FeedPrint

Carbon Footprint Animal Nutrition

A database and calculation tool of the feed production chain to calculate GHG emissions by using LCA

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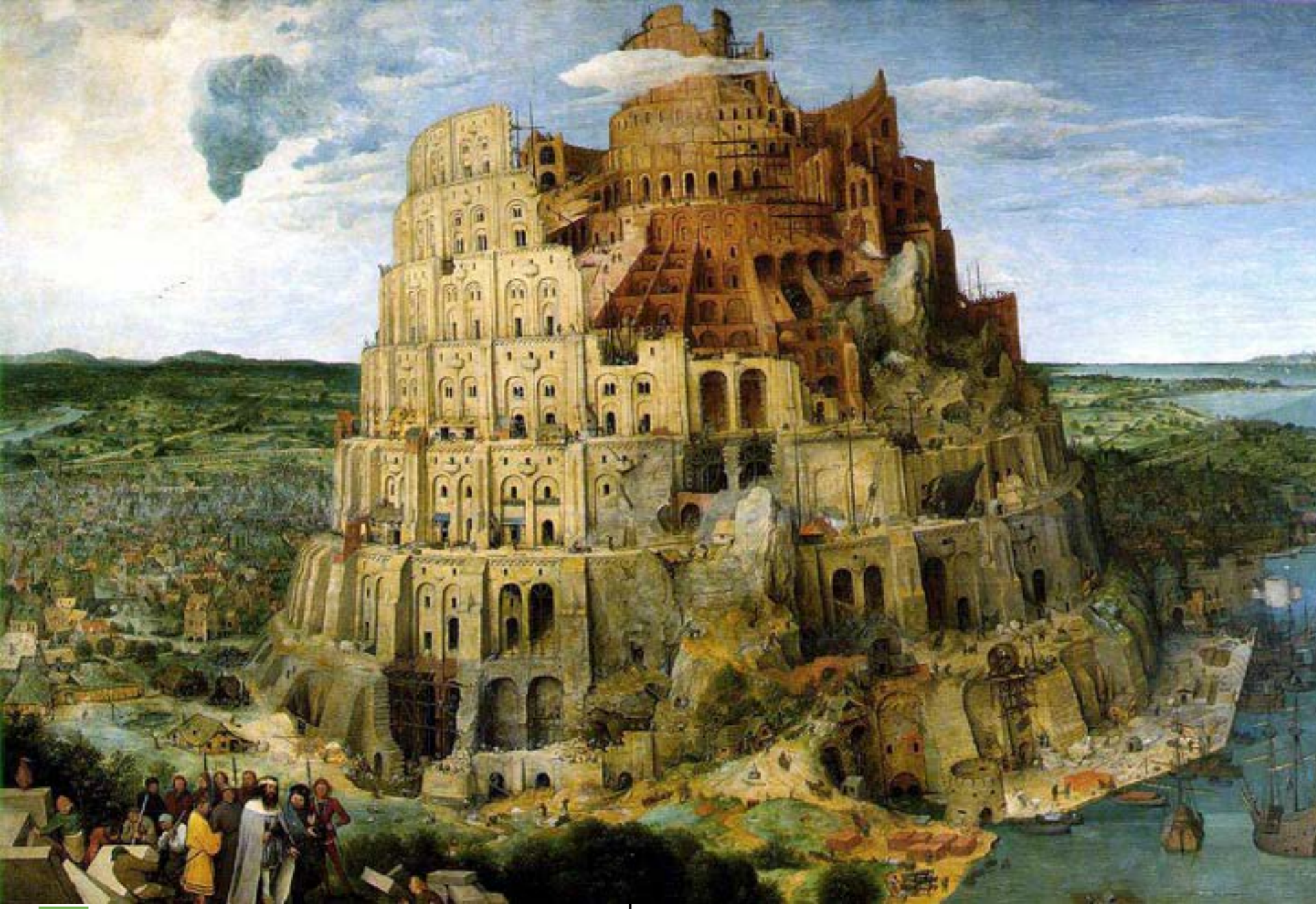

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Feed in analysis of livestock systems

