

RESSOURCES SÉMANTIQUES ET TERMINOLOGIQUES EN SCIENCES DE L'ENVIRONNEMENT ET DE LA BIODIVERSITÉ

(liste évolutive actualisée)

Voir aussi :

https://www.zotero.org/groups/2181298/semantic_and_terminology_resources_in_environmental_and_biodiversity_sciences/items

* des thésaurus spécialisés en écologie/environnement :

- GEMET - GEneral Multilingual Environmental Thesaurus

(Eionet / EEA European Environment Agency) multilingue [6000 concepts]

[Linguistic Linked Open Data] [CC BY] (SKOS)

<https://www.eionet.europa.eu/gemet/en/themes/>

<http://www.eionet.europa.eu/gemet> (base URI)

<http://agroportal.lirmm.fr/ontologies/GEMET>

- EnvThes - Environmental Thesaurus (LTER-Europe : EnvEurope-Life+ / ExpeER)

(référentiel européen du réseau ILTER : International Long Term Ecological Research)

[Linked Open Data] (SKOS) Skosmos multilingue

<https://vocabs.lter-europe.net/envthes/en/> [2800 concepts validés + 2900 concepts dépréciés]

<http://ecoportal.lifewatchitaly.eu/ontologies/ENVTHES> [concepts validés uniquement]

<http://vocabs.lter-europe.net/EnvThes/> (base URI)

- LTER Controlled Vocabulary (U.S. Long Term Ecological Research network) (SKOS) anglais

<https://vocab.lternet.edu/vocab/vocab/> (base URI)

- EARTH - Environmental Applications Reference Thesaurus (CNR-IIA-EKOLab)

[Linguistic Linked Open Data] [CC BY-NC-ND] (SKOS) anglais/italien [14300 concepts]

<http://linkeddata.ge.imati.cnr.it/resource/EARTH/> [serveur indisponible ou en maintenance]

<http://linkeddata.ge.imati.cnr.it/resource/EARTH/27980> (concept URI)

<http://linkeddata.ge.imati.cnr.it/resource/SkosConceptScheme/1> (base URI)

<http://www.semantic-web-journal.net/content/earth-environmental-application-reference-thesaurus-linked-open-data-cloud>

Accès possible par :

<https://vocabularyserver.com/cnr/ml/earth/en/> (URIs propres au serveur)

<https://skosmos.dev.finto.fi/earth/en/> (URIs d'origine)

- LusTRE - Linked Thesaurus fRamework for Environment

(eENVplus / IMATI-CNR / NatureSDIPlus) [serveur actuellement défaillant ou en maintenance]

http://linkeddata.ge.imati.cnr.it/terminologies_new.jsp

https://www.researchgate.net/publication/324362218_LusTRE_a_framework_of_linked_environmental_thesauri_for_metadata_management

= EARTH + EUNIS-Habitats + EUNIS-Species (EUropean Nature Information System) + GEMET

+ AGROVOC + EuroVoc [interrogation simultanée de terminologies environnementales]

- Thésaurus AnaEE (Analyse et Expérimentation sur les Écosystèmes / AnaEE-France)

AnaEE Thesaurus [Linked Open Data] [CC BY] (SKOS) anglais/français [3300 concepts]

<https://doi.org/10.15454/1.4894016754286177E12>

<https://voculaires-ouverts.inrae.fr/2017/03/13/thesaurus-anaee/>

<http://agroportal.lirmm.fr/ontologies/ANAETHES>

<http://opendata.inra.fr/anaeeThes/> (base URI)

<https://bartoc-skosmos.unibas.ch/anaeethes/en/>

- **LifeWatch Italy thesauri** (SKOS)

- **Alien Species Thesaurus**

<http://ecoportal.lifewatchitaly.eu/ontologies/ALIENSPECIES>

URI : <http://thesauri.lifewatchitaly.eu/AlienSpecies/>

- **Aquatic Organisms Thesaurus**

URI : <http://thesauri.lifewatchitaly.eu/AquaticOrganisms/>

- **Endemisms Thesaurus**

<http://ecoportal.lifewatchitaly.eu/ontologies/ENDEMISMS>

URI : <http://thesauri.lifewatchitaly.eu/endemisms/>

- **Fish Traits Thesaurus**

<http://ecoportal.lifewatchitaly.eu/ontologies/FISHTRAITS>

URI : <http://thesauri.lifewatchitaly.eu/fishTraits/>

- **Macroalgae Traits Thesaurus**

<http://ecoportal.lifewatchitaly.eu/ontologies/MACROALGAETRAITS>

URI : <http://thesauri.lifewatchitaly.eu/MacroalgaeTraits/>

- **Phytoplankton Traits Thesaurus** (PhytoTraits)

<http://ecoportal.lifewatchitaly.eu/ontologies/PHYTOTRAITS>

URI : <http://thesauri.lifewatchitaly.eu/PhytoTraits/>

- **Zooplankton Traits Thesaurus**

<http://ecoportal.lifewatchitaly.eu/ontologies/ZOOPLANKTRAITS>

URI : <http://thesauri.lifewatchitaly.eu/zooplanktonTraits/>

- **Thésaurus de la Biodiversité** (Inist-CNRS) / **Biodiversity Thesaurus**

[Linked Open Data] [CC BY] (SKOS) Skosmos ; bilingue (français/anglais) [827 concepts]

<http://data.loterre.fr/ark:/67375/BLH> (base URI)

<https://skosmos.loterre.fr/BLH/en/>

<http://agroportal.lirmm.fr/ontologies/BIODIVTHES>

<http://ecoportal.lifewatchitaly.eu/ontologies/BIODIVTHES>

<https://thesaurus-biodiversite.semandiv.cnrs.fr/>

<https://hal.archives-ouvertes.fr/hal-02907484>

- **Thésaurus Eau** (OIEau / AFB) [CC BY-NC-SA] bilingue

<https://www.oieau.fr/eaudoc/veille/thesaurus-eau>

<http://thesaurus.oieau.fr/thesaurus/resource/ark:/99160/7af302a6-7518-4a8a-84a6-b8df7b595e14>

