU) 2021/2115 to compensate beneficiaries for additional costs and income foregone related to areas characterised by area-specific disadvantages resulting from certain mandatory requirements set in art. 72, different from those set in art. 72(3)(a) and art. 72(3)(c). -- **Multiplicity**-- 1
isFormerAANowSetAside	Boolean	**--Name--** isFormerAANowSetAside **--Definition--** Boolean attribute whose value is 1 (true) if the OEA is eligible for payments under art. 4(4)(c)(iv) of R (EU) 2021/2115. -- **Multiplicity**-- 1
beginLifespanVersion	DateTime	-- **Name**-- Begin life span version --**Definition**--

Name	Type	Notes
		Set of properties of an object/feature that describes the temporal characteristics of a version or the changes between versions. [Adapted from INSPIRE Generic Conceptual Model] -- **Description** -- Date and time at which this version of the feature was inserted or changed in the dataset. -- **Multiplicity**-- 1
endLifespanVersion	DateTime	--**Name** -- End life span version --**Definition** -- Set of properties of an object/feature that describe the temporal characteristics of a version or the changes between versions [Adapted from INSPIRE Generic Conceptual Model] -- **Description** -- Date and time at which this version of the feature was superseded or retired in the dataset. -- **Multiplicity**-- 0..1
validFrom	Date	--**Name**— Valid from -- **Definition** – Official date when the object / feature has been (will be) in situ or legally established. -- **Multiplicity**-- 1

Name	Type	Notes
validTo	Date	--**Name** – Valid to --**Definition** – Official date at which the feature in situ (or legally) ceased (will cease) to be used. -- **Multiplicity**-- 0..1

Table 12. Constraints of OtherEligibleArea feature type

Name	Notes
declaredAreaUoM	/* Value of declaredArea shall be given in hectars. */
endLifespanVersion	/* If set, the date endLifespanVersion shall be later than beginLifespanVersion. */
validTo	/* If set, the date validTo shall be equal or later than validFrom. */

Table 13. Relationships of OtherEligibleArea feature type

Association	Notes
relatedRP	--**Name**-- Association role between ReferenceParcel and OtherEligibleArea. -- **Definition** -- Semantic relationship (association) between ReferenceParcel and OtherEligibleArea feature types. -- **Description** -- One reference parcel can be composed of one or more other eligible area types. Each other eligible area shall be related to only one reference parcel.

Association	Notes
	-- **Multiplicity**-- 1

3.3.2.1.5. EcoLandscapeElement

--**Name**--

Eco Landscape Element

-- **Definition**--

From Article 4(4)(b) of R (EU) 2021/2115, any area of the holding which is: (i) covered by landscape features subject to the retention obligation under GAEC standard 8 listed in Annex III and (ii) for the duration of the relevant commitment by the farmer, established or maintained as a result of an eco-scheme referred to in Article 31.

-- **Description** --

It shall be a landscape feature or an area interested by an area-based eco-scheme.

Table 14. Attributes of EcoLandscapeElement feature type

Name	Type	Notes
ELEid	CharacterString	--**Name**-- Eco Landscape element identifier -- **Definition** -- Unique thematic ID of ecolandscape element. -- **Description** -- European unique alphanumerical identification code of ecolandscape element. It should follow the rules of INSPIRE when delivered for EU use. -- **Multiplicity**-- 1
geometry	GM_Object	--**Name**-- Geometry -- **Definition** --

Name	Type	Notes
		Spatial representation of ecolandscape element. -- **Multiplicity**-- 1
holdingId	CharacterString	--**Name**-- Holding ID **-- Definition --** Unique ID of the holding. The holding, as defined in Article 3(2) of R (EU) 2021/2115, means all the units used for agricultural activities and managed by a farmer situated within the territory of the same Member State. **-- Description --** Europe-wide unique alphanumerical identification code of agricultural parcel. It should follow the rules of INSPIRE when delivered for EU use. NOTE This attribute, when covered by confidentiality clauses set by the data providers, will be shared only to authorised and authenticated users (e.g. EC services) under specific conditions laid down in written terms of use. -- **Multiplicity**-- 1
declaredArea	Area	--**Name**-- Area declared -- **Definition** -- Value for the quantification of area as referred to in Art. 8 (2)(b) of R (EU) 1173/2022. -- **Multiplicity**-- 0..1

Name	Type	Notes
ecoLandscapeElementType	EcoLandscapeElementTypeValue	--**Name**-- Eco Landscape Element type -- **Definition** -- Type of ecolandscape element. It can be landscape feature or area-based ecoscheme. -- **Description** -- The value of this attribute shall be taken from the EcoLandscapeElementTypeValue code list. -- **Multiplicity**-- 1
ecoLandscapeElementDesignation	EcoLandscapeElementDesignationValue	--**Name**-- Eco Landscape Element designation -- **Definition** -- Designation of the ecolandscape element within the ecolandscape element type. -- **Description** -- According to the value of EcoLandscapeElementType, the value of this attribute shall be taken from the LandscapeFeatureTypeValue codelist (if EcoLandscapeElement type if landscapeFeature) or from the AreaBasedEcoSchemeValue codelist (if EcoLandScapeElement type is areBasedEcoScheme). -- **Multiplicity**-- 1
beginLifespanVersion	DateTime	-- **Name**-- Begin life span version

Name	Type	Notes
		--**Definition**-- Set of properties of an object/feature that describes the temporal characteristics of a version or the changes between versions. [Adapted from INSPIRE Generic Conceptual Model] -- **Description** -- Date and time at which this version of the feature was inserted or changed in the dataset. -- **Multiplicity**-- 1
endLifespan Version	DateTime	--**Name** -- End life span version --**Definition** -- Set of properties of an object/feature that describe the temporal characteristics of a version or the changes between versions [Adapted from INSPIRE Generic Conceptual Model] -- **Description** -- Date and time at which this version of the feature was superseded or retired in the dataset. -- **Multiplicity**-- 0..1
validFrom	Date	--**Name**— Valid from -- **Definition** – Official date when the object / feature has been (will be) in situ or legally established. -- **Multiplicity**--

Name	Type	Notes
		1
validTo	Date	--**Name** – Valid to --**Definition** – Official date at which the feature in situ (or legally) ceased (will cease) to be used. -- **Multiplicity**-- 0..1

Table 15. Constraints of EcoLandscapeElement feature type

Name	Notes
designation	/*EcoLandscapeElement must use designations from an appropriate type and the designation value must agree with the EcoLandscapeElementType.*/ inv: self.ecoLandscapeElementType = EcoLandscapeElementTypeValue::landscapeFeature implies self.ecoLandscapeElementDesignation.oclIsKindOf(LandscapeFeatureTypeValue) and self.ecoLandscapeElementType = EcoLandscapeElementTypeValue::areaBasedEcoScheme implies self.ecoLandscapeElementDesignation.oclIsKindOf(AreaBasedEcoSchemeValue)
declaredAreaUoM	/* Value of declaredArea shall be given in hectars. */
endLifespanVersion	/* If set, the date endLifespanVersion shall be later than beginLifespanVersion. */
validTo	/* If set, the date validTo shall be equal or later than validFrom. */

Table 16. Relationships of EcoLandscapeElement feature type

Association	Notes
relatedRP	--**Name**--

Association	Notes
	Association role between reference parcel and eco landscape element. -- **Definition** -- Semantic relationship (association) between ReferenceParcel and EcoLandscapeElement feature types. -- **Description** -- One reference parcel can be composed of one or more eco landscape element types. Each eco landscape element shall be related to only one reference parcel. -- **Multiplicity**-- 1

3.3.2.1.6. Site

--**Name**--

Site

-- **Definition** --

Place within a holding where agricultural activities related to animals are exercised.

-- **Description** --

Simplified version of the Site Feature Type present in the INSPIRE data specifications for Agricultural Facilities.

NOTE. the geometry can be a point or a surface.

Table 17. Attributes of Site feature type

Name	Type	Notes
SiteId	CharacterString	--**Name**-- Site ID -- **Definition**-- Unique ID of site. -- **Description**--

Name	Type	Notes
		European unique alphanumerical identification code of ecological focus area. It should follow the rules of INSPIRE when delivered for EU use. -- **Multiplicity**-- 1
geometry	GM_Object	--**Name**-- Geometry -- **Definition** -- Spatial representation of site. It can be a point (site location) or a surface (site building footprint). -- **Multiplicity**-- 1
holdingId	CharacterString	--**Name**-- Holding ID **-- Definition --** Unique ID of the holding, The holding, as defined in Article 3(2) of R (EU) 2021/2115, means all the units used for agricultural activities and managed by a farmer situated within the territory of the same Member State. **-- Description --** Europe-wide unique alphanumerical identification code of agricultural parcel. It should follow the rules of INSPIRE when delivered for EU use. NOTE This attribute, when covered by confidentiality clauses set by the data providers, will be shared only to authorised and authenticated users (e.g. EC services) under specific conditions laid down in written terms of use. -- **Multiplicity**--

Name	Type	Notes
		1
activity	NACEActivityValue	--**Name**-- activity -- **Definition** -- Type of economic activity for the site, according to NACE classification. -- **Description** -- Type of economic activity for the site, according to NACE classification (The newest version is NACE revision 2 update 1 (NACE Rev. 2.1), which is to be used for European statistics from 2025 onwards. This was adopted by the European Commission in October 2022.). NOTE 1: The activities should be selected from the ones available in the Group 01.4 - Animal production. -- **Multiplicity**-- 1..*
includesAnimal	FarmAnimalSpecies	--**Name**-- includesAnimals -- **Definition** -- Indicates the presence or not of animals in the site. -- **Multiplicity**-- 1..*
animalWelfare	Boolean	--**Name**-- animal welfare -- **Definition** --

Name	Type	Notes
		Indicates the presence or not of subsidies related to animal welfare according to Art. 31 of R (EU) 2021/2115 -- **Multiplicity**-- 1
beginLifespanVersion	DateTime	-- **Name**-- Begin life span version --**Definition**-- Set of properties of an object/feature that describes the temporal characteristics of a version or the changes between versions. [Adapted from INSPIRE Generic Conceptual Model] -- **Description** -- Date and time at which this version of the feature was inserted or changed in the dataset. -- **Multiplicity**-- 1
endLifespanVersion	DateTime	--**Name** -- End life span version --**Definition** -- Set of properties of an object/feature that describe the temporal characteristics of a version or the changes between versions [Adapted from INSPIRE Generic Conceptual Model] -- **Description** -- Date and time at which this version of the feature was superseded or retired in the dataset. -- **Multiplicity**-- 0..1

Name	Type	Notes
validFrom	Date	--**Name**— Valid from -- **Definition** – Official date when the object / feature has been (will be) in situ or legally established. -- **Multiplicity**-- 1
validTo	Date	--**Name** – Valid to --**Definition** – Official date at which the feature in situ (or legally) ceased (will cease) to be used. -- **Multiplicity**-- 0..1

Table 18. Constraints of Site feature type

Name	Notes
activityValue	/*The values shall be selected from the ones available in the Group 01.4 - Animal production */
endLifespanVersion	/* If set, the date endLifespanVersion shall be later than beginLifespanVersion. */
validTo	/* If set, the date validTo shall be equal or later than validFrom. */

3.3.2.1.7. EcologicalFocusArea

--**Name**--

Ecological Focus Area

-- **Definition** --

Ecological focus areas as referred to in Article 46 of R (EU) No1307/2013 and its Delegated Regulation (EU) No 639/2014.

-- **Description** --

Areas contributing to practices beneficial for the climate and the environment as referred to in Art. 43(2)(c) of (EU) R No 1307/2013.

NOTE. EFA is not applicable for datasets issued after 2023.

Table 19. Attributes of EcologicalFocusArea feature type

Name	Type	Notes
EFAid	CharacterString	--**Name**-- Ecological focus area identifier -- **Definition** -- Unique thematic ID of ecological focus area. -- **Description** -- European unique alphanumerical identification code of ecological focus area. It should follow the rules of INSPIRE when delivered for EU use. -- **Multiplicity**-- 0..1
geometry	GM_Object	--**Name**-- Geometry -- **Definition** -- Spatial representation of ecological focus area. -- **Description** -- Representation of the geographical dimension/position of the ecological focus area. EFA may be represented as , point, curve, or surface depending on the options allowed by Art 46(3) of R (EU) 1307/2013 and the choice of the MS/region.

Name	Type	Notes
		NOTE 1: The established area referred in DSCG/2014/31 is derived from surface representation of the geometric extent. NOTE 2: The converted area referred in DSCG/2014/31 is derived from a geometric representation with reduced dimensions (curves or points) NOTE 3: In case of GM_Point geometry - Clementini point should be used. NOTE 4: When GM_curve representation is applied, it should be within the polygon that would represent the feature if full geometric extent was used. -- **Multiplicity**-- 1
convertedArea	Area	--**Name**-- Ecological focus area -- **Definition** -- Official area of EFA that can be accounted for fulfilling the obligation detailed in Art. 46(1) of R (EU) 1307/2013. -- **Description** -- This is the area value after applying the eventual conversion and weighting factors (DSCG/2014/31). NOTE 1: According to DSCG/2014/31 **- Established area:** Area resulting from direct field measurement or from delineation using ortho imagery **- Converted area**: Virtual area of EFAs obtained when using the conversion factors of Annex II of R (EU) No 639/2014. NOTE 2: EFA area shall be given in ha.

Name	Type	Notes
		-- **Multiplicity**-- 1
ecologicalFocusAreaType	EcologicalFocusAreaTypeValue	--**Name**-- Ecological focus area type -- **Definition** -- Ecological focus area type as listed in Art. 46(2) of R (EU) 1307/2013. -- **Description** -- The value of this attribute shall be taken from the EcologicalFocusAreaTypeValue code list. -- **Multiplicity**-- 1
beginLifespanVersion	DateTime	-- **Name**-- Begin life span version --**Definition**-- Set of properties of an object/feature that describes the temporal characteristics of a version or the changes between versions. [Adapted from INSPIRE Generic Conceptual Model] -- **Description** -- Date and time at which this version of the feature was inserted or changed in the dataset. -- **Multiplicity**-- 1
endLifespanVersion	DateTime	--**Name** -- End life span version

Name	Type	Notes
		--**Definition** -- Set of properties of an object/feature that describe the temporal characteristics of a version or the changes between versions [Adapted from INSPIRE Generic Conceptual Model] -- **Description** -- Date and time at which this version of the feature was superseded or retired in the dataset. -- **Multiplicity**-- 0..1
validFrom	Date	--**Name**— Valid from -- **Definition** – Official date when the object / feature has been (will be) in situ or legally established. -- **Multiplicity**-- 1
validTo	Date	--**Name** – Valid to --**Definition** – Official date at which the feature in situ (or legally) ceased (will cease) to be used. -- **Multiplicity**-- 0..1

Table 20. Constraints of EcologicalFocusArea feature type

Name	Notes
geometryType	/* Type of geometry shall be GM_Surface or GM_Curve or GM_Point*/
convertedAreaUoM	/* Value of convertedArea shall be given in hectars. */
endLifespanVersion	/* If set, the date endLifespanVersion shall be later than beginLifespanVersion. */
validTo	/* If set, the date validTo shall be equal or later than validFrom. */

3.3.2.2. Data types

3.3.2.2.1. FarmAnimalSpecies

--**Name**--

farm animal

-- **Definition** --

Identifies an animal or group of animals of the same species kept on the specific site.

Table 21. Attributes of FarmAnimalSpecies data type

Name	Type	Notes
livestock	LivestockSpeciesValue	--**Name**-- livestock -- **Definition** -- Define the presence of livestock species in the site, to be selected from the LivestockSpeciesValue codelist. -- **Multiplicity**-- 0..1
aquaculture	AquacultureSpeciesValue	--**Name**-- aquaculture -- **Definition** --

Name	Type	Notes
		Define the presence of aquaculture species in the site. -- **Description** -- Aquaculture species are listed in aquacultureSpecies attribute. The allowed values for this code list comprise only the values specified in the February 2012 version of the ASFIS (Aquatic Sciences and Fisheries Information System) List of Species for Fishery Statistics Purposes maintained by FAO. -- **Multiplicity**-- 0..1
nuberOfAnimals	AnimalRangeValue	--**Name**-- number of animals -- **Definition** -- Indicates the range of number of animals in the site for each species declared present. -- **Multiplicity**-- 1

Table 22. Constraints of FarmAnimalSpecies data type

Name	Notes
livestockOrAquaculture	/* One of the two attributes livestock and aquaculture shall be present */

3.3.2.3. Code lists

3.3.2.3.1. OrganicStatusValue

--**Name**--

OrganicStatusValue

--**Definition**--

List of values for organic status of parcels, according to R (EU) 2021/2115.

--**Extensibility**--

None.

--**Identifier**--

https://mydomain/registry/codelist/OrganicStatusValue

Table 23. Values of OrganicStatusValue codelist

Name	**Notes**
nonOrganic	--**Name**-- nonOrganic -- **Definition**-- Conventional land not managed in compliance with organic production requirements.
inConversion	--**Name**-- inConversion -- **Definition** -- In-conversion status according to R (EU) 2018/848.
organic	--**Name**-- organic -- **Definition** -- Organic status according to R (EU) 2018/848.

3.3.2.3.2. CropValue

--**Name**--

Crop value

--**Definition**--

Crop classification.

--**Description**--

An empty code list that acts as a container for crop European nomenclature.

--**Extensibility**--

Any.

--**Identifier**--

https://mydomain/registry/codelist/CropValue

Values

Even though there is a big users' interest in a harmonised and unique European crop classification, such agreement has not been reached yet. Indeed, the level of the required details defines the number of types. However, a hierarchical and harmonised classification system that is easily accessible, would support coherence of the related initiatives.

Annex III of Regulation (EU) 2018/1091 (EU 2018)[10] and the Manual of Integrated Farms Statistics[11](Eurostat 2020) provide a detailed multi-level hierarchical classification for arable, permanent crop and permanent grassland main categories.

An alternative is to use of national code lists defined by MS. In this case the related TG requirements have to be respected.

Box 13. TG Requirement 11: Crop code lists

When publishing geoIACS datasets, one of the following code lists should be used: – "Variables of land" provided in Annex III of R (EU) 2018/1091 – National code lists published in a multilingual registry as defined in TG Requirement 5 and 6.

3.3.2.3.3. LocalisedCropValue

--**Name**--

Localised Crop value

--**Definition**--

Crop classification according to local nomenclatures.

--**Description**--

An empty code list that acts as a container for crop local nomenclature.

--**Extensibility**--

Any.

--**Identifier**--

https://mydomain/registry/codelist/LocalisedCropValue

Values

Even though crop values shall be provided according to European or national classifications referred to in 3.3.2.3.2, additional local nomenclatures may be optionally used.

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[10] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32018R1091

[11] https://ec.europa.eu/eurostat/web/products-manuals-and-guidelines/-/ks-gq-20-009 (pp 90 - 148)

3.3.2.3.4. AATypeValue

--**Name**—

Agricultural area type value

-- **Definition** –

Types of agricultural areas

-- **Description** --

List of agricultural area type values, according to art. 4(3) of R (EU) 2021/2115.

--**Extensibility**--

None.

--**Identifier**--

https://mydomain/registry/codelist/AATypeValue

Table 24. Values of AATypeValue codelist

Name	**Notes**
arableLand	--**Name**-- Arable land -- **Definition** -- Land cultivated for crop production or areas available for crop production but lying fallow.
permanentCrop	--**Name**-- Permanent crop -- **Definition** -- Non-rotational crops other than permanent grassland and permanent pasture that occupy the land for five years or more. -- **Description** -- It yields repeated harvests, including nurseries and short rotation coppice. [Art. 4 (1)(g) of R (EU)1307/2013 and Art. 4(3)(b) of R (EU) 2021/2125].
permanentGrassland	--**Name**-- Permanent grassland

Name	Notes
	-- **Definition** -- Permanent grassland and permanent pasture (together referred to as "permanent grassland") means land used to grow grasses or other herbaceous forage naturally (self-seeded) or through cultivation (sown) and that has not been included in the crop rotation of the holding for five years or more. -- **Description** -- It may include other species, such as shrubs or trees, which can be grazed and, where Member States so decide, other species such as shrubs or trees which produce animal feed, provided that the grasses and other herbaceous forage remain predominant. Member States may also decide to consider the following types of land to be permanent grassland: - land which is covered by any of the species referred to in this point and which forms part of established local practices, where grasses and other herbaceous forage are traditionally not predominant or absent in grazing areas; - land covered by any of the species referred to in this point, where grasses and other herbaceous forage are not predominant or are absent in grazing areas. [Art. 4(3)(c) of R (EU) 2021/2125].

3.3.2.3.5. OEATypeValue

--**Name**—

Other eligible area type value

-- **Definition** –

Types of the other eligible areas

-- **Description** --

Values of other eligible area types as defined in Art. 4(4)(c) of R (EU) 2021/2115 and in the strategic plans of the MS.

NOTE: This code list is extensible by the MS, according to the types defined in their Strategic Plans.

--**Extensibility**--

Any.

--**Identifier**--

https://mydomain/registry/codelist/OEATypeValue

Table 25. Values of OEATypeValue codelist

Name	Notes
wetland	--**Name**-- Wetland -- **Definition** -- Wet area protected under GAEC 2. -- **Description** -- Area under a measure for protecting carbon-rich soils.
peatland	--**Name**-- Peatland -- **Definition** -- Peatland area protected under GAEC 2. -- **Description** -- Area under a measure for protecting carbon-rich soils.
afforestedArea	--**Name**-- Afforested areas -- **Definition** -- Areas as defined in art. 4(4)(c)(iii) of R (EU) 2021/2115.
otherPhysicalConditions	--**Name**-- Other physical conditions -- **Definition** -- Other types of OEA referred to in art. 4(4)(c) of R (EU) 2021/2115.

3.3.2.3.6. ELETypeValue

--**Name**—

Eco Landscape Element type value

-- **Definition** –

Types of eco landscape elements.

-- **Description** --

Two types are foreseen: landscapeFeature and areaBasedEcoScheme.

--**Extensibility**--

None.

--**Identifier**--

https://mydomain/registry/codelist/ELETypeValue

Table 26. Values of ELETypeValue codelist

Name	**Notes**
landscapeFeature	--**Name**-- Landscape Feature --**Definition**-- Landscape feature as defined in art. 4(4)(b)(i) of R (EU) 2021/2115
areaBasedEcoScheme	--**Name**-- Area-based eco-scheme --**Definition**-- Area-based eco-schemes defined in Art. 31 of R. (EU) 2021/2115

3.3.2.3.7. ELEDesignationValue

--**Name**—

Eco Landscape Element Designation value

-- **Definition** –

Designation of eco landscape elements, according to their type.

-- **Description** --

If EcoLandscapeElement type if landscapeFeature, the designation shall be taken from the LandscapeFeatureTypeValue codelist. If EcoLandScapeElement type is areBasedEcoScheme, the designation shall be taken from the AreaBasedEcoSchemeValue codelist.

--**Extensibility**--

Any.

--**Identifier**--

https://mydomain/registry/codelist/EcoLandscapeElementDesignationValue

Values

Values shall be selected from two different codelists, according to the value of the type of EcoLandscapeElement:

- LandscapeFeatureTypeValue codelist (described in 3.3.2.3.8), if EcoLandscapeElementTypeValue is landscapeFeature
- AreaBasedEcoSchemeValue codelist (described in 3.3.2.3.9), if EcoLandscapeElementTypeValue is areBasedEcoScheme

3.3.2.3.8. LFTypeValue

--**Name**--

Landscape feature type value

-- **Definition** --

Types of landscape features.

-- **Description** --

The code list can be extended by narrower values. The broad functional LF types have been defined by (Czucz et al. 2022)

--**Extensibility**--

Narrower.

--**Identifier**--

https://mydomain/registry/codelist/LFTypeValue

Table 27. Values of LFTypeValue codelist

Name	**Notes**
woody	--**Name**-- Woody -- **Definition** -- Functional LF feature type in sense of Section 1.2.2 of Czucz at al. -- **Description** -- Isolated trees, tree lines and avenues, hedges, woody strips, trees in group, field coppices and riparian woody vegetation.

