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Aurélie Wilfart, Sylvie Dauguet, Aurélie Tailleux, Sarah Willmann, Marie Laustriat, Morgan Magnin, Florence Garcia-Launay, Sandrine Espagnol

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ECOALIM: LCA results of feedstuffs for French livestock

A. WILFART¹, S. DAUGUET², A. TAILLEUR³, S. WILLMANN³, M. LAUSTRIAT²,
M. MAGNIN¹, F. GARCIA-LAUNAY⁴, S. ESPAGNOL⁵

¹INRA, Agrocampus Ouest, UMR 1069 Soil, Agro and hydroSystems, 35042 Rennes, France,

²Terres Inovia, Technical Institute for Oilseeds, 33600 Pessac, France,

³ARVALIS, Institut du végétal, 44370 la Chapelle Saint Sauveur, France,

⁴INRA, Agrocampus Ouest, UMR 1348 PEGASE, 35590 St Gilles, France,

⁵IFIP, Institut du porc, 35651 Le Rheu, France;

aurelie.Wilfart@rennes.inra.fr



Context (1/2)

Livestock production has major impacts on the environment related to air, soil, water, natural resources (FAO, 2006)

Need to reduce global emissions from livestock (FAO, 2013)

“As it stands now, there are no technically or economically viable alternatives to intensive livestock production for providing the bulk of the food supply” (FAO 2011)

Animal feed contribute highly to environmental impacts assess by LCA, particularly CC, CED, and EU (50-75 %, Basset-Mens and van der Werf, 2005 ; Dourmad et al. 2014)

- Reducing impacts through animal feeds can be a lever
- Need for environmental impacts databases for feed

Context (2/2)

Some initiatives exist :

French Agribalyse database for environmental labeling (food oriented)

Agrifootprint for European references based on FAO stat for data outside the Netherlands

