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**AALBORG
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Semantic Resources for the Geospatial Domain

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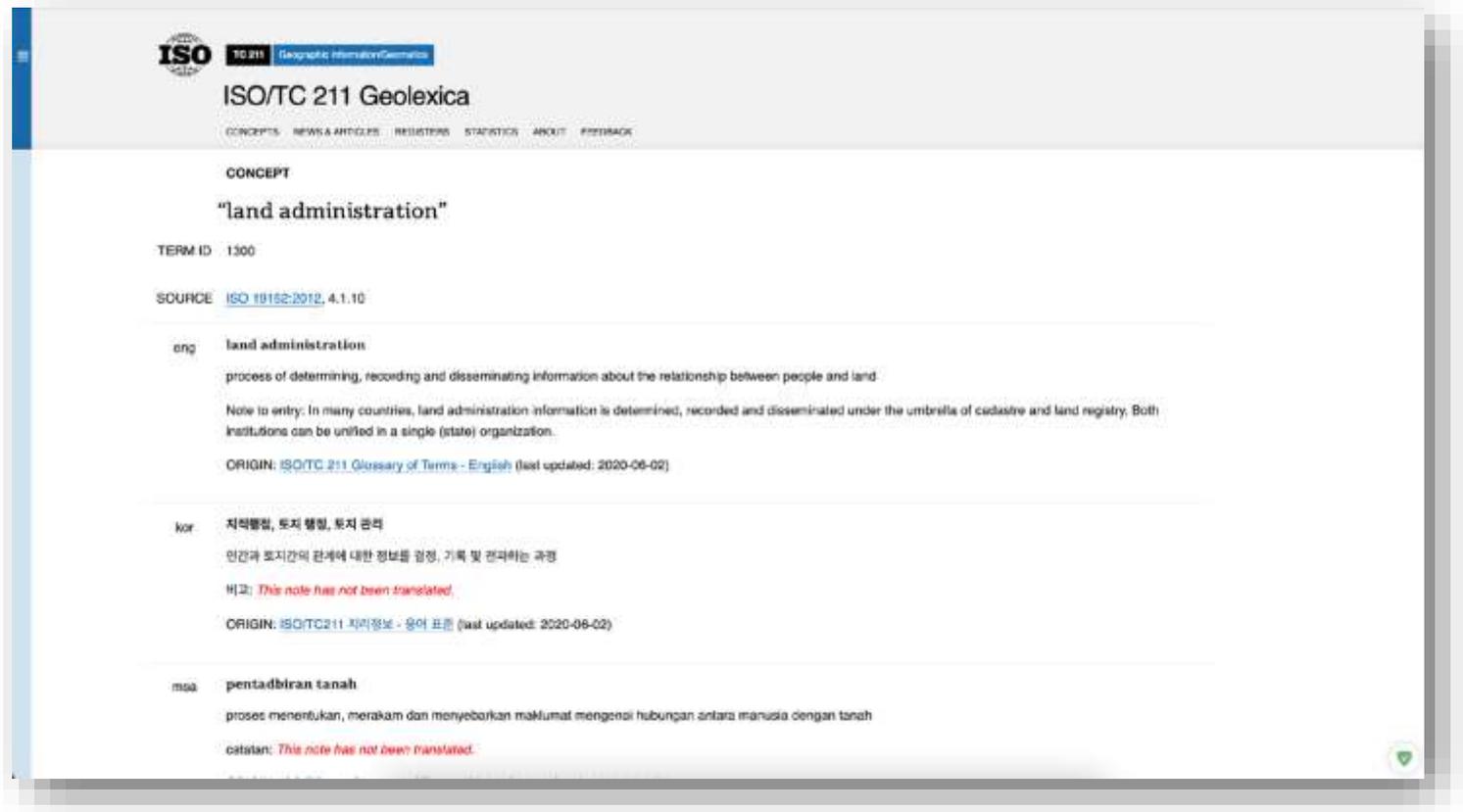
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Introduction

- Sharing and learning from one country to the other is hampered by language and terminology barriers
- Development of the Semantic Web, making internet data machine-readable, has spurred interest in semantic resources and Knowledge Organization Systems (KOSs)
- Several Knowledge Organization Systems (KOSs) are relevant for the FIG community
- The presentation
 - Describe briefly each of these KOSs
 - Compare and evaluate their characteristics
- The paper further illustrates, how KOSs may be applied in ongoing project work, for (master) students and researchers.

ISO/TC 211 Geolexica

- A glossary for geographic information technology maintained by ISO/TC 211.
- Includes terminology clauses published in ISO/TC 211 standards.
- Consists of 1,302 terms and their definitions in English and 8,706 translated entries in fourteen languages.
- Published through Glossarist, an open-source software for maintaining multi-language concept systems.