- Feed is a large contributor to GHG emissions
- Most LCA are at farm level
- Feed ranges from 100 to 0 % home grown
  - (extensive beef to footloose monogastrics)
- Yet, no systematic analysis of GHG emissions of the feed production chain

Carbon FootPrint Animal Nutrition:

systematic analysis of the feed production chain

Strategic goals:

- awareness of and insight in GHG emissions
  - production and utilization of animal feed
- identify potential mitigation options
- *not meant for use in carbon labelling !!*

Use of the CFP calculation tool “Feedprint”

- Main users:
  - Compound feed industry and their suppliers
    - Coupling with feed optimization programs
- Main applications:
  - Strategic management
  - Corporate Social Responsibility Reporting
- International alignment and application
  - FAO, FEFAC, IDF, ...

Standards in alignment of GHG calculations

- ISO 14000/14044/14067
- PAS2050, British Standards Institute (2008 & 2011)
- IPCC Guidelines for National Inventory Reports
  - No LCA, GHG guidelines, strict sectorial approach
- IDF Guide to standard LCA, bulletin 445/2010
  - Combining LCA and GHG guidelines

Data analysis and interpretation

Multiple values, expert judgement:

- Pedigree matrix (Ecoinvent) used in decisions on average values
- Confidentiality interval, uncertainty for all data
  - Uniform, normal , lognormal or triangular distribution
  - Monte Carlo simulation for limited set of data

Lack of data:

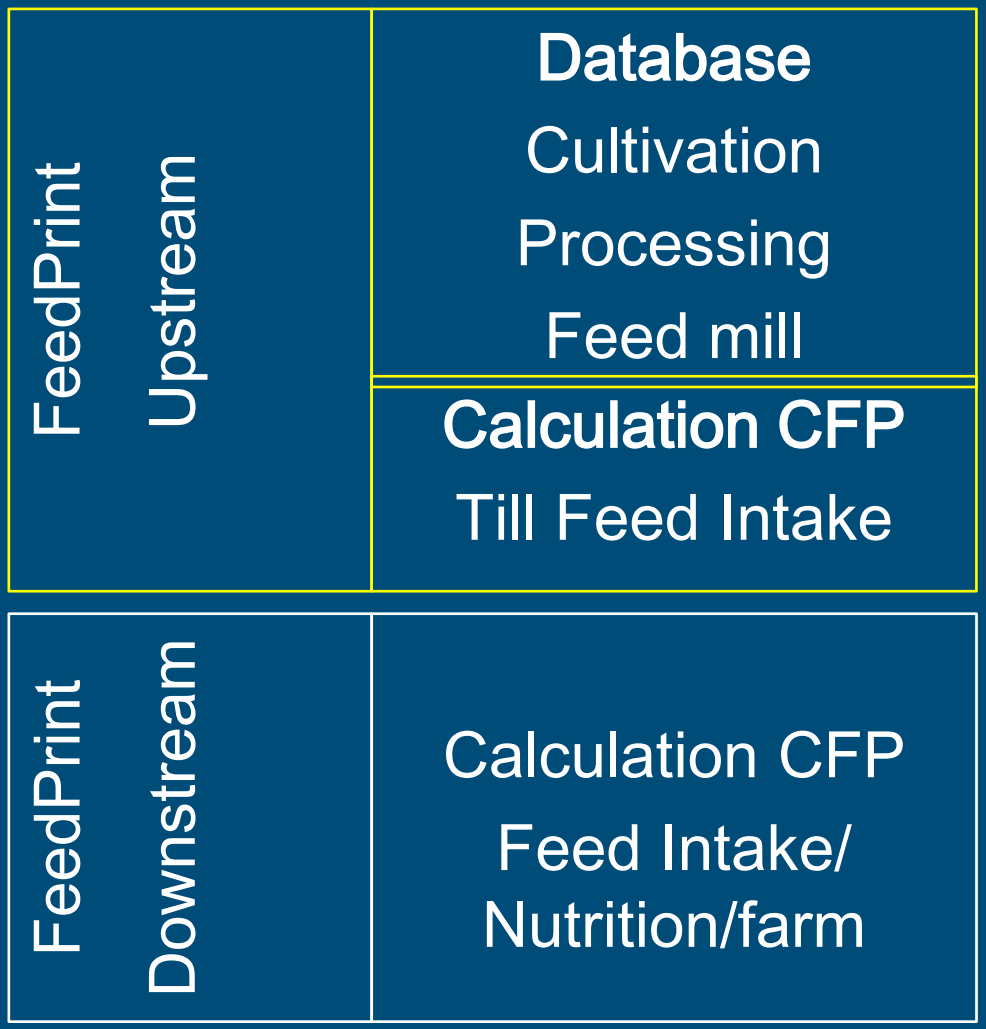
- standard procedure for defaults, e.g. MEXALCA

