AGRIS and AGROVOC: a bibliographic catalogue and its thesaurus into the world of linked data

The experience of the Food and Agriculture Organization of the UN (FAO)

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IRCDL

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Today

- A few words on FAO
- AGRIS, a LOD based application
- AGROVOC, a concept scheme

FAO

Food and Agriculture Organization of the UN

Basics on FAO

- Founded in 1945
- Goals of the organization: Help eliminate hunger, **food insecurity** and malnutrition– make agriculture, forestry and fisheries more **productive and sustainable** – reduce rural **poverty** - enable **inclusive and efficient food systems** – increase the **resilience** of livelihoods

- Currently, 194 members
- HQ in Rome, 5 regional offices, various country offices

FAO & information

- Corporate documents – “State of …”, guidelines for governments, research and reports on specific themes/areas
  - http://www.fao.org/publications/
- Collection of statistics
  - http://faoostat.org.fao.org …
- Distance learning - http://www.fao.org/elearning/
- Capacity development
- Promotion of (open) access to information among member countries

AGRIS

AGRIS partnership

- Started in 1975, to help partners promote their scientific production
  - Typically, ministries and research centres in agriculture
- In practice, a bibliographic repository contributed by partners and compiled & disseminated by FAO (on paper, CD, ..)

Agris today

1. A **network**: collaborative network of more than 150 institutions from 65 countries
2. A **Web portal**: agris.fao.org/ is a Web application that enriches the AGRIS repository with related Web resources. Uses Linked Open Data methodologies
3. An **RDF database**

The AGRIS network

The AGRIS network at a glance

The name "AGRIS centers" stands for all the data providers that have contributed or are contributing with bibliographic data to AGRIS, from national libraries, institutional repositories, single or corporate journal publishers to service providers.

Currently the AGRIS network consists of 150 AGRIS centers from 65 countries. Each center is indicated on the map down below. If you click on a marker, the name and URL of the provider will appear in an info window.

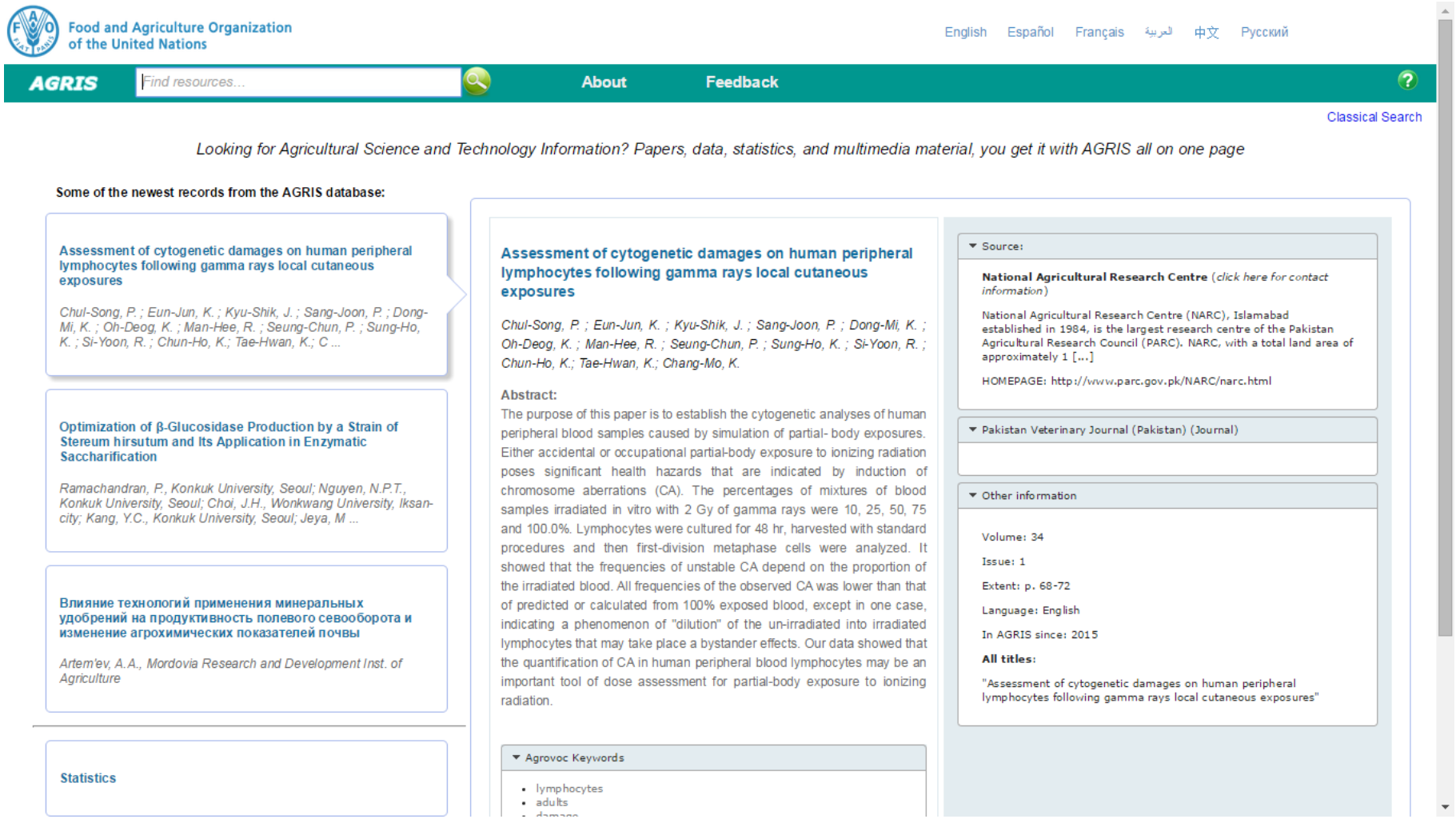
view larger map

More detailed information about the centers has been stored in the CIARD RING, a global registry for information providers and their services. You may search the RING by Data Providers, specifying the type of institution, country or name. Otherwise check the List of AGRIS centers that have been active for the past five years (an extraction from the RING).

