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ecoinvent 3.8 Dataset Documentation

'combine harvesting - CH'

Note: This document contains only an extract of the information in the dataset. Additional data about properties of exchanges, mathematical relations, parameters, and contact information for authors and reviewers are available in the full dataset, i.e. in ecoSpold format. Amount and identity of the exchanges in an undefined dataset are independent of modeling choices of the different system models. Linked dataset are available in separate documents.

Link to the dataset on ecoquery website

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Dataset Identification

Activity name	combine harvesting
Geography	CH (Switzerland)
Time period	1991-01-01 to 2002-12-31 - Valid for the entire period
ISIC rev.4 ecoinvent	0161: Support activities for crop production
Reference product	combine harvesting
CPC classification	86119: Other support services to crop production
Dataset type	Ordinary transforming activity
Technology level	Current
Version - system model	3.8 - Undefined

Dataset Authorship

Data generator	Silvio Blaser, NOENTRY
Data entry	Silvio Blaser, NOENTRY
Review	Roland Hischier, Eidgenössische Materialprüf- und -forschungsanstalt
Review	Emilia Moreno Ruiz, ecoinvent Centre

Exchange Summary

Reference product	Material for treatment	Byproduct classification	Amount
combine harvesting	no	allocatable product	1 ha

Inputs from technosphere	Amount
diesel	33.3 kg
harvester	6.3 kg
shed	0.00858 m2

Emissions to air	Amount
Ammonia	0.000666 kg
Benzene	0.000243 kg
Benzo(a)pyrene	9.99e-07 kg
Cadmium	3.33e-07 kg
Carbon dioxide, fossil	1.03e+2 kg
Carbon monoxide, fossil	0.32 kg
Chromium	1.67e-06 kg
Copper	5.66e-05 kg
Dinitrogen monoxide	0.004 kg
Methane, fossil	0.0043 kg
NMVOC, non-methane volatile organic compounds, unspecified origin	0.145 kg
Nickel	2.33e-06 kg
Nitrogen oxides	1.7 kg
PAH, polycyclic aromatic hydrocarbons	0.00011 kg
Particulates, < 2.5 um	0.149 kg
Selenium	3.33e-07 kg
Sulfur dioxide	0.0336 kg
Zinc	3.33e-05 kg

Emissions to soil	Amount
Cadmium	8.82e-07 kg
Lead	3.78e-06 kg
Zinc	0.00238 kg

Dataset Description

General comment
This dataset represents an example of a typical combine harvesting. The working width is 4.5m. The functional unit (FU) is one ha harvested. The operation time is 1.3 h/FU.
This dataset was already contained in the ecoinvent database version 2. It was not individually updated during the transfer to ecoinvent version 3. Life Cycle Impact Assessment results may still have changed, as they are affected by changes in the supply chain, i.e. in other datasets. This dataset was generated following the ecoinvent quality guidelines for version 2. It may have been subject to central changes described in the ecoinvent version 3 change report, and the results of the central updates were reviewed extensively. The changes added e.g. consistent water flows and other information throughout the database. The documentation of this dataset can be found in the ecoinvent reports of version 2, which are still available via the ecoinvent website. The change report linked above covers all central changes that were made during the conversion process.The original ecoinvent version 2 documentation can be consulted here.

Included activities start
From agricultural field foreseen to be processed.

Included activities end
This activity ends with the delivery of harvesting by combined harvester.The dataset includes the diesel fuel consumption and the amount of agricultural machinery and of the shed attributed to harvesting. It was also taken into consideration the amount of emissions to the air from combustion and the emission to the soil from tyre abrasion during the work process. The following activities where considered part of the work process: preliminary work at the farm, such as attaching the adequate machine to the tractor; driving to field (with an assumed distance of 1 km); field work (for a parcel of land of 1 ha surface); driving to farm and concluding work, like uncoupling the machine. The overlapping during the field work is considered. The dataset doesn"t include the grain production, straw treatment, dust other than from combustion and noise.

Sampling procedure
Data on fuel consumption and emissions of CO, HC and NOx are expert estimations based on measurements for comparable activities. The other emissions were calculated basing on literature data and the measured fuel consumption.

Extrapolations
Processes are typical procedures for Switzerland around the year 2000, they are not statistical average processes.

Technology comment
The inventories are based on measurements made by the Swiss Federal Research Station for Agricultural Economics and Engineering of Taenikon (FAT). Fuel consumption and emissions were taken from recent literature of ART, expert"s estimations or unpublished data.

Geography comment
The inventory applies for Swiss Agricultural Field Work processes.

Time period comment
Measurements were made in the last few years (1999-2001).