- **Theia/OZCAR thesaurus** (Thesaurus for in situ data from Environmental and Critical Zone Sciences - **Observatoires de la Zone Critique : Application et Recherche** / Pôle de données Surfaces Continentales)

[Linked Open Data] [CC BY] (SKOS) Skosmos monolingue anglais

https://in-situ.theia-land.fr/skosmos/theia_ozcar_thesaurus/en/

<https://w3id.org/ozcar-theia> (base URI)

- **GCMD Earth Science keywords Thesaurus** (**Global Change Master Directory** / NASA Earthdata)

<https://www.earthdata.nasa.gov/learn/find-data/idn/gcmd-keywords>

<https://gcmd.earthdata.nasa.gov/KeywordViewer/>

- **Law and Environment Ontology (LEO) portal** [*thésaurus navigable et téléchargeable en RDF*]
multilingue
(InforMEA : United Nations Information portal on Multilateral Environmental Agreements)
<https://www.informea.org/en/terms>
<https://www.informea.org/enterms> (base URI)
<https://www.informea.org/enterms/biodiversity> (concept URI)
<https://www.informea.org/en/taxonomy/term/10394>

 - **AFO - Natural resource and environment ontology** (National Library of Finland)
(ex- Agriculture and Forestry Ontology / Agriforest Thesaurus)
[Linked Open Data] [CC BY] (SKOS) Skosmos anglais/finlandais
<https://finto.fi/afo/en/>
<http://www.yso.fi/onto/afo/> (base URI)

 - **Earth Observation Thesaurus (EOStem)** (CNR-IIA-EKOLab)
<https://vocabularyserver.com/cnr/ml/eostem/en/> (base URI)

 - **EnVoc: Multilingual thesaurus of environmental terms**
(United Nations Environment Programme / Infoterra)
[non maintenu depuis 1997, mais utilisé par GEMET et la Convention sur la diversité biologique]
<https://unesdoc.unesco.org/ark:/48223/pf0000106580>

 - **Biocomplexity Thesaurus** (USGS - U.S. Geological Survey) anglais (non SKOS)
https://www1.usgs.gov/csas/biocomplexity_thesaurus/

 - **ThesBio - thesaurus em biodiversidade** (BHL SciELO, MZUSP, Brésil) interface en portugais
<http://thesaurus.bhlsciELO.org/vocab/index.php>

 - **Thesaurus Of Plant characteristics** for ecology and evolution (**TOP Thesaurus**) monolingue anglais
(CEFE-CNRS/Univ. Montpellier) (anciennement **Trait of Plants thesaurus**)
[ontoterminologie publiée en OWL ; utilise SKOS pour les propriétés d'annotation; URIs non déréférencables]
<https://top-thesaurus.org/>
<http://agroportal.lirmm.fr/ontologies/TOP>
- en relation avec :*
- **TRY Glossary** (Plant Trait Database) :
<https://www.try-db.org/de/TraitGlossExp.php>

 - **Thesaurus for Soil Invertebrate Trait-based Approaches (T-SITA)** (BETSI/CESAB) monolingue anglais
https://t-sita.betsi.cnrs.fr/BETSI_vizIndex.jsp
<https://t-sita.cefe.cnrs.fr/t-sita/index>
<https://w3id.org/t-sita/> (base URI)

 - **Thésaurus d'Agroécologie** (INRA) monolingue français [CC BY] (SKOS)
<https://doi.org/10.15454/1EKYVE>
<http://agroportal.lirmm.fr/ontologies/THESAE> (Agroecology thesaurus)
<http://opendata.inra.fr/ThesAE/> (base URI)

*** des sous-ensembles de thésaurus agronomiques ou plus généralistes :**

(thésaurus subdivisés en microthésaurus ou en groupes thématiques de concepts)

- **AGROVOC Multilingual Thesaurus** (FAO) multilingue
[Linguistic Linked Open Data] [CC BY IGO] (SKOS) Skosmos

<https://agrovoc.fao.org/browse/agrovoc/en/>

<https://www.fao.org/agrovoc/fr/search>

<http://agrovoc.uniroma2.it/agrovoc/agrovoc/en/>

base URI : <http://aims.fao.org/aos/agrovoc>

concept URI : http://aims.fao.org/aos/agrovoc/c_33949

<http://agroportal.lirmm.fr/ontologies/AGROVOC>

*Intègre le thésaurus **LandVoc (Linked Land Governance Thesaurus)** multilingue*

<https://landvoc.org/>

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

base URI : <http://landvoc.org/landvoc>

concept URI : http://aims.fao.org/aos/agrovoc/c_33949

<http://agroportal.lirmm.fr/ontologies/LANDVOC>

Les relations classiques du thésaurus Agrovoc sont enrichies par une ontologie de relations :

Agrontology (property vocabulary of VocBench) / Agricultural Ontology Service (FAO)

<https://www.fao.org/agrovoc/agrontology>

- **ASFA /ASFIS Thesaurus** (FAO Aquatic Sciences and Fisheries Information System Thesaurus)
multilingue

[se présente désormais comme un sous-thésaurus d'AGROVOC] Skosmos

<http://agrovoc.uniroma2.it/skosmosAsfa/asfa/en/>

édition 2019 : <http://www.fao.org/3/CA2743EN/ca2743en.pdf>

http://aims.fao.org/aos/agrovoc/conceptScheme_7a97495f (base URI)

- **CAB Thesaurus (CABT)** (CABI / Centre for Agriculture and Biosciences International) :
anglais/espagnol [CC BY-NC-ND] devenu multilingue [*navigable, non téléchargeable*]

