NAS Life-Cycle Assessment Panel

Towards a Life Cycle Assessment (LCA) Digital Commons

http://www.lcacommons.gov/

November 17, 2011

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Agenda

- Introduction
- Why – Needs & Purposes
- What – System, Datasets & Website
- How – Technical Approach
- Who – Collaborating Community
- Next Steps
- Q&A

Product Life Cycle – Soybean





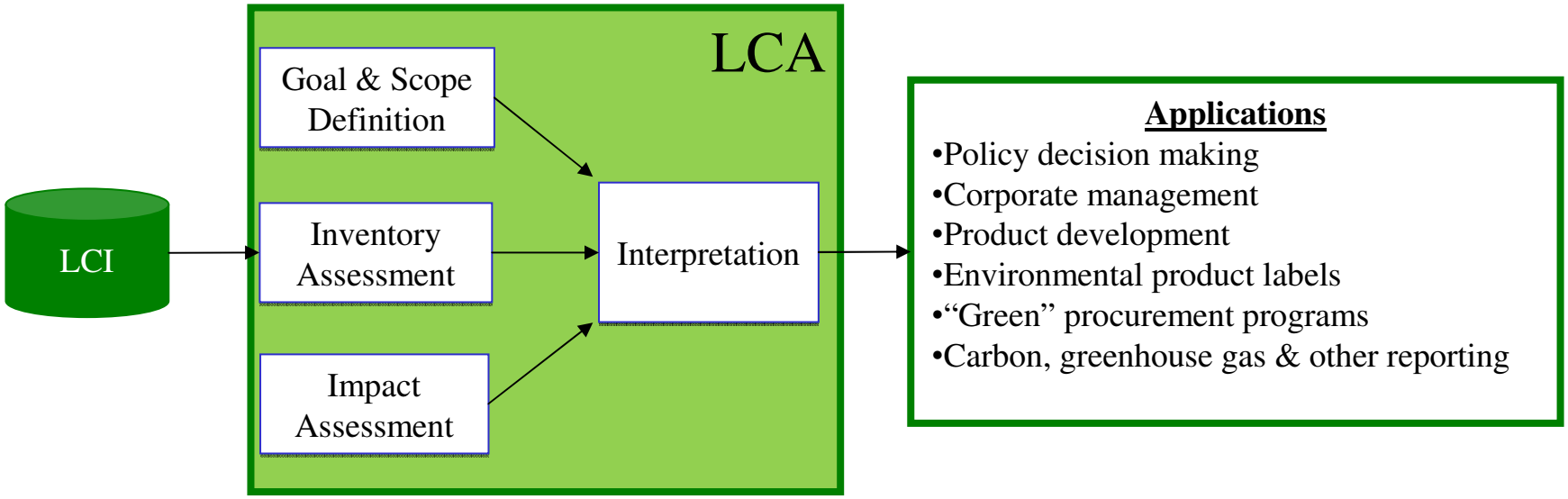






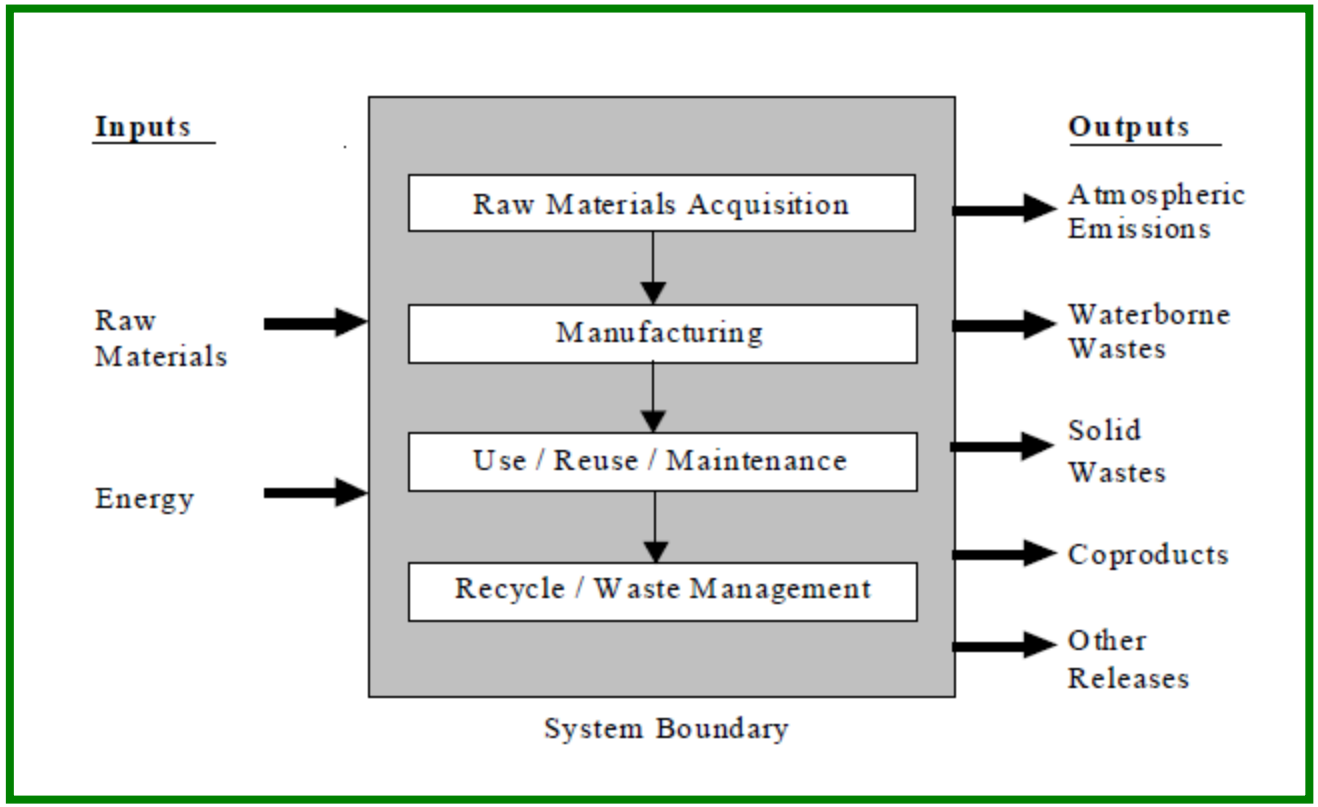
Life Cycle Assessment

- **Life Cycle Assessment (LCA) –** The assessment of the environmental, economical, and social impact of a given product throughout its lifespan.