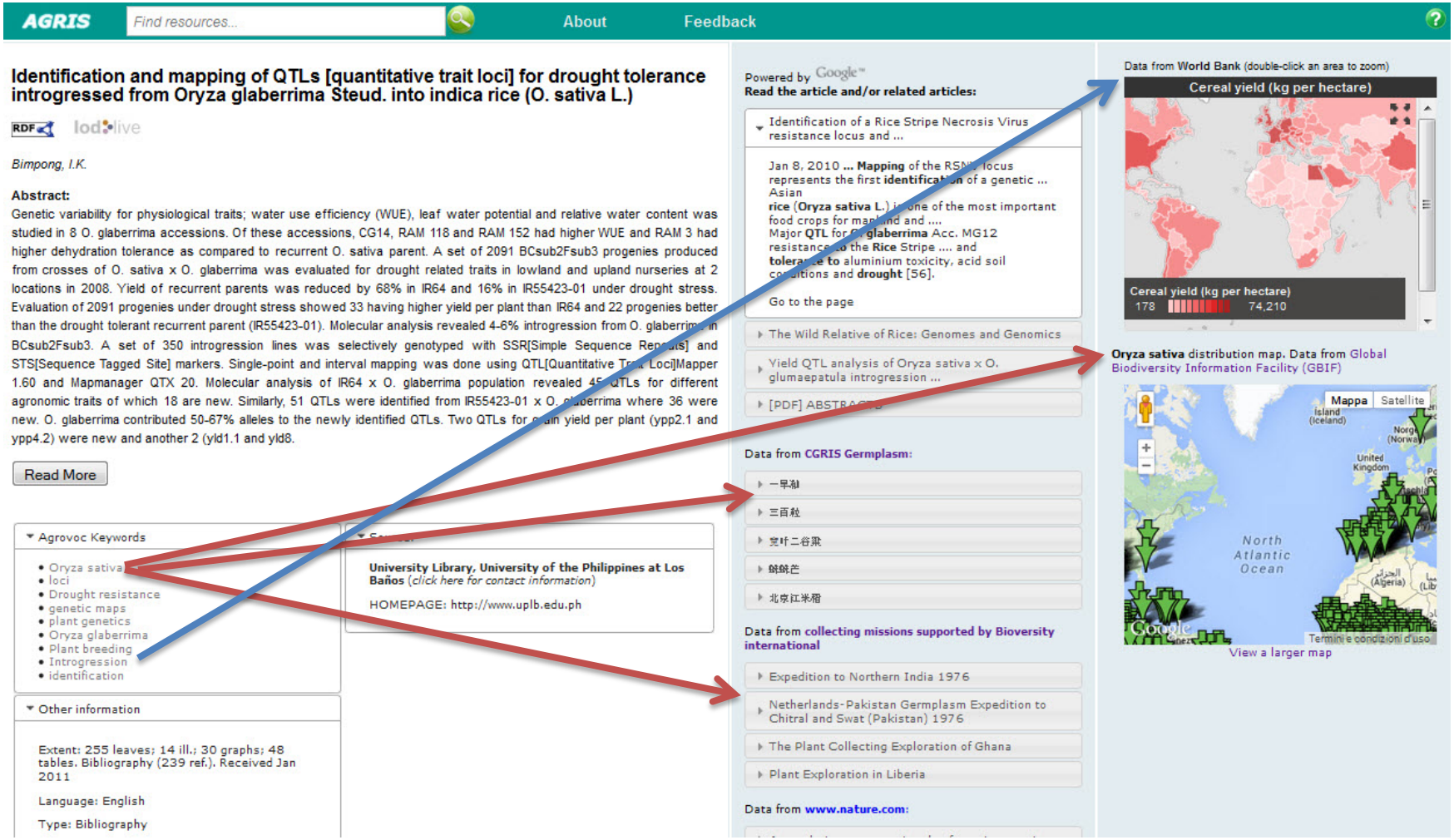
Would you also like to contribute to AGRIS? For detailed information, please visit the "For contributors" section.

The AGRIS portal

agris.fao.org



An AGRIS record



Linked resources

- DBPedia
- Nature OpenSeach
- GBIF
- WorldBank
- FAO geopolitical ontology – Country profiles
- IFPRI
- FAO fisheries and aquaculture fact sheets
- Bioversity international
- CGRIS germplasm database

- Full-text: an increasing number of full papers is available, using simple search through Google

Agris content

~ 8 million *multilingual* bibliographic records

- 400,000 from Latin America
- 150,000 from Africa
- 760,000 from Asia + 400,000 links to CASDD (China)

- ~ 250 million triples

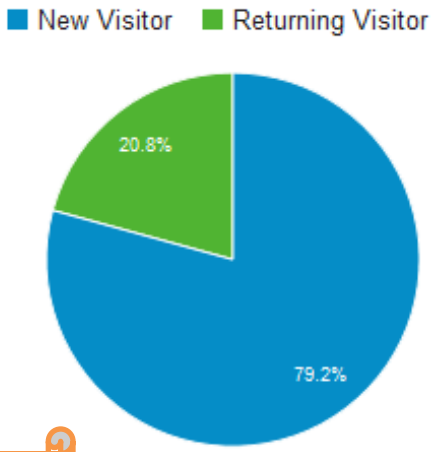
Access

- From 200+ countries and territories

Sessions	Users	Pageviews
299,644	255,724	421,663

Pages / Session	Avg. Session Duration	Bounce Rate
1.41	00:01:13	82.18%

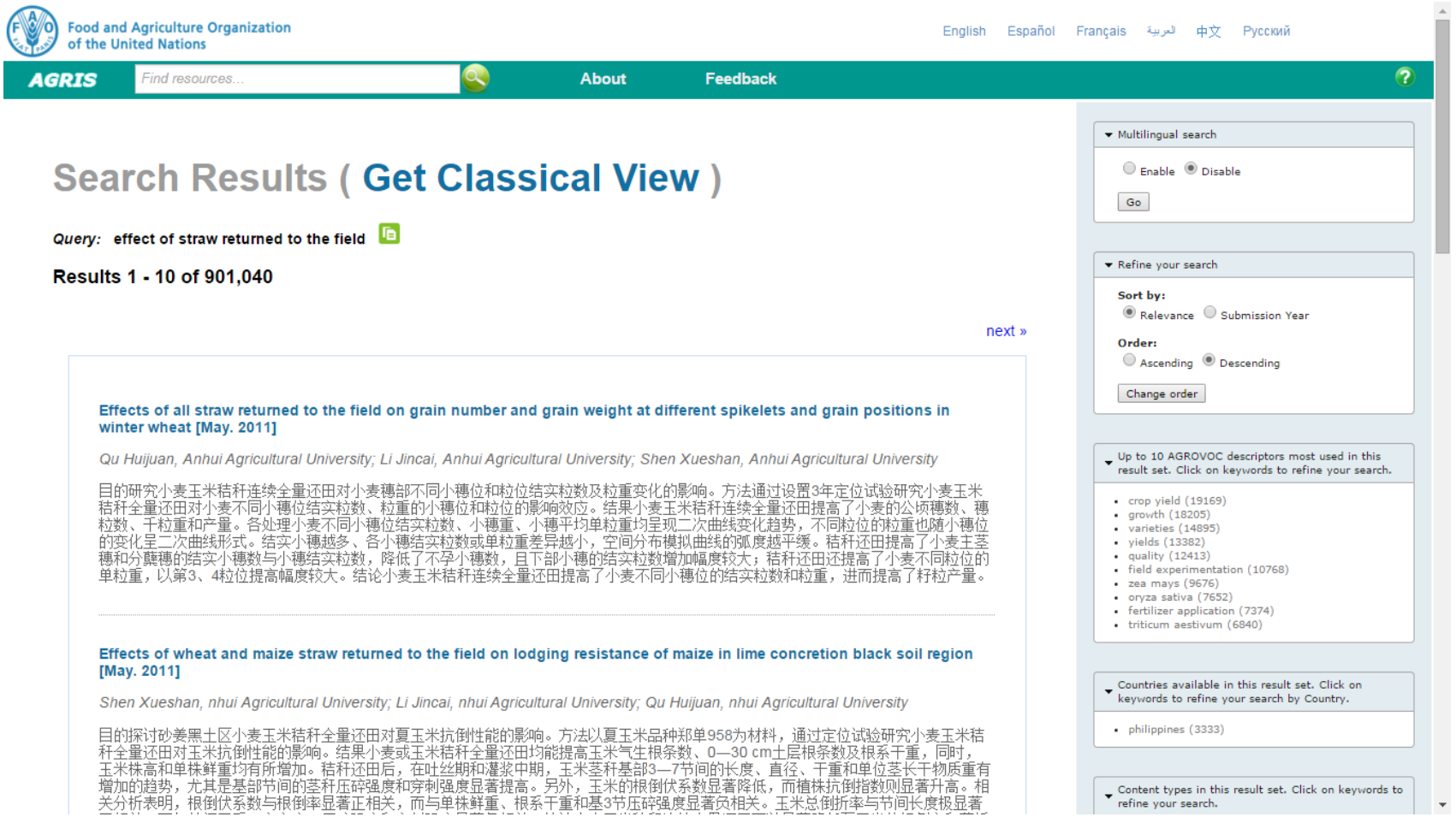
% New Sessions
79.21%



Google Analytics
October 2015

Multilinguality

AGRIS is natively multilingual



Effects of straw returned to the field on growth and water use efficiency of maize in lime concretion black soil region

RDF lod·live

Shen Xueshan, Anhui Agricultural University, Hefei(China), College of Agronomy
Li Jincai, Anhui Agricultural University, Hefei(China), College of Agronomy
Qu Huijuan, Anhui Agricultural University, Hefei(China), College of Agronomy

Abstract:
The effects of straw returned to the field which including no straw returning(CK),wheat straw returning(T1),maize straw returning(T2) and wheat and maize straw returning(T3) on emergence,growth,yield and water use efficiency of maize under field location condition to generalize the techniques of total straw of wheat and maize returned to the filed in lime concretion black soil region of Huaibei plain.The results showed that to compared with CK,the maize emergence number of T3 were increased by 3.25% and 11.98% in 2008 and 2009,respectively.The emergence rate,emergence uniformity,evenness of plant height,seedling quality and soil water content of T3 were higher than that of CK,which created a good population growth condition for maize,thus the population leaf area index and dry matter accumulation of that were improved.Finally,be compared with CK,the yield of T3 were increased by 7.92% and 9.51% while water use efficiency of that were increased by 8.15% and 9.48% in 2008 and 2009,respectively.Therefore,under the condition of wheat/maize straw returned in two seasons,the growth and grain yield of maize could be improved.