Wide variation between companies and countries

Allocation in processing and livestock production

- Preferred approach in feed: economic allocation
- Other options available: mass, gross energy
- Show embedded (allocated) emissions
  - What enters “your” link in the chain
  - What is the contribution of your link
- *Allocation is only shifting emissions, it does not change emissions.*

Simplified structure of FeedPrint



FeedPrint

File Options Help

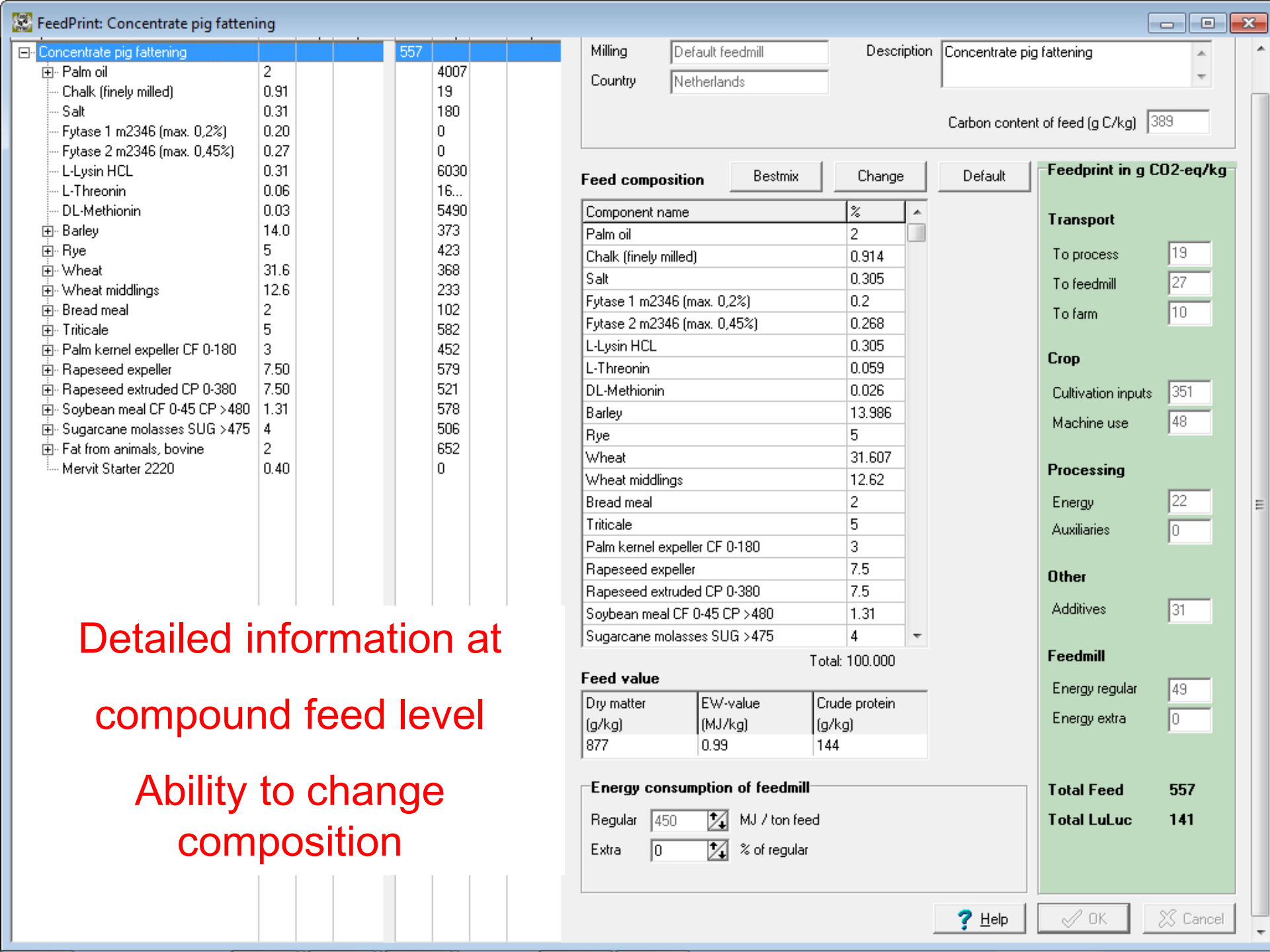
Including Monte Carlo simulation | Log farm model | Help