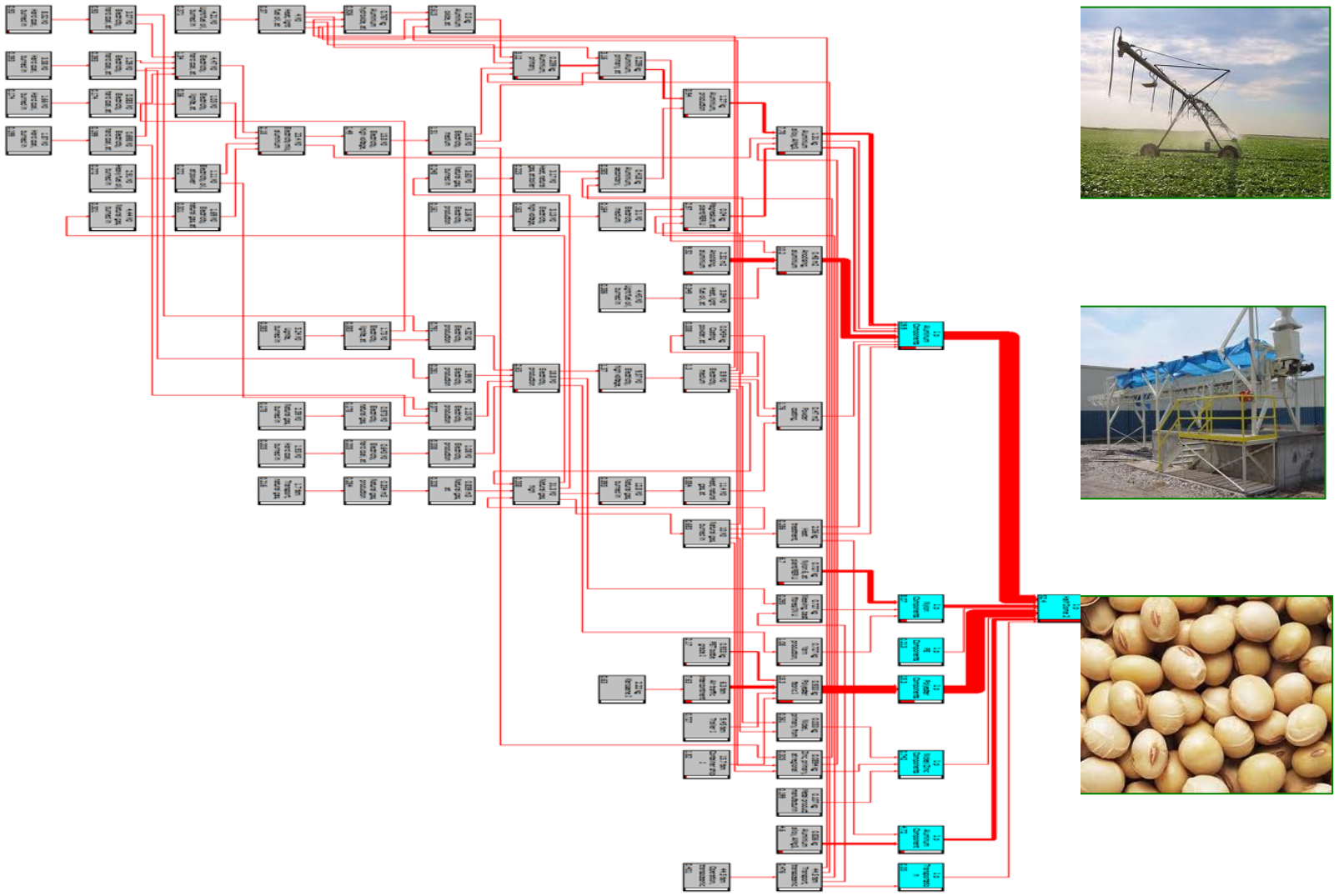


A Life Cycle Inventory

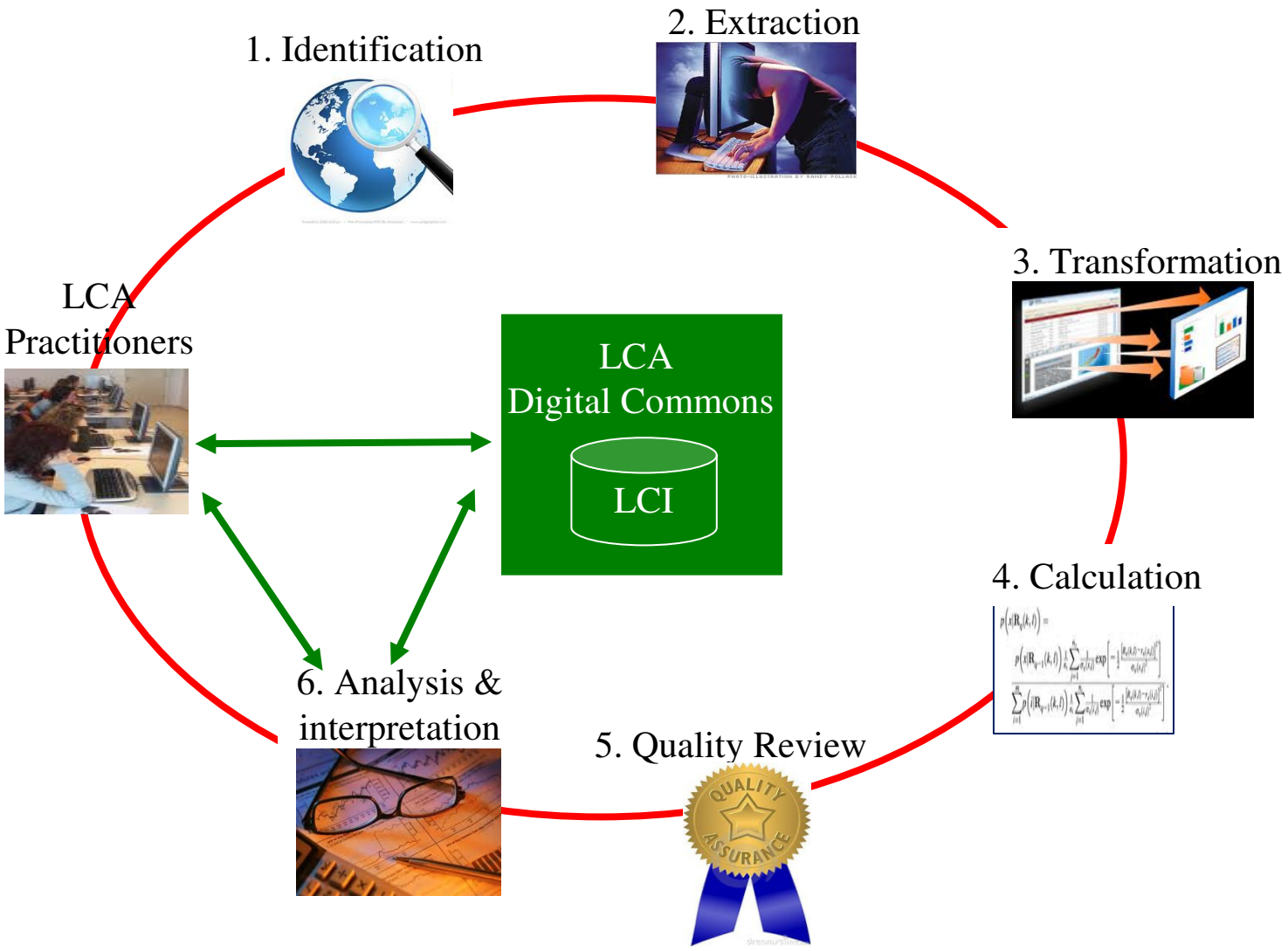
- **A Life Cycle Inventory (LCI) –** A collection of data about unit processes of a product life cycle with their associated inputs and outputs.



