



Swiss Centre for Life Cycle Inventories

A joint initiative of the
ETH domain and Swiss
Federal Offices

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ecoinvent data v2.0 biomass production new agricultural products

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Overview



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- What is new in ecoinvent V2.0?
- Comparison of agricultural products between countries:
 - Wheat
 - Rape seed
- How to choose appropriate inventories resp. extrapolate inventories?
- Outlook



New agricultural products in ecoinvent V2.0



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Switzerland

Rape seed, organic
Grass from meadow
Grass from natural meadow

Europe

Hemp
Rye

France

Barley,
Protein peas
Rape seed
Wheat

Germany

Barley
Protein peas
Rape seed
Wheat

Spain

Barley
Protein peas
Sunflower
Wheat

USA

Cotton
Corn
Potatoes
Rape seed
Rice
Soybeans
Wheat
Sheep & Wool

India

Jute
Kenaf
Ramie

Philippines

Coconut

Brasil

Soybeans
Sugarcane

China

Cotton
Sweet sorghum

Malaysia

Palm fruit branches



Inventory of wheat production



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wheat production	yield main product		seeds		N-Fertiliser (as N)		P-Fertiliser (as P2O5)		K-Fertiliser (as K2O)		pesticides		diesel use field operations		land occupation
	kg/ha	kg/ha	g/kg yield	kg/ha	g/kg yield	kg/ha	g/kg yield	kg/ha	g/kg yield	kg/ha	g/kg yield	kg/ha	g/kg yield	kg/ha	m2/kg yield
US	2253	94	41.7	76	33.7	42	18.6	53	23.5	0.26	0.115	66	29.3	4.50	
Saxony, DE	7567	180	23.8	187	24.7	51	6.7	46	6.1	2.59	0.342	129	17.0	1.48	
Castilla, ES	3049	175	57.4	80	26.2	72	23.6	111	36.4	0.77	0.253	95	31.2	2.83	
Barrois, FR	6760	141	20.9	154	22.8	49	7.2	45	6.7	3.48	0.515	96	14.2	1.52	
CH, org	4069	200	49.2	66	16.2	65	16.0	196	48.2	0	0.000	108	26.5	1.93	
CH, ext	5305	180	33.9	124	23.4	55	10.4	49	9.2	1.29	0.243	117	22.1	1.44	
CH, IP	6425	180	28.0	140	21.8	66	10.3	59	9.2	2.66	0.414	120	18.7	1.19	
Range factor	3.4	2.1	2.8	2.8	2.1	1.7	3.5	4.4	7.9			2.0	2.2	3.8	