Name	Notes
grassy	--**Name**-- Grassy -- **Definition** -- Functional LF feature type in sense of Section 1.2.2 of Czucz et al. -- **Description** -- Grassy strips, field margins, embankments, buffer strips, grassed thalweg.
stony	--**Name**-- Stony --**Definition**-- Functional LF feature type in sense of Section 1.2.2 of Czucz at al. --**Description**-- Dry stone walls, terrace elements, rock outcrops, natural or artificial stacks of stone.
wet	--**Name**-- Wet --**Definition**-- Functional LF feature type in sense of Section 1.2.2 of Czucz at al. --**Description**-- Inland channels of fresh water, standing small water bodies such as natural or man-made ponds, ditches.

3.3.2.3.9. AreaBasedEcoSchemeValue

--**Name**--

Area-based EcoScheme Value

-- **Definition** --

Type of area-based eco-scheme (from art. 31 of R (EU) 2021/2115).

-- **Description** --

NOTE: This code list is extensible at narrower level by the MS, to include eco-schemes defined in their Strategic Plans.

--**Extensibility**--

Narrower.

--**Identifier**--

https://mydomain/registry/codelist/AreaBasedEcoSchemeValue

Table 28. Values of AreaBasedEcoSchemeValue codelist

Name	**Notes**
R2021_1115_art31(4)(a)	--**Name**-- R2021_1115_art31(4)(a) --**Definition**-- Eco-scheme covering the following areas of action: climate change mitigation, including reduction of greenhouse gas emissions from agricultural practices, as well as maintenance of existing carbon stores and enhancement of carbon sequestration.
R2021_1115_art31(4)(b)	--**Name**-- R2021_1115_art31(4)(b) --**Definition**-- Eco-scheme covering the following areas of action: climate change adaptation, including actions to improve resilience of food production systems and animal and plant diversity for stronger resistance to diseases and climate change.
R2021_1115_art31(4)(c)	--**Name**-- R2021_1115_art31(4)(c) --**Definition**-- Eco-scheme covering the following areas of action: protection or improvement of water quality and reduction of pressure on water resources.
R2021_1115_art31(4)(d)	--**Name**-- R2021_1115_art31(4)(d)

Name	Notes
	--**Definition**-- Eco-scheme covering the following areas of action: prevention of soil degradation, soil restoration, improvement of soil fertility and of nutrient management and soil biota.
R2021_1115_art31(4)(e)	R2021_1115_art31(4)(e) --**Definition**-- Eco-scheme covering the following areas of action: protection of biodiversity, conservation or restoration of habitats or species, including maintenance and creation of landscape features or non-productive areas.
R2021_1115_art31(4)(f)	R2021_1115_art31(4)(f) --**Definition**-- Eco-scheme covering the following areas of action: actions for a sustainable and reduced use of pesticides, in particular pesticides that present a risk for human health or environment.

3.3.2.3.10. NACEActivityValue

--**Name**--

NACE activity value

-- **Definition** --

Type of economic activity for the site, according to NACE classification.

-- **Description** --

Type of economic activity for the site, according to NACE classification (The newest version is NACE revision 2 update 1 (NACE Rev. 2.1), which is to be used for European statistics from 2025 onwards. This was adopted by the European Commission in October 2022.)

NOTE: The activities shall be selected from the ones available in the Group 01.4 - Animal production.

--**Extensibility**--

None.

--**Identifier**--

https://showvoc.op.europa.eu/#/datasets/ESTAT_Statistical_Classification_of_Economic_Activities_in_the_European_Community_Rev._2.1._%28NACE_2.1%29/data

Values

The values shall be selected from the ones available in the Group 01.4 - Animal production (publications.europa.eu/resource/authority/ux2/nace2.1/014):

— 01.41: Raising of dairy cattle
— 01.42 Raising of other cattle and buffaloes
— 01.43 Raising of horses and other equines
— 01.44 Raising of camels and camelids
— 01.45 Raising of sheep and goats
— 01.46 Raising of swine and pigs
— 01.47 Raising of poultry
— 01.48 Raising of other animals

All the semantic details of each value are available at the corresponding uri (e.g. http://data.europa.eu/ux2/nace2.1/0141 for Raising of dairy cattle).

3.3.2.3.11. EcologicalFocusAreaTypeValue

--**Name**--

Ecological focus area type value

-- **Definition** --

Types of EFA as listed in Art. 46(2) of R (EU) 1307/2013.

-- **Description** --

MS shall decide that one or more values of this code list are considered to be ecological focus area.

NOTE 1: The extension of this code list shall be documented in the eligibility profile of the MS/region in a register / registry service to publish the extended values and their definitions.

NOTE 2. This concept is relevant only for period covered by CAP before 2023.

Table 29. Values of EcologicalFocusAreaTypeValue codelist

Name	Type	Notes
afforestedAreas		--**Name**-- Afforested areas -- **Definition** -- Ecological focus area type as defined by Art. 46(2) of R (EU) 1307/2013. -- **Description** -- Afforested areas referred to in point (b)(ii) of Article 32(2) of R (EU) 1307/2013.
bufferStrips		--**Name**--

Name	Type	Notes
		Buffer strips -- **Definition** -- Ecological focus area type as defined by Art. 46(2) of R (EU) 1307/2013. -- **Description** -- Buffer strips, including those covered by permanent grassland, provided that these are distinct from adjacent eligible agricultural area [Art. 46(2)(d) of (EU) R 1307/2013].
hectaresOfArgoForestry		--**Name**-- Hectares of agro-forestry -- **Definition** -- Ecological focus area type as defined by Art. 46(2) of R (EU)1307/2013 -- **Description** -- Hectares of agro-forestry - are those that receive, or have received, support under Article 44 of R (EC) 1698/2005 and/or Article 23 of R (EU) 1305/2013 - shall be arable land eligible for the basic payment scheme or the single area payment scheme for which support under Article 44 of R (EC) 1698/2005 or Article 23 of R (EU) 1305/2013 was or is granted.
landscapeFeatureDitches		--**Name**-- LF ditches -- **Definition** -- Ecological focus area type as defined by Art. 46(2) of R (EU) 1307/2013. -- **Description** -- Landscape feature, **ditches** with a maximum width of 6 meters, including open watercourses for the purpose of irrigation or drainage. Channels with walls of concrete shall not be considered ecological focus area. [Art. 45(3)(g) of (EU) R No 639/2014].

Name	Type	Notes
		NOTE : When this type of LF is protected under SMR 3, MS may specify other width based on national requirements.
landscapeFeatureFieldMargin		--**Name**-- LF field margin -- **Definition** -- Ecological focus area type as defined by Art. 46(2) of R (EU) 1307/2013. -- **Description** -- Landscape feature, **field margin** with a width between 1 and 20 meters, on which there shall be no agricultural production. [Art. 45(3)(e) of R (EU) 639/2014].
landscapeFeatureGroupOfTrees		--**Name**-- LF Group of trees -- **Definition** -- Ecological focus area type as defined by Art. 46(2) of R (EU) 1307/2013. -- **Description** -- Landscape feature, group of trees, where trees are connected by overlapping crown cover, and field copses of maximum 0.3 ha in both cases. [Art. 45(3)(d) of R (EU) 639/2014].
landscapeFeatureIsolatedTree		--**Name**-- LF isolated tree -- **Definition** -- Ecological focus area type as defined by Art. 46(2) of R (EU) 1307/2013. -- **Description** -- Landscape feature, isolated tree with a crown diameter of minimum 4 meters. [Art. 45(3)(b) of R (EU) 639/2014].

Name	Type	Notes
landscapeFeatureOtherProtectedByGaecSmr		--**Name**-- Other LF protected by GAEC or SMR. -- **Definition** -- Ecological focus area type as defined by Art. 46(2) of R (EU) 1307/2013. -- **Description** -- Landscape feature, other features not listed in this code list but protected under GAEC7, SMR 2 or SMR 3. [Art. 45(3)(a) of R (EU) 639/2014].
landscapeFeaturePonds		--**Name**-- LF ponds -- **Definition** -- Ecological focus area type as defined by Art. 46(2) of R (EU) 1307/2013. -- **Description** -- Landscape feature, **ponds** of up to a maximum of 0.1 ha. Reservoirs made of concrete or plastic shall not be considered ecological focus area; [Art. 45(3)(f) of R (EU) 639/2014].
landscapeFeaturesHedgesWoodedStrips		--**Name**-- LF hedges and wooded strips -- **Definition** -- Ecological focus area type as defined by Art. 46(2) of (EU) R 1307/2013 -- **Description** -- Landscape features: Hedges/wooded strips with a width of up to 10 meters [Art. 45(3)(a) of R (EU) 639/2014] NOTE : When such LF are protected under GAEC 7, SMR 2 and SMR 3, MS may specify other width based on national requirements.

Name	Type	Notes
landscapeFeatureTraditionalStoneWalls		--**Name**-- LF traditional walls -- **Definition** -- Ecological focus area type as defined by Art. 46(2) of R (EU) 1307/2013. -- **Description** -- Landscape feature **traditional stone walls**. [Art. 45(3)(a) of R (EU) 639/2014].
landscapeFeatureTreesInLine		--**Name**-- LF trees in line -- **Definition** -- Ecological focus area type as defined by Art. 46(2) of R (EU) 1307/2013. -- **Description** -- Landscape feature, trees in line trees in line with a crown diameter of minimum 4 meters. The space between the crowns shall not exceed 5 meters. [Art. 45(3)(c) of R (EU) 639/2014].
stripsOfEligibleHectaresAlongForestEdgesWithoutProduction		--**Name**-- Strips of eligible hectares without production -- **Definition** -- Ecological focus area type as defined by Art. 46(2) of R (EU) 1307/2013 -- **Description** -- Strips of eligible hectares along forest edges without production.
terraces		--**Name**-- Terraces

Name	Type	Notes
		-- **Definition** -- Ecological focus area type as defined by Art. 46(2) of R (EU) 1307/2013 -- **Description** -- Terraces shall be terraces that: -are protected under GAEC 7 as referred to in Annex II to Regulation (EU) 640/2014; -other terraces established based on criteria defined by MS.

4. Reference systems, units of measure and grids

4.1. Default reference systems, units of measure and grid

The reference systems, units of measure and geographic grid systems included in this sub-section are the defaults to be used for geoIACS datasets, similarly to all INSPIRE data sets, unless theme-specific exceptions and/or additional requirements are defined in section 6.2.

4.1.1. Coordinate reference systems

4.1.1.1. Datum

Box 14. **TG Requirement 12:** Datum for three-dimensional and two-dimensional coordinate reference systems

For the three-dimensional and two-dimensional coordinate reference systems and the horizontal component of compound coordinate reference systems used for making spatial data sets available, the datum shall be the datum of the European Terrestrial Reference System 1989 (ETRS89) in areas within its geographical scope, or the datum of the International Terrestrial Reference System (ITRS) or other geodetic coordinate reference systems compliant with ITRS in areas that are outside the geographical scope of ETRS89. Compliant with the ITRS means that the system definition is based on the definition of the ITRS and there is a well-documented relationship between both systems, according to EN ISO 19111.

4.1.1.2. Coordinate reference systems

Box 15. **TG Requirement 13:** Coordinate reference systems

Spatial data sets shall be made available using at least one of the coordinate reference systems specified below in sections paragraphs 1, .2 and 3, unless one of the conditions specified in paragraph 4 holds. **1. Three-dimensional Coordinate Reference Systems** - Three-dimensional Cartesian coordinates based on a datum specified in 1.2 and using the parameters of the Geodetic Reference System 1980 (GRS80) ellipsoid. - Three-dimensional geodetic coordinates (latitude, longitude and ellipsoidal height) based on a datum specified in 1.2 and using the parameters of the GRS80 ellipsoid. **2. Two-dimensional Coordinate Reference Systems** – Two-dimensional geodetic coordinates (latitude and longitude) based on a datum specified in 1.2 and using the parameters of the GRS80 ellipsoid. – Plane coordinates using the ETRS89 Lambert Azimuthal Equal Area coordinate reference system. – Plane coordinates using the ETRS89 Lambert Conformal Conic coordinate reference system. – Plane coordinates using the ETRS89 Transverse Mercator coordinate reference system. **3. Compound Coordinate Reference Systems** 1. For the horizontal component of the compound coordinate reference system, one of the coordinate reference systems specified in section 1.3.2 shall be used. 2. For the vertical component, one of the following coordinate reference systems shall be used: – For the vertical component on land, the European Vertical Reference System (EVRS) shall be used to express gravity-related heights within its geographical scope. Other vertical reference systems related to the Earth gravity field shall be used to express gravity-related heights in areas that are outside the geographical scope of EVRS. – For the vertical component in the free atmosphere, barometric pressure, converted to height using ISO 2533:1975 International Standard Atmosphere, or other linear or parametric reference systems shall be

used. Where other parametric reference systems are used, these shall be described in an accessible reference using EN ISO 19111-2:2012.
- For the vertical component in marine areas where there is an appreciable tidal range (tidal waters), the Lowest Astronomical Tide (LAT) shall be used as the reference surface.
- For the vertical component in marine areas without an appreciable tidal range, in open oceans and effectively in waters that are deeper than 200 meters, the Mean Sea Level (MSL) or a well-defined reference level close to the MSL shall be used as the reference surface.

4. Other Coordinate Reference Systems

Exceptions, where other coordinate reference systems than those listed in 1, 2 or 3 may be used, are:
a). Other coordinate reference systems may be specified for specific spatial data themes in this Appendix.
b). For regions outside of continental Europe, Member States may define suitable coordinate reference systems.
The geodetic codes and parameters needed to describe these coordinate reference systems and to allow conversion and transformation operations shall be documented and an identifier shall be created, according to EN ISO 19111 and ISO 19127.

4.1.1.3. Display

Box 16. TG Requirement 14: Coordinate Reference Systems used in the View Network Service

For the display of spatial data sets with the view network service as specified in Regulation No 976/2009, at least the coordinate reference systems for two-dimensional geodetic coordinates (latitude, longitude) shall be available.

4.1.1.4. Identifiers for coordinate reference systems

Box 17. TG Requirement 15: Coordinate Reference System Identifiers

1. Coordinate reference system parameters and identifiers shall be managed in one or several common registers for coordinate reference systems.
2. Only identifiers contained in a common register shall be used for referring to the coordinate reference systems listed in this Section.

This TG proposes to use the http URIs provided by the Open Geospatial Consortium as coordinate reference system identifiers (see identifiers for the default CRSs below). These are based on and redirect to the definition in the EPSG Geodetic Parameter Registry (http://www.epsg-registry.org/).

The identifiers listed in shall be used for referring to the coordinate reference systems used in a data set.

NOTE: CRS identifiers may be used e.g. in:

— data encoding,

— data set and service metadata, and

— requests to INSPIRE network services

Table 30. http URIs for the default coordinate reference systems

Coordinate reference system	Short name	http URI identifier
3D Cartesian in ETRS89	ETRS89-XYZ	*http://www.opengis.net/def/crs/EPSG/0/4936*

Coordinate reference system	Short name	http URI identifier
3D geodetic in ETRS89 on GRS80	ETRS89-GRS80h	*http://www.opengis.net/def/crs/EPSG/0/4937*
2D geodetic in ETRS89 on GRS80	ETRS89-GRS80	*http://www.opengis.net/def/crs/EPSG/0/4258*
2D LAEA projection in ETRS89 on GRS80	ETRS89-LAEA	*http://www.opengis.net/def/crs/EPSG/0/3035*
2D LCC projection in ETRS89 on GRS80	ETRS89-LCC	*http://www.opengis.net/def/crs/EPSG/0/3034*
2D TM projection in ETRS89 on GRS80, zone 26N (30°W to 24°W)	ETRS89-TM26N	*http://www.opengis.net/def/crs/EPSG/0/3038*
2D TM projection in ETRS89 on GRS80, zone 27N (24°W to 18°W)	ETRS89-TM27N	*http://www.opengis.net/def/crs/EPSG/0/3039*
2D TM projection in ETRS89 on GRS80, zone 28N (18°W to 12°W)	ETRS89-TM28N	*http://www.opengis.net/def/crs/EPSG/0/3040*
2D TM projection in ETRS89 on GRS80, zone 29N (12°W to 6°W)	ETRS89-TM29N	*http://www.opengis.net/def/crs/EPSG/0/3041*
2D TM projection in ETRS89 on GRS80, zone 30N (6°W to 0°)	ETRS89-TM30N	*http://www.opengis.net/def/crs/EPSG/0/3042*
2D TM projection in ETRS89 on GRS80, zone 31N (0° to 6°E)	ETRS89-TM31N	*http://www.opengis.net/def/crs/EPSG/0/3043*
2D TM projection in ETRS89 on GRS80, zone 32N (6°E to 12°E)	ETRS89-TM32N	*http://www.opengis.net/def/crs/EPSG/0/3044*
2D TM projection in ETRS89 on GRS80, zone 33N (12°E to 18°E)	ETRS89-TM33N	*http://www.opengis.net/def/crs/EPSG/0/3045*
2D TM projection in ETRS89 on GRS80, zone 34N (18°E to 24°E)	ETRS89-TM34N	*http://www.opengis.net/def/crs/EPSG/0/3046*
2D TM projection in ETRS89 on GRS80, zone 35N (24°E to 30°E)	ETRS89-TM35N	*http://www.opengis.net/def/crs/EPSG/0/3047*

Coordinate reference system	**Short name**	**http URI identifier**
2D TM projection in ETRS89 on GRS80, zone 36N (30°E to 36°E)	ETRS89-TM36N	*http://www.opengis.net/def/crs/EPSG/0/3048*
2D TM projection in ETRS89 on GRS80, zone 37N (36°E to 42°E)	ETRS89-TM37N	*http://www.opengis.net/def/crs/EPSG/0/3049*
2D TM projection in ETRS89 on GRS80, zone 38N (42°E to 48°E)	ETRS89-TM38N	*http://www.opengis.net/def/crs/EPSG/0/3050*
2D TM projection in ETRS89 on GRS80, zone 39N (48°E to 54°E)	ETRS89-TM39N	*http://www.opengis.net/def/crs/EPSG/0/3051*
Height in EVRS	EVRS	*http://www.opengis.net/def/crs/EPSG/0/5730*
3D compound: 2D geodetic in ETRS89 on GRS80, and EVRS height	ETRS89-GRS80-EVRS	*http://www.opengis.net/def/crs/EPSG/0/7409*

5. Data quality

This section contains the data quality (DQ) elements referred to in the INSPIRE Data Specifications and applied to geoIACS datasets.

Even though IACS Quality Assessment (QA) is out of the scope of this TG and remains regulated by the related CAP legal provisions and technical documentation, the content of this section contributes to improve the overall quality of IACS data. Moreover, geoIACS data model helps significantly MS fulfil some of their QA obligations, as shown in Appendix 3.

In particular, the DQ elements, sub-elements and measures specified in section 5.1 should be used for:

- evaluating and documenting DQ properties and constraints of spatial objects, where such properties or constraints are defined as part of the application schema (see section 3),
- evaluating and documenting DQ metadata elements of spatial data sets (see section 6), and/or
- specifying minimum requirements or recommendations on the DQ (see sections 5.2).

The information about data quality is generally documented in related metadata elements. However it is given the possibility to the geoIACS data providers to document the DQ information in a unique standalone report, whose link can be provided in the Abstract metadata element.

5.1. Data quality elements

In this section, the DQ elements applied to the geoIACS datasets are described, providing also an alignment with the LPIS QA process detailed in the corresponding Technical guidance[12](European Commission DG JRC 2016), a.k.a ETS guidance.

The DQ elements and measures are based on Appendix D of ISO 19157 Geographic information – Data quality and ISO 2859-2:1985 Sampling procedures for inspection by attributes — Part 2: Sampling plans indexed by limiting quality (LQ) for isolated lot inspection.

A mapping among the INSPIRE/ISO 19157 based DQ elements and the related LPIS QA is provided in **Table 31**. In addition to the DQ elements used in LPIS QA, Logical consistency with the Domain consistency sub-element is also included. This latter is evaluated based on the adherence of the geoIACS datasets to the schema described.

Table 31. Data quality elements used in geoIACS datasets

Section	Data quality element	Data quality sub-element	Definition (according to ISO 19157)	Evaluation Scope	Reference
5.1.1	Completeness	Commission	Excess data present in the dataset, as	spatial object type	QE3 of the LPIS ETS guidance

[12] https://marswiki.jrc.ec.europa.eu/wikicap/images/1/16/6_1_Annex_I_QC_measures_20160701.pdf

Section	Data quality element	Data quality sub-element	Definition (according to ISO 19157)	Evaluation Scope	Reference
			described by the scope.		
5.1.2	Logical consistency	Domain consistency	Adherence of values to the value domains.	spatial object	Application schemas in section 3.
5.1.3	Logical consistency	Topological consistency	Correctness of the explicitly encoded topological characteristics and rules of the dataset, as described by the scope	spatial object	If applicable: application schemas of the local implementations of the MS.
5.1.4	Positional accuracy	Absolute or external accuracy	closeness of reported coordinate values to values accepted as or being true	dataset	Art. 68(1) of Regulation 2021/2116 (1:5000 equivalent scale)
5.1.5	Positional accuracy	Relative or internal accuracy	Closeness of reported coordinate values to values accepted as or being true	dataset	
5.1.6	Thematic accuracy	Quantitative attribute accuracy - percentage	Closeness of the value of a quantitative attribute to a value accepted or known to be true,	dataset	QE1a of the LPIS ETS Guidance
5.1.7	Thematic accuracy	Quantitative attribute	Closeness of the value of a	dataset	QE1a of the LPIS ETS Guidance

Section	Data quality element	Data quality sub-element	Definition (according to ISO 19157)	Evaluation Scope	Reference
		accuracy – conformance	quantitative attribute to a value accepted or known to be true,		

Source: INSPIRE Data Specifications.

Box 18. **TG Recommendation 3:** Quantitative evaluation of data quality elements

Where it is impossible to express the evaluation of a data quality element in a quantitative way, the evaluation of the element should be expressed with a textual statement as a data quality descriptive result.

The following subsections include the documentation of the data quality elements according to the standard documentation of ISO 19157. The measure identifiers included in the tables are the references from this standard.

5.1.1. Completeness – Commission

Data quality element 3 (QE3) aggregated at the level of the LPIS dataset informs about the reference parcels with critical defects. These reference parcels either holds a fundamental effect regarding the eligibility, in particular:

- in delineation of eligible area, or
- including such instances of a feature type that don't have any eligibility ground (parcels that don't include agricultural area, or other eligible area)

These extra items in the LPIS dataset can be documented with the Commission data quality element according to ISO 19157.

Box 19. **TG Recommendation 4:** Commission

Commission should be evaluated and documented using **excess item** as specified in the **Table 32**.

Table 32. Excess items

Name	Excess item
Alternative name	-
Data quality element	completeness
Data quality sub-element	commission

Name	Excess item
Data quality basic measure	error indicator
Definition	indication that an item is incorrectly present in the data
Description	-
Evaluation scope	spatial objects: ReferenceParcel
Reporting scope	data set: geoIACS
Parameter	-
Data quality value type	Boolean (true indicates that the item is in excess)
Data quality value structure	-
Source reference	ISO 19157 Geographic information – Data quality
Example	Presence of excess items in a dataset: - Two reference parcels with critical defects have been found in the inspected sample.
Measure identifier	1

5.1.2. Logical consistency – Domain consistency

Box 20. **TG Recommendation 5:** Domain consistency

Domain consistency should be evaluated and documented using *value domain non-compliance* as specified in the **Table 33**.