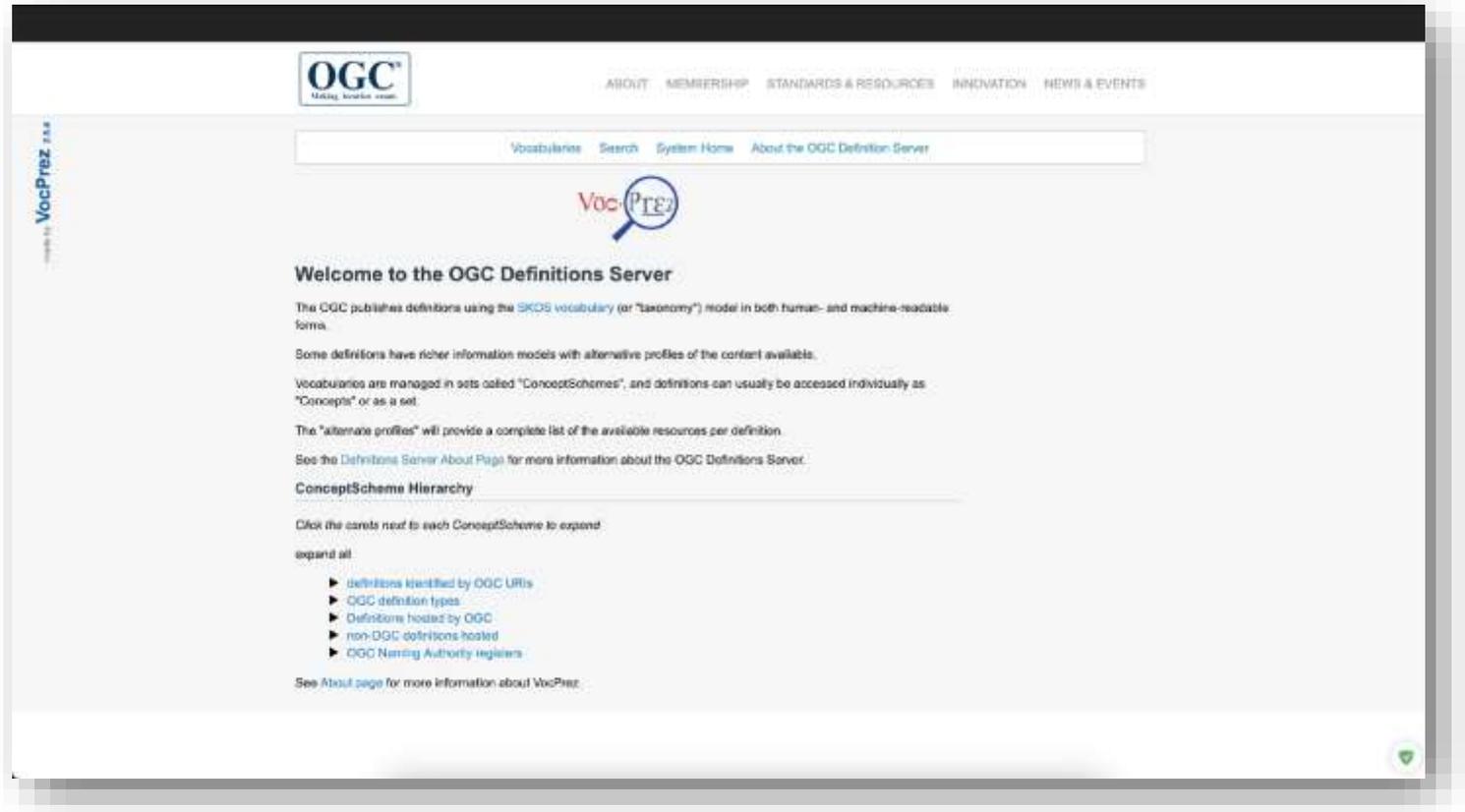


The screenshot displays the ISO/TC 211 Geolexica website interface. At the top, the ISO logo and 'TC 211 Geographic Information Geomatics' are visible. The main heading is 'ISO/TC 211 Geolexica', with navigation links for 'CONCEPTS', 'NEWS & ARTICLES', 'REGISTERS', 'STATISTICS', 'ABOUT', and 'FEEDBACK'. The central content area is titled 'CONCEPT' and features the term 'land administration' in quotes. Below this, the 'TERM ID' is 1300 and the 'SOURCE' is ISO 19152:2012, 4.1.10. The entry is presented in three languages: English, Korean, and Indonesian. The English entry includes a definition: 'process of determining, recording and disseminating information about the relationship between people and land', a note about its application in cadastre and land registry, and its origin in the ISO/TC 211 Glossary of Terms - English (last updated: 2020-06-02). The Korean entry lists the term as '지력행정, 토지 행정, 토지 관리' and describes it as a process of managing information related to land and its relationship with people, with a note that it has not been translated. The Indonesian entry lists the term as 'pentadbiran tanah' and describes it as a process of determining, recording, and disseminating information about the relationship between humans and land, also with a note that it has not been translated.