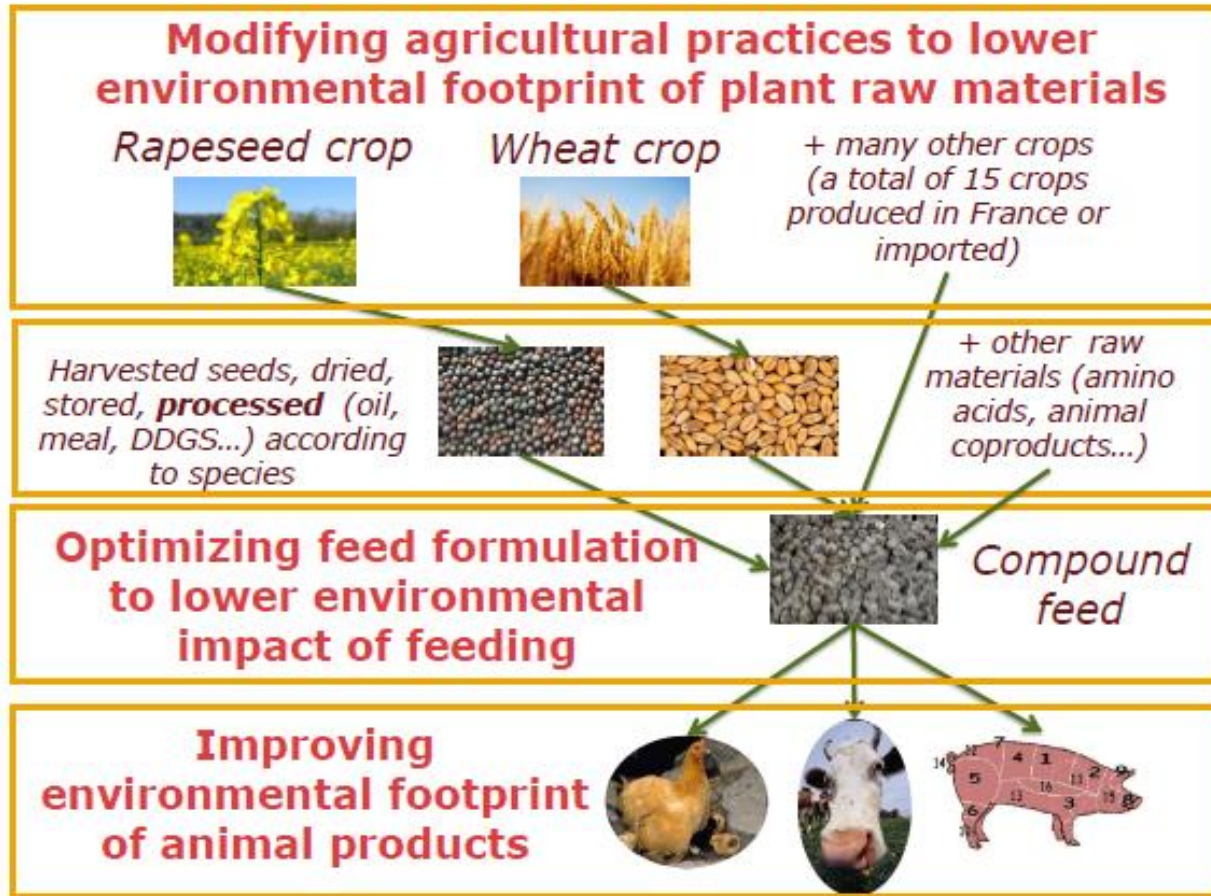
But

Agribalyse does not cover all the raw material required to formulate animal feed

Agrifootprint is not sensitive to several crop management

→ It is necessary to have for each country representative data of specific animal and cropping systems, specific technical process, and specific pedoclimatic context