Table 33. Value domain non-conformance

Name	Value domain non-conformance
Alternative name	-
Data quality element	logical consistency
Data quality sub-element	domain consistency
Data quality basic measure	error indicator

Name	**Value domain non-conformance**
Definition	indication of if an item is not in conformance with its value domain
Description	-
Evaluation scope	spatial objects: NonAgriculturalReferenceArea, ReferenceParcel, AgriculturalParcel, EcoLandscapeElement, EcologicalFocusArea
Reporting scope	data set: geoIACS
Parameter	-
Data quality value type	Boolean (true indicates that an item is not in conformance with its value domain)
Data quality value structure	-
Source reference	ISO 19157 Geographic information – Data quality
Example	Presence of extra items in a non-extensible code list violating domain consistency: - Code list contains values out of attribute domain (e.g. non existing class codes)
Measure identifier	14
Comment	The evaluation is done against the LPIS/GSA data models as presented in Section 3 of this TG.

5.1.3. Logical Consistency – Topological consistency

This DQ element can be evaluated and reported when topology is directly encoded in the dataset. Such encoding is not specified in the data model presented in section 3. Nevertheless, the local implementations in the MS may include such encoding.

Box 21. **TG Recommendation 6:** Topological consistency

Topological consistency should be evaluated and documented using **number of invalid self-intersect errors, number of overlaps and number of slivers** as specified in the table below.

Table 34. Number of invalid self-intersect errors

Name	**Number of invalid self-intersect errors**
Alternative name	loops
Data quality element	logical consistency
Data quality sub-element	topological consistency
Data quality basic measure	error count
Definition	count of all items in the data that illegally intersect with themselves
Description	-
Evaluation scope	spatial objects: ReferenceParcel, EcologicalFocusArea, NonAgriculturalEligibleArea, EcoLandscapeElement AgriculturalParcel
Reporting scope	data set: geoIACS
Parameter	-
Data quality value type	Integer
Data quality value structure	-
Source reference	ISO 19157 Geographic information – Data quality
Example	Number of loops („figure eight" forming AgriculturalParcel polygons) present
Measure identifier	26
Comment	This measure is applicable to EcologicalFocusArea and EcoLandscapeElement only if they are represented with GM_surface.

5.1.4. Data Quality – Positional accuracy – Absolute or external accuracy

Box 22. **TG Recommendation 7:** Absolute or external accuracy

Absolute or external accuracy should be evaluated and documented using **root mean square error of planimetry** as specified in the table below.

Table 35. Root mean square error of planimetry

Name	**Root mean square error of planimetry**
Alternative name	RMSEP
Data quality element	positional accuracy
Data quality sub-element	absolute or external accuracy
Data quality basic measure	-
Definition	radius of a circle around the given point, in which the true value lies with probability P.
Description	-
Evaluation scope	spatial objects: ReferenceParcel, EcologicalFocusArea, NonAgriculturalEligibleArea, EcoLandscapeElement AgriculturalParcel
Reporting scope	data set: geoIACS
Parameter	-
Data quality value type	Real
Data quality value structure	-
Source reference	ISO/DIS 19157 Geographic information – Data quality
Example	Absolute or external positional accuracy of LPIS/GSA data can be determined based on control points directly measured on the terrain by and independent method (e.g. GPS measurement, surveying).
Measure identifier	47
Comment	This measure is applicable to EcologicalFocusArea and LandscapeFeature only if they are represented with GM_surface.

5.1.5. Data Quality – Positional accuracy – Relative or internal accuracy

Box 23. **TG Recommendation 8:** Relative or internal accuracy

Relative or internal accuracy should be evaluated and documented using **root mean square error of planimetry** as specified in the table below.

Table 36. Root mean square error of planimetry

Name	**Root mean square error of planimetry**
Alternative name	RMSEP
Data quality element	positional accuracy
Data quality sub-element	relative or internal accuracy
Data quality basic measure	-
Definition	radius of a circle around the given point, in which the true value lies with probability P
Description	-
Evaluation scope	spatial objects: ReferenceParcel, EcologicalFocusArea, NonAgriculturalEligibleArea, EcoLandscapeElement AgriculturalParcel
Reporting scope	data set: geoIACS
Parameter	-
Data quality value type	Real
Data quality value structure	-
Source reference	ISO 19157 Geographic information – Data quality
Example	Relative or internal accuracy of LPIS/GSA data is usually determined as the accuracy of delineation of LPIS/GSA boundaries relative to the underlying Earth Observation imagery which serves as basis for derivation of the LPIS/GSA data.
Measure identifier	47
Comment	This measure is applicable to EcologicalFocusArea and LandscapeFeature only when they are represented with GM_surface.

5.1.6. Data Quality – Thematic accuracy – Quantitative attribute accuracy – percentage

Box 24. **TG Recommendation 9:** Quantitative attribute accuracy

Thematic accuracy should be evaluated and documented using **Quantitative attribute accuracy – percentage** as specified in the table below.

Table 37. Quantitative attribute accuracy - percentage

Name	**Quantitative attribute accuracy - percentage**
Alternative name	QE1a - percentage
Data quality element	thematic accuracy
Data quality sub-element	Quantitative attribute accuracy - percentage
Data quality basic measure	Percentage of correctly quantified area
Definition	Percentage of the eligible hectares as observed, with respect to all eligible hectares recorded
Description	-
Evaluation scope	spatial objects: ReferenceParcel,
Reporting scope	data set: geoIACS
Parameter	-
Data quality value type	Real
Data quality value structure	-
Source reference	LPIS Technical Guidance for ETS
Example	The rate of missing agricultural area is 0.24
Measure identifier	10201

5.1.7. Data Quality – Thematic accuracy – Quantitative attribute accuracy – conformance

Box 25. **TG Recommendation 10:** Non-quantitative attribute accuracy

Non-quantitative attribute accuracy should be evaluated and documented using **Quantitative attribute accuracy - conformance** as specified in the table below.

Table 38. Quantitative attribute accuracy - conformance

Name	**Quantitative attribute accuracy - conformance**
Alternative name	QE1a - conformance
Data quality element	thematic accuracy
Data quality sub-element	Quantitative attribute accuracy - conformance
Data quality basic measure	pass
Definition	Closeness of the value of a quantitative attribute to a value accepted or known to be true.
Description	-
Evaluation scope	spatial objects: ReferenceParcel
Reporting scope	data set: geoIACS
Parameter	-
Data quality value type	Boolean
Data quality value structure	-
Source reference	ISO/DIS 19157 Geographic information – Data quality
Example	Pass: true
Measure identifier	10201

5.2. Minimum data quality requirements

Minimum quality requirements are defined for the following data quality elements:

- Positional accuracy
- Completeness – Commission

— Thematic accuracy – Quantitative and qualitative attribute accuracy (percentage and conformance)

A general requirement against the geoIACS datasets stipulated by Art. 68(1) or R (EU) 2021/2116 is that they have to fulfil the requirements of positional accuracy of mapping in scale 1:5000.

As for Completeness and Thematic accuracy please refer to the ETS guidance[13](European Commission DG JRC 2016).

[13] https://marswiki.jrc.ec.europa.eu/wikicap/images/1/16/6_1_Annex_I_QC_measures_20160701.pdf

6. Dataset level metadata

This section specifies dataset-level metadata elements to be used for documenting metadata of a geoIACS dataset or dataset series.

These metadata elements are grouped into two main categories:

— metadata elements defined in INSPIRE Metadata Regulation 1205/2008/EC (so called “metadata for discovery”),

— metadata elements defined in Article 13 "Metadata required for Interoperability" of Regulation 1089/2010 and its amendment Regulation 1253/2013 (so called “metadata for interoperability”).

Regarding metadata of a geoIACS dataset or dataset series, the fulfilment of the requirements contained in “Technical Guidance for the implementation of INSPIRE dataset and service metadata based on ISO/TS 19139:2007”[14] , is mandatory and the adoption of the Recommendations contained in the above-mentioned Technical Guidance is suggested. The requirements and recommendations contained in the above-mentioned Technical Guidance are hereafter referred to as “INSPIRE metadata requirements and recommendations”.

Instructions about how to apply to geoIACS metadata some of the INSPIRE metadata requirements and recommendations, as well as requirements and recommendations additional to the INSPIRE ones are provided in this section.

Box 26. TG Requirement16: Application of INSPIRE metadata requirements

The metadata of geoIACS datasets or dataset series shall fulfil all the TG requirements of the “Technical Guidance for the implementation of INSPIRE dataset and service metadata based on ISO/TS 19139:2007”.

Box 27. TG Recommendation 11: Application of INSPIRE metadata recommendations

The metadata of geoIACS datasets or dataset series should follow all the TG recommendations of the “Technical Guidance for the implementation of INSPIRE dataset and service metadata based on ISO/TS 19139:2007”.

Regarding the publication of metadata of geoIACS datasets or dataset series, there are several options to be adopted by MS, according to how the publication of metadata of geospatial datasets is handled in each country, e.g. if the Paying Agency operates or not a discovery service. Different geoIACS metadata publication scenarios may exist, each of them implying different workflows involving different actors with different roles. However, independently from the scenario applied, geoIACS datasets or dataset series shall be discoverable in the MS national geoportals.

Box 28. TG Requirement 17: Publication of metadata of geoIACS datasets or dataset series

Independently from the scenario applied by each MS to publish the metadata of geoIACS datasets or dataset series, geoIACS datasets or dataset series shall be discoverable in the MS national geoportal.

[14] https://github.com/INSPIRE-MIF/technical-guidelines/tree/main/metadata/metadata-iso19139

6.1. Metadata elements defined in INSPIRE Metadata Regulation

Table 39 gives an overview of the metadata elements specified in Regulation 1205/2008/EC (implementing Directive 2007/2/EC of the European Parliament and of the Council as regards metadata).

The table contains the following information:

— The first column provides a reference to the relevant section in the Metadata Regulation, which contains a more detailed description.

— The second column specifies the name of the metadata element.

— The third column specifies the multiplicity.

— The fourth column specifies the condition, under which the given element becomes mandatory.

Table 39. Metadata elements defined in the INSPIRE Metadata Regulation

Metadata Regulation Section	Metadata element	Multiplicity	Condition
1.1	Resource title	1	
1.2	Resource abstract	1	
1.3	Resource type	1	
1.4	Resource locator	0..*	Mandatory if a URL is available to obtain more information on the resource, and/or access related services.
1.5	Unique resource identifier	1..*	
1.7	Resource language	0..*	Mandatory if the resource includes textual information.
2.1	Topic category	1..*	
3	Keyword	1..*	
4.1	Geographic bounding box	1..*	
5	Temporal reference	1..*	
6.1	Lineage	1	
6.2	Spatial resolution	0..*	Mandatory for data sets and data set series if an equivalent scale or a resolution distance can be specified.
7	Conformity	1..*	
8.1	Conditions for access and use	1..*	
8.2	Limitations on public access	1..*	
9	Responsible organisation	1..*	
10.1	Metadata point of contact	1..*	
10.2	Metadata date	1	
10.3	Metadata language	1	

6.1.1. Resource title

The resource title of a geoIACS dataset should relate to an LPIS lot, if lots are applicable in the country. The reason is that the lot has a unique data product specification and geographic extent, which can be described by a single metadata file. When the LPIS is homogenous all over the country/region, there is no need to indicate the lot in the title.

Any newly produced or upgraded geoIACS dataset should be distinguished with an unambiguous title. For sake of clarity, the title shall provide a reference to the MS and if applicable, to its region. If needed, additional information may be added to the title.

EXAMPLE: geoIACS of Belgium (Wallonia region)

Box 29. **TG Requirement 18**: geoIACS resource title

An unambiguous title containing the name of the Member State and the claim year(s) shall be given to a geoIACS dataset or dataset series. When applicable, the title shall also contain the name of the lot and a reference to the region.

6.1.2. Resource abstract

The resource abstract is a short narrative describing the content and the main properties of the dataset or dataset series. In case of historic data, the abstract should also refer to the validity period, i.e. the time when the dataset was in official use.

Box 30. **TG Recommendation 12:** Abstract of geoIACS historic datasets

The abstract of geoIACS historic datasets should refer to the validity period.

Box 31. **TG Recommendation 13:** Abstract of geoIACS historic dataset series

The description of a geoIACS historic dataset series should refer to the dates or creation years of the datasets included in the series.

Box 32. **TG Recommendation 14:** Legal references in the abstract

The abstract of the geoIACS datasets or dataset series should contain references to the national and European law under which the datasets have been created.

6.1.3. Resource type

The possible values for are either dataset or series.

6.1.4. Resource locator

This metadata element provides information about the spatial data services that makes the data resource accessible. The URL provided in this metadata element may point to a download or view service. It should not point to a general information web page of the operating or other organization.

Box 33. **TG Requirement 19:** geoIACS resource locator

The resource locator metadata element of a geoIACS dataset or dataset series shall point to a spatial data service, where the geoIACS resource can be directly accessed.

6.1.5. Unique resource identifier

A unique identifier shall be given for each described geoIACS dataset or dataset series. This identifier shall be a URI consisting of a namespace uniquely identifying a naming context governed by an identifier authority, and a code unique within this namespace.

6.1.6. Resource language

The language(s) used in the geoIACS resource shall be given.

6.1.7. Topic category

Box 34. TG Requirement 20: geoIACS topic category

The geoIACS datasets and series shall be assigned to the "farming" topic category.

6.1.8. Keyword

Keywords help the users find the data that they are looking for. Therefore, keywords should be meaningful and well known. Controlled vocabularies standardise and disseminate keywords to the targeted audiences. From the point of view of IACS the most relevant vocabularies are GEMET, which is adopted by INSPIRE and AGROVOC, maintained by UN FAO. In addition to controlled vocabularies, free keywords can be also used, as the multiplicity of the keyword metadata element is one to many (1..*).

Box 35. TG Requirement 21: INSPIRE data themes for geoIACS datasets or series

The three keywords corresponding to the INSPIRE data themes associated to geoIACS datasets or series shall be: "Land Cover", "Land Use", "Agricultural and Aquaculture Facilities".

Box 36. TG Requirement 22: Mandatory keywords from GEMET for geoIACS datasets or series

The following three keywords contained in the GEMET vocabulary shall be assigned to geoIACS datasets or series: "Common Agricultural Policy", "agriculture", "agricultural land".

Box 37. TG Requirement 23: Other mandatory keywords for geoIACS datasets or series

The following additional keywords shall be assigned to geoIACS datasets or series: "IACS", "geoIACS" and all the spatial objects actually contained in the dataset or series: "reference parcel", "agricultural parcel", "agricultural area", "other eligible area", "eco-landscape element", "site", "ecological focus area".

6.1.9. Geographic bounding box

No specific considerations to geoIACS apply.

6.1.10. Temporal reference

According to INSPIRE, at least one of the following values should be used:

— temporal extent of the described resource,

— date of publication,

— date of last revision or,

— date of creation.

In the IACS realm the two main events that have an impact on the life cycle of the dataset - and thus on the values of temporal references - are the upgrades and updates. An upgrade is a production of a geoIACS dataset according to new specifications, whilst an update occurs when instances of the various feature types in the dataset are created, deleted. or modified.

Box 38. TG Recommendation 15: Recommended value of the temporal reference of geoIACS da-tasets

The temporal references of geoIACS dataset shall include the date of creation.

Box 39. TG Requirement 24: Mandatory value of the temporal reference type of the geoIACS datasets

The temporal references of geoIACS datasets shall contain at least the date of last revision.

Box 40. TG Requirement 25: Updating the value of the last revision date metadata element for a geoIACS dataset

Sharing an updated geoIACS dataset shall trigger an update of the value of the last revision metadata ele-ment.

Box 41. TG Requirement 26: Value of last revision date of geoIACS datasets

In case of a geoIACS dataset update related to the yearly GSA, the value of the last revision shall correspond to the date within the campaign year, when the last change is validated.

Box 42. TG Requirement 27: Minimum frequency of publishing the updated geoIACS datasets

The updated geoIACS datasets, together with the updated metadata, shall be published within 6 months from the validation of the last change in the dataset.

Following a step-wise approach of spatial data sharing, the data owners have to ensure the publication of the most current dataset and are encouraged to provide historic (past) versions too. The step-wise implementation is at the same time an incremental approach too. Therefore, sharing a new version of a dataset should not result in withdrawing the previous ones.

Box 43. TG Recommendation 16: Accessibility of historic geoIACS datasets

The accessibility of historic versions of geoIACS datasets should be maintained.

TG requirements provided from Requirement 24 to Requirement 27 address the temporal references relevant for geoIACS datasets. In case of geoIACS dataset series, the temporal reference should be described in one common metadata record for all datasets using the temporal extent as a temporal reference.

Box 44. TG Requirement 28: Temporal reference of geoIACS dataset series

In case of geoIACS dataset series, requirements from TG Requirement 23 to TG Requirement 26 do not apply and the temporal reference shall be described in one common metadata record for all datasets using the temporal extent as a temporal reference.

6.1.11. Lineage

This free-text element should contain information on the source data used and the main transformation steps that took place in creating the current dataset or dataset series.

6.1.12. Spatial resolution

Box 45. TG Requirement 29: Spatial resolution of geoIACS datasets

The spatial resolution of geoIACS datasets shall be at least 1:5.000. Finer spatial resolutions are accepted.

6.1.13. Conformity

Box 46. TG Requirement 30: Specifications against which to evaluate conformity of geoIACS datasets

The only specifications against which the conformity of geoIACS datasets shall be evaluated and reported is this TG.

6.1.14. Conditions applying to access and use

Besides the information required by the INSPIRE metadata requirements, information related to the existence of any possible confidentiality clause referred to in section 7.4 shall be described here, as free text or providing the link to a publicly accessible document containing the description.

Box 47. TG Requirement 31: Information about confidentiality clauses on geoIACS datasets

Where confidentiality clause referred to in section 7.4 exist, they shall be described as free text or providing the link to a publicly accessible document containing the description.

6.1.15. Limitations on public access

No specific considerations to geoIACS apply.

6.1.16. Responsible organisation

No specific considerations to geoIACS apply.

6.1.17. Metadata point of contact

Box 48. TG Recommendation 17: Metadata point of contact for geoIACS datasets

The responsible party for production of the metadata for the geoIACS datasets should be the custodians of the geoIACS datasets.

6.1.18. Metadata date

No specific considerations to geoIACS apply.

6.1.19. Metadata language

No specific considerations to geoIACS apply.

6.2. Metadata elements for interoperability

The metadata describing a spatial dataset shall include the following metadata elements required for interoperability:

- Coordinate Reference System: Description of the coordinate reference system(s) used in the data set.
- Temporal Reference System: Description of the temporal reference system(s) used in the data set. This element is mandatory only if the spatial data set contains temporal information that does not refer to the default temporal reference system.
- Encoding: Description of the computer language construct(s) specifying the representation of data objects in a record, file, message, storage device or transmission channel.
- Topological Consistency: Correctness of the explicitly encoded topological characteristics of the data set as described by the scope. This element is mandatory only if the data set includes types from the Generic Network Model and does not assure centreline topology (connectivity of centre-lines) for the network.
- Character Encoding: The character encoding used in the data set. This element is mandatory only if an encoding is used that is not based on UTF-8.
- Spatial Representation Type: The method used to spatially represent geographic information.

Regarding metadata of a geoIACS dataset or dataset series, similarly to what required for the metadata elements described in section 6.1, also for the metadata elements described in this section the fulfilment of the requirements contained in "Technical Guidance for the implementation of INSPIRE dataset and service metadata based on ISO/TS 19139:2007" is mandatory and the adoption of the Recommendations contained in the above-mentioned Technical Guidance is suggested.

No specific considerations to geoIACS apply, nor additional requirements and recommendations are provided.

6.3. Metadata documenting Data Quality

Quality of geoIACS datasets or dataset series is assessed using the DQ elements described in section 5.1 and may be documented using metadata in two alternative ways:

- using the encoding specified by ISO 19115 for each DQ element, or
- using a free text comprehensive standalone quality report, containing a description of the data quality assessment framework, of the data quality scope, methodology, findings and analysis.

Box 49. **TG Recommendation 18:** Documenting Data Quality of geoIACS datasets

geoIACS Data Quality should documented in a standalone quality report that should be downloadable at a link to be provided in the Resource Abstract metadata element.

7. Delivery

7.1. Updates

Box 50. TG Requirement 32: Updates

1. Member States shall make available updates of data on a regular basis. 2. All updates shall be made available at the latest 6 months after the change was applied in the source data set.

7.2. Delivery medium

According to Article 11(1) of the INSPIRE Directive, Member States shall establish and operate a network of services for INSPIRE spatial data sets and services. The relevant network service types for making spatial data available are:

— view services making it possible, as a minimum, to display, navigate, zoom in/out, pan, or overlay viewable spatial data sets and to display legend information and any relevant content of metadata;

— download services, enabling copies of spatial data sets, or parts of such sets, to be downloaded and, where practicable, accessed directly;

— transformation services, enabling spatial data sets to be transformed with a view to achieving interoperability.

For the relevant requirements and recommendations for network services, see the relevant INSPIRE Implementing Rules and Technical Guidelines available at https://github.com/INSPIRE-MIF/technical-guidelines/tree/main/services.

EXAMPLE 1 Through the Get Spatial Objects function, a download service can either download a pre-defined data set or pre-defined part of a data set (non-direct access download service), or give direct access to the spatial objects contained in the data set, and download selections of spatial objects based upon a query (direct access download service). To execute such a request, some of the following information might be required:

— the list of spatial object types and/or predefined data sets that are offered by the download service (to be provided through the Get Download Service Metadata operation),

— and the query capabilities section advertising the types of predicates that may be used to form a query expression (to be provided through the Get Download Service Metadata operation, where applicable),

— a description of spatial object types offered by a download service instance (to be provided through the Describe Spatial Object Types operation).

EXAMPLE 2 Through the Transform function, a transformation service carries out data content transformations from native data forms to the INSPIRE-compliant form and vice versa. If this operation is directly called by an application to transform source data (e.g. obtained through a download service) that is not yet conformant with this data specification, the following parameters are required:

Input data (mandatory). The data set to be transformed.

— Source model (mandatory, if cannot be determined from the input data). The model in which the input data is provided.

— Target model (mandatory). The model in which the results are expected.

— Model mapping (mandatory, unless a default exists). Detailed description of how the transformation is to be carried out.

For bulk download of harmonised geoIACS datasets and series, an Atom Implementation of Pre-defined Dataset Download Service, adhering to the instructions contained in the Section 5 of the Technical Guidance for the implementation of INSPIRE Download Services15, is recommended. An example is provided in Appendix 4.

Box 51. **TG Recommendation 19:** Atom Implementation of Pre-defined Dataset Download Service

An Atom Implementation of Pre-defined Dataset Download Service, adhering to the instructions contained in the Section 5 of the Technical Guidance for the implementation of INSPIRE Download Services, is recommended for bulk download of harmonised geoIACS datasets and series.

To enable HVD machine readability and provision via APIs, harmonised geoIACS datasets and series should be made accessible via APIs. An example is provided in Appendix 4.

Box 52. **TG Recommendation 20:** Harmonised geoIACS datasets and series accessibility via APIs

TG Recommendation 1. Harmonised geoIACS datasets and series accessibility via APIs Harmonised geoIACS datasets and series should be made accessible via APIs.

7.3. Encodings

Box 53. **TG Requirement 33:** Encoding

1. Every encoding rule used to encode spatial data shall conform to EN ISO 19118. In particular, it shall specify schema conversion rules for all spatial object types and all attributes and association roles and the output data structure used. 2. Every encoding rule used to encode spatial data shall be made available.

ISO 19118:2011 specifies the requirements for defining encoding rules used for interchange of geographic data within the set of International Standards known as the "ISO 19100 series". An encoding rule allows geographic information defined by application schemas and standardised schemas to be coded into a system-independent data structure suitable for transport and storage. The encoding rule specifies the types of data being coded and the syntax, structure and coding schemes used in the resulting data structure. Specifically, ISO 19118:2011 includes:

— requirements for creating encoding rules based on UML schemas,

— requirements for creating encoding services, and

— requirements for XML-based encoding rules for neutral interchange of data.

[15] https://github.com/INSPIRE-MIF/technical-guidelines/tree/main/services/download-atom-wfs

This TG proposes to make geoIACS datasets available at least in the default encoding(s) specified in section 7.3.1. In this section, a number of TG requirements are listed that need to be met in order to be conformant with the default encoding(s).