Agrovoc Keywords

- straw
- Efficiency
- maize
- Water use
- Floor husbandry

Other information

Volume: 16

Issue: 2

Language: Chinese

Type: Journal Article

All titles:

"Effects of straw returned to the field on growth and water use efficiency of maize in lime concretion black soil region"

"砂姜黑土区秸秆还田对玉米生育及水分利用效率的影响"

Zhongguo Nongye Daxue xuebao (Journal)

FREQUENCY: Bimonthly

START DATE: 1996

Source:

Institute of Agricultural Information, Chinese Academy of Agricultural Sciences (*click here for contact information*)

HOMEPAGE: http://www.caas.net.cn

砂姜黑土区秸秆还田对玉米生育及水分利用效率的影响 [apr.2011]

Shen Xueshan, Anhui Agricultural University, Hefei(China), College of Agronomy
Li Jincai, Anhui Agricultural University, Hefei(China), College of Agronomy
Qu Huijuan, Anhui Agricultural University, Hefei(China), College of Agronomy

摘要:
摘　要:为了在淮北砂姜黑土区推广小麦玉米秸秆全量还田技术,采用大田定位试验,设置小麦玉米秸秆不还田、小麦玉米秸秆单季还田和小麦玉米秸秆两季还田4种秸秆还田方式,研究了小麦、玉米秸秆全量粉碎还田对机播夏玉米出苗、生育、产量和水分利用效率的影响。结果表明:小麦玉米秸秆两季还田处理2008和2009年玉米出苗数分别比对照高3.25%和11.98%;出苗均匀度、株高整齐度、幼苗素质和耕层土壤含水率均高于对照,最终2008和2009年玉米产量分别较对照提高了7.92%、9.51%,土壤水分利用效率分别提高了8.15%、9.48%。可见,砂姜黑土区小麦玉米秸秆两季全量还田有利于玉米生长发育,提高籽粒产量。

Agrovoc关键词

- 秸秆
- 效率
- 玉米
- 用水
- 地面饲养

其他信息

卷：16

期：2

语言：Chinese

类型：Journal Article

所有题名：

"Effects of straw returned to the field on growth and water use efficiency of maize in lime concretion black soil region"

"砂姜黑土区秸秆还田对玉米生育及水分利用效率的影响"

Zhongguo Nongye Daxue xuebao (学术期刊)

频率：Bimonthly

起始日期：1996

来源：

Institute of Agricultural Information, Chinese Academy of Agricultural Sciences (*点击查看联系信息*)

主页：http://www.caas.net.cn

由...驱动 Google™
阅读文章和/或者相关文章：

- 秸秆全量还田条件下配施化肥对沿淮砂姜黑土培肥及玉米产量的影响①

  关键词：沿淮**砂姜黑土区**;**秸秆**全量**还田**;化学氮肥;培肥;产量 ... 重化肥而轻有机肥[3];**秸秆**利用率约45%,剩余**秸秆** ..... **秸秆还. 田对玉米生育及水分利用效率的影响.**

  前往网页

- [PDF] 砂姜黑土区小麦玉米秸秆全量还田对玉米抗倒性能的影响
- 秸秆还田和施肥对砂姜黑土理化性质及小麦郑玉米产量的影响
- 砂姜黑土区小麦玉米一年两熟秸秆全量还田对夏玉米生育及产量影响 ...

数据来源于 www.nature.com:

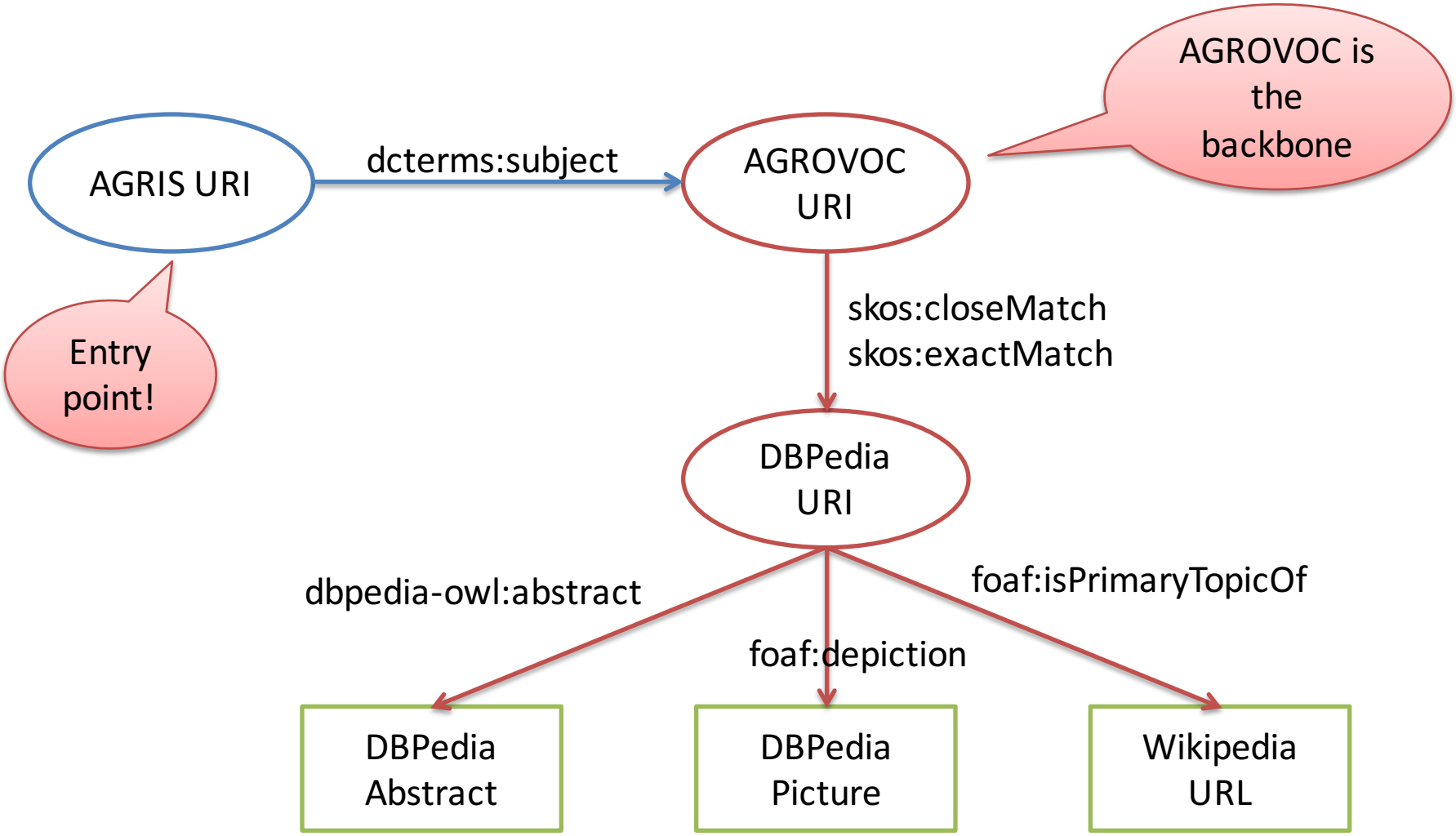
- A crop of maize variants
- US processor rejects maize that EU won't take
- A transposon in tb1 drove maize domestication
- A cornucopia of maize genes