LCA Is Data Driven

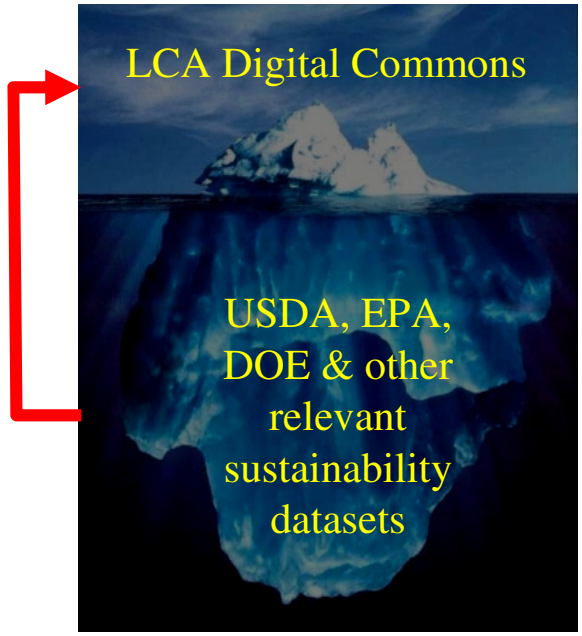


The Needs

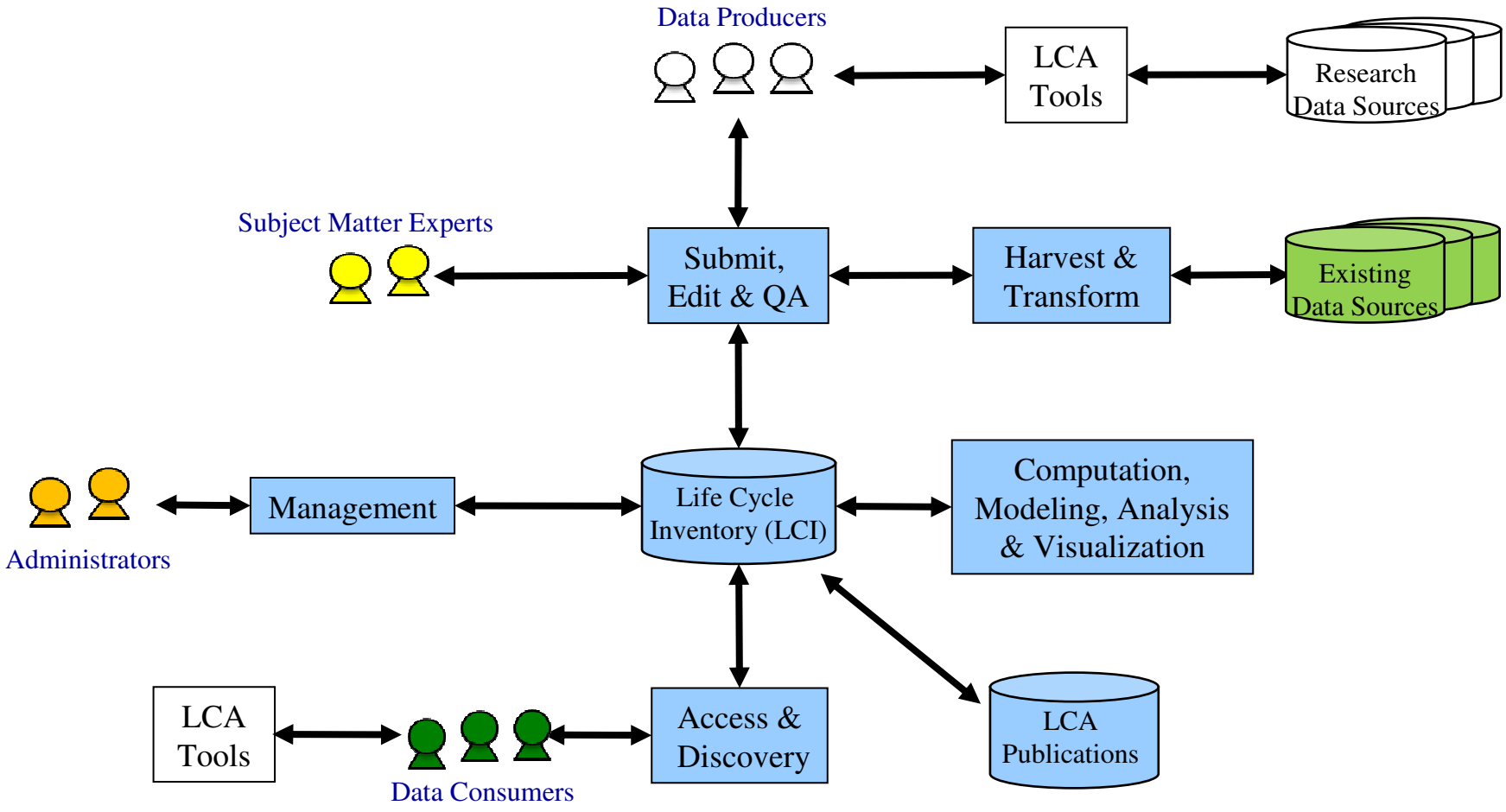

1. Identification
2. Extraction
3. Transformation
4. Calculation
5. Quality Review
6. Analysis & interpretation
LCA Practitioners
LCA Digital Commons
LCI
QUALITY ASSURANCE

Main Purposes

- Provide transparent & high quality information
- Promote open access
- Maximize return on sustainability research investments
  - Reuse sustainability datasets
  - Preserve sustainability datasets
  - Avoid duplication efforts
- Speed up sustainability research
  - One-stop resource
  - Integrated view
  - Intelligent tools



System Architecture



Harvest Datasets

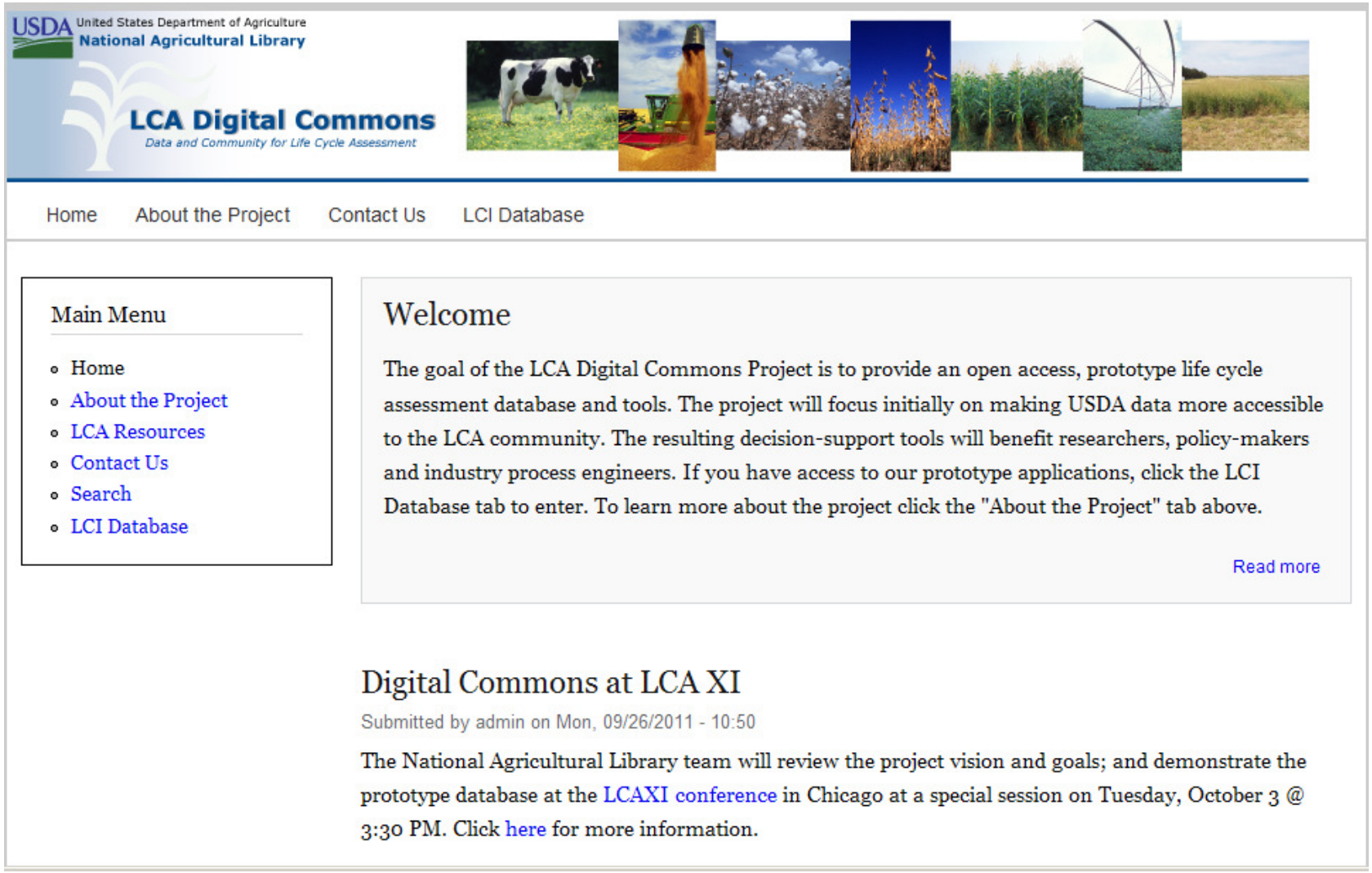
- Data collection in tiers
  - **Tier 1 data: crop production** with unit processes by *year-state-crop (2005-Nebraska-corn)*
  - **Tier 2 data: agricultural means of production/work processes** *(e.g., pressure irrigation, surface water, KY, 2003)*
  - **Tier 3 data: supporting processes**