<https://isotc211.geolexica.org/stats/>

OGC Definitions Server

- An online registry of terms, definitions, vocabularies and other related resources defined in OGC standards.
- Publishes definitions using the SKOS vocabulary model in both human- and machine-readable forms.
- Implemented using Linked Data principles.
- Uses VocPrez, a read-only web delivery system, licensed using the GPL v3 licence.

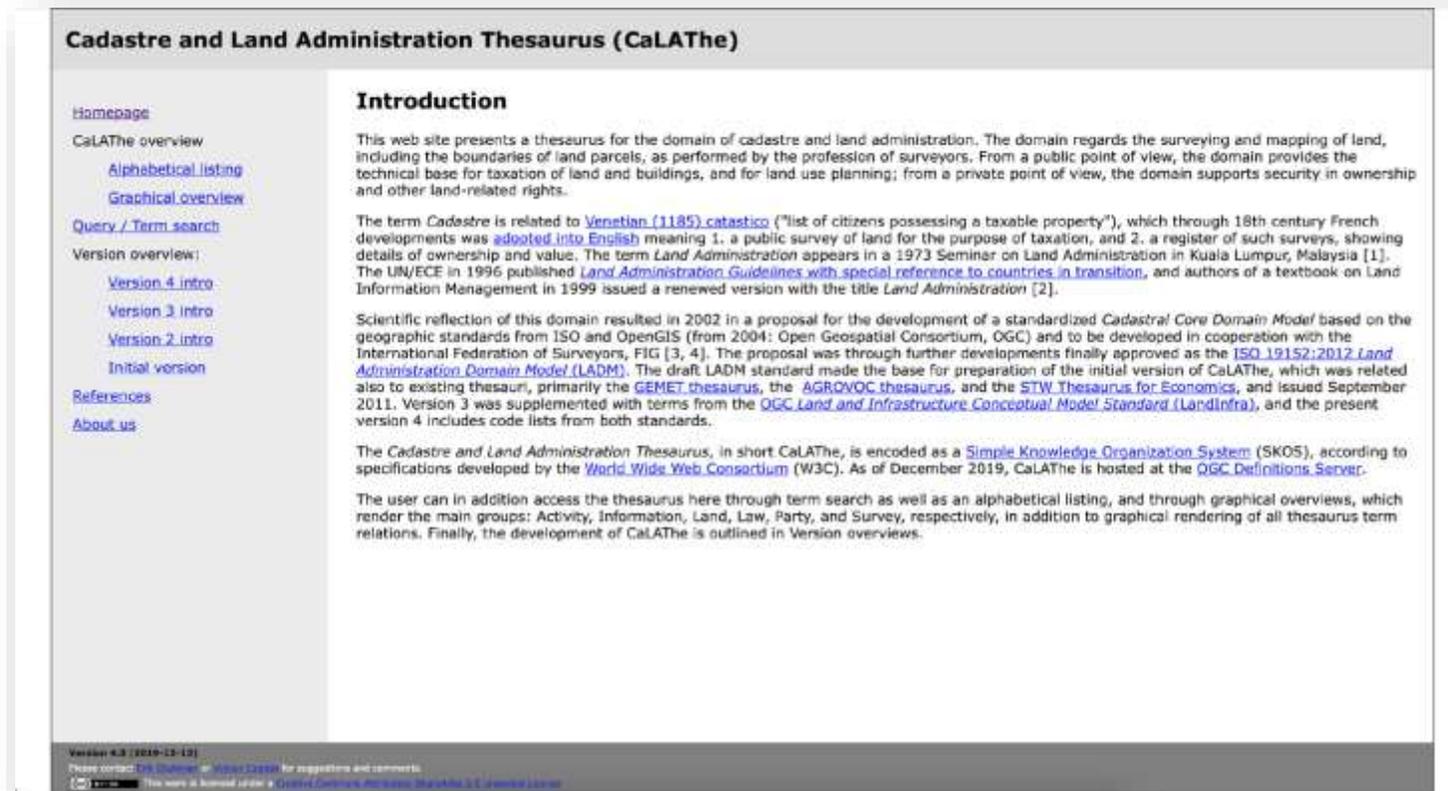


[http://defs.opengis.net/vocprez/vocab/?](http://defs.opengis.net/vocprez/vocab/)

Cadastral and Land Administration Thesaurus

- CaLAThe

- A thesaurus presenting core concepts of the cadastral domain.
- A mediating platform between ISO LADM and OGC LandInfra/InfraGML standards
- Includes 250 concepts.
- Supports the development of a universal cadastral theory or ontology.
- Published through a web server, drawing SKOS-structured content from a MySQL database.



