Novel feed crops and residual products: vision from the feeding industry

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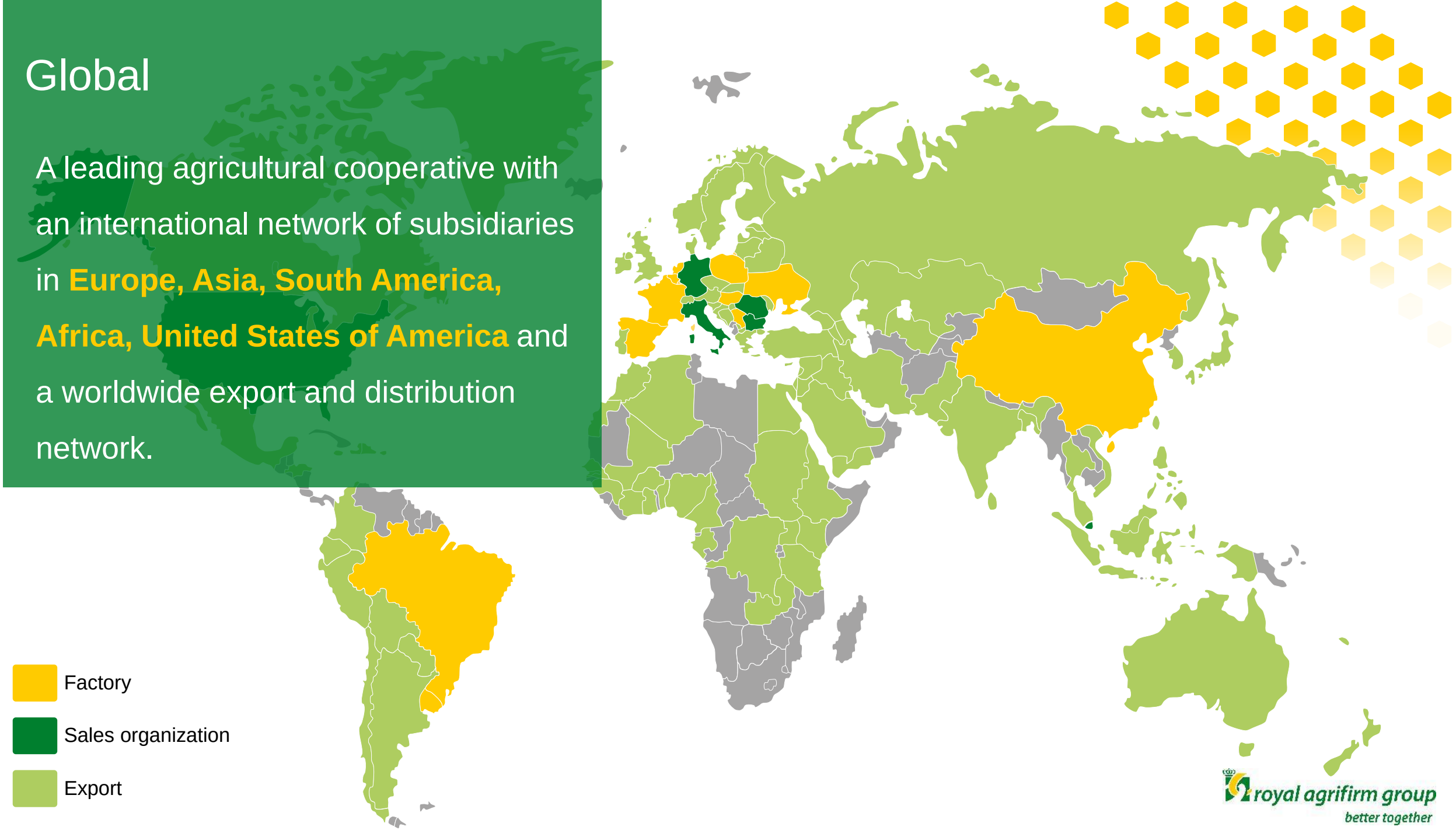
Global

A leading agricultural cooperative with an international network of subsidiaries in **Europe, Asia, South America, Africa, United States of America** and a worldwide export and distribution network.



