

Implementing Linked Data in Low Resource Conditions

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Goals for Today

- Give you a high level view of what is needed to do Linked Data
- Identify possible bottlenecks due to working with little resources
- Based on our experience, give you some suggestions to overcome those bottlenecks

Our background assumptions

Some restrictions are needed...

- Target audience: small-medium size institutions
 - This talk is not meant to be a how-to guide for specific technical problems, but rather a support grid to plan your entering the linked open data world
- Target data
 - We mainly think of textual data, e.g., list of publications produced by the institution, catalogues of specimens in the local museum, factsheets on plants, events organized, ..

Topics for today

- What is a “low-resource” condition
- Open Data and Linked Open Data
- An overview of Linked Data lifecycle
 - Bottlenecks in terms of resources
 - Our suggestions to overcome them
- The example of Agris

Low-resource condition = ?

1. IT competencies

- Few IT people, over-busy
- Technology fast moving, nothing taught in school
- Need personal update
 - But working environment may not encourage this
 - Or there may be language barriers

2. Other IT/IM/cultural issues

- Competency on legal issues – licenses, litigations?
- “It is my data”, even in the same organization
- Different “cultures” in the same workplace
 - Domain specialists “know” the domain and the data – e.g., the reports they produced - do not want to spend time with “techy stuff”
 - IT/IM people may prefer to spend time to make better system once, instead of repeating ad-hoc conversions - would like to standardize more

All may require some investments in time

3. Software

- Outdated operating systems and software
 - Because of cost of licenses, or cultural issues

4. Hardware

CPU, memory and technology constraints...



5. Electricity may be unreliable



5. Electricity

..occasionally available...



5. Electricity

...expensive...



6. Internet connection may be slow...



6. Internet connection ..dependent on the weather..



Data

The trend

Great attention to data

- Interoperability of data – data that can be reused = processed in different applications
- Standard and open formats are seen as crucial to interoperability
- Data made available over the web, for maximum reuse

Open Data

Open data in a nutshell

- Like other “open” movements: open and free
 - See <http://opendefinition.org/>
- Especially for government-generated data
 - E.g., census, public investments, housing, environment, ..
- A variety of formats used to expose the data
 - XLS, CSV, XLM, JSON, PPT, SDMX, ..
 - Preference for non-proprietary formats
- Most of the data around is “open”, more or less...
 - But, check out if your country has produced a national policy on data!

Who does Open Data?

- National and regional initiatives (not exhaustive)
 - opendataforafrica.org
 - data.gov.uk
 - usopendata.org
 - opendatalatinamerica.org
 - open-data.europa.eu
 - data.gov.au
 - data.gov.in
- Global and sectorial initiatives – e.g., GODAN

Why do people go for Open Data

- Increase transparency of governments and institutions
- Create new business opportunities
- It is the way to go now

Taking stock of challenges for global open data in agriculture and nutrition

As the open data revolution in agriculture and nutrition gathers pace, discussions are emerging about some of the ethical issues involved in equitable sharing and use of data, particularly as increasing amounts of data are now generated by or for farmers, although the discussion and implications extend much more widely across the agriculture and nutrition [...]



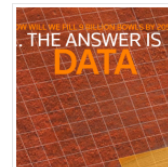
Africa Open Data Conference (AODC), Dar es Salaam, Tanzania, September 2 – 5

GODAN will be participating actively in discussions at the AODC and will be leading the Agriculture and Nutrition Track on Saturday September 5. The conference represents a valuable opportunity for GODAN partners to shape the focus of our activities in the coming months and network with potential partners in the region. More widely, GODAN partners [...]



How will we fill 9 billion bowls?

This new in-depth report by Thomson Reuters raises the immense issue of how the world will feed the 9 billion people, or more, that are predicted to inhabit the planet by 2050. Featuring the USDA Under Secretary and Chief Scientist, Cathie Woteki, along with a wealth of top scientists and experts in the field, [...]

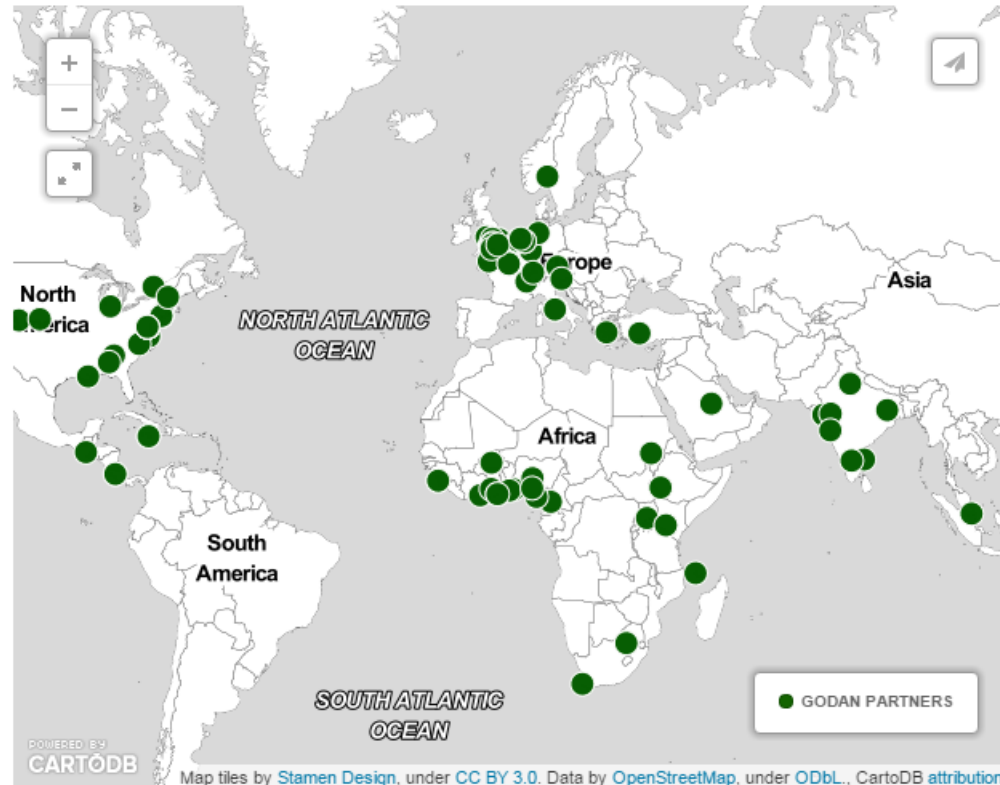


Urgent call for Kenyan applicants for fully sponsored UK Masters Research in invasive species

CABI has teamed up with its neighbours at Royal Holloway, University of London in Surrey, England to offer a jointly funded one year Master of Science by Research programme on invasive species for this academic year (Sept 2015 – August 2016). Tuition, accommodation and adequate living expenses will be covered, as will one economy return [...]



Partner locations



Source: [Burkina Faso Development Indicators, 2010](#)

Centre-Est

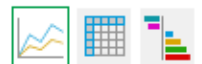


Population (persons)	Area in sq.km	Population Density	Total Fertility Rate (children per woman)	Gross enrollment rate in primary (%)	Net enrollment rate in primary (%)	Gross Secondary School Enrollment (%)	Employment (%)
1.13M	14.66k	77.20	6.50	70.77	60.25	5.70	68.90
Unemployed (%)	Infant mortality (deaths/1000 live births)	Child mortality (deaths/1000 live births)	Maternal mortality (Deaths per 1000 live births)	Prevalence of infant and child underweight (%)	Prevalence of HIV/AIDS (%)	Total classified Road Network (km)	
1	111	75	322	28.79	1.30	940.80	

Source: [Burkina Faso, Atlas Fact Dataset, 10-May-2013](#)

Centre-Est

(Number)





What is the Open Government Partnership?

OGP was launched in 2011 to provide an international platform for domestic reformers committed to making their governments more open, accountable, and responsive to citizens. Since then, OGP has grown from 8 countries to the 66 participating countries indicated on the map below. In all of these countries, government and civil society are working together to develop and implement ambitious open government reforms.





Syngenta publishes data to unlock environmental, social and economic value

Basel, Switzerland, April 23, 2015

- **Searchable, useable and shareable data on The Good Growth Plan**
- **Open Data Institute collaboration a first for the agriculture industry**
- **Encourages 'crowd sourced' solutions to agricultural challenges**

Syngenta today published a broad range of data on the six ambitious commitments in [The Good Growth Plan](#) with the aim of unlocking environmental, social and economic value.

The data are searchable, useable and shareable via the Internet. They include 2014 baseline information for agricultural efficiency indicators collected on 3,600 farms in 41 countries across Europe, Africa, Latin America, North America and Asia Pacific, representing about 200 crop-climate combinations. It is the first time information at a crop level, including resource efficiency, has been made public in this way by a commercial organization.

Syngenta also announced a collaboration with the Open Data Institute (ODI), an independent, non-profit open data expert. The ODI works with organisations to create economic, environmental, and social value from open data. It helps unlock supply, generate demand, create and disseminate

Linked Open Data

Linked Open Data in a nutshell

- Like other “open” movement: open and free
 - You can have Linked Data that with no open license – but today we think of Linked Open Data (LOD)
- Any type of data, any domain
- The format of choice: RDF
 - Various serialization possible – XML, Turtle, N-Triples, N-Quads, JSON-LD, Notation 3, TriX
- Not just getting datasets out, but linked pieces of data

Why should I go for Linked Data?

- To be able to reuse data published by others
- To promote business – made by others or yourself
- Not to be isolated, left behind in the information world
- Yes but... is the game worth the candle?

