

sustainability consulting + software

The MSDB in comparison to other databases

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Topics

- MSDB: what is it
- Status
- Difference to other databases
- Next steps

MSDB, what is it

MSDB = massive sustainability database

- 1. Developed by GreenDelta in recent years, starting from a German research project "LCA data machine"
- 2. 500,000 datasets, global coverage, broad technological coverage
- 3. Unit process datasets





Approach: how to develop the MSDB?

- 1. Combine top-down and bottom up
- 2. Model "atoms", truly smallest information units, for important elements
- 3. Important elements are processes, flows, locations
- 4. Initial database not be in one of the existing reference systems (nomenclature and format) - ILCD, EcoSpold, etc., but agnostic, and can be exported in these
- 5. Creation of process data sets, and iteratively refine them
- 6. Where existing, use good, detailed models directly (transport, waste treatment, waste water treatment, etc.)

Approach: how to develop the MSDB?

<u>Start</u>

- 1. Products in Combined Nomenclature, European Commission structure, but plain products and sectors ("atomic")
- 2. Postulate datasets based on common knowledge + AI
- 3. Refine datasets based on internal and open source information (PRTR, Wikipedia, UN Food database, satellite images, ..)
- 4. Using reasoning and graph databases and models
- 5. Calculate data quality
- 6. .. until satisfactory

Dimensions are flows, processes, locations.

Approach: gated AI, for new datasets



Approach: entire database



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Structure of the LCA database?

Dimensions are flows, processes, locations.

This creates a massive sustainability database with traceable quality.

We call it the MSDB.

The database is prepared for openLCA initially (most powerful, our own software, widely used)

Combined nomenclature

 <u>https://taxation-</u> <u>customs.ec.europa.eu/customs-4/calculation-</u> <u>customs-duties/customs-tariff/combined-</u> <u>nomenclature_en</u>