    (e.g., *diesel production)*
- Tier 1 and 2 data derived from NASS (yield) and ARMS; Tier 3 data derived from a variety of sources including ARMS

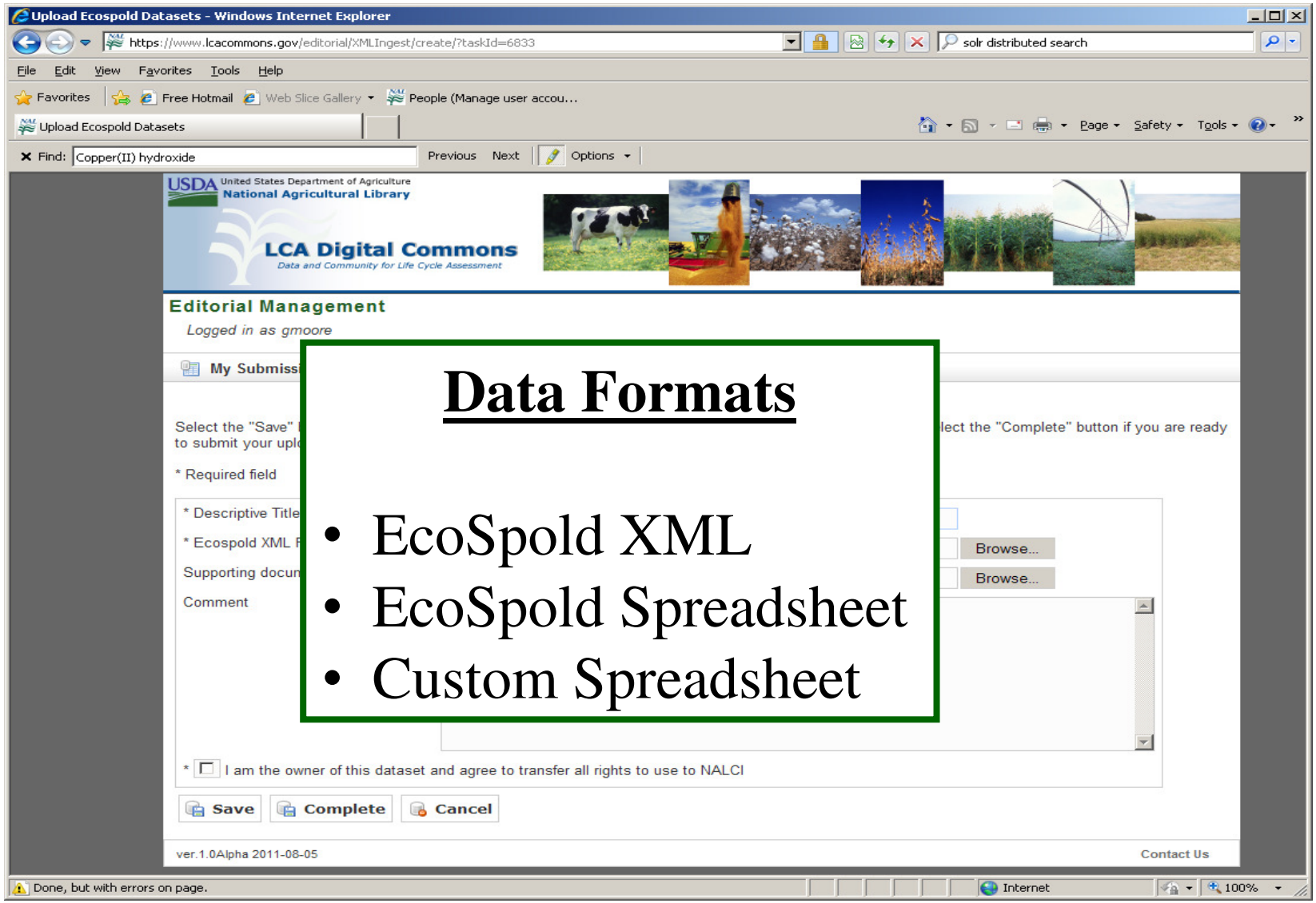
Field Crops

- Corn (1996, 1997, 1998, 1999, 2000, 2001, 2005)
- Soybeans (1996, 1997, 1998, 1999, 2000, 2002, 2006)
- Oats (2005)
- Spring, durum, and winter wheat (1996, 1997, 1998, 2000, 2004)
- Cotton (1996, 1997, 1998, 1999, 2000, 2003, 2007)
- Sorghum (2003)
- Barley for malt, barley for feed (2003)
- Peanuts (1999, 2004)
- Rice (2006)

Home Page


USDA United States Department of Agriculture
National Agricultural Library
LCA Digital Commons
Data and Community for Life Cycle Assessment
Home
About the Project
Contact Us
LCI Database
Main Menu
Home
About the Project
LCA Resources
Contact Us
Search
LCI Database
Welcome
The goal of the LCA Digital Commons Project is to provide an open access, prototype life cycle assessment database and tools. The project will focus initially on making USDA data more accessible to the LCA community. The resulting decision-support tools will benefit researchers, policy-makers and industry process engineers. If you have access to our prototype applications, click the LCI Database tab to enter. To learn more about the project click the "About the Project" tab above.
Read more
Digital Commons at LCA XI
Submitted by admin on Mon, 09/26/2011 - 10:50
The National Agricultural Library team will review the project vision and goals; and demonstrate the prototype database at the LCAXI conference in Chicago at a special session on Tuesday, October 3 @ 3:30 PM. Click here for more information.