Ecoalim scope and awaited results

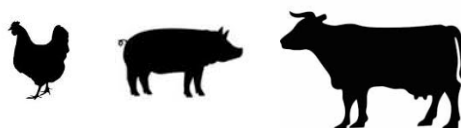


New data on environmental impacts of feedstuffs used or usable in feed

Innovative feeding strategies

Tool box for the feed manufacturers

Ecoalim database



Cereals : 6 cereals, 26 data

Coproducts of cereals : 11 data

Protein and oilseeds : 6 products, 23 data

Cakes : 4 products, 29 data

Fats: 6 products, 28 data

Amino acids : 5 data

Minerals, additives : 9 data

Vitamins : 1 data

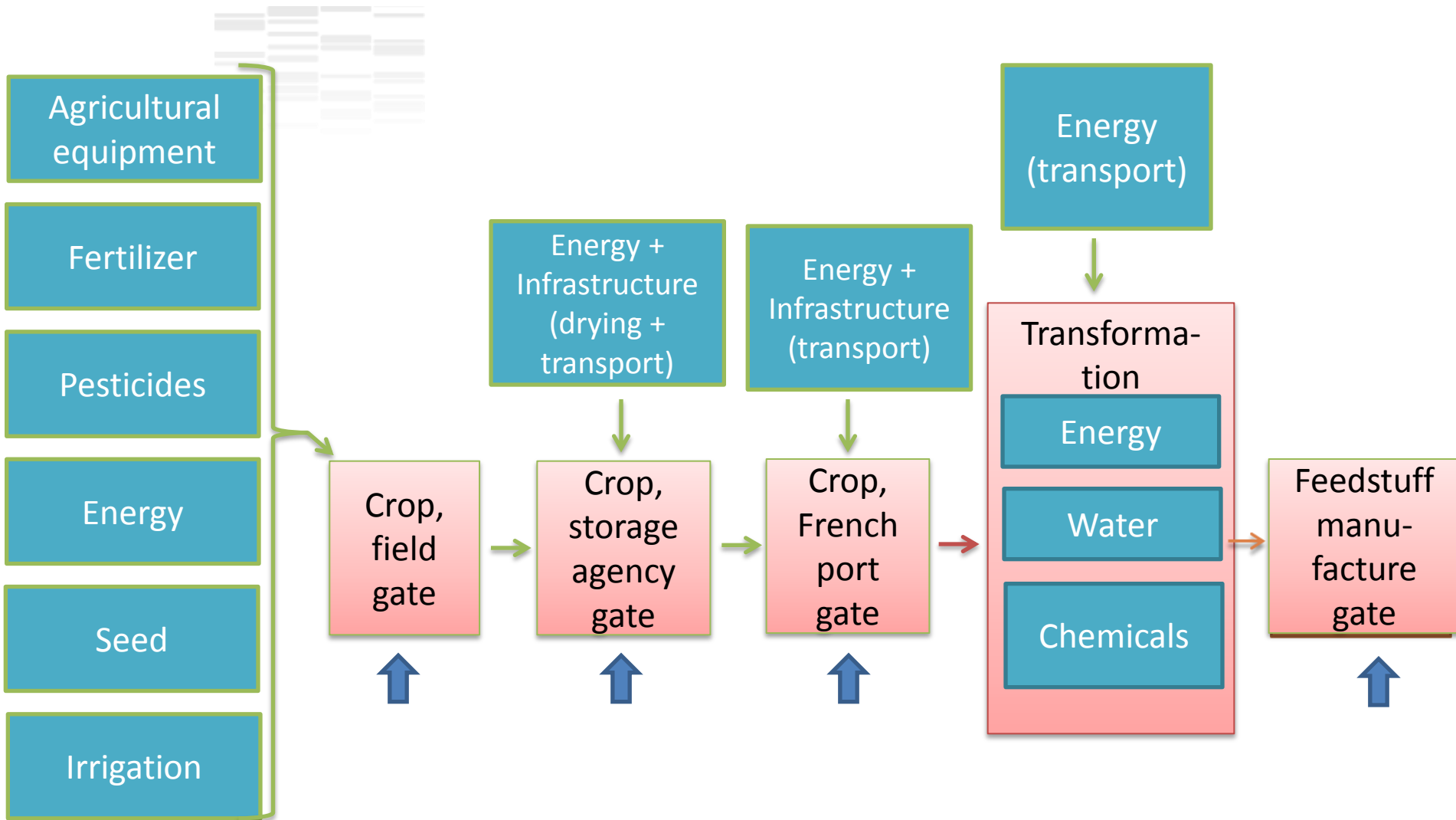
Other coproducts : 12 data

Silages: 2 data

- 150 feedstuffs LCI and LCA (60 different feedstuffs)
- Expressed for 1 kg of feedstuff

- Average national data representative of France
- And
- Different crop managements for the main crops
- Different processing
- 2 formats : Excel file/Simapro 8.3

Ecoalim database : perimeter



ECOALIM allocation rules



- **Economical allocation between product and coproduct :**
 - Grain / straw
 - Oil / meal

- **Other allocations between crops of the rotation**
 - Allocation of the input P, based on the exportation of crops and the specific requirement of each crop of the rotation.
 - Allocation of input K and organic N based on the crop exportations
 - Allocations of the nitrate leaching equally divided between crops of the rotation

Ecoalim database : data collection



- Period : 2008-2012
- National average value
 - Crops : statistical data
 - Others : survey + bibliography + expertise
 - Innovative feedstuff : expertise
- Specific crop managements
 - Use of case-studies
- Various processings
 - Bibliography + expertise
- Calculation method based on Agribalyse methodology



Ecoalim database : Environmental impacts considered in the Excel file



LCA results are available for the 2 main characterization methods used in agricultural LCA : method recommended by JRC (ILCD method) and CML IA (most used in agricultural LCA)

- Climate change (with/without land use change)
- Acidification
- Eutrophication (marine, terrestrial, freshwater (ILCD) and CML)
- Land occupation
- Cumulative energy demand (total and non renewable)
- Phosphorus consumption (specific to Ecoalim, developed at the request of animal nutrition manufacturers)

ECOALIM database specificities



- High data quality for agricultural operations and high representativeness at France scale
- Large perimeter (building, infrastructure, machineries)
- Adaptation of modelling to french conditions
- Allocations rules adapted to agronomy
- Data reviewed by LCA/animal production experts
- Excel file will be available in open access (first release autumn 2015, www.inra.fr/ecoalim)
- Methodological report
- Insertion in the next tables of composition and nutritional value of feed materials (INRA/AFZ)



- No water scarcity nor biogenic carbon accounted for
- LCI for foreign crops are subject to the same pitfalls as other databases (based on publication, FAO stat,...)

