Food and Agriculture Organization
of the United Nations

The AGROVOC Editorial Guidelines

Second edition

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Food and Agriculture Organization of the United Nations
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About these guidelines

These guidelines have been developed to provide editorial recommendations for adding content to the controlled vocabulary and thesaurus, AGROVOC, based on the work of the AGROVOC Editorial Network. The document builds on and supersedes the publication *The AGROVOC Editorial Guidelines, first edition*.

Contents

Abbreviations and acronyms

BCP	Best Current Practices
BT	Broader term
FAO	Food and Agriculture Organization of the United Nations
FAOTERM	FAO Terminology
IANA	Internet Assigned Numbers Authority
IcTV	International Committee on Taxonomy of Viruses
ISO	International Organization for Standardization
KOS	Knowledge Organization System
NALT	National Agricultural Library Thesaurus
NOCS	FAO Names of Countries database

NT	Narrower term
OWL	Web Ontology Language
RDF	Resource Description Framework
SKOS	Simple Knowledge Organization System
SPARQL	SPARQL Protocol and RDF Query Language
UN	United Nations
UNBIS	United Nations Bibliographic Information System
UNESCO	United Nations Educational, Scientific and Cultural Organization
URI	Uniform Resource Identifier
URL	Uniform Resource Locator

Executive summary

Since the early 1980s, the Food and Agriculture Organization of the United Nations (FAO) has promoted greater knowledge sharing and access among its member countries through the publication of AGROVOC: a controlled vocabulary and thesaurus covering all FAO's areas of interest. Coordinated by FAO, AGROVOC is currently maintained by over 25 organizations and communities of experts volunteering as focal points for specific languages and/or specific food- and agriculture-related domains.

AGROVOC has evolved into a Simple Knowledge Organization System (SKOS) concept scheme and a Linked Open Data set. SKOS is a World Wide Web Consortium recommendation designed for representation of thesauri, classification schemes, taxonomies, subject-heading systems or any other type of structured controlled vocabulary. AGROVOC is currently linked to over 20 other vocabularies.

Over recent years, AGROVOC has evolved to become a valued information resource worldwide, with more than 40 million accesses a year. In 2021, FAO published the book *AGROVOC – Semantic data interoperability on food and agriculture* (FAO, 2021a). This publication aims to increase awareness of the use of AGROVOC to enhance the accessibility and visibility of information and data, as well as to inform individuals and institutions about the latest technical developments, recommended standards and various ways to engage with AGROVOC. It is especially targeted to those who are interested in controlled

vocabularies and SKOS, who may also wish to use AGROVOC or improve its usage, and those who may wish to contribute to AGROVOC, either through the AGROVOC editorial community or as part of a community of experts.

AGROVOC is based on a concept model, and as of November 2021, it consisted of over 39 600 concepts and over 925 000 terms in up to 41 languages. In order to be added to AGROVOC, a language must have a responsible editing institution. In recent years, AGROVOC has expanded its coverage with a significant annual growth in the number of terms and concepts. This success has required precise rules and protocols on how to edit the vocabulary in order to facilitate maintenance of AGROVOC. Clear guidelines, developed through working with editors worldwide, are especially needed in light of the shift to distributed management of AGROVOC.

The first edition of *The AGROVOC Editorial Guidelines* (FAO, 2020) was published to share clear, concise and agreed guidelines to guarantee consistency and coherence on selection of concepts and terms. Focus areas included whether to use the singular or plural in each language, how to deal with proper names, scientific names, and geographical names, etc. In 2021, an AGROVOC Editorial Guidelines task force, with members from Empresa Brasileira de Pesquisa Agropecuária, Kuratorium für Technik und Bauwesen in der Landwirtschaft e.V. and FAO, continued to deepen editorial discussions, which resulted in the second edition of *The AGROVOC Editorial Guidelines*. In this second edition, additional guidance has been added on scientific names, spelling, definitions and more.

This guide is a set of editorial recommendations for adding content to AGROVOC, with a strong focus on multilingual aspects. The guidelines also apply to sub-vocabularies in AGROVOC.

1 About the AGROVOC editorial guidelines

The AGROVOC editorial guidelines include different elements related to AGROVOC editing. After introducing the AGROVOC concept model, specifications and considerations are highlighted as key elements to ensure coherence and consistency during data entry.

AGROVOC was born as a terminological (technical terms) resource organized hierarchically and covering all the Food and Agriculture Organization of the United Nations (FAO) areas of interest, i.e. a thesaurus. AGROVOC has evolved into a Simple Knowledge Organization System (SKOS) concept scheme; SKOS is part of the Semantic Web family of standards, and its main objective is to enable easy publication and use of vocabularies, such as linked data.

Today, AGROVOC is a fully web-orientated resource in which all notions related to thesauri, like related term, broader term (BT) or narrower term (NT), have a translation into SKOS properties.

AGROVOC supports knowledge organization through a structured collection of concepts, terms, definitions and relationships. AGROVOC is organized as a hierarchy of concepts in various languages under 25 top concepts (see Annex). Concepts may also be linked by non-hierarchical relations, either expressing a generic notion of 'relatedness' or expressing some more refined relation (e.g. something 'is a product of' something else).

Operationally, a concept is the set of terms used in any language to describe the same idea. In AGROVOC, concepts are represented by terms (i.e. words in a given language). In SKOS, concepts are formalized as `skos:Concept` and identified by a dereferenceable Uniform Resource Identifier (URIs) (i.e. a Uniform Resource Locator [URL]).

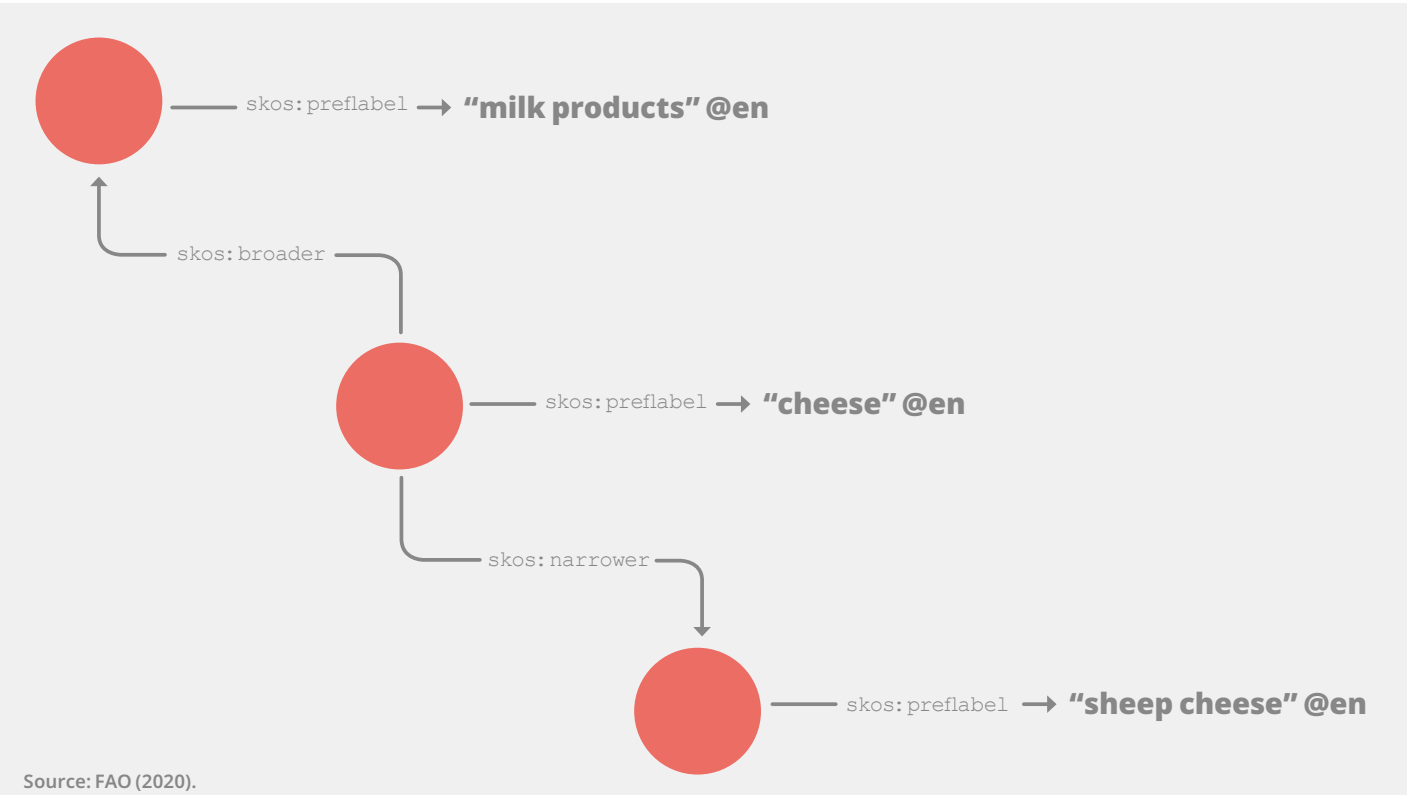
The URI **http://aims.fao.org/aos/agrovoc/c_12332** is the AGROVOC concept for "maize". Terms, or labels, are the actual terms used to name a concept. For example, "maize", "maïs" and "玉米" are terms for the same concept in English, French and Chinese, respectively.

In SKOS, terms are known as preferred and non-preferred labels. In order to be more expressive, AGROVOC uses the SKOS extension for labels (SKOS-XL). The predicates used are: `skosxl:prefLabel`, used for preferred terms ("descriptors" in thesaurus terminology), and `skosxl:altLabel`, used for alternative or non-preferred terms.

A concept has only one preferred term in a language. All the alternative terms to name a concept in any given language are called non-preferred terms. In AGROVOC, concepts always have at least one preferred term in a language. A concept may have zero or more non-preferred terms.

From a formal point of view, AGROVOC is a Resource Description Framework (RDF)/SKOS-XL concept scheme. The classical BT/NT thesauri relations are expressed by the SKOS predicates `skos:broader` and `skos:narrower` (see Figure 1). In addition to SKOS properties, it is possible to use a number of relations to state that two concepts are related to one another through the Agrontology, a support ontology for AGROVOC to accommodate non-hierarchical relations. Examples of these domain-specific relations between concepts are `hasScientificName`, `affects` and `isAffectedBy` (see section 8.4 Agrontology).

Figure 1. AGROVOC concept model



Source: FAO (2020).

Table 1 defines the items and their formatting to make reading of this document easier. Note that this formatting is only to be used in these guidelines and not when editing AGROVOC.

Element	Formatting in guidelines	Example
Concept	All terms are in quotation marks and italics. Except for English, the term language is indicated by @plus the IANA Language Subtag.	*"growth control"* *"Wachstumssteuerung"@de*
Preferred term and non-preferred terms	Preferred terms and non-preferred terms are in italics.	*"growth control"* *"growth regulation"*
URIs	In abbreviated form In full form	:c_345 <http://aims.fao.org/aos/agrovoc/c_345>
Relations	The relation name is listed in font type `Courier New`	`agrontology:hasProducts` `skos:related`

Table 1. The main elements in these guidelines and their formatting. IANA = Internet Assigned Numbers Authority

New elements added to this edition include:

- more detailed advice on scientific names, author names, punctuation, authorities and definitions;
- more information on the Agrontology, as a condensed version of the Agrontology has been introduced for use by AGROVOC editors within VocBench; and
- lower case for French, Portuguese and Brazilian Portuguese, except where capitals are required in acronyms, scientific names, geographical names and proper names.