The proposed default encoding(s) are conformant with ISO 19118.

7.3.1. Default Encoding(s)

7.3.1.1. Specific requirements for GML encoding

This data specification proposes the use of GML as the default encoding, as recommended in sections 7.2 and 7.3 of DS-D2.7 - Guidelines for the encoding of spatial data (INSPIRE Data Specifications Drafting Team 2010). GML is an XML encoding in compliance with ISO 19118. For details, see [ISO 19136], and in particular Annex E (UML-to-GML application schema encoding rules).

The following TG requirements need to be met in order to be conformant with GML encodings.

Box 54. TG Requirement 34: Default encoding

Data instance (XML) documents shall validate without error against the provided XML schema.

Not all constraints defined in the application schemas can be mapped to XML. Therefore, the following requirement is necessary.

NOTE: The obligation to use only the allowed code list values specified for attributes and most of the constraints defined in the application schemas cannot be mapped to the XML schema. They can therefore not be enforced through schema validation. It may be possible to express some of these constraints using other schema or rule languages (e.g. Schematron), in order to enable automatic validation.

7.3.1.2. Default encoding(s) for geoIACS application schemas

Name: geoIACS GML Application Schema

Version: version 2.0

Specification: This TG;

Character set: UTF-8

For testing purposes, the xml schemas document is available[16] at https://public.epsilon-italia.it/IACS/1.1/xsd/geoiacs.xsd

[16] The finalised schemas will be uploaded in a registry operated in a EU domain.

7.3.1.3. Alternative Encoding

To facilitate reuse of large volume geoIACS datasets, a GeoPackage encoding alternative to the gml default encoding, strictly adhering to the INSPIRE Good Practice for the GeoPackage encoding of INSPIRE datasets[17], is recommended.

Box 55. TG Recommendation 21: Use of GeoPackage encoding

> ***TG Recommendation 2. Use of GeoPackage encoding***
> Data providers should create their data using the OGC GeoPackage encoding standard, particularly suitable for managing and exchanging large datasets and optimised for data usability in GIS environments. In that case, the INSPIRE Good Practice for the GeoPackage encoding of INSPIRE datasets should be referenced.

For testing purposes, a geoIACS GeoPackage template adhering to the above mentioned INSPIRE Good Practice for the GeoPackage encoding of INSPIRE datasets has been created and applied to produce an harmonised geoIACS dataset. More details are provided in Appendix 4.

Other exiting/new alternative encodings (apart from GeoPackage), duly endorsed by the INSPIRE Maintenance and Implementation Group (MIG) and defined as INSPIRE Good Practices in the INSPIRE Good Practice library[18], might be used/proposed.

7.4. Confidentiality clauses

geoIACS datasets (or series) harmonised according to the data model described in this TG may contain information that can be classified as sensitive by the data providers and therefore may be covered by confidentiality clauses to be fulfilled to prevent the disclosure of the related information to non authorised users.

This condition could very likely happen for the holdingId attribute, present in several geoIACS spatial objects (agricultural parcel, agricultural area, site, other eligible area, eco-landscape element).

This attribute, when covered by confidentiality clauses set by the data providers, will be shared only to authorised and authenticated users (e.g. EC services) under specific conditions laid down in written terms of use and documented in the metadata element "Conditions applying to access and use" (described in section 6.1.14).

Regarding data delivery, because the holdingId attribute has multiplicity 1 (meaning that its provision is mandatory), those geoIACS data providers who will require the application of confidentiality clauses shall share with the EC services the full dataset (containing also the sensitive information) and shall publicly share a version of the dataset to be derived from the full one after removal or masking of the sensitive information.

Several options exist to publicly share a dataset (not containing sensitive information) starting from a full harmonised dataset (containing the sensitive information), as shown in Appendix 4.

[17] https://github.com/INSPIRE-MIF/gp-geopackage-encodings/blob/main/spec/GeoPackage_Good_Practice_initiation_fiche.md

[18] https://knowledge-base.inspire.ec.europa.eu/evolution/good-practice-library_en

8. Data Capture

The data capture should follow the general rules of mapping in scale 1:5000. In addition, for specific procedures of digitising elements of the geoIACS dataset, refer to the current version of the Technical Guidance of LPIS Update[19].(European Commission JRC 2015).

[19] https://wikis.ec.europa.eu/spaces/GUIDANCEANDTOOLSFORCAP/overview

9. Portrayal

This clause defines the rules for layers and styles to be used for portrayal of the spatial object types defined for geoIACS data model.

Box 56. **TG Requirement 35**: Portrayal

For the portrayal of spatial data sets using a view network service as specified in Commission Regulation No 976/2009, the following should be available: (a) the layers specified in Section 9.1; (b) for each layer at least a default portrayal style, with as a minimum an associated title and a unique identifier. For each layer, Section 9.1 defines the following: (a) a human readable title of the layer to be used for display in user interface; (b) the spatial object type(s), or sub-set thereof, that constitute(s) the content of the layer.

9.1. Layers to be provided by INSPIRE view services

Table 40. geoIACS layers to be provided by INSPIRE view services

Layer Name	Layer Title	Spatial object type(s)	Keywords
AgriculturalParcel	Agricultural Parcel	Agricultural Parcel	Agricultural Parcel
AgriculturalArea	Agricultural Area	Agricultural Area	Agricultural Area
OtherEligibleArea	Other Eligible Area	Other Eligible Area	Other Eligible Area
ReferenceParcel	Reference Parcel	Reference Parcel	Reference Parcel
EcoLandscapeElement	EcoLandscape Element	EcoLandscape Element	EcoLandscape Element

Box 57. **TG Recommendation 22.** Keywords in Layers Metadata parameters of the INSPIRE View service

It is recommended to use the keywords specified in Section 9.1 in the Layers Metadata parameters of the INSPIRE View service (see Annex III, Part A, section 2.2.4 in Commission R (EC) No 976/2009).

The layers specified in **Table 40** can be further classified using a code list-valued attribute.

Box 58. **TG Requirement 36:** Portrayal

For spatial object types whose objects can be further classified using a code list-valued attribute, several layers may be defined. Each of these layers shall include the spatial objects corresponding to one specific code list value. In the definition of such sets of layers: (a) the placeholder <CodeListValue> shall represent the values of the relevant code list, with the first letter in upper case; (b) the placeholder <human-readable name> shall represent the human-readable name of the code list values; (c) the spatial object type shall include the relevant attribute and code list, in parentheses; (d) one example of a layer shall be given.

Box 59. **TG Requirement 37:** Styles

For each layer specified in this section, the styles defined in section 9.2 shall be available.

9.2. Styles required to be supported by INSPIRE view services

Table 41. Styles for the layer AgriculturalArea

<table>
<tr><th>Style Name</th><th>AgriculturalArea.Default</th></tr>
<tr><td>Default Style</td><td>yes</td></tr>
<tr><td>Style Title</td><td>Agricultural Area Default Style</td></tr>
<tr><td>Style Abstract</td><td>AgriculturalArea objects filled with a colour depending on the value of the attribute from AAType nomenclature and their boundaries as black lines of 2 pixels.
<table>
<tr><td>AATypeValue</td><td>colour</td><td>red</td><td>Green</td><td>blue</td></tr>
<tr><td>arableLand</td><td></td><td>255</td><td>255</td><td>168</td></tr>
<tr><td>permanentCrop</td><td></td><td>230</td><td>166</td><td>0</td></tr>
<tr><td>permanentGrassland</td><td></td><td>204</td><td>242</td><td>77</td></tr>
</table></td></tr>
<tr><td>Symbology</td><td>The SLD specifying the symbology is distributed in a file separately from the data specification document.</td></tr>
<tr><td>Minimum & maximum scales</td><td>No scale limit.</td></tr>
</table>

Table 42. Styles for the layer OtherEligibleArea

<table>
<tr><th>Style Name</th><th>OtherEligibleArea.Default</th></tr>
<tr><td>Default Style</td><td>yes</td></tr>
<tr><td>Style Title</td><td>Other Eligible Area Default Style</td></tr>
<tr><td>Style Abstract</td><td>OtherEligibleArea objects filled with a colour depending on the value of the attribute from OEAType nomenclature and their boundaries as black lines of 2 pixels
<table>
<tr><td>OEATypeValue</td><td>colour</td><td>red</td><td>Green</td><td>blue</td></tr>
<tr><td>wetland</td><td></td><td>166</td><td>166</td><td>255</td></tr>
<tr><td>peatland</td><td></td><td>77</td><td>77</td><td>255</td></tr>
<tr><td>afforestedArea</td><td></td><td>166</td><td>242</td><td>0</td></tr>
</table></td></tr>
</table>

Style Name	OtherEligibleArea.Default				
	otherPhysicalConditions		79	98	40
Symbol-ogy	The SLD specifying the symbology is distributed in a file separately from the data specification document.				
Minimum & maxi-mum scales	No scale limit.				

Table 43. Styles for the Layer ReferenceParcel

Style Name	ReferenceParcel.Default
Default Style	yes
Style Title	ReferenceParcel Default Style
Style Abstract	ReferenceParcel objects filled with yellow colour (#FFFFCC) and their boundaries as black lines of 2 pixels.
Minimum & maximum scales	No scale limit.

Table 44. Styles for the layer EcoLandscapeElement

Style Name	EcoLandscapeElement.Default				
Default Style	yes				
Style Title	EcoLandscape Element Default Style				
Style Abstract	EcoLandscapeElement objects whose type is landscapeFeature filled with a colour depending on the value of the attribute from landscapeFeatureType nomenclature and their boundaries as black lines of 2 pixels.				
	LandscapeFeatureTypeValue	*colour*	*red*	Green	blue

Style Name	EcoLandscapeElement.Default			
	grassy	0	176	80
	stony	166	166	166
	wet	49	132	155
	woody	153	51	0
Symbology	The SLD specifying the symbology is distributed in a file separately from the data specification document.			
Minimum & maximum scales	No scale limit			

10. Conclusions

A proposal to solve the lack of harmonisation of geoIACS datasets across Europe, which is currently a big obstacle to IACS data sharing and interoperability, has been provided in these technical guidelines.

A common unique data model for geoIACS datasets, together with a full data specification adhering to the template for INSPIRE Data Specifications have been provided, along with the related gml application schema and GoPackage template. These artefacts are supposed to solve data sharing and interoperability issues and thus, facilitate data reuse.

This version 2.0 of the TG represents an updated version of the Technical Guidelines on IACS Data Sharing published in 2025[20], which, in turn, updated and merged the two previous Technical Guidelines on Spatial Data Sharing[21] (Part 1 – Data discovery (Tóth and Milenov 2020), Part 2 – Data interoperability (MARTIRANO and TOTH 2023)). Appendix 1 of this TG contains a description of the updates introduced on the first version of the unique TG published in 2025, emerged during a consultation process held with Member States in the first quarter of 2026 and documented in the geoIACS dedicated GitHub organisation[22].

The adoption of the TG by Member States will help them reduce the burden required by several IACS-related already existing obligations. Indeed, geoIACS datasets conformant to the data specifications of this TG:

- are High Value Datasets, because they contain the key attributes required for Reference parcels and Agricultural parcels by High Value Datasets Regulation 2023/138 (more details are provided in Appendix 2);
- facilitate the fulfilment of IACS QA obligations by Member States (more details are provided in Appendix 3);

In addition, the availability of geoIACS datasets conformant to the data specifications of the TG will support several EC services involved in IACS-related activities which will benefit from a significant enhancement streamlining of IACS-based data flows, such us IACS statistics and FSDN.

Finally, support is provided to MS also for the fulfilment of INSPIRE obligations. Indeed, the solution proposed in this TG, besides preserving the IACS semantics, has the additional advantage of supporting the relevance of IACS spatial datasets to INSPIRE. The adoption of the geoIACS data model for the harmonisation of geoIACS datasets facilitates the creation of three INSPIRE conformant LU/LC/AF datasets from each harmonised geoIACS dataset. A conceptual mapping from the geoIACS data model to three INSPIRE data themes (LU/LC/AF) has been developed and provided in Appendixes 5, 6 and 7.

Possible confidentiality clauses required by geoIACS data providers willing to prevent disclosure of sensitive information contained in the harmonised datasets to non authorised users have been dealt with.

[20] https://geoiacs.github.io/technical-guidelines/tg/Technical_Guidelines_on_IACS_Data_Sharing.pdf

[21] https://github.com/INSPIRE-MIF/technical-guidelines/tree/main/iacs

[22] https://github.com/geoIACS

A preliminary test of the TG, described in Appendix 4, has been executed, producing three harmonised geoIACS datasets from non-harmonised source datasets shared by three pilot Paying Agencies.

After the above-mentioned consultation phase held in the first quarter of 2026, the TG will now undergo a formal endorsement process, in collaboration with JRC, AGRI and the INSPIRE Maintenance and Implementation Group (MIG).

The on-going INSPIRE simplification process will be taken into due account, considering that geoIACS is ready to align with the final INSPIRE amendments, once the current proposal is ratified. Specifically, the TG are already following the simplification principles, e.g. fully adopting INSPIRE Good Practice on the use of GeoPackage as alternative encoding to gml. Moreover, geoIACS data provision through APIs and bulk download, in line with HVD Implementing Regulation, have been already successfully tested (as documented in Appendix 4).

TG maintenance will be part of an overall TG governance process and feedback from the community of users will continue to be collected in the geoIACS dedicated GitHub organisation.

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Tóth, Katalin, and Pavel Milenov. 2020. *Technical Guidelines on IACS Spatial Data Sharing Part 1 - Data Discovery*.

Wojda, P., Martin Jimenez, J., De Medici, D., Scarpa, S. and Martirano, G., *Technical Guidelines on IACS Data Sharing - geoIACS*, European Commission, Ispra, 2025, JRC144416

List of abbreviations and definitions

Abbreviations	Definitions
AA	Agricultural Area
a.k.a	Also known as
AF	Agricultural and Aquaculture Facilities
ANC	Natural or other Area-specific Constraints
AP	Agricultural Parcel
API	Application Programming Interface
Art.	Article
ASD	Area Specific Disadvantages
CAP	Common Agricultural Policy
CRS	Coordinate Reference System
DG AGRI	Directorate General Agriculture
DQ	Data quality
ID	Identifier
EFA	Ecological Focus Area
ELE	Eco Landscape Feature
EN	European norm
EPSG	European Petroleum Survey Group
ETS	Executive Test Suite
EU	European Union
FSDN	Farm Sustainable Development Network
GAEC	Good agricultural and environmental conditions
GIS	Geographic Information System
GML	Geography Markup Language
GSA	Geo Spatial Application
HVD	High Value Datasets
IACS	Integrated Administration and Control Systems
INSPIRE	Infrastructure for Spatial Information in Europe
ISO	International Standards Organisation
JRC	Joint Research Centre
LC	Land Cover
LF	Landscape feature

LQ	Limiting Quality
LPIS	Land Parcel Identification System
LU	Land Use
MIG	(INSPIRE) Maintenance and Implementation Group
MS	Member States
OEA	Other Eligible Area
OGC	Open Geospatial Consortium
PA	Paying Agencies
QA	Quality assessment
QE	Quality element
R	Regulation
RBM	River Basin Management
RDF	Resource Description Framework
SKOS	Simple Knowledge Organisation System
SMR	Statutory management requirements
TC	Technical Committee
TG	Technical Guidelines
UML	Unified Modeling Language
XML	Extensible Markup Language
XSD	XML Schema Definition

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Appendices

Appendix 1. Changes with respect to the previous TGs on IACS spatial data sharing and outcomes of the consultation process

This version 2.0 of the TG represents an updated version of the Technical Guidelines on IACS Data Sharing published in 2025[23] (Wojda, P., Martin Jimenez, J., De Medici, D., Scarpa, S. and Martirano, G., Technical Guidelines on IACS Data Sharing - geoIACS, European Commission, Ispra, 2025, JRC144416), which, in turn, updated and merged the two previous Technical Guidelines on Spatial Data Sharing[24] (Part 1 – Data discovery (Tóth and Milenov 2020), Part 2 – Data interoperability (Martirano and Toth 2023)).

Changes introduced by the first version of the unique TG published in 2025

Three were the main changes introduced by the first version of the unique TG published in 2025:

- one unique TG merging the two previous TGs on data discovery (metadata) and data interoperability (data model);
- one unique application schema including both old LPIS and GSA schemas;
- scope enlarged to Rural Development Commitments and livestock.

The changes introduced in the geoIACS data model at feature type, data type and code list levels are described in **Table 45**, **Table 46** and **Table 47** respectively.

Table 45. Changes at feature type level

Feature type	Change introduced in the new TG
ReferenceParcel	Added association with AgriculturalParcel
AgriculturalParcel	• Added association to AgriculturalParcel • Added holdingId attribute • Added agriculturalAreaType attribute • Added localisedMainCrop attribute • Added localisedCatchCrop attribute
AgriculturalArea	Eliminated (added agriculturalAreaType attribute to AgriculturalParcel)
NonAgriculturalEligibleArea	• Added holdingId attribute • Added declaredArea attribute
EcoLandscapeElement	New feature type which embeds previous LandscapeFeature feature type
Site	New feature type
EcologicalFocusArea	Eliminated association to AgriculturalArea feature type (not existing anymore)

[23] https://geoiacs.github.io/technical-guidelines/tg/Technical_Guidelines_on_IACS_Data_Sharing.pdf

[24] https://github.com/INSPIRE-MIF/technical-guidelines/tree/main/iacs

Table 46. Changes at data type level

Feature type	Change introduced in the new TG
FarmAnimalSpecies	New data type for the includesAnimal attribute of Site (taken from INSPIRE AF)

Table 47. Changes at code list level

Feature type	Change introduced in the new TG
AgriculturalAreaTypeValue	No changes
NonAgriculturalEligibleAreaTypeValue	Added 2 values, one of them corresponding to "areas with natural/specific constraints" required by HVD Regulation
cropValue	No changes (empty code list)
localisedCropValue	No changes (empty code list)
EcoLandscapeElementTypeValue	New code list
EcoLandscapeElementDesignationValue	New code list
LandscapeFeatureTypeValue	No changes
AreBasedEcoSchemeValue	New code list
NACEActivityValue	New code list (taken from INSPIRE AF)
LivetockSpeciesValue	New code list (taken from INSPIRE AF)
AquacultureSpecieValue	New code list (taken from INSPIRE AF)
EcologicalFocusAreaTypeValue	No changes

The consultation process

The first version of the unique TG was presented to representatives of seven MS who participated in the initial test phase in the period May-October 2025, during an in-person Workshop held in Bruxelles on 18th and 19th of November 2025. Then the TG was published in the geoIACS dedicated GitHub organisation[25] on 16th of December 2025, where MS were invited to participate to discussions and to submit change proposals. An informative webinar was also organised by AGRI and JRC on 27th of February 2026, which was attended by 60 participants. During the consultation process, terminated at the end of March 2026, 21 discussions[26] were opened, together with 4 issues[27] containing change proposals. The feedback collected was then processed by the editorial team and further discussed with AGRI (A.4 and C.1), leading to the TG update and to the release of its version 2.0 contained in this report.

Changes introduced by this version 2.0 of the TG

The changes introduced by this version 2.0 of the TG, compared to the first version published in 2025 are listed below:

- Agricultural Area feature type has been restored (from past TG2).

[25] https://github.com/geoIACS

[26] https://github.com/orgs/geoIACS/discussions

[27] https://github.com/geoIACS/technical-guidelines/issues

- Agroforestry has been eliminated as 4th value of Agricultural Area Type codelist and has been added as boolean attribute of Agricultural Area feature type.
- NAEA (Non Agricultural Eligible Area) feature type has been renamed as OEA (Other Eligible Area) and restructured.
- Afforested areas has been included as additional value in Other Eligible Area codelist.
- A series of boolean attributes (isANC, isN2000, isRBM, is ASD) has been added to Agricultural Parcel feature type, to indicate if an Agriultural Parcel is eligible also for area-based payments under Title III, Chapter IV of R (EU) 2021/2115 to compensate beneficiaries for additional costs and income foregone related to natural or other area-specific constraints (art. 71) or related to area-specific disadvantages (art. 72).
- Similarly, a series of boolean attributes (isANC, isN2000, isRBM, is ASD) has been added to Other Eligible Area feature type, to indicate if a OEA is eligible also for area-based payments under Title III, Chapter IV of R (EU) 2021/2115 to compensate beneficiaries for additional costs and income foregone related to natural or other area-specific constraints (art. 71) or related to area-specific disadvantages (art. 72).
- Multiplicity of declaredArea attribute of Agricultural Area and of Other Eligible Area feature types has been changed from 1 to 0..1, making the attribute optional.
- Boolean data type of organic attribute of Agricultural Parcel feature type has been replaced by a codelist with three values (nonOrganic, inConversion, organic) and the attribute name has been changed to organicStatus.
- Integer data type of numberOfAnimals attribute (of Site feature type) has been replaced by a codelist with ranges of values.
- Livestock species INSPIRE codelist will be replaced by a new extended codelist which will include other species in addition to bovines, goats, pigs and sheep.
- The multiplicity of includesAnimal attribute (of Site feature type) has been changed from 0..* to 1..*.
- The multiplicity of relatedRP association of EcoLandscapeElement feature type has been changed from 1 to 1..* (to avoid making spatial intersections of features intersecting more than one Reference Parcel).

Use cases related to the use of the additional boolean attributes of Agricultural Parcel and Other Eligible Area representing real world scenarios

Six real-world scenarios showing how to use the additional boolean attributes of Agricultural Parcel and Other Eligible Area are illustrated in the following figures, from **Figure 13** to **Figure 18**. In each figure, for a hypothetical composition of a Reference Parcel illustrated on the left, the corresponding mapping toward AA/OEA is shown on the top right and toward AP on the bottom right. Other possible real-world scenarios resulting from the combination of other possible constraints, commitments and physical conditions can be easily derived from the six scenarios presented in this appendix.