数据来源于 DBPedia:

- Straw
- Efficiency
- Water use
- Maize

The AGRIS LOD dataset

A LOD dataset



AGROVOC enables AGRIS LOD

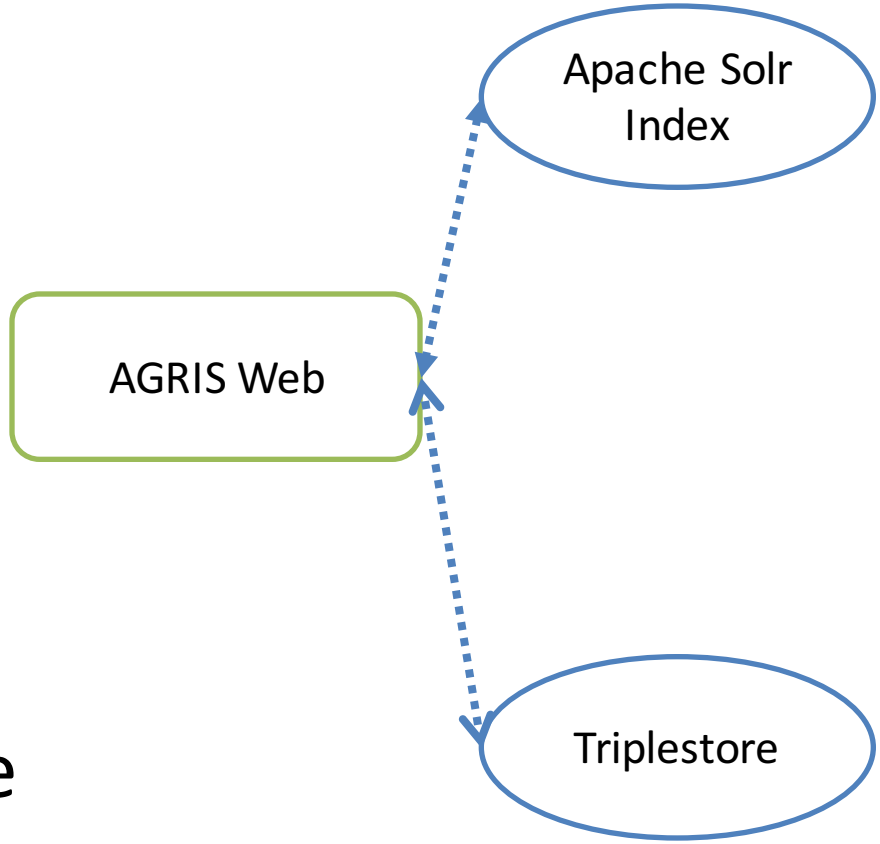
1. all documents in AGRIS are indexed with AGROVOC
   - –Manually, by the partner
   - –Automatically, by AGRIS
2. AGROVC is a LOD resource
   - AGROVOC links to Voc
   - Voc indexes Data
   - AGRIS links to Data
3. AGROVOC keywords are also used to query external Web Services

AGROVOC enables multilingual search

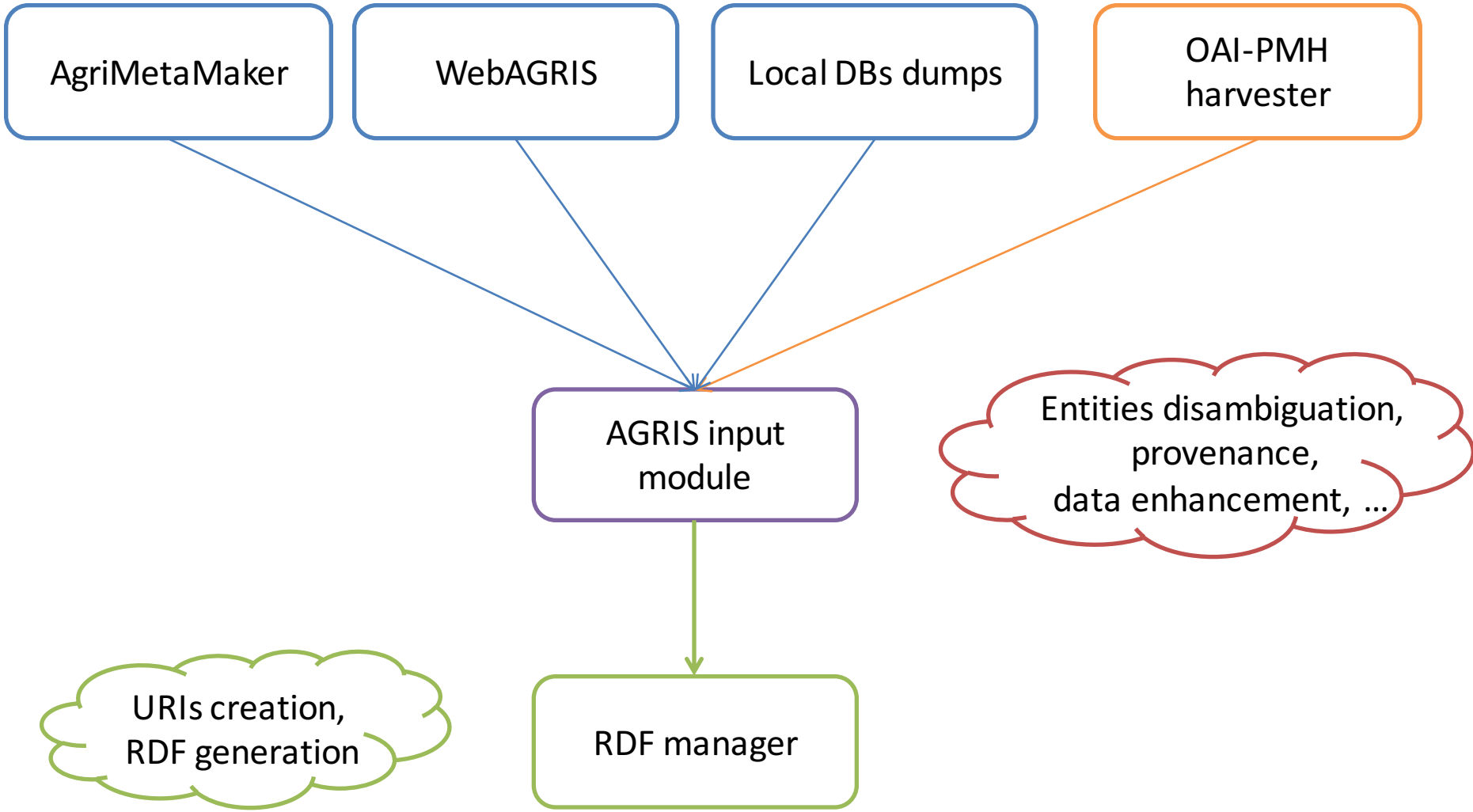
- AGRIS records are indexed with AGROVOC keywords in a specific language
- AGROVOC concepts have multilingual labels – all with the same URI
- Queries are expanded to match results indexed in any language

Accessibility

- Sparql endpoints
  - Records
  - Serials
  - centers
- Data served as LOD
- Comes with a VoID file



Data collection & processing



AGROVOC

aims.fao.org/agrovoc

AGROVOC Multilingual agricultural thesaurus

ABOUT | SEARCH | ACCESS | COMMUNITY | USES | LINKED DATA | PUBLICATIONS | FAQ | CONTACT US

Latest AGROVOC release : January 2016

AGROVOC is a controlled vocabulary covering all areas of interest of the Food and Agriculture Organization (FAO) of the United Nations, including food, nutrition, agriculture, fisheries, forestry, environment etc. It is published by FAO and edited by a community of experts.