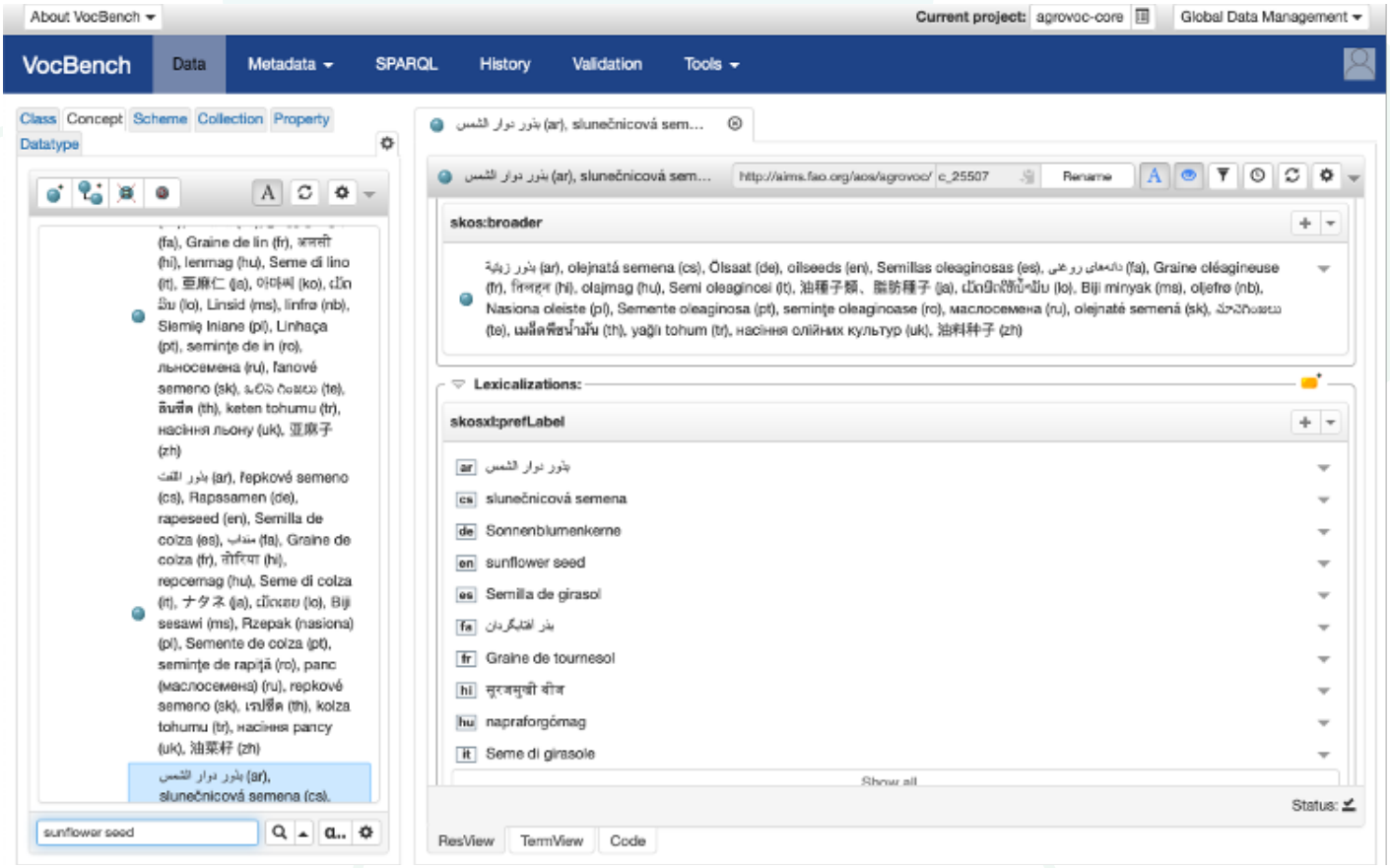
2 How to access AGROVOC

VocBench is designed to meet the needs of the Semantic Web and is made available as an open source solution.

AGROVOC is edited in the online open source platform VocBench (FAO, 2021b) (see Figure 2). VocBench is a free web-based platform that facilitates collaborative editing and management of authority lists, taxonomies, thesauri and ontologies. AGROVOC editors can request VocBench credentials in order to use the platform for collaborative content editing, for editing either languages or schemes. Editors must be affiliated with an institution. All suggested changes to concepts, terms and relationships are reviewed and validated by the FAO/ AGROVOC team.

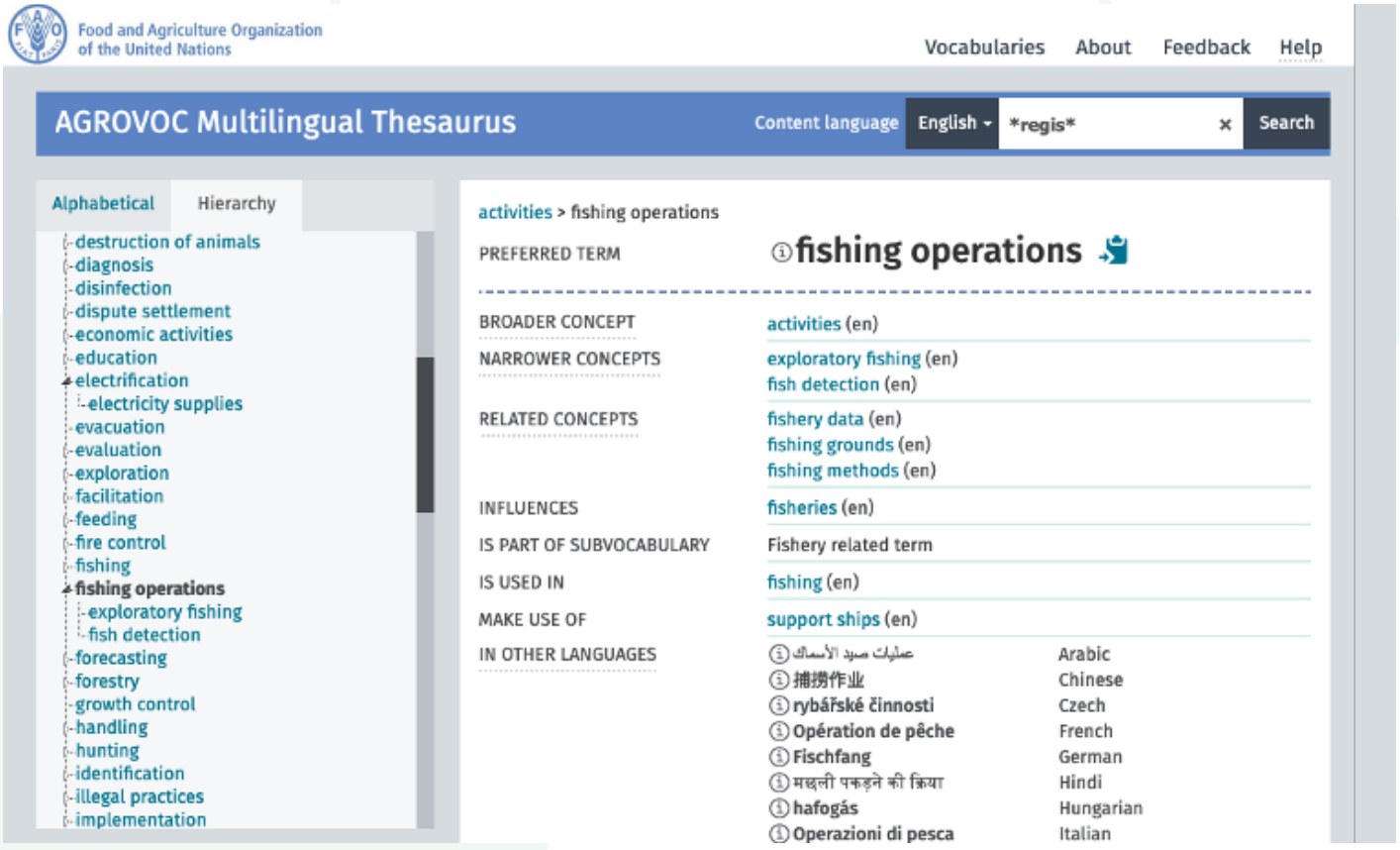
If an editor wants to browse AGROVOC, search for concepts or terms, or look at the structure, the web browsing interface Skosmos (FAO, 2021d) is the best option, which is an open source web-based SKOS browser and publishing tool (see Figure 3). This interface offers search and browse functionalities, an alphabetical and thematic index, a structured concept display, a concept hierarchy and a multilingual user interface.

Figure 2. VocBench, the online editing interface for AGROVOC



Source: FAO (2021b).

Figure 3. Skosmos, the public browsing interface for AGROVOC



Source: FAO (2021c).

3 Editing AGROVOC

Editors can suggest and create concepts and terms within the food and agriculture domains within AGROVOC.

As a preliminary step, it is recommended that the editor checks whether the concept or term already exists in AGROVOC, using Skosmos or VocBench, and that it is relevant to the scope of AGROVOC. If a term or a concept is missing, there are some steps to take into consideration (see Figure 4). New terms or concepts can be suggested through VocBench or by e-mail to **AGROVOC@fao.org**.

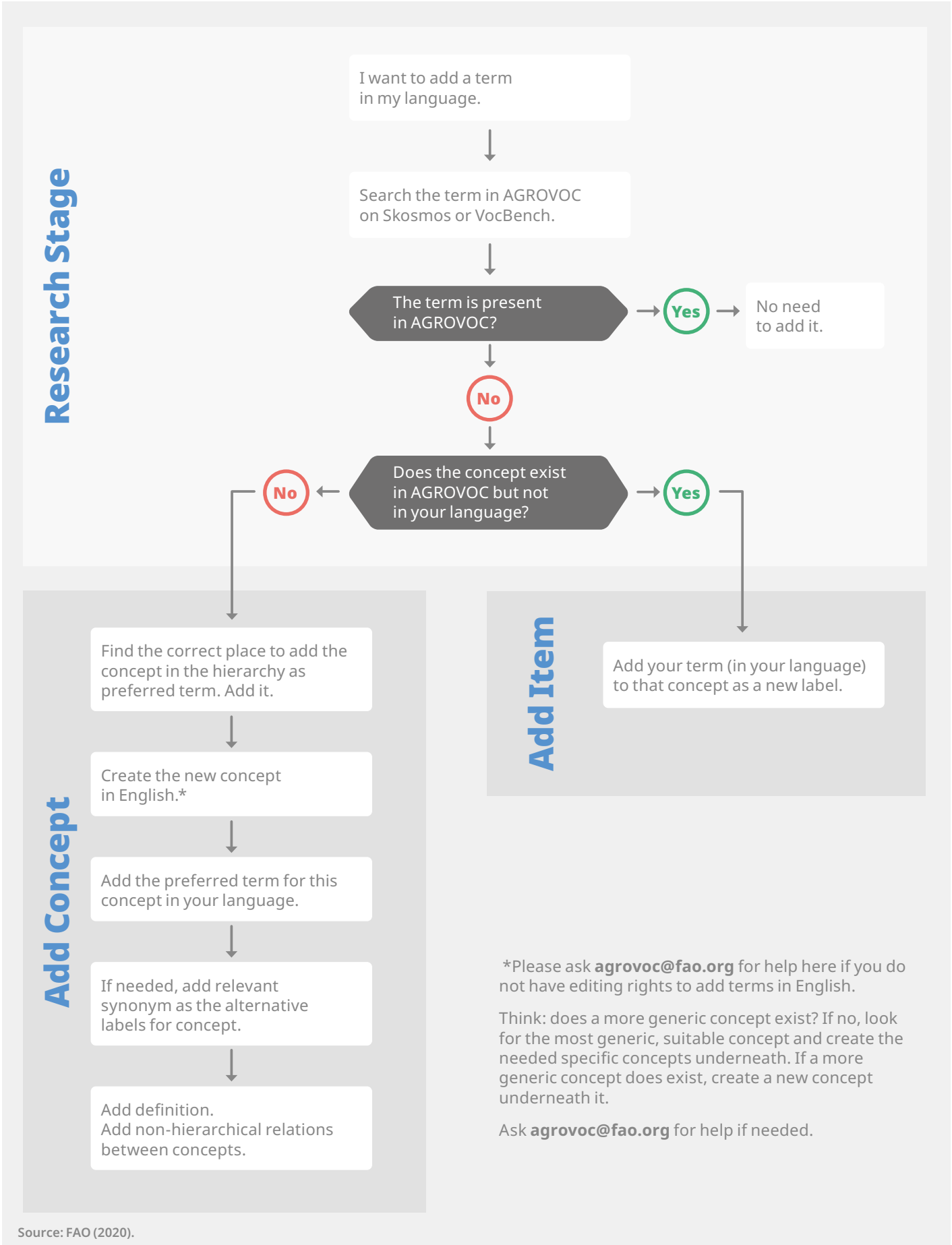
When making a suggestion, the following elements should be avoided:

- duplicates of existing concepts;
- trademarked names (e.g. brand names and commercial names);
- names of plant varieties;
- names of individuals;
- names of specific software or models;
- names of policies, programmes or initiatives;
- individual publication titles (e.g. "*The Eatwell Guide*"); and
- concepts not within the scope of AGROVOC (e.g. "*intensive care*" and "*mortgage holiday*").

Neologisms, slang and jargon are generally not included as concepts.

Concepts should have international relevance. A concept describing a practice only used in one country is thus discouraged, unless it is of global relevance, such as a practice with the United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage relevance. In general, names of cities should not be included in AGROVOC.

Figure 4. Adding new terms and concepts to AGROVOC



Source: FAO (2020).

If in doubt about adding a new concept, leave it out or consult a colleague. Duplicates of existing concepts must be avoided. If an existing concept is similar to another existing concept, the definition should clarify the difference. The slash or solidus (/) should be avoided, for example "*afforestation/reforestation*". Use two separate concepts if these differ in meaning, or set one as an alternative label if meaning is the same.

To avoid adding a duplicate of an existing concept, look for synonyms and consider spelling variants ("*behaviour*", not "*behavior*"), singular vs plural ("*communities*", not "*community*") and hyphenation ("*agrifood systems*", not "*agri-food systems*"). For more information, see language-specific guidance in section 4 Suggesting terms.