Agris - a LOD-based application



Monitoring of tuna resources (Yellowfin and Skipjack tunas) in Oman Sea along Sistan and Balouchestan coastal waters [2006]

RDF lod:live

Hosseini, Abbas
Darvishi, M.
Daryanabard, Gh.
Kaymaram, F.

Abstract:

Collecting of biometric parameters and catch and effort data were made for yellowfin and skipjack tunas from artisanal gillnet and industrial purse seine fisheries during the years 2002- 2004 in Oman Sea along Sistan and Balouchestan coastal waters. The previous available data was used for the purpose of better monitoring the resources. The frequency of maturity stages and GSI values obtained from yellowfin showed a spawning period from February to May, peaking in April-May. For skipjack, the data indicated a long spawning period which began in December with peaking in April-May. LM50% was obtained as 83.1 and 62.4 for yellowfin and skipjack tunas respectively. Sex ratio by size group showed a predominance of males with larger fish. Analysis of stomach contents showed a significant proportion for the both species. The composition of food contents by occurrence method revealed that fish were the most dominant food items by year for the species. Presence of squilla, crabs, shrimps (Larval stage), belonging to Peneaeidea family, in large quantities were the obvious food items so that they had not been reported by previous studies. Blooming of squilla, Natosquilla investingatoris, in the western Indian Ocean provided a situation to be observed in large occurrence in yellowfin and skipjack stomach contents. The ratio was more in yellowfin stomachs when compared to skipjack ones which accounted for 38%, 19% and 35% of the total stomachs studied by the study year.

Read More

Agrovoc Keywords

- saltwater fishes
- Coastal waters
- Coastal area
- aquaculture
- management
- environmental monitoring
- fish
- marine areas
- monitoring
- coasts
- coastal lagoons
- Western Indian Ocean
- fishery production
- fishery products
- fish products
- Arabian Sea
- Iran Islamic Republic
- tuna
- production
- process control

Source:

Agricultural Scientific Information and Documentation Centre, Agricultural Research and Education Organization
([click here for contact information](#))

The main mission of the Agricultural Scientific Information & Documentation Center (ASIDC) is about providing needed information for agricultural researchers

HOME PAGE: <http://agrisis.areo.ir/HomePage.aspx?TabID=15589&Site=agrisis.areo&Lang=en-US>

Related information in other data sources

Powered by Google™

Read the article and/or related articles:

Estimates of Length-Based Population Parameters of Yellowfin Tuna ...

worldwide after skipjack, *Katsuwonus pelamis*, with 25,230,011 tons ... landed in southern coastal waters of Iran in the Oman Sea ... managers to provide planning for resource ... of yellowfin tuna resource in the Oman Sea and to be ...
Monitoring plan of tuna stock, ... (*Katsuwonus pelamis*) in Oman Sea along Sistan and.

Go to the page

Estimates of Length-Based Population Parameters of Yellowfin Tuna ...

Data from [www.nature.com](#):

- ▶ Bioluminescence-mediated longitudinal monitoring of adipose-derived stem cells in a large mammal ex vivo organ culture
- ▶ Production of Catalyst-Free Hyperpolarised Ethanol Aqueous Solution via Heterogeneous Hydrogenation with Parahydrogen
- ▶ Robust production of recombinant phosphoproteins using cell-free protein synthesis
- ▶ Rapid Bacterial Identification, Resistance, Virulence and Type Profiling using Selected Reaction Monitoring Mass Spectrometry

Data from [TECA](#):

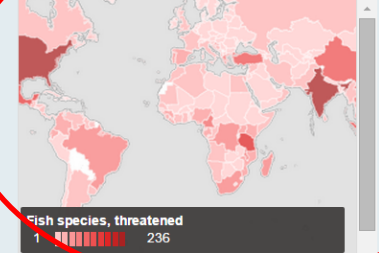
- ▶ Control of foreign fishing
- ▶ How to produce Mirrow Carp fry (*Cyprinus carpio*), Uganda
- ▶ Groundnuts varieties, management and post harvest, Uganda
- ▶ Light attraction method to catch Mukene fish on Lake Victoria

Data from [DBpedia](#):

- ▶ Aquaculture

Data from World Bank (double-click an area to zoom)

Fish species, threatened



Activities from the Web

Powered by [SomaBrow](#)

- ▶ [www.fao.org](#)
- ▶ [orgprints.org](#)
- ▶ [orgprints.org](#)
- ▶ [orgprints.org](#)
- ▶ [english.agri.gov.cn](#)

Data from [CGRIS Germplasm](#):

- ▶ 大青山山野豌豆
- ▶ WFISHI C2
- ▶ Fisher 5
- ▶ Kingfishor"S" (Check)

Statistics from [FAO Country Profiles and IFPRI](#)

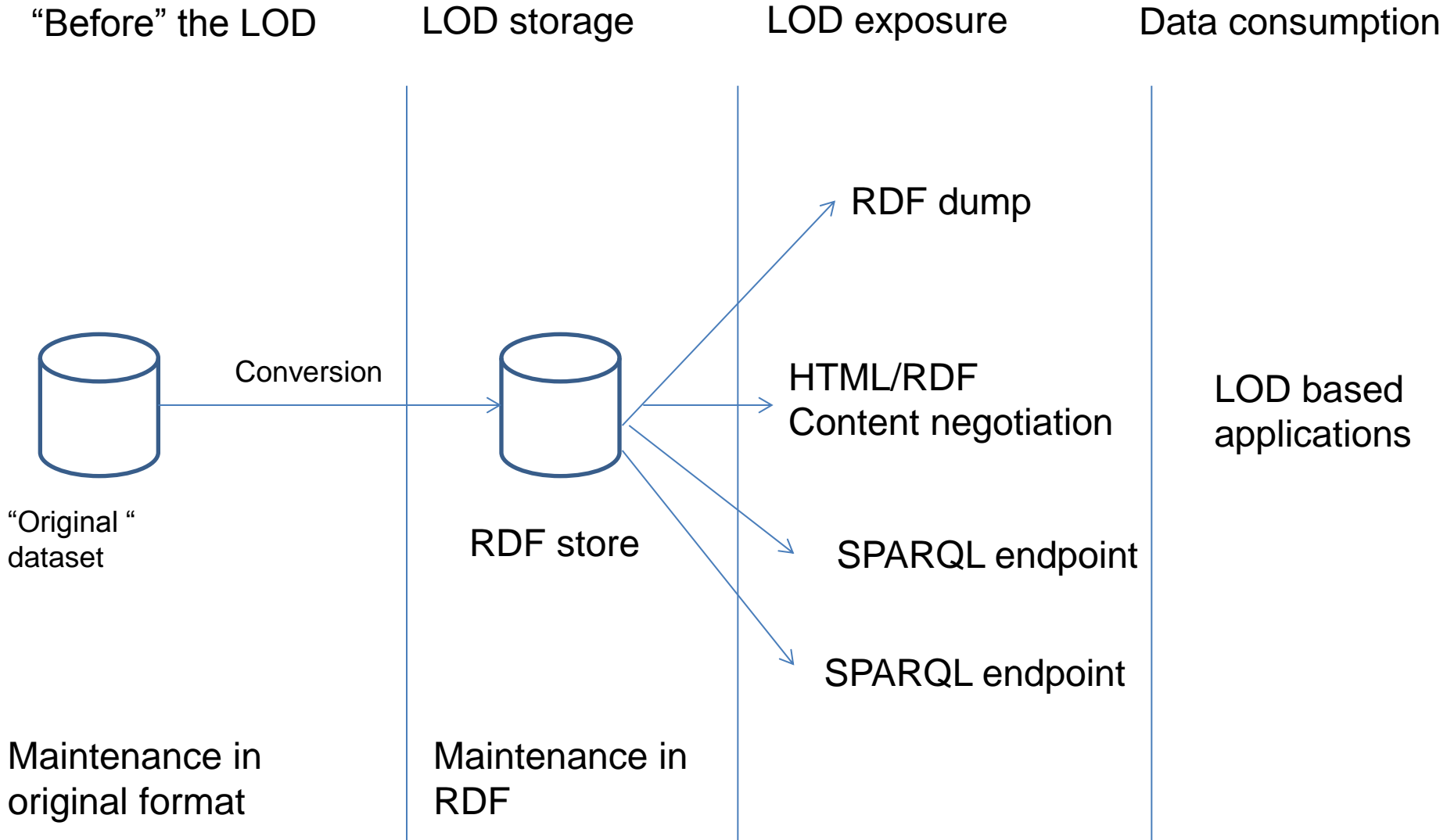
- ▶ the Islamic Republic of Iran

Then, Open Data or Linked Data?