AGROVOC consists of over 32,000 concepts available in 23 languages: Arabic, Chinese, Czech, English, French, German, Hindi, Hungarian, Italian, Japanese, Korean, Lao, Malay, Persian, Polish, Portuguese, Russian, Slovak, Spanish, Telugu, Thai, Turkish and Ukrainian.

You can use AGROVOC to look up the common name of a plant in a language that you do not master, or to find relations between a commodity and the crop from which it is produced. Your library can use AGROVOC to index its documents, or you can use it from inside your content management system (e.g., Drupal) to organize your documents or web site. You can also use AGROVOC as an hub to access many other vocabularies available on the web.

To date, AGROVOC is used by researchers, librarians and information managers for indexing, retrieving and organizing data in agricultural information systems and Web pages. Currently, AGROVOC is an SKOS-XL concept scheme and a Linked Open Data (LOD) set aligned with 16 other multilingual knowledge organization systems related to agriculture.

You may download AGROVOC, access its Web Services or SPARQL endpoint.

If you are an AGROVOC user, please check if you appear in the page AGROVOC uses. If you would

Register and subscribe to receive e-mail updates

TYPE
thesaurus

CONTACT EMAIL
agrovoc@fao.org

CREATION DATE
1 Jan 1980

MODIFICATION DATE
1 Mar 2015

SUPPORTED LANGUAGE(S)
Multiple Languages

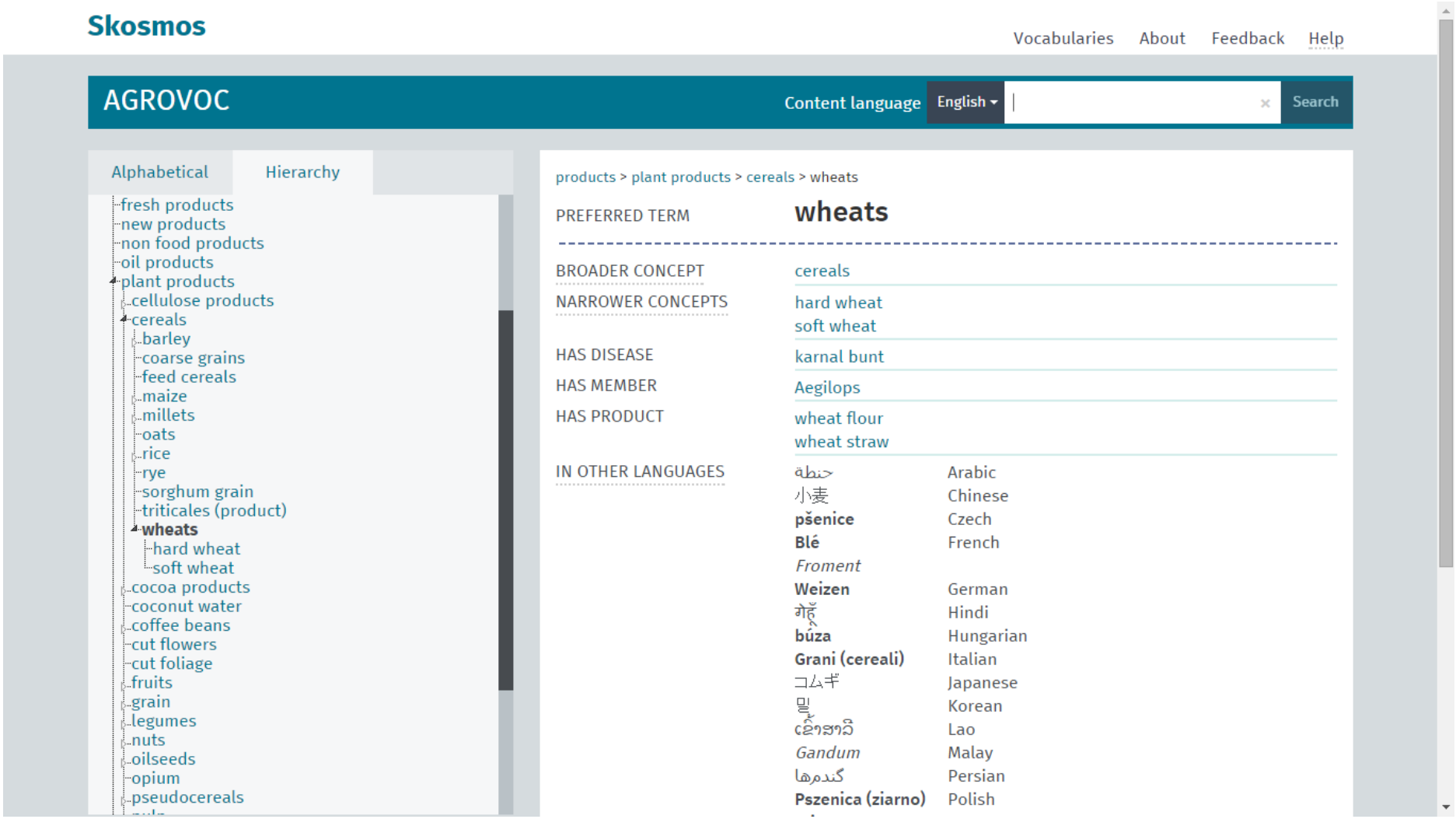
URL(S)
http://aims.fao.org/standards/agrovoc

DOMAIN(S)
agriculture - General/All

AGROVOC in short

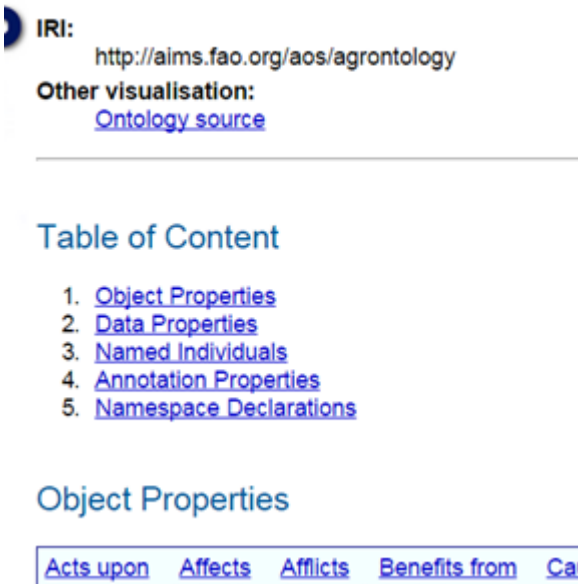
- Started as a thesaurus in 1980
- Covers all areas of interest to FAO, e.g. agriculture, forestry, fisheries, nutrition, environment, …
- 32,000+ concepts in up to 23 languages
- A Linked Open Dataset, available in various formats