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Facts and figures 2020

FINANCE

> € 39,8 million net income
> € 2,2 billion turnover
> € 492,1 million Group equity
> 57 % solvency

EMPLOYEES

c. 3.000 fte worldwide

INTERNATIONAL

Locaties in Europe, America, Asia and Africa
Global export and distribution

SOLUTIONS

Providing arable, nutritional and industrial soulutions in the agricultural sector worldwide

COOPERATIVE

Since 1892
Equity 100% farmer owned

MEMBERS

Collective ownership of over 10.000 Dutch farmers and growers

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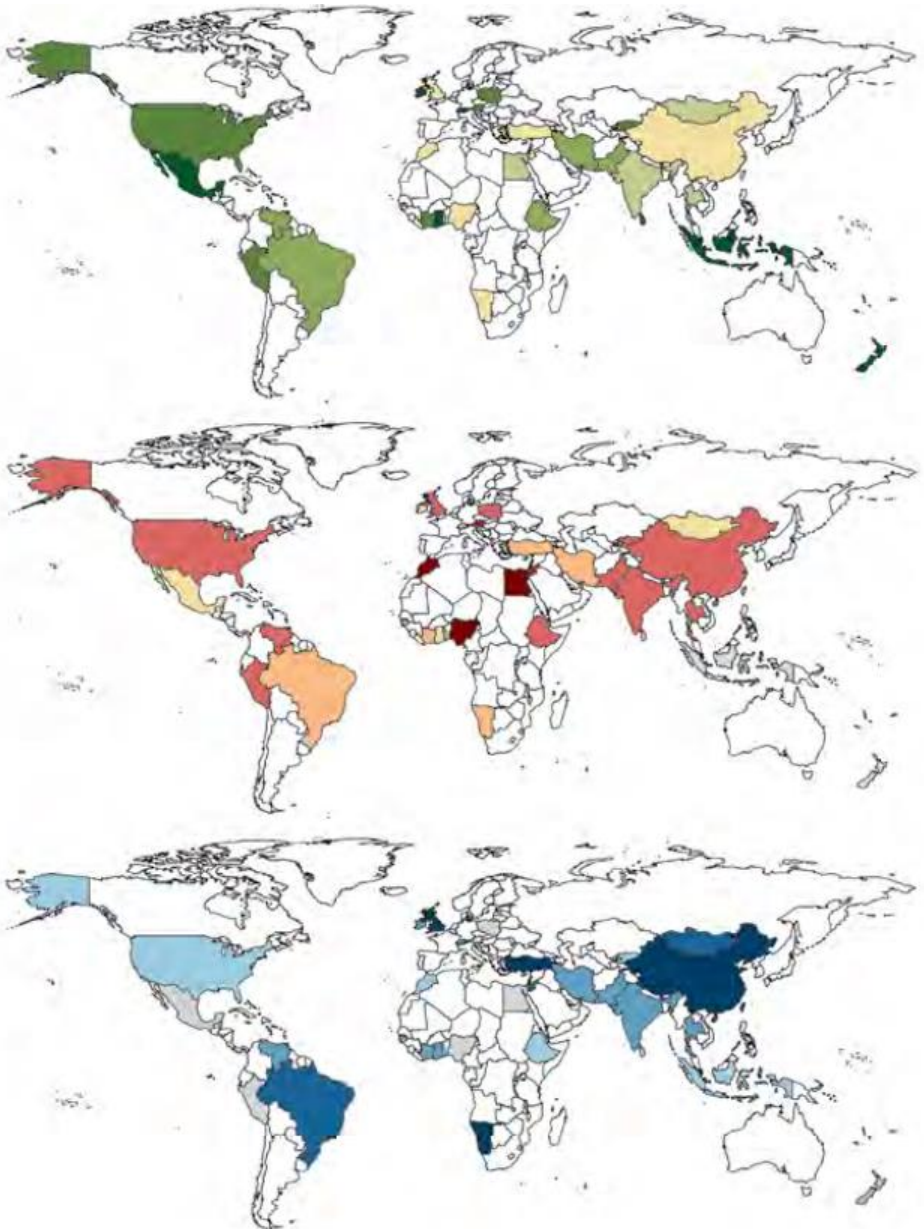
What do we feed animals?



ROUGHAGE

(%)

- <50
- 50-60
- 60-70
- 70-80
- >80

CONCENTRATE FEED

(%)

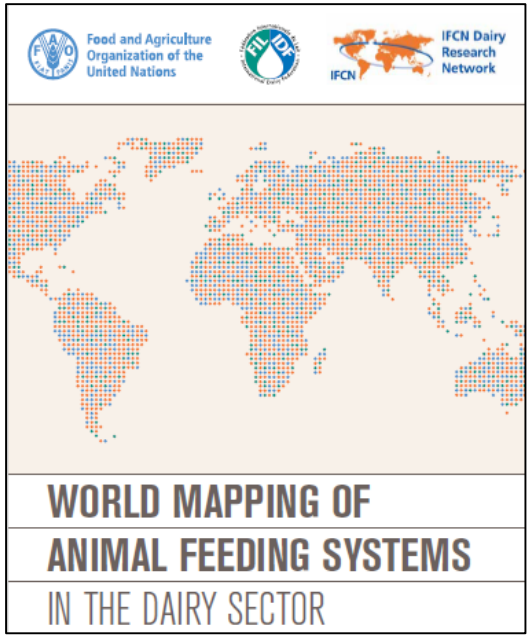
- 0
- 1-10
- 10-20
- 20-30
- 30-40
- >40