- Can be seen as two steps along the same line
- You should decide based on your situation and goals
 - Open data requires less effort. Good if data will be primarily used by others or have no direct interest in linking to other datasets
 - Linked Open Data may be more complex because of the linking step. Good if you want to exploit the data yourself, e.g. to enhance your library/doc rep catalogue with data produced by others

The Linked Data workflow

A typical Linked Data flow



Data generation

Some remarks on RDF

RDF

- RDF is simply triples
 - Subject – predicate - object



- Triples may be serialized in various formats
 - RDF/XML, Turtle, N-triples, N-Quads, JSON-LD, TriX

The role of predicates

- ... the *dct:title* in previous slide, to indicate the “title” of a book
- Important to expose the data without ambiguities
- Recommendation is to use standards, or de facto standard, to facilitate reuse of data
- Search for the vocabulary appropriate to your data, e.g. with <http://lov.okfn.org/dataset/lov/index.html>
 - Look also at W3C Best Practices for Publishing Linked data <http://www.w3.org/TR/ld-bp/>

Conversion from existing formats

Converting data to RDF

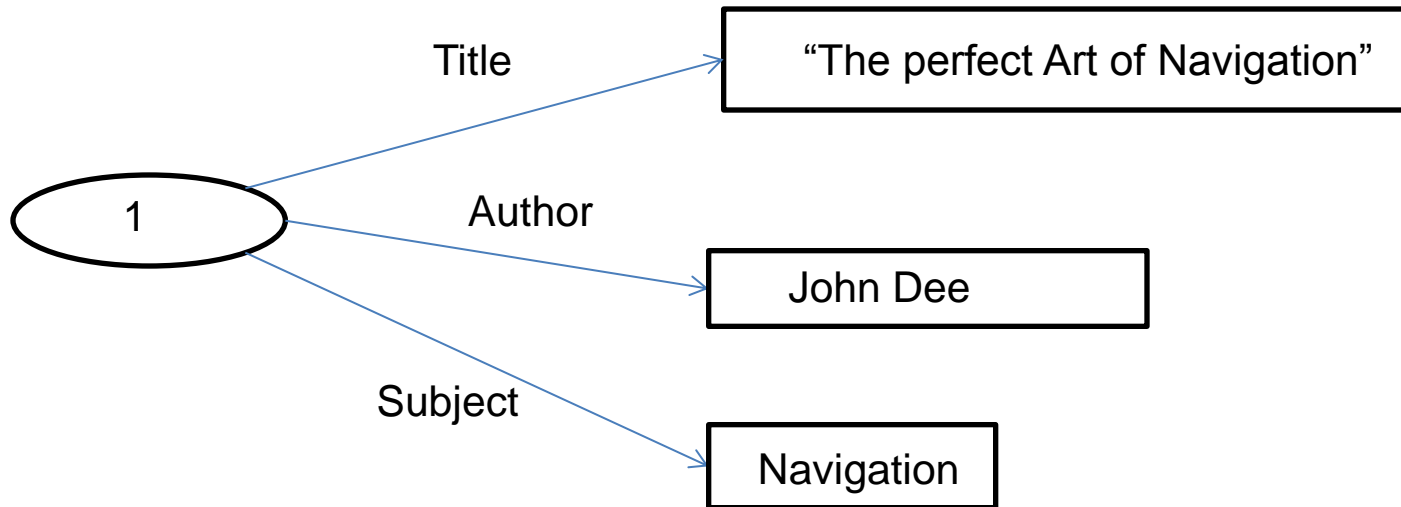
- Many converter to RDF
 - A list in <http://www.w3.org/wiki/ConverterToRdf>
- Conversion could be done as a one-time migration effort, or could be scheduled regularly
 - When done regularly, for exposing your data, your established data maintenance is not affected

An simple example of conversion

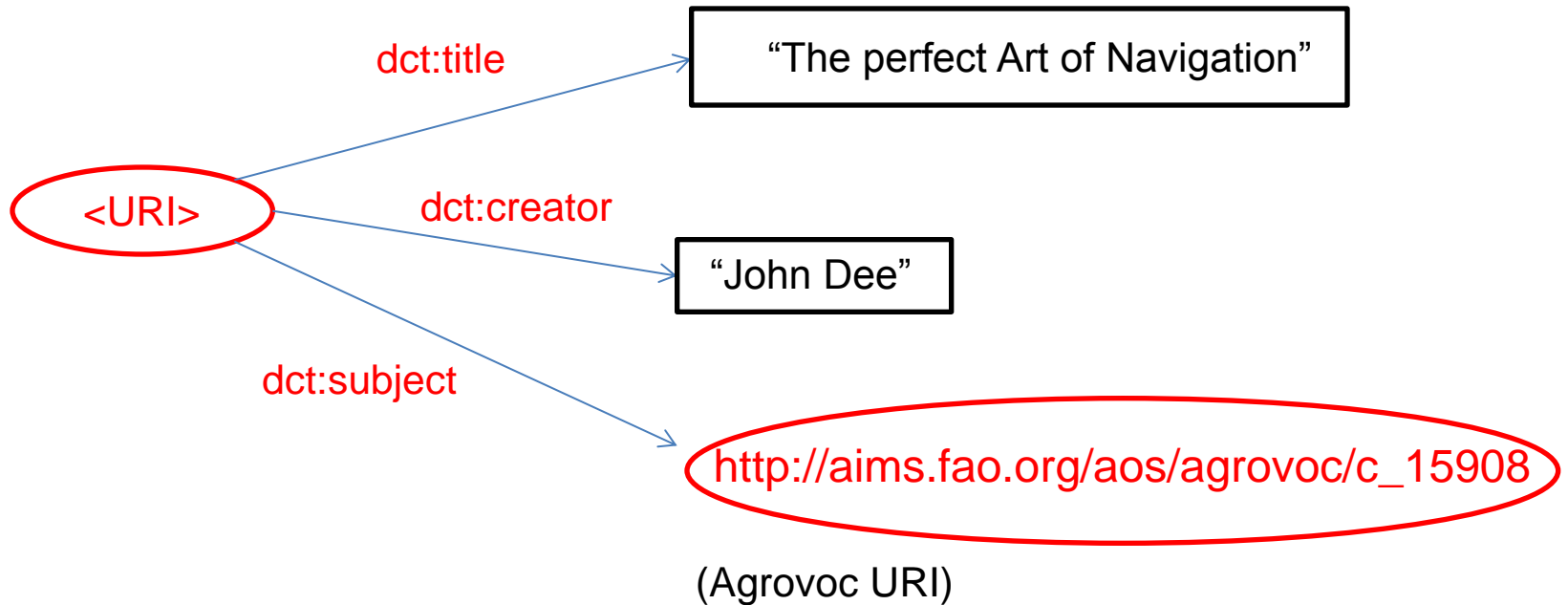
My dummy table

ID book	Author	Title	Subject
1	John Dee	Perfect Art of Navigation	Navigation, geography
2	Jethro Tull	The new horse-houghing husbandry	Horse husbandry

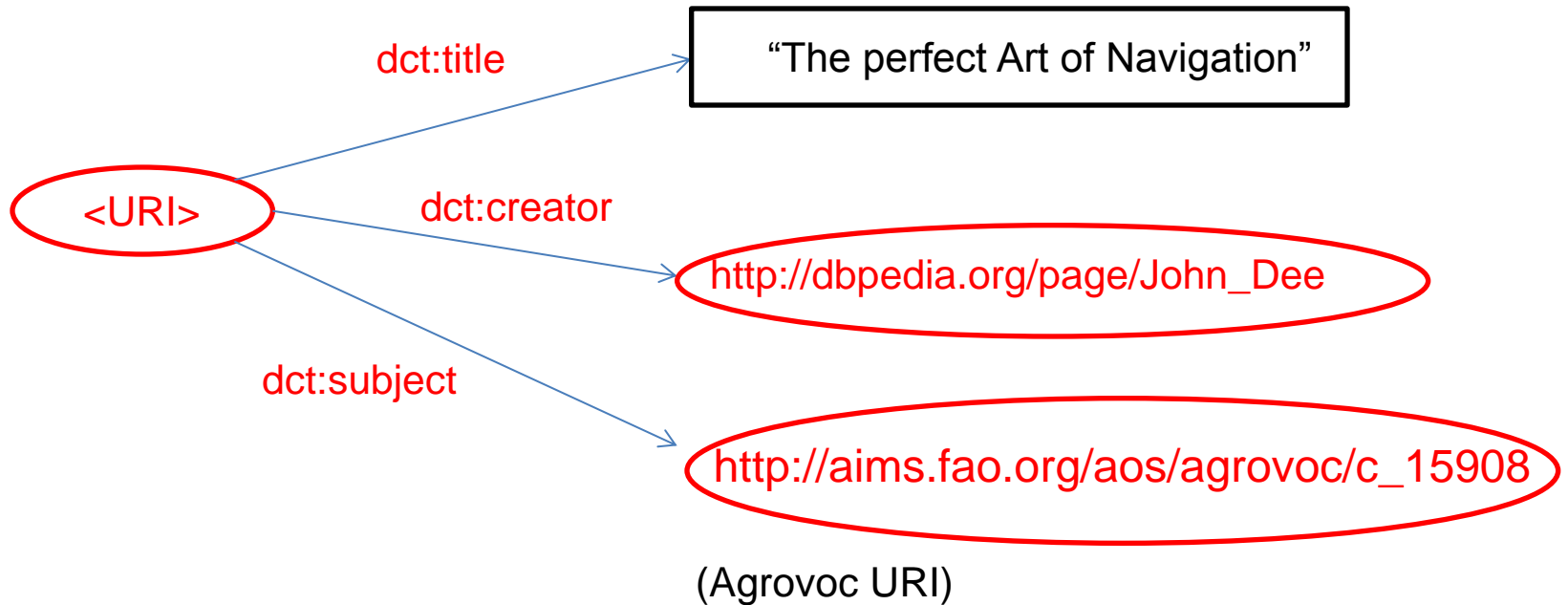
1. Get some RDF



2. Get some linked RDF



3. Get some more links



Data maintenance

Data maintenance

- If data is regularly converted to RDF, the “old” maintenance flow is kept
 - But with the extra step of linking
- If data is once for all migrated RDF, may have the problem of maintenance – you may need a GUI

Linking your data

What can be linked?