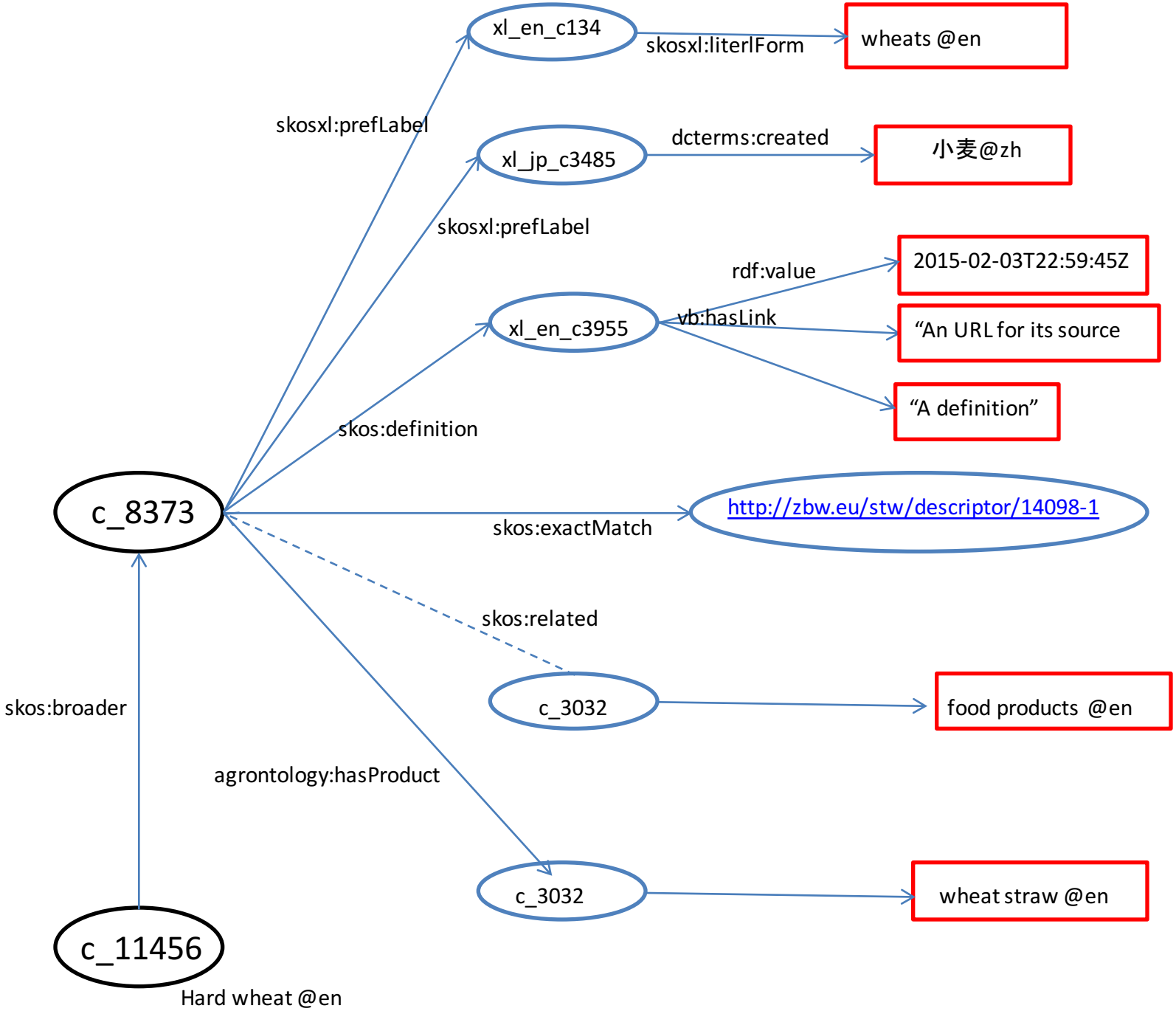
An AGROVOC concept



An RDF dataset

- Thesaurus converted to an RDF SKOS concept scheme
- Goal to have “standard” RDF
  - SkOS-XL, DC, DCterms, FOAF
  - and a specific vocabulary, Agrontology ->




xl_en_c134
skosxl:literlForm
wheats @en
skosxl:prefLabel
xl_jp_c3485
dcterms:created
小麦@zh
skosxl:prefLabel
rdf:value
2015-02-03T22:59:45Z
xl_en_c3955
vb:hasLink
“An URL for its source
“A definition”
skos:definition
c_8373
http://zbw.eu/stw/descriptor/14098-1
skos:exactMatch
skos:related
c_3032
food products @en
skos:broader
agrontology:hasProduct
c_3032
wheat straw @en
c_11456
Hard wheat @en

Multilinguality

- 32,000+ concepts in **up to 23 languages**
- = concepts may have labels in one or more languages
  - One hierarchy, many languages
  - No language is “compulsory”
  - Although there is an historical preference for English as a *lingua franca*

VocBench – SKOS editing platform

A community of editors

Moldavian**	General	The Republican Scientific Agricultural Library, State Agrarian University	Viorica Lupu
Multilingual - en, fr, es, ar, zh	Forestry	FAO, Forestry Department	Magnus Grylle
Multilingual - en, fr, es, ar, zh	Good practices	FAO, Good Practices website	Kristin Kolshus
Multilingual - en, fr, es, zh	Land governance	Land Portal Foundation	Laura Meggiolaro, Gérard Ciparisse
Multilingual - en, fr, es, ar	Agricultural technologies and practices	FAO, Technologies and Practices for Small Agricultural Producers (TECA)	Charlotte Lietaer Nedaa Amraish
Polish	General	Centralna Biblioteka Rolnicza, Central Agricultural Library (AgroWeb Poland)	Irena Walczak-Koperska
Portuguese	General	FAO Ministério da Agricultura, Desenvolvimento Rural e das Pescas	Manuela Pintão
Russian	General	Russian Academy of Agricultural Sciences, Central Scientific Agricultural Library (CSAL)	Lidia Pirumova
Slovak	General	Agroinstitut Nitra	Mária

A kinked dataset

- Links to 16 vocabularies
- Skos:closeMatch,
- skos:exactMatch
- Links identified with Semi-automatic process
- Comes with a VoID file

```
      void:linkPredicate skos:closeMatch ;
      void:objectsTarget :ASFAThesaurus ;
      void:subjectsTarget :Agrovoc ;
      void:triples 1784 .

:AGROVOC2Biotechglossary
      rdf:type void:Linkset ;
      void:linkPredicate skos:closeMatch ;
      void:objectsTarget :Biotechglossary ;
      void:subjectsTarget :Agrovoc ;
      void:triples 793 .

:AGROVOC2DBPEDIA
      rdf:type void:Linkset ;
      void:linkPredicate skos:exactMatch ;
      void:objectsTarget <http://dbpedia.org/void/Dataset> ;
      void:subjectsTarget :Agrovoc ;
      void:triples 11015 .

:AGROVOC2DDC
      rdf:type void:Linkset ;
      void:linkPredicate skos:closeMatch ;
      void:objectsTarget :DDC ;
      void:subjectsTarget :Agrovoc ;
      void:triples 401 .

:AGROVOC2DNB
      rdf:type void:Linkset ;
      void:objectsTarget :DNB ;
      void:subjectsTarget :Agrovoc ;
      void:triples 6212 .

:AGROVOC2EUROVOC
      rdf:type void:Linkset ;
      void:linkPredicate skos:exactMatch ;
      void:objectsTarget :EUROVOC ;
      void:subjectsTarget :Agrovoc ;
      void:triples 1268 .

:AGROVOC2GEMET
      rdf:type void:Linkset ;
      void:linkPredicate skos:exactMatch ;
      void:objectsTarget :GEMET ;
      void:subjectsTarget :Agrovoc ;
      void:triples 1178 .
```