Figure 13. Use case 1a

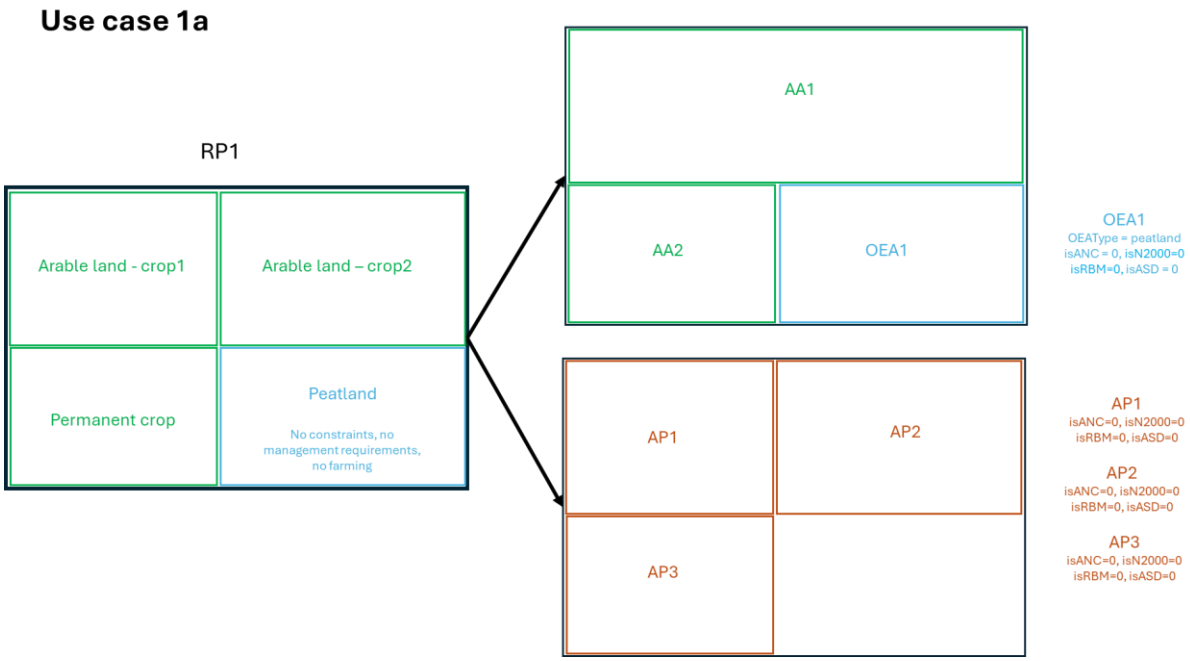


Figure 14. Use case 1b

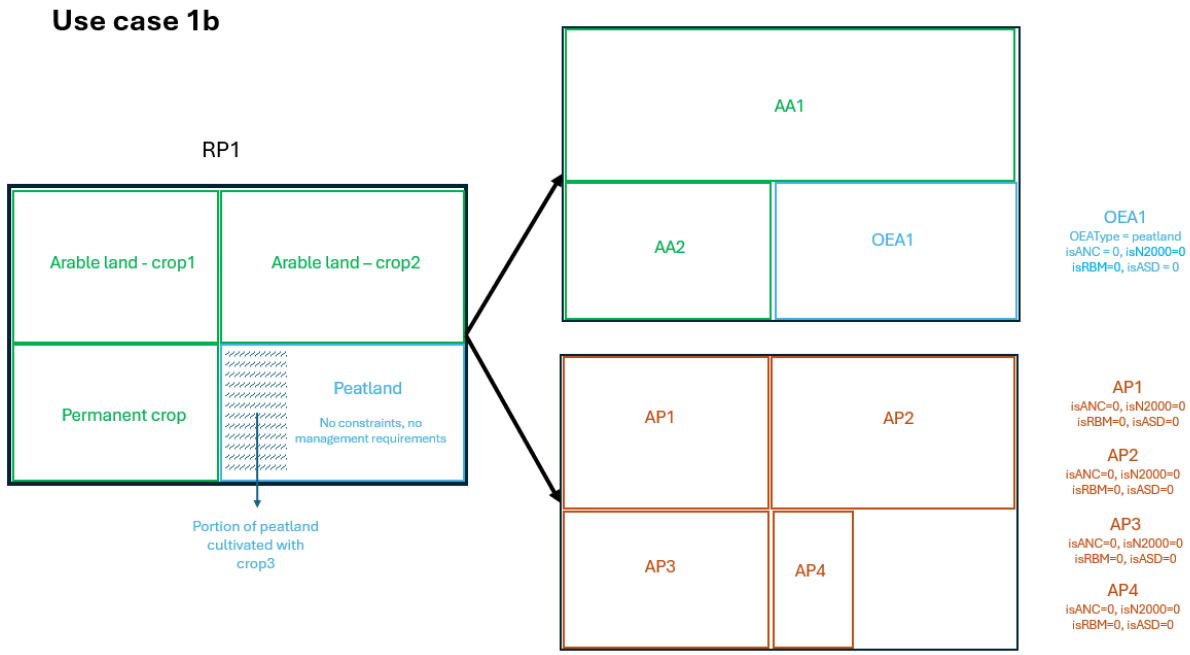


Figure 15. Use case 2a

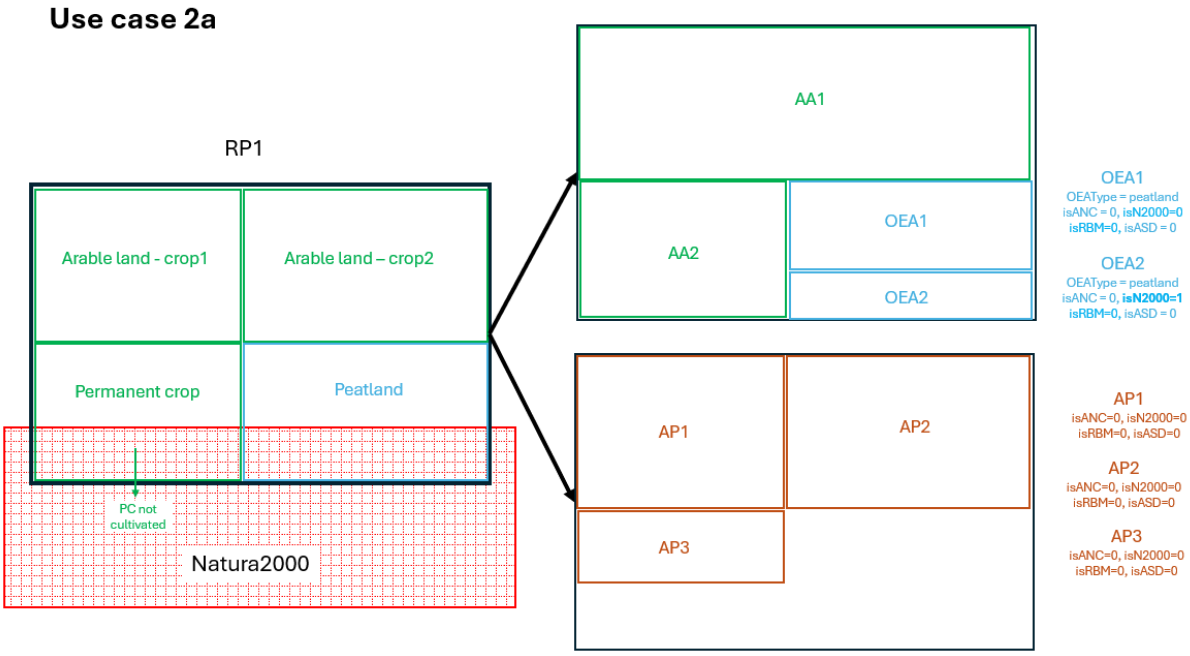


Figure 16. Use case 2b

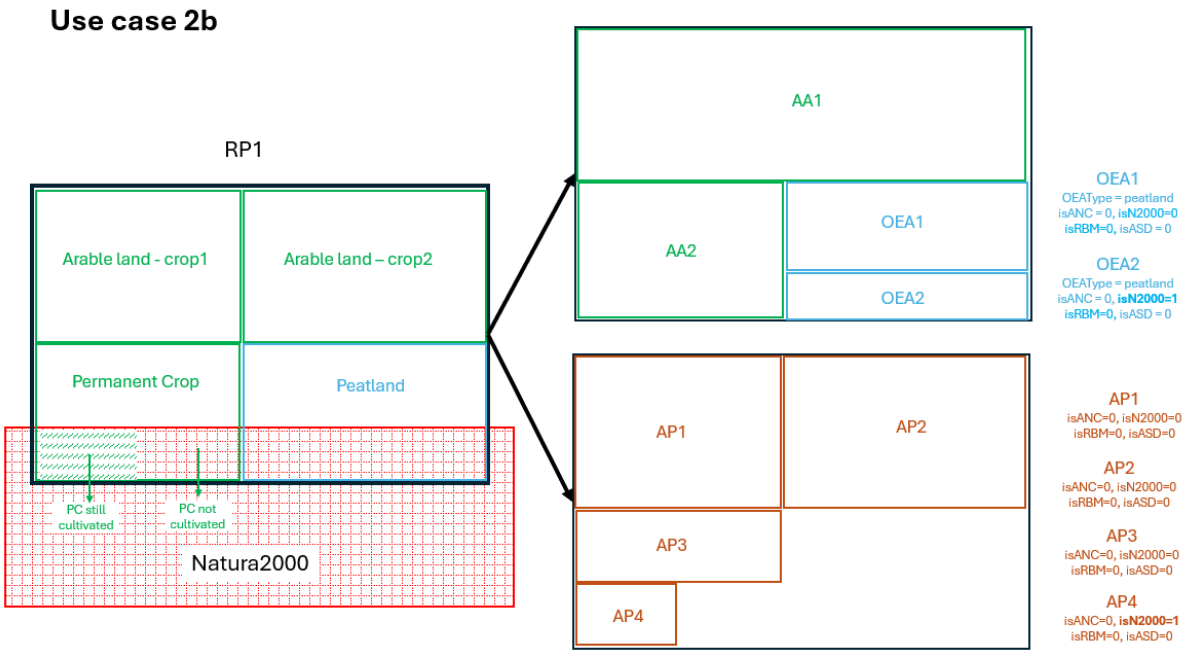


Figure 17. Use case 2c

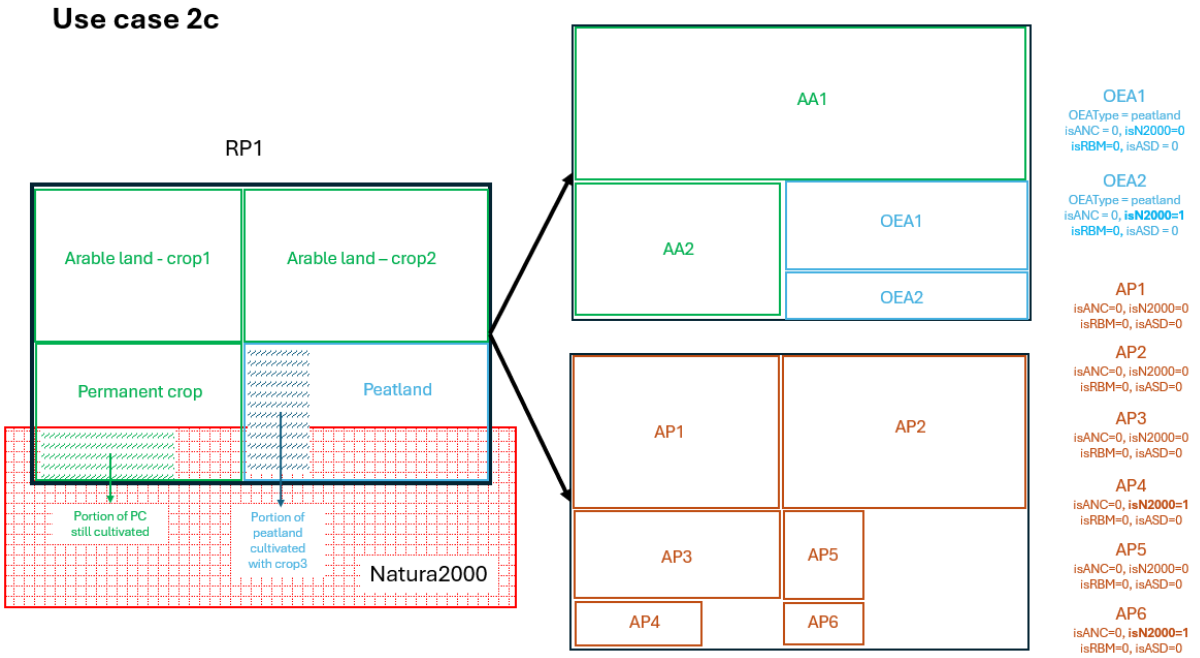
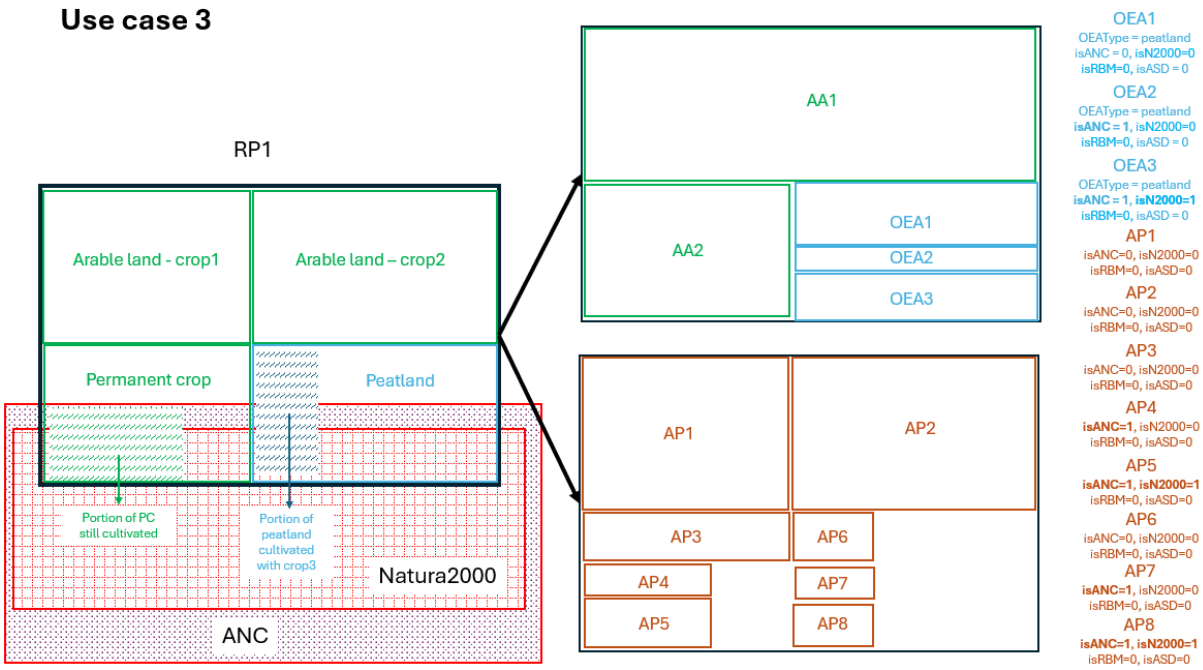


Figure 18. Use case 3



Appendix 2. geoIACS datasets and HVD

geoIACS datasets are High Value Datasets, because they fulfil the requirements set for Reference parcels and Agricultural parcels datasets listed in the Annex of Regulation (EU) 2023/138.

However, geoIACS datasets contain more information than required by HVD Regulation. This additional information consists in information potentially sensitive, which shall fulfil confidentiality clauses dealt with in section 7.4, and in information that can be publicly shared. Therefore, in order to comply with HVD Regulation, it is sufficient that MS publicly share geoIACS datasets removing the sensitive information. Should MS decide to publicly share only the information required by HVD Regulation (therefore excluding the publicly shareable additional information), they can easily derive an additional dataset from a geoIACS dataset, following the mapping instructions provide in this Appendix.

The key attributes of Reference parcels and Agricultural parcels HVD are shown in **Figure 19** and their mapping toward the geoIACS data model is described in the following.

Figure 19. Key attributes of Reference parcels and Agricultural parcels HVD

Datasets	Administrative units	Geographical names	Addresses	Buildings	Cadastral parcels	Reference parcels	Agricultural parcels
Key attributes	Unique identifier; Unit type (administrative or maritime unit); Geometry (⁸); Boundary status; National identification code; Identification code of the upper administrative level; Official name; Country code; Name in multiple languages (only for countries with more than one official language) including a language with Latin characters, when feasible.	Unique identifier; Geometry; Name in multiple languages (only for countries with more than one official language) including a language with Latin characters, when feasible; Type.	Unique identifier; Geometry; Address locator (e.g. house number); Thoroughfare (street); name; Administrative units (e.g. municipality, province, country; Postal descriptor (e.g. post code); Date of last update.	Unique identifier; Geometry (footprint of the building); Number of floors; Type of use.	Unique identifier; Geometry (boundary of cadastral parcels or basic property units (⁷)); Parcel or basic property unit code; A reference to the administrative unit of lowest administrative level to which this parcel or basic property unit belongs.	Unique identifier; Geometry (boundary and area); Land cover (⁵); organic (⁶); Stable landscape elements (¹⁰) ("EFA-layer"); areas with natural/specific constraints.	Unique identifier; Geometry (boundary and area of each agricultural parcel); Land uses (crops or crop groups); Organic; Individual landscape element; Permanent grassland.

ReferenceParcel

Table 48. Mapping of ReferenceParcel key attributes toward the geoIACS data model

HVD key attribute	Element of the geoIACS data model
Unique identifier	ReferenceParcel.RPid
Geometry	ReferenceParcel.geometry
Land cover	AgriculturalArea.AAType (inherited from the association ReferenceParcel.relatedAA)
organic	AgriculturalParcel.organicStatus (inherited from the association ReferenceParcel.relatedAP)
Stable landscape elements (EFA layer)	EcologicalFocusArea.ecologicalFocusAreaType (derived by spatial join with reference parcel)
Areas with natural/specific constraints	AgriculturalParcel.isANC (inherited from the association ReferenceParcel.relatedAP) and OtherEligibleArea.isANC (inherited from the association ReferenceParcel.relatedOEA)

Regarding 'Land cover' HVD key attribute, because one Reference Parcel may contain one or more Agricultural Areas and with different agricultural area types, the HVD key attribute may have multiple

values, that can be easily obtained from geoIACS datasets thanks to the mandatory association between Agricultural Area and Reference Parcel.

Regarding 'organic' HVD key attribute, it should be key attribute of Agricultural Parcels (as in the case of geoIACS data model), because it is a characteristic of Agricultural Parcels. However, its value can be easily obtained from geoIACS datasets thanks to the mandatory association between Agricultural Parcel and Reference Parcel. Because one Reference Parcel may contain one or more Agricultural Parcels and, consequently, more Agricultural Parcels managed under organic practices (OrganicStatusValue=organic), the HVD key attribute may have multiple values.

Regarding 'Stable landscape element' HVD key attribute, not existing anymore in geoIACS data model an association between Reference Parcel and EcologicalFocusArea, it can be obtained by spatial join between EcologicalFocusArea layer and ReferenceParcel layer. Alternatively, in order to avoid possible data processing complexities related to spatial joins, it could be added in the TG a requirement imposing that the EFAid attribute becomes mandatory (currently it is optional) and it contains (as a substring) the RPid. Or it could be introduced a new mandatory association between EFA and Reference Parcel. However, not being EFA required anymore in the CAP since 2023, EFA Feature Type has been kept in geoIACS only to allow the provision of historical data, potentially useful for statistical purposes.

Regarding 'Areas with natural/specific constraints' HVD key attribute, it corresponds to the attribute isANC of the geoIACS AgriculturalParcel feature type and to the attribute isANC of the geoIACS OtherEligibleArea feature type. Because one Reference Parcel may contain one or more Agricultural Parcels and/or one or more Other Agricultural Eligible Areas which are areas with natural/specific constraints (isANC=1), the HVD key attribute may have multiple values, that can be easily obtained from geoIACS datasets thanks to the mandatory association between Agricultural Parcel and Reference Parcel and between Other Eligible Area and Reference Parcel.

AgriculturalParcel

Table 49. Mapping of AgriculturalParcel key attributes toward the geoIACS data model

HVD key attribute	Element of the geoIACS data model
Unique identifier	AgriculturalParcel.APid
Geometry	AgriculturalParcel.geometry
Land uses (crops or crop groups)	AgriculturalParcel.mainCrop
Organic	AgriculturalParcel.organicStatus
Individual landscape element	EcoLandscapeElement.ELEDesignation
Permanent grassland	AgriculturalArea.AAType (inherited from the association AgriculturalParcel.relatedRP and the association AgriculturalArea.relatedRP)

Regarding the 'Individual landscape element' HVD key attribute, it should be key attribute of Reference Parcels (as in the case of geoIACS data model), because it is a characteristic of Reference Parcels. However, its value, contained in the attribute ELEDesignation of the geoIACS EcoLandscapeElement feature type, when the value of the ELEType attribute is landscapeFeature, as shown in **Figure 20**, can be obtained from geoIACS datasets thanks to the association between EcoLandscapeElement and Agricultural Parcel, through the association of both feature types with Reference Parcel feature type, as shown in **Figure 21**.

Figure 20. Individual landscape element

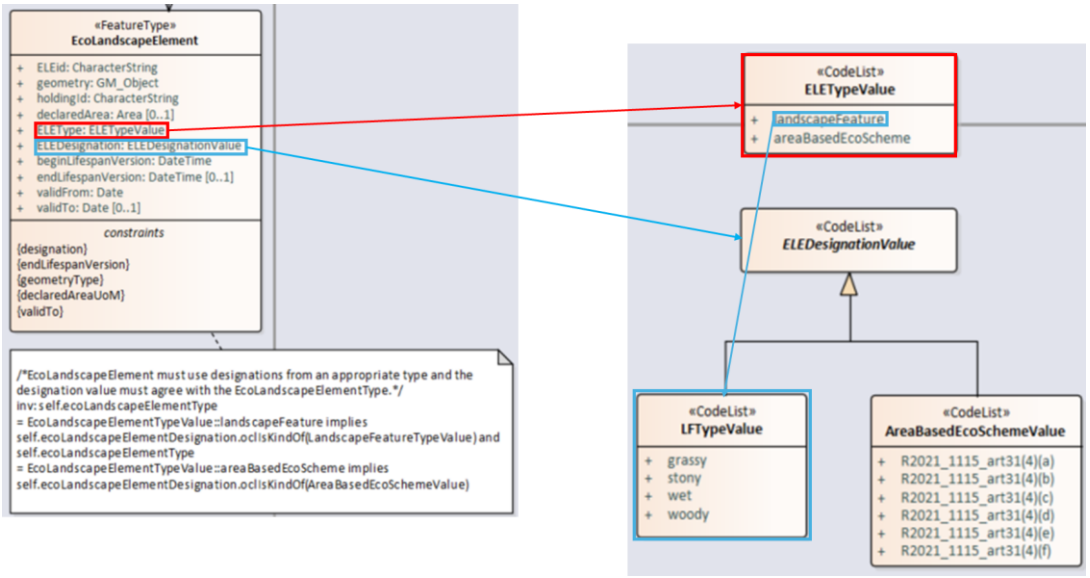
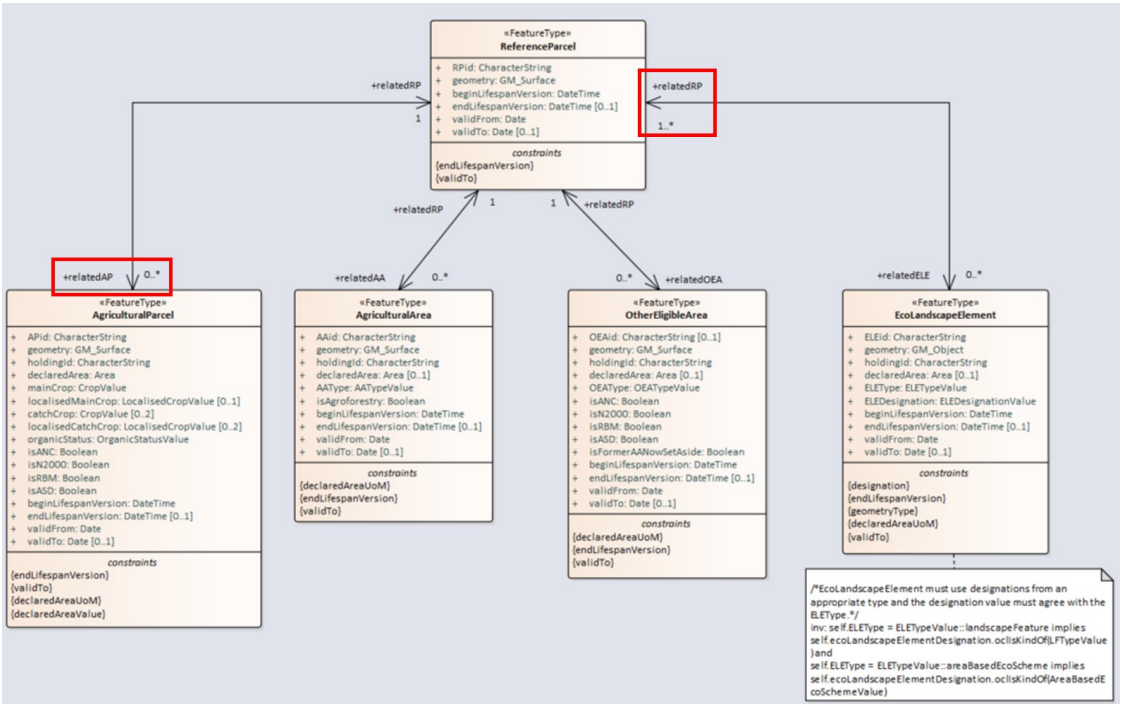


Figure 21. Individual landscape element – link to geoIACS Agricultural Parcel



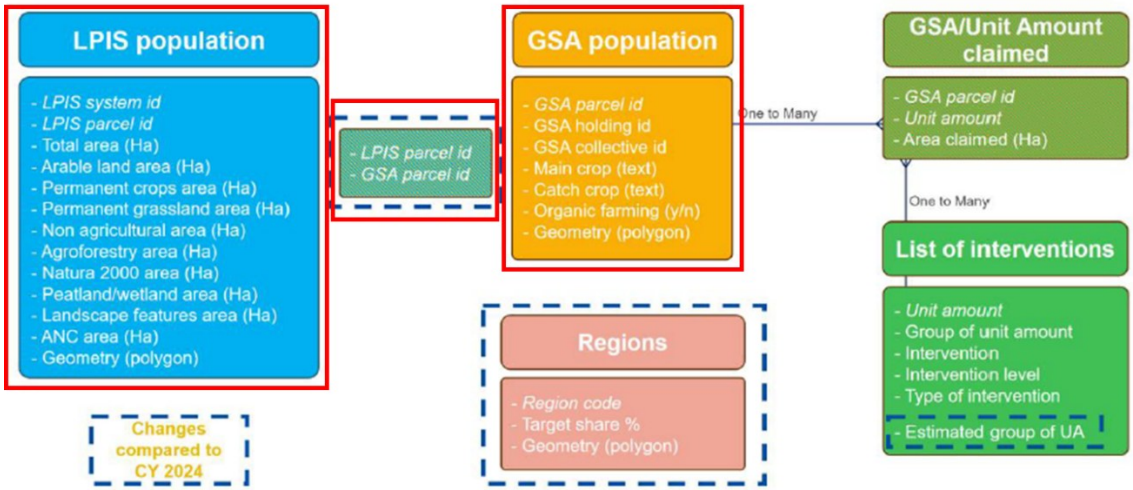
It's to be highlighted that, using these associations, only individual landscape elements associated with a Reference Parcel in turn associated with one or more Agricultural Parcels can be derived from geoIACS datasets. Conversely, Landscape Features that in a geoIACS dataset are associated with a Reference Parcel not containing any Agricultural Parcel, can't be mapped toward HVD Agricultural Parcels and remain present in HVD Reference Parcels. Indeed, the EcoLandscapeElement geoIACS feature type has a mandatory association to Reference Parcel, which in turn has an optional association to Agricultural Parcel, as shown in **Figure 21**. To solve this potential issue, the 'Individual landscape element' HVD key attribute should be moved from Agricultural parcel to Reference parcel, even though this should imply a change in HVD Regulation.