1. Vocabularies used to describe and annotate the data - or ontologies
 - i.e., the properties of the triples - your “Title” and somebody else’s “Titulo”
 2. The entities linked, the “objects”
 - i.e., the object of the triple – a specific author in your dataset to the same author in somebody else’s dataset, or in Wikipedia
- Often, they are also called vocabularies, which may create confusion

1. Linking vocabularies

- It is a research area
 - Ontology Alignment Evaluation Initiative (OAEI)
 - Note that “ontology” is often used as a generic term, also to mean rather simple vocabularies to describe data – ontology may sometimes also include “individuals”, e.g., country names, ..
- Best solution is to go for standard vocabularies from the start!
 - When you design the conversion of your data

2. Linking “individuals”

- Relatively simple problem, but few out-of-the-box tools
 - Usually the problem is data “cleanliness” – e.g., different name spelling, abbreviations, ...
- Best solution is to identify the top dataset(s) to link and start linking to it/them
 - Either manually or semi-automatically (Automatic selection of candidate links, then manual check)
 - Data validation usually outside the rest of the data lifecycle

Hint: Drupal for your catalogue

Drupal = a content management system

- Allows you to:
 1. import data from csv, xml, RSS feed
 2. create RDF
 3. maintain the data from GUI
 4. expose RDF
- Good for your catalogues of documents, people, ..
- Need to know Drupal, but no programming skills required

Similar tools

- AgriDrupal
 - Drupal customized for small institutions
 - Includes tools for automatic tagging with AGROVOC, which is a linked resource
- ScratchPad
 - Customized for biodiversity data

If you want to have your thesaurus linked...

- This is our experience - AGROVOC
- Thesauri are used for document indexing (*dct:subject “navigation”*)
- Steps:
 - Convert the thesaurus into SKOS concept scheme
 - Use VocBench for data maintenance, including links
 - Use SKOSMOS for data visualization and search

Data storage

Triple stores

- Very many around, also very many benchmark to compare performances and functionalities
 - Cf. <http://www.w3.org/wiki/RdfStoreBenchmarking>
- Some tech know-how needed to choose the best solution and keep it up and running

Data exposure

Various options

1. Provide a dump for download
2. Expose de-referenceable URIs
3. Expose sparql endpoint
4. Expose webserivces

RDF dump for download

- Pros
 - Simply a file to download
 - For data consumers, access to data is under control
-> efficient, fast
- Cons
 - The issue may be to keep the dump in synch
 - Need to decide policy on versioning
 - Need to decide what to include in the dump (only the data? Also the links? ..)

De-referenceable URIs

- Pros:
 - Data exposed is always up-to-date
 - Serving content for URIs
 - Simple back-ends are available to visualize also the html - e.g. Pubby, Loddy
- Cons:
 - Need to set up content negotiation mechanism. Not a big issue, but server must be up 24/7..
 - Data is accessible but not searchable by humans

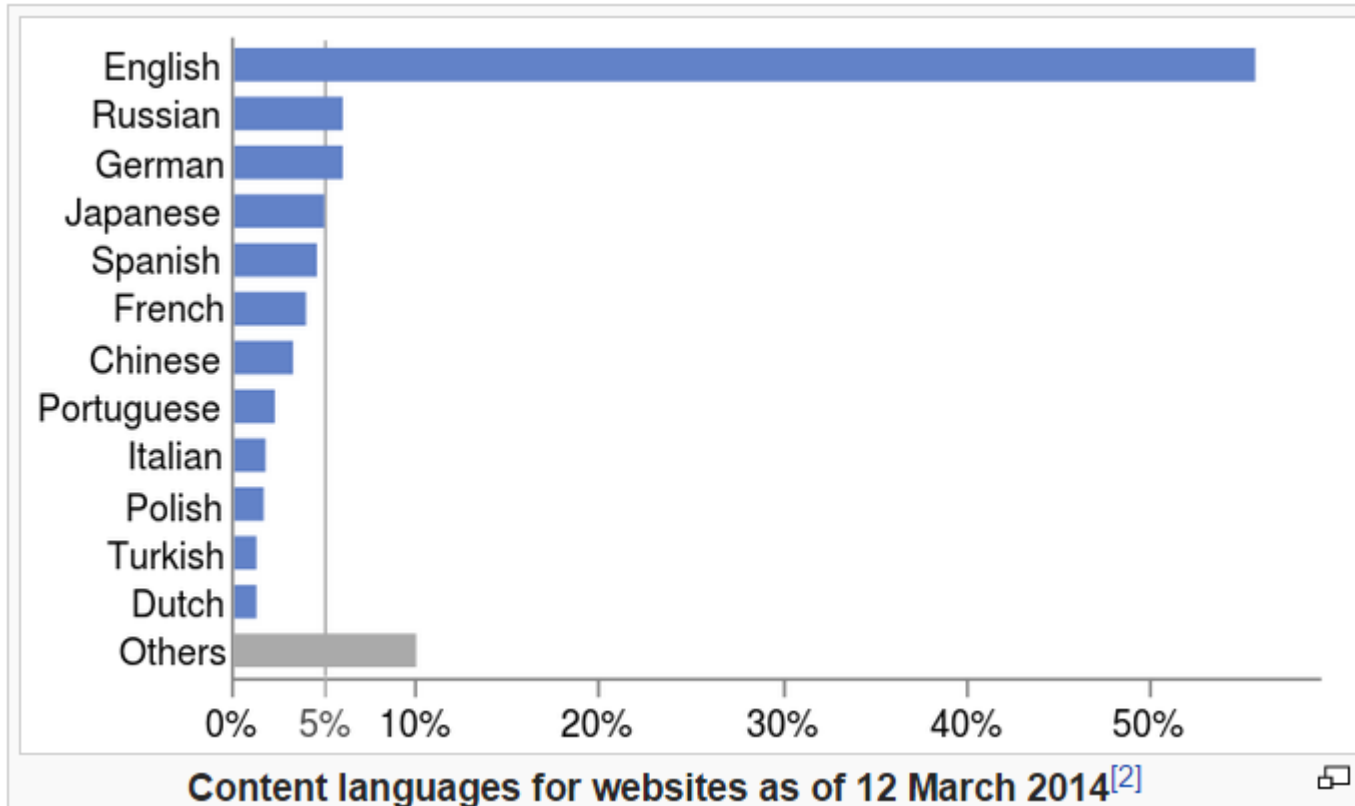
SPARQL endpoint

- Pros:
 - Not much work involved, typically endpoint is provided by triple store
- Cons:
 - Require 24/7 server availability
 - No limitations on queries -> may be heavy on server side
- Other solutions under study, e.g.
<http://linkeddatafragments.org>

Web Services

- Pros:
 - Known technology, good performances
 - More control on data access, less strain on server
 - May be built on top RDF store
- Cons:
 - Need to be implemented

Multilinguality



	Language	approximate # of speakers
1.	Mandarin Chinese	NATIVE: 873 million 2nd: 178 million TOTAL: 1.051 billion
2.	Hindi	NATIVE: 370 million 2nd: 120 million TOTAL: 490 million
3.	<u>Spanish</u>	NATIVE: 350 million 2nd: 70 million TOTAL: 420 million
4.	English	NATIVE: 340 million TOTAL: 510 million
5.	<u>Arabic</u>	NATIVE: 206 million 2nd: 24 million TOTAL: 230 million
[World Almanac est. total 255 million]		
6.	Portuguese	NATIVE: 203 million 2nd: 10 million TOTAL: 213 million
7.	Bengali	NATIVE: 196 million TOTAL: 215 million
8.	Russian	NATIVE: 145 million 2nd: 110 million TOTAL: 255 million
9.	<u>Japanese</u>	NATIVE: 126 million 2nd: 1 million TOTAL: 127 million
10.	<u>German</u>	NATIVE: 101 million 2nd: 128 million

Multilingual vocabularies can help

http://aims.fao.org/aos/agrovoc/c_6599
rice

prefLabel	altLabel	Lang
ငါး		lo
rice	paddy	en
рис (зерно)	необрушенный рис	ru
चावल	धान	hi
Arroz		es
Riso	Risone	it
Reis		de
برنج		fa
Ryż (ziarno)	Ryż brunatny (ziarno) Ryż niełuszczony	pl
ข้าว	ข้าวเปลือก	th
rýže	rýže setá	cs
Riz	Riz paddy	fr
ryža	ryža siata	sk
rizs	hántolatlan rizs	hu
벼		ko
أرز		ar
Arroz	Arroz paddy	pt
米		ja
稻米	水稻	zh
piring	çeltik	tr
	Beras	ms

In practice...

An institution with limited
resources wants to move to Linked
Data. What to do?

