



NAS Life-Cycle Assessment Panel

Towards a Life Cycle Assessment (LCA) Digital Commons

<http://www.lcacommmons.gov/>

November 17, 2011

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Director, National Agricultural Library



Agenda

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



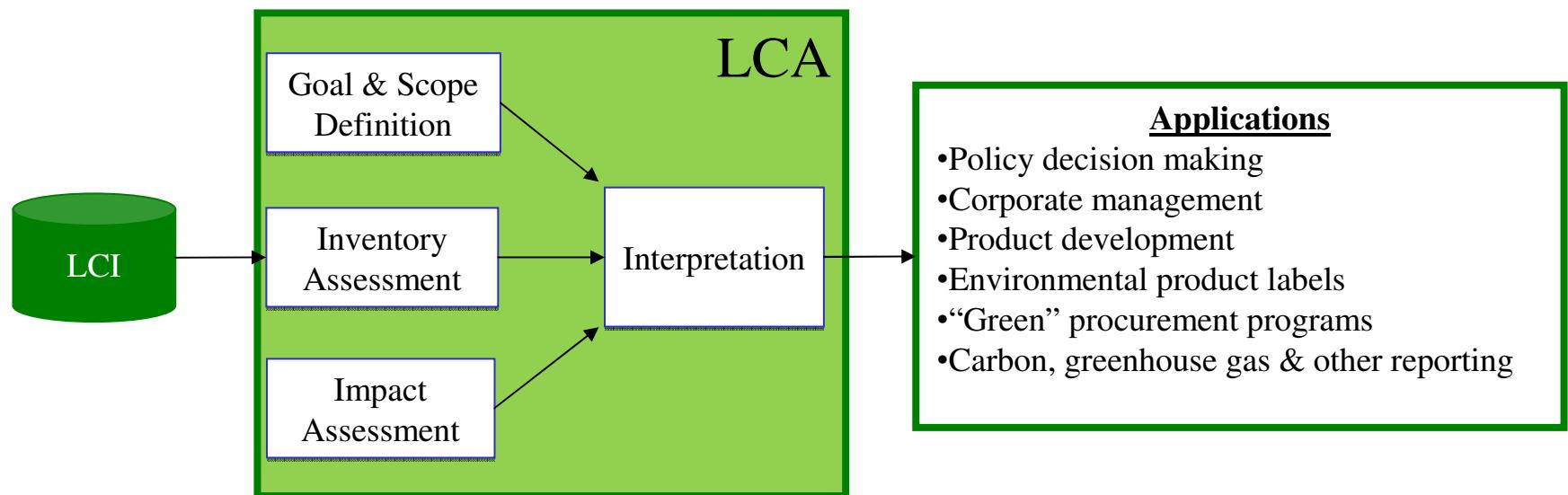
Product Life Cycle – Soybean





Life Cycle Assessment

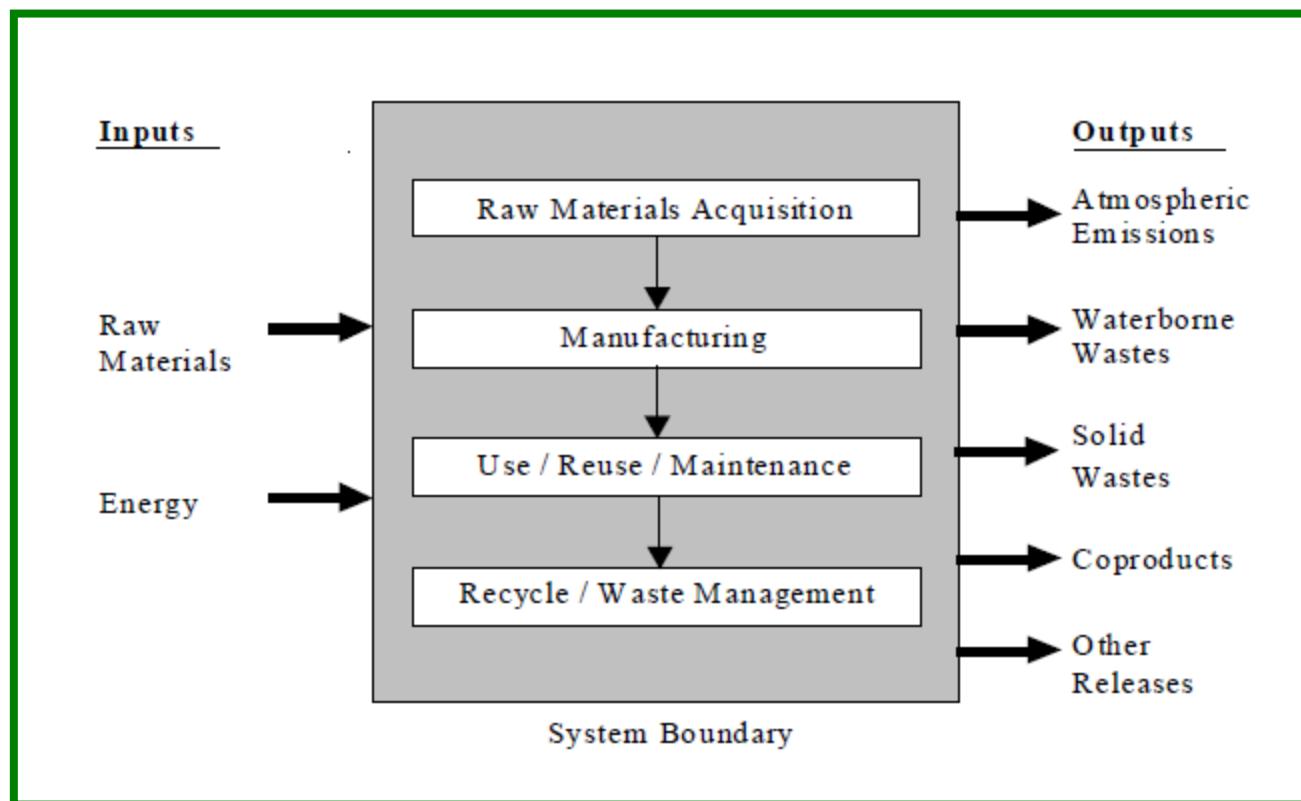
- **Life Cycle Assessment (LCA)** – The assessment of the environmental, economical, and social impact of a given product throughout its lifespan.