2025, from https://tulli.fi/en/statistics/combinednomenclature-cn

~ 16,000 categories

These are categories for products

an aada	
un_code	
U1	LIVE ANIMALS
0101	Live horses, asses, mules and hinnies
010121	Pure-bred breeding horses
01012100	Pure-bred breeding horses
010129	Live horses (excl. pure-bred for breeding)
01012910	Horses for slaughter
01012990	Live horses (excl. for slaughter, pure-bred for breeding)
010130	Live asses
ñ1013000	
51010000 1010190	Live mules and hinnies
510130 51019000	Live mules and hinnies
01013000 5102	
0102	Live buyine animals
010221	Purebred came for breeding
01022110	Pure-bred breeding neiters 'Temale bovines that have never caived."
01022130	Pure-bred breeding cows (excl. heiters)
01022190	Pure-bred cattle for breeding (excl. heifers and cows)
J10229	Live cattle (excl. pure-bred for breeding)
01022905	Live cattle of the sub-genus Bibos or Poephagus (excl. pure-bred for breeding)
J1022910	Live cattle of a weight <= 80 kg (excl. pure-bred for breeding)
01022921	Cattle of a weight > 80 kg but <= 160 kg, for slaughter
01022929	Live cattle of a weight > 80 kg but <= 160 kg (excl. for slaughter, pure-bred for breeding)
Ó1022941	Cattle of a weight > 160 kg but <= 300 kg, for slaughter
01022949	Live cattle of a weight > 160 kg but <= 300 kg (excl. for slaughter, pure-bred for breeding)
01022951	Heifers "female bovines that have never calved" of a weight > 300 kg for slaughter
01022959	Live heifers "female bovines that have never calved" of a weight > 300 kg (exc) for slaughter and pure-bred for bre-
01022961	Cows of a weight > 300 kg for slaughter (exc) heifers)
51022001 51022969	Live cover of a weight > 300 kg (avd. for claughter and nure-bred for breeding and heifere)
h1022303	Cette cows of a weight > 300 kg (exclosion stadymental and performental performance)
01022331	Calle of a weight 2 300 kg. (c) is statighter (exc. hences and cows)
01022333	Live calle of a weight > 300 kg (excl. for slaughter, pure-bred for breeding and hellers and cows)
010231	Pure-bred burialo tor breeding
01023100	Pure-bred buffalo for breeding
010239	Live buttalo (excl. pure-bred for breeding)
01023910	Live domestic buffalo (excl. pure-bred for breeding)
01023990	Live buffalo (excl. domestic species and pure-bred for breeding)
010290	Live bovine animals (excl. cattle and buffalo)
01029020	Bovine pure-bred breeding animals (excl. cattle and buffalo)
Ó1029091	Live domestic bovine animals (excl. cattle and buffalo and pure-bred for breeding)
01029099	Live bovine animals (excl. cattle, buffalo, pure-bred for breeding and domestic species)
Ó103	Live swine
610310	Pure-bred breeding swine
ñ1031000	Pure-bred breeding swine
h10391	live pure-bred swine weighing < 50 kg (excl. pure-bred for breeding)
h1039110	Domestic swine weighing < 50 kg (sed spin-bred for breading)
01033110	Live non-democratic swine, weighing < 50 kg (EAL) prietoreu for breeding)
01033130	Live normalized swine, weighting V 50 kg
010332	Live pare-site swine, weighing 2= 50 kg (exc. pare-sited for preading)
01039211	Live comestic sows, having tarrowed at least once, weighing >= 160 kg (excl. pure-bred for breeding)
01039219	Live domestic swine, weighing >= 50 kg (excl. sows having farrowed at least once and weighing >= 160 kg, and tho
01039290	Live non-domestic swine, weighing >= 50 kg
0104	Live sheep and goats
010410	Live sheep
01041010	Pure-bred sheep for breeding
Ó1041030	Live lambs "sheep up to a year old" (excl. purebred breeding animals)
01041080	Live sheep (excl. lambs and pure-bred breeding animals)
010420	Live goats
01042010	Pure-bred breeding goats
01042090	Live goats (exc) pure-bred for breeding)
0105	Live nulty, "fixed of the energies Gallis domesticus ducks deace turkeys and quines fowls"
0105	Live founds of the energies Callus domesticus, aucks, geese, tarkeys and guined towis
010011	Live rows or the species Galus correspondences, weighing $<$ to g (excl. tarkeys and gained tows).
01051111	Granuparent and parent ternale chicks of rows of the species Gallus domesticus laying stocks of a weight of <= 18
01051119	Grandparent and parent temale chicks towls of the species Gallus domesticus of a weight of <= 185 g (excl. laying s
01051191	Laying stock "rowls of the species Gallus domesticus" of a weight of <= 185 g (excl. grandparent and parent female
U1051199	Live towls of the species Gallus domesticus of a weight of <= 185 g (excl. grandparent and parent female chicks an
010512	Live domestic turkeys, weighing <= 185 g