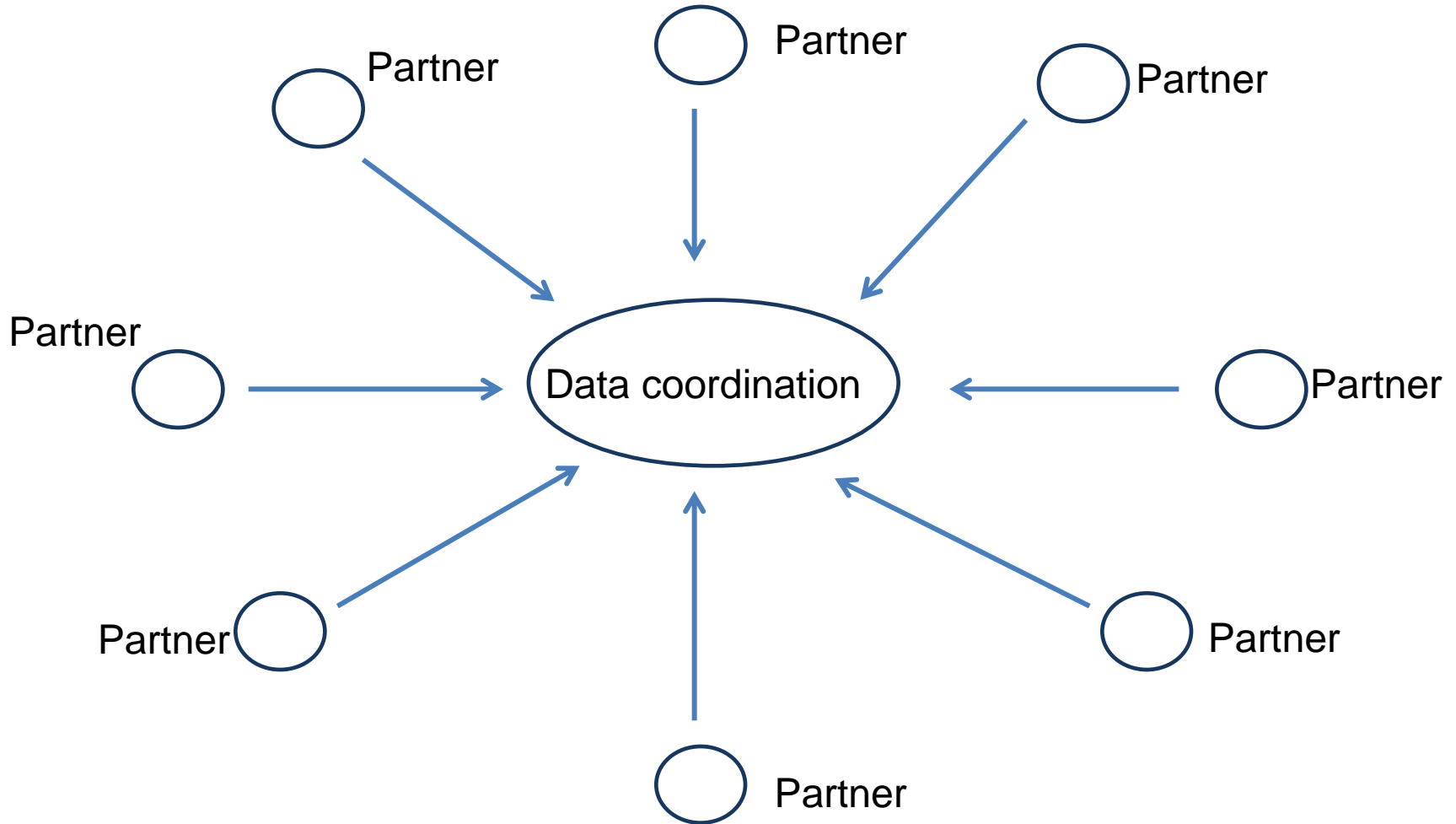
You have at least two options

1. Consider your specific bottlenecks and go ahead on your own
2. Organize a collaboration
 - Effort on creating partnership, networks

AGRIS

An example of collaborative
approach to LOD

The AGRIS network



Can be much smaller o bigger!



The AGRIS network

A I M S



.....a bibliographical record original

MSU International Development Working Paper (2007)

Factors associated with farm households and movement into and out of poverty in Kenya: the rising importance of livestock

Burke, W.J.; Jayne, T.S.; Freeman, H.A.; Kristjanson, P.

Corporate author	Michigan State Univ., East Lansing; ILRI, Nairobi
Publisher	MSU, East Lansing, Michigan (USA)
Date of publication	2007
AGRIS Categories	Agricultural economics and policies ; Rural sociology ; Animal husbandry
AGROVOC English terms	Farms ; Households ; Poverty ; Kenya ; Livestock ; Social welfare ; Economic analysis ; Econometrics ; Income ; Land use ; Markets ; Maize ; Maize ; Assets ; Marketing
Language	English
Notes	fig., tables; ref.
Type	Working p
Pagination	53p.
Journal Title	MSU International Development Working Paper
ISSN	0731-3438
Volume/Issue	no. 90
Abstract (English)	<p>This study explores the dynamics of poverty, specifically to examine how certain initial conditions, household decisions, and other factors that may change over time affect poverty. The study uses longitudinal data collected from 1,324 households which participated in three nationwide surveys conducted over seven years, in 1997, 2000, and 2004. Dynamic relationships between behavioral variables, exogenous shocks at one point in time, and indicators of household welfare in subsequent years are identified. The study starts by developing a welfare indicator and characterizing the degree of poverty mobility, i.e., the extent to which households move into and out of poverty over time. Salient household-level and community-level correlates of poverty in rural Kenya are identified, then dynamic relationships between time-invariant initial conditions, lagged household resource allocation and technology adoption decisions, and current income and wealth outcomes are also identified. Last, the paper draws implications for designing policies and programs for alleviating rural poverty and promoting income growth for households of different landholding sizes.</p>

...the same record in a mashup page

<http://agris.fao.org/agris-search/search.do?recordID=QM2007000047>

Factors associated with farm households and movement into and out of poverty in Kenya: the rising importance of livestock [2007]

RDF 

Burke, W.J.
Jayne, T.S.
Freeman, H.A.
Kristjanson, P.

Abstract:
This study explores the dynamics of poverty, specifically to examine how certain initial conditions, household decisions, and other factors that may change over time affect poverty. The study uses longitudinal data collected from 1,324 households which participated in three nationwide surveys conducted over seven years, in 1997, 2000, and 2004. Dynamic relationships between behavioral variables, exogenous shocks at one point in time, and indicators of household welfare in subsequent years are identified. The study starts by developing a welfare indicator and characterizing the degree of poverty mobility, i.e., the extent to which households move into and out of poverty over time. Salient household-level and community-level correlates of poverty in rural Kenya are identified, then dynamic relationships between time-invariant initial conditions, lagged household resource allocation and technology adoption decisions, and current income and wealth outcomes are also identified. Last, the paper draws implications for designing policies and programs for alleviating rural poverty and promoting income growth for households of different landholding sizes.

- ▼ Agrovoc Keywords
- livestock
 - Kenya
 - land use
 - rural sociology
 - farms
 - maize
 - markets
 - poverty
 - economic analysis
 - agricultural policies
 - income
 - econometrics
 - agricultural economics
 - animal husbandry
 - assets
 - households

- ▼ MSU international development papers (Journal)
- <http://www.aec.msu.edu/fs2/papers/idp.htm>
- START DATE: 1982
- ▼ Agris articles from the same journal:
- Applications of decision theory and the measurement of attitudes towards risk in farm management research in industrialized and Third World settings
 - User's manual for the SADCC cereals trade database compiled by the University of Zimbabwe and Michigan State University.
 - Rice marketing in the Senegal River Valley

Related information in other data sources

Powered by Google™
Read the article and/or related articles:

- ▼ [PDF] Factors Associated with Farm Households' Movement Into and Out ...
- Factors Associated with Farm Households' Movement Into and Out of Poverty in Kenya: The Rising Importance of Livestock** by, William J. Burke, T.S. Jayne, ...
- Go to the page

► Rural Household Income Analysis and Policy

► [PDF] Pathways out of Poverty in Western Kenya and the Role of Livestock

► Specialisation or Diversification? Poverty Exits and Agricultural ...

Data from www.nature.com:

► Optimal trading and shipping of agricultural commodities

► Dynamic asset allocation

► Identification of gene mutation in patients with osteogenesis imperfect using high resolution melting analysis

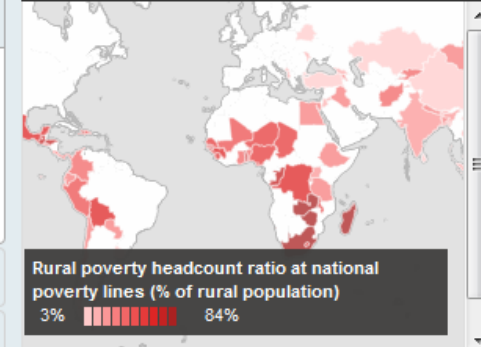
► Two-step complete polarization logic Bell-state analysis

Data from TECA:

► Improving fodder by incorporating legumes in the cropping system, Uganda

Data from World Bank (double-click an area to zoom)

Poverty headcount ratio at rural poverty line (% of rural population)