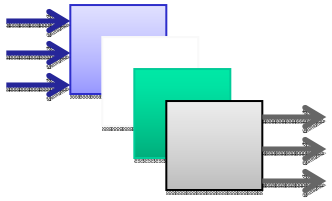
Upload Datasets



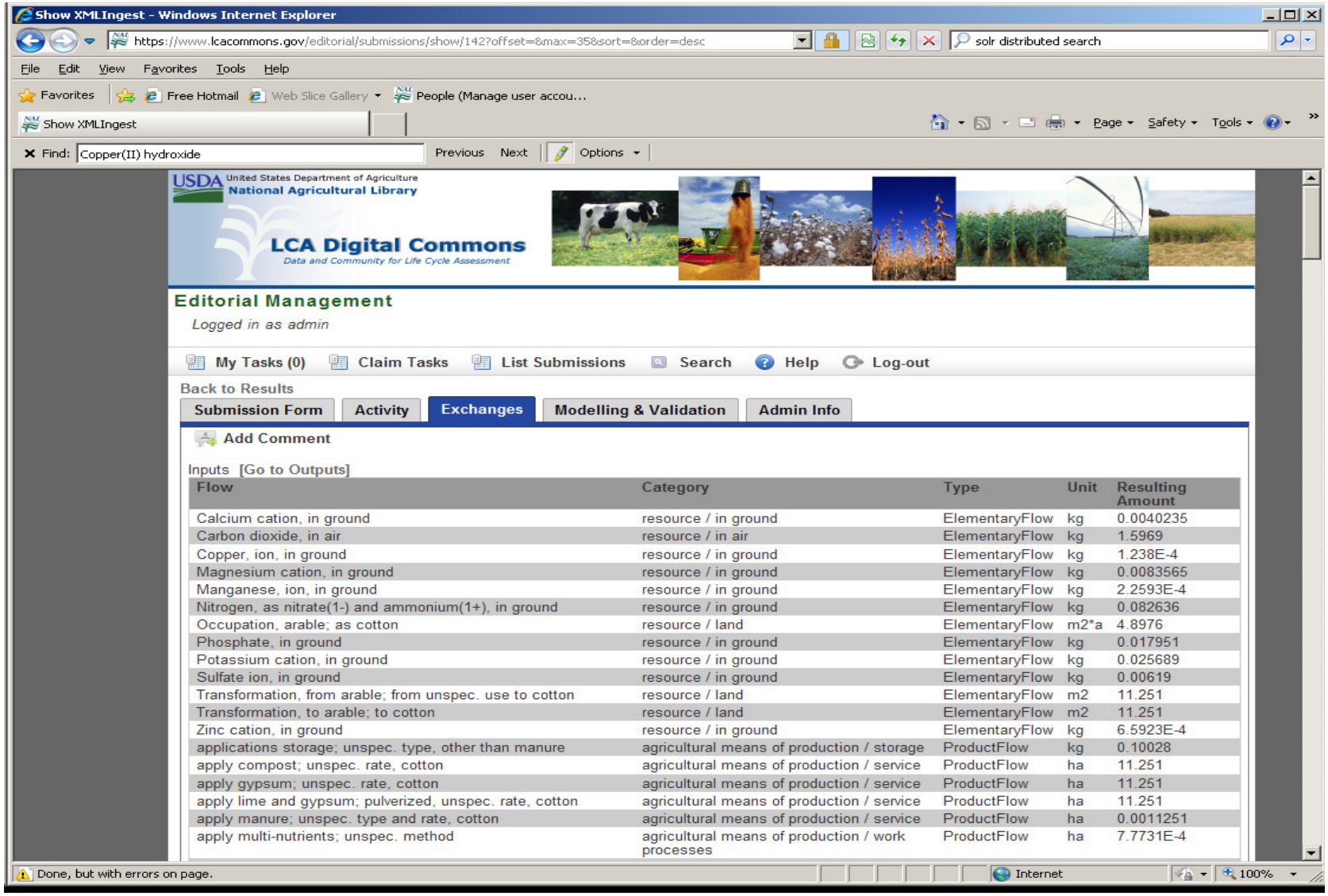
Data Formats

- EcoSpold XML
- EcoSpold Spreadsheet
- Custom Spreadsheet

Dataset Contents

- Complete unit process data sets 
  - **Representing a gate-to-gate scope** (e.g., activities on a farm or in a fuel conversion facility)
  - These can be used in the preparation of life cycle inventories
  - These can include simply mean values or add statistical information to increase the data quality
- Incomplete unit process data sets 
  - **Again representing a gate-to-gate scope,** but omitting select resource use or emissions (e.g., facility construction, toxic emissions, etc.)
  - These require data to be added or gaps to be described for use in inventories
  - Again these can include simply mean values or add statistical information
- Life cycle inventory data sets 
  - **Representing a cradle-to-gate or cradle scope**
  - These are life cycle inventories
  - Again these can include simply mean values with statistical information

View Submitted Datasets



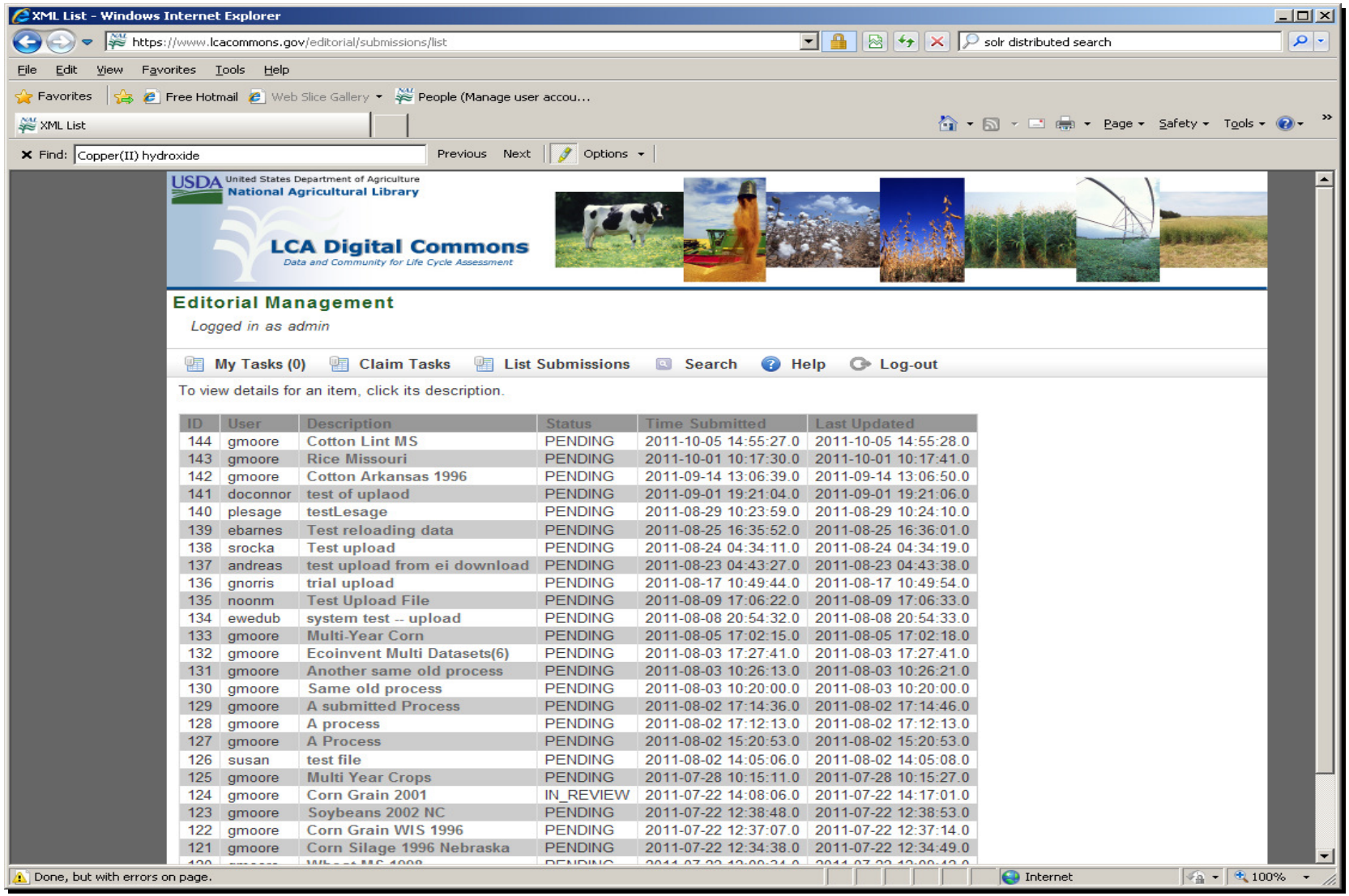
Flow	Category	Type	Unit	Resulting Amount
Calcium cation, in ground	resource / in ground	ElementaryFlow	kg	0.0040235
Carbon dioxide, in air	resource / in air	ElementaryFlow	kg	1.5969
Copper, ion, in ground	resource / in ground	ElementaryFlow	kg	1.238E-4
Magnesium cation, in ground	resource / in ground	ElementaryFlow	kg	0.0083565
Manganese, ion, in ground	resource / in ground	ElementaryFlow	kg	2.2593E-4
Nitrogen, as nitrate(1-) and ammonium(1+), in ground	resource / in ground	ElementaryFlow	kg	0.082636
Occupation, arable; as cotton	resource / land	ElementaryFlow	m2*a	4.8976
Phosphate, in ground	resource / in ground	ElementaryFlow	kg	0.017951
Potassium cation, in ground	resource / in ground	ElementaryFlow	kg	0.025689
Sulfate ion, in ground	resource / in ground	ElementaryFlow	kg	0.00619
Transformation, from arable; from unspec. use to cotton	resource / land	ElementaryFlow	m2	11.251
Transformation, to arable; to cotton	resource / land	ElementaryFlow	m2	11.251
Zinc cation, in ground	resource / in ground	ElementaryFlow	kg	6.5923E-4
applications storage; unspec. type, other than manure	agricultural means of production / storage	ProductFlow	kg	0.10028
apply compost; unspec. rate, cotton	agricultural means of production / service	ProductFlow	ha	11.251
apply gypsum; unspec. rate, cotton	agricultural means of production / service	ProductFlow	ha	11.251
apply lime and gypsum; pulverized, unspec. rate, cotton	agricultural means of production / service	ProductFlow	ha	11.251
apply manure; unspec. type and rate, cotton	agricultural means of production / service	ProductFlow	ha	0.0011251
apply multi-nutrients; unspec. method	agricultural means of production / work processes	ProductFlow	ha	7.7731E-4