The screenshot shows the homepage of the Cadastral and Land Administration Thesaurus (CaLAThe). The page has a header with the title "Cadastral and Land Administration Thesaurus (CaLAThe)". On the left side, there is a navigation menu with links: "Homepage", "CaLAThe overview", "Alphabetical listing", "Graphical overview", "Query / Term search", "Version overview:", "Version 4 intro", "Version 3 intro", "Version 2 intro", "Initial version", "References", and "About us". The main content area is titled "Introduction" and contains several paragraphs of text. The first paragraph explains the purpose of the website and the domain it covers. The second paragraph discusses the historical context of the term "Cadastral" and its adoption into English. The third paragraph describes the scientific reflection of the domain and the development of the standardized Cadastral Core Domain Model. The fourth paragraph provides information about the encoding of the thesaurus as a SKOS and its hosting on the OGC Definitions Server. The fifth paragraph mentions the user's access options and the development of CaLAThe.

Cadastral and Land Administration Thesaurus (CaLAThe)

[Homepage](#)

CaLAThe overview

[Alphabetical listing](#)

[Graphical overview](#)

[Query / Term search](#)

Version overview:

[Version 4 intro](#)

[Version 3 intro](#)

[Version 2 intro](#)

[Initial version](#)

[References](#)

[About us](#)

Introduction

This web site presents a thesaurus for the domain of cadastral and land administration. The domain regards the surveying and mapping of land, including the boundaries of land parcels, as performed by the profession of surveyors. From a public point of view, the domain provides the technical base for taxation of land and buildings, and for land use planning; from a private point of view, the domain supports security in ownership and other land-related rights.

The term *Cadastral* is related to *Venetian (1185) catastico* ("list of citizens possessing a taxable property"), which through 18th century French developments was *adopted into English* meaning 1. a public survey of land for the purpose of taxation, and 2. a register of such surveys, showing details of ownership and value. The term *Land Administration* appears in a 1973 Seminar on Land Administration in Kuala Lumpur, Malaysia [1]. The UN/ECE in 1996 published *Land Administration Guidelines with special reference to countries in transition*, and authors of a textbook on Land Information Management in 1999 issued a renewed version with the title *Land Administration* [2].

Scientific reflection of this domain resulted in 2002 in a proposal for the development of a standardized *Cadastral Core Domain Model* based on the geographic standards from ISO and OpenGIS (from 2004: Open Geospatial Consortium, OGC) and to be developed in cooperation with the International Federation of Surveyors, FIG [3, 4]. The proposal was through further developments finally approved as the *ISO 19152:2012 Land Administration Domain Model (LADM)*. The draft LADM standard made the base for preparation of the initial version of CaLAThe, which was related also to existing thesauri, primarily the *GEMET thesaurus*, the *AGROVOC thesaurus*, and the *STW Thesaurus for Economics*, and issued September 2011. Version 3 was supplemented with terms from the *OGC Land and Infrastructure Conceptual Model Standard (LandInfra)*, and the present version 4 includes code lists from both standards.

The *Cadastral and Land Administration Thesaurus*, in short CaLAThe, is encoded as a *Simple Knowledge Organization System (SKOS)*, according to specifications developed by the *World Wide Web Consortium (W3C)*. As of December 2019, CaLAThe is hosted at the *OGC Definitions Server*.