Detailed Information For Exchanges

Reference product	Annual prod.vol.	Amount
combine harvesting	1.45e+5 ha	1 ha

Production volume: 1.45e+5 ha
Production volume comment: FAOSTAT data year 2011 (total area of cereals)

Inputs from technosphere	Amount
diesel	33.3 kg

Comment: Proxy, based on "Agricultural Field Work Processes" - pdf-document on the dedicated talk page of ecoinvent (www.ecoinvent.org/talk-pages).
Uncertainty distribution: lognormal; **GSD2:** 1.05; **Pedigree matrix:** [1, 4, 1, 1, 1]

harvester	6.3 kg

Comment: Proxy, based on "Agricultural Field Work Processes" - pdf-document on the dedicated talk page of ecoinvent (www.ecoinvent.org/talk-pages).
Uncertainty distribution: lognormal; **GSD2:** 1.05; **Pedigree matrix:** [1, 4, 1, 1, 1]

shed	0.00858 m2

Activity Link: shed construction - CH
Comment: Proxy, based on "Agricultural Field Work Processes" - pdf-document on the dedicated talk page of ecoinvent (www.ecoinvent.org/talk-pages).This exchange has an activity link directly to the producing activity because the product is primarily consumed in the same geographical area where it is produced.
Uncertainty distribution: lognormal; **GSD2:** 1.73; **Pedigree matrix:** [1, 4, 1, 1, 1]

Emissions to air	Subcompartment	Amount
Ammonia	non-urban air or from high stacks	0.000666 kg

Comment: Proxy, based on "Agricultural Field Work Processes" - pdf-document on the dedicated talk page of ecoinvent (www.ecoinvent.org/talk-pages).
Uncertainty distribution: lognormal; **GSD2:** 1.27; **Pedigree matrix:** [1, 2, 1, 1, 3]

Benzene	non-urban air or from high stacks	0.000243 kg

Comment: Proxy, based on "Agricultural Field Work Processes" - pdf-document on the dedicated talk page of ecoinvent (www.ecoinvent.org/talk-pages).
Uncertainty distribution: lognormal; **GSD2:** 1.27; **Pedigree matrix:** [1, 2, 1, 1, 3]

Benzo(a)pyrene	non-urban air or from high stacks	9.99e-07 kg

Comment: Proxy, based on "Agricultural Field Work Processes" - pdf-document on the dedicated talk page of ecoinvent (www.ecoinvent.org/talk-pages).
Uncertainty distribution: lognormal; **GSD2:** 2.25; **Pedigree matrix:** [1, 2, 1, 1, 3]

Cadmium	non-urban air or from high stacks	3.33e-07 kg

Comment: Proxy, based on "Agricultural Field Work Processes" - pdf-document on the dedicated talk page of ecoinvent (www.ecoinvent.org/talk-pages).
Uncertainty distribution: lognormal; **GSD2:** 2.25; **Pedigree matrix:** [1, 2, 1, 1, 3]

Carbon dioxide, fossil	non-urban air or from high stacks	1.03e+2 kg

Comment: Proxy, based on "Agricultural Field Work Processes" - pdf-document on the dedicated talk page of ecoinvent (www.ecoinvent.org/talk-pages).

Uncertainty distribution: lognormal; **GSD2:** 1.14; **Pedigree matrix:** [1, 2, 1, 1, 3]

Carbon monoxide, fossil	non-urban air or from high stacks	0.32 kg

Comment: Proxy, based on "Agricultural Field Work Processes" - pdf-document on the dedicated talk page of ecoinvent (www.ecoinvent.org/talk-pages).
Uncertainty distribution: lognormal; **GSD2:** 2.24; **Pedigree matrix:** [1, 4, 1, 1, 1]

Chromium	non-urban air or from high stacks	1.67e-06 kg

Comment: Proxy, based on "Agricultural Field Work Processes" - pdf-document on the dedicated talk page of ecoinvent (www.ecoinvent.org/talk-pages).
Uncertainty distribution: lognormal; **GSD2:** 2.25; **Pedigree matrix:** [1, 2, 1, 1, 3]

Copper	non-urban air or from high stacks	5.66e-05 kg

Comment: Proxy, based on "Agricultural Field Work Processes" - pdf-document on the dedicated talk page of ecoinvent (www.ecoinvent.org/talk-pages).
Uncertainty distribution: lognormal; **GSD2:** 2.25; **Pedigree matrix:** [1, 2, 1, 1, 3]

Dinitrogen monoxide	non-urban air or from high stacks	0.004 kg

Comment: Proxy, based on "Agricultural Field Work Processes" - pdf-document on the dedicated talk page of ecoinvent (www.ecoinvent.org/talk-pages).
Uncertainty distribution: lognormal; **GSD2:** 1.27; **Pedigree matrix:** [1, 2, 1, 1, 3]