Farm type | Farm feeds | Feeding pigs | Results graphs | Results tables

	CFP embedded (g CO2-eq/kg)	CFP transport (g CO2-eq/kg)	CFP total (g CO2-eq/kg)	CFP LuLuc (g CO2-eq/kg)	
Compound feeds					
Concentrate pig starting	508	65	574	172	Details
Concentrate pig fattening	501	56	557	141	Details
Byproducts					
Barley	353	19	373	163	Details
Corn cob mix, no core	209	10	219	106	Details
Select feed					
Select feed					
Select feed					
Select feed					
Roughage					
Select feed					
Select feed					
Select feed					

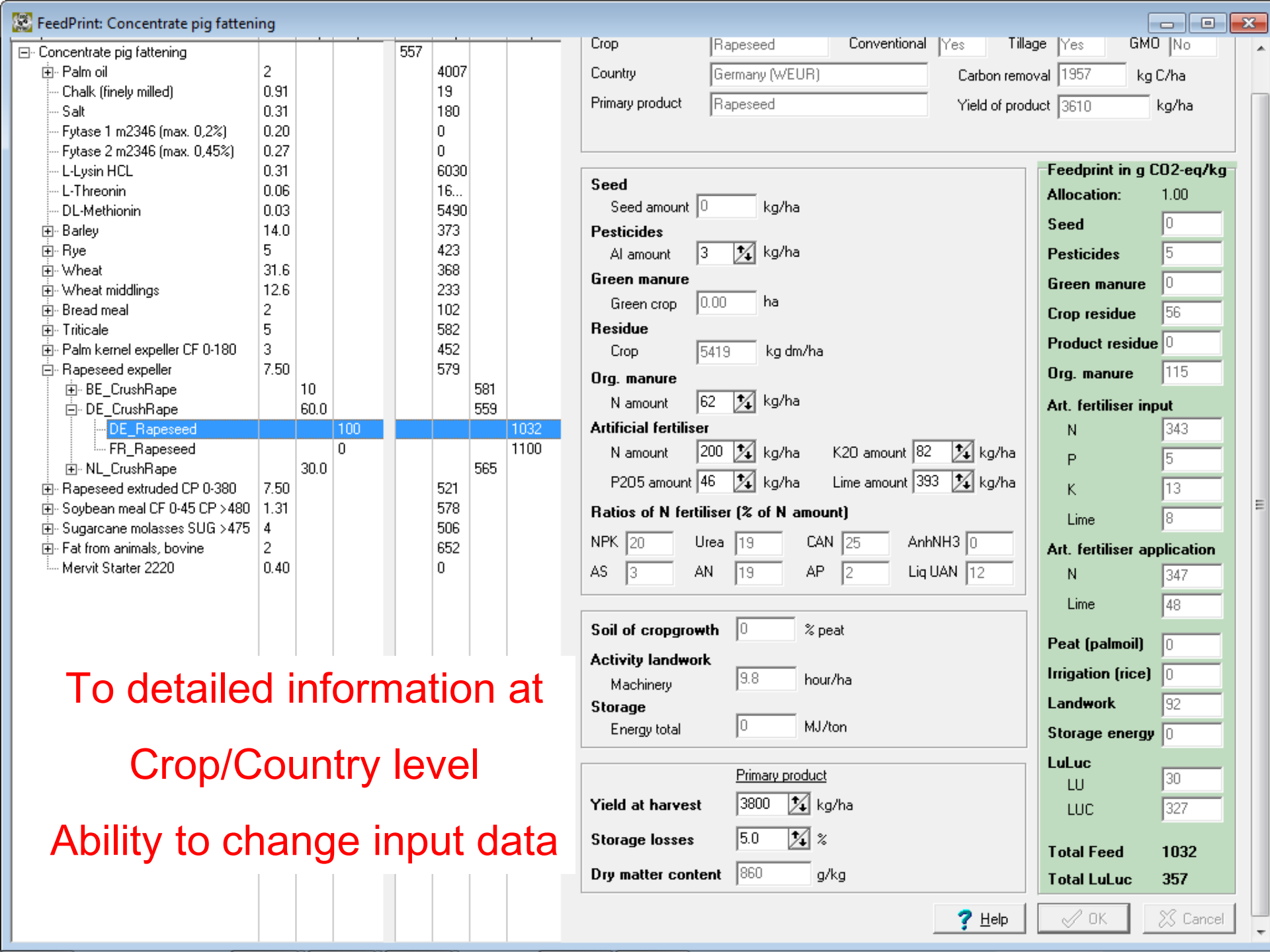
Previous

Next


FeedPrint: Concentrate pig fattening
Concentrate pig fattening 557
Palm oil 2 4007
Chalk (finely milled) 0.91 19
Salt 0.31 180
Fytase 1 m2346 (max. 0,2%) 0.20 0
Fytase 2 m2346 (max. 0,45%) 0.27 0
L-Lysin HCL 0.31 6030
L-Threonin 0.06 16...
DL-Methionin 0.03 5490
Barley 14.0 373
Rye 5 423
Wheat 31.6 368
Wheat middlings 12.6 233
Bread meal 2 102
Triticale 5 582
Palm kernel expeller CF 0-180 3 452
Rapeseed expeller 7.50 579
Rapeseed extruded CP 0-380 7.50 521
Soybean meal CF 0-45 CP >480 1.31 578
Sugarcane molasses SUG >475 4 506