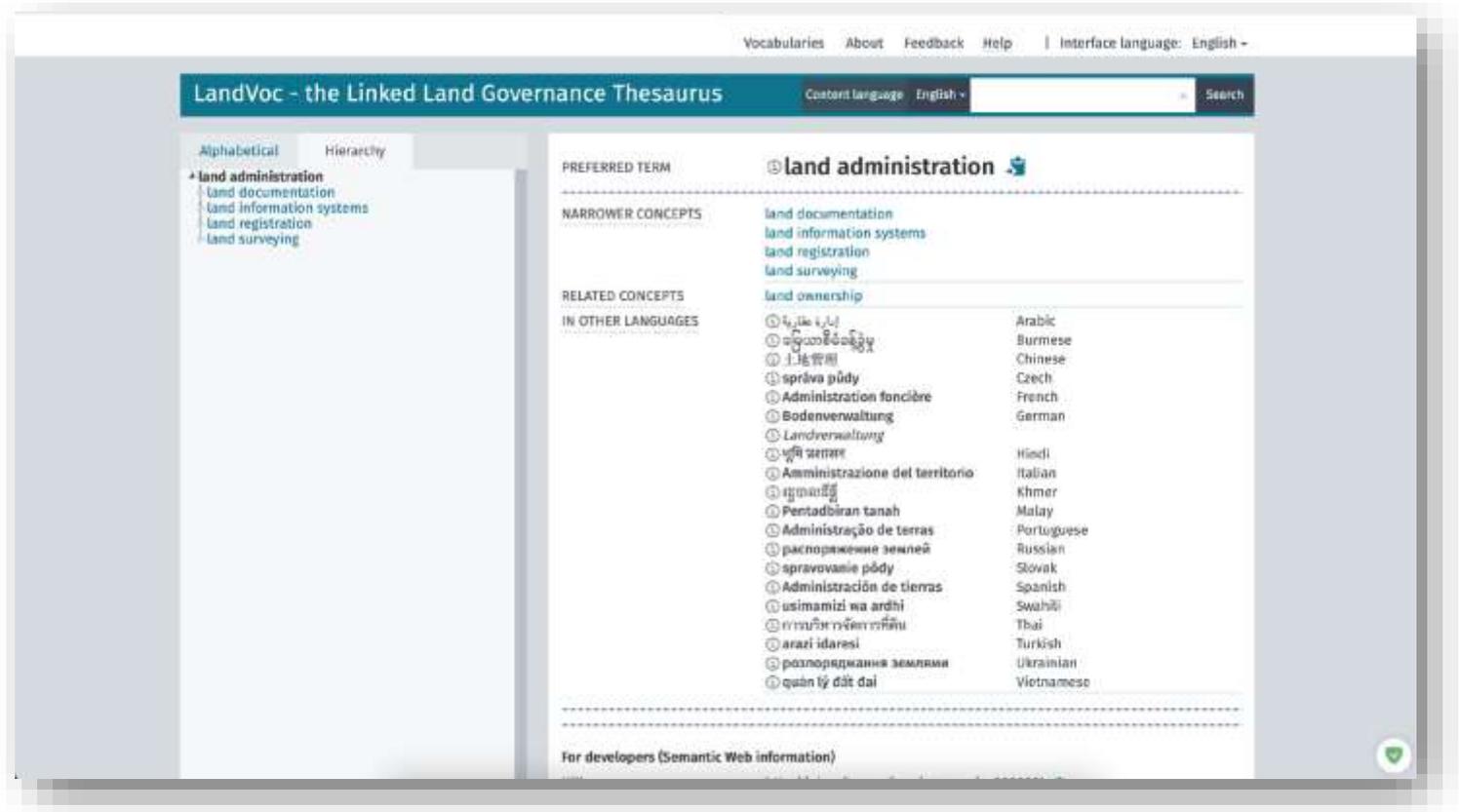
The user can in addition access the thesaurus here through term search as well as an alphabetical listing, and through graphical overviews, which render the main groups: Activity, Information, Land, Law, Party, and Survey, respectively, in addition to graphical rendering of all thesaurus term relations. Finally, the development of CaLAThe is outlined in Version overviews.

Version 4.3 (2019-12-12)
Please contact [DA Hollander](#) or [Wouter Dierckx](#) for suggestions and comments.
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<http://www.cadastralvocabulary.org>

LandVoc - the Linked Land Governance Thesaurus

- A thesaurus focusing on land governance.
- A sub vocabulary of AGROVOC, maintained by the Land Portal Foundation.
- Includes 330 concepts.
- Available in English, French, Spanish and Portuguese.
- Browsed through a Web-based browsing environment, SKOSMOS.



The screenshot displays the LandVoc web interface. At the top, there is a navigation bar with links for 'Vocabularies', 'About', 'Feedback', and 'Help', along with an 'Interface language: English' dropdown. Below this is a search bar with 'Content language: English' and a 'Search' button. The main content area is divided into several sections:

- Alphabetical / Hierarchy:** A sidebar menu showing a tree structure with 'land administration' selected, and sub-items: 'land documentation', 'land information systems', 'land registration', and 'land surveying'.
- PREFERRED TERM:** 'land administration' with a small icon.
- NARROWER CONCEPTS:** A list of related terms: 'land documentation', 'land information systems', 'land registration', and 'land surveying'.
- RELATED CONCEPTS:** 'land ownership'.
- IN OTHER LANGUAGES:** A table listing the concept in various languages:

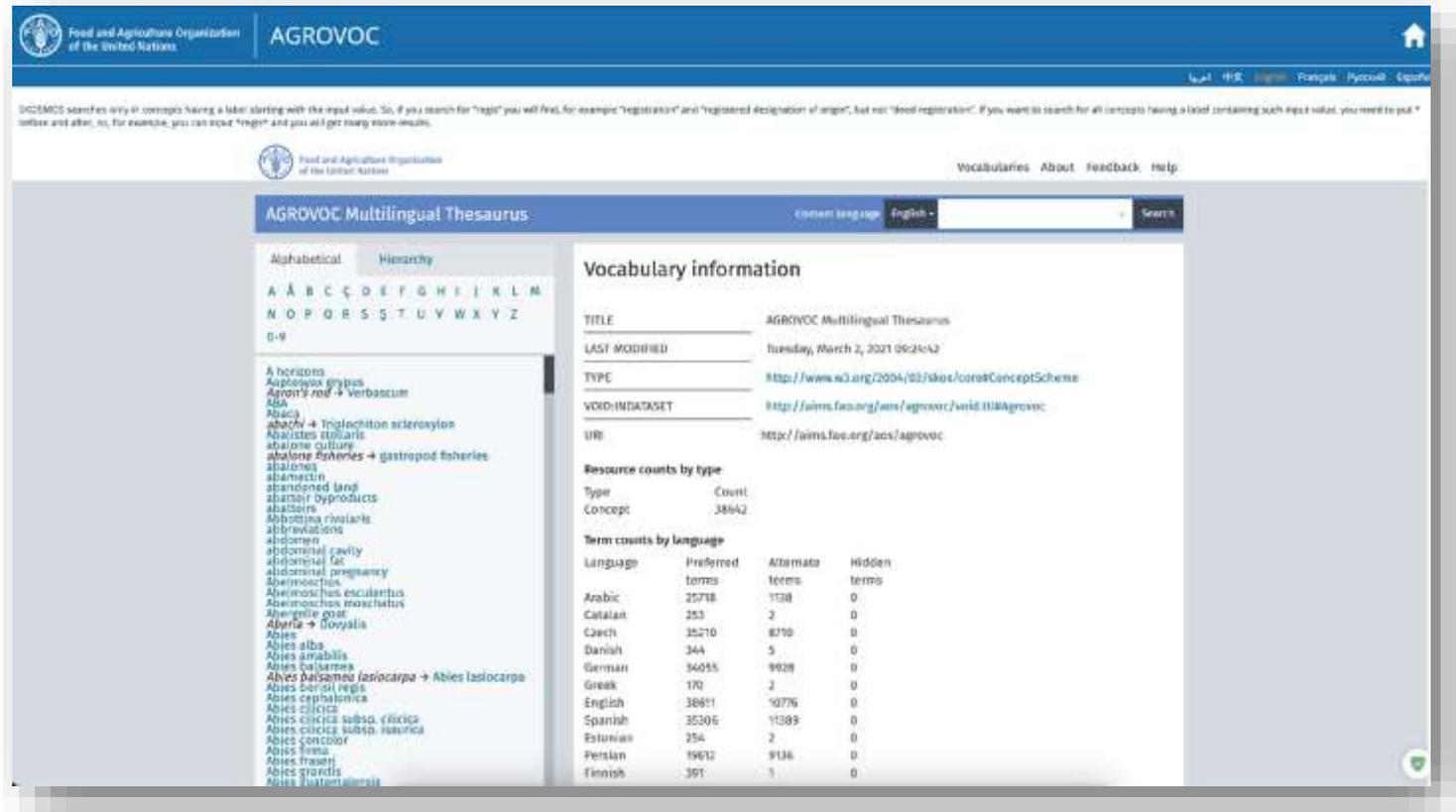
Language	Concept
Arabic	إدارة الأراضي
Burmese	မြေစီမံခန့်ခွဲမှု
Chinese	土地管理
Czech	správa půdy
French	Administration foncière
German	Bodenverwaltung
	Landverwaltung
Hindi	भूमि प्रशासन
Italian	Amministrazione del territorio
Khmer	ព្រំប្រទល់
Malay	Pentadbiran tanah
Portuguese	Administração de terras
Russian	управление землей
Slovak	spravovanie pôdy
Spanish	Administración de tierras
Swahili	usimamizi wa ardhi
Thai	การบริหารที่ดิน
Turkish	arazi idaresi
Ukrainian	порядкування земель
Vietnamese	quản lý đất đai

At the bottom of the page, there is a link for 'For developers (Semantic Web information)' and a small green shield icon in the bottom right corner.

<https://explore.landvoc.org/landvoc/en/>

AGROVOC Multilingual agricultural thesaurus

- A vocabulary related to all areas of interest to FAO, such as food, nutrition, agriculture, forestry.
- Available as a Linked Open Data set published and linked other KOSs.
- Includes about 38,000 concepts and 803,000 terms in 40 languages.
- Browsed through a Web-based browsing environment, SKOSMOS.



AGROVOC Multilingual Thesaurus

Vocabulary information

TITLE	AGROVOC Multilingual Thesaurus
LAST MODIFIED	tuesday, March 2, 2021 06:24:42
TYPE	http://www.w3.org/2004/02/skos/core#ConceptScheme
VOID:INDATASET	http://aims.fao.org/aims/agrovoc/vuid:0144Agrovoc
URI	http://aims.fao.org/aims/agrovoc