Concepts might exist that do not follow the current guidelines because they were created when other rules existed, and therefore, there might be inconsistencies. In the past, some antonyms were included as non-preferred terms for the same concept because they dealt with the same topic; for example, `:c_2636` "*erectness*" had the non-preferred term "*prostrate plants*". This practice is no longer valid, and antonyms should be generated into a separate concept.

If a concept exists in AGROVOC but does not have a term in a specific language, it is possible to suggest a new preferred term (and non-preferred terms, if needed) (see Figure 5 and section 4 Suggesting terms). However, an exact term may not always exist in the target language. In this case, a term that is commonly used is recommended over an artificial or literal translation. In addition, it is also preferable to use a term from the source language, such as English, only if it is used in the target language (e.g. "*Farmer Field School*"@de). Another option is to use a similar term with the same meaning, such as `:c_2cfe62a` "*from farm to fork*", "*de la ferme à la table*"@fr and "*fra jord til bord*"@nb. Each label must be unique in a specific language; identical labels for different concepts in one language are not allowed (see section 4.4 Disambiguation).

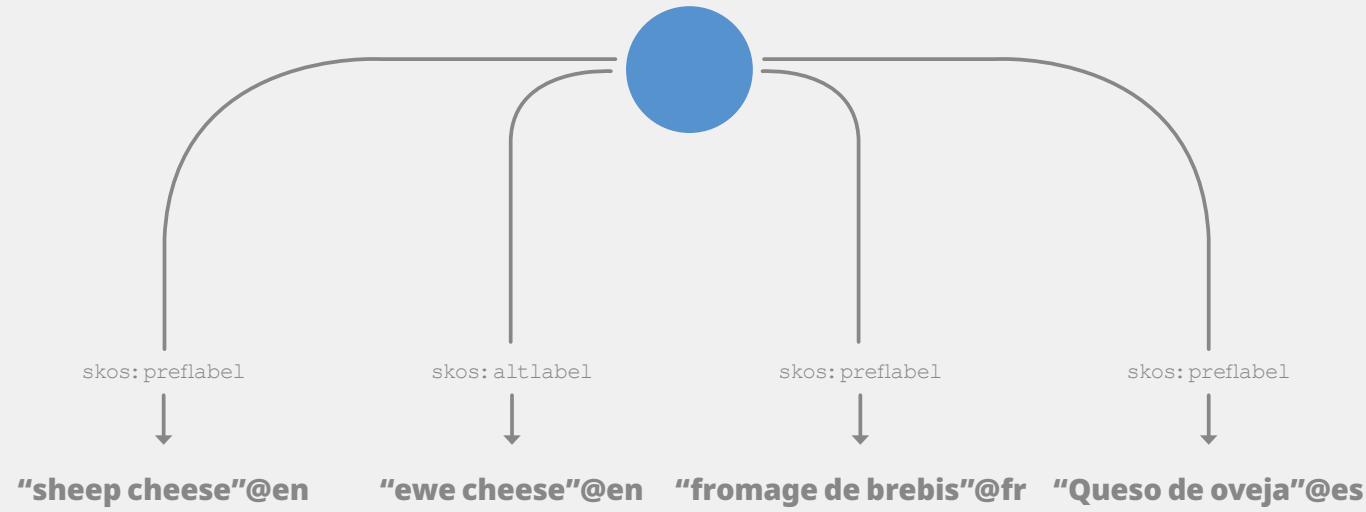
It is possible to suggest a new preferred label for a concept, if needed, as terminology does evolve. For example, "*fishers*" has replaced "*fishermen*". However, please do not remove labels unless there is an actual mistake. In cases like this, please add the new term "fishers" as a suggested new preferred label, which will make "*fishermen*" a new non-preferred term. Legacy labels are still relevant for indexing older resources. For reference see *AGROVOC – Semantic data interoperability on food and agriculture* section 8.2 Editing an existing term.

Terms are seen in both two-word and one-word forms. The preferred term is the one most commonly used by experts and in expert literature of the specific field, such as "*temperature regulation*" or "*thermoregulation*". Which of these is the preferred term will depend on the subject and the language.

Terms may comprise more than one word, but multi-word compound terms should express a single concept or unit of thought. Complex compound concepts are discouraged. For example, "*unpaid care work*" and "*food chain approach to food safety*" are complex compound terms that express multiple concepts, while "*controlled atmosphere storage*" and "*food safety*" are multi-word compound terms that express a single concept. International standards generally recommend splitting compound words into simpler concepts. This may vary by language. Maintaining distinct semantic elements is useful to facilitate machine searches and to detect structural relationships between concepts.

To correct spelling in VocBench, use "*edit literal content*". If a term is edited because the former version had incorrect spelling, do not change the former version to a non-preferred term (altLabel). The non-preferred term should also have the correct spelling.

Figure 5. Preferred and non-preferred terms



Source: FAO (2020).

3.1 Checking an authoritative source

It is important to check terms with other vocabularies, but avoid circular reasoning (if a term is wrong in vocabulary X that cites AGROVOC, future AGROVOC editors may think X must be correct). When possible, primary authorities should be used. Consider consulting agricultural thesauri such as the CAB Thesaurus, published by the Centre for Agriculture and Bioscience International, or the United States Department of Agriculture National Agricultural Library Thesaurus (NALT) to have a better idea of the names they use to represent concepts. Thesaurus logic may differ. Trusted sources are also recommended, such as the International Committee on Taxonomy of Viruses (IcTV) for viruses or FAO Terminology (FAOTERM) for general agricultural terms.

Some examples of primary authorities for editors to consult include:

- FAOTERM (www.fao.org/faoterm/en/) (multilingual);
- FAO (www.fao.org/home/en/);
- FAO Names of Countries (NOCS) database (www.fao.org/nocs/) (multilingual);
- UNESCO Thesaurus (http://vocabularies.unesco.org/browser/thesaurus/en/) (multilingual);
- United Nations Bibliographic and Information System (UNBIS) Thesaurus; (http://metadata.un.org/thesaurus/) (multilingual);
- CAB Thesaurus (www.cabi.org/cabthesaurus/) (multilingual);
- NALT (https://agclass.nal.usda.gov/thesaurus-search);
- Basel Register of Thesauri, Ontologies & Classifications (https://bartoc-skosmos.unibas.ch/en);
- Interactive Terminology for Europe (https://iate.europa.eu/home) (multilingual);
- European Union vocabularies (https://op.europa.eu/en/web/eu-vocabularies) (multilingual);
- General Multilingual Environmental Thesaurus (GEMET) (www.eionet.europa.eu/gemet/) (multilingual);
- AgroPortal (http://agroportal.lirmm.fr/);
- AlgaeBase (www.algaebase.org/);
- CGIAR Crop Ontology (www.cropontology.org);
- European and Mediterranean Plant Protection Organization Global Database (https://gd.eppo.int/);
- Fungi Index Fungorum (www.indexfungorum.org/names/names.asp);

Terms included in AGROVOC must be used in relevant literature (scientific papers, books, etc.) or by relevant institutions (public sector organizations, agricultural extension organizations, etc.). For names of animals and plants, it is necessary to search for both their scientific/taxonomic names and common/local names.

4 Suggesting terms

The guidance given in this section applies to all languages represented in AGROVOC, including specifications for particular languages. For spelling, the official rules of the languages should be followed. In addition, all terms should be given in the script of the individual languages, unless writing a scientific name in Latinate.

4.1 FAO spelling

The FAO style guide is also recommended for AGROVOC content in English, French, Spanish, Arabic, Chinese and Russian languages. AGROVOC uses British English spelling as standard, with some FAO spelling exceptions. FAO applies the following spelling rules for English:

- words ending in -re/-er. Prefer -re: centre, calibre, theatre;
- words ending in -our/-or. Prefer -our: colour, labour, behaviour;
- words ending in -ence/-ense. Prefer -ence (for nouns): defence, offence, licence (but spell the verb "*to license*");
- words ending in -l and followed by a suffix. Prefer -ll (not -l): traveller, counselled, modelling;
- words ending in -ize/-ise. Prefer -ize: organize, realize, theorize; and
- words ending in -yse/-yze. Prefer -yse: analyse, catalyse, paralyse.

Exceptions to these rules include words that appear in proper names (e.g. "*Organisation for Economic Cooperation and Development*"). See the recommended word list in FAOSTYLE 2021 (FAO, 2021d).

Consult FAOTERM if needed. The FAOTERM PORTAL has been created to store, manage and update concepts, terms and definitions related to the various fields of FAO activity. Languages covered include Arabic, Chinese, English, French, Spanish and Russian.

When suggesting a term, it is important to avoid empty spaces before and after the term, and avoid adding extra empty spaces within a term. Extra spaces are removed by quality checks before each AGROVOC release. Between releases, however, unnecessary empty spaces could compromise search results, especially in SPARQL Protocol and RDF Query Language (SPARQL). Depending on search settings, a search for "*rice bran*" can give different results than a search for " *rice bran*". An additional empty line as well as non-breaking spaces (white spaces) in the labels should also be avoided (although this can be hard to spot if editors are copying and pasting existing text).

4.2 Punctuation, diacritics and special characters

Appropriate punctuation, diacritics and any other special characters of an individual language should be used. For English, diacritics are only used rarely and in the case of imported terms where the original form with diacritics is commonly used in English, for example "*Côte d'Ivoire*" or "*vicuñas*".

Commas should be avoided in terms unless in set phrases like "free, prior and informed consent" or "2,4-dinitrophenol". Some older concepts have comma separated terms in certain languages, for example, "高分子、ポリマー、重合体"@ja, but these should be avoided. Use multiple alternative labels instead. In some cases, commas are used to separate a subsequent adjective from the preceding noun (e.g. "Kupfersulfat, basisch"@de). To avoid this use of commas, the adjective should be put before the noun.

Avoid overuse of hyphens except where required, for example "*2,4-D*", "*Guinea-Bissau*" and "*e-learning*". In English, compound adjectives modifying a noun generally take a hyphen, for example "*foot-and-mouth disease*", "*long-term experiments*" and "*in-situ conservation*".

4.2.1 Alphabet, diacritics and special characters: language variants

Belarusian (be). Cyrillic is used. The letters with diacritics (ë, й and ў) and apostrophe (') are used according to common orthographic rules, for example "самалёты"@be, "надой малака"@be and "надвор'е"@be.

Chinese (zh). AGROVOC uses simplified Chinese, not traditional Chinese. Some scientific names may contain characters that are hard to

distinguish, particularly fish species. Please use half-width parentheses without space before or after the term. For example, "亚马孙 (委内瑞拉)"@zh should be "亚马孙(委内瑞拉)"@zh.

German (de). The characters Ä, Ö, Ü, ä, ö, ü and ß are used according to the common spelling of the word. In early versions of AGROVOC, other rules applied, such as oe used for ö, but are no longer relevant. A hyphen (-) might be used to connect parts of compound terms according to the general spelling rules.

Norwegian Nynorsk (nn). Nynorsk uses some diacritic signs (é, è, ê, ó, ò, â and ô). The vowels æ, ø and å never take diacritics.

Polish (pl). The Polish alphabet uses diacritics in the letters ć, ń, ó, ś, ź; ł; ż; ą and ę.

Portuguese (pt) and Brazilian Portuguese (pt-BR). The characters Á, á, É, é, Í, í, Ó, ó, Ú, ú, ã, õ, ê, ô, â, à and ç are used according to the common spelling of the word (note ü is no longer used according to the Orthographic Agreement signed in 1990 to establish a single official orthography for the Portuguese language).

Serbian (sr). Cyrillic is used. Latinate is used for some scientific names.

Slovak (sk). Slovak uses the Latin script with small modifications that include four diacritics placed above certain letters (á, ä, č, ď, é, í, ľ, Í, ň, ó, ô, ŕ, š, ť, ú, ý and ž).

Spanish (es). Hyphens are used infrequently, usually to link two elements that make up a compound word or to express different types of relationships between simple words, for example "*Cooperación Sur-Sur*"@es,"*Ecto-parasitismo*"@es, *"Interfase aire–agua*"@es, but "*Conservación ex situ*"@es.

Thai (th). Spaces between words are not used.

Turkish (tr). The correction mark or circumflex (^) is used on some vowels in the Turkish language. The circumflex "düzeltme (şapka) işareti" used over the vowels a, i and u for visual discrimination between homographs. For example, compare "*kar*"@tr ("snow") and "*kâr*"@tr ("profit"). The circumflex over the vowels a and u is sometimes used in words of Arabic or Persian derivation to indicate when a preceding consonant (k, g, l) is to be pronounced as a palatal plosive (e.g. "*kâğıt*"@tr). Sometimes the circumflex over the letter i is used to indicate a nisba suffix (e.g. "millî" and "dinî"). Some terms may contain hyphens in Turkish.

Romanian (ro). Letters with diacritics (ă, â, î, ș and ț) are used according to common orthographic rules.

Russian (ru). Cyrillic is used. The character ë is replaced by e, while й is always used.

Ukrainian (uk). Cyrillic is used. In certain cases the apostrophe or single quotation mark (') is used, for example "*м'ята*"@uk and "*бур'яни*"@uk. Latinate is used for some scientific names.