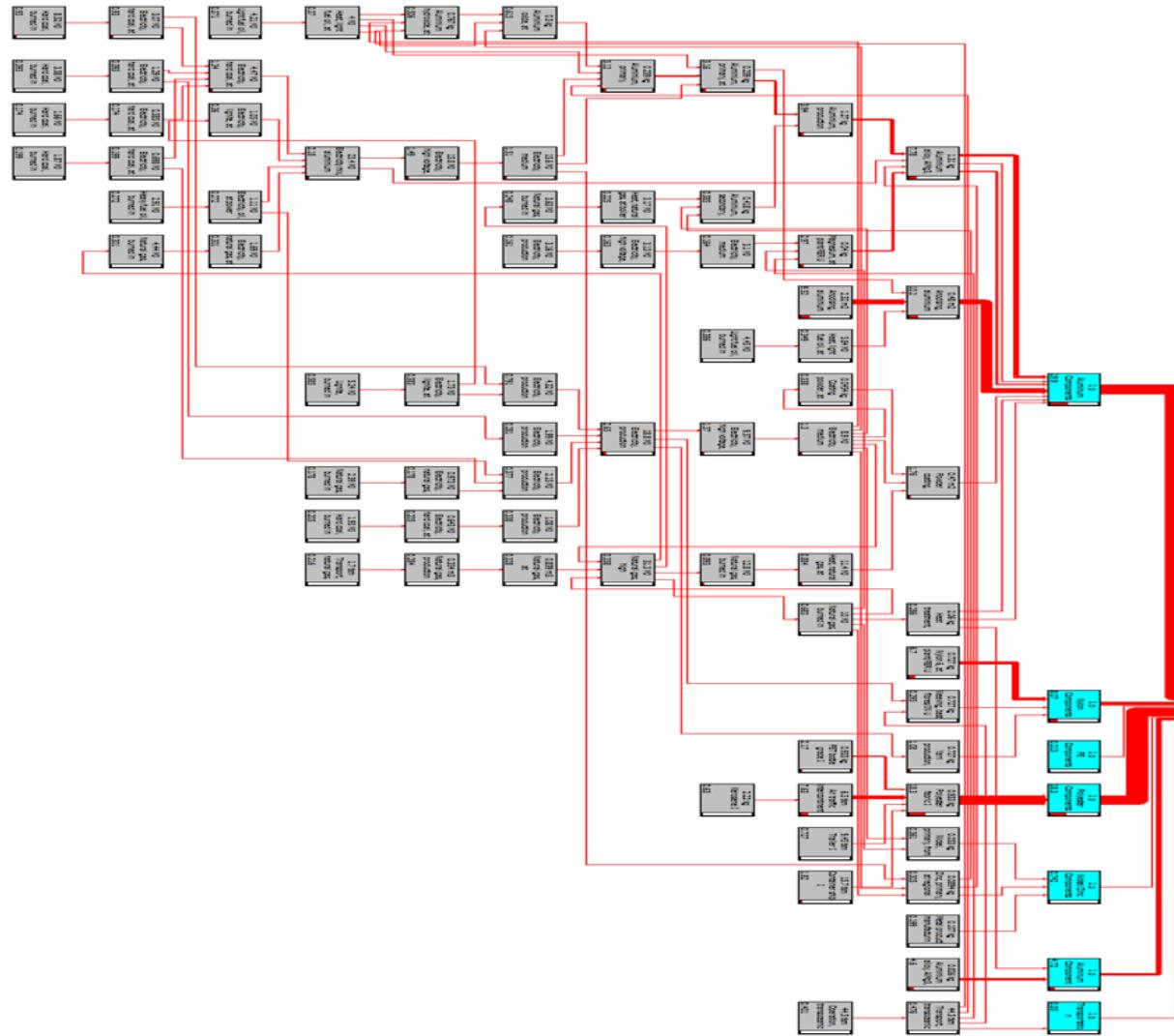
A Life Cycle Inventory

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



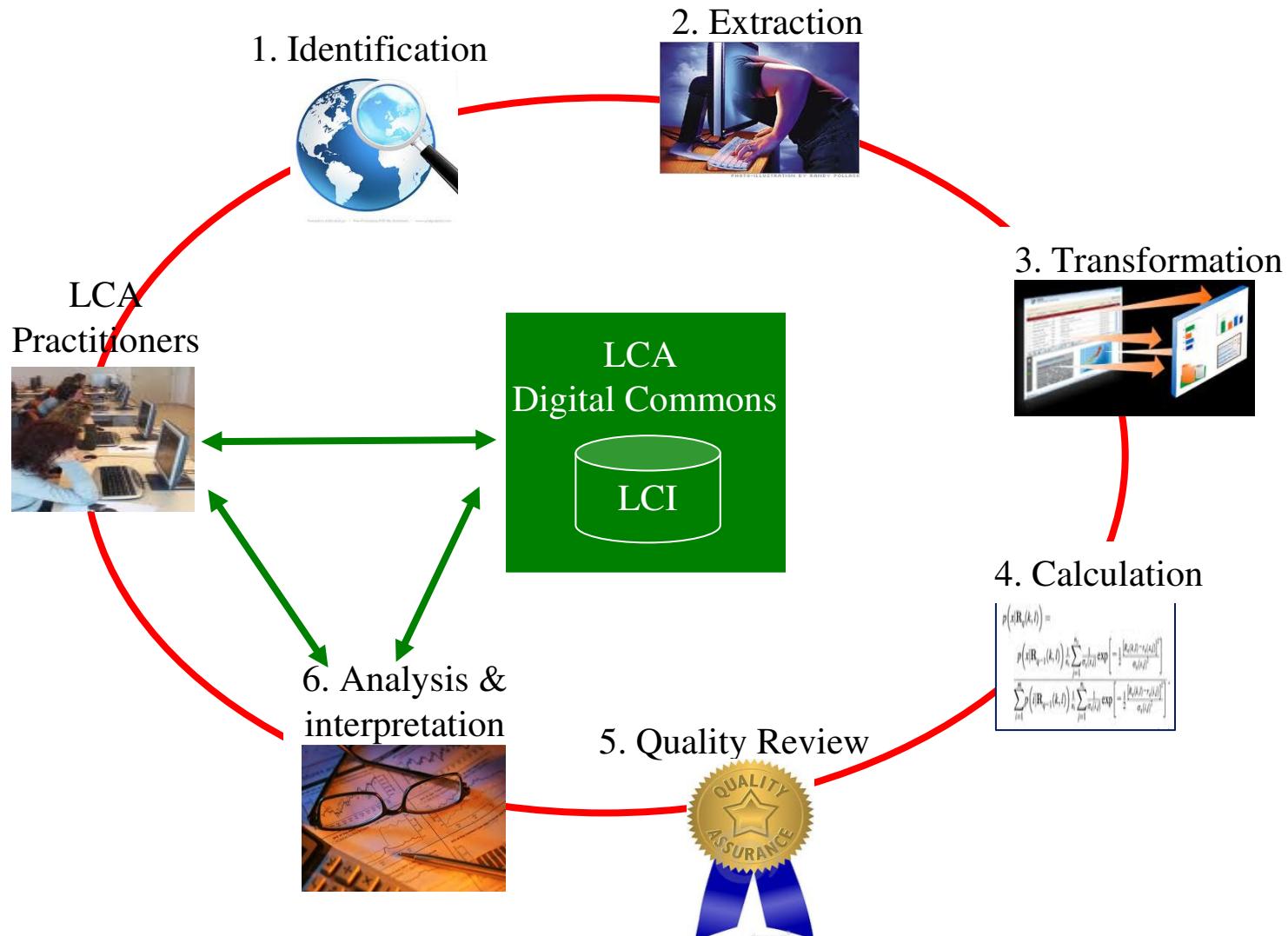


LCA Is Data Driven





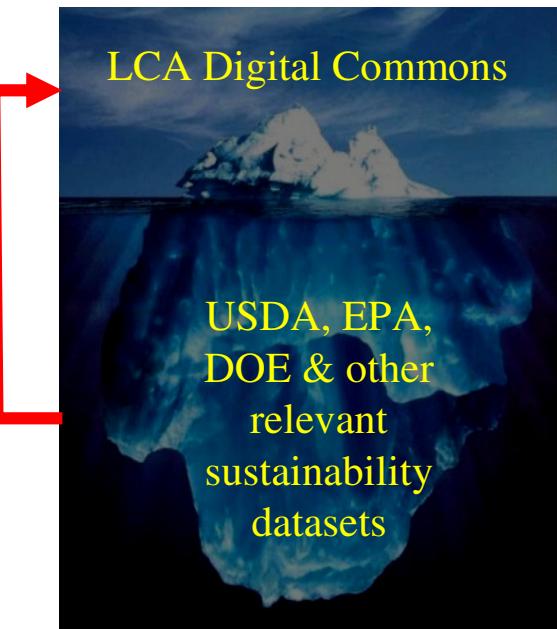
The Needs