VoID file

	Resource	Topics	Total # of Linked concepts	Languages	Linked Resource available as LOD?	Type of link (and # of linked concepts)
1	ASFA	Fisheries	1784		Yes	skos:closeMatch (38), skosLexactMatch (1741)
2	Biotechnology Glossary (FAO)	Biotechnologies	793	EN, ES, FR, +3 more	Yes	skos:closeMatch (793)
3	Chinese Agriculture Thesaurus (CAT)	Agriculture			Yes	skos:narrowMatch (137) skos:broadMatch (10153) skos:exactMatch (10325)
4	DBpedia	General	11009	EN, ES, FR + 8 more	Yes	skos:closeMatch (11009)
5	Dewey Decimal Classification (DDC)	General	401	EN, ES, FR + 8 more	Yes	skos:closeMatch (2) skos:exactMatch (399)
6	EUROVOC	General EU	1 269	EN, ES, FR + 21 more	Yes	skos:exactMatch (1269)
7	GEMET	Environment	1 175	EN, ES, FR + 30 more	Yes	skos:exactMatch (1175)
8	GeoNames	Geographical entities	206	EN, ES, FR + 63 more	Yes	skos:exactMatch (206)
9	Geopolical Ontology	Geopolitical entities	253	AR, CH, EN, ES, FR, RU	Yes	skos:exactMatch (253)
10	Library of Congress Subject Headings (LCSH)	General	1 075	EN	Yes	skos:exactMatch (1075)

11	NAL Thesaurus	Agriculture	13114	EN, ES	Yes	skos:exactMatch (13114) skos:closeMatch (2)
12	RAMEAU Répertoire d'autorité-matière encyclopedique et alphabetique unifie	General	670	FR	Yes	skos:exactMatch (670)
13	STW - Thesaurus for Economics	Economy	1125	EN, DE	Yes	skos:exactMatch (1122) skos:closeMatch (3)
14	TheSoz - Thesaurus for the Social Sciences	Social sciences	827	EN, DE	Yes	skos:exactMatch (821) skos:closeMatch (6)
15	SWD (Schlagwortnormdatei)	General	6 245	DE	Yes	skos:exactMatch skos:closeMatch skos:broadMatch skos:narrowMatch
16	EARTh	Environment	1363	EN+	Yes	skos:exactMatch (1363)

Table 1. Some figures of vocabularies linked from AGROVOC (last updated on January 2015)

An AGROVOC concept in the LOD view

http://aims.fao.org/aos/agrovoc/c_12332
maize

Property	Value
rdf:type	skos:Concept
skos:broader	http://aims.fao.org/aos/agrovoc/c_1474 http://aims.fao.org/aos/agrovoc/c_1474
skos:narrower	http://aims.fao.org/aos/agrovoc/c_7152 http://aims.fao.org/aos/agrovoc/c_2974 http://aims.fao.org/aos/agrovoc/c_8337 http://aims.fao.org/aos/agrovoc/c_6108 http://aims.fao.org/aos/agrovoc/c_2187 http://aims.fao.org/aos/agrovoc/c_7552 http://aims.fao.org/aos/agrovoc/c_14385
skos:exactMatch	http://www.caas.net.cn/caas/cat/c_1771 http://eurovoc.europa.eu/1744 http://www.caas.net.cn/caas/cat/c_1763 http://www.caas.net.cn/caas/cat/c_57079 http://www.caas.net.cn/caas/cat/c_55466 http://zbw.eu/stw/descriptor/14093-4 http://d-nb.info/gnd/4037135-9 http://www.caas.net.cn/caas/cat/c_55604 http://www.caas.net.cn/caas/cat/c_1747 http://www.caas.net.cn/caas/cat/c_1764
skos:closeMatch	http://dbpedia.org/resource/Maize
skos:broadMatch	http://www.caas.net.cn/caas/cat/c_3948 http://www.caas.net.cn/caas/cat/c_3948
dcterms:created	2011-11-20T20:35:16Z
dcterms:modified	2014-07-03T18:42:49Z
void:inDataset	http://aims.fao.org/aos/agrovoc/void.ttl#Agrovoc
skos:inScheme	http://aims.fao.org/aos/agrovoc
skos:relatedMatch	http://www.caas.net.cn/caas/cat/c_55567
foaf:depiction	http://aims.fao.org/aos/agrovoc/c_img_1306147386623
vocbench:hasStatus	Published

prefLabel	altLabel	Lang
кукуруза (зерно)	зерно кукурузы	ru
maize	corn (maize)	en
옥수수		ko
Mais		de
Kukurydza (ziarno)	Ziarno kukurydzy	pl
Maïs		fr
ข้าวโพด		th
kukorica		hu
Mais	Granoturco	it
ສາລີ		lo
ذرة صفراء		ar
kukuřičné zrno	zrno kukuřice	cs
トウモロコシ	コーン	ja
Milho		pt
mısır		tr
Jagung		ms
Maíz		es
kukurica siata	zrno (kukurica)	sk
मक्का	अनाज (मक्का)	hi
ذرت		fa
玉米	苞谷	zh

As RDF/XML | As TURTLE

Adopters of AGROVOC

Applications using AGROVOC

- AgriDrupal
- AGRIMetaMaker
- Agrimoodle
- AgriOcean DSpace
- AGRIS
- AgriVivo
- Agropedia India
- AgroTagger
- ALEPH (Ex Libris)
- ASKOSI
- BIBSYS
- Brage UMB
- Catalogue MeditAgri du Cent
- CGSpace Repository
- data.fao.org
- e-Termos
- FAO website
- FAO Country Profiles
- FAO Corporate Document Re
- FAOTERM
- Global Range Lands
- Hive
- ICRISAT OA Repository
- International Maize and Wheat Improvement Center (CIMMYT
- IFPRI Knowledge Repository
- KAINet
- KOHA
- Maui
- NOR2O software
- National Bibliogra
- Nuovo soggettari
- OceanDocs
- Organic edunet
- Organic eprints
- PanLex
- Portal da Língua P
- Range Science Inf
- Saffron
- SmartLogic
- Thai Agriculture R
- Union Catalog of
- VOA3R

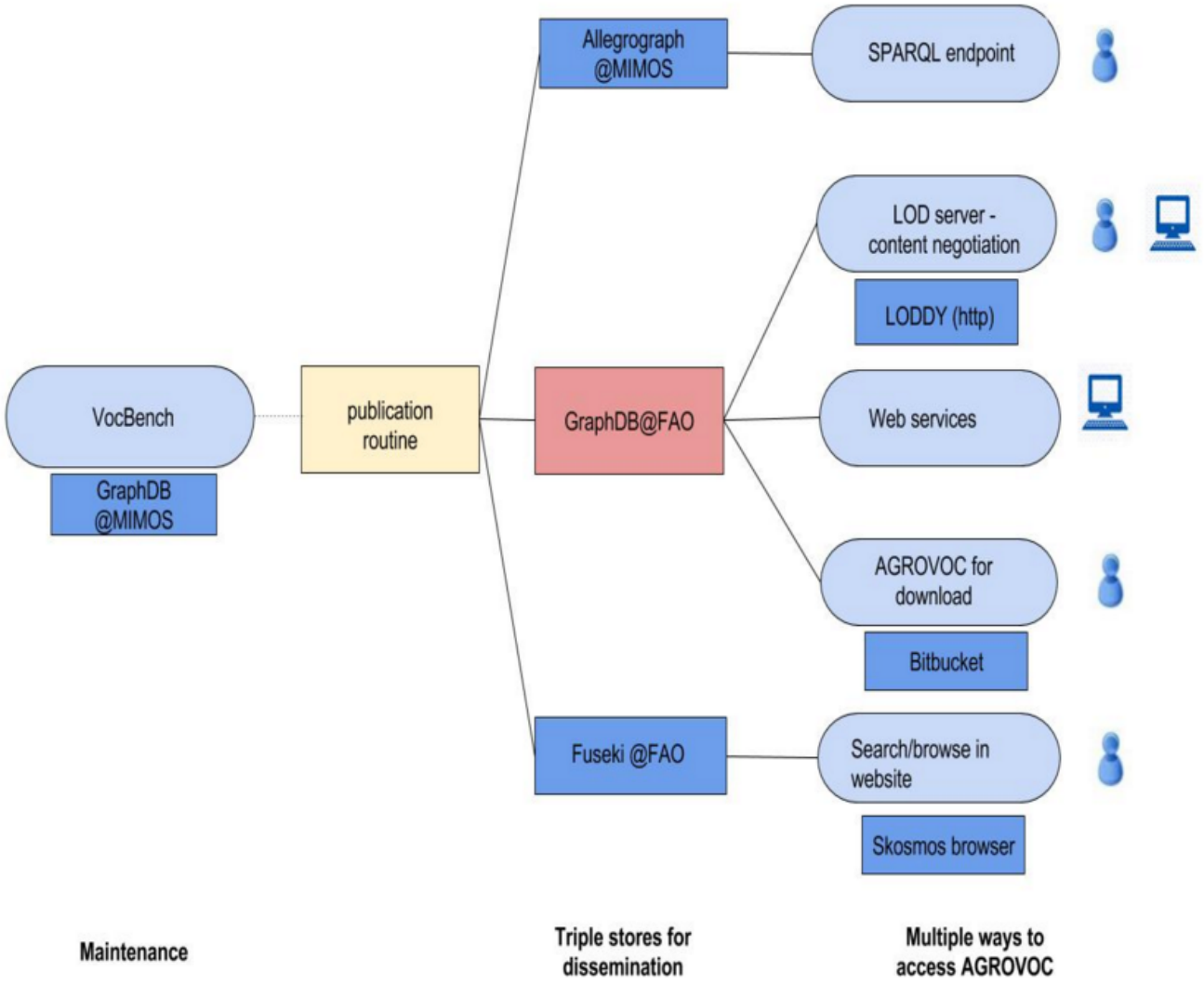
Institutions and libraries adopting AGROVOC