Vietnamese (vi). The Vietnamese alphabet contains seven letters that use diacritics: đ, ă, â, ê, ô, ơ and ư.

4.3 Regional language variants

English (en). Regional variants exist in English but are not used in AGROVOC (@en-gb, @en-us). AGROVOC uses UK spelling as standard.

German (de). The spelling and use of terms for German in AGROVOC should follow the common language use in the Federal Republic of Germany. Regional variants, for example for Austria, Switzerland, Belgium, Luxembourg and Italy, might be added when required.

Portuguese (pt) and Brazilian Portuguese (pt-BR). AGROVOC uses the pt code for Portuguese, as used in Portugal, and the pt-BR code for Brazilian Portuguese. The spelling and use of terms in Brazilian Portuguese in AGROVOC follow the common language use in Brazil. These may differ from regional variants in Portugal (and Angola, Cabo Verde, Guinea-Bissau, Equatorial Guinea, Mozambique, Sao Tome and Príncipe, and Timor-Leste), which might be added, if necessary.

Spanish (es) and (es-419). AGROVOC differentiates between Spanish and Spanish as used in Latin America and the Caribbean, using the United Nations M.49 region code.

4.4 Disambiguation

In AGROVOC, a term should only be used once, either as a preferred or non-preferred term. In some cases, disambiguation (term qualifiers in parentheses) is needed, particularly to uniquely identify one concept from another (e.g. if one wants to suggest a term for a concept already available but the term is already in use by another concept). This requires an evaluation and disambiguation action by the editor. However, disambiguation should be used only when necessary. Examples include `:c_15903` "*poisson (aliment)*"@fr and `:c_2943` "*poisson (animal)*"@fr, and `:c_6831` "*boards (wooden)*" and `:c_50163` "*boards (organizations)*". Homonyms also occur in taxonomy, such as `:c_25510` "*Vanilla (genus)*" and `:c_15126` "*vanilla (spice)*", or `:c_3299` "*glycine (amino acid)*" and `:c_3300` "*Glycine (genus)*". Depending on the language, term qualifiers may not be needed. For some older concepts, parentheses are part of the term, such as the statistical classification in `:c_44695` "*Acanthuridae (17402XXXXX)*".

[1] Using "pt" is permitted in RDF context, but deviates to some extent from Phillips and Davis, eds. (2009).

4.5 Adjectives and nominalization

The use of adjectives (without a noun), verbs and initial articles (e.g. "A", "An" or "The") should be avoided. In AGROVOC, verbs are nominalized (e.g. "*threshing*" instead of "*thresh*"). Adjectives are only ever used in compound terms, such as "*early diagnosis*", never alone.

4.6 Prepositional phrases

Depending on the language, the use of prepositional phrases should be avoided (e.g. use "*carbohydrate metabolism*" rather than "*metabolism of carbohydrates*").

4.7 Gender-neutral language

AGROVOC seeks to use gender-neutral language, although this depends on the specific language. English examples include using "*fishers*" rather than "*fishermen*" as the preferred term (with "*fishermen*", "*fisherwomen*" as non-preferred terms); "*humans*" rather than "*mankind*"; and "*workforce*" rather than "*manpower*".

4.8 Abbreviations and acronyms

Abbreviations are a shortened form of a word or set of words, while an acronym is an abbreviation formed from the initial letters of other words and pronounced as a word. An initialism is an abbreviation consisting of initial letters pronounced separately. The full form (written out) of the word should be generally selected as the preferred term. The abbreviated form, acronym or initialism should be selected (as the preferred term) only when it has become so well established that the full form is rarely used. In that case, the full form should be included as the non-preferred label. Examples include "*HACCP*" as the preferred label and "*hazard analysis and critical control point*" as the non-preferred label, and "*COVID-19*" as the preferred label and "*coronavirus disease 2019*" as the non-preferred label. Following the official spelling of organization names is recommended. The abbreviation or acronym should not be followed by the full form in parentheses, unless to disambiguate homographic terms within AGROVOC in the same language.

4.9 Capitalization

Capitalization rules vary by language and are often quite complex. In writing systems with a case distinction, capitalization is writing a word with its first letter as a capital letter (upper case letter) and the remaining letters in lower case. The agreed and appropriate capitalization of an individual language should be used when editing AGROVOC.

Common nouns and noun phrases use lower case except for proper names, acronyms, geographical names and scientific names for plants, animals, fungi, bacteria and viruses (see below).

Common names for plants, animals, fungi, bacteria and viruses use lower case. Please note that scientific names of organisms are often anglicized by changing their endings to English format, which should not be capitalized (e.g. scientific name: "*Vertebrata*", common name: "*vertebrates*"). Anglicized names of scientific names are considered common names. All taxonomic rank names start with a small letter.

Proper names are capitalized, generally with the first letter of each word. Please note that the official spelling of an organization should be used. Proper names also occur within longer terms, such as in combination with "*method*", "*theory*" or "*disease*" (e.g. "*Bayesian theory*" or "*Kjeldahl method*").

Geographical names begin with a capital letter. In the case of geographical names consisting of several words, all of them are capitalized. In the case of names of physical geography entities, such as names of mountains, rivers and lakes, the words "*mountain*", "*river*" and "*lake*" are usually also capitalized, for example "*Amazon River*".

Geographical adjectives or nouns used in a name also start with a capital letter. Look in authorized resources, such as national mapping agencies, for the official form.

Chemical compounds and elements, in their full form, are written in lower case, such as "*ethylene*" and "*methabenzthiazuron*", while the chemical symbol is always capitalized, such as "*O (symbol)*".

4.9.1 Capitalization: language variants

Albanian (sq). Lower case is used throughout, except where capitals are required in acronyms, scientific names, geographical names and proper names.

Arabic (ar). Arabic does not have capital letters. However, letters generally have four forms: 1) initial, 2) medial, 3) final and 4) isolated.

Belarusian (be). Lower case is used throughout, except where capitals are required in abbreviations, acronyms, scientific names and proper names. Adjectives formed from geographic names are written in capital letters if they are included in complex geographic names, (e.g. "*Усходняя Еўропа*"@be) and in lower case if they are not included in a complex proper geographical name (e.g. "*вірус афрыканскай чумы свінней*"@be). The proper names of geographic objects are capitalized, but within these, terms such as "*lake*", "*river*", "*ocean*", or "*mountain*" are written in lower case (e.g. "*Ціхі акіян*"@be).

Catalan (ca). Common nouns and noun phrases begin with a capital letter.

Chinese (zh). Chinese characters are not case sensitive in form.

Czech (cs). Lower case is used throughout, except where capitals are required in acronyms, scientific names, geographical names and proper names.

Danish (da). Lower case is used throughout, except where capitals are required in acronyms, scientific names, geographical names and proper names.

English (en). Lower case is used throughout, except where capitals are required in acronyms, scientific names, geographical names and proper names.

Estonian (et). Lower case is used throughout, except where capitals are required in acronyms, scientific names, geographical names and proper names.

Farsi (fa). The Farsi alphabet uses upper and lower case. The last letter of each word is capitalized. Common nouns and noun phrases are written in lower case. Farsi, or Persian, is written like Arabic: from the right, not the left. Farsi has two models for letters: 1) small or 2) capitalized.

Finnish (fi). Lower case is used throughout, except where capitals are required in acronyms, scientific names, geographical names and proper names.

French (fr). Lower case is used throughout, except where capitals are required in acronyms, scientific names, geographical names and proper names. This change was made in 2021. Adjectives qualifying a mountain, an ocean or a river are capitalized, for example, "*golfe Persique*"@fr. When the words "*nord*", "*sud*", "*est*" and "*ouest*" are part of the name of a state, or designate a region or a portion of territory, these words take a capital letter, for example, "*Afrique du Sud*"@fr. Accents are retained on capital letters.

Gaelic (ga). Lower case is used throughout, except where capitals are required in acronyms, scientific names, geographical names and proper names.

Georgian (ka). Modern written Georgian does not distinguish cases.

German (de). Common nouns start with a capital. Terms may start with a lower case if the first word is not a noun, for example "*natürliches Gründland*"@de. In proper names, all terms start with a capital letter, for example "*Indischer Ozean*"@de or "*Indischer Elefant*"@de.

Italian (it). Common nouns, verbs and noun phrases start with a capital.

Malay (ms). Common nouns start with a capital.

Norwegian Bokmål (nb) and Norwegian Nynorsk (nn). Lower case is used throughout, except where capitals are required in acronyms, scientific names, geographical names and proper names.

Polish (pl). Common nouns start with a capital.

Portuguese (pt) and Brazilian Portuguese (pt-BR). Lower case is used throughout, except where capitals are required in acronyms, scientific names, geographical names and proper names. This change was made in 2021. Proper names turned into adjectives (in an expression) are written in lower case (e.g. "*teoria bayesiana*" but "*teoria de Bayes*"). Geographical adjectives or nouns used in a name also start with lower case letters (e.g. "*elefante asiático*").

Romanian (ro). Lower case is used throughout, except where capitals are required in acronyms, scientific names, geographical names and proper names.

Russian (ru). Common nouns and noun phrases are written in lower case, while upper case is used to distinguish proper nouns (starting with a capital) or abbreviations (all upper case). Adjectives formed from geographic names are written in capital letters if they are included in complex geographic names (e.g. "*Восточная Европа*"@ru and "*Индийский океан*"@ru) and in lower case if they are not included in a complex proper geographical name (e.g. "*африканская чума лошадей*"@ru). The proper name of an geographic object is written with a capital letter, but within these, terms such as "*lake*" or "*river*" are written in lower case, for example "*озеро Альберта*"@ru or "*река Тигр*"@ru.

Serbian (sr). Lower case is used throughout, except where capital letters are required in abbreviations, acronyms, scientific names and proper names. Adjectives formed from geographic names are written in lower case if they are not included in a complex proper geographical name (e.g. "*афрички слонови*"@sr). The proper name of geographic

object begins with a capital letter, but within these, terms such as "*lake*", "*river*", "*ocean*" or "*mountain*" are written in lower case (e.g. "*Тихи океан*"@sr).

Slovak (sk). Lower case is used throughout, except where capitals are required in acronyms, scientific names, geographical names and proper names.

Spanish (es) and (es-419). Common nouns and noun phrases start with a capital. Accents should be retained on capital letters (e.g "*África*"@es). When the cardinal directions (north, east, south and west) have a geopolitical value or are part of a geographical name, they are capitalized, as in "*América del Norte*"@es.

Swahili (sw). Lower case is used throughout, except where capitals are required in acronyms, scientific names, geographical names and proper names.

Swedish (se). Lower case is used throughout, except where capitals are required in acronyms, scientific names, geographical names and proper names.

Thai (th). In Thai, letters are not case-sensitive in form.

Turkish (tr). Common nouns and noun phrases are written in lower case. The first letter of proper nouns are written in upper case. The abbreviations of establishment, country, book, magazine and direction names are made by writing the first letter of each word in a capital letter.

Ukrainian (uk). Lower case is used throughout, except where capitals are required in acronyms, scientific names, geographical names and proper names.

Vietnamese (vi). Lower case is used throughout, except where capitals are required in acronyms, scientific names, geographical names and proper names.

4.10 Singular and plural

For English, all **countable common nouns** should be plural, while **uncountable common nouns** should be singular (e.g. "*light*" and "*navigation*").

Names of **parts of the body** should be expressed in plural when more than one occurs in a fully formed organism (e.g. "*eyes*") but in the singular if only one is present (e.g. "*heart*").

If a given **substance or material** is regarded as a class with more than one member, the class should be expressed in the plural (e.g. "*ceramics*" and "*plastics*").

The names of **abstract concepts** (e.g. systems of belief, activities, emotions, properties and disciplines) should be expressed in the singular.

For all **multi-word names** composed of nouns and content words (i.e. verbs, adjectives and most adverbs), the same editorial rules apply as for common nouns.

4.10.1 Common names for plants, fungi, bacteria and viruses

Family. Common family names for plants and animals should be either singular or plural (e.g. "*pondweed family*" and "*legumes*"). Common names for fungi at genus and family level are rarely used.

Genus. Common genus names for plants and animals should be singular, or plural if referring to all species with that genus.

Species. Common species names for plants and animals should be plural (e.g. "*millets*" and "*dogs*"). Common names for fungi, bacteria and viruses should be singular (e.g. "*oyster mushroom*").

4.10.2 Scientific names for plants, animals, fungi, bacteria and viruses

Scientific family, subfamily (and upper taxonomic levels). Scientific names for plants, animals and fungi above species level should be plural (e.g. "*Solanaceae*", "*Salmonidae*" and "*Pucciniales*").

Genus. Scientific genus names for plants, animals, fungi, bacteria and viruses are usually used in the singular (e.g. "*Salmo*", "*Poa*" and "*Aparavirus*").