COMPOUND FEED

(%)

- 0
- 1-10
- 10-20
- 20-30
- >30

2.2.1. **CATTLE, LACTATING**



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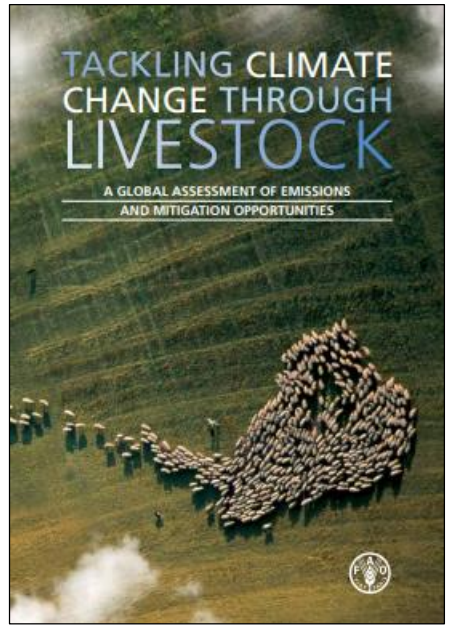
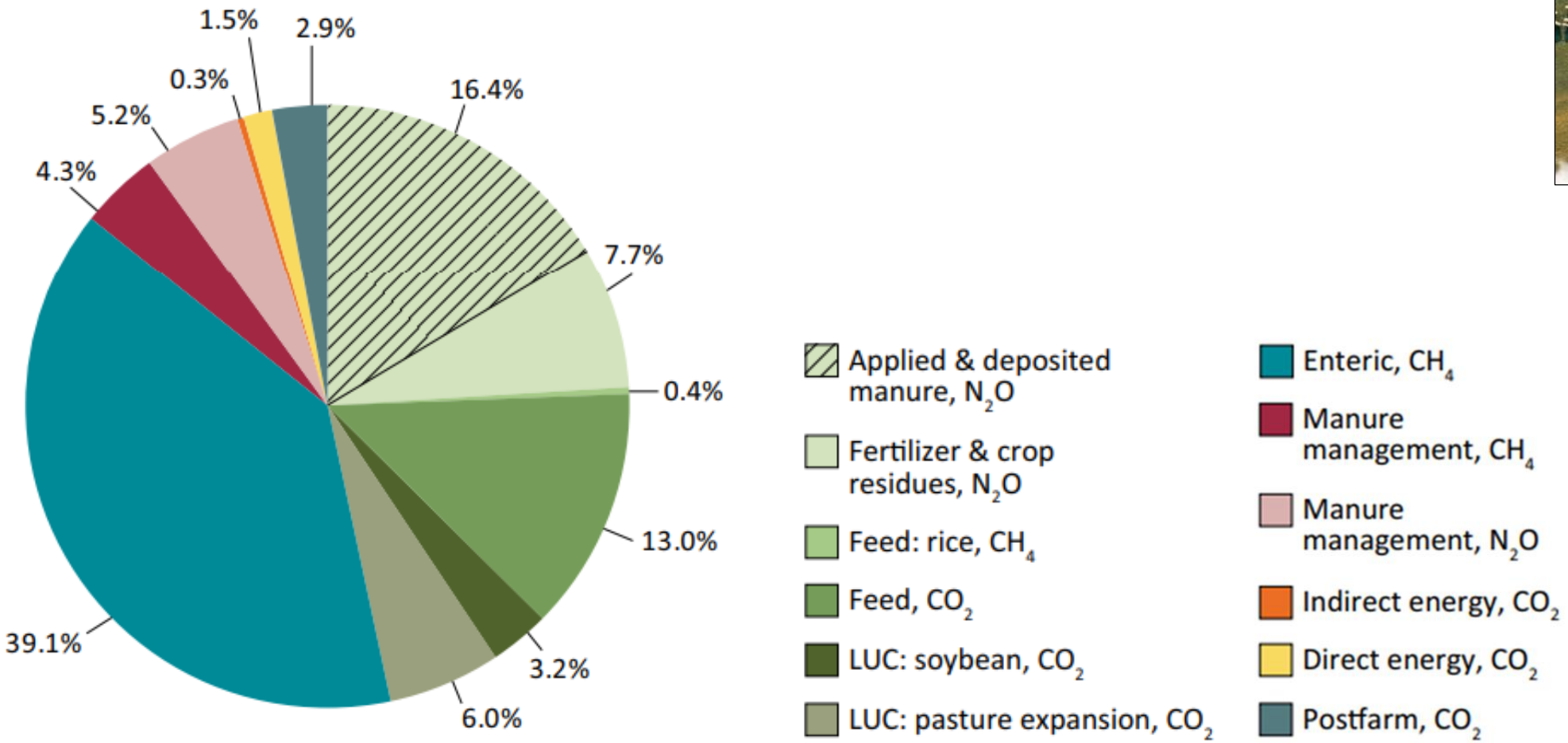
What is the footprint of the feed industry?