Activities from the Web

Powered by SemaGrow

► www.fwi.co.uk

► www.ioia.net

► orgprints.org

► clippings.ilri.org

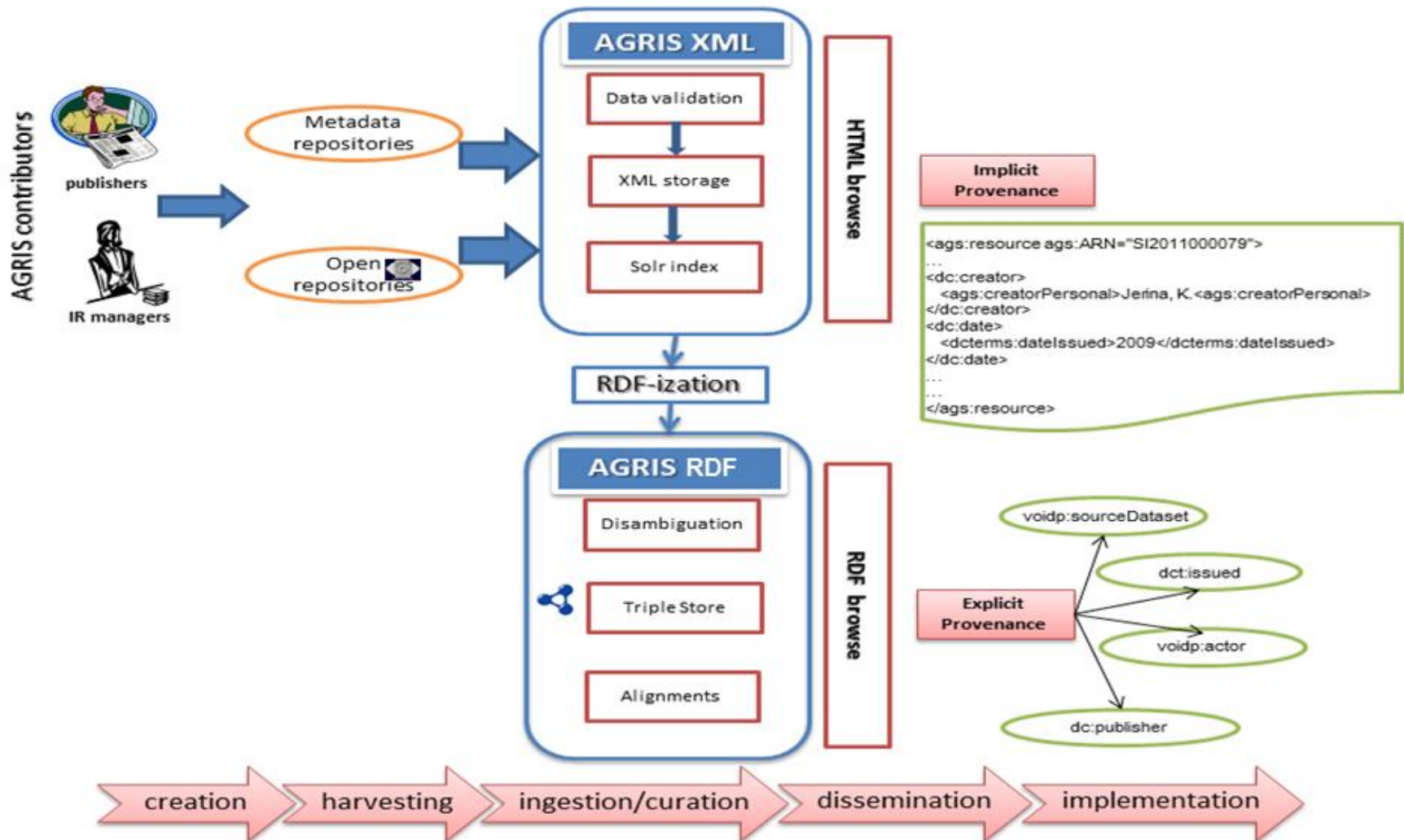
► www.ilri.org

Data from CGRIS Germplasm:

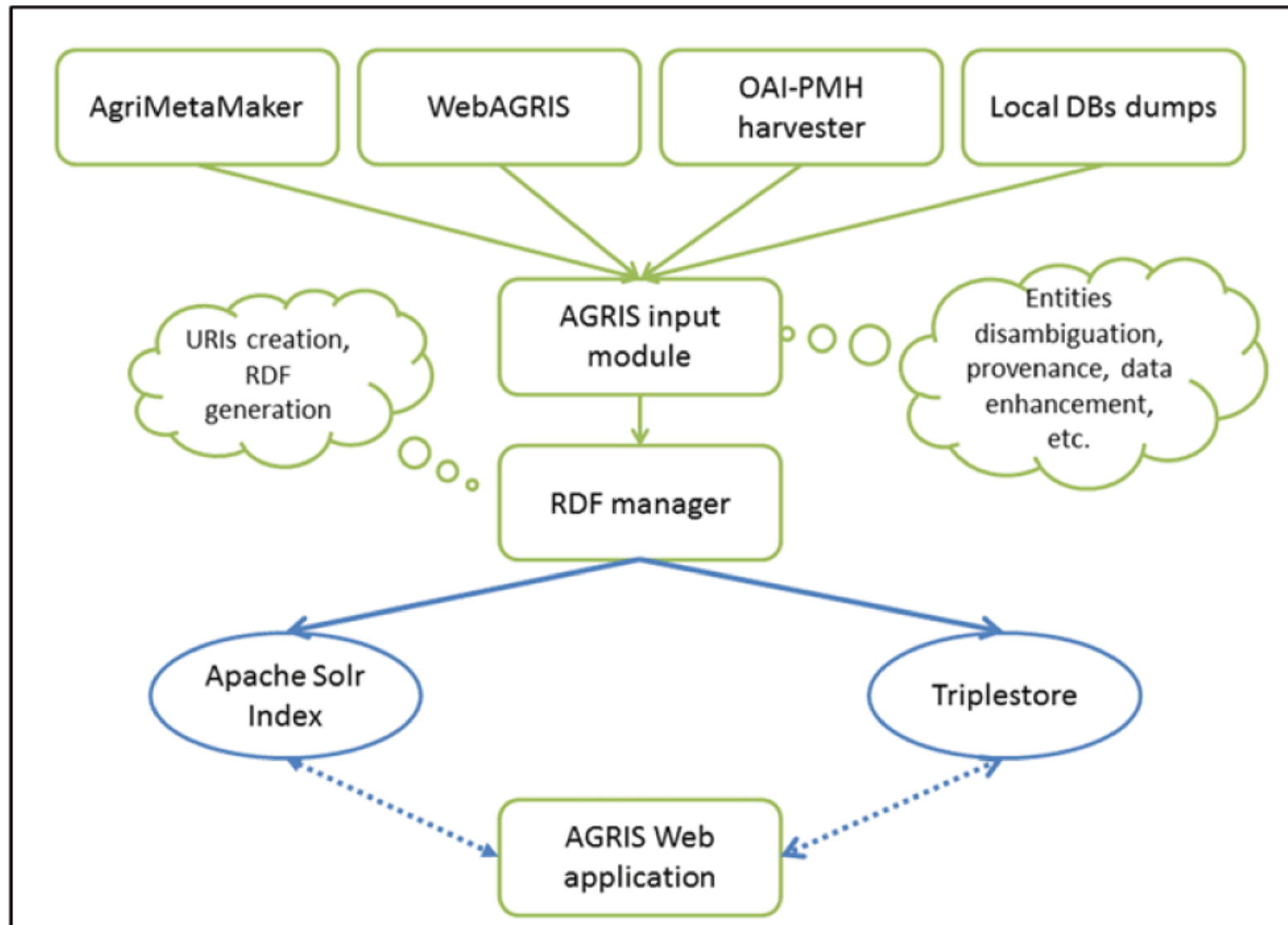
► KENYA C.I.709

► KENYA


Data Flow



AGRIS dataflow and processing



The AGRIMetaMaker

of the **Create Reference**  [English](#) [Español](#)

[Home](#)

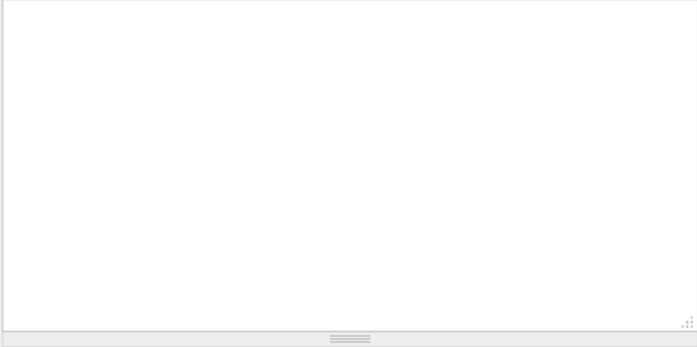
Title *

Title Language

Document type *

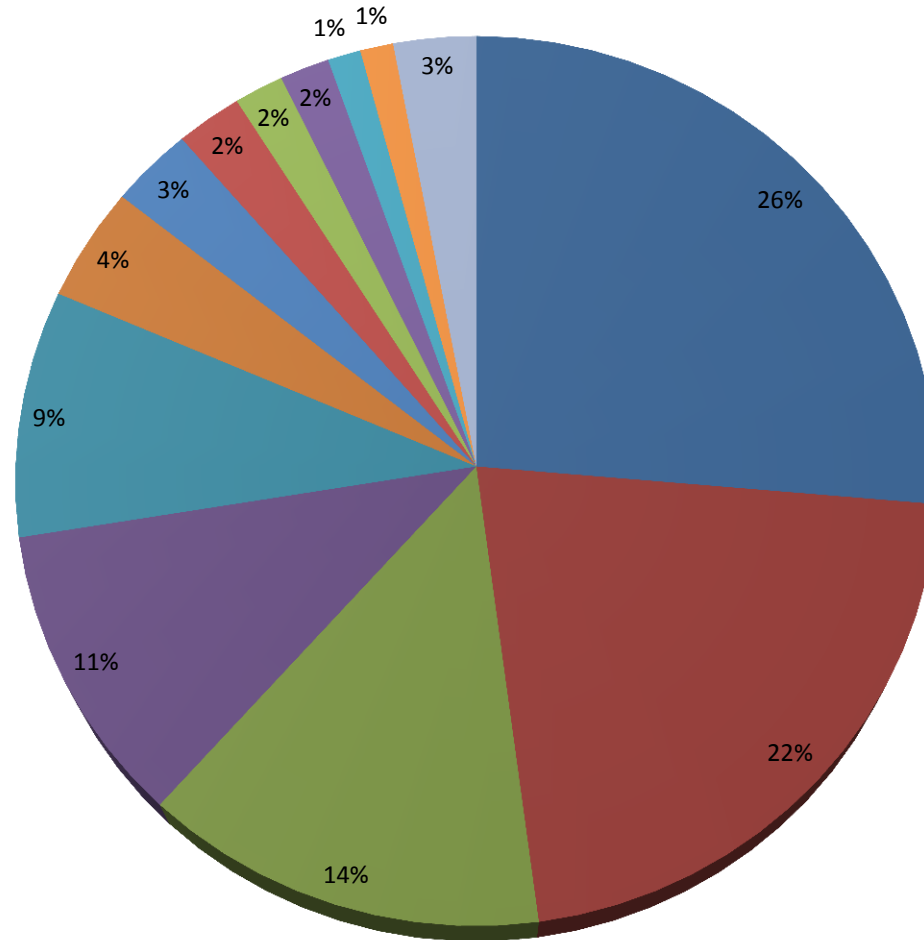
Select the most appropriate type for the resource.