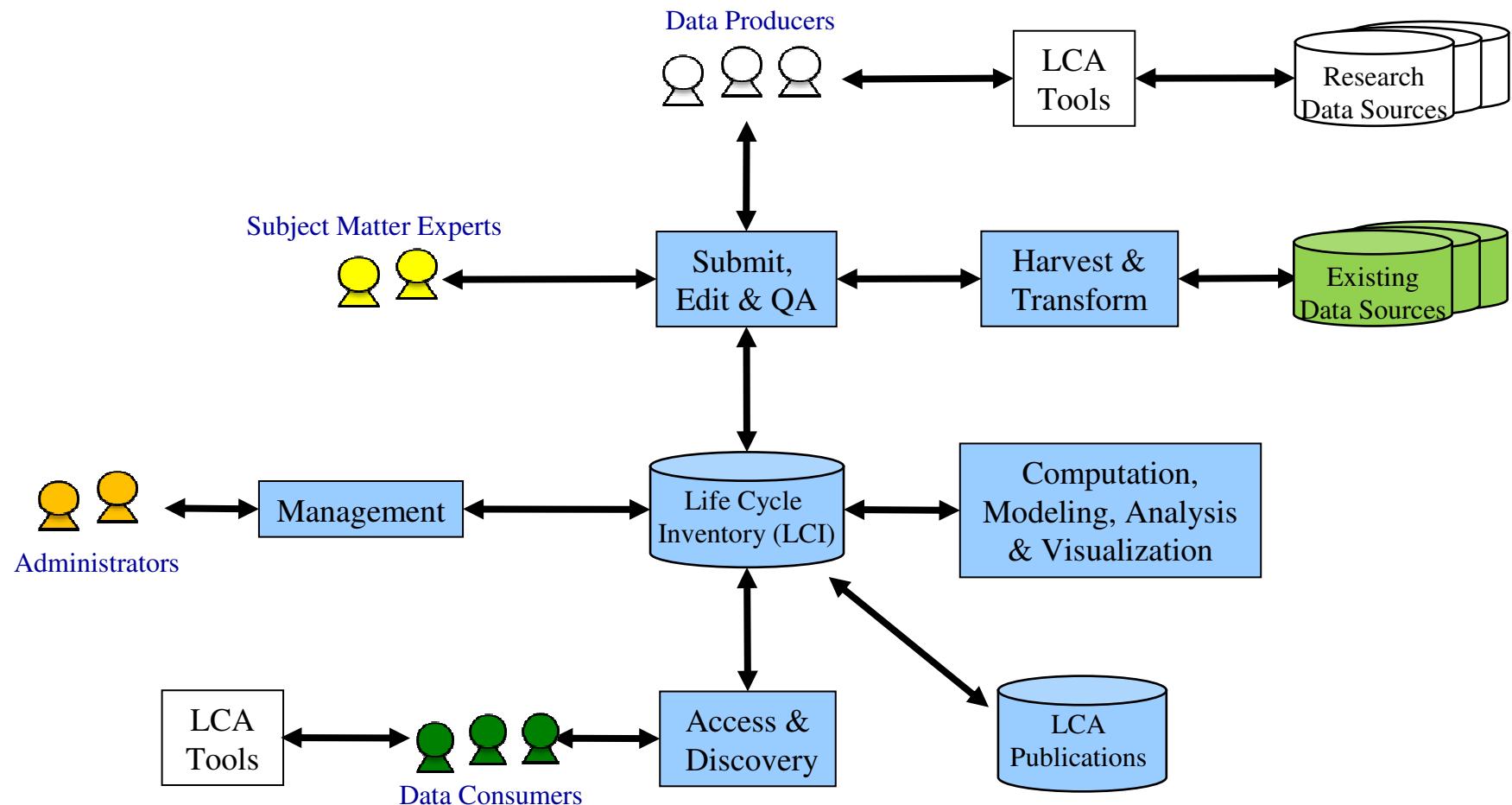
Main Purposes

- 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





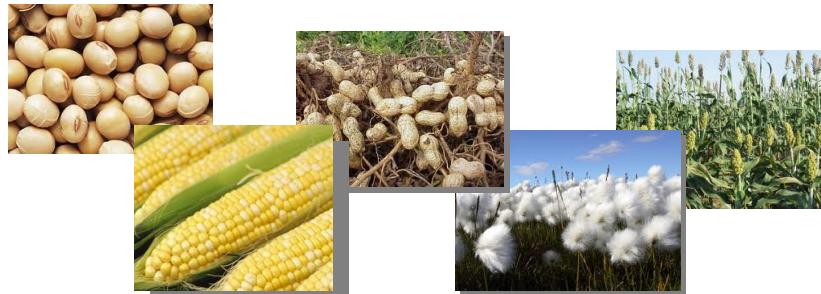
System Architecture





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

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

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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 [LCA XI conference](#) in Chicago at a special session on Tuesday, October 3 @ 3:30 PM. Click [here](#) for more information.