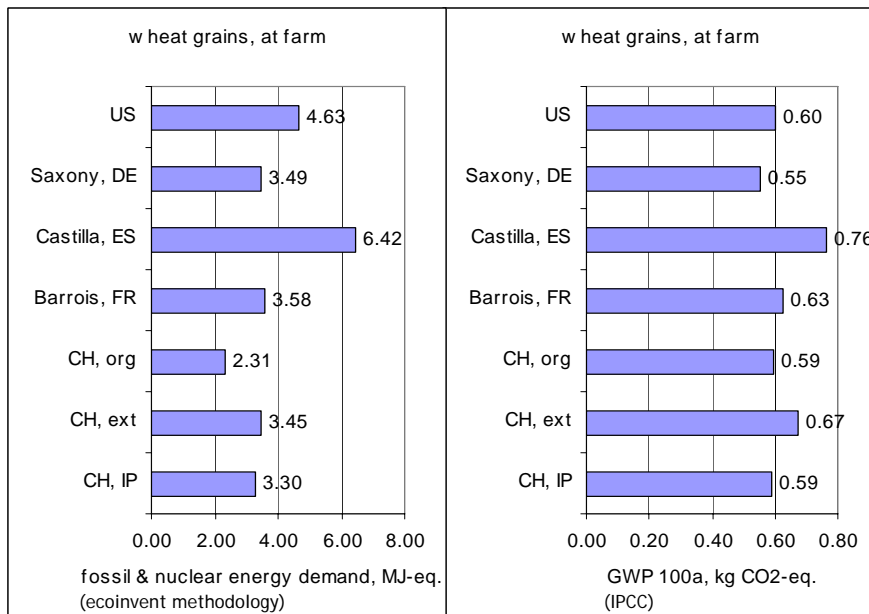


Impact of wheat grains, at farm, Various countries



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range factor (max/min): 2.8

1.4

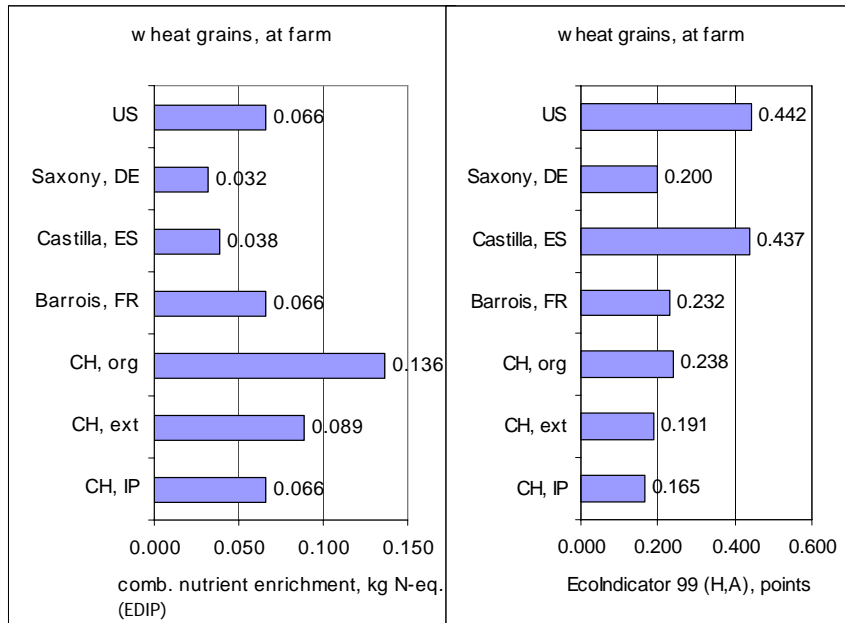


Impact of wheat grains, at farm, Various countries



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range factor (max/min): 4.3

2.7



Inventory of rape seed production



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rape seed production	yield main product kg/ha	seeds		N-Fertiliser (as N)		P-Fertiliser (as P2O5)		K-Fertiliser (as K2O)		pesticides		diesel use field operations		land occupation m2/kg yield
		kg/ha	g/kg yield	kg/ha	g/kg yield	kg/ha	g/kg yield	kg/ha	g/kg yield	kg/ha	g/kg yield	kg/ha	g/kg yield	
US	1182	5.5	4.65	112	94.8	22	18.6	34	28.8	0.64	0.541	95	80.4	8.57
DE	3413	3.5	1.03	227	66.5	122	35.7	270	79.1	1.15	0.337	84	24.6	2.77
Saxony, DE	3500	3.5	1.00	83	23.7	60	17.1	64	18.3	1.1	0.314	141	40.3	2.89
Barrois, FR	3020	3.0	0.99	177	58.6	75	24.8	74	24.5	2.82	0.934	93	30.8	3.62
CH, ext	2683	5.5	2.05	107	39.9	44	16.4	26	9.7	2.79	1.040	98	36.5	3.44
CH, IP	3113	5.6	1.80	125	40.2	50	16.1	31	10.0	2.43	0.781	103	33.1	2.97
Range factor	3.0	1.9	4.7	2.7	4.0	5.5	2.2	10.4	8.2			1.7	3.3	3.1