Fat from animals, bovine 2 652
Mervit Starter 2220 0.40 0
Detailed information at
compound feed level
Ability to change
composition
Milling
Default feedmill
Description
Concentrate pig fattening
Country
Netherlands
Carbon content of feed (g C/kg)
389
Feed composition
Bestmix
Change
Default
Component name
%
Palm oil 2
Chalk (finely milled) 0.914
Salt 0.305
Fytase 1 m2346 (max. 0,2%) 0.2
Fytase 2 m2346 (max. 0,45%) 0.268
L-Lysin HCL 0.305
L-Threonin 0.059
DL-Methionin 0.026
Barley 13.986
Rye 5
Wheat 31.607
Wheat middlings 12.62
Bread meal 2
Triticale 5
Palm kernel expeller CF 0-180 3
Rapeseed expeller 7.5
Rapeseed extruded CP 0-380 7.5
Soybean meal CF 0-45 CP >480 1.31
Sugarcane molasses SUG >475 4
Total: 100.000
Feed value
Dry matter (g/kg) 877
EW-value (MJ/kg) 0.99
Crude protein (g/kg) 144
Energy consumption of feedmill
Regular 450 MJ / ton feed
Extra 0 % of regular
Feedprint in g CO2-eq/kg
Transport
To process 19
To feedmill 27
To farm 10
Crop
Cultivation inputs 351
Machine use 48
Processing
Energy 22
Auxiliaries 0
Other
Additives 31
Feedmill
Energy regular 49
Energy extra 0
Total Feed 557
Total LuLuc 141
Help
OK
Cancel