Species. The scientific species names for plants, animals, fungi, bacteria and viruses (genus name + epithet) should be singular (e.g. "*Salmo salar*", "*Poa pratensis*" and "*Kashmir bee virus*").

4.10.3 Singular and plural: language variants

Arabic (ar). Plural is used for countable and uncountable nouns.

Belarusian (be). Singular is used for countable nouns. Plural is used if the singular does not exist or if the plural is more common.

Catalan (ca). Plural is used for countable nouns.

Chinese (zh). Chinese nouns and noun phrases have no distinction between singular or plural.

Danish (da). Words representing units, types and parts that can be counted are put in plural, while what cannot be counted is singular. Properties, processes, operations, activities, disciplines, materials and raw materials are used in the singular.

English (en). Plural is used for countable nouns.

Estonian (et). Plural is used for countable nouns.

Farsi (fa). Farsi uses both the singular and plural forms for countable nouns, with the suffixes added for plural nouns. In modern Farsi, the plural suffix is not connected to the noun, while in the old Farsi the plural suffix is connected to the noun, for example, قلمها (old); ها قلم (modern). Some plural nouns follow the Arabic model.

French (fr). Singular is used for countable nouns.

Georgian (ka). Singular is used for countable nouns. Plural is used if the singular does not exist or if the plural is more common.

German (de). Singular is used for countable nouns, nominative unless a term does not exist in singular (e.g. "*Leute*"@de) or does not make sense (e.g. "*Kakaonibs*"@de).

Italian (it). Plural is used for countable nouns.

Norwegian Bokmål (nb) and Norwegian Nynorsk (nn). Words representing units, types and parts that can be counted are put in plural, while what cannot be counted is singular. Uncountable nouns, such as properties, processes, operations, activities, disciplines, materials and raw materials, are used in the singular.

Portuguese (pt) and Brazilian Portuguese (pt-BR). Common nouns are used in the singular, unless a noun does not exist in singular or has a distinct meaning in plural (distinction between countable and uncountable nouns is not used to define plural or singular in Portuguese). Compound terms might be single words, connected by hyphen or consist of multiple words. Adjectives are only used in compound terms. Verbs are nominalized.

Romanian (ro). Plural is used for countable nouns. Singular is used for uncountable nouns, such as activities, processes, operations, properties and disciplines.

Russian (ru). There are no regulations related to the use of plural or singular in Russian, but in general, plural is used for countable nouns. The lowest concepts in the hierarchy are written mostly in singular, while broader concepts can be written in plural. Elements of a collection are listed in singular, and the generic name is in plural.

Serbian (sr). Singular is used for countable nouns. Plural is used if the singular does not exist or if the plural is more common.

Slovak (sk). Plural is used for both nouns and verbs. Some nouns do not have a singular form (e.g. "*dvere*"@sk).

Spanish (es and ed-419). Common nouns are used in the singular, unless a noun does not exist in singular or has a distinct meaning in plural.

Swahili (sw). Singular is used for countable nouns.

Swedish (se). Words representing units, types and parts that can be counted are put in plural, while what cannot be counted is singular. Properties, processes, operations, activities, disciplines, materials and raw materials are set in singular.

Thai (th). There is no distinction between singular and plural.

Turkish (tr). Singular is used for nouns. If the meaning of the term is lost or changes when written in the singular, use plural, for example "*memeliler*"@tr. Common family names for plants and animals can be plural, for example, "*Patlıcangiller*"@tr (Solanaceae) and "*Abanozgiller*"@tr (Ebenaceae). In Turkish all words are singular. The morphological indication of plural formation in the Turkish language is the "ler" and "lar" at the end of the words. In some cases, the plural suffix (-lar and -ler) can add meanings other than plural to the nouns. There are also different styles and meanings to singular and plural nouns. In other words, although some nouns do not take the plural suffix, they express more than one entity in terms of meaning. These nouns are the names that express "community", for example "*sürü*"@tr.

Ukrainian (uk). Plural is used for countable nouns. Singular is used for uncountable nouns, for example "*діяльність*"@uk and "*навчання*"@uk.

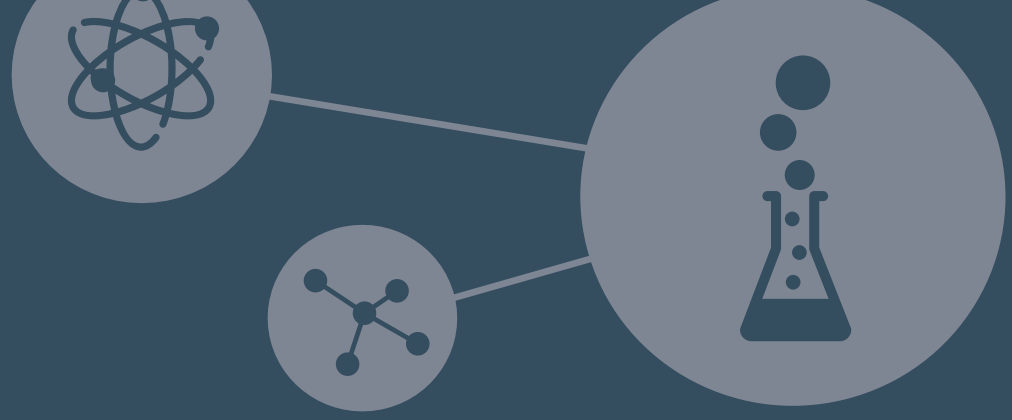
Vietnamese (vi). Vietnamese has no plural forms for nouns, adjectives or verbs.

4.11 Other

Arabic (ar). Known scientific names are written in Arabic, while names that have no equivalent in Arabic are written in Latin. To translate a specific term from English to Arabic, translate it as close to English as the Arabic words allow.

Chinese (zh). For scientific names, there are three methods: 1) replace the foreign words with translations; 2) use the translation and attach the original text in parentheses after it; or 3) if there is no translation, use the foreign language directly. In AGROVOC, the first and third methods are used.

German (de). Articles ("der", "die" and "das") are not used at the beginning of a term. Compound terms might be single words, connected by a hyphen, or consist of multiple words (e.g. `:c_9000046` "*Energie für die Landwirtschaft*"@de or `:c_16146` "*Pflanze Boden-Beziehung*"@de). Adjectives are only used in compound terms; for example, "landwirtschaftlich" is not a valid term. Verbs are nominalized (e.g. `:c_14721` "*Schwitzen*"@de).



5 Scientific and common names

The scientific species names for plants, animals, fungi and bacteria are always binomial, consisting of a genus name and a specific name.

The genus name comes first and starts with a capital letter; the specific name comes second and starts with a lower-case letter. Scientific names are usually written in the Latin alphabet (scientific names are Latinate words, meaning it is not a Latin word but is Latinized). However, they may be also transliterated in different alphabets. Scientific names for virus species do not follow the Linnaean system. A virus may have a non-Latinate scientific name (e.g. "*Coconut cadang-cadang viroid*") that does not follow the usual two-part genus–species system.

In AGROVOC, scientific names do not use italics. The names of the ranks above species, such as families and orders, start with a capital letter (e.g. "*Eukaryota*", "*Animalia*" and "*Chordata*").

Common names and scientific names should be kept in separate hierarchies wherever possible, unless a scientific name is used as a common name. Scientific or common names of animals, plants and fungi may be preferred terms depending on the hierarchy in which the common names or scientific names are placed. Scientific and common names of viruses and bacteria are not kept in separate hierarchies.

If adding scientific or common names, the corresponding common or scientific name should also be added, with links between them. It may be necessary to add the rank above and then the new concept. The common name and scientific name should be linked by means of the concept-to-concept property `hasTaxonomicConcept/hasCommonNameConcept` to explain, for example, that "*banteng*" `hasTaxonomicConcept` "*Bos javanicus*" or that "*Apis mellifera*" `hasCommonNameConcept` "*honeybees*". This should not be confused with the label-to-label relationship `hasScientificName/scientificNameOf`, which is only used inside a concept.

Scientific names should not be used as non-preferred terms in the common name hierarchy. However, there are a few exceptions to this rule, such as cases where common names and scientific names can be found together. For scientific names, the taxonomic rank must always be added for organisms, for example "*Apis mellifera*" `hasTaxonomicRank` "*species (taxa)*".

Authors of a species or genus should be added where available as an editorial note (see section 8.2 Notes), for example "*Caudiverbera caudiverbera*" `skos:editorialNote` "*Author: (Linnaeus 1758)*". This information is useful for disambiguation. For the format of the author citation, please follow the conventions of the relevant science discipline. Additional information on a scientific name, such as the source citation, will be available in other resources. Aligning concepts with these authoritative resources is very important, as it helps ensure that the correct and current name is used, such as "*Ochotona*" (author: Link, 1795), not the synonym "*Tibetolagus*" (author: Argyropulo, 1948), to avoid concept duplicates and to support linked open data efforts.

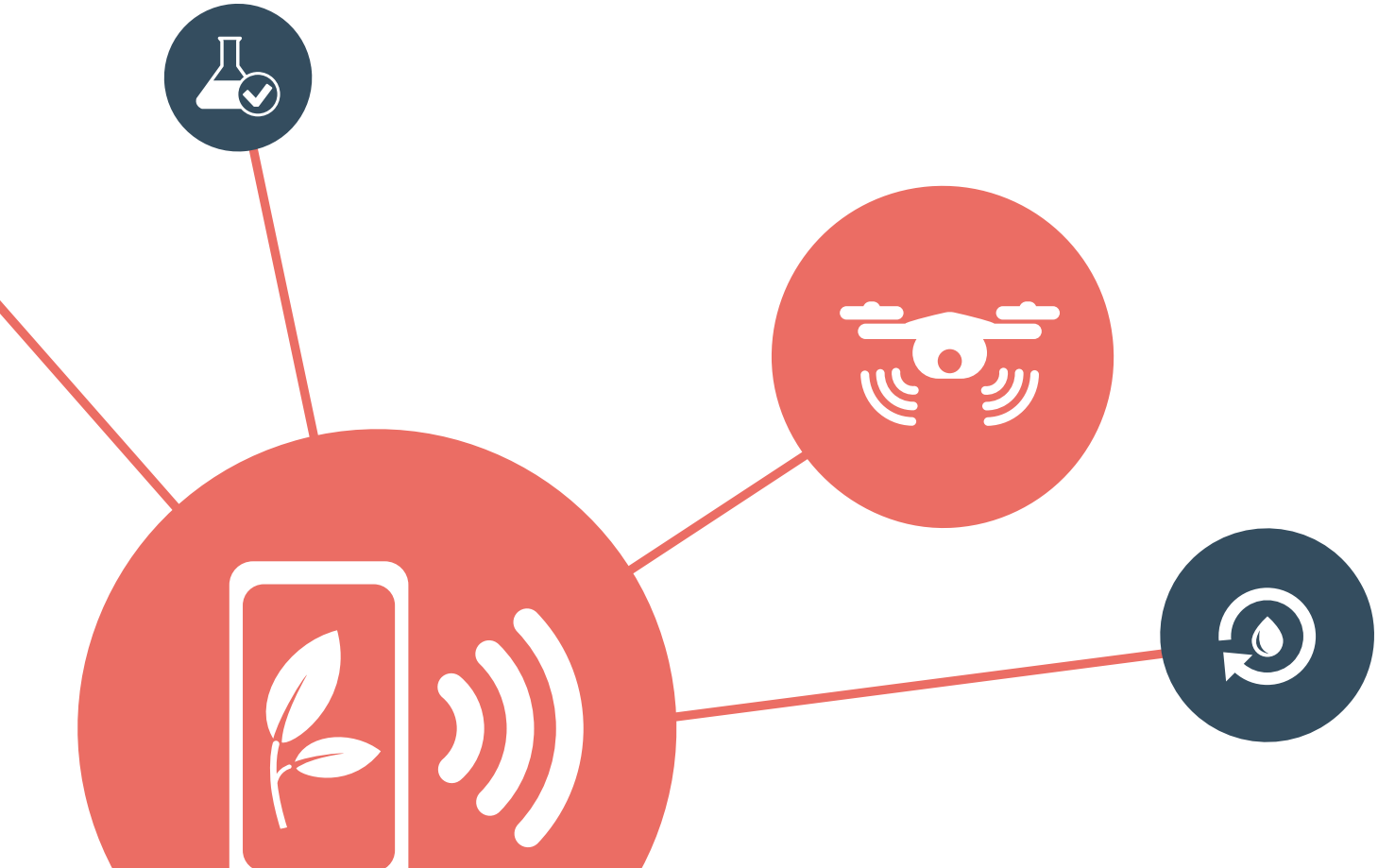
Before adding scientific names, check authorities lists to make sure the correct name is added (not a synonym or an old name). If necessary, a synonym might be added as an altLabel. AGROVOC focuses on scientific names of other organisms relevant for its areas of interest, mainly food, agriculture, forestry and fishery. For organisms in general, more specialized resources are available (see Bibliography).