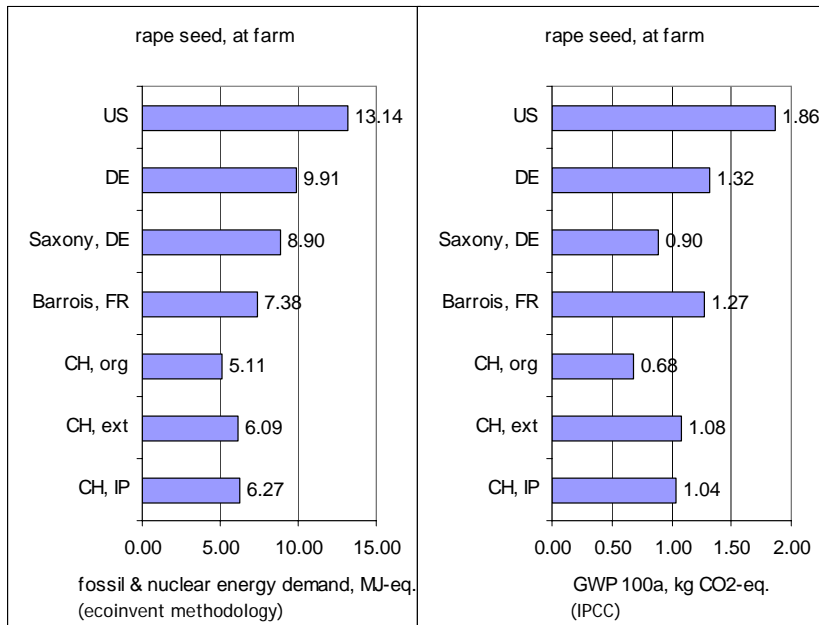


Impact of rape seed, at farm, various Countries



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range factor (max/min): 2.6

2.7

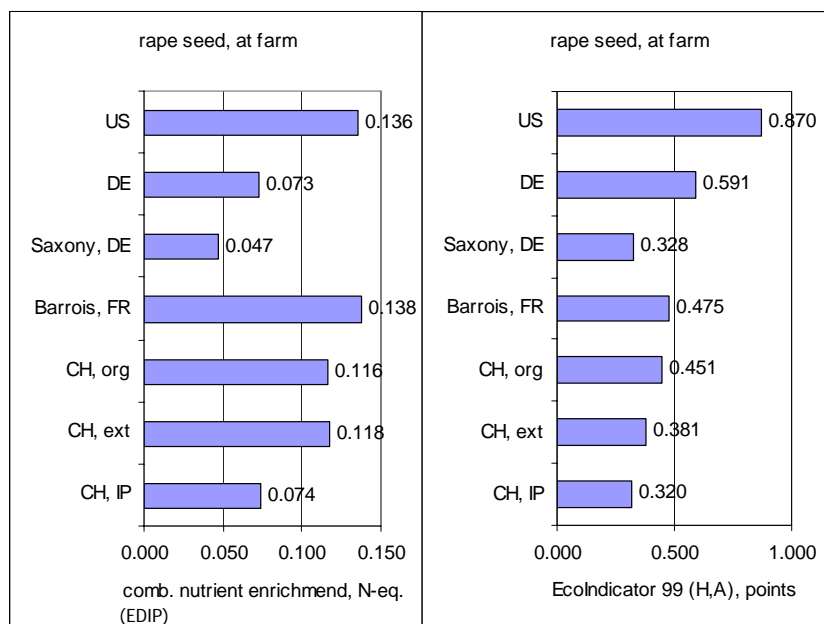


Impact of rape seed, at farm, various Countries



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range factor (max/min): 2.9

2.7



Common problem of LCI data user



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What should I do, if a crop produced in a different country has to be assessed, for example wheat in Italy?

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Best solution



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to collect the necessary data and to create a new inventory for the specific situation

-> often, there are not sufficient resources to perform a detailed analysis, or the dataset is not of great importance for the considered system.

-> so, what else could be done?

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Guide for choosing adequate inventory

Possible solutions:

1. to use an existing inventory
 - I. with the most similar site specific conditions.
 - II. with the most similar management criteria per ha.
 - III. with the most similar input of means of production per kg yield.
2. to use two or more existing inventories and interpolate between them (for example 70% wheat Spain and 30% wheat France).
3. to use the the existing inventory with the most similar site specific or management criterias and consider a correction factor for the difference in the relation of yields to inputs of means of production (if the necessary data of wheat in Italy is known), depending on the considered impact



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Key parameters to compare situations

There are two important criteria sets to be considered for agricultural production inventories:

- **Site specific parameters:** climate, soil conditions etc.
 - especially **precipitation** (amount and distribution): important for nutrient leaching
- **Management parameters:** yield, means of production (machines, fertilisers, pesticides, water, land occupation):
 - **Yield** -> key factor for land use in ecoindicator99
 - **Diesel input** -> important factor for energy demand and global warming potential
 - **Nitrogen input:** type and amount of fertiliser -> important factor for energy demand, global warming potential, nutrient enrichment and acidification
 - **Pesticide input** -> key factor for human- and ecotoxicity
 - **Irrigation** -> important for the energy demand and the water resources



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Summary: extrapolation of inventories

- A large variation exists between countries and regions
 - extrapolation is problematic
 - a closer look to the data is inevitable.
- There is not a simple rule that works in all situations
- The procedure depends on the goal, the considered system, the considered impacts or methods, the particular situation
- There is not a simple correction factor with universal use



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Outlook

There is ongoing work on inventories of agricultural products.
What should we focus on from the user's point of view?

- CH crops produced in mountain areas
- Cereals in other countries
- „exotic“ crops such as banana, coffee, ananas etc.
- Products from animal production
- Processed food
- Different modules for processes and means of productions
- ...



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