<https://www.cabi.org/cabithesaurus>

concept URI : <http://id.cabi.org/cabt/18708>

- **NALT - National Agricultural Library Thesaurus** (USDA, IICA)

[Linked Open Data] [CC 0] (SKOS) bilingue anglais/espagnol

<https://agclass.nal.usda.gov/thesaurus-search>

<https://agclass.nal.usda.gov/download-files>

<http://agroportal.lirmm.fr/ontologies/NALT>

concept URI : <http://lod.nal.usda.gov/nalt/5559>

- **GACS - Global Agricultural Concept Space** = intersection {**AGROVOC, CABT, NALT**}

(ex- Global Agricultural Concept Scheme) (SKOS) [CC BY] multilingue

[*thésaurus non maintenu, mais devant servir de hub pour des alignements (AgroPortal / projet D2KAB)*]

<https://agrisemantics.org/#GACShome/>

<https://agrisemantics.github.io/gacs-qip/gacs/>

- **Thésaurus GACS Core** [*navigable*] Skosmos

<http://browser.agrisemantics.org/gacs/en/>

<http://artemide.art.uniroma2.it/skosmos/gacs/en/>

<http://agroportal.lirmm.fr/ontologies/GACS>

concept URI : <http://id.agrisemantics.org/gacs/C1918>

<https://www.researchgate.net/publication/335895130> Global agricultural concept space lightweight semantics for pragmatic interoperability

- **Thésaurus INRAE** [*en cours d'évolution*] Skosmos

<https://voculaires-ouverts.inrae.fr/a-propos-du-thesaurus-inrae/>

<https://consultation.voculaires-ouverts.inrae.fr/thesaurus-inrae>

<http://opendata.inrae.fr/thesaurusINRAE/thesaurusINRAE> (base URI)

- **Thésaurus d'Irstea** (ex-Institut national de recherche en sciences et technologies pour l'environnement et l'agriculture)

[*non maintenu; fusionné avec VocInrae au sein du Thésaurus INRAE*] Skosmos

<https://consultation.voculaires-ouverts.inrae.fr/thesaurus-irstea>

- **Chinese Agricultural Thesaurus (CAT)** [*actuellement indisponible*]

concept URI : <http://cat.aii.caas.cn/concept/39096>

- **Thésaurus EuroVoc : Domaine Environnement** (Union européenne) multilingue

[Linguistic Linked Open Data]

<https://www.vocabularyserver.com/eurovoc/en/index.php?tema=16583>

<https://op.europa.eu/en/web/eu-vocabularies/concept/-/resource?uri=http://eurovoc.europa.eu/100155>

<https://op.europa.eu/en/web/eu-vocabularies/concept/-/resource?uri=http://eurovoc.europa.eu/632>

- **UNESCO microthésaurus** multilingues

[Linked Open Data] [CC BY-SA IGO] Skosmos

(Domain) Science: Environmental sciences and engineering / Natural resources

<http://vocabularies.unesco.org/browser/thesaurus/en/>

<https://vocabularyserver.com/unesco/en/index.php?tema=1061&/science>

- **Thésaurus Motbis et Thésagri 2021** (Réseau Canopé)

<https://www.reseau-canope.fr/motbis/>

<https://www.reseau-canope.fr/thesagri/>

- **PLOS Thesaurus : Ecology and environmental sciences**

<https://www.vocabularyserver.com/plos/index.php?tema=1609>

- **USAID Thesaurus : Natural resources and the environment**

(United States Agency for International Development)

<https://www.vocabularyserver.com/usaidd/index.php?tema=4437&/natural-resources-and-environment>

- **UNBIS Thesaurus : NATURAL RESOURCES AND THE ENVIRONMENT**

(United Nations Bibliographic Information System)

<https://vocabularyserver.com/unbis/en/index.php?tema=3794&/natural-resources-and-environment>

- **LCSH (Library of Congress Subject Headings)** [Linked Open Data]

<https://id.loc.gov/authorities/subjects/sh87005569.html>

- **Répertoire RAMEAU** (BnF)

[Linked Open Data] [CC BY]

<https://data.bnf.fr/12144189/biodiversite/>

<https://catalogue.bnf.fr/ark:/12148/cb121441898>

- **General Finnish ontology (YSO)** (Finto - Finnish thesaurus and ontology service)

[Linked Open Data] [CC BY] (SKOS) Skosmos anglais/finlandais

<https://finto.fi/yso/en/>

<http://www.yso.fi/onto/yso/p5496> (concept URI)

<https://finto.fi/yso/en/page/p5496?clang=en>

<https://finto.fi/yso/en/page/p26560>

*** des portails et répertoires d'ontologies / ontoterminologies :**

- **Ontology Lookup Service (OLS)** (EMBL / EBI European Bioinformatics Institute)

<https://www.ebi.ac.uk/ols>

- **Open Biological and Biomedical Ontologies** (OBO Foundry)

<https://obofoundry.org>

- **Ontobee** (Univ. Michigan)

<https://ontobee.org>

- **BioPortal ontologies** (NCBO National Center for Biomedical Ontology)

<https://bioportal.bioontology.org>

- **SIFR BioPortal (Semantic Indexing of French Biomedical Data Resources)**

<http://bioportal.lirmm.fr>

<http://www.lirmm.fr/sifr>

- **AgroPortal** (LIRMM / CNRS-Univ. Montpellier)

(vocabulary and ontology repository for agronomy and related domains)

<http://agroportal.lirmm.fr/ontologies>

<http://aims.fao.org/agroportal>

- **Vocabulaires Ouverts @INRAE** (ex- LOVInra)