Global emissions from livestock supply chains by category of emissions



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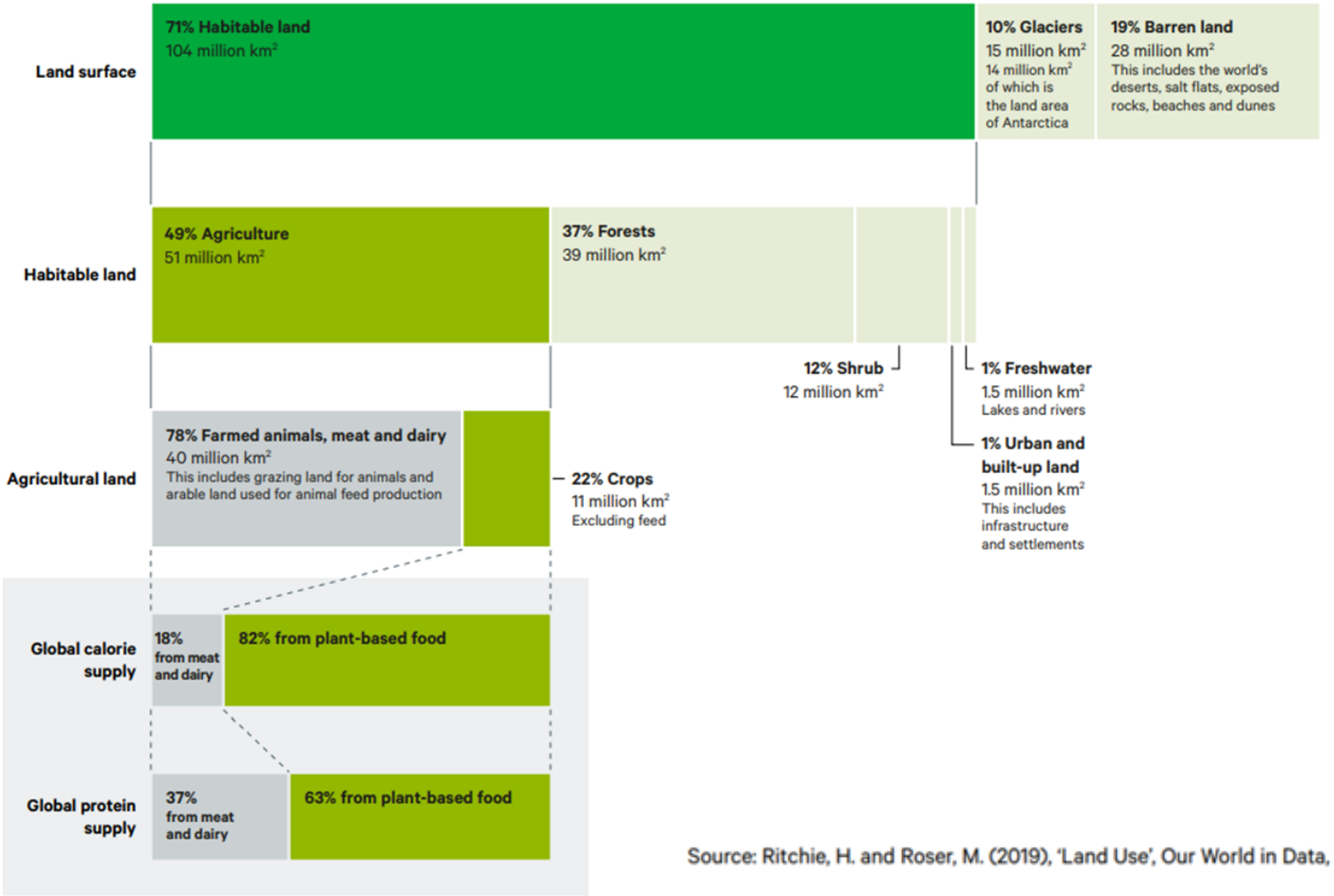
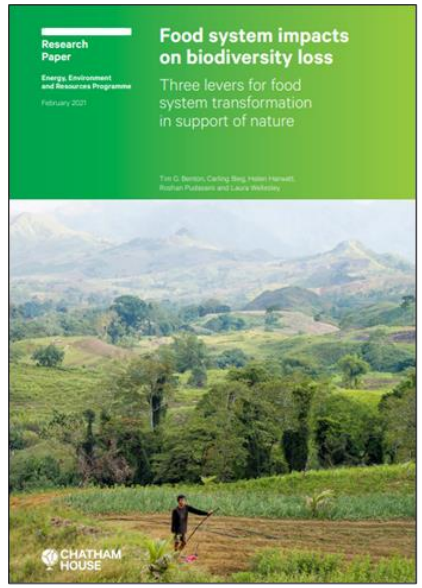
What is the footprint of the feed industry?