ECOALIM: LCIA results of feedstuffs for French livestock

THANK YOU FOR YOUR ATTENTION



Various crop managements / various processing

CEREALS

(wheat, barley, corn)

- at rotation scale
- Mineral fertilization / organic
- Introduction of legumes in the rotation
- Cover crop before spring crops

OILSEEDS

(rapeseed, sunflower, soybean)

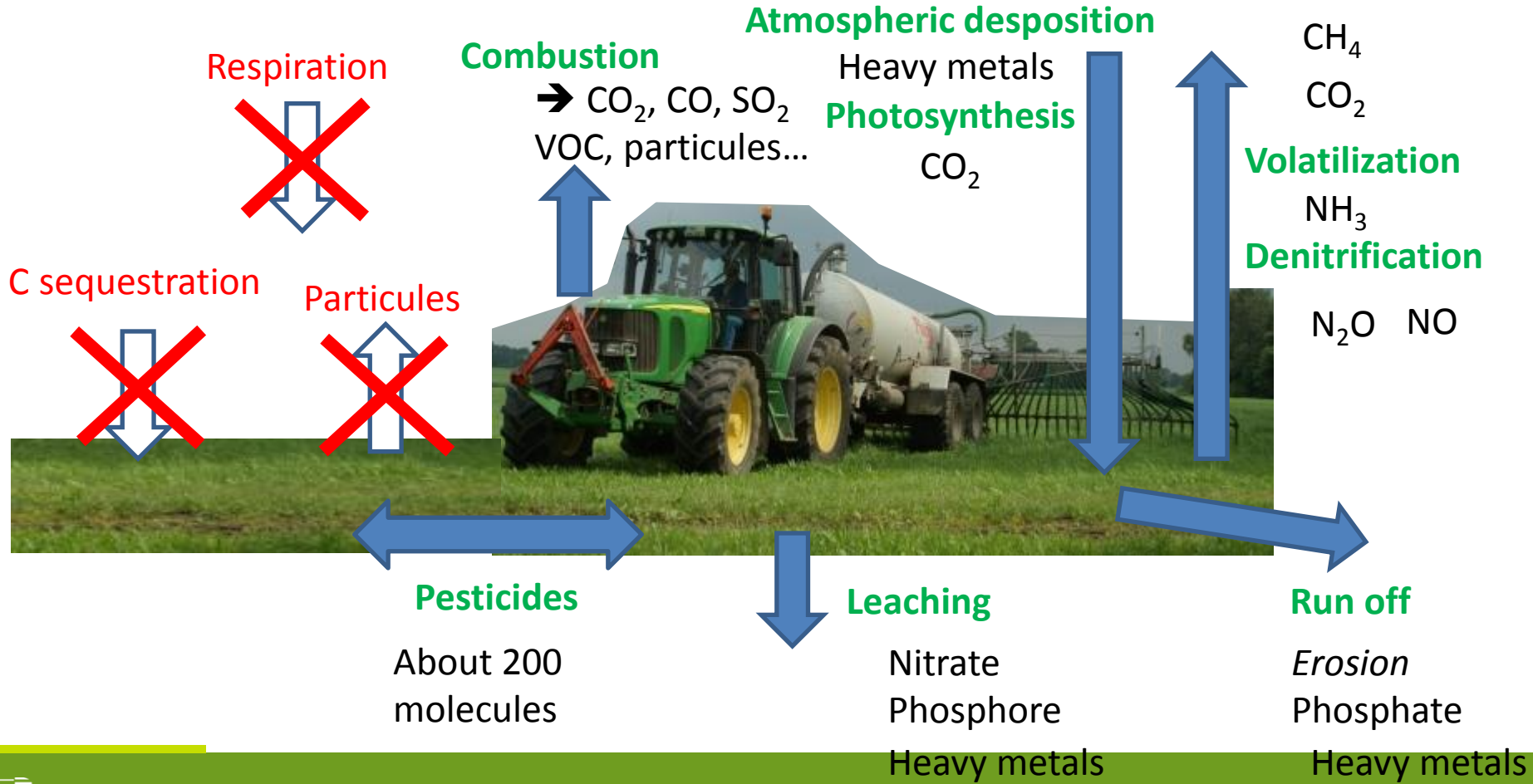
- rapeseed, sunflower at rotation scale
 - Mineral fertilization / organic
 - Introduction of legumes in the rotation
 - Cover crop before spring crops
- Associated crop for rapeseed
- sunflower
 - Processing: no dehulling / low dehulling / high dehulling
- soybean
 - Processing: extrusion