<https://vocabulaires-ouverts.inrae.fr/>

<https://data.inrae.fr/dataverse/vo-inrae>

- **EcoPortal** (LifeWatch ERIC / LTER-Europe)

(e-Science European Research Infrastructure for Biodiversity and Ecosystem Research)

<http://ecoportal.lifewatch.eu/>

<http://ceur-ws.org/Vol-2969/paper6-s4biodiv.pdf>

<https://github.com/lifewatch-eric/documentation/wiki>

- **TemaTres Vocabulary Server**

<https://www.vocabularyserver.com/vocabularies/>

- **Loterre (Linked open terminology resources)** (Inist-CNRS)

<https://www.loterre.fr/>

- **I-ADOPT Catalogue of Terminologies**

(RDA Interoperable Descriptions of Observable Property Terminology WG)

<https://i-adopt.github.io/terminologies/>

- **GODAN Action / Agrisemantics Map of Data Standards** (ex- FAO VEST Registry)

(Global Open Data for Agriculture and Nutrition)

<https://vest.agrisemantics.org/>

<https://hal-lirmm.ccsd.cnrs.fr/lirmm-01964791/document>

- **AgriOntology**

<https://sites.google.com/site/agriontology/home>

- **GBIF Vocabularies** [*répertoire de ressources*]

<http://rs.gbif.org/vocabulary/>

- **CEH Vocabularies** (UK Centre for Ecology & Hydrology)

<https://vocabs.ceh.ac.uk>

- **NERC Vocabulary Server** (UK Natural Environment Research Council)

<http://vocab.nerc.ac.uk/collection/>

<http://vocab.nerc.ac.uk/scheme/>

- **CSIRO Compendium of vocabularies**

(Commonwealth Scientific and Industrial Research Organisation /Australia)

<https://confluence.csiro.au/public/VOCAB/vocabulary-content/compendium-of-vocabularies>

- **GFBio Terminology Service** (German Federation for Biological Data)

<https://terminologies.gfbio.org/browse/>

- **FAIRsharing Standards: terminology artefacts**

https://fairsharing.org/search?recordType=terminology_artefact&q=biodiversity

- **BARTOC (Basic Register of Thesauri, Ontologies & Classifications)**

(Common Library Network GBV, Germany) <https://bartoc.org>

BARTOC Skosmos Browser: <https://bartoc-skosmos.unibas.ch>

*** des ontologies de domaine :**

- **Planteome = common Reference Ontologies for Plant biology** (cROP)

(ex-Plant Ontology Consortium)

<http://browser.planteome.org/amigo>

<http://planteome.org/>

<https://github.com/Planteome>

https://wiki.plantontology.org/index.php/Main_Page

- **AGRONomy Ontology (AGRO / AgrO)** (CGIAR)

IRI : <http://purl.obolibrary.org/obo/agro.owl>

<https://www.ontobee.org/ontology/AGRO>

<http://agroportal.lirmm.fr/ontologies/AGRO>

<https://www.ebi.ac.uk/ols/ontologies/agro>

- **Crop Ontology (CO) Curation Tool** (CGIAR)

<https://www.croponontology.org/>

- **Plant Experimental Conditions Ontology (PECO)**

[ex-Plant Environment Ontology (EO) deprecated: <https://obofoundry.org/ontology/eo.html>]

IRI : <http://purl.obolibrary.org/obo/peco.owl>

<https://www.ontobee.org/ontology/PECO>

<http://agroportal.lirmm.fr/ontologies/PECO>

<https://www.ebi.ac.uk/ols/ontologies/peco>

- **Plant Ontology (PO)**

IRI : <http://purl.obolibrary.org/obo/po.owl>

<http://agroportal.lirmm.fr/ontologies/PO>

- **Plant Trait Ontology (TO / PTO)**

IRI : <http://purl.obolibrary.org/obo/to.owl>

<https://browser.planteome.org/amigo/term/TO:0000387>

<http://agroportal.lirmm.fr/ontologies/TO>

- **FLOra Phenotype Ontology (FLOPO)**

IRI : <http://purl.obolibrary.org/obo/flopo.owl>

<https://ontobee.org/ontology/FLOPO>

<http://agroportal.lirmm.fr/ontologies/FLOPO>

- **Phenotype And Trait Ontology (PATO)** (= Phenotype and ATtribute Ontology)