Appendix 3. geoIACS data model and IACS QA

On a yearly basis, MS have to fulfil IACS QA obligations, consisting in delivering to EC a series of files according to Technical Specifications which contain instructions related to both the structure of the data to be delivered and the delivery mechanism (e.g. number of files, format, naming, exchange protocols).

A conceptual schema of the data to be delivered is shown in **Figure 22**, taken from the "IACS quality assessment data exchange in November 2024: Technical Specifications".

Figure 22. Conceptual schema of QA data to be submitted by MS to EC



With reference to LPIS population, GSA population and GSA/LPIS relationship shown within the red boxes in **Figure 22**, as well as to the definition of the 'Field names' provided in the "IACS quality assessment data exchange in November 2024: Technical Specifications", it is evident that all the information required can be easily derived from a geoIACS dataset.

In particular, it's to be highlighted that the GSA/LPIS relationship can be easily derived from the mandatory associations between AgriculturalParcel and ReferenceParcel and between AgriculturalAreas/OtherEligibleArea and ReferenceParcel geoIACS feature types.

EC may consider to replace the current obligation to deliver the files related to LPIS population, GSA population and GSA/LPIS relationship with the sharing of geoIACS datasets.

Appendix 4. Examples of geoIACS data harmonisation

The physical implementation of the geoIACS data model was tested with data of three Paying Agencies participating in a pilot test phase. The source data used in the data harmonisation exercise are listed in **Table 50**.

Table 50. Source data used in the geoIACS data harmonisation exercise

MS/Region	geoIACS feature types present in the source dataset	Year	Spatial scope	Format
Belgium-Wallonia	RP, AP, AA, ELE	2023	Entire region	1 gpkg containing 4 layers (one for each feature type)
Belgium-Flanders	RP, AP	2024	Entire region	1 gpkg containing one unique layer for RP and AP
Spain	RP, AP, ELE	2024	Sample dataset, corresponding to a portion of a Municipality	3 gpkg, one for each feature type

The data harmonisation exercise consisted of two distinct phases:

1. source data harmonisation using geoIACS data model as target data model
2. harmonised geoIACS datasets publication.

A third test was performed to demo a codelist publication.

Source data harmonisation

According to a classical data harmonisation workflow, source data were first analysed, then a mapping table with the correspondences between attributes and properties of the source data and those of the geoIACS data model was filled-in and finally the mapping rules were applied to a data transformation tool (hale»studio[28] open source) which generated three harmonised gml files, one for each pilot MS/region, which were then opened in QGIS and compared to the non-harmonised source data.

A screenshot of the mapping rules applied to a transformation project in hale»studio is shown in **Figure 23**.

An overview of the AP source datasets of BE-Wallonia and BE-Flanders is shown in **Figure 24**, together with a small red box showing a cross-border area where more detailed analyses were made and are presented in the following figures.

[28] https://wetransform.to/halestudio/

Figure 23. Mapping rules applied to a transformation project in hale»studio

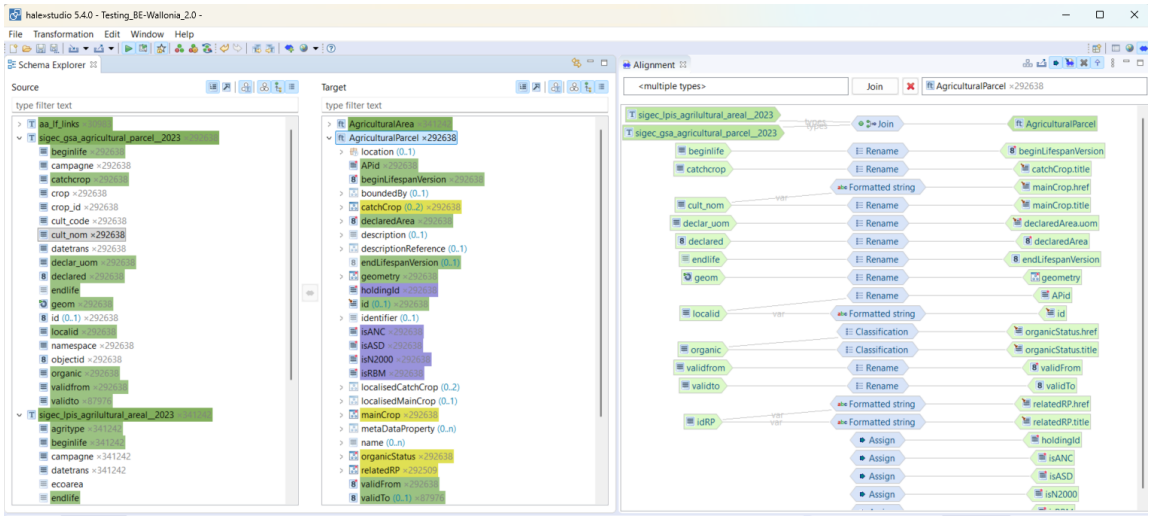
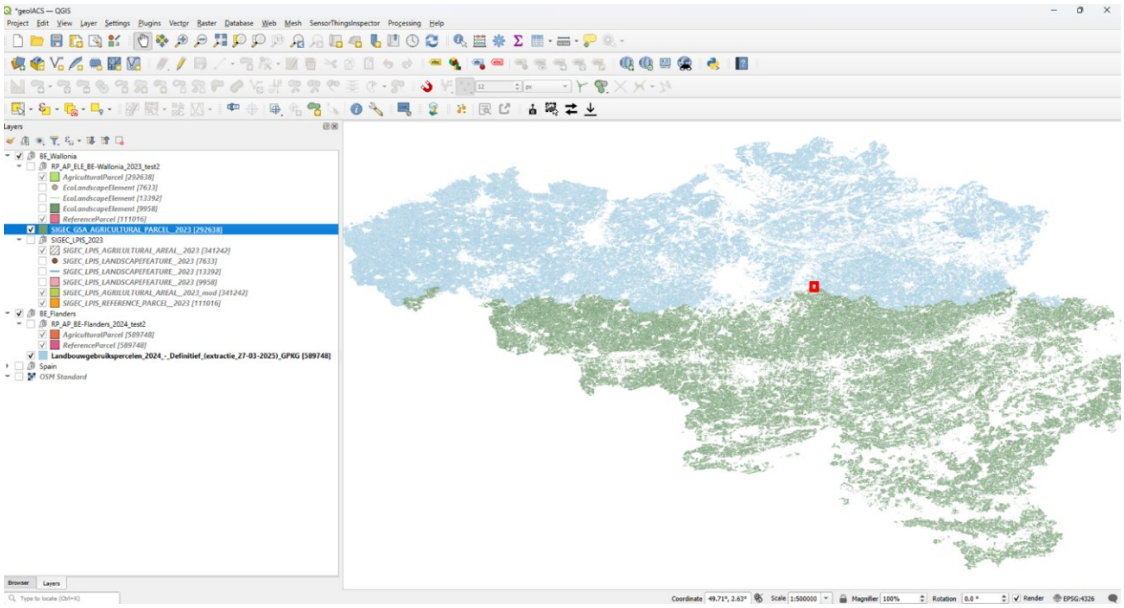


Figure 24. AP source datasets of BE-Wallonia and BE-Flanders



The attributes of two reference parcels, one in BE-Wallonia and another in BE-Flanders source datasets, are shown in **Figure 25** and **Figure 26** respectively.

Figure 25. Zoom-in on and attributes of a reference parcel in the BE-Wallonia source dataset

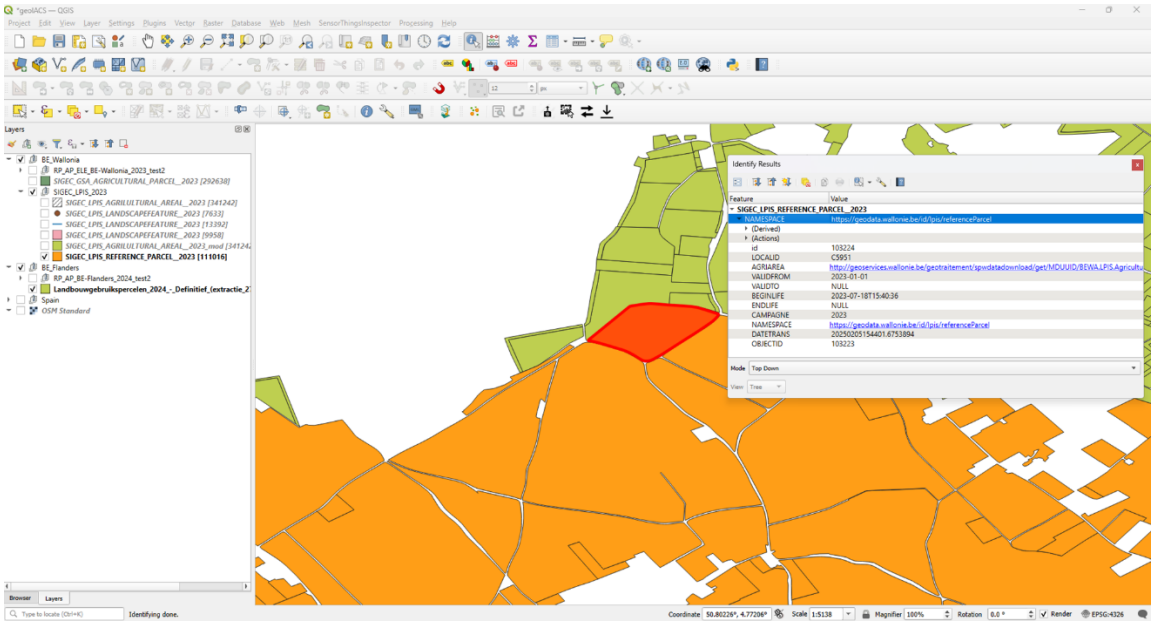
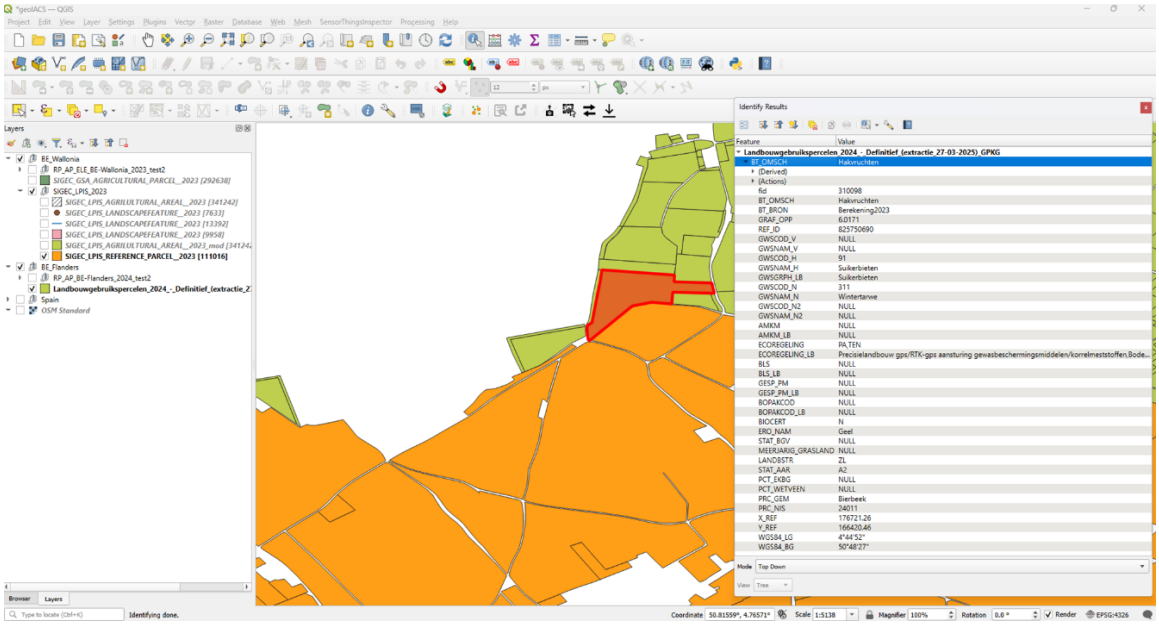


Figure 26. Zoom-in on and attributes of a reference parcel in the BE-Flanders source dataset



The attributes of two agricultural parcels, one in BE-Wallonia and another in BE-Flanders source datasets are shown in **Figure 27** and **Figure 28** respectively.

Figure 27. Zoom-in on and attributes of an agricultural parcel in the BE-Wallonia source dataset

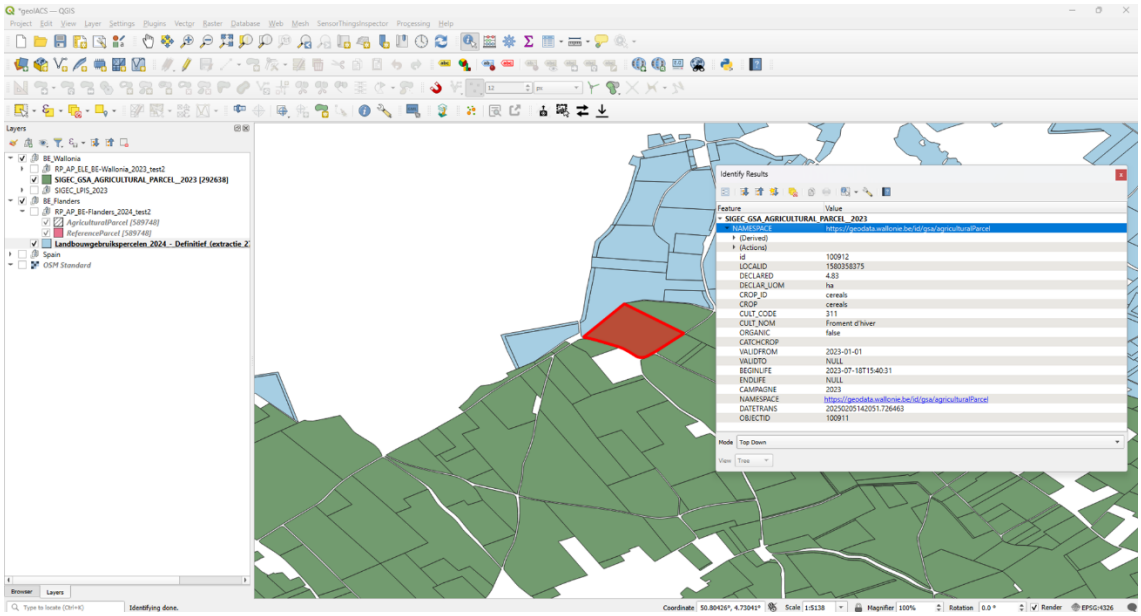
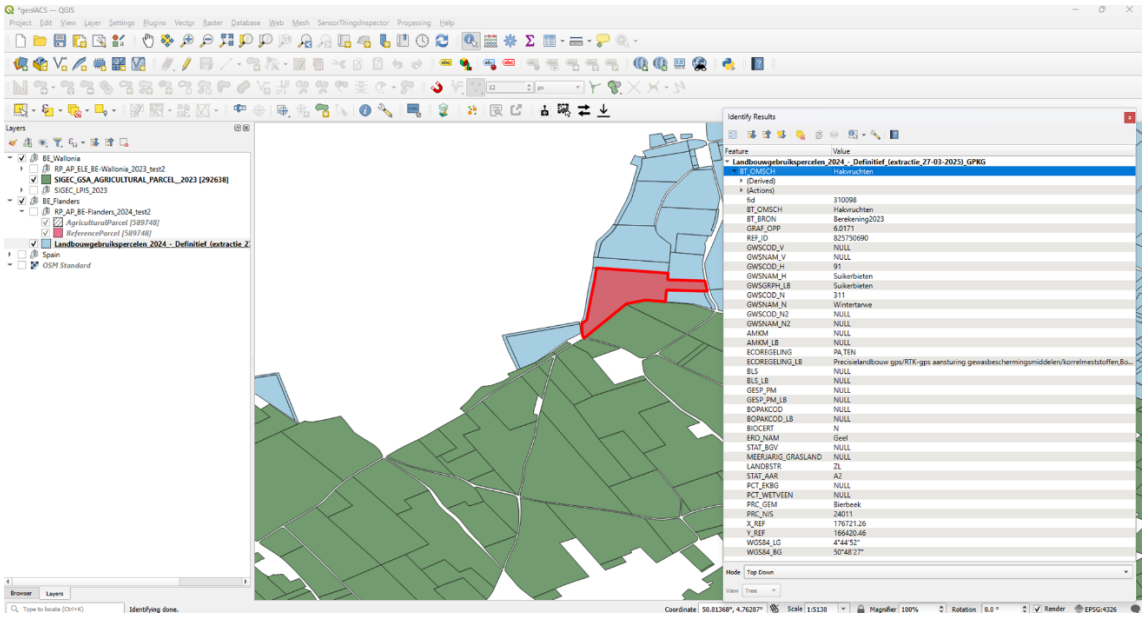


Figure 28. Zoom-in on and attributes of an agricultural parcel in the BE-Wallonia source dataset



The attributes of two agricultural parcels, one in BE-Wallonia and another in BE-Flanders geoIACS harmonised datasets are shown in **Figure 29** and **Figure 30** respectively.

Figure 29. Zoom-in on and attributes of an agricultural parcel in the BE-Wallonia geoIACS harmonised dataset

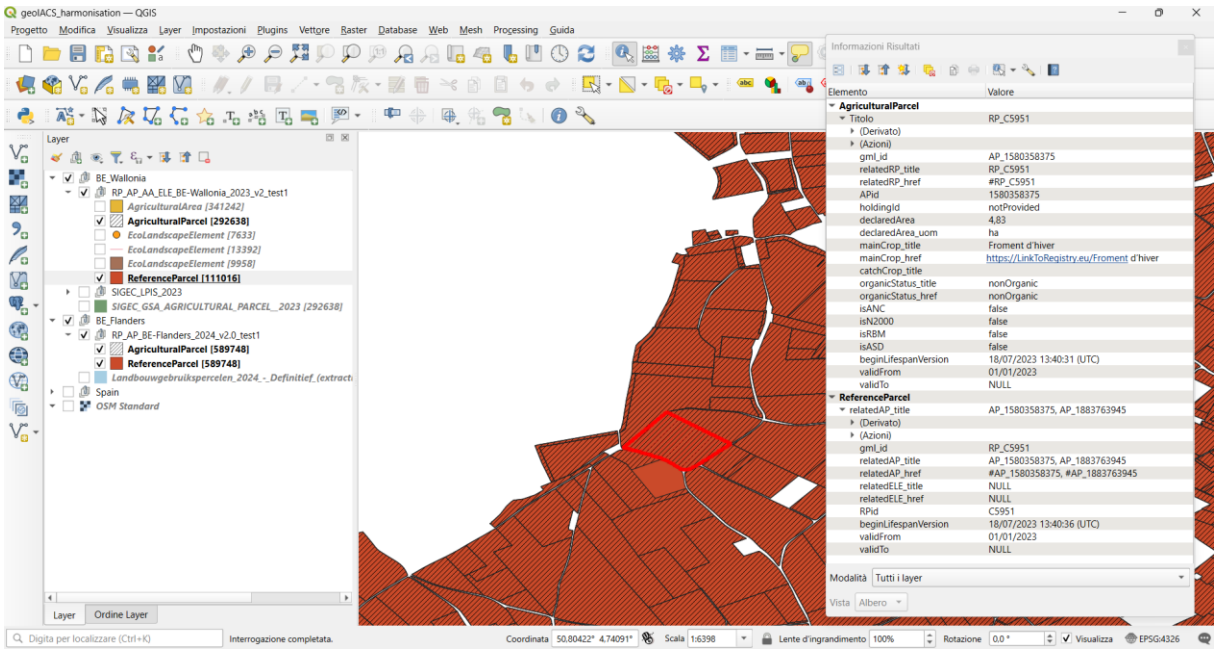
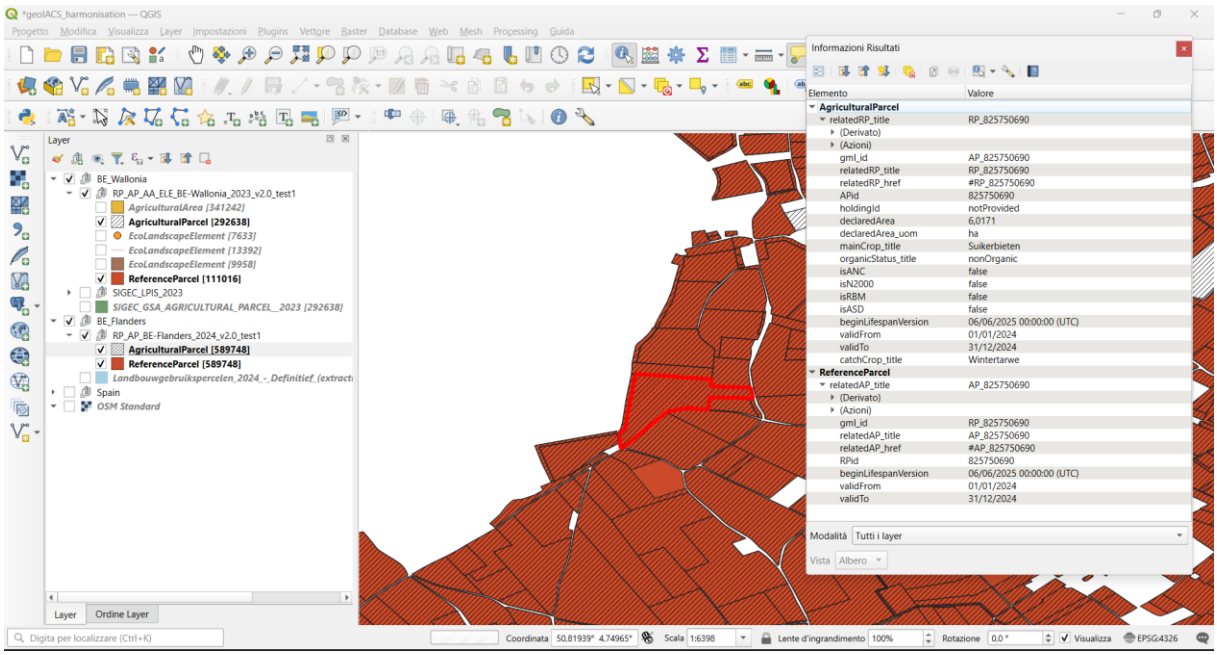