Biodiversity loss: Agriculture 'threatening 86% of at-risk species', says major UN-backed report

4 February 2021, source edie newsroom





Source: Ritchie, H. and Roser, M. (2019), 'Land Use', Our World in Data, September 2019

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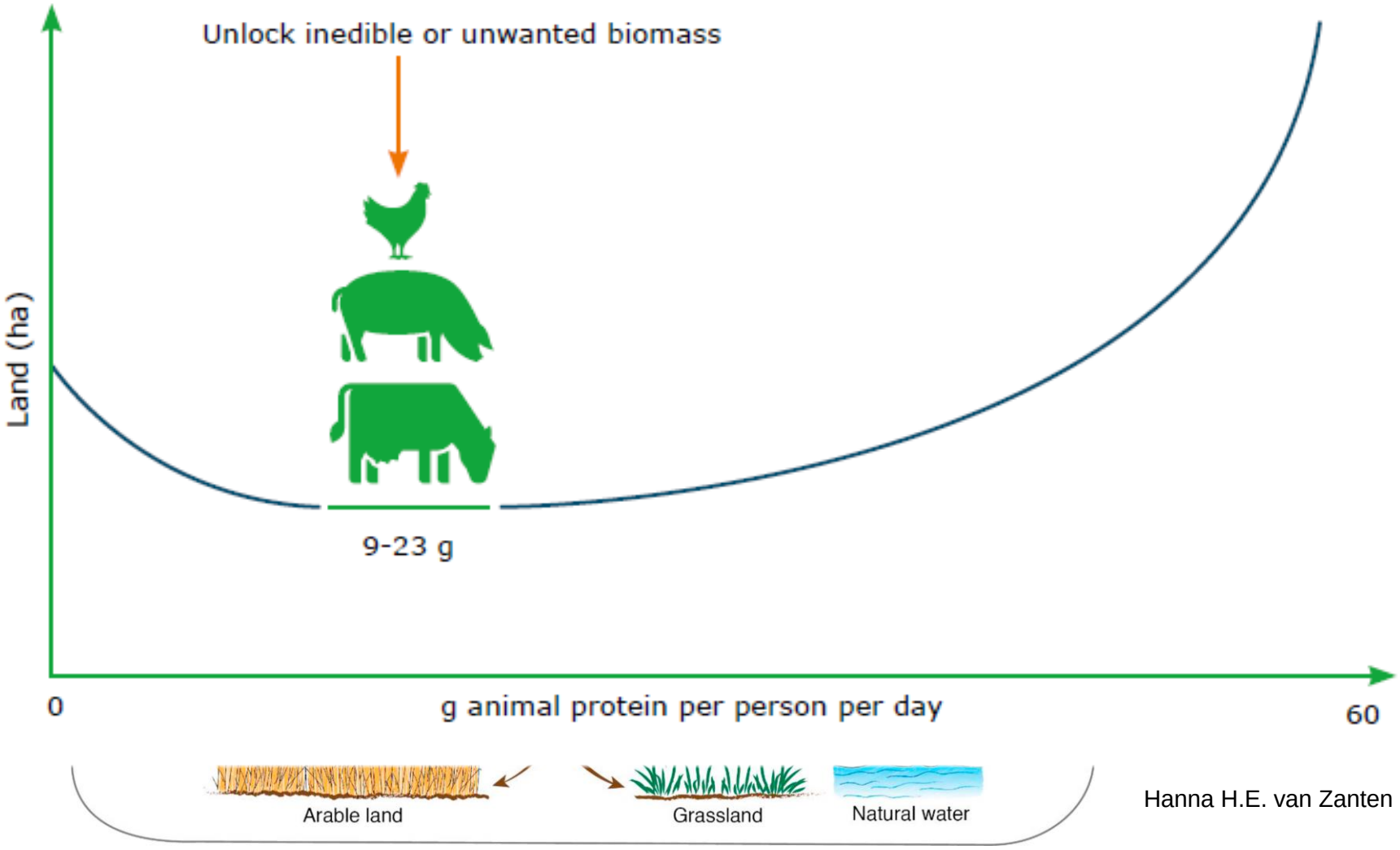

Hanna H.E. van Zanten

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Defined a model which will help to turn into the right direction: Key: “% fit for feed use”

- Nutritional requirements
- Food & Feed safety requirements
- Technological requirements
- Circulair requirements

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Transition of the feed industry towards raw materials, not in competition with human food

- Category 1: Primary raw materials
- Category 2: Co-products
- Category 3: Former foodstuffs
- Category 4: Additives, minerals, premixes

100% fit for feed use

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Transition of the feed industry towards raw materials, not in competition with human food