Data Quality

- ***Minimizing*** subjectivity and score misuse
- ***Maximizing*** repeatability and usefulness

Category	Requirements for a data quality score of A
1. Reliability and reproducibility	The flow data were based on measurements using a specified and standardized measurement method **OR** The flow data were estimated using methods and data described in specified archival or other consistently publically available sources.
2. Flow data completeness	The flow data were collected over at least 3 years for agricultural (crop, livestock, forest, range) processes or other processes in which the data point varies for uncontrolled annual conditions (e.g., weather) **AND** The flow data were collected from the population it is intended to represent without surrogacy.
3. Temporal coverage	The flow data represent operations that occurred between the unit process start and end dates without forecasting.
4. Geographical coverage	The flow data represent operations that occurred within the location of the unit process, including non-agricultural process data that have been adapted to reflect logistics and market shares[31] for the unit process location.
5.Technological coverage	The flow data represent the process(es) and/or material(s) specified without surrogacy or aggregation with other technologies.
6. Uncertainty	The flow data either include estimates of the first quartile, mean, median, and third quartile values **OR** data from which these values can be estimated.
7. Precision	The relative standard error of the flow data is less than or equal to 25% **OR** The interquartile range divided by the median is less than or equal to 50% **OR** For a triangular distribution, the minimum flow data value is ≥ 25% and maximum flow data value is ≤125% of the most likely value **OR** For a uniform distribution, the minimum flow data value is ≥ 25% and maximum flow data value is ≤125% of the average of the minimum and maximum values.