PROTEIN CROPS

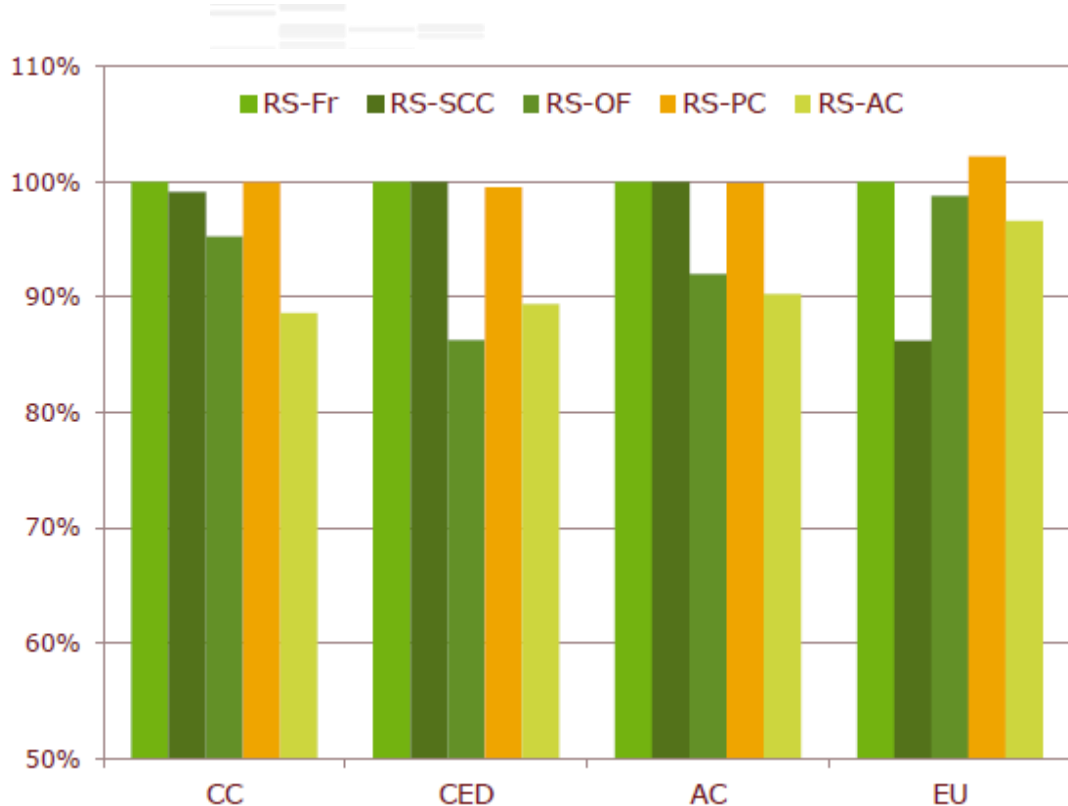
(spring pea, faba bean)

- **Faba bean:**
no dehulling / dehulling

Flows considered



Example of results with various crop managements



- RS-Fr = Rapeseed, conventional, average France (average of actual practices)
- RS-SCC = Rapeseed with systematic covercropping in the crop rotation
- RS-OF = Rapeseed with high level of organic fertilization in the crop rotation
- RS-PC = Rapeseed with insertion of a protein crop in the crop rotation
- RS-AC = Rapeseed with an associated crop with de rapeseed crop

LCA results of rapeseed, with various agricultural practices

Climate Change (CC),
Cumulative Energy Demand (CED),
Acidification (AC),
Eutrophication (EU)