Figure 30. Zoom-in on and attributes of an agricultural parcel in the BE-Flanders geoIACS harmonised dataset

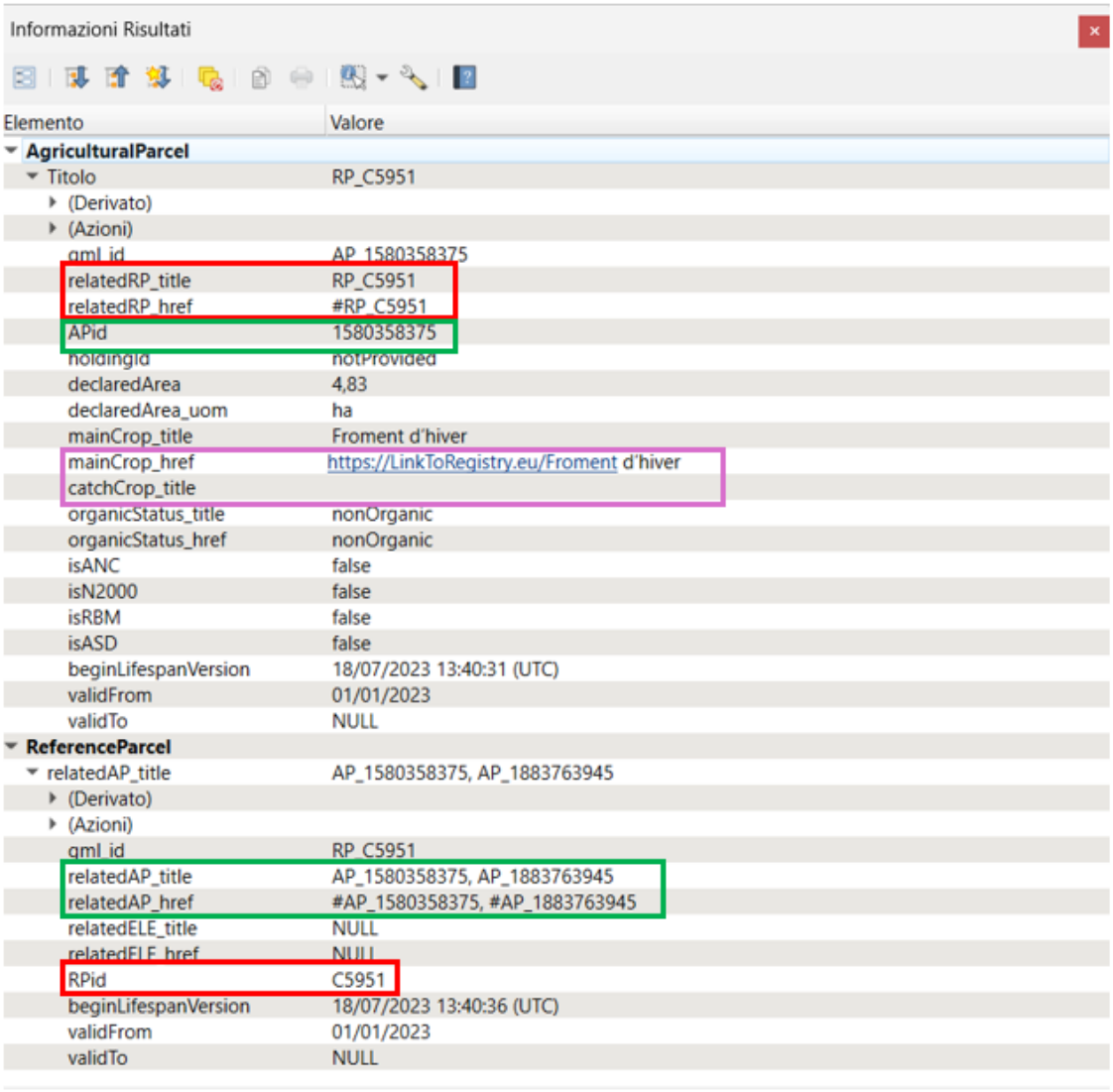


An enlarged view of the attributes of the agricultural parcel and the associated reference parcel in the BE-Wallonia geoIACS harmonised dataset shown in **Figure 29** is shown in **Figure 31**. The following considerations can be made:

- the AP relatedRP association was mapped using the RPid, as shown in the red boxes (the presence of the "#" as prefix of relatedRP_href attribute allows direct referencing to the associated RP);
- the RP relatedAP association, mapped using the APid, contains two values, corresponding to the two APid of the two AP contained in the RP, as shown in the green boxes;

- the possibility to map the crops using the mainCrop_title attribute containing the crop name (or label) and the mainCrop_href attribute containing the uri of a codelist publishing the crop definition, is shown in the purple box (the codelist uri is fictitious, having only demonstration purposes);
- the holdingId attribute was temporarily populated with the 'notProvided' character string.

Figure 31. Attributes of an agricultural parcel in the BE-Wallonia geoIACS harmonised dataset

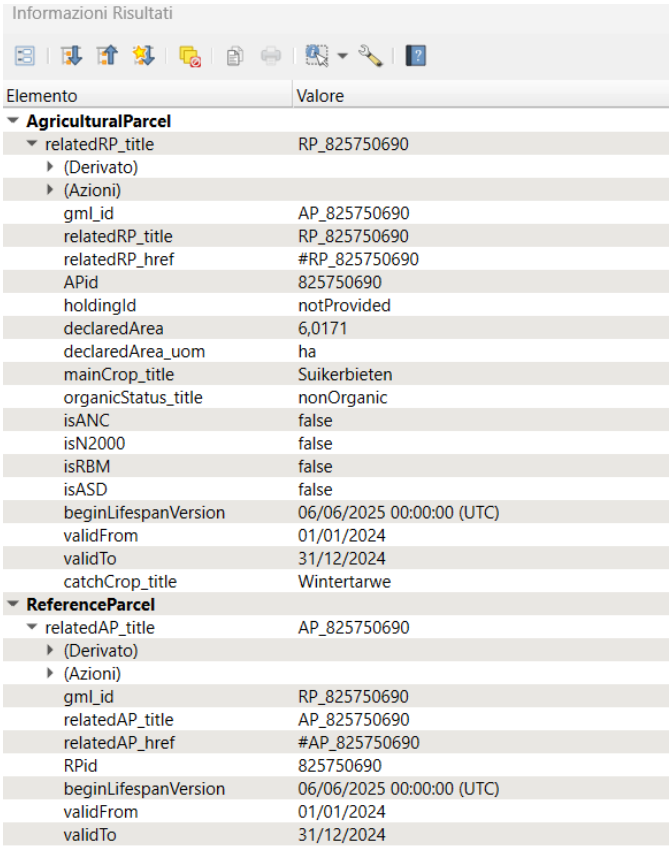


An enlarged view of the attributes of the agricultural parcel and the associated reference parcel in the BE-Flanders geoIACS harmonised dataset shown in **Figure 30** is shown in **Figure 32**.

The same considerations made for the BE-Wallonia geoIACS harmonised datasets apply also BE-Flanders geoIACS harmonised dataset. The mainCrop_href and agriculturalAreaType_href attributes, used for demonstration purposes in the BE Wallonia geoIACS harmonised dataset to provide codelists uri, were not used in the BE-Flanders geoIACS (only the mainCrop_title and agriculturalAreaType_title.

With reference to the figures from **Figure 29** to **Figure 32**, the benefits of analyses and processing made on geoIACS harmonised datasets are evident.

Figure 32. Attributes of an agricultural parcel in the BE-Flanders geoIACS harmonised dataset



Elemento	Valore
AgriculturalParcel	
relatedRP_title	RP_825750690
(Derivato)	
(Azioni)	
gml_id	AP_825750690
relatedRP_title	RP_825750690
relatedRP_href	#RP_825750690
APid	825750690
holdingId	notProvided
declaredArea	6,0171
declaredArea_uom	ha
mainCrop_title	Suikerbieten
organicStatus_title	nonOrganic
isANC	false
isN2000	false
isRBM	false
isASD	false
beginLifespanVersion	06/06/2025 00:00:00 (UTC)
validFrom	01/01/2024
validTo	31/12/2024
catchCrop_title	Wintertarwe
ReferenceParcel	
relatedAP_title	AP_825750690
(Derivato)	
(Azioni)	
gml_id	RP_825750690
relatedAP_title	AP_825750690
relatedAP_href	#AP_825750690
RPid	825750690
beginLifespanVersion	06/06/2025 00:00:00 (UTC)
validFrom	01/01/2024
validTo	31/12/2024

A similar harmonisation was done on sample Spanish source data and a sample geoIACS harmonised dataset was produced also for Spain.

The data harmonisation exercise described so far produced three gml files, according to the default encoding requirements contained in section 7.3.1.

In addition, the use of the GeoPackage alternative encoding, referred to in section 7.3.1.3, was applied to the three geoIACS harmonised gml and three geoIACS harmonised GeoPackages were produced, using a GeoPackage template and a hale»studio transformation project with the geoIACS xsd as source schema and the GeoPackage template as target schema.

The benefits of geoIACS harmonised datasets encoded in GeoPackages are twofold:

- their database characteristics, their reduced size and their simplified (flat) structure with respect to those of the gml, facilitate their (re)use in a GIS environment and in data processing chains;
- they facilitate geoIACS harmonised publication via API (as shown in the following).

Harmonised geoIACS datasets publication

Two different types of spatial data services to access harmonised geoIACS datasets were implemented and tested:

- an ATOM download service was implemented and tested only for BE-Wallonia and BE-Flanders; it was a fully representative test for ATOM-based bulk download services, since it was applied to the 2 PAs with a large volume harmonised data and creating it also for the small-volume sample data of Spain would not have brought any added value;

- the publication of the harmonised data via API (OGC API Features) was tested for 1 PA only (ES), using the harmonised GeoPackage stored in a GeoServer instance; it was a fully representative test regarding API implementation.

A demo home page for the ATOM download service implemented for BE-Wallonia harmonised geoIACS dataset is shown in **Figure 33**. Clicking on the link in the red box, a demo ATOM dataset feed html page opens (screenshot shown in **Figure 34**). This page contains the link to download the dataset in the different encodings available (gml and GeoPackage).

Figure 33. Demo ATOM download service home page

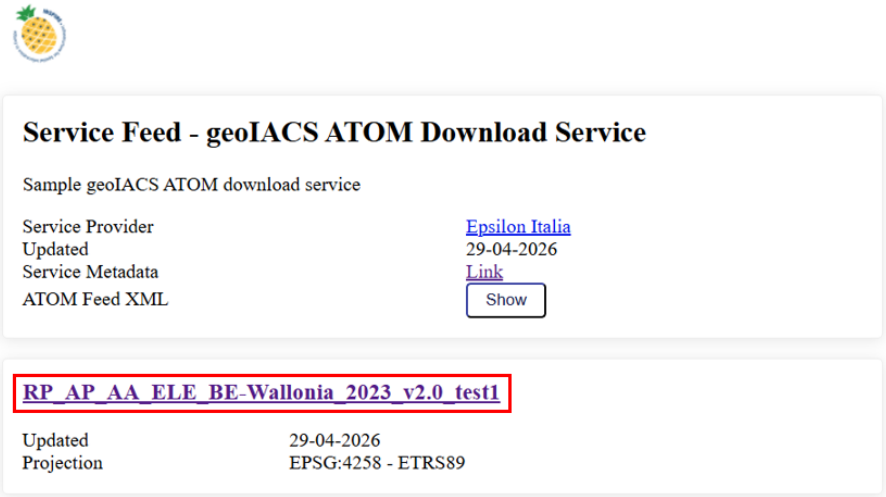


Figure 34. Demo ATOM dataset feed html page

Regarding the test publication of the harmonised geoIACS sample dataset of Spain via API, an OGC API Feature service was created in a GeoServer instance.

The GeoServer home page is shown in **Figure 35**, where the restricted access to an authenticated user having access only to an authorised workspace (IACS) is shown in the red box. From all the services enabled by GeoServer for the harmonised geoIACS dataset stored in a gpkg datastore, clicking on the link shown in the green box, the OGC API Feature service landing page opens, as shown in **Figure 36**.

Figure 35. GeoServer home page

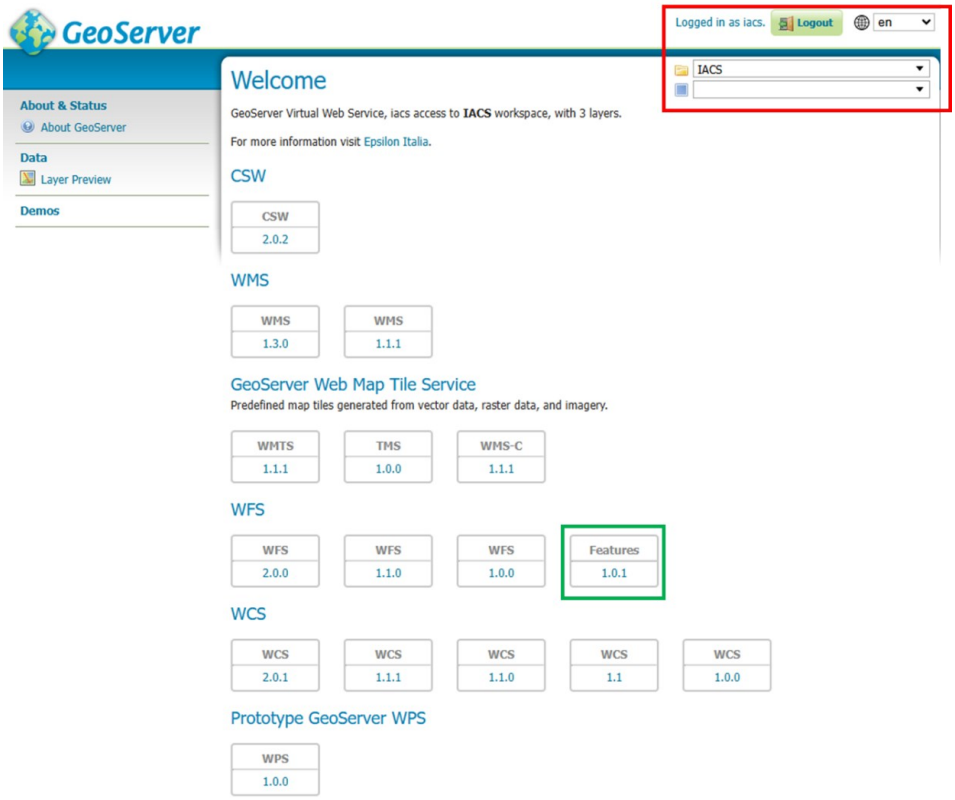
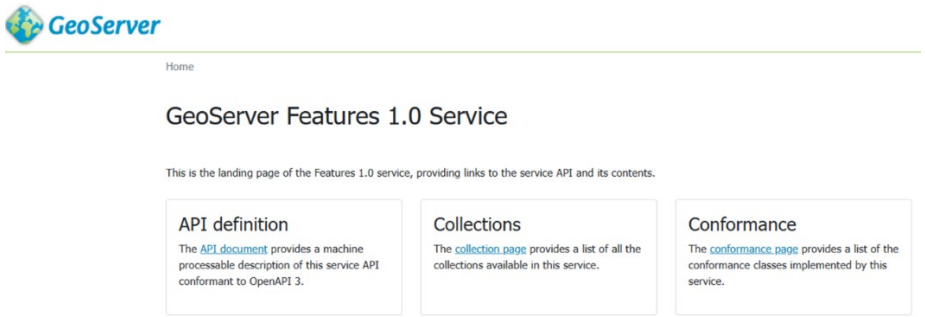


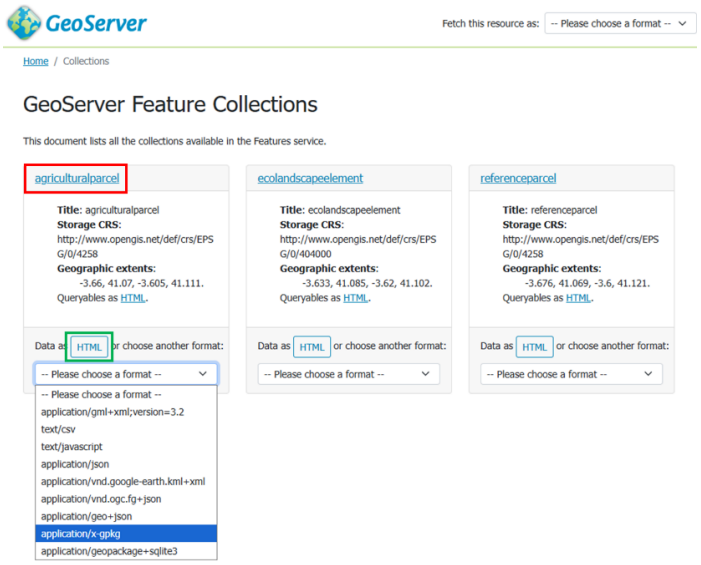
Figure 36. OGC API Feature service landing page



Clicking on the Collections button in **Figure 36**, the three collections available in the OGC API Feature service based on the ES geoIACS dataset harmonised in the exercise described in this Appendix, namely agriculturalparcel, referenceparcel and ecolandscapeelement, appear, as shown in **Figure 37**.

For each collection it is possible to select the download format, as shown in **Figure 37** for agriculturalparcel.

Figure 37. Collections of OGC API Feature service



Clicking on the link shown in the red box in **Figure 37**, the feature schema of the agriculturalparcel collection appears, as shown in **Figure 38**, whilst clicking on the (default) HTML format shown in the green box in **Figure 37**, the html attribute table of agriculturalparcel collection appears, as shown in **Figure 39**.

Figure 38. Feature schema of the agricultural parcel collection

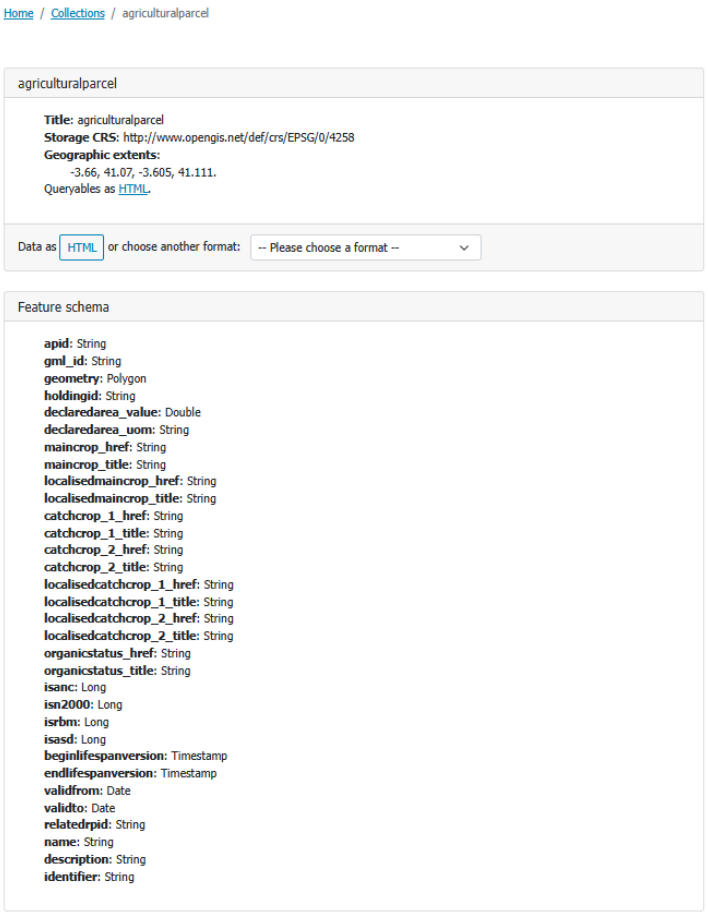


Figure 39. HTML attribute table of agricultural parcel collection

Home / Collections / Feature

agriculturalparcel

fid	apid	gml_id	holdingid	declaredarea_value	declaredarea_uom	maincrop_href	maincrop_title
agriculturalparcel.1	1539331025	AP_1539331025	http://inspire.ec.europa.eu/codelist/VoidReasonValue/Withheld	6100.0	m2	https://LinkToRegistryValue.eu/62	PASTOS PERMANENTES DE 5 O MÁS AÑOS
agriculturalparcel.2	1539331032	AP_1539331032	http://inspire.ec.europa.eu/codelist/VoidReasonValue/Withheld	7900.0	m2	https://LinkToRegistryValue.eu/62	PASTOS PERMANENTES DE 5 O MÁS AÑOS
agriculturalparcel.3	1539331033	AP_1539331033	http://inspire.ec.europa.eu/codelist/VoidReasonValue/Withheld	800.0	m2	https://LinkToRegistryValue.eu/62	PASTOS PERMANENTES DE 5 O MÁS AÑOS
agriculturalparcel.4	1539331034	AP_1539331034	http://inspire.ec.europa.eu/codelist/VoidReasonValue/Withheld	4400.0	m2	https://LinkToRegistryValue.eu/62	PASTOS PERMANENTES DE 5 O MÁS AÑOS
agriculturalparcel.5	1539331035	AP_1539331035	http://inspire.ec.europa.eu/codelist/VoidReasonValue/Withheld	1300.0	m2	https://LinkToRegistryValue.eu/62	PASTOS PERMANENTES DE 5 O MÁS AÑOS
agriculturalparcel.6	1539331036	AP_1539331036	http://inspire.ec.europa.eu/codelist/VoidReasonValue/Withheld	2000.0	m2	https://LinkToRegistryValue.eu/62	PASTOS PERMANENTES DE 5 O MÁS AÑOS

Codelist publication

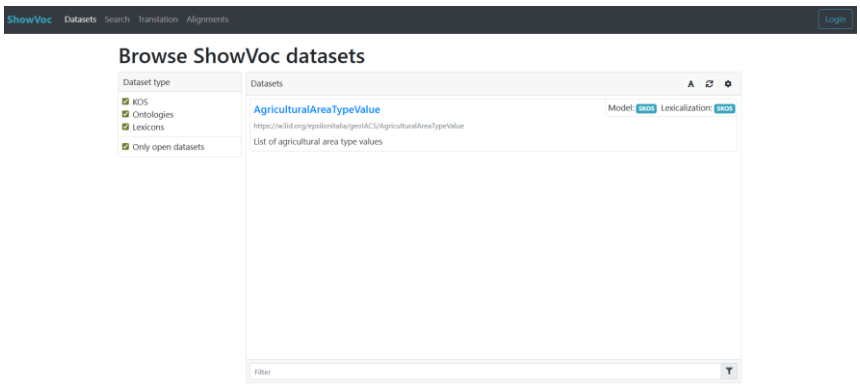
Tests on the publication of a codelist were made using the following technology:

- ShowVoc (coupled with VocBench, is the platform used by EC Publication Office[29] to publish vocabularies, thesauri and ontologies, using the related semantic terminology).

The codelist publication test was made on AgriculturalAreaType codelist.

An instance of the version 2.4.0 of the software was installed. The landing page of the ShowVoc demo service publishing the AgriculturalAreaTypeValue codelist is shown in **Figure 40**.