FeedPrint: Concentrate pig fattening

Concentrate pig fattening			557
Palm oil	2		4007
Chalk (finely milled)	0.91		19
Salt	0.31		180
Fytase 1 m2346 (max. 0,2%)	0.20		0
Fytase 2 m2346 (max. 0,45%)	0.27		0
L-Lysin HCL	0.31		6030
L-Threonin	0.06		16...
DL-Methionin	0.03		5490
Barley	14.0		373
Rye	5		423
Wheat	31.6		368
Wheat middlings	12.6		233
Bread meal	2		102
Triticale	5		582
Palm kernel expeller CF 0-180	3		452
Rapeseed expeller	7.50		579
Rapeseed extruded CP 0-380	7.50		521
Soybean meal CF 0-45 CP >480	1.31		578
Sugarcane molasses SUG >475	4		506
Fat from animals, bovine	2		652
Mervit Starter 2220	0.40		0



To detailed information at

Crop/Country level

Ability to change input data

Detailed information on crop input and yield

Seed
Seed amount 0 kg/ha

Pesticides
AI amount 3 kg/ha

Green manure
Green crop 0.00 ha

Residue
Crop 5419 kg dm/ha

Org. manure
N amount 62 kg/ha

Artificial fertiliser
N amount 200 kg/ha K20 amount 82 kg/ha
P205 amount 46 kg/ha Lime amount 393 kg/ha

Ratios of N fertiliser (% of N amount)

NPK	20	Urea	19	CAN	25	AnhNH3	0
AS	3	AN	19	AP	2	Liq UAN	12

Soil of cropgrowth 0 % peat

Activity landwork
Machinery 9.8 hour/ha

Storage
Energy total 0 MJ/ton

Primary product

Yield at harvest 3800 kg/ha

Storage losses 5.0 %

Dry matter content 860 g/kg

Feedprint in g CO2-eq/kg

Allocation:	1.00
Seed	0
Pesticides	5
Green manure	0
Crop residue	56
Product residue	0
Org. manure	115
Art. fertiliser input	
N	343
P	5
K	13
Lime	8
Art. fertiliser application	
N	347
Lime	48
Peat (palmoil)	0
Irrigation (rice)	0
Landwork	92
Storage energy	0
LuLuc	
LU	30
LUC	327
Total Feed	**1032**
Total LuLuc	**357**

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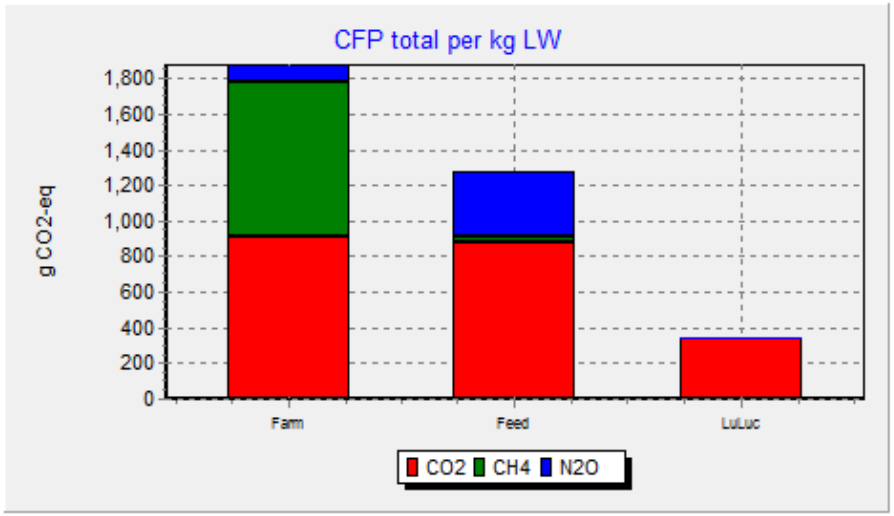
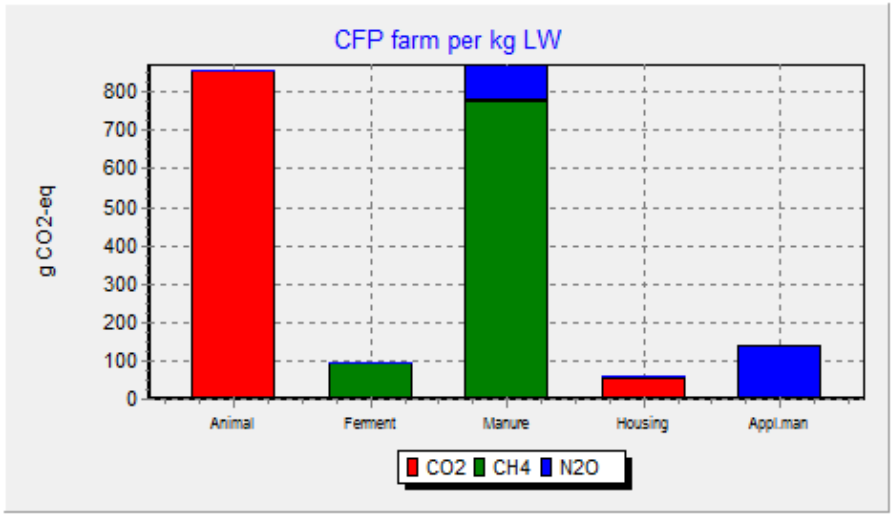
Current session
Scenario