The checklist for adding a new scientific name is (* means mandatory):

- Verify that the organism is in scope for AGROVOC (i.e. has relevance for agriculture, fisheries, forestry, horticulture or economics), such as food, feed or pest, or has an important ecological function.*
- Verify the name with the trusted authority that suggested its current, accepted name.*
- Check that a synonym of the concept does not exist in AGROVOC.*
- Add the scientific name as a new concept.
- Add the taxon (Agrontology property `hasTaxonomicRank`).*
- Add the author (see section 8.2 Notes) using `skos:editorialNote`.
- Add the alignments (see section 8.3 Alignments), for example to GBIF or NALT.
- Add the Agrontology relation to or from the common name (i.e. Agrontology property `hasTaxonomicConcept/hasCommonNameConcept`).
- If the common name does not exist, evaluate if it is needed as a separate new concept (applies to animals, plants and fungi but not viruses).

6 Chemical compounds and elements

For chemical compounds and elements, the full form is always the preferred term, whereas the symbol is the non-preferred term. For example, "*trinitrotoluene*" is preferred, but "*TNT*" is non-preferred, and "*oxygen*" is preferred, but "*O (symbol)*" is non-preferred. Note that a chemical symbol is followed by the specification "*symbol*" in parentheses (e.g. "*P [symbol])*" and "*C [symbol]*"). Chemical compounds and chemical elements written out are non-countable nouns and should be expressed in the singular.



7 Geographical names

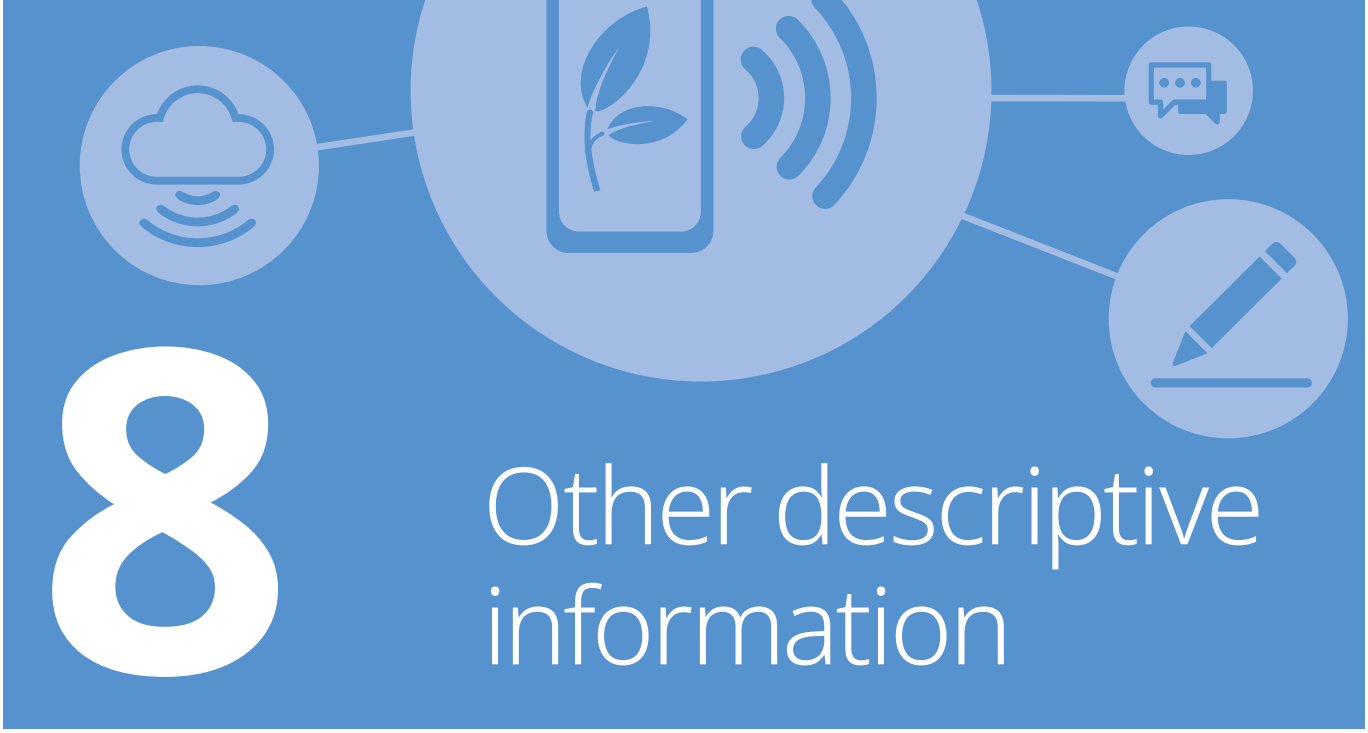
AGROVOC contains all names of countries recognized by the United Nations, as defined in FAOTERM and in the FAO NOCS database and/or the UNBIS Thesaurus.

Short names are generally entered as preferred terms (`skos:prefLabel`), while long names and abbreviations/acronyms are entered as non-preferred or alternative terms (`skos:altLabel`), for example "*Rwanda*", "*Republic of Rwanda*"; "*European Union*", "*EU*"; and "*Saint Lucia*", "*St Lucia*". Types of countries, like "*Small Island Developing States*", are under subconcept "*countries*". For old names of countries, the label-to-label Agrontology property `HasOldName` is used (e.g. "*Rwanda*" `HasOldName` "*Rwandese Republic*", "*European Union*" `HasOldName` "*European Common Market*").

Authoritative resources should be consulted for the geographical entities, sub- and super-nationals, and entities of physical geography (e.g. for the official form of names of mountains, rivers, lakes, valleys, etc.). The official form should be the preferred term, and all other variants are considered non-preferred terms.

In the case of names of entities from physical geography, such as names of mountains, rivers and lakes, for English, for example, consider adding the word "mountain", "river", "lake", etc., directly to the term (without parentheses) to disambiguate it from regions, cities, etc., with the same name. AGROVOC is not a geographical thesaurus, so smaller geographical entities such as cities are discouraged.

The three-digit ISO 3166 alpha code of a country or area represents its identity, whereas the M49 numerical code represents its statistical area.



8 Other descriptive information

In this section, other descriptive information types are explained, including definitions, notes and alignments.

8.1 Definitions

Definitions help AGROVOC users to understand concepts and decide how to use them. The definition is a statement or formal explanation of the meaning of a concept. In SKOS, definitions are expressed by the predicate `skos:definition`. The following considerations should be followed when adding definitions.

- Definitions consist of a narrative and its source, which are both mandatory.
- A good definition explains what a concept is, not what it does.
- Only one definition per language is recommended.
- A definition is a sentence that requires orthographical rules, such as starting a sentence with a capital letter and ending a sentence with a full stop (period). The AGROVOC definitions need to be concise (ideally one sentence) and clear.
- A definition may be expressed in one or more AGROVOC languages.
- A definition does not have to be a translation of an existing definition, but all definitions for a concept should have the same conceptual meaning.
- A definition should implicitly explain the difference from closely related concepts.
- Circular, imprecise or negative definitions should be avoided.

Editors are strongly encouraged to provide a definition in English when adding a new concept to AGROVOC, independently of their preferred language. This helps users to understand the concept and other editors to find appropriate translations to other languages.

The definition should contain a unique identifier for chemical substances, such as the CAS number "CAS NO. 422556-08-9".

A trusted and stable source for the definition, such as an external glossary or thesaurus of a well-known institution, is required. Credit must be given to the creator. When copyright is restrictive, it must be respected. The source should be:

- a URL (e.g. www.fao.org/3/ ca9182en/CA9182EN.pdf); or
- a descriptive text, such as the name of the publication (e.g. "The pollination of cultivated plants: a compendium for practitioners-Vol. 2, FAO, 2018"). If descriptive text is selected, the citation of the source (including the title, author and year) should be added; or
- an authority (e.g. "Land Administration Domain Model ISO 19152:2012"). To combine free text and URL, the descriptive text should be used.

As an example, the concept "*local knowledge*" (see Figure 6) has the definition "Local knowledge is the knowledge that people in a given community have developed over time, and continue to develop." The source is "Building on Gender, Agrobiodiversity and Local Knowledge". FAO, 2004 www.fao.org/3/y5610e/y5610e01.htm.

Figure 6. Example of a definition and scope note shown in Skosmos

Source: FAO (2021).

8.2 Notes

AGROVOC currently uses three types of notes: 1) editorial notes, 2) scope notes, and 3) history notes. **It is optional to translate notes.**

8.2.1 Editorial note

The note `skos:editorialNote` is used for editorial comments, such as reasons for changing a concept. This type of note is also used for adding the author of a species.

For plants, algae and fungi, follow the conventions described in the Botanical Code. Use the format "*Author: Surname*" or "*Author: Standard abbreviation*", where applicable. For example, "*Linneaus*" is often abbreviated to "*L*".

Other guidelines include:

- Use standard abbreviations of author names, if existing, as given in the authoritative resources (see Bibliography), for example "*Hordeum bogdanii*" with `skos:editorialNote` "*Author: Wilensky*" or "*Hordeum vulgare*" with `skos:editorialNote` "*Author: L*".
- List the author for the preferred scientific name only.
- An authority in parentheses indicates that the species has changed since the original authority described it. If the author of the current name is different from the author of the species itself, e.g. a species has been moved to another genus, the original author is given in parentheses, followed by the current author, for example "*Abies lasiocarpa*" with `skos:editorialNote` "*Author: (Hook.) Nutt*".

For animals, follow the conventions given in the Zoological Code. Use the format "*Author: Surname, Year*". Author names are not abbreviated, for example "Spodoptera frugiperda" (Smith, 1797). In skos:editorialNote "*Author: (Smith, 1797)*". Note that the author is in parentheses, as it was originally "*Phalaena frugiperda*". Another example is "Capra ibex" Linnaeus, 1758. In `skos:editorialNote` "Author: Linnaeus, 1758". Note that no parentheses are used here, but the comma is followed by authority year.

For bacteria, follow the conventions given in the Microbial Code. Use the format "*Author: Surname, Year.*" Author names are not abbreviated. The citation of a new combination should include the name of the original author in parentheses followed by the name of the author who proposed the new combination and the year of publication of the new combination.

Authorities and dates are not required for viruses and viroids.

8.2.2 Scope note

The note `skos:scopeNote` is used to explain the application of a term and to indicate limitations or extensions of the term meaning. Some examples for scope notes are:

- For "*consistency*", the scope note reads "*Restricted to the physical property*".
- For "*agricultural sector*", the scope note indicates "*Includes fishery and forestry sectors*".
- For "*growth rate*", the scope note explains "*Restricted to the biological phenomenon; in economics use* `:c_29767`".

8.2.3 History note

The note `skos:historyNote` can be used to provide more details for the editorial history. Some examples for history notes are:

- For "*Eswatini*", the history note explains "*The country name was changed from the former name of the Kingdom of Swaziland (former short form: Swaziland). Effective date: 19 April 2018.*"
- For "*Balistes capriscus*", the history note indicates "*Previously Balistes carolinensis Gmelin, 1789 (synonym)*".

8.3 Alignments

AGROVOC uses skos:mappingRelation sub-properties for aligning to concepts in other vocabularies. In particular, these are `skos:closeMatch`, `skos:exactMatch`, `skos:broadMatch`, `skos:narrowMatch` and `skos:relatedMatch`.

These are defined according to SKOS as:

"The properties `skos:broadMatch` and `Skos:narrowMatch` *are used to state a hierarchical mapping link between two concepts. The property* `skos:relatedMatch` *is used to state an associative mapping link between two concepts.*

The property `skos:closeMatch` *is used to link two concepts that are sufficiently similar that they can be used interchangeably in some information retrieval applications. In order to avoid the possibility of "compound errors" when combining mappings across more than two concept schemes,* `skos:closeMatch` *is not declared to be a transitive property.*

The property `skos:exactMatch` *is used to link two concepts, indicating a high degree of confidence that the concepts can be used interchangeably across a wide range of information retrieval applications.* `skos:exactMatch` *is a transitive property, and is a sub-property of* `skos:closeMatch`."

www.w3.org/TR/skos-reference/#mapping

It is recommended to use `exactMatch` or `closeMatch`, when appropriate. Attention needs to be paid when applying `skos:exactMatch` to an external concept, since a reasoner will infer that all concepts that are `skos:exactMatch` for that external concept are also `skos:exactMatch` for the AGROVOC concept. If in doubt, `skos:closeMatch` needs to be used, not `skos:exactMatch` (see Figure 7).

Figure 7. Example of alignments for the concept "*food safety*" shown in Skosmos

Source: FAO (2021).

When adding a new concept, it is recommended to add one or more alignments wherever possible. Only URIs should be used, not web page URLs. For example, `:c_6599` "*rice*" has `skos:exactMatch` to <http://lod.nal. usda.gov/nalt/56293> and <http://with http://cat.aii.caas.cn/concept/7599>.

Alignment targets are checked periodically and removed from AGROVOC releases if they are no longer available.

Only concepts in other trusted thesauri should be aligned to AGROVOC, not classes from ontologies (DBpedia and Wikidata are exceptions).