Check Submission Status



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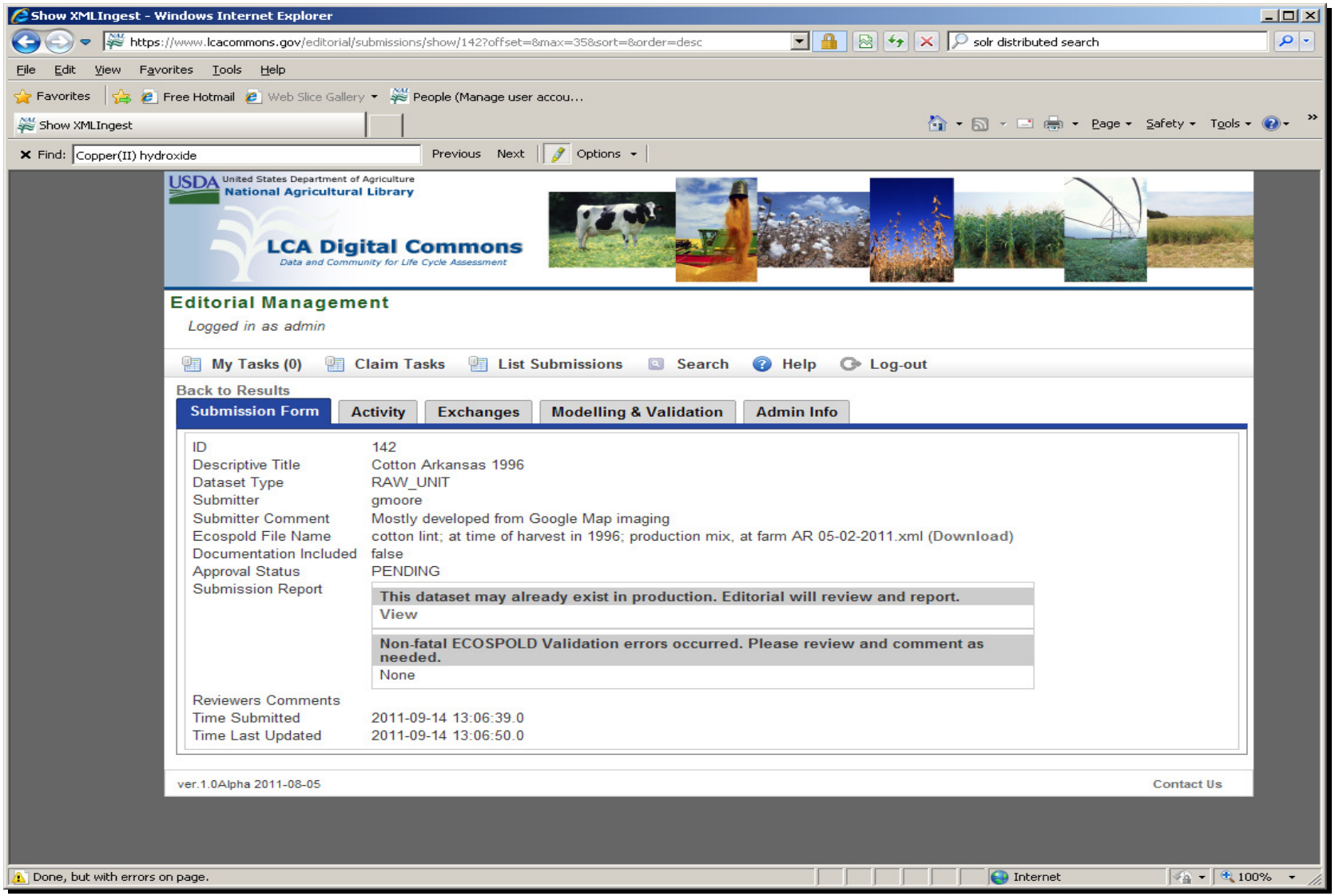
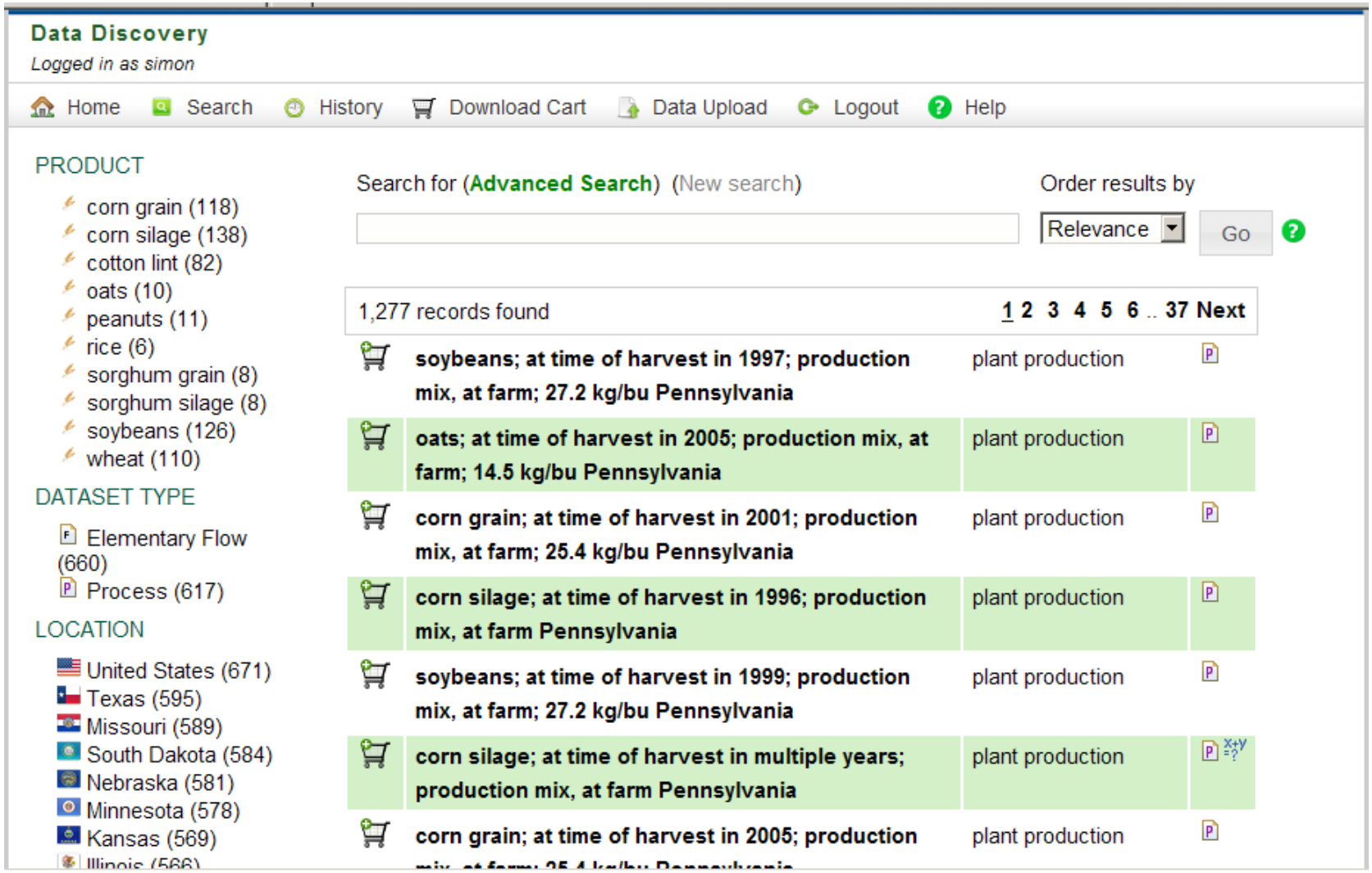
144	gmoore	Cotton Lint MS	PENDING	2011-10-05 14:55:27.0	2011-10-05 14:55:28.0
143	gmoore	Rice Missouri	PENDING	2011-10-01 10:17:30.0	2011-10-01 10:17:41.0
142	gmoore	Cotton Arkansas 1996	PENDING	2011-09-14 13:06:39.0	2011-09-14 13:06:50.0
141	doconnor	test of uplaod	PENDING	2011-09-01 19:21:04.0	2011-09-01 19:21:06.0
140	plesage	testLesage	PENDING	2011-08-29 10:23:59.0	2011-08-29 10:24:10.0
139	ebarnes	Test reloading data	PENDING	2011-08-25 16:35:52.0	2011-08-25 16:36:01.0
138	srocka	Test upload	PENDING	2011-08-24 04:34:11.0	2011-08-24 04:34:19.0
137	andreas	test upload from ei download	PENDING	2011-08-23 04:43:27.0	2011-08-23 04:43:38.0
136	gnorris	trial upload	PENDING	2011-08-17 10:49:44.0	2011-08-17 10:49:54.0
135	noonm	Test Upload File	PENDING	2011-08-09 17:06:22.0	2011-08-09 17:06:33.0
134	ewedub	system test -- upload	PENDING	2011-08-08 20:54:32.0	2011-08-08 20:54:33.0
133	gmoore	Multi-Year Corn	PENDING	2011-08-05 17:02:15.0	2011-08-05 17:02:18.0
132	gmoore	Ecoinvent Multi Datasets(6)	PENDING	2011-08-03 17:27:41.0	2011-08-03 17:27:41.0
131	gmoore	Another same old process	PENDING	2011-08-03 10:26:13.0	2011-08-03 10:26:21.0
130	gmoore	Same old process	PENDING	2011-08-03 10:20:00.0	2011-08-03 10:20:00.0
129	gmoore	A submitted Process	PENDING	2011-08-02 17:14:36.0	2011-08-02 17:14:46.0
128	gmoore	A process	PENDING	2011-08-02 17:12:13.0	2011-08-02 17:12:13.0
127	gmoore	A Process	PENDING	2011-08-02 15:20:53.0	2011-08-02 15:20:53.0
126	susan	test file	PENDING	2011-08-02 14:05:06.0	2011-08-02 14:05:08.0
125	gmoore	Multi Year Crops	PENDING	2011-07-28 10:15:11.0	2011-07-28 10:15:27.0
124	gmoore	Corn Grain 2001	IN_REVIEW	2011-07-22 14:08:06.0	2011-07-22 14:17:01.0
123	gmoore	Soybeans 2002 NC	PENDING	2011-07-22 12:38:48.0	2011-07-22 12:38:53.0
122	gmoore	Corn Grain WIS 1996	PENDING	2011-07-22 12:37:07.0	2011-07-22 12:37:14.0
121	gmoore	Corn Silage 1996 Nebraska	PENDING	2011-07-22 12:34:38.0	2011-07-22 12:34:49.0