Alternative title **Alt-title language**

Abstract


Language of abstract

Metadata tools used by AGRIS Providers



How linked data is produced

.....using title and authors

MSU International Development Working Paper (2007)

Factors associated with farm households and movement into and out of poverty in Kenya: the rising importance of livestock

Burke, W.J.; Jayne, T.S.; Freeman, H.A.; Kristjanson, P.

Corporate author	Michigan State Univ., East Lansing; ILRI, Nairobi
Publisher	MSU, East Lansing, Michigan (USA)
Date of publication	2007
AGRIS Categories	Agricultural economics and policies; Rural sociology; Animal husbandry
AGROVOC English terms	Farms; Households; Poverty; Kenya; Livestock; Social welfare; Economic analysis; Econometrics; Income; Land use; Markets; Maize; Assets; Marketing
Language	English
Notes	fig., tables; ref.
Type	Working p
Pagination	53p.
Journal Title	MSU International Development Working Paper
ISSN	0731-3438
Volume/Issue	no. 90
Abstract (English)	This study explores the dynamics of poverty, specifically to examine how household decisions, and other factors that may change over time affect longitudinal data collected from 1,324 households which participated in the study conducted over seven years, in 1997, 2000, and 2004. Dynamic relationships between variables, exogenous shocks at one point in time, and indicators of household-level and community-level correlates of poverty in rural Kenya are identified. The study starts by developing a welfare indicator and characterizing poverty mobility, i.e., the extent to which households move into and out of poverty. The paper draws implications for designing policies and programs for alleviating rural income growth for households of different landholding sizes.

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Read the article and/or related articles:

- ▼ [PDF] Factors Associated with Farm Households' Movement Into and Out ...
- **Factors Associated with Farm Households'. Movement Into and Out of Poverty in Kenya: The Rising Importance of Livestock** by. William J. Burke, T.S. Jayne, ...
Go to the page
- Rural Household Income Analysis and Policy
- [PDF] Pathways out of Poverty in Western Kenya and the Role of Livestock
- Specialisation or Diversification? Poverty Exits and Agricultural ...

.....using key words


MSU International Development Working Paper (2007)


▼ Agrovoc Keywords

- livestock
- Kenya
- land use
- rural sociology
- farms
- maize
- markets
- poverty
- economic analysis
- agricultural policies
- income
- econometrics
- agricultural economics
- animal husbandry
- assets
- households
- marketing
- social welfare

Data from **DBpedia**:

▼ Livestock

[edit wikipedia](#) 



Livestock are domesticated animals raised in an agricultural setting to produce commodities such as food, fiber and labor. This article does not discuss poultry or farmed fish, although these, especially poultry, are commonly included within the meaning of "livestock". Livestock are generally raised for profit. Raising animals (animal husbandry) is a component of modern agriculture. It has been practiced in many cultures since the transition to farming from hunter-gather lifestyles.

► Land use

► Rural sociology

► Kenya

► Maize

► Poverty

years are identified. The study starts by developing a measure of poverty mobility, i.e., the extent to which household-level and community-level correlations between time-invariant initial conditions and current technology adoption decisions, and current income growth for households of different la

.....using key words

MSU International Development Working Paper (2007)

Statistics from FAO Country Profiles and IFPRI

the Republic of Kenya



POPULATION TOTAL (2010): 40 513 000
[SOURCE]

Gross domestic product

GDP TOTAL (2009): 29 376 (millions of US dollars) [SOURCE]

Human Development Index (0 - 1 / low - high)

HDI TOTAL (2010): 0.47 (Calculated)
[SOURCE]

FROM: [FAO Country Profiles](#)

Data from [World Bank](#)

Poverty headcount ratio at rural poverty line (% of rural population)



Poverty headcount ratio at rural poverty line (% of rural population)

14.6%  45.0%

technology adoption decisions, and current income and wealth outcomes are also identified. Last, the paper draws implications for designing policies and programs for alleviating rural poverty and promoting income growth for households of different landholding sizes.

...using the journal name or the ISSN

Factors and out
[2007]

<http://agris>

Burke, W.J.

Jayne, T.S.

Freeman, K.

Kristjanson

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ILRI, Nairo

This study

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paper draws

implications

▼ MSU international development papers (Journal)

<http://www.aec.msu.edu/fs2/papers/idp.htm>

START DATE: 1982

▼ Agris articles from the same journal:

- Applications of decision theory and the measurement of attitudes towards risk in farm management research in industrialized and Third World settings
- User's manual for the SADCC cereals trade database compiled by the University of Zimbabwe and Michigan State University.
- Rice marketing in the Senegal River Valley: research findings and policy reform options
- Rapid reconnaissance guidelines for agricultural marketing and food system research in developing countries

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paper draws implications for designing policies and programs for alleviating rural poverty and promoting income growth for households of different landholding sizes.

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Data from **CGRIS Germplasm:**

▼ Turkey Basma

Catalog Number: 00004007

ACCENAME: Turkey Basma

Scientific Name: Nicotiana tabacum L.(普通烟草)

Family: Solanaceae(茄科)

Genus: Nicotiana(烟属)

[Get More Info...](#)

▶ (Oro×Med-Hope)×Hope-Turkey

▶ Tanmarq×Cheyenne×Turkey 1069

▶ 20H 28 Turkey I.Australia

发芽糙米白米黑米软罐头米饭的研制

Development of Soft Package Rice Product Made of Germinated Brown Rice, Black Rice and Rice

耿欣, 肖军霞

Keywords :

发芽糙米;黑米;米的比例;软罐头米饭

germinated brown rice;black rice;proportion of three rice;soft package rice product

Abstract :

以发芽糙米黑米白米为原料开发研制比白米饭更具营养价值及食用方面性的软罐头米饭。通过研究3种米的比例、发芽糙米和黑米的预煮时间、蒸煮水的添加比例以及高温杀菌时间等单因素及多因素组合对软罐头米饭组织状态、口感及糊化度的影响,确定发芽糙米白米黑米的比例为2:2:1,把发芽糙米和黑米均分别预煮20 min和15 min,蒸煮水的添加比例为1:1.4,再和白米一起蒸煮15 min,121℃高温杀菌30 min可得到呈淡紫色、有光泽、有米饭特有的天然香气、白米米粒完整、无软烂、口感爽滑、有嚼劲和弹性、软硬适宜的软罐头

Convenient soft package rice product made of germinated brown rice,black rice,rice was developed in this paper.The proportion of the three rice,the pre-boiling time of germinated brown rice and black rice,the ratio of boiling water to whole rice,time of h

Citation : *食品研究与开发*, 2011, (09) p. 137-141

Length-frequency compositions and weight-length relations for bigeye tuna, yellowfin tuna, and albacore (Perciformes: Scombrinae) in the Atlantic, Indian, and eastern Pacific oceans [2008]

RDF Iod live

Access the resource:

Zhu, G.
 Xu, L., *Shanghai Ocean University, Shanghai (China). College of Marine Sciences*
 Zhou, Y.
 Dai, X., *Tuna Fishery Technical Working Group of China, Shanghai, China*

Abstract:

Bigeye tuna, *Thunnus obesus* (Lowe, 1839), yellowfin tuna, *Thunnus albacares* (Bonnaterre, 1788), and albacore, *Thunnus alalunga* (Bonnaterre, 1788), are very important species for world fisheries. The weight-length relations (WLRs) of the three species were studied using commonly accepted methodology. Significant differences can be found from the fork length distributions and the WLRs of the above 3 tuna species and the relations of gilled-gutted and whole weight of bigeye and yellowfin tunas collected from the Atlantic, Indian, and Eastern Pacific Oceans. Significant differences of fork length distributions can be found for bigeye tuna, yellowfin tuna, and albacore from the three areas. The data collected will be useful for the fisheries management of the three species studied

<p>▼ Agrovoc Keywords</p> <ul style="list-style-type: none"> • animal growth forms • fishery management • Thunnus • Pacific Ocean • statistical data • Thunnus albacares • Indian Ocean • Thunnus alalunga • body weight • body measurements • Thunnus obesus • fishery production • fishery data • tuna • animal physiology • Atlantic Ocean • animal developmental stages 	<p>▼ Acta Ichthyologica et Piscatoria (Journal)</p> <p>FREQUENCY: Semiannual (2 numbers a year)</p> <p>START DATE: 1972</p> <p>▼ Agris articles from the same journal:</p> <ul style="list-style-type: none"> • No relationship between fecundity and annual reproductive rate in bony fish • Wpływ detergentu DBS na aktywnosc niektórych enzymow mozgu, skrzeli i surowicy narybku karpia (<i>Cyprinus carpio</i> L.). • On the occurrence of Salomon (<i>Salmo salar</i> L.) in the Szczecin Firth and the Lower Odra in 1977 [Poland].
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Related information in other data sources

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 Read the article and/or related articles:

▼ Length-frequency compositions and weight-length relations for ...