Combined nomenclature

These are categories for products

V Hows
> 💼 01 LIVE ANIMALS
> 🛑 02 MEAT AND EDIBLE MEAT OFFAL
> 🧰 03 FISH AND CRUSTACEANS, MOLLUSCS AND OTHER AQUATIC INVERTEBRATES
> 🧰 04 DAIRY PRODUCE; BIRDS' EGGS; NATURAL HONEY; EDIBLE PRODUCTS OF ANIMAL ORIGIN, NOT ELSEWHERE SPECIFIED OR INCLUDED
> 🔤 05 PRODUCTS OF ANIMAL ORIGIN, NOT ELSEWHERE SPECIFIED OR INCLUDED
> DO LIVE TREES AND OTHER PLANTS; BULBS, ROOTS AND THE LIKE; CUT FLOWERS AND ORNAMENTAL FOLIAGE
> 07 EDIBLE VEGETABLES AND CERTAIN ROOTS AND TUBERS
> 08 BOBILE FRUIT AND NUTS; PEEL OF CITRUS FRUIT OR MELONS
> US COFFEE, TEA, MATE AND SPICES
> I uou vineat and mesiin
> I looc Rye
To 1000 barrey seed for cowing
I 100300 Barley (sec) seed for sowing)
s 1004 Oats
> 1005 Maize or com
> 🛄 1006 Rice
, 📁 1007 Grain sorghum
> 🛑 1008 Buckwheat, millet, canary seed and other cereals (excl. wheat and meslin, rye, barley, oats, maize, rice and grain sorghum)
> 💼 11 PRODUCTS OF THE MILLING INDUSTRY; MALT; STARCHES; INULIN; WHEAT GLUTEN
> 💼 12 OIL SEEDS AND OLEAGINOUS FRUITS; MISCELLANEOUS GRAINS, SEEDS AND FRUIT; INDUSTRIAL OR MEDICINAL PLANTS; STRAW AND FODDER
> 💼 13 LAC; GUMS, RESINS AND OTHER VEGETABLE SAPS AND EXTRACTS
> 💼 14 VEGETABLE PLAITING MATERIALS; VEGETABLE PRODUCTS NOT ELSEWHERE SPECIFIED OR INCLUDED
> 🛅 15 ANIMAL, VEGETABLE OR MICROBIAL FATS AND OILS AND THEIR CLEAVAGE PRODUCTS; PREPARED EDIBLE FATS; ANIMAL OR VEGETABLE WAXES
> 💼 16 PREPARATIONS OF MEAT, OF FISH, OF CRUSTACEANS, MOLLUSCS OR OTHER AQUATIC INVERTEBRATES, OR OF INSECTS
> 17 SUGARS AND SUGAR CONFECTIONERY
> 18 COCOA AND COCOA PREPARATIONS
> I I PREPARATIONS OF CEREALS, FLOOR, STARCH OR MILE, PASTIR COORS PRODUCTS
2 BFUFBAGES SPIRITS AND VINEGAR
> 2 2 RESIDUES AND WASTE FROM THE FOOD INDUSTRIES: PREPARED ANIMAL FODDER
> 24 TOBACCO AND MANUFACTURED TOBACCO SUBSTITUTES; PRODUCTS, WHETHER OR NOT CONTAINING NICOTINE, INTENDED FOR INHALATION WITHOUT COMBUSTION; OTHER NICOTINE CONTA
> 💼 25 SALT; SULPHUR; EARTHS AND STONE; PLASTERING MATERIALS, LIME AND CEMENT
> 💼 26 ORES, SLAG AND ASH
> 💼 27 MINERAL FUELS, MINERAL OILS AND PRODUCTS OF THEIR DISTILLATION; BITUMINOUS SUBSTANCES; MINERAL WAXES
> e 28 INORGANIC CHEMICALS; ORGANIC OR INORGANIC COMPOUNDS OF PRECIOUS METALS, OF RARE-EARTH METALS, OF RADIOACTIVE ELEMENTS OR OF ISOTOPES
> Device 29 ORGANIC CHEMICALS
> 🔤 30 PHARMACEUTICAL PRODUCTS
> 3 FERTILISERS
22 LANNING OR DEVINGE XTRACTS; LANNINS AND THEIR DERIVATIVES; DEVES, PIGMENTS AND OTHER COLOURING MATTER; PAINTS AND VARNISHES; PUTY AND OTHER MASTICS; INKS 32 SEGENTIAL OF A DEVINUE STRATEGY OF THE ADDRESS OF THE
3 B355EN TIAL OILS AND RESIRVOIDS; PERFUMERY, COSMETIC OR TOTLET PREPARATIONS 3 SCORE ORGANIC CURPCE ACTIVE ACCENTE MARCHARMAN AND AND AND AND AND AND AND AND AND A
S 41 DIAMONDAL SUBSCIENCES AND A SUBSCIENCES
Source 2005 Intervention of the state o
> 37 PHOTOGRAPHIC OR CINEMATOGRAPHIC GOODS
3 MISCELLANEOUS CHEMICAL PRODUCTS
> 9 PLASTICS AND ARTICLES THEREOF
> mail 40 RUBBER AND ARTICLES THEREOF
> 🧰 41 RAW HIDES AND SKINS (OTHER THAN FURSKINS) AND LEATHER
> 🛑 42 ARTICLES OF LEATHER; SADDLERY AND HARNESS; TRAVEL GOODS, HANDBAGS AND SIMILAR CONTAINERS; ARTICLES OF ANIMAL GUT (OTHER THAN SILKWORM GUT)
> 🧰 43 FURSKINS AND ARTIFICIAL FUR; MANUFACTURES THEREOF
> 🧧 44 WOOD AND ARTICLES OF WOOD; WOOD CHARCOAL
S CORK AND ARTICLES OF CORK
46 MANUFAC LURES OF STRAW, OF ESPARIO OR OF OTHER PLATING MATERIALS; BASKE IWARE AND WICKERWORK A TANKA OF AVERA DATA OF A STRAW, OF ESPARIO OR OF OTHER PLATING MATERIALS; BASKE IWARE AND WICKERWORK
AP POLP OF WOOD OR OF OTHER HIBROUS CELLULOSIC MATERIAL, RECOVERED (WASTE AND SCRAP) PAPER OR PAPERBOARD APPROVE AND DARREPORTED, APPCI (ES CE PAREP DUIL) O CENARE OR OF OR DARREPORTED (WASTE AND SCRAP) PAPER OR PAPERBOARD
> 5 1 WOOL FINE OR COARSE ANIMAL HAIR: HORSEHAIR VARN AND WOVEN FABRIC
> 5 2 COTTON
> 5 3 OTHER VEGETABLE TEXTLE FIBRES: PAPER YARN AND WOVEN FABRICS OF PAPER YARN