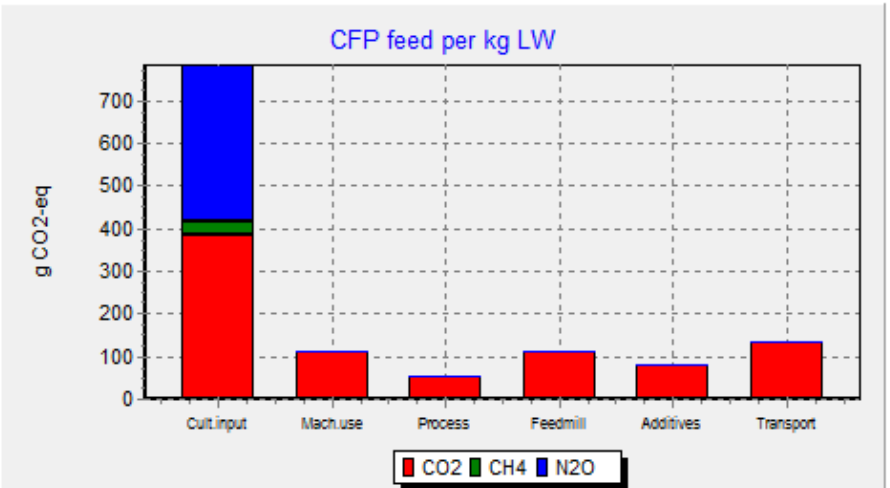
CFP per output product

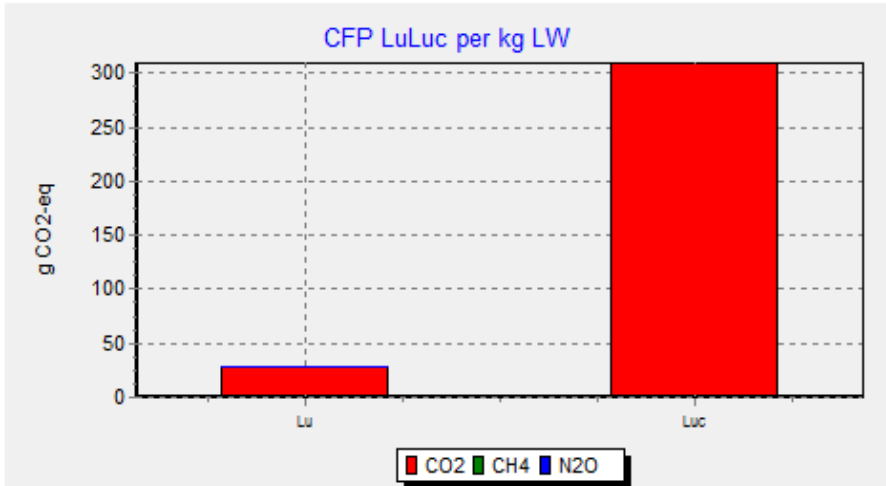
Produced: 401 kg LW per pig
Feedamount: 914 kg feed per pig
Allocation: 1.00