> Category 1: Primary raw materials

- **Primary raw materials category A:**

  Raw materials grown for feed quality, but could be produced for food quality (like feed quality wheat and corn – specific feed quality)

- **Primary raw materials category B:**

- **Primary raw materials category C:**

- **Primary raw materials category D:**

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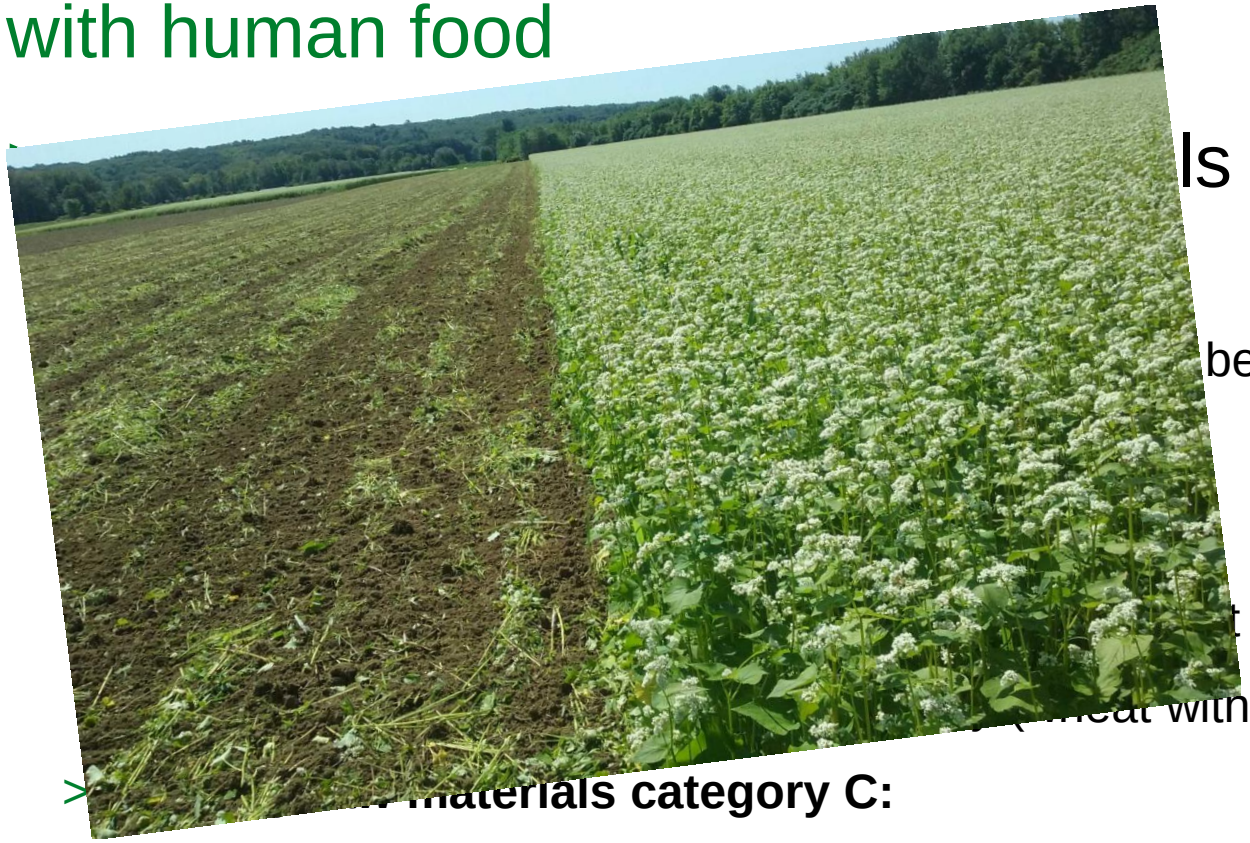
Transition of the feed industry towards raw m[illegible]terials, not in competition with human food



ls

be produc

t not suitable for human consumption due [illegible]ent of

[illegible] with high content of mycotoxins, soy with low protein content)

> **[illegible]materials category C:**

Raw materials grown for animal feed and due to product characteristics plays an important role in circular agriculture as a green manure or for the use of crop rotation (grasses, lupins)

> **Primary raw materials category D:**

Raw materials grown for animal feed that, due to crop characteristics, play an important role in the (future) circular agriculture (high-protein soy alternatives)

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Transition of the feed industry towards raw materials, not in competition with human food

> Category 1: Primary raw materials

- **Primary raw materials category A:**

  Raw materials grown for human food, but r an consumption (wheat and corn – specific feed quality)

- **Primary raw materials category B:**

  Raw materials grown for human consumpti n consumption due to high content of undesirable substances or low quality (whe toxins, soy with low protein content)

- **Primary raw materials category C:**

  Raw materials grown for animal feed and d s plays an important role in circular agriculture as a green manure or for the us