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Upload Datasets

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Data Formats

- EcoSpold XML
- EcoSpold Spreadsheet
- Custom Spreadsheet

I am the owner of this dataset and agree to transfer all rights to use to NALCI

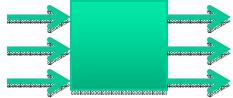
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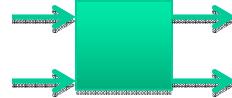
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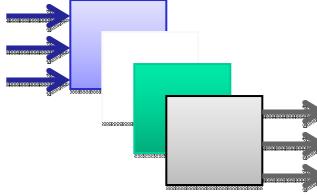
Dataset Contents

- 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

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Submission Form Activity Exchanges Modelling & Validation Admin Info

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Inputs [Go to Outputs]

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	m ² *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	m ²	11.251
Transformation, to arable; to cotton	resource / land	ElementaryFlow	m ²	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

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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 $\geq 25\%$ and maximum flow data value is $\leq 125\%$ of the most likely value OR For a uniform distribution, the minimum flow data value is $\geq 25\%$ and maximum flow data value is $\leq 125\%$ of the average of the minimum and maximum values.



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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 upload	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
120	gmoore	Wheat 1996 NC	PENDING	2011-07-22 12:30:24.0	2011-07-22 12:30:42.0

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ID	142
Descriptive Title	Cotton Arkansas 1996
Dataset Type	RAW_UNIT
Submitter	gmoore
Submitter Comment	Mostly developed from Google Map imaging
Ecospold File Name	cotton lint; at time of harvest in 1996; production mix, at farm AR 05-02-2011.xml (Download)
Documentation Included	false
Approval Status	PENDING
Submission Report	<p>This dataset may already exist in production. Editorial will review and report.</p> <p>View</p> <p>Non-fatal ECOSPOLD Validation errors occurred. Please review and comment as needed.</p> <p>None</p>
Reviewers Comments	
Time Submitted	2011-09-14 13:06:39.0
Time Last Updated	2011-09-14 13:06:50.0

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Search & Download

Data Discovery
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PRODUCT

- corn grain (118)
- corn silage (138)
- cotton lint (82)
- oats (10)
- peanuts (11)
- rice (6)
- sorghum grain (8)
- sorghum silage (8)
- soybeans (126)
- wheat (110)

DATASET TYPE

- Elementary Flow (660)
- Process (617)

LOCATION

- United States (671)
- Texas (595)
- Missouri (589)
- South Dakota (584)
- Nebraska (581)
- Minnesota (578)
- Kansas (569)
- Illinois (566)

Search for (Advanced Search) (New search) Order results by

Relevance Go ?

1,277 records found 1 2 3 4 5 6 .. 37 Next

	soybeans; at time of harvest in 1997; production mix, at farm; 27.2 kg/bu Pennsylvania	plant production	
	oats; at time of harvest in 2005; production mix, at farm; 14.5 kg/bu Pennsylvania	plant production	
	corn grain; at time of harvest in 2001; production mix, at farm; 25.4 kg/bu Pennsylvania	plant production	
	corn silage; at time of harvest in 1996; production mix, at farm Pennsylvania	plant production	
	soybeans; at time of harvest in 1999; production mix, at farm; 27.2 kg/bu Pennsylvania	plant production	
	corn silage; at time of harvest in multiple years; production mix, at farm Pennsylvania	plant production	X+Y
	corn grain; at time of harvest in 2005; production mix, at farm 25.4 kg/bu Pennsylvania	plant production	



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





A Global LCA Community

- International Reference Life Cycle Data System



- Commercial tools (SimaPro, GaBi, ..)