IRI : <http://purl.obolibrary.org/obo/pato.owl>

<https://www.obofoundry.org/ontology/pato.html>

<http://agroportal.lirmm.fr/ontologies/PATO>

- **Plant Phenology Ontology (PPO)**

IRI : <http://purl.obolibrary.org/obo/ppo.owl>

<https://www.obofoundry.org/ontology/ppo.html>

<http://agroportal.lirmm.fr/ontologies/PPO>

- **Population and Community Ontology (PCO)**

IRI : <http://purl.obolibrary.org/obo/pco.owl>

<http://purl.bioontology.org/ontology/PCO>

<http://agroportal.lirmm.fr/ontologies/PCO>

- **Biological Collections Ontology (BCO)**

IRI : <http://purl.obolibrary.org/obo/bco.owl>

<http://agroportal.lirmm.fr/ontologies/BCO>

<https://bioportal.bioontology.org/ontologies/BCO>

- **ENVironment Ontology (ENVO / EnvO)**

IRI : <http://purl.obolibrary.org/obo/envo.owl>

<http://environmentontology.org/>

<http://agroportal.lirmm.fr/ontologies/ENVO>

<https://github.com/EnvironmentOntology/envo/releases>

- **The Ecosystem Ontology (ECSO)**

<https://bioportal.bioontology.org/ontologies/ECSO>

- **XEML Environment Ontology (XEO)**
<http://purl.bioontology.org/ontology/XEO>
<http://agroportal.lirmm.fr/ontologies/XEO>
- **OntoBiotope (OBT) (INRAE)**
<https://voculaires-ouverts.inrae.fr/2015/07/30/ontobiotope/>
<http://agroportal.lirmm.fr/ontologies/ONTOBIOTOPE/>
- **Biodiversity Ontology (BOF) ex-OntoBio (INPA, Brésil)**
 (Biodiversity Domain Ontology for Amazonian Biological Collected Objects)
<https://www.computer.org/csdl/proceedings/hicss/2015/7367/00/7367d770.pdf>
<https://bioportal.bioontology.org/ontologies/BOF>
- **Sustainable Development Goals Interface Ontology (SDGIO) (UNEP)**
 IRI : <http://purl.unep.org/sdg/sdgio.owl>
<https://github.com/SDG-InterfaceOntology/sdgio>
<http://agroportal.lirmm.fr/ontologies/SDGIO>
- **BBC Wildlife Ontology**
<https://www.bbc.co.uk/ontologies/wo> [*inaccessible*]
http://liveschema.eu/dataset/lov_wlo
- **EcoLexicon - Terminological Knowledge Base on the Environment (Univ. Granada)**
 [*ontoterminologie*] multilingue
<http://ecolexicon.ugr.es/en/aboutecolexicon.htm>
http://ecolexicon.ugr.es/visual/index_en.html
- **Lexique bilingue des données géophysiques et textuelles sur l'eau**
 (= Dictionnaire de l'Académie de l'Eau / Projet Lexeau)
<http://agroportal.lirmm.fr/ontologies/LEXEAU-FR> (version française monolingue)
- **Stratified lexicon of water related geophysical and textual data** [*ontoterminologie*] bilingue
<http://agroportal.lirmm.fr/ontologies/LEXEAU> (interrogeable en anglais)
- **SERONTO - Socio-Ecological Research and Observation oNTology (ALTER-Net 2008)**
<https://nora.nerc.ac.uk/id/eprint/9607/>
https://www.w3.org/2013/share-psi/wiki/images/0/00/Schentz_et_al_SemanticDataIntegrationforLTER.pdf
<http://www.umweltbundesamt.at/fileadmin/site/daten/Ontologien/SERONTO/SERONTOCore20090205.owl>
- **SWEET Ontology Suite - Semantic Web for Earth and Environmental Terminology**
 (NASA / ESIP Earth Science Information Partners) [*ensemble incluant ~200 ontologies*]
<http://sweetontology.net/>
<https://github.com/ESIPFed/sweet>
<https://bioportal.bioontology.org/ontologies/SWEET/>
- **TDWG Ontology (Taxonomic Database Working Group / Biodiversity Information Standards)**
 [*ensemble regroupant plusieurs ontologies*]
<https://github.com/tdwg/ontology>
- **Ecological Trait-data Standard (ETS) (GFBio Terminology Service)**
 IRI : <http://terminologies.gfbio.org/terms/ETS/>
<https://terminologies.gfbio.org/terms/ets/pages/>

- OBOE – The Extensible OBservation Ontology

(NCEAS - National Center for Ecological Analysis and Synthesis, Univ. California)

IRI : <http://ecoinformatics.org/oboe/oboe.1.2/oboe.owl>

<https://github.com/NCEAS/oboe/>

<http://agroportal.lirmm.fr/ontologies/OBOE>

- **Santa Barbara Coastal Observation Ontology (OBOE-SBC)**

<https://bioportal.bioontology.org/ontologies/OBOE-SBC>

- SOSA – Sensor, Observation, Sample, and Actuator ontology

IRI : <http://www.w3.org/ns/sosa/>

<http://agroportal.lirmm.fr/ontologies/SOSA>

- DBpedia Ontology [Linguistic Linked Open Data] [CC BY-SA]

<http://dbpedia.org/resource/Ecosystem>

<http://fr.dbpedia.org/resource/%C3%89cosyst%C3%A8me>

<https://dbpedia.org/describe/?uri=http%3A%2F%2Fdbpedia.org%2Fresource%2FEcosystem>

*** des vocabulaires spécialisés :**

glossaires / nomenclatures / dictionnaires / terminologies

- Corine Land Cover Nomenclature (European Environment Agency) (SKOS)

<https://www.w3.org/2015/03/corine>

<http://agroportal.lirmm.fr/ontologies/CLC>

<https://land.copernicus.eu/user-corner/technical-library/corine-land-cover-nomenclature-guidelines/html>

- EUNIS habitat types classification [1600 concepts ; successeur de CORINE Biotopes]

(European Nature Information System / EEA) [CC BY]

<https://eunis.eea.europa.eu/habitats.jsp>

<https://eunis.eea.europa.eu/rdf/habitats.rdf.gz>

- Référentiel habitats HABREF (INPN / MNHN)

<https://inpn.mnhn.fr/telechargement/referentiels/habitats>

- CBD Controlled Vocabulary (Convention on Biological Diversity)

<http://www.cbd.int/doc/lists/cbd-voc.pdf>

(< Agrovoc/FAO + EnVoc/UNEP + CBD)

- Biodiversity Glossary (CBD 2008)

<https://www.cbd.int/cepa/toolkit/2008/doc/CBD-Toolkit-Glossaries.pdf>

- CBD Glossary of Terms related to invasive alien species

<https://www.cbd.int/invasive/terms.shtml>

- GLOSSAIRE RELATIF AU PREMIER PROJET DE CADRE MONDIAL DE LA BIODIVERSITÉ POUR L'APRÈS-2020

<https://www.cbd.int/doc/c/d671/6965/eb5932faa3df107dc4e3d250/wg2020-03-03-add2-fr.pdf>

<https://www.cbd.int/doc/c/b74f/58d5/8ec8c92c22db0f8df28461b8/wg2020-03-03-add2-en.pdf>

- **Biodiversity A-Z** (UNEP-WCMC) [*en ligne*]