- **Primary raw materials category D:**

  Raw materials grown for animal feed that, lay an important role in the (future) circular agriculture (high-protein soy alterna

0% fit for feed use

20% fit for feed use

50% fit for feed use

80% fit for feed use

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European protein developments

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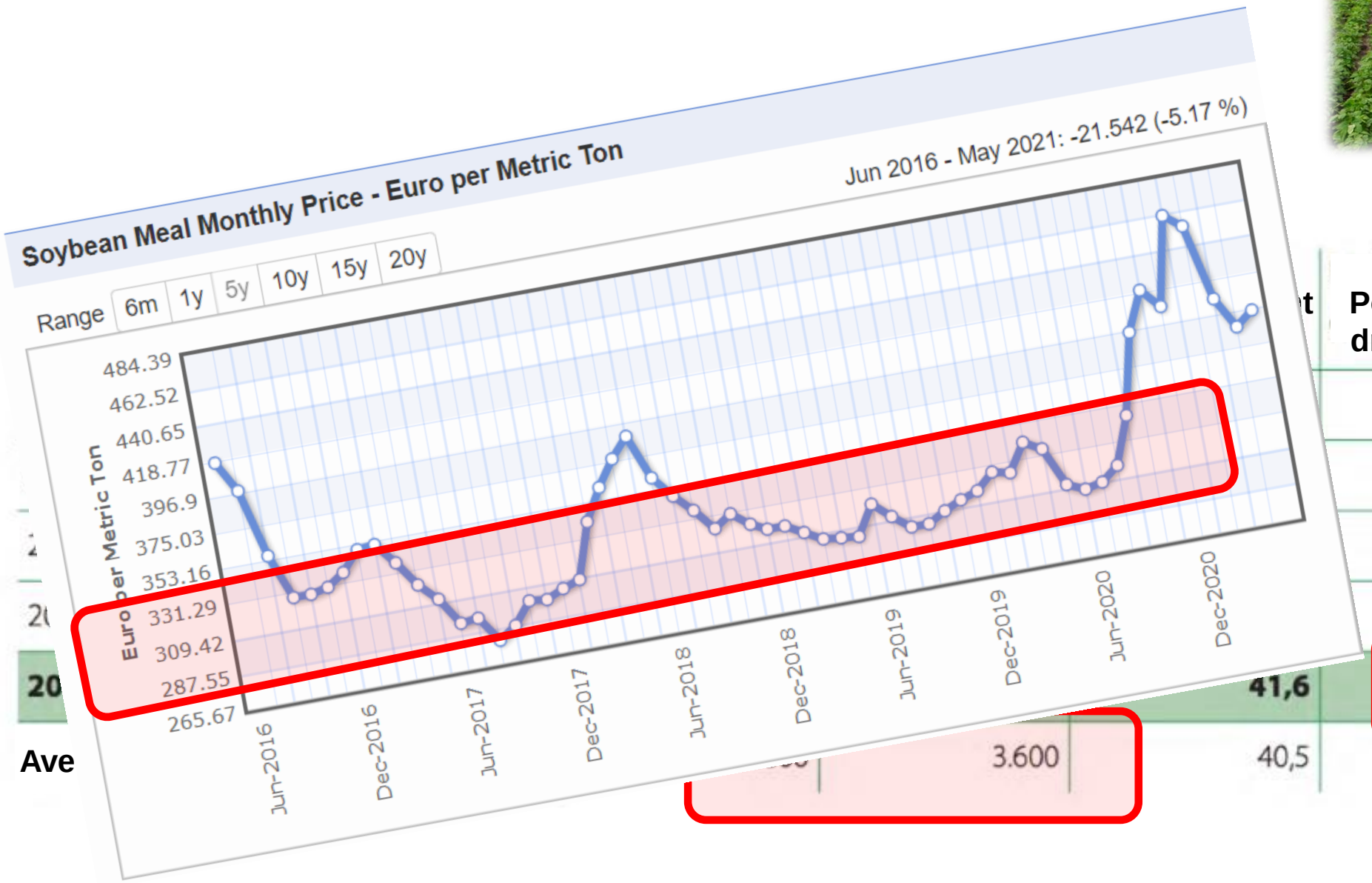
Production of soy in Europe – is that possible?