- > 🛑 54 MAN-MADE FILAMENTS
- > = 55 MAN-MADE STAPLE FIBRES
- > 🛑 56 WADDING, FELT AND NONWOVENS; SPECIAL YARNS; TWINE, CORDAGE, ROPES AND CABLES AND ARTICLES THEREOF
- 57 CARPETS AND OTHER TEXTILE FLOOR COVERINGS
- > 💼 58 SPECIAL WOVEN FABRICS; TUFTED TEXTILE FABRICS; LACE; TAPESTRIES; TRIMMINGS; EMBROIDERY

Processes?

 Merged several classification systems from different domains, e.g. [1-3]

[1] Daniel G.H. Sorensen, Thomas Ditlev Brunoe, Kjeld Nielsen, A classification scheme for production system processes, Procedia CIRP, Volume 72, 2018, Pages 609-614, ISSN 2212-8271, https://doi.org/10.1016/j.procir.2018.03.021.

[2] R.A. Buswell, W.R. Leal da Silva, F.P. Bos, H.R. Schipper, D. Lowke, N. Hack, H. Kloft, V. Mechtcherine, T. Wangler, N. Roussel, A process classification framework for defining and describing Digital Fabrication with Concrete, Cement and Concrete Research, Volume 134, 2020, 106068, ISSN 0008-8846, https://doi.org/10.1016/j.cemconres.2020.106068.

[3] McCabe, W.L, Smith, J.C., and Harriott, P., "Unit Operations of Chemical Engineering", 7th Edition, McGraw-Hill Book Co, 2005



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Locations

• For now, the default openLCA locations, but extendable; each with long lat and GeoJSON information

~	Locations
	Aluminium
	Country
	Cutout
	Electricity
	Global
	Miscellaneous
	Subdivisions
	Unlocated