<https://www.biodiversitya-z.org>

- **IPBES Glossary** anglais [*en ligne*]

(Intergovernmental science-policy Platform on Biodiversity and Ecosystem Services)

<https://www.ipbes.net/glossary>

- **IPCC Glossaries (Intergovernmental Panel on Climate Change)** français ou anglais

<https://apps.ipcc.ch/glossary/>

- WG1 AR5 Climate Change 2013: The Physical Science Basis
<https://www.ipcc.ch/report/ar5/wg1/glossary/>
<https://www.ipcc.ch/report/ar5/wg1/glossary-french/>
- WG2 AR5 Climate Change 2014: Impacts, Adaptation, and Vulnerability
<https://www.ipcc.ch/report/ar5/wg2/glossary/>
<https://www.ipcc.ch/report/ar5/wg2/glossary-french/>
- WG3 AR5 Climate Change 2014: Mitigation of Climate Change
<https://www.ipcc.ch/report/ar5/wg3/glossary-english/>
<https://www.ipcc.ch/report/ar5/wg3/glossary-french/>
- AR5 Synthesis Report: Climate Change 2014
<https://www.ipcc.ch/report/ar5/syr/ar5-syr-glossary-english/>
<https://www.ipcc.ch/report/ar5/syr/ar5-syr-glossary-french/>
- Special Report on Global Warming of 1.5°C 2018
<https://www.ipcc.ch/sr15/chapter/glossary/>
https://www.ipcc.ch/site/assets/uploads/sites/2/2019/10/SR15_Glossary_french.pdf
- Special Report on Climate Change and Land 2019
<https://www.ipcc.ch/srcl/chapter/glossary/>
- Special Report on Ocean and Cryosphere in a Changing Climate 2019
<https://www.ipcc.ch/srocc/chapter/glossary/>

- **Climate-ADAPT Glossary** (European Climate Adaptation Platform)

<https://climate-adapt.eea.europa.eu/help/glossary>

- **Glossaire du climat** (Organisation internationale de la francophonie, 2009) français/anglais

<https://static.lexicool.com/dictionary/ZD7RH713420.pdf>

- **Glossaire pour le développement durable** (Agora 21, 2001) français/anglais

https://www.researchgate.net/publication/228780559_Glossaire_pour_le_developpement_durable

- **Vocabulaire du développement durable** (FranceTerme / DGLFLF 2015) français/anglais

<http://www.culture.fr/Ressources/FranceTerme/Actualites/Le-vocabulaire-du-developpement-durable-novembre-2015>

https://www.culture.gouv.fr/content/download/150847/file/Vocabulaire%20developpement%20durable_reimpression_2016.pdf

- **Vocabulaire de l'environnement** (FranceTerme / DGLFLF 2012) français/anglais

<http://www.culture.fr/franceterme/result?francetermeSearchTerme=&francetermeSearchDomaine=271>

<https://www.notre-planete.info/environnement/definitions.php>

https://aida.ineris.fr/consultation_document/10223

- **Glossaires de l'UICN (Union Internationale pour la Conservation de la Nature)**

- **IUCN Glossary of translated terms**

<https://www.iucn.org/sites/default/files/2022-06/iucn-glossary-of-translated-terms-en-es-fr.pdf>

- **BODC Glossary and acronyms (British Oceanographic Data Centre)**

https://www.bodc.ac.uk/resources/help_and_hints/glossary_and_acronyms/

- **Glossaire eau, milieux marins et biodiversité (OIEau – Office International de l'Eau / OFB) trilingue**

[consultable et téléchargeable en PDF (français/anglais/espagnol), TSV et SKOS/OWL] [CC BY]

<https://glossaire.eauetbiodiversite.fr/>

- **Dictionnaire de l'Environnement** français [en ligne]

https://www.dictionnaire-environnement.com/dico_env.php

- **Dictionnaire encyclopédique des sciences de la nature et de la biodiversité**

(François Ramade, Dunod 2008) français

<http://magat.francois.free.fr/Dictionnaire%20sciences%20%20nature%20biodiversite.pdf>

- **Dictionnaire encyclopédique de la diversité biologique et de la conservation de la nature**

(Patrick Triplet, 7^e édition 2021) français

<https://lacreteil.fr/spip.php?article481>

- **Glossaire Bonobos World** [en ligne; basé principalement sur le Dictionnaire de P. Triplet]

<https://www.bonobosworld.org/fr/glossaire>

- **Glossaire sur les ressources génétiques forestières** (FAO / IUFRO, 2003) multilingue

(français/anglais/espagnol)

<https://www.fao.org/publications/card/fr/c/d7f8c47f-74f4-557b-a674-12e6ef276625/>

- **Dictionnaire biologie, botanique, zoologie, écologie, aquariophilie (Glossaire de la vie)** [en ligne]

<https://www.aquaportail.com/dictionnaire-biologie.html>

- **Dictionnaire des Sciences Animales** (CIRAD) français/anglais [en ligne]

<http://dico-sciences-animales.cirad.fr/index.php>

- **Dictionnaire d'agroécologie** (INRAE) bilingue français/anglais [en ligne]

<https://dicoagroecologie.fr/dictionnaire/>

- **Environmental Dictionary - EnDic** (Finnish Environment Institute) multilingue [en ligne]

<https://mot.kielikone.fi/mot/indic/netmot.exe?UI=ened>

- **Dictionnaire Environnement** (Actu-Environnement) [en ligne]

https://www.actu-environnement.com/ae/dictionnaire_environnement/

- **GreenFacts Glossary** multilingue [en ligne]

<https://www.greenfacts.org/glossary/index.htm>

<https://www.greenfacts.org/fr/glossaire/index.htm>

- **EU 2010 Biodiversity Baseline Glossary** (European Topic Centre on Biological Diversity)
<https://www.eea.europa.eu/themes/biodiversity/document-library/eu-2010-biodiversity-baseline/eu-2010-biodiversity-baseline-glossary/view>