Resource counts by type

Type	Count
Concept	38042

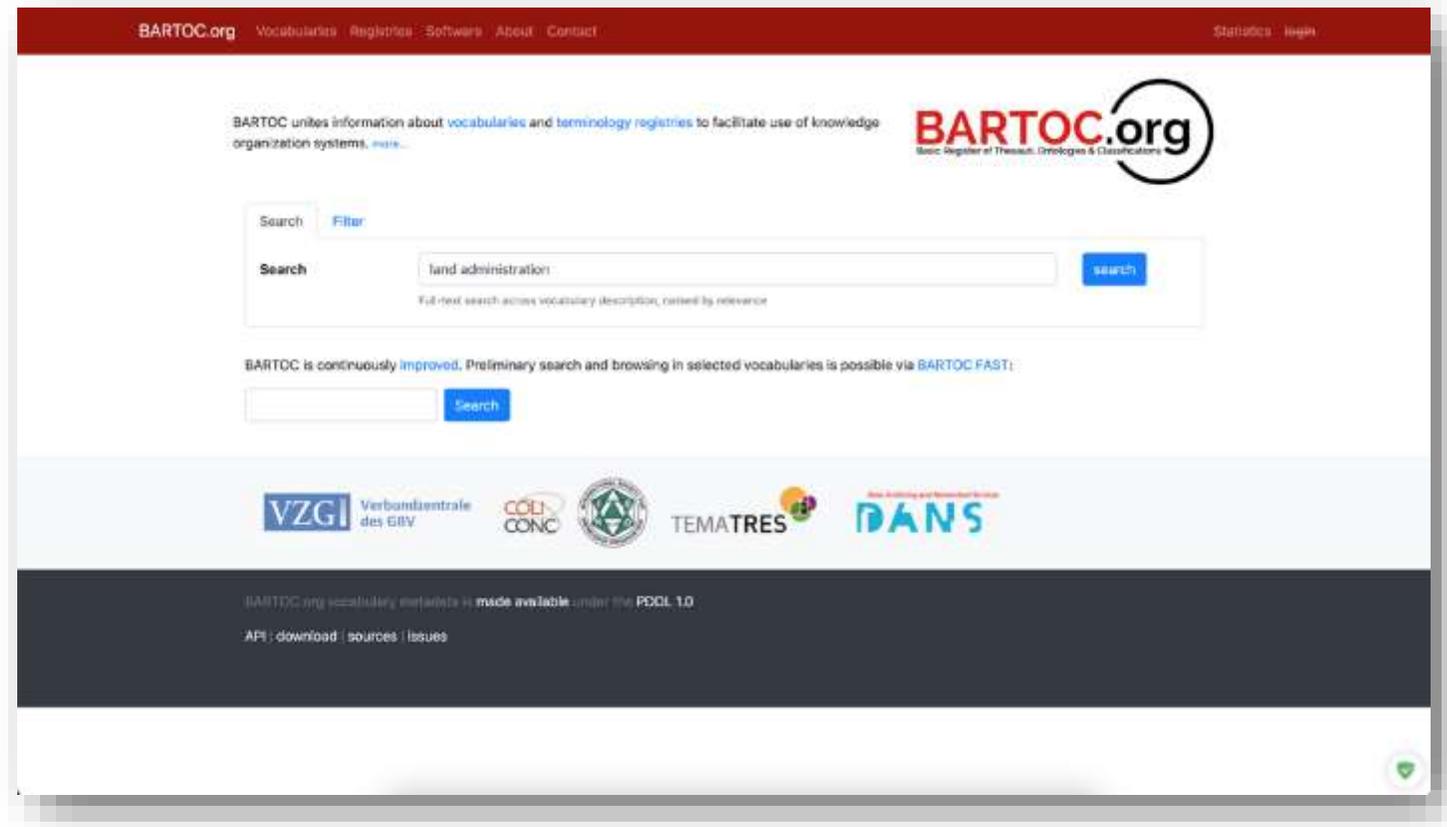
Term counts by language

Language	Preferred terms	Alternate terms	Hidden terms
Arabic	25718	1108	0
Catalan	253	2	0
Czech	35270	8719	0
Danish	344	5	0
German	34055	9928	0
Greek	170	2	0
English	38811	10776	0
Spanish	35305	11389	0
Estonian	254	2	0
Persian	19612	9716	0
Finnish	351	1	0