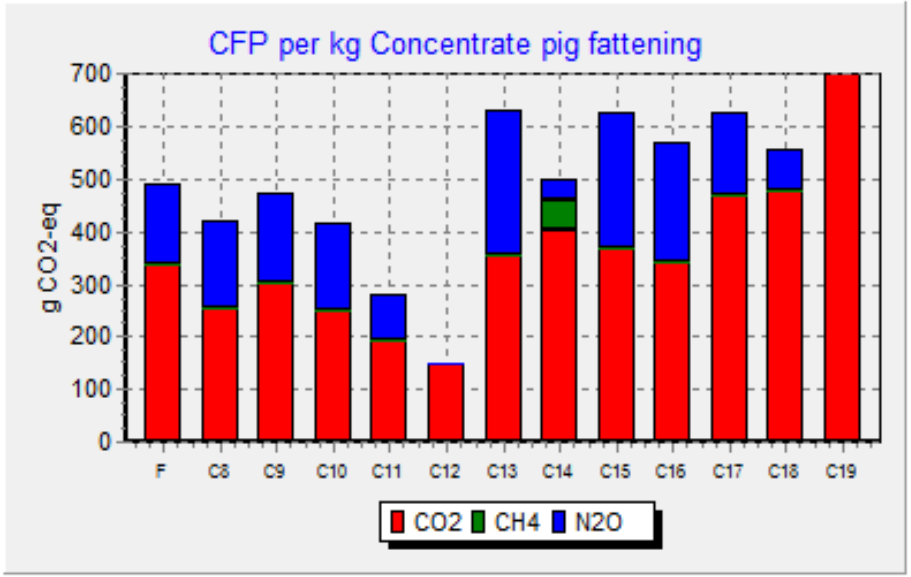
Results shown per kg of Live Weight of product

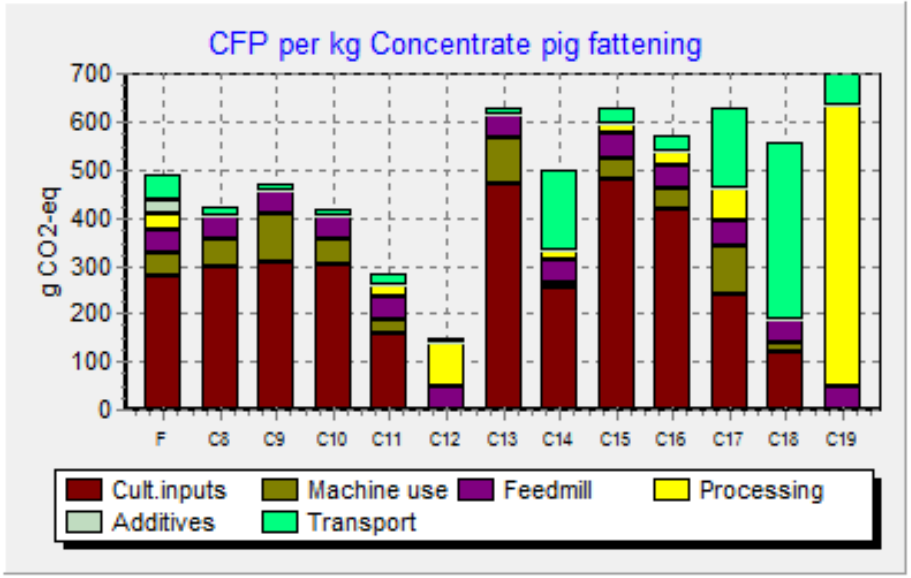












Results can be shown for all components of compound feed

Breakdown to CO2, CH4 and N2O

Or

Breakdown to inputs, machine use, processing, etc.

Conclusions FeedPrint

- Alignment in LCA methodology : good progress
- The data for LCA are the challenge
- FeedPrint upstream fit for international application

- Proceed to develop:
  - a common methodology
  - a harmonised database for default data
  - a common protocol for assessing mitigation options

FeedPrint available at:

- http://webapplicaties.wur.nl/software/feedprint/
- Demonstration during breaks on Wednesday

Thank you for listening

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