- AgroKnow
- Alliace of Agricultural Information Services (SIDALC)
- Azienda La Noria
- Biblioteca Agropecuaria de Colombia - Corporación Colombiana de Investig Agropecuaria (Corpoica) and Instituto Colombiano Agropecuario (ICA)
- Biblioteca Nazionale Centrale di Firenze
- Department Of Education Printing And Publishing, Ministry of Food, Agricul Livestock, Turkey
- ECOSCOPE
- Embrapa
- Norwegian University Library of Life Sciences
- Food and Agriculture Organization of the United Nations (FAO)
- Finnish Forest Research Institute Forestalia (METLA)
- Inter-American Institute for Cooperation on Agriculture (IICA)
- Rural Horizons Library, a project of Solaridad Network, Brazil
- Techinformi - FAO Deposit Library, Georgia

How to access AGROVOC

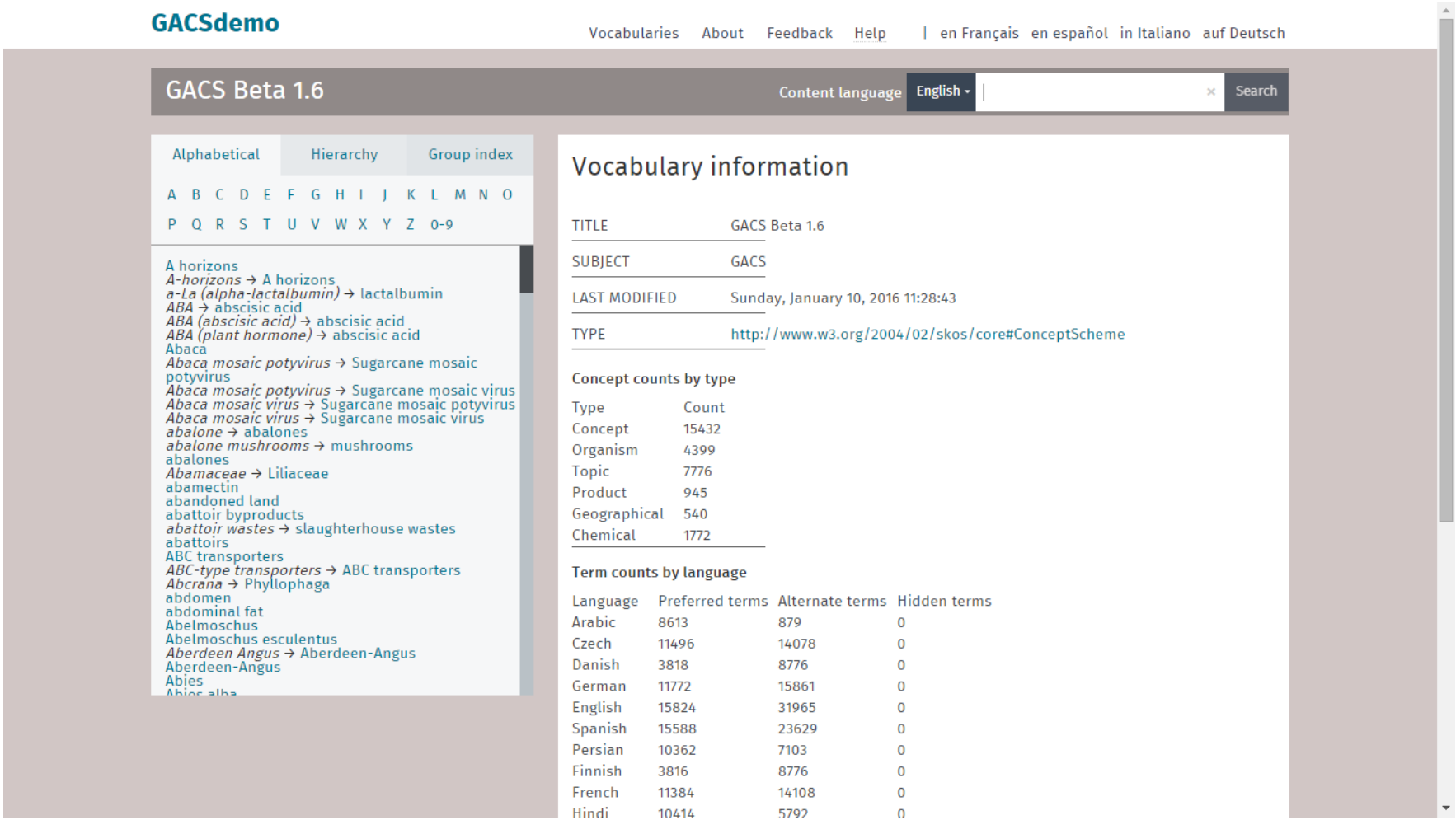
- Online, search
- Download (RDF)
- Web services built on top of the RDF
- SPARQL endpoint

The AGROVOC technology stack



Ongoing & future

Global Agriculture Concept Scheme GACS - beta



GACS at a glance

- Working group: AGROVOC, NALT, CABI
- Steering committee: .. + INRA, CGIAR
- Beta core 1.6 = 15,000 ca concepts
- A merge of all info available
- Ongoing: preparation for public release
- Future: expand GACS framework to include relevant semantic resources in agriculture – for document indexing, for data annotation. Possible collaboration with AgroPortal

Credits

- AGROVOC: Caterina Caracciolo, Sarah Dister, Johannes Keizer, Marie-Angelique Laporte, Karna Wegner, Luciana Zedda
- AGRIS: Fabrizio Celli, Yves Jaques, Mauro Ranchicchio
- VocBench: Armando Stellato, Andrea Turbati (U Tor Vergata, Rome)
- Johannes Keizer, head of the AIMS team @FAO

- **Technical support**: MIMOS Berhad (Malaysia) hosts some of the technical infrastructure of AGROVOC and AGRIS. AgroKnow (Greece) supports the data AGRIS ingestion phase.

Pointers and contacts

AGROVOC: aims.fao.org/agrovoc
AGRIS: agris.fao.org
VocBench: http://vocbench.uniroma2.it/

VocBench sandbox: http://202.73.13.50:55481/vocbench/ (with AGROVOC)

AIMS community: http://aims.fao.org/
Subscribe, you get the news

VB m-list: http://groups.google.com/group/vocbench-user

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