- U. of Washington
- U. of Arkansas
- U. Wisconsin
- Others

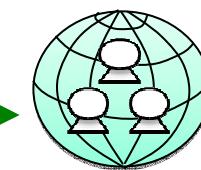
LCA Community



ARS, NIFA, ERS,
NASS, FS, RD
NRCS & Others

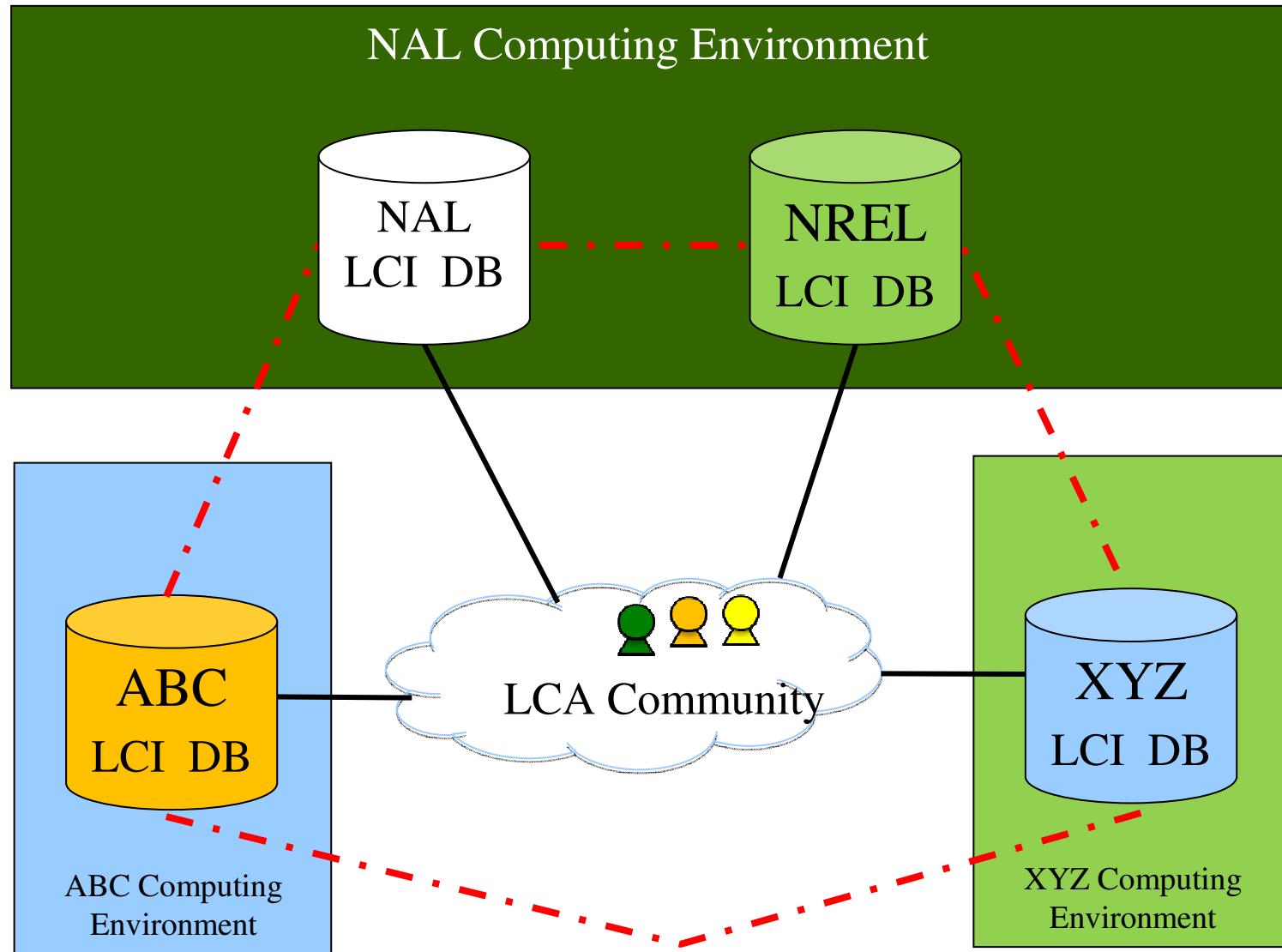


- Dairy industry
- Commodities: soybean, cotton, etc.
- Keystone Field to Market
- The Sustainability Consortium
- American Center for LCA
- Specialty Crop Stewardship Index
- Private companies
- Others





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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301-504-5248