- **Glossary for Ecosystem Service mapping and assessment terminology** (ESMERALDA 2018)
http://www.esmeralda-project.eu/getatt.php?filename=ESMERALDA%20D1.4_14964.pdf

- **CHM Biodiversity Coverage glossary**
<https://www.eea.europa.eu/help/glossary/chm-biodiversity-coverage>

- **Invasive Species Compendium Glossary** (CABI)
<https://www.cabi.org/isc/search/?q=&types=12&rows=10&sort=AtoZ>

- **Ecosystems and Human Well-being** (Millennium Ecosystem Assessment) **Appendix D Glossary**
<http://www.millenniumassessment.org/documents/document.776.aspx.pdf>

- **NASA Earth Observatory – Glossary**
<https://earthobservatory.nasa.gov/glossary>

- **What is Life - Glossary of Scientific Terms**
<http://www.whatislife.com/glossary.htm>

- **Dictionary of ecology** (Hanson, 1962) (Biodiversity Heritage Library)
<https://www.biodiversitylibrary.org/item/pdf/74646>

*** des bases / banques de données terminologiques :**

- **List of environmental terms used by EEA** (European Environment Agency) multilingue
<https://www.eea.europa.eu/help/glossary>

- **INSPIRE Themes** (INfrastructure for SPatial InfoRmation in Europe / INSPIRE knowledge base)
<https://inspire.ec.europa.eu/Themes/Data%20Specifications/2892>
<https://inspire.ec.europa.eu/registry/>
SmOD INSPIRE Vocabularies (SmartOpenData)
<https://www.w3.org/2015/03/inspire/>

- **EcoRessources** (Ressources terminologiques en environnement) trilingue
 Observatoire de linguistique Sens-Texte (OLST) [*dictionnaires, glossaires, thésaurus en ligne*]
<http://olst.ling.umontreal.ca/~termeco/EcoRessources/>

- **DiCoEnviro** (Dictionnaire fondamental de l'environnement) multilingue
<http://olst.ling.umontreal.ca/dicoenviro/>

- **BioConcepts - The Origin and Definition of Biological Concepts** multilingue
<http://www.biological-concepts.com>

- **Biodiversity terminology** (Centre de la Science de la Biodiversité du Québec) bilingue
<https://qcb.ca/biodiversity-terminology/>

- **Terminological Inventory for Biodiversity** (NaCTeM - National Centre for Text Mining)
 [inventaire de noms d'espèces basé sur le corpus de [Biodiversity Heritage Library](#)]
http://nactem.ac.uk/bhl_inventory/

- **SilvaTerm Database** (IUFRO SilvaVoc / International Union of Forest Research Organizations)
 multilingue
<https://www.iufro.org/science/special/silvavoc/silvaterm/query-silvaterm-database/>

- **European Parliament / Terminology** Coordination (DG TRAD) multilingue
<https://termcoord.eu/terminology-websites/>

- Terminology Search Tools: <https://termcoord.eu/terminology-search-tools/>
- Glossary Links (Environment): <https://termcoord.eu/glossarylinks/?Category=29>

- **EPA Enterprise Vocabulary / Vocabulary Catalog** (US Environmental Protection Agency)
<https://www.epa.gov/research/epa-enterprise-vocabulary>
https://iaspub.epa.gov/sor_internet/registry/termreg/searchandretrieve/glossariesandkeywordlists/search.do

- **Dictionnaires environnement Lexicool**
<https://www.lexicool.com/dictionnaires-en-ligne.asp?FSP=C16&FKW=environnement>

- **FAOTERM - PORTAIL TERMINOLOGIQUE DE LA FAO** multilingue
<https://www.fao.org/faoterm/fr/>

- **UNTERM - United Nations Terminology Database** multilingue
<https://unterm.un.org/UNTERM/portal/welcome>

- **Le grand dictionnaire terminologique (GDT)** (Office québécois de la langue française) multilingue
<https://gdt.oqlf.gouv.qc.ca/>
<https://vitrinelinguistique.oqlf.gouv.qc.ca/>

- **TERMIUM Plus**
 (Banque de données terminologiques et linguistiques du gouvernement du Canada) multilingue
<https://www.btb.termiumplus.gc.ca/>

- **Wikidata knowledge base**
<https://www.wikidata.org/wiki/Q47041>

* Outils de gestion de thésaurus / terminologie :

- **VocBench 3** (open source / Publications Office of the European Union / Tor Vergata Univ. of Rome)

<http://vocbench.uniroma2.it/>

<https://joinup.ec.europa.eu/collection/semantic-interoperability-community-semic/solution/vocbench/about>

<https://vocbench.op.europa.eu/#/Home>

<http://aims.fao.org/activity/blog/webinar-recording-vocbench-3-v70-vocabulary-development-tool-and-what-new>

- **Opentheso 2** (open source / Frantiq / TGIR Huma-Num)

<https://github.com/miledrousset/Opentheso2>

<https://opentheso.hypotheses.org/>

- **TemaTres** (open source Vocabulary Server)

<https://vocabularyserver.com/web/>

<https://sourceforge.net/projects/tematres/>

<https://sourceforge.net/projects/tematrespack/>

<https://github.com/tematres/TemaTres-Vocabulary-Server>

- **Ginco** (Gestion Informatisée de Nomenclatures Collaboratives et Ouvertes)

(open source / Ministère de la Culture)

<https://github.com/culturecommunication/ginco/>

<http://culturecommunication.github.io/ginco/doc/>

- **ThManager** (open source / Univ. Zaragoza)

<https://thmanager.sourceforge.io>

<https://sourceforge.net/projects/thmanager/>

- **ThesauForm** (CESAB)