✓ Country	😅 openLCA 2.4.0 - msdb_Jan25_3.2	
Afghanistan - AF	File Database Tools Help	
Albania - AL		
Algeria - DZ	E: Navigation	The Welcome Vaudi Araba - SA X
American Samoa - AS	Portugal - PT	General information - Saudi Arabia - SA
	Vieno Kico - PK Vatar - QA	General information
	Romania - RO Russian Federation (the) - RU	Name Saudi Arabia
Anguilla - Al	Rwanda - RW	Category Country
	 Reunion - KE Saint Barthélemy - BL 	Description
	Saint Helena, Ascension and Tristan da Cunha - SH Saint Kitte and Nacir, - KN	
Antigua and Barbuda - Ao	 Saint Lucia - LC 	
V Argentina - AK	 Saint Martin (French part) - MF Saint Pierre and Miguelon - PM 	
Armenia - AM	Saint Vincent and the Grenadines - VC Common Mill	
V Aruba - AW	Samua - ws Sa Marino - SM	Toos Addra too
🔮 Australia - AU	Sao Tome and Principe - ST Saudi Arabia - SA	
💡 Austria - AT	Senegal - SN	Additional information
💡 Azerbaijan - AZ	 Serbia - RS Seychelles - SC 	Code SA
💡 Bahamas (the) - BS	Sierra Leone - SL Sierra ne - SG	Longitude 44.53666367471592
💡 Bahrain - BH	Sint Maarten (Dutch part) - SX	Latitude 24.122327/064432138
💡 Bangladesh - BD	 Slovakia - SK Slovenia - Sl 	
💡 Barbados - BB	Solomon Islands - S8 Solomon Islands - S8 Sonoslis - S0	• Geographic data
📀 Belarus - BY	South Africa - ZA	
💡 Belgium - BE	 South Georgia and the South Sandwich Islands - GS South Sudan - SS 	
Belize - BZ	Spain - ES	
💡 Benin - BJ	Shi Lanka - LK Sudan (the) - SD	
Bermuda - BM	 Suriname - SR Svalbard and Jan Maven - SJ 	
Bhutan - BT	Sweden - SE	
Bolivia (Plurinational State of) - BO	 Switzerand - CH Syrian Arab Republic (the) - SY 	
Bonaire, Sint Eustatius and Saba - BO	 Taiwan (Province of China) - TW Taiwistan - TI 	
Bosnia and Herzegovina - BA	Tanzania, the United Republic of - TZ	
Botswana - RW	V Ihailand - IH V Timor-Leste - TL	
Bouvet Island - BV	Togo - TG Totelau - TK	
Boarderistanta BV	♀ Tonga - TO	
Pritick Indian Ocean Tarriton: (the) IO	♀ Trinidad and Tobago - TT ♀ Tunisia - TN	
	Turkmenistan - TM Turkmenistan - TM Turkmenistan - TM Turkmenistan - TM	
	Tuvalu - TV	
	 Türkiye - TR Uganda - UG 	
Burkina Faso - BF	Ukraine - UA Ukraine - UA Ukraine - UA	
	 United Arabi Primates (title) - AE United Kingdom of Great Britain and Northern Ireland (the) - GB 	
Cabo Verde - CV	United States Minor Outlying Islands (the) – UM United States of America (the) – US	
Cambodia - KH	Vruguay - UY	
💡 Cameroon - CM	Vzbekistan - UZ Vanuatu - VU	
💎 Canada - CA	Venezuela (Bolivarian Republic of) - VE	

And the entire database

- Created in openLCA now, with "gated AI".
- Works well, we are finetuning (setup, data sources, routines...)
- 500,000 processes systems work in openLCA (!)
- Database itself is agnostic to specific flow reference systems, modelling methods (allocation, end of life, ...) to maximise application possibilities
- Conversion to specific reference systems and modelling rules via Graph database (typedb)¹



MSDB, comparison to other databases

MSDB, comparison to other databases

- 1. (it is not released yet, but soon)
- 2. 500,000 datasets much larger than other databases
- 3. The database is
 - 1. A database (!)
 - 2. An answering machine, able to provide datasets for any requested product
 - 3. A system that can be trained for specific sectors, locations, ...
 - 4. An LCA assistant in openLCA

MSDB, the LCA assistant

The LCA assistant is just a tool in openLCA that proposes datasets.

Tools Help		
\$:	♠ Welcome ×	
ers		\sim
ons		openica
	<u>Getting started</u>	
5_3.2	What's new in openLCA 2	
systems 25 entary flows	Extensive documentation	With openLCA, you can model the life cycle of everything.
rs and parameters und data	Community Q&A	Create or import existing databases with life cycle processes and import assessment methods; create your own processes,
ited 12 06 ited 12 06 (1) udents_with_methods_	Databases, case studies, impact methods	build your own life cycle models, calculate and analyse them. Click the other sections on the left to read more.