Examples of trusted alignment targets include the:

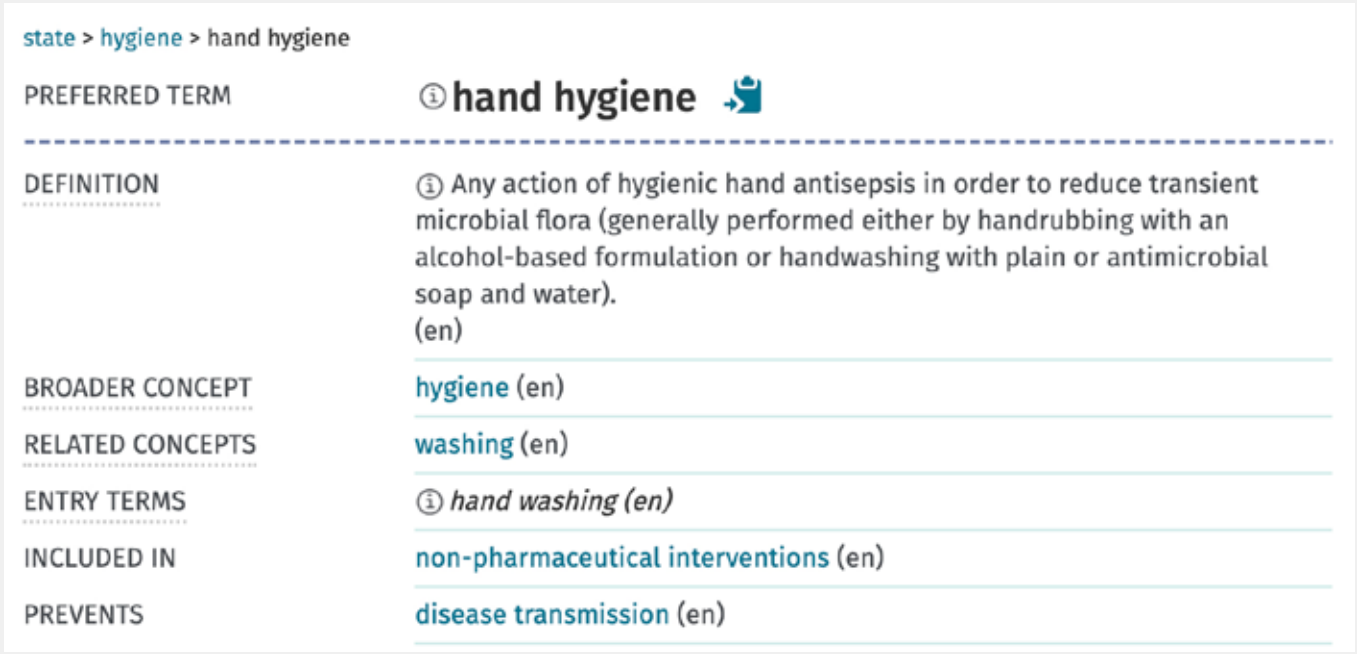
- NALT (http://agclass.nal.usda.gov/);
- Chinese Agricultural Thesaurus (http://cat.aii.caas.cn/);
- EuroVoc and other European Union vocabularies (https://op.europa.eu/en/web/eu-vocabularies/);
- GEMET (www.eionet.europa.eu/gemet);
- United Nations Bibliographic and Information System (UNBIS) (http://metadata.un.org/thesaurus/?lang=en);
- DBPEDIA (http://dbpedia.org/void/Dataset); and
- Wikidata (www.wikidata.org/).

8.4 Agrontology

AGROVOC uses a specific vocabulary of relations called "Agrontology", a support ontology for AGROVOC, and a Web Ontology Language (OWL) vocabulary. When these properties are applied consistently and at scale, it will also enhance the impact of AGROVOC in semantic context. For example, "*olive oil*" `isDerivedFrom` "*olives*", which `IsProducedBy` "*Olea europaea*", which `hasPest` "*Bactrocera oleae*" and `hasPathogen` "*Xylella fastidiosa*". A condensed version of the Agrontology was introduced for use by AGROVOC editors within VocBench in late 2021. The full Agrontology set is available in releases.

More examples of these domain-specific relations between concepts are `isProducedBy/produces` and `hasComponent/isComponentOf`. Concept-to-concept relationships can be either symmetric or asymmetric. Symmetric properties for **concept-to-concept relations** only need to be added in one direction to be shown symmetrically in Skosmos, but they will not be visible symmetrically in VocBench. The inferred information is available in SPARQL queries, published AGROVOC datasets, Loddy and in Skosmos. For example, after adding the relationship in VocBench that "hand hygiene" prevents "disease transmission", in the next release of AGROVOC, Skosmos will indicate that "disease transmission" `IsPreventedBy` "hand hygiene" (see Figure 8). Other properties are not symmetric, such as `M49code`.

Figure 8. Example of Agrontology properties for the concept "*food safety*" shown in Skosmos



Source: FAO (2021).

Some Agrontology properties are also **label-to-label relations** within a concept, such as `hasSynonym/hasSynonym`. For example, `:c_1145` "*Bulgaria*" has the English label `xl_en_1299522430729` "*Bulgaria*" (the formal short name), which `hasSynonym` "*Republic of Bulgaria*" (the formal long name) and `hasOldName` "*People's Republic of Bulgaria*". Label-to-label relations are visible in VocBench, SPARQL queries, Loddy and published AGROVOC datasets, but not in Skosmos.

Definitions for selected Agrontology properties are available in its OWL file and Vocbench.

Below is a short list of selected Agrontology properties.

processRelationship

usesProcess/isProcessFor

isUsedIn/makeUseOf

hasGoalOrProcess/isAchievedByMeansOf

hasObjectOfActivity/isObjectOfActivity

isStudiedBy/study

causativeRelationship

affects/isAffectedBy

afflicts/isAfflictedBy

causes/isCausedBy

hasDisease/isDiseaseFor

hasHost/isHostFor

hasPathogen/isPathogenOf

hasPest/pestOf

hasProduct/productOf

hasProperty/isPropertyOf

hasSymptom/indicates

IsDerivedFrom/isSourceOf

isMadeFrom/isUsedToMake

isPreventedBy/prevents

isProducedBy/produces

quantitativeRelationship

isMeasuredBy/measures

spatialRelationships

isSpatiallyIncludedIn/spatiallyIncludes

surroundedBy/surrounds

taxonomicRelationship

hasTaxonomicRank/isTaxonomicRankOf

hasTaxonomicConcept/
hasCommonNameConcept

partitiveRelationship

hasPart/isPartOf

compose/isComposedOf

hasComponent/isComponentOf

hasMember/isMemberOf

hasType/TypeOf

includes/includedIn

skosxl:labelRelation
(Label-to-label relationships)

hasSynonym/hasSynonym

hasAcronym/isAcronymOf

hasOldName/isOldNameOf

hasScientificName/scientificNameOf

hasSymbol/isSymbolFor

skos:notation

hasCodeISO3Country

M49code

9 Frequently asked questions (FAQs)

What topics does AGROVOC cover?

AGROVOC covers all areas of interest to FAO, such as food, nutrition, agriculture, forestry, fisheries, names of animals and plants, environment, biological notions, plant cultivation techniques.

How is AGROVOC organized?

AGROVOC has 25 top concepts, described in the Annex. All other concepts, the sub-concepts, are placed underneath these concepts. Concepts are organized hierarchically by means of the relations `skos:broader` (BT) and its inverse `skos:narrower` (NT). The thesaurus ideal is to keep hierarchies as simple as possible. In some cases, more than one broader concept may be used (polyhierarchy), but this is an exception. Consider using Agrontology properties instead. Concepts can be moved in hierarchy if needed, but please ask the AGROVOC team for help. The hierarchy should be coherent so that all concepts below the same top concept belong to the same semantic category.

What type of information is attached to AGROVOC concepts?

For each concept in AGROVOC, the following types of information can be distinguished:

- terminological information: all the terms/labels in all languages that represent the concept;
- structural information: relations between concepts and between terms;
- semantic information: definitions of the concept; and
- editorial information: editorial notes and scope notes.

If a language is not covered by AGROVOC, can it be added?

Yes. For the maintenance of each language version, AGROVOC collaborates with different domain experts (or information managers with domain knowledge) and institutions. If an organization is interested in translating and curating (a part of) AGROVOC into a specific language,

it should inform FAO at agrovoc@fao.org. In order to be added to AGROVOC, a language must have a responsible editing institution, and a language tag in the IANA Language Subtag Registry.

How is the quality of AGROVOC content ensured?

All AGROVOC editors are recognized experts in their field, working in centres of recognized value in the area of agriculture. Moreover, the workflow distinguishes three editorial roles: 1) validator, 2) editor and 3) lexicographer. Beyond being very knowledgeable in their specific area of expertise, validators are also well acquainted with the AGROVOC structure and editorial issues. Validators are entitled to accept or reject contributions made by editors and lexicographers.

AGROVOC is a KOS. What does this mean?

KOS stands for Knowledge Organization System. Thesauri, authority lists, controlled vocabularies and classification systems are examples of KOS. In particular, AGROVOC is a KOS because its terms and concepts are normally used as values of certain metadata properties.

Who maintains AGROVOC?

AGROVOC is a collaborative effort. The AGROVOC team at FAO keeps AGROVOC up to date, together with a number of partner institutions.

How often is AGROVOC updated?

AGROVOC is updated on a continuous basis. Updated AGROVOC content is released once a month.

What tool is used to maintain AGROVOC?

AGROVOC is edited using VocBench, a web-based vocabulary management tool. VocBench fully supports multilingualism and embodies a formalized editorial workflow. VocBench allows for the distinction between user roles and editing rights. The VocBench installation used to maintain AGROVOC is available only to AGROVOC editors.

Is it possible to view or browse hierarchies when viewing AGROVOC online?

It is possible to view or browse hierarchies through Skosmos. When searching a term, a list of term results that match the search will be displayed. When one of the concepts is clicked, the hierarchy of the selected concept will appear in the left panel, and all the information regarding the concept appears in the right panel. It is possible to navigate within the hierarchy by clicking other concepts in the left panel.

10 Future action

The AGROVOC editorial guidelines are not exhaustive, but they are a living document, which will be updated when needed to accommodate the needs of AGROVOC editors and the AGROVOC community of users.

AGROVOC has evolved from a paper-printed source to a dynamic online tool with an important number of stakeholders volunteering to contribute to different language versions and subject domains. AGROVOC has started a substantial effort to expand the coverage through collaboration with communities of experts to include specialized domains that benefit from the AGROVOC infrastructure. All this work requires coordination and full understanding of the basic principles behind the maintenance of AGROVOC. With the purpose that AGROVOC will continue growing in a coherent and consistent way, these guidelines will be periodically updated to cover more editorial principles and also to enlarge the recommendations with more information about language versions.

Data-driven decision-making is essential to drive further research, support ongoing investigations and share critical knowledge. Controlled vocabularies such as AGROVOC play a small but important part in ensuring that data and research are accessible, even across languages. AGROVOC supports agricultural sciences to become better in Findability, Accessibility, Interoperability and Reuseability.

Suggestions and questions are welcome. Contact AGROVOC by emailing **agrovoc@fao.org**.

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Language specific resources

Note for German (de). The spelling of all words follows the Amtliche Regelwerk (www.rechtschreibrat.com/regeln-und-woerterverzeichnis/).

Note for Portuguese (pt) and Brazilian Portuguese (pt-BR). The spelling of words should follow *Vocabulário Ortográfico Comum da Língua Portuguesa* (https://voc.cplp.org/index.php) and the *Vocabulário Ortográfico da Língua Portuguesa, sexta edição, 2021* (www.academia.org.br/nossa-lingua/busca-no-vocabulario).

Note for Spanish (es). The rules on spelling and punctuation can be consulted in *Ortografía de la lengua española* (www.rae.es/obras-academicas/ortografia/ortografia-2010), *Nueva grammar de la lengua española* (www.rae.es/obras-academicas/gramatica) and the *Dictionary of the Spanish language of the Royal Spanish Academy* (https://dle.rae.es/diccionario).

Note for Turkish (tr). Detailed information on Turkish spelling rules can be found on the official website of the Turkish Language Association (www.tdk.gov.tr/kategori/icerik/yazim-kurallari/), which includes *Türkçe Sözlük*, the official Turkish dictionary, and *Yazım Kılavuzu*, the Turkish writing guide.