<https://github.com/CESAB-FRB/Thesauform/wiki>

<https://www.sciencedirect.com/science/article/pii/S1574954112000404>

- **TyDI** (Terminology Design Interface) (INRAE MaIAGE / Bibliome)

<https://maiage.inrae.fr/fr/node/2334>

<https://maiage.mathnum.inrae.fr/fr/bibliome>

- **TEDI** (ontoTerminology EDItor) (Condillac Research Group)

<http://ontoterminology.com/tedi>

- **ecoRelevé** Concepts/Glossary (Semantic MediaWiki)

http://ecorelevéglossary.natural-solutions.eu/index.php/Main_Page

- **Software for controlled vocabularies** (BARTOC)

<https://github.com/gbv/bartoc.org/wiki/Software-for-controlled-vocabularies>

* Outils de gestion d'ontologie :

- **Protégé / WebProtégé**

https://protegewiki.stanford.edu/wiki/Main_Page

- **VocBench**

http://vocbench.uniroma2.it/doc/user/owl_editing.jsf

* **Outils d'exposition / navigation SKOS/OWL :**

- Skosmos

<https://skosmos.dev.finto.fi/en/>

<https://skosmos.loterre.fr/en/>

<https://github.com/NatLibFi/Skosmos/wiki>

- NCBO Technology

https://www.bioontology.org/wiki/Using_NCBO_Technology_In_Your_Project

* **Outils de vérification / transformation SKOS :**

- Skosify

<http://demo.seco.tkk.fi/skosify/skosify>

- qSKOS (SKOS testing tool)

<https://github.com/cmader/qSKOS/wiki/Quality-Issues>

<https://skos-play.sparna.fr/skos-testing-tool/>

- SKOS Play!

<https://skos-play.sparna.fr/play/>

<https://github.com/sparna-git/skos-play>

- Opentheso2

<https://opentheso2.mom.fr/opentheso2/>

<https://github.com/miledrousset/Opentheso2/blob/master/src/main/resources/install/webservices.pdf>

- Loterre (Linked open terminology resources) (Inist-CNRS)

<https://www.loterre.fr/category/gerer-fr/>

<https://www.loterre.fr/category/services-en/gerer-en/>

* **Outils d'alignement / réconciliation :**

- OnAGUI (Ontology Alignment GUI)

<https://github.com/lmazuel/onagui>

- YAM++ (D2KAB project)

<https://hal.archives-ouvertes.fr/hal-01987659/document>

<http://yamplusplus.lirmm.fr/>

- OpenRefine

<https://openrefine.org/>

* **Linked Open Data** :

- The Linked Open Data Cloud

<https://lod-cloud.net/>

- Linking Open Data Cloud

<https://old.datahub.io/organization/about/lodcloud>

- Linguistic Linked Open Data (LLOD) cloud

<http://linguistic-lod.org>

<http://iis.tsinghua.edu.cn/~web/t/papers/lod-lrec2016.pdf>

- LODAtlas

<http://lodatlas.lri.fr>

- AGROVOC Linked Open Data (Alignments)

<https://www.fao.org/agrovoc/linked-data>

- FAST Linked Data (OCLC / LCSH)

<http://experimental.worldcat.org/fast/>

- Linked Open Vocabularies (LOV)

<https://lov.linkeddata.es/dataset/lov/>

- DataScientia Linked Open Vocabulary

<http://liveschema.eu/organization/lov>

- projet LodLive - browsing the Web of Data

<http://fr.lodlive.it/>

* **FAIR semantics** :

- *D2.5 FAIR Semantics Recommendations Second Iteration* (FAIRsFAIR, 2020)

<https://doi.org/10.5281/zenodo.5362010>

- *Best Practices for Implementing FAIR Vocabularies and Ontologies on the Web* (2020)

<https://arxiv.org/pdf/2003.13084.pdf>

- *39 Hints to Facilitate the Use of Semantics for Data on Agriculture and Nutrition* (2020)

<https://dx.doi.org/10.5334/dsj-2020-047>

- *Ten Simple Rules for making a vocabulary FAIR* (2021)

<https://doi.org/10.1371/journal.pcbi.1009041>

- *De TermSciences à Loterre : comment l'Inist-CNRS a rendu les terminologies ouvertes plus conformes aux principes FAIR* (2021)

<https://hal.inrae.fr/hal-03176063>

<https://foosin.fr/cas-detude-fair/de-termosciences-a-loterre-comment-inist-cnrs-a-rendu-les-terminologies-ouvertes-plus-conformes-aux-principes-fair/>

- *Une méthodologie et un outil d'évaluation du niveau de " FAIR- ness " pour les ressources sémantiques : le cas d'AgroPortal* (IC, 2021)

<https://hal-lirmm.ccsd.cnrs.fr/lirmm-03232615>

- **FAIR or FAIRer? An integrated quantitative FAIRness assessment grid for semantic resources and ontologies** (MTSR, 2021)

<https://hal-lirmm.ccsd.cnrs.fr/lirmm-03208544>

- **O'FAIRe: Ontology FAIRness Evaluator in the AgroPortal semantic resource repository** (ESWC, 2022)

<https://hal-lirmm.ccsd.cnrs.fr/lirmm-03630543>

- **O'FAIRe: Ontology FAIRness evaluator** (AgroPortal)

<https://github.com/agroportal/fairness>

- **FAIR Evaluation Services** (FAIRsharing)

<https://fairsharing.github.io/FAIR-Evaluator-FrontEnd/>

- **FOOPS! (Ontology Pitfall Scanner for FAIR)**

https://foops.linkeddata.es/FAIR_validator.html

<http://ceur-ws.org/Vol-2980/paper321.pdf>

- **FAIR-Checker** (IFB)

<https://fair-checker.france-bioinformatique.fr/>