<http://www.fao.org/agrovoc/search>

Basic Register of Thesauri, Ontologies & Classifications - BARTOC

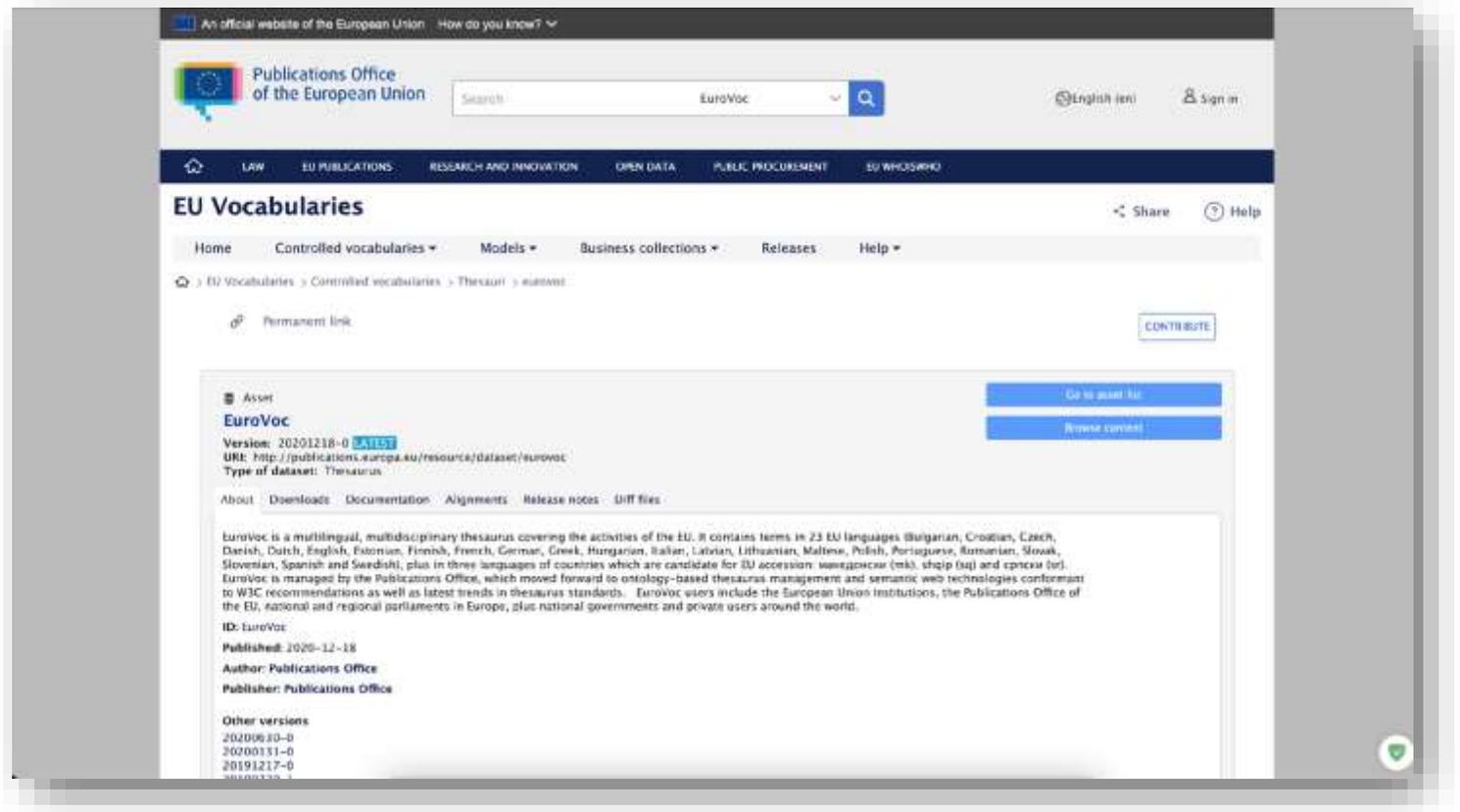
- A terminology registry developed by Basel University Library.
- Provides a multilingual tool facilitating searching, finding, and browsing KOSs.
- Includes metadata of more than 2,800 KOSs and 87 other terminology registries in one place.



<https://bartoc.org>

EuroVoc - the EU's multilingual thesaurus

- A multilingual thesaurus managed by the Publications Office of the European Union (EU).
- Created for indexing and searching documentary information produced by EU institutions.
- Contains terms in 26 languages.



<http://publications.europa.eu/resource/dataset/eurovoc>

Evaluation of semantic resources

- BARTOC could be considered as a gateway to access available semantic resources.
- As for terms and term definitions used by the international geospatial standards, people are referred to ISO/TC 211 Geolexica and OGC Definitions Server.
- AGROVOC is the most comprehensive thesaurus for agriculture and neighbor subdomains.
- The domain of land administration are represented by CaLAThe and LandVoc. These thesauri have some commonalities in terms of subject areas, yet with different levels of detail.
- The LandVoc intends to serve a community covering experts from, e.g. land governance, land administration, land use planning, land rights, geography and spatial planning fields; while CaLAThe intends to serve professionals with surveying, law, and public administration background.

Conclusions

- Semantic resources, which seem relevant for the FIG community, are described and evaluated. We suggest you take interest, and apply the available terminology resources in your own work and research.
- Terminology work is an ongoing process. Thesauri focus on concept relations, while concept definitions comes as a next step. CaLaThe and LandVoc are being supported with concept definitions to fulfill their functions, so we are describing work in progress.
- ISO 704:2009 'Terminology work - Principles and methods' recommends the use of intensional definitions (also known as genus-differentia definitions).
- Genus-differentia definitions improve communication between parties and thus provide a scientific base for further research and teaching in the domain of land administration.
- We invite the FIG community to contribute to the work that has been done in enhancing concepts and definitions for LandVoc and CaLaThe.

Thank you for your attention!

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volkancagdas@gmail.com