Length-frequency compositions and weight-length relations for bigeye tuna, ... (Perciformes: Scombrinae) in the Atlantic, Indian, and eastern Pacific oceans ...
 The **weight-length relations (WLRs)** for **bigeye tuna, yellowfin tuna, and albacore,** ...

Go to the page

▶ Length-frequency compositions and weight-length relations f ...

▶ Regional patterns in mercury and selenium concentrations of ...

▶ An Assessment to Relationships between the Yellowfin Tuna and ...

Data from www.nature.com:

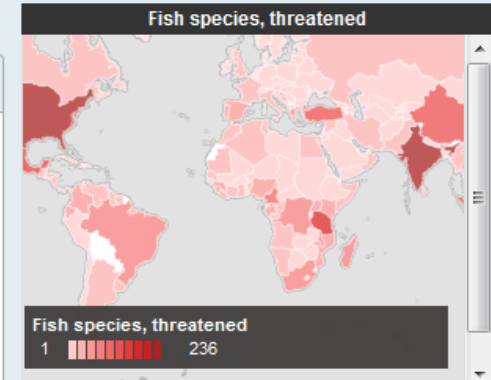
▶ Role of mouse *Wdr13* in placental growth; a genetic evidence for lifetime body weight determination by placenta during development

▶ Harmonising and linking biomedical and clinical data across disparate data archives to enable integrative cross-biobank research

▶ Edge state magnetism in zigzag-interfaced graphene via spin susceptibility measurements

▶ Long noncoding RNA FER1L4 suppresses cancer cell growth by acting as a competing endogenous RNA and regulating PTEN expression

Data from World Bank (double-click an area to zoom)



Data from [CGRIS Germplasm](http://CGRIS.Germplasm.org):

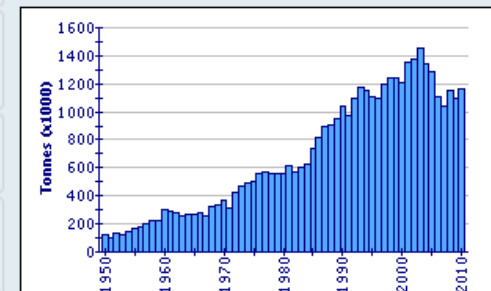
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▶ Fortunato

▶ SWM742639 Fortunata 2/CI 1B 17

Thunnus albacares - Global Capture Production (FAO Fishery Statistic)



Identification and mapping of QTLs [quantitative trait loci] for drought tolerance introgressed from *Oryza glaberrima* Steud. into indica rice (*O. sativa* L.) [apr2009]



Bimpong, I.K.

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 118 and RAM 152 had higher WUE and RAM 3 had higher dehydration tolerance as compared to recurrent *O. sativa* parent. A set of 2091 BCsub2Fsub3 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 2008. Yield of recurrent parents was reduced by 68% in IR64 and 16% in IR55423-01 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 (IR55423-01). Molecular analysis revealed 4-6% introgression from *O. glaberrima* in BCsub2Fsub3. A set of 350 introgression lines was selectively genotyped with SSR[Simple Sequence Repeats] and STS[Sequence Tagged Site] markers. Single-point and interval mapping was done using QTL[Quantitative Trait Loci]Mapper 1.60 and Mapmanager QTX 20. Molecular analysis of IR64 x *O. glaberrima* population revealed 45 QTLs for different agronomic traits of which 18 are new. Similarly, 51 QTLs were identified from IR55423-01 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 (ypp2.1 and ypp4.2) were new and another 2 (yld1.1 and yld8.

[Read More](#)

Agrovoc Keywords

- introgression
- identification
- drought resistance
- loci
- plant breeding
- *Oryza sativa*
- *Oryza glaberrima*
- genetic maps
- plant genetics

Source:

University Library, University of the Philippines at Los Baños ([click here for contact information](#))

HOME PAGE: <http://www.uplb.edu.ph>

Other information

Extent: 255 leaves; 14 ill.; 30 graphs;

Related information in other data sources

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Read the article and/or related articles:

▼ Identification of a Rice Stripe Necrosis Virus resistance locus and ...

Jan 8, 2010 ... Asian rice (*Oryza sativa* L.) is one of the most important food crops for ... Although methodologies for mapping genes or QTLs underlying quantitative traits have made ... the donor genotype, introgressed into a recurrent background genome. ... *O. sativa* L. and *O. glaberrima* Steud., the cultivated African rice ...

[Go to the page](#)

▶ The Wild Relative of Rice: Genomes and Genomics

▶ [PDF] 10 Unlocking the *Oryza glaberrima* Treasure for Rice Breeding in ...

▶ Yield QTL analysis of *Oryza sativa* x *O. glumaepatula* introgression ...

Data from www.nature.com:

▶ リサーチダウンロードアップ

Ethylene resistance in flowering
▶ ornamental plants – improvements and future perspectives

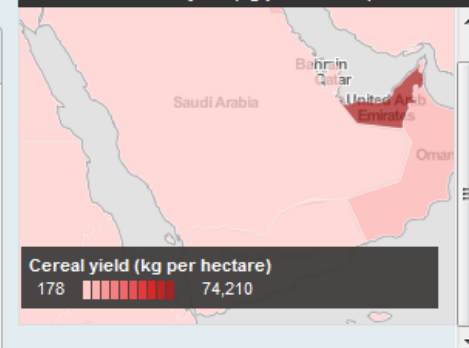
Inhibition of human GLUT1 and GLUT5
▶ by plant carbohydrate products; insights into transport specificity

Common genetic variants in 11q13.3 and 9q22.33 are associated with molecular subgroups of multiple myeloma

Data from TECA:

Data from World Bank (double-click an area to zoom)

Cereal yield (kg per hectare)



Activities from the Web

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Data from Germplasm accessions from the Planta-res database

▶ Precoz 2 F A

▶ Upla 104

▶ Upla 64

▶ Upla 66

Linking URIs

Property	Value
abstract	<ul style="list-style-type: none">▪ This study explores the dynamics of poverty, specific factors that may change ... »more» (en)
creator	<ul style="list-style-type: none">▪ [6 anonymous resources]
identifier	<ul style="list-style-type: none">▪ QM2007000047
isPartOf	<ul style="list-style-type: none">▪ <http://aims.fao.org/serials/c_82757bf2>
issued	<ul style="list-style-type: none">▪ 2007
language	<ul style="list-style-type: none">▪ En
publisher	<ul style="list-style-type: none">▪ [1 anonymous resource]
subject	<ul style="list-style-type: none">▪ <http://aims.fao.org/aos/agrovoc/c_12332>▪ <http://aims.fao.org/aos/agrovoc/c_2468>▪ <http://aims.fao.org/aos/agrovoc/c_2469>▪ <http://aims.fao.org/aos/agrovoc/c_2809>▪ <http://aims.fao.org/aos/agrovoc/c_3676>▪ <http://aims.fao.org/aos/agrovoc/c_3820>▪ <http://aims.fao.org/aos/agrovoc/c_4086>▪ <http://aims.fao.org/aos/agrovoc/c_4182>▪ <http://aims.fao.org/aos/agrovoc/c_4397>▪ <http://aims.fao.org/aos/agrovoc/c_4620>▪ <http://aims.fao.org/aos/agrovoc/c_4626>▪ <http://aims.fao.org/aos/agrovoc/c_6151>▪ <http://aims.fao.org/aos/agrovoc/c_6707>▪ <http://aims.fao.org/aos/agrovoc/c_677>▪ <http://aims.fao.org/aos/agrovoc/c_7137>▪ <http://aims.fao.org/aos/agrovoc/c_8532>
title	<ul style="list-style-type: none">▪ Factors associated with farm households and movement

Linking vocabularies

Kenya

Property	Value
rdf:type	skos:Concept
skos:broader	http://aims.fao.org/aos/agrovoc/c_2442 http://aims.fao.org/aos/agrovoc/c_2442
skos:exactMatch	http://www.caas.net.cn/caas/cat/c_25374 http://eurovoc.europa.eu/1557 http://lod.nal.usda.gov/nalt/35152 http://zbw.eu/stw/descriptor/17660-1 http://lod.gesis.org/thesoz/concept/10035650 http://www.fao.org/countryprofiles/geoinfo/geopolitical/resource/Kenya http://dewey.info/class/967.62/
skos:closeMatch	http://dbpedia.org/resource/Kenya
dcterms:created	2011-11-20T20:37:56Z
dcterms:modified	2013-08-28T18:44:58Z
http://www.w3.org/2004/02/skos/mapping#exactMatch	http://sws.geonames.org/192950/
void:inDataset	http://aims.fao.org/aos/agrovoc/void.ttl#Agrovoc
http://aims.fao.org/aos/agrontology#isPartOfSubvocabulary	Geographical country level
skos:inScheme	http://aims.fao.org/aos/agrovoc
vocbench:hasStatus	Published
http://aims.fao.org/aos/agrontology#spatiallyIncludes	http://aims.fao.org/aos/agrovoc/c_50031 http://aims.fao.org/aos/agrovoc/c_29719 http://aims.fao.org/aos/agrovoc/c_29726

Recap and Conclusions

1. Understand your own
constraints

2. Keep an eye on tech
improvements

3. Be smart from the start

In brief...

- Start small: one dataset only (or few)
- Start relevant: choose a key dataset, either because central to your application, or because widely used (visibility)
- Start from somewhere: try to reuse experience as much as possible
- Go in steps: open first, then link
- Look for collaborations

4. In union there is strength

Find your own union

- Organize a consortium and maximize your resources
- Look for experience and support from other organizations

Thank you!

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johannes.keizer@fao.org

<http://aims.fao.org>