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
5th February 2016, Firenze
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
• Collection of statistics
  – [http://faoostat.org.fao.org](http://faoostat.org.fao.org) ... 
• Distance learning - [http://www.fao.org/elearning/](http://www.fao.org/elearning/)
• Capacity development
• Promotion of (open) access to information among member countries
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

Currently the AGRIS network consists of 150 AGRIS centers from 85 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.

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
Identification and mapping of QTLs [quantitative trait loci] for drought tolerance introgressed from Oryza glaberrima Steud. into indica rice (O. sativa L.)

Blimpong, IK.

Abstract:
Genetic variability for physiological traits, water use efficiency (WUE), leaf water potential and relative water content was studied in 8 O. glaberrima accessions. Of these accessions, CG14, RAM 115 and RAM 152 had higher WUE and RAM 3 had higher dehydration tolerance as compared to recurrent O. sativa parent. A set of 2091 BCsub2F6a63 progenies produced from crosses of O. sativa x O. glaberrima was evaluated for drought related traits in lowland and upland nurseries at 2 locations in 2006. Yield of recurrent parents was reduced by 86% in IR64 and 15% in IR55-423-01 under drought stress. Evaluation of 2091 progenies under drought stress showed 33 having higher yield per plant than IR64 and 22 progenies better than the drought tolerant recurrent parent (IR55-423-01). Molecular analysis revealed 40% introgression from O. glaberrima in BCsub2F6a63. A set of 358 introgression lines was selectively genotyped with SSR(Simple Sequence Repeat) and STS(Sequence Tagged Site) markers. Single-point and interval mapping was done using QTL[Quantitative Trait Loci]Mapper 1.60 and Mapmanager QTv. 20. Molecular analysis of IR64 x O. glaberrima population revealed 46 QTLs for different agronomic traits of which 18 are new. Similarly, 51 QTLs were identified from IR55-423-01 x O. glaberrima where 36 were new. O. glaberrima contributed 50-67% alleles to the newly identified QTLs. Two QTLs for grain yield per plant (yyp2.1 and yyp4.2) were new and another 2 (yld1.1 and yld8).

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

Google Analytics
October 2015
Multilinguality
AGRIS is natively multilingual

Search Results (Get Classical View)

Query: effect of straw returned to the field

Results 1 - 10 of 901,040

Effects of all straw returned to the field on grain number and grain weight at different spikelets and grain positions in winter wheat [May, 2011]

Qu Huijuan, Anhui Agricultural University; Li Jincal, Anhui Agricultural University; Shen Xueshan, Anhui Agricultural University

目的探讨小麦玉米秸秆混合还田对小麦密度不同小穗位和粒位结实率及籽粒产量的影响。方法是通过设置不同密度试验研究小麦玉米秸秆混合还田对小麦密度不同小穗位和粒位结实率及籽粒产量的影响。结果表明：不同密度试验中，小穗密度不同小穗位的结实率和籽粒产量均呈线性关系，不同密度试验中，小穗密度不同小穗位的结实率和籽粒产量均呈线性关系。不同密度试验中，小穗密度不同小穗位的结实率和籽粒产量均呈线性关系。

Effects of wheat and maize straw returned to the field on lodging resistance of maize in lime concretion black soil region [May, 2011]

Shen Xueshan, nihui Agricultural University; Li Jincal, nihui Agricultural University; Qu Huijuan, nihui Agricultural University

目的探讨施于冀南区小麦玉米秸秆混合还田对小麦抗倒性的影响。方法是设置不同密度试验研究小麦玉米秸秆混合还田对小麦抗倒性的影响。结果表明：不同密度试验中，小麦密度不同小穗位的结实率和籽粒产量均呈线性关系，不同密度试验中，小麦密度不同小穗位的结实率和籽粒产量均呈线性关系。不同密度试验中，小麦密度不同小穗位的结实率和籽粒产量均呈线性关系。
Effects of straw returned to the field on growth and water use efficiency of maize in lime concretion black soil region

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 field in lime concretion black soil region of Huaibei plain. The results showed that 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.
摘要：为了在淮北砂姜黑土区推广小麦玉米秸秆还田技术，采用大田定位试验，设置小麦玉米秸秆还田、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量均高于对照，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。
The AGRIS LOD dataset
A LOD dataset

AGRIS URI

AGROVOC URI

AGROVOC is the backbone

DBPedia URI

Entry point!

dbpedia-owl:abstract

foaf:isPrimaryTopicOf

foaf:depiction

DBPedia Abstract

DBPedia Picture

Wikipedia URL

skos:closeMatch

skos:exactMatch
AGROVOC enables AGRIS LOD

1. All documents in AGRIS are indexed with AGROVOC
   - Manually, by the partner
   - Automatically, by AGRIS

2. AGROVOC 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

AGRIS Web

Apache Solr Index

Triplestore
Data collection & processing

AgriMetaMaker → WebAGRIS → Local DBs dumps → OAI-PMH harvester

AGRIS input module

URIs creation, RDF generation

RDF manager

Entities disambiguation, provenance, data enhancement, ...
AGROVOC
AGROVOC Multilingual agricultural thesaurus

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 users. If you would
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 ->
wheats @en

http://zbw.eu/stw/descriptor/14098-1

2015-02-03T22:59:45Z

“An URL for its source

“A definition”

2015-02-03T22:59:45Z

“An URL for its source

“A definition”

http://zbw.eu/stw/descriptor/14098-1

food products @en

wheat straw @en

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

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A kinked dataset

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

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As RDF/XML  | As TURTLE
Adopters of AGROVOC

Applications using AGROVOC
- AgriDrupal
- AGRI Meta Maker
- 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-Terms
- FAO website
- FAO Country Profiles
- FAO Corporate Document Repository
- FAOTERM
- Global Range Lands
- Hive
- ICRISAT OA Repository
- International Maize and Wheat Improvement Center (CIMMYT)
- IFPRI Knowledge Repository
- KAINet
- KOHA
- Maui
- NOR2O software
- National Bibliog
- Nuovo soggettari
- OceanDocs
- Organic edunet
- Organic eprints
- PanLex
- Portal da Língua
- Range Science Inf
- Saffron
- SmartLogic
- Thai Agriculture R
- Union Catalog of
- VOA3R

Institutions and libraries adopting AGROVOC
- AgroKnow
- Aliance of Agricultural Information Services (SIDALC)
- Azienda La Noria
- Biblioteca Agropecuaria de Colombia - Corporación Colombiana de Investigación Agropecuaria (Corpoica) and Instituto Colombiano Agropecuario (ICA)
- Biblioteca Nazionale Centrale di Firenze
- Department Of Education Printing And Publishing, Ministry of Food, Agriculture, 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
- Techinormi - 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

caterina.caracciolo@fao.org