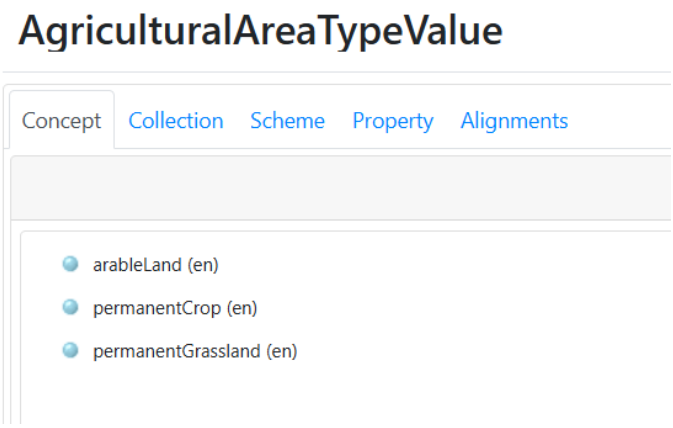
Figure 40. Landing page of ShowVoc demo service



In the publication test described in this Appendix, the concepts associated to the AgriculturalAreaTypeValue codelist values are shown in **Figure 41**.

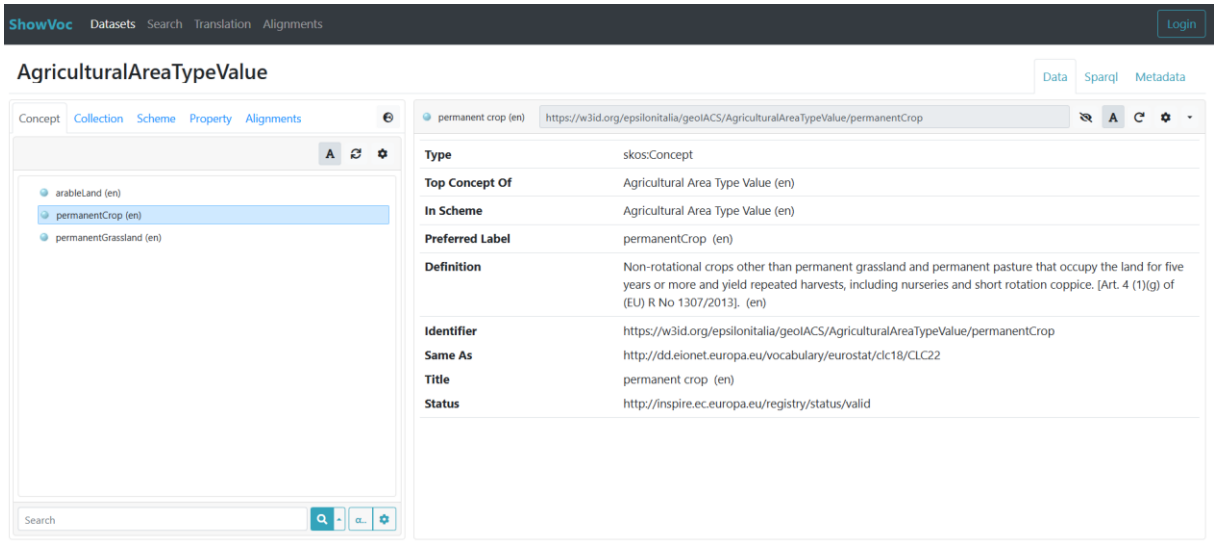
[29] https://op.europa.eu/it/web/eu-vocabularies/showvoc

Figure 41. Landing page of ShowVoc demo service



Clicking on the single concept, the related details appear, as shown in **Figure 42**.

Figure 42. Codelist value details in ShowVoc



Appendix 5. Mapping of geoIACS data model toward INSPIRE LC data model

The similarity in scope between the INSPIRE LC LandCoverUnit feature type and some geoIACS feature types, namely:

- AgriculturalArea (limited to agriculturalAreaType attribute)
- OtherEligibleArea (limited to some values of the OEATypeValue codelist)
- EcoLandscapeElement
- EcologicalFocusArea

enables the creation of four INSPIRE LC datasets (conformant to the LandCoverVector and LandCoverNomenclature application schemas) from a geoIACS dataset.

A conceptual mapping from the four geoIACS feature types to INSPIRE LC LandCoverUnit feature type is shown in the following figures.

Figure 43. Conceptual mapping from geoIACS AgriculturalArea feature type to INSPIRE LC LandCoverUnit feature type

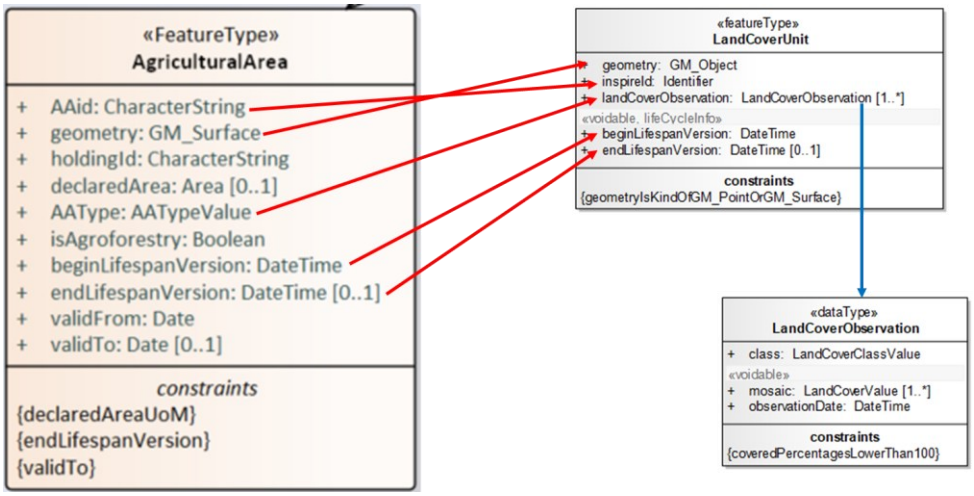


Figure 44. Conceptual mapping from geoIACS OtherEligibleArea feature type to INSPIRE LC LandCoverUnit feature type

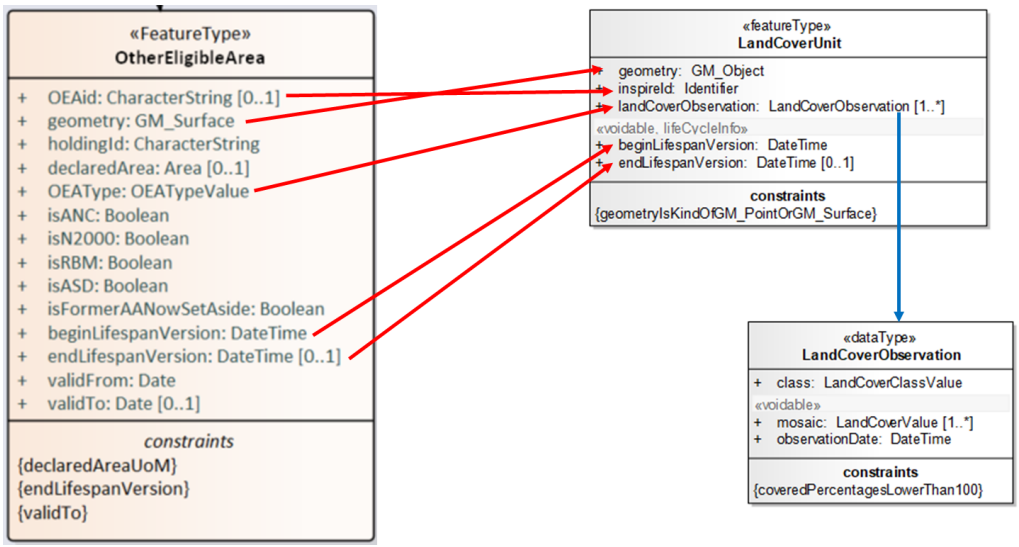


Figure 45. Conceptual mapping from geoIACS EcoLandscapeElement feature type to INSPIRE LC LandCoverUnit feature type

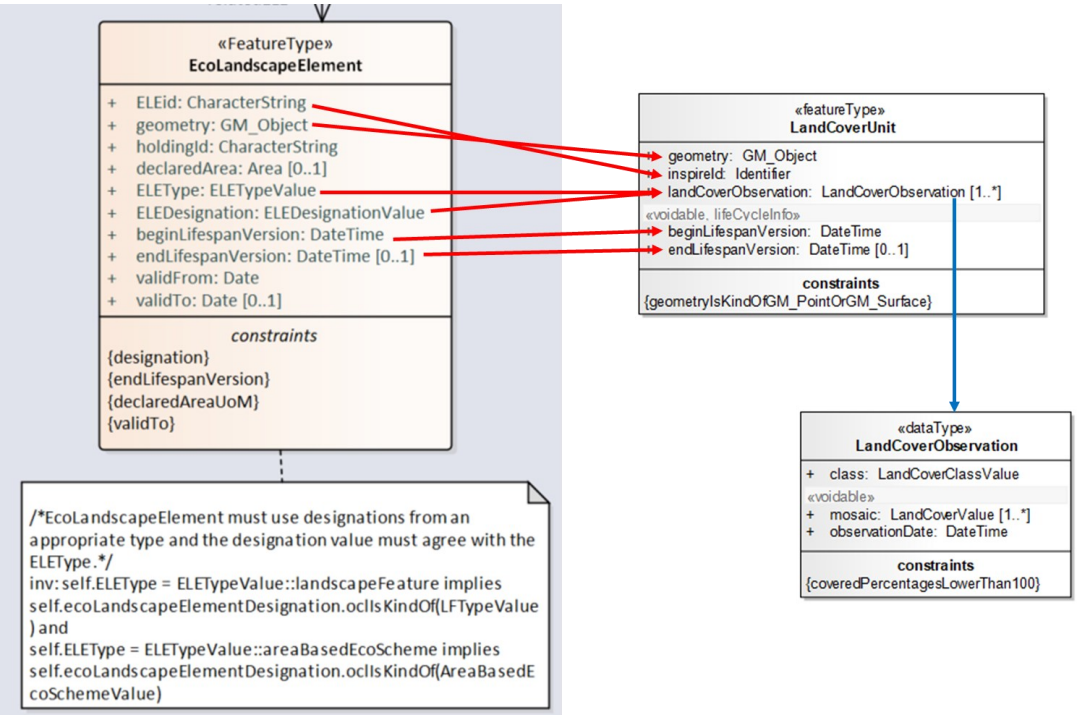
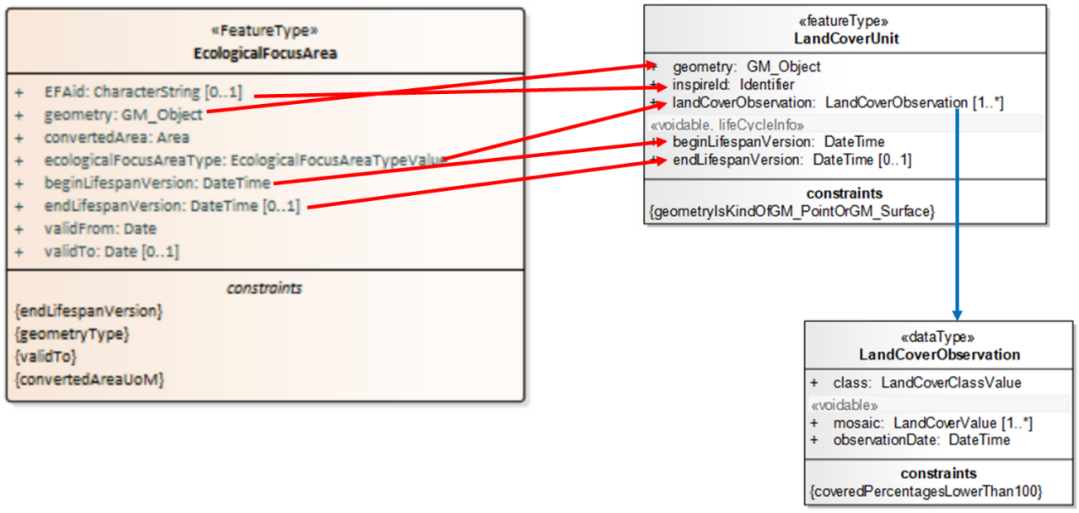


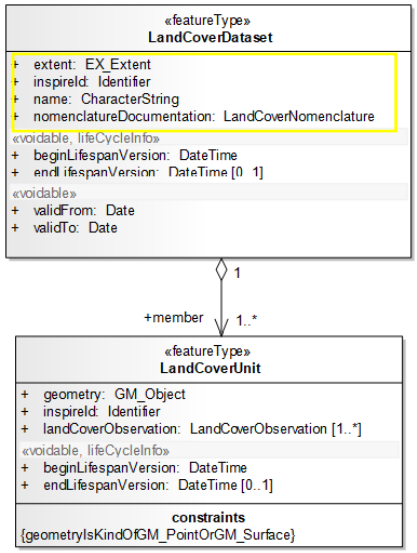
Figure 46. Conceptual mapping from geoIACS EcologicalFocusArea feature type to INSPIRE LC LandCoverUnit feature type



Starting from this conceptual mapping, a detailed mapping table could be created, facilitating the final data transformation step consisting in the implementation of the mapping rules in a data transformation software, such as Hale Studio or FME.

It is to be highlighted that creating an INSPIRE LC dataset (conformant to the LandCoverVector schema) requires to create one LandCoverDataset feature, of which one to many LandCoverUnits are members, as shown in **Figure 47**.

Figure 47. Relationship between INSPIRE LC LandCoverDataset featureType and LandCoverUnit featureType



Therefore, one LandCoverDataset feature has to be created and a value has to be assigned to the attributes in the yellow box in **Figure 47**:

- extent: according to ISO 19115, it can be realized through a bounding polygon, a geographic bounding-box or a geographic description (e.g. name of a region …),
- inspireId: an identifier has to be assigned, according to the instructions provided in section 3.2.6,
- name: a textual name has to be assigned by the data provider,
- nomenclatureDocumentation: this attribute allows to provide documentation on the nomenclature used in the dataset. Please note that the core model supports only one nomenclature per dataset. According to the INSPIRE LandCoverVector application schema, this nomenclature "can be CORINE, another European nomenclature, a national one or any other LC nomenclature", modelled with the UML class LandCoverNomenclature. In this specific case it will be related to the nomenclature used in the following code lists:

    1.1. AATypeValue

    1.2. OEATypeValue

    1.3. LFTypeValue

    1.4. EcologicalFocusAreaTypeValue

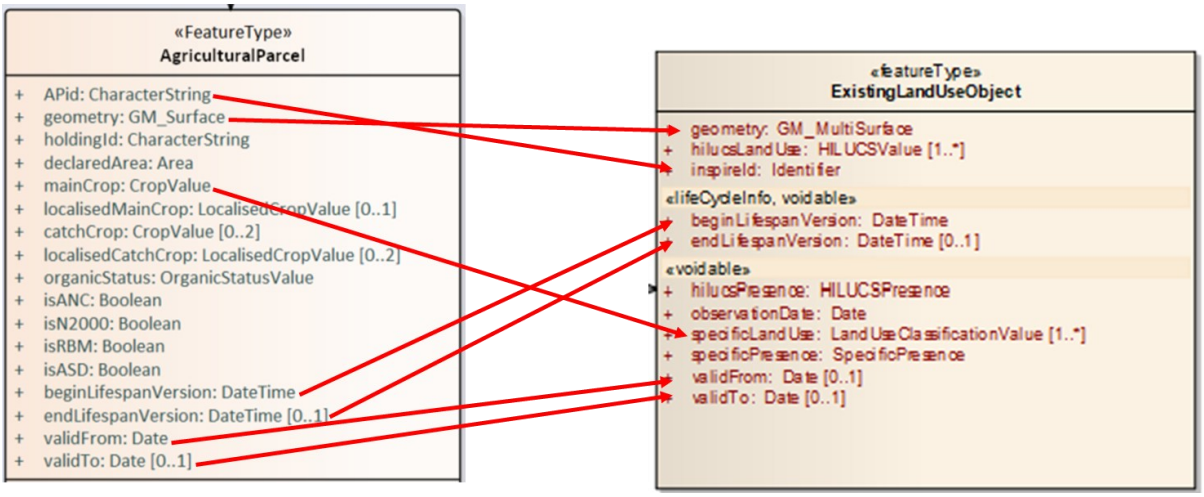
  whose values will be used to populate the class attribute of LandCoverObservation.

Appendix 6. Mapping of geoIACS data model toward INSPIRE LU data model

The similarity in scope between the INSPIRE LU ExistingLandUseObject feature type and the geoIACS AgriculturalParcel feature type enables the creation of an INSPIRE LU dataset (conformant to the ExistingLandUse application schema) from a geoIACS dataset.

A conceptual mapping from geoIACS AgriculturalParcel feature type to INSPIRE LU ExistingLandUseObject featureType is shown in **Figure 48**.

Figure 48. Conceptual mapping from geoIACS AgriculturalParcel feature type to INSPIRE LU ExistingLandUseObject feature type



Starting from this conceptual mapping, a detailed mapping table could be created, facilitating the final data transformation step consisting in the implementation of the mapping rules in a data transformation software, such as Hale Studio or FME.

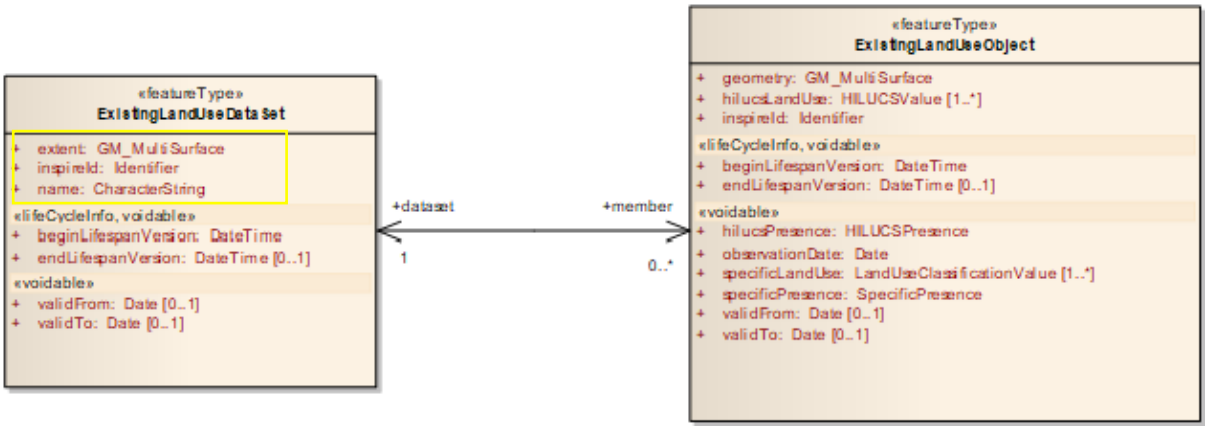
Regarding the INSPIRE mandatory attribute hilucsLandUse, it will be populated with the value "agriculture"[30] taken from the INSPIRE HILUCS codeList[31], whilst the AgriculturalParcel attribute mainCrop will be mapped to the INSPIRE specificLandUse attribute, whose related LandUseClassificationValue codeList will be created and populated with the values of the geoIACS CropValue code list.

It is to be highlighted that creating an INSPIRE LU dataset (conformant to the ExistingLandUse schema) requires to create one ExistingLandUseDataSet feature, of which one to many ExistingLandUSeObject are members, as shown in **Figure 49**.

30 https://inspire.ec.europa.eu/codelist/HILUCSValue/1_1_Agriculture

31 https://inspire.ec.europa.eu/codelist/HILUCSValue

Figure 49. Relationship between INSPIRE ExistingLandUse featureType and ExistingLandUseObject featureType



Therefore, one ExistingLandUseDataSet feature has to be created and a value has to be assigned to the attributes in the yellow box in **Figure 49**:

— extent: the extent of an ExistingLandUseDataset is defined as the boundary of the union of all the polygons (ExistingLandUseObject) that are a member of the ExistingLandUseDataset,

— inspireId: an identifier has to be assigned, according to the instructions provided in section 3.2.6,

— name: a textual name has to be assigned by the data provider.

Appendix 7. Mapping between geoIACS data model and INSPIRE AF data model

The geoIACS Site feature type was introduced in the geoIACS data model to include in geoIACS dataset harmonised data related to livestock.

From a semantic point of view, the livestock-related data modelling requirements analysed during the geoIACS data model design suggested to reuse part of the INSPIRE AF data model, given the similarity in scope.

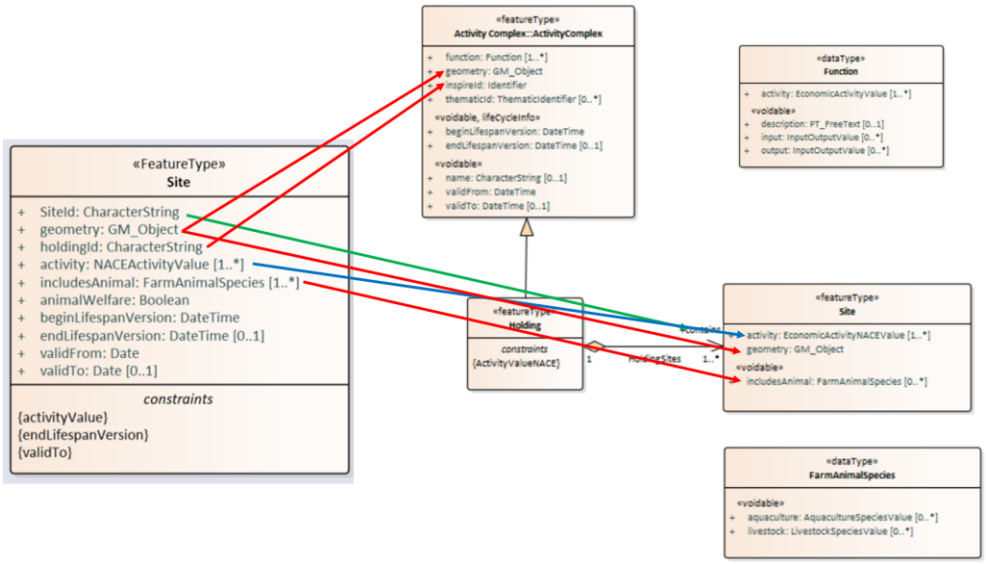
In particular, a Site feature type, whose UML class diagram is shown in **Figure 50** and whose attributes are described in section 3.3.2.1.6, representing a simplified version of INSPIRE AF Site feature type, was designed. The simplification consisted in having eliminated the aggregation with the Holding feature type, and consequently the specialisation of the Activity Complex feature type, and having added to the geoIACS Site feature type the relevant attributes of the INSPIRE Activity Complex feature type.

The relationships between geoIACS Site feature type and INSPIRE AF data model elements are visually schematised in **Figure 50**.

Should INSPIRE conformant AF datasets be available, the creation of geoIACS Site layers from INSPIRE conformant AF datasets is an easy data transformation process, following the mapping shown in **Figure 50**. Regarding the values of the geoIACS Site attributes beginLifespanVersion, endLifeSpanVersion, validFrom, validTo, the data provider should analyse if the values of the same attributes of the INSPIRE AF Holding feature Type can be used. Because one Holding may contain one or more Sites, these values may be different for each Site and may be also different from the values of the Holding attributes. In addition, the data provider has to provide the value of the attribute numberOfAnimals, required by geoIACS and not present in INSPIRE AF.

Conversely, an INSPIRE conformant AF dataset can be partially obtained from a geoIACS dataset, following the mapping shown in **Figure 50**. The only INSPIRE AF mandatory attribute not present in geoIACS Site feature type is function, whose Function data type has the only mandatory attribute 'activity', related to the activity of the holding, which can be different from the activities of the Sites contained in the holding. Therefore, this information should be provided by the data provider.

Figure 50. Relationships between geoIACS Site feature type and INSPIRE AF data model elements



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