MSDB, a modular treatment of infrastructure

- Machines are not directly allocated to the process but this contribution is driven by capacity, lifetime, utilization, and can thus be configured. Sources are provided.
- We will provide default values

E.g., PCB production

```
"machines": [
    "name": "Automatic PCB Etching Machine",
    "lifetime": "7 years",
    "utilization": "90%",
    "capacity": "500 piece/hour",
    "description": "This machine performs the chemical etching process to remove unwanted copper from the PCB design data, creating the circuit traces.",
    "source": "[1] - Flex Circuit Solutions - Automatic PCB Etching Machines: [https://flexcircuitsolutions.com/automatic-pcb-etching-machines/](https://flexcircuitsolutions.com/automatic-pcb-etching-machines/]
    "name": "Pick and Place Machine",
    "lifetime": "6 years",
    "utilization": "85%",
    "capacity": "300 piece/hour",
    "description": "This machine accurately places electronic components onto the PCB based on the fabrication order. It uses robotic arms for precise placement.",
    "source": "[2] - Panasonic - Pick and Place Machines: [https://www.panasonic.com/us/en/solutions/industrial-automation/pick-place-machines](https://www.panasonic.com/us/en/solutions/industrial-automation/pick-place-machines]
    "name": "Laminator",
    "lifetime": "10 years",
    "utilization": "75%",
    "capacity": "1000 piece/hour (overall production line)",
    "description": "This machine applies a layer of resin or other material to the PCB to improve its mechanical strength and solderability.",
    "source": "[3] - SMT Global - PCB Laminators: [https://www.smtglobal.com/pcb-laminators](https://www.smtglobal.com/pcb-laminators)"
    "name": "Screen Printer",
    "lifetime": "5 years",
    "utilization": "95%",
    "capacity": "400 piece/hour",
    "description": "This machine applies solder paste onto the PCB, which is the necessary material for surface mount technology (SMT) soldering.",
    "source": "[4] - Henkel - Screen Printing Machines: [https://www.henkel.com/en/solutions/electronics/screen-printing](https://www.henkel.com/en/solutions/electronics/screen-printing]
```

MSDB compared to IO databases

(such as exiobase, for example)

Velcome	휜	Kerosene -	DK

Inputs/Outputs - Kerosene - DK

-	In	DUI	5
		۲ •	-

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Flow	Category	Amount	Unit	;ts/Revenues	Uncertainty	Avoided was	Provider	Data quality	Location
🏟 Air transport services (62) - FR	Product flows/Air transport se	2.35530	📟 EUR 20		none				
log Air transport services (62) - GR	Product flows/Air transport se	0.23422	📟 EUR 20		none				
log Air transport services (62) - HR	Product flows/Air transport se	0.04475	📟 EUR 20		none				
🕸 Air transport services (62) - HU	Product flows/Air transport se	0.37885	🚥 EUR 20		none				
lange for the services (62) - IE	Product flows/Air transport se	2.58431	📟 EUR 20		none				
lange the services (62) - IT	Product flows/Air transport se	0.25939	📟 EUR 20		none				
log Air transport services (62) - LT	Product flows/Air transport se	0.09119	📟 EUR 20		none				
🕸 Air transport services (62) - LU	Product flows/Air transport se	0.18964	📟 EUR 20		none				
🅸 Air transport services (62) - LV	Product flows/Air transport se	0.06492	📟 EUR 20		none				
log Air transport services (62) - MT	Product flows/Air transport se	0.06258	📟 EUR 20		none				
log Air transport services (62) - NL	Product flows/Air transport se	2.62976	📟 EUR 20		none				
log Air transport services (62) - PL	Product flows/Air transport se	0.16762	🚥 EUR 20		none				
🕸 Air transport services (62) - PT	Product flows/Air transport se	0.60979	🚥 EUR 20		none				
log Air transport services (62) - RO	Product flows/Air transport se	0.07049	📟 EUR 20		none				
log Air transport services (62) - SE	Product flows/Air transport se	11.15230	🚥 EUR 20		none				