Glossary

Agrontology	Specific vocabulary of non-hierarchical relations developed for AGROVOC, grouped under `skos:related`.
Concept	Concepts may cover any subject: an animal, a plant, a geographical region, a chemical element, a technique, etc. Operationally, a concept is a set of terms used in any language to describe the same idea. *"intensive farming"** *"intensive agriculture"* *"Explotación agrícola intensiva"*@es *"agriculture intensive"*@fr
Sibling concept	Concepts that have the same parent concept. For example, "*wood products*" and "*non-wood products*" are sibling concepts (i.e. on the same level in the hierarchy) of the shared parent concept "*forest products*".
Hierarchical relations between concepts	Concepts are organized hierarchically by means of the relations `skos:broader` (BT) and its inverse `skos:narrower` (NT). The relation can be generic between a category and its members, such as "*birds*" `skos:narrower` "*parrots*", where the biological order "*parrots*" is one of the members of the class "*birds*". Another hierarchical relation is between the whole and its parts. For example, "*blood vessels*" `skos:narrower` "*blood veins*" and "*arteries*". In some cases, the relation is instantial (i.e. refers to a particular instance). For example, "*mountain ranges*" `skos:broader` "*Alps*" or "*Apennines*".
Non-preferred term	All the alternative terms to name a concept in any given language are called non-preferred terms. For example, "*agrosilvicultural systems*" and "*farm forestry*" are non-preferred terms in English, which are used for concept `:c_207` (the preferred term is "*agroforestry*") .
Parent concept	In the hierarchical structure, the more general concept is the parent concept. It is the object of the relation `skos:broader`. For example, "*animals*", "*Animales*"@es is the parent concept of "*aquatic animals*", "*Animales acuáticos*"@es.
Preferred term	For each concept, in each language, one term is preferred and represents a single concept. The decision of which term should be preferred usually depends on its domain and its accepted conventions. For example, "*agroforestry*" is the preferred term in English for the concept `:c_207`.
Simple Knowledge Organization System (SKOS)	SKOS is a World Wide Web Consortium recommendation designed for representation of thesauri, classification schemes, taxonomies, subject-heading systems or any other type of structured controlled vocabulary. SKOS is part of the Semantic Web family of standards built upon Resource Description Framework and Resource Description Framework Schema, and its main objective is to enable easy publication and use of such vocabularies as linked data (https://en.wikipedia.org/wiki/Simple_Knowledge_Organization_System).
SKOS concept scheme	A SKOS concept scheme is an aggregation of one or more SKOS concepts (www.w3.org/TR/skos-reference/).

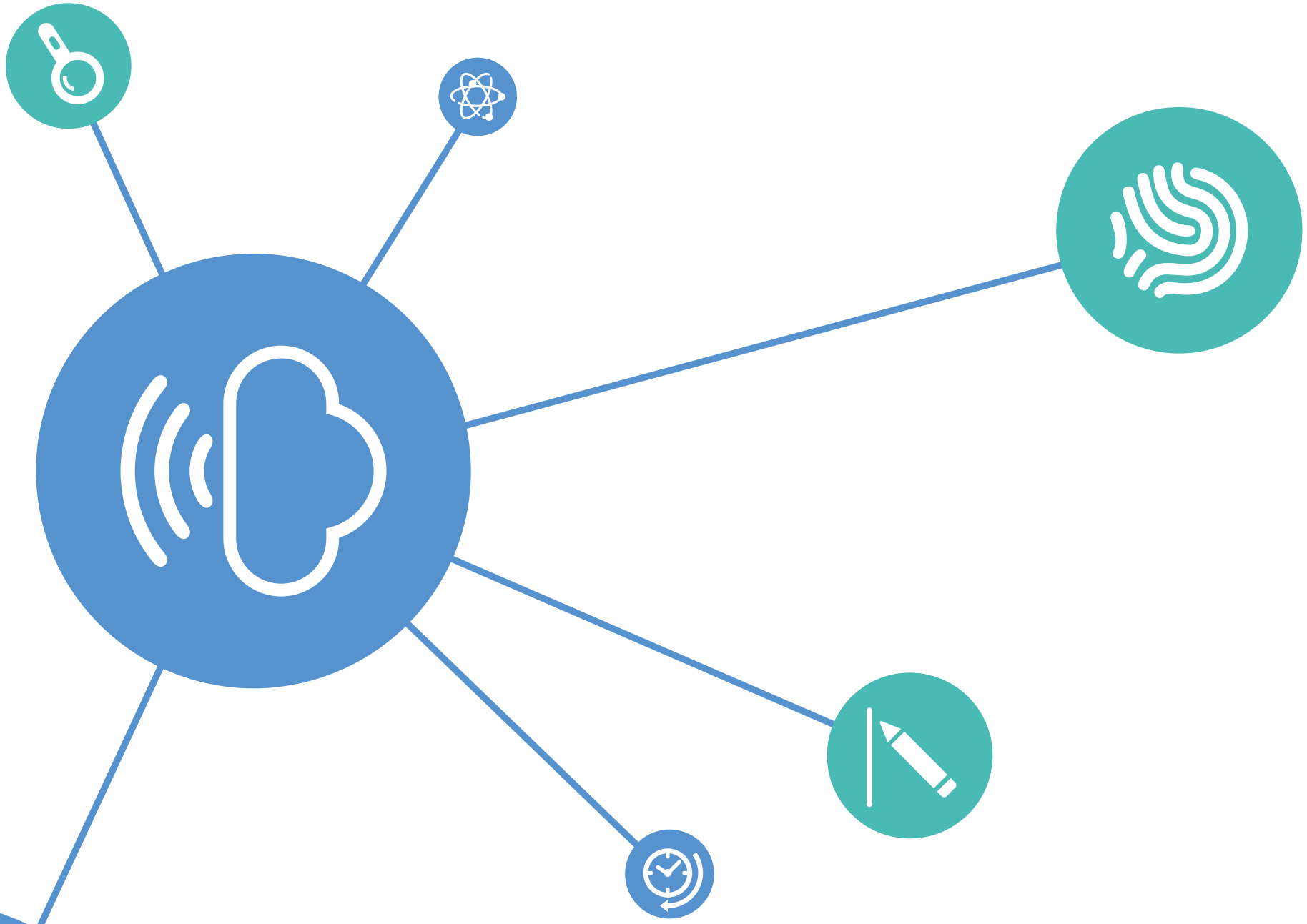
Term	A term is a word or set of words used to name a concept in any given language. For example: • *"zrno kukuřice"*@cs, *"maize"*, *"Maíz"*@es and *"Mais"*@it; • "मकका"@hi *"kukorica"*@hu, "სიმინდი"@ka, *"Jagung"*@ms and *"Kukurydza (ziarno)"*@pl; and • *"milho"*@pt, *"porumb"*@ro, *"kukurica siata"*@sk and "玉米"@zh.
Uniform Resource Identifier (URI)	A URI is a string of characters used to identify a name or a resource on the internet. The most common form of a URI is the web page address, which is a particular form or subset of URI, called a Uniform Resource Locator (URL). In SKOS, concepts are formalized as `skos:Concept` and identified by dereferenceable URIs. For example, http://aims.fao.org/aos/agrovoc/c_12332 is the URI of the concept *"maize"*, *"corn (maize)"*, *"maïs"*@fr, etc. AGROVOC URIs are automatically generated by VocBench.

Annex AGROVOC 25 top concepts

Activities	This contains activities that are conducted along the food supply chain, such as "*breeding*", "*feeding*", "*surveying*", "*cleaning*" and "*transport*". Included here are also higher-level management activities, such as "*accounting*" and "*planning*"; activities on nutritional topics, such as "*weight reduction*"; and activities that are more loosely related to agriculture and food or rural areas, such as "*cartography*", "*computer programming*" and "*recreation*".
Entities	Entities are broadly defined as "something which is distinct and separate from something else." These include narrower concepts like "*agencies*", "*labels*", "*networks*" and "*policies*".
Events	Events in this context are outlined as something taking place at a certain point in time and involving the participation of people, so they include concepts such as "*exhibitions*" and "*training courses*".
Factors	In agricultural research and publications, the term "*factors*" is frequently used in a number of rather common word combinations. These common combinations are reflected in the narrower concepts to be found here, such as "*abiotic factors*", "*biotic factors*", "*environmental factors*" and "*production factors*".
Features	This relates to the feature concept from geosciences and genetics and contains narrower concepts, such as "*genomic features*", "*physiographic features*" and "*soil morphological features*".
Groups	Groups are defined as "a number of individual items or people brought together." Narrower concepts, such as "*engineers*" and "*librarians*", can be found here, as well as societal groups, such as "*consumers*" and "*interest groups*".
Location	A location is a "a point or extent in space" and thus holds concepts such as "*climatic zones*", "*maritime zones*", "*protected areas*" and "*urban areas*".
Measure	While a measure can also denote an action taken, in this context, it is clearly defined as something that can be observed and involves a measurement. A measure is defined as a "number or quantity that records a directly observable value or performance. All measures have a unit attached to them: inch, centimetre, dollar, litre, etc." Examples of narrower concepts are "*altitude*", "*breeding value*", "*humidity*", "*price indices*" and "*soil water potential*".
Methods	Methods describe ways of doing things, either in agricultural research or in production and also in everyday life. They are like recipes, and as a notable fact, "*cooking methods*" is a narrower concept of the methods top concept. Other examples include "*autoclaving*", "*irrigation methods*", "*sampling*", "*statistical methods*" and "*survey methods*".
Objects	Objects in this context include human-made, tangible things, such as "*equipment*" and "*furniture*".
Organisms	The organisms hierarchy is one of the largest ones in AGROVOC and contains the taxonomic hierarchy of organisms relevant to agriculture under concepts, such as "*Eukaryota*" and "*Prokaryotae*"; common organism classes, such as "*plants*" and "*animals*"; and roles that an organism can hold, such as "*hosts*", "*pests*" or "*predators*". Concepts for organisms that live in a certain habitat, such as "*aquatic organisms*" and "*soil organisms*", are also available.

Phenomena	In scientific usage, a phenomenon is any event that is observable, however common it might be, even if it requires the use of instrumentation to observe, record or compile data concerning it. In natural sciences, a phenomenon is an observable happening or event. This hierarchy includes the concepts "*deficiencies*", "*economic phenomena*", "*hazards*", "*population dynamics*" and "*trends*".
Processes	A process is a set of interrelated or interacting activities that transform inputs into outputs. Examples of narrower concepts of processes include "*anthropogenic changes*", "*biological processes*", "*evolution*", "*inhibition*", "*physiological processes*" and "*synthesis*".
Products	In the context of AGROVOC, these concepts are mostly confined to products and product classes originating from agricultural supply chains, such as "*animal products*", "*feeds*", "*foods*" and "*oil products*". Raw materials or product properties are also represented by concepts such as "*resins*", "*forest products*", "*biodegradable products*" and "*sustainable products*".
Properties	A property is a characteristic or quality that can be owned or possessed that serves to define or describe its possessor. This hierarchy contains numerous narrower concepts of differing granularity, such as "*age*", "*colour-fastness*", "*periodicity*", "*soil properties*", "*toxicity*" and "*wind direction*".
Resources	Resources are things that are used during a production process or that are required to cover human needs in everyday life. Concepts such as "*economic resources*", "*inputs*" and "*raw materials*" would refer to the former category. The latter category is covered by more abstract resources, such as "*cultural heritage*" and "*natural resources*".
Site	Sites contain narrower concepts that serve to describe locations and facilities that are set up by humans for a certain purpose, such as "*hospitals*", "*laboratories*", "*meteorological stations*", "*restaurants*" and "*timber yards*".
Stages	Stages has a few narrower concepts, such as "*developmental stages*" and "*life cycle*". The former concept, however, is highly branched, containing plant and animal development stages, such as "*embryo stage*" and "*reproductive stage*".
State	States are any condition in which a physical substance or organism can be in. Some narrower concepts are "*anoxia*", "*colloidal state*", "*employment*", "*physical states*" and "*sleep*".
Strategies	Strategies describe acting options and include "*communication strategies*", "*training strategies*" and "*approaches*".
Subjects	Subjects are disciplines of study or topics relevant to agriculture and nutrition and include "*humanities*" and "*sciences*".
Substances	Substances is a broad sub-hierarchy, providing hierarchies for chemical substances according to physical properties, such as "*ceramics*", "*explosives*", "*oils*" and "*solutes*"; their role or function, such as "*attractants*", "*culture media*", "*drugs*" and "*soil amendments*"; and their source or place of origin, such as "*exudates*", "*filter cakes*" and "*sediment*".
Systems	The systems top concept contains a wide range of concepts for systems of human action, interaction and thought (e.g. "*economic systems*", "*political systems*" and "*value systems*"), production and supply (e.g. "*distribution systems*", "*drinking water systems*" and "*agroforestry systems*"), technological systems (e.g. "*information systems*", "*photovoltaic systems*" and "*surveillance systems*"), and systematic and organizational approaches from science (e.g. "*knowledge organization system*" and "*terminology*").
Technology	This includes concepts for technological developments and inventions that are applied in modern agricultural and food systems, such as "*biotechnology*", "*food technology*", "*information and communication technologies*", "*seed technology*" and "*wood technology*".
Time	This contains concepts that describe timespans with a certain function, such as *"free time"*, *"seasons"*, *"times of the day"* and *"working hours*". Timespans relevant to agricultural production are mostly aggregated in the *"timing"* concept.

Design: Steers McGillan Eves



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