Methane, fossil	non-urban air or from high stacks	0.0043 kg

Comment: Proxy, based on "Agricultural Field Work Processes" - pdf-document on the dedicated talk page of ecoinvent (www.ecoinvent.org/talk-pages).
Uncertainty distribution: lognormal; **GSD2:** 1.27; **Pedigree matrix:** [1, 2, 1, 1, 3]

NMVOC, non-methane volatile organic compounds, unspecified origin	non-urban air or from high stacks	0.145 kg

Comment: Proxy, based on "Agricultural Field Work Processes" - pdf-document on the dedicated talk page of ecoinvent (www.ecoinvent.org/talk-pages).
Uncertainty distribution: lognormal; **GSD2:** 1.23; **Pedigree matrix:** [1, 4, 1, 1, 1]

Nickel	non-urban air or from high stacks	2.33e-06 kg

Comment: Proxy, based on "Agricultural Field Work Processes" - pdf-document on the dedicated talk page of ecoinvent (www.ecoinvent.org/talk-pages).
Uncertainty distribution: lognormal; **GSD2:** 2.25; **Pedigree matrix:** [1, 2, 1, 1, 3]

Nitrogen oxides	non-urban air or from high stacks	1.7 kg

Comment: Proxy, based on "Agricultural Field Work Processes" - pdf-document on the dedicated talk page of ecoinvent (www.ecoinvent.org/talk-pages).
Uncertainty distribution: lognormal; **GSD2:** 1.23; **Pedigree matrix:** [1, 4, 1, 1, 1]

PAH, polycyclic aromatic hydrocarbons	non-urban air or from high stacks	0.00011 kg

Comment: Proxy, based on "Agricultural Field Work Processes" - pdf-document on the dedicated talk page of ecoinvent (www.ecoinvent.org/talk-pages).
Uncertainty distribution: lognormal; **GSD2:** 1.76; **Pedigree matrix:** [1, 2, 1, 1, 3]

Particulates, < 2.5 um	non-urban air or from high stacks	0.149 kg

Comment: Proxy, based on "Agricultural Field Work Processes" - pdf-document on the dedicated talk page of ecoinvent (www.ecoinvent.org/talk-pages).

Uncertainty distribution: lognormal; **GSD2:** 1.76; **Pedigree matrix:** [1, 2, 1, 1, 3]

Selenium	non-urban air or from high stacks	3.33e-07 kg

Comment: Proxy, based on "Agricultural Field Work Processes" - pdf-document on the dedicated talk page of ecoinvent (www.ecoinvent.org/talk-pages).
Uncertainty distribution: lognormal; **GSD2:** 1.27; **Pedigree matrix:** [1, 2, 1, 1, 3]

Sulfur dioxide	non-urban air or from high stacks	0.0336 kg

Comment: Proxy, based on "Agricultural Field Work Processes" - pdf-document on the dedicated talk page of ecoinvent (www.ecoinvent.org/talk-pages).
Uncertainty distribution: lognormal; **GSD2:** 1.14; **Pedigree matrix:** [1, 2, 1, 1, 3]

Zinc	non-urban air or from high stacks	3.33e-05 kg

Comment: Proxy, based on "Agricultural Field Work Processes" - pdf-document on the dedicated talk page of ecoinvent (www.ecoinvent.org/talk-pages).
Uncertainty distribution: lognormal; **GSD2:** 2.25; **Pedigree matrix:** [1, 2, 1, 1, 3]

Emissions to soil	Subcompartment	Amount
Cadmium	agricultural	8.82e-07 kg

Comment: Proxy, based on "Agricultural Field Work Processes" - pdf-document on the dedicated talk page of ecoinvent (www.ecoinvent.org/talk-pages).
Uncertainty distribution: lognormal; **GSD2:** 1.23; **Pedigree matrix:** [1, 4, 1, 1, 1]

Lead	agricultural	3.78e-06 kg

Comment: Proxy, based on "Agricultural Field Work Processes" - pdf-document on the dedicated talk page of ecoinvent (www.ecoinvent.org/talk-pages).
Uncertainty distribution: lognormal; **GSD2:** 1.23; **Pedigree matrix:** [1, 4, 1, 1, 1]

Zinc	agricultural	0.00238 kg

Comment: Proxy, based on "Agricultural Field Work Processes" - pdf-document on the dedicated talk page of ecoinvent (www.ecoinvent.org/talk-pages).
Uncertainty distribution: lognormal; **GSD2:** 1.23; **Pedigree matrix:** [1, 4, 1, 1, 1]

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