- Outputs

Flow	Category	Amount	Unit	;ts/Revenues	Uncertainty	Avoided pro	Provider	Data quality	Location	Description
🏟 Kerosene - DK	Product flows/Kerosene	1.00000E6	🚥 EUR 2		none					
🕖 As - combustion - air	/Emissions to air	0.00178	🚥 kg		none					
🕖 As - non combustion	/Emissions to air	3.39966E-5	🚥 kg		none					
🕖 As - non combustion	/Emissions to air	0.00020	🚥 kg		none					
🕖 As - non combustion	/Emissions to air	4.28990E-6	🚥 kg		none					
🕖 As - non combustion	/Emissions to air	0.00129	🚥 kg		none					
🖉 Benzo(a)pyrene - com	/Emissions to air	0.01948	🚥 kg		none					
🖉 Benzo(b)fluoranthene	/Emissions to air	0.02526	🚥 kg		none					
🖉 Benzo(k)fluoranthene	/Emissions to air	0.01016	🚥 kg		none					
🕖 Cd - combustion - air	/Emissions to air	0.00096	🚥 kg		none					
🖉 Cd - non combustion	/Emissions to air	1.88870E-7	🚥 kg		none					
🖉 Cd - non combustion	/Emissions to air	4.38478E-5	🚥 kg		none					
🕖 Cd - non combustion	/Emissions to air	1.11375E-8	🚥 kg		none					
🕖 Cd - non combustion	/Emissions to air	5.71987E-5	🚥 kg		none					
🕖 Cd - non combustion	/Emissions to air	3.45219E-5	📟 kg		none					
CH4 - combustion - air	/Emissions to air	47.57258	🚥 kg		none					

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MSDB compared to IO databases

(such as exiobase, for example)

	exiobase 382, pxp	MSDB		
process dataset size (flows)	10,912	3-35		
Locations	global, 49	569		
Datasets	8,148	500,000		
Documentation on dataset level	none (!)	on dataset and flow level		
Flexibility	none but several versions available	adjustable		

MSDB compared to IO databases

(such as exiobase, for example)

	exiobase 382, pxp	MSDB
process dataset size (flows)	10,912	3-35
Locations	global, 49	569
Datasets	8,148	500,000
Documentation on dataset level	none (!)	on dataset and flow level
Flexibility	none but several versions available	adjustable

number of flows in datasets, exiobase 382



MSDB compared to LCA unit process databases

(such as Agribalyse, for example)

nputs										•
Flow	Category	Amount	Unit	;ts/Revenues	Uncertainty	Avoided was	Provider	Data quality	Location	Description
Avocado {GLO} prod	material/Others/Adapte	7.09000	📟 kg		none					Average e
Electricity, low voltag	energy/Others/Copied f	0.08200	🚥 kWh		none					Electricity
Oil mill construction	material/Others/Copied	1.11000E-9	📖 ltem(s)		none					Calculatio
) Water, well, FR	Resources/in ground	0.00069	Ლ m3		none					10-20% of
utputs low	Category	Amount	Unit	its/Revenues	Uncertainty	Avoided pro	Provider	Data quality	Location	• Description
Avocado oil, at oil mil	material/Agricultural/P	1.00000	🚥 kg		none					Average
🔉 Avocado peel, at oil	material/Agricultural/Pl	1.06000	🚥 kg		none					Average e
Avocado stone, at oil	material/Agricultural/Pl	1.42000	🚥 kg		none					Average e
Avocado, residual pul	material/Agricultural/Pl	3.61000	📼 kg		none					Average e
Avocado, residuar pulm										

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MSDB compared to LCA databases

(such as Agribalyse, for example)

	Agribalyse 311	MSDB
process dataset size (flows)	1-3622	3-35
Locations	570	569
Datasets	17.557	500.000
Documentation on dataset level	on dataset and flow level	on dataset and flow level
Flexibility	adjustable apart from system processes	adjustable



MSDB compared to LCA databases

(such as Agribalyse, for example)

	Agribalyse 311	MSDB
process dataset size (flows)	1-3622	3-35
Locations	570	569
Datasets	17.557	500.000
Documentation on dataset level	on dataset and flow level	on dataset and flow level
Flexibility	adjustable apart from system processes	adjustable

number of flows in datasets, Agribalyse 311



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MSDB, next steps

Next steps

- Deliver first version, spring 2025
- Put the database for tests
 - in projects
 - with external experts
- Document and explain



Camille Flammarion: L'atmosphère. Météorologie populaire. Paris 1888, p. 163.

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Thank you!

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