View Comments



Search & Download

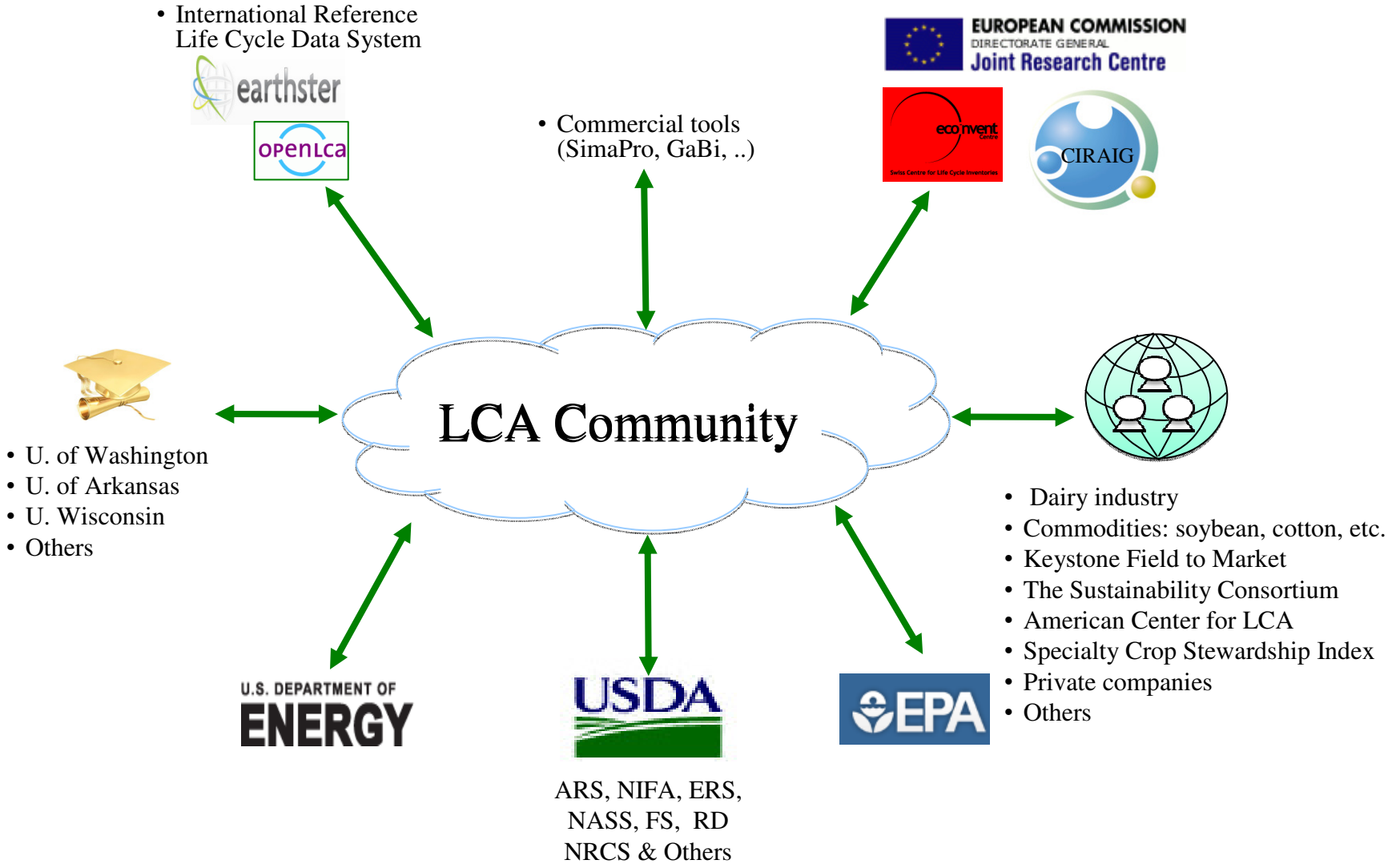


Technical Approach

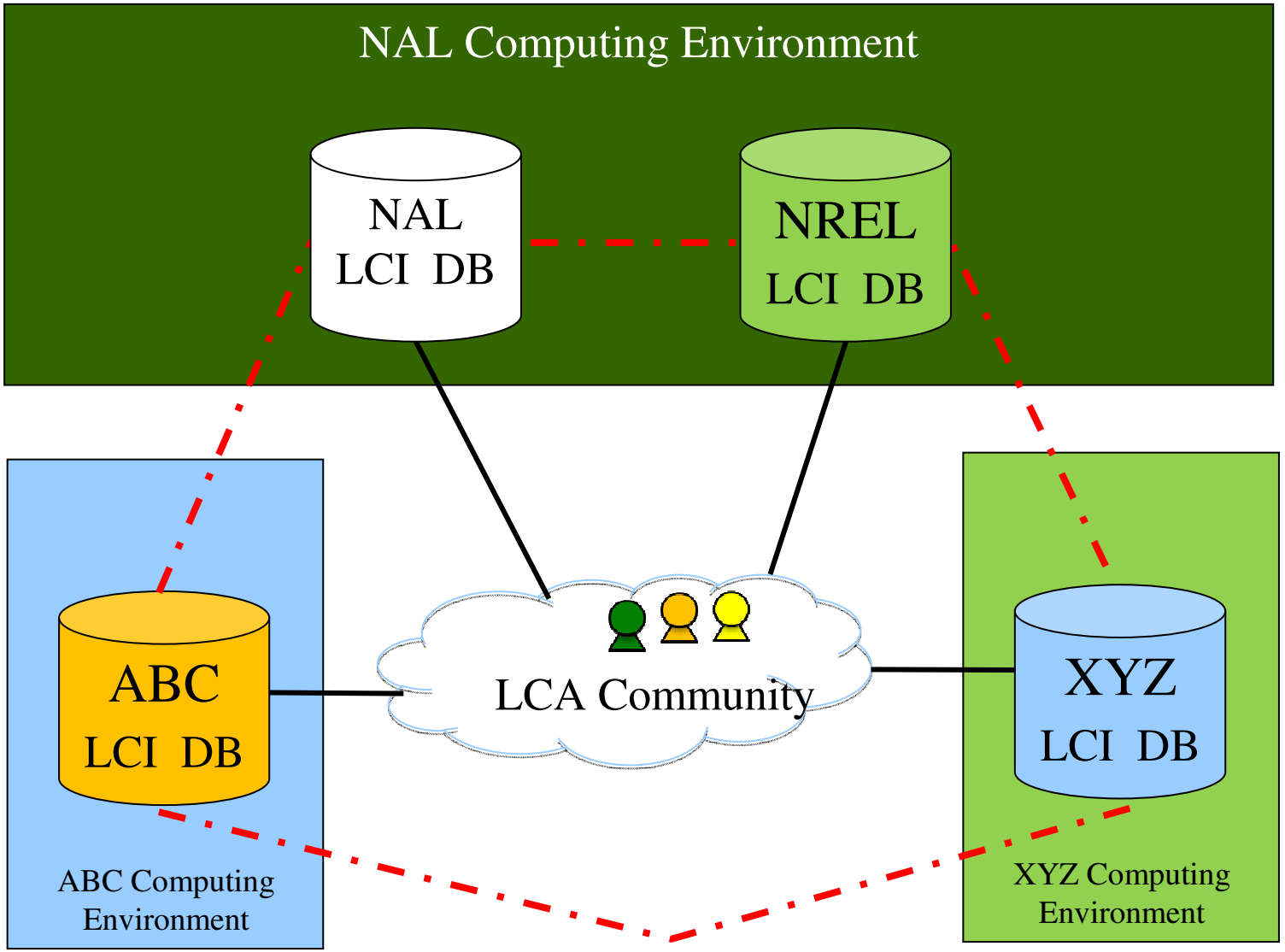
- Exchange standards
  - EcoSpold – ISO 14048, SPOLD, SPINE
- Import formats
  - Support major commercial LCA tools such as SimaPro, GaBi, Umberto
- Export formats
  - EcoSpold XML
  - EcoSpold Spreadsheet
  - Spreadsheet

ISO LCA Standards – 14xxx

A Global LCA Community



A Collaboration Framework



Next Steps – Collaboration

- Academic/research partners
- LCA Software Vendors
  - OpenLCA, Earthster, SimaPro, Gabi & Quantis
- Federal partners
  - Federal LCA digital commons (EPA, DOE, ..)
- Industry partners
  - Dairy, Soybeans, Cotton, Chemical & Others
- International partners
  - Canada, Japan, China & Switzerland

Next Steps – Dataset Expansion

Q&A

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