	Pool price dry beans
	600,00
	512,50
	502,50
	501,50
20	529,75
Ave	

	3.600	40,5
		41,6

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Why is > 500 Euro/ton so important? Because it needs to be competitive with alternative choices

	Soy		Summer wheat
Seed	259		124
Fertilization	147		257
Weed control	170		49
Control of diseases	87		163
Total production costs	€ 663		€ 593

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	Soy	Summ wheat
Total production costs	663,00	
Production (kg/ha)	2.900	
-/- cost of intake, including margin	-24,90	-12,40
netto per ton (€/ton)	489,60	151,20
netto per hectare	1420,00	1194,00
saldo EM	€ 757,00	€ 601,00

Only valid at premium of 200 euro/ton

Major challenges

- Development of a stable supply chain
- Value creation
  - By market development
  - By increased productivity

Transition of the feed industry towards raw materials, not in competition with human food

> Category 2: Co-products

main product **A**

co-product **B**

100%

- **Co-product category A:**

  co-product suitable for human consumption

- **Co-product category B:**

  co-product not suitable for human consumption, and economic allocation <25%

  (e.g. palm kernel expeller)

- **Co-product category C:**

  co-product not suitable for human consumption, and economic allocation between 25 and 50%

  (e.g. wheat bran)

- **Co-product category D:**

  co-product not suitable for human consumption, and economic allocation > 50%

  (e.g. soy bean meal)

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Transition of the feed industry towards raw materials, not in competition with human food

> Category 2: Co-products

- **Co-product category A:**

  co-product suitable for human consumption

- **Co-product category B:**

  co-product not suitable for human consumption, and economic allo

- **Co-product category C:**

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- **Co-product category D:**

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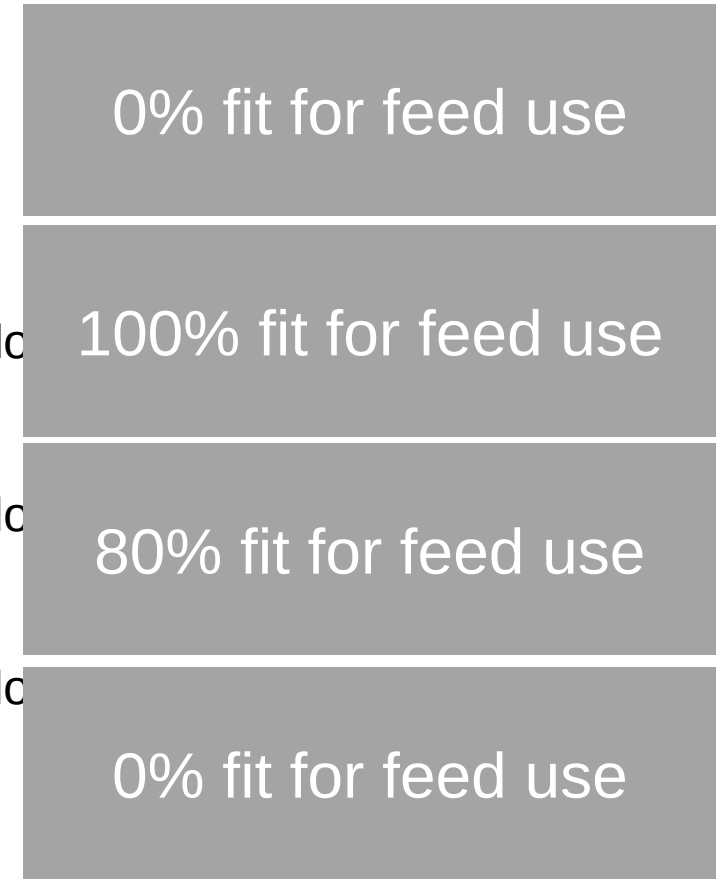

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Transition of the feed industry towards raw materi… with human food

> Category 3: Former Foodstufs

100% fit for fee…

Defined as: Products from food industry, not…

3.5 MILLION TONNES

of former foodstuffs are processed into animal feed annually in the countries where EFFPA holds active membership

5 MILLION TONNES

of former foodstuffs are estimated to be processed into animal feed in the entire EU

7 MILLION TONNES

EFFPA estimates the EU former foodstuff processing industry could expand up to this amount by 2025, taking future innovations and EU drive to reduce food waste into account.

100 FORMER FOODSTUFF PROCESSORS

varying from very small scale to medium-size companies are active in the EU, according to EFFPA estimations.

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Transition of the feed industry towards raw materials, not in competition with human food

- The easy accessible former foods stuff are already in use now
- 40 million tons (EU) to go!
  - What about catering waste?
  - What about products with beef meat (not allowed because of BSE)?
  - What about the cannibalism regulation?
  - What about high moisture containing food products & microbiological contamination?

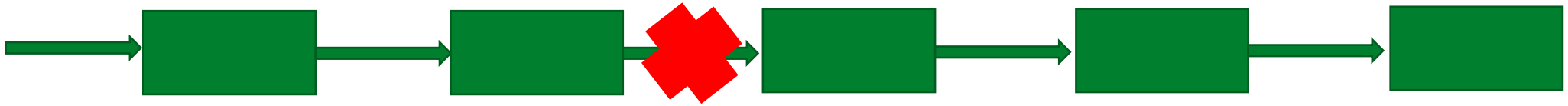
Former food stuff – it's all about the production chain

Food safety is based on:

> Hazard analysis

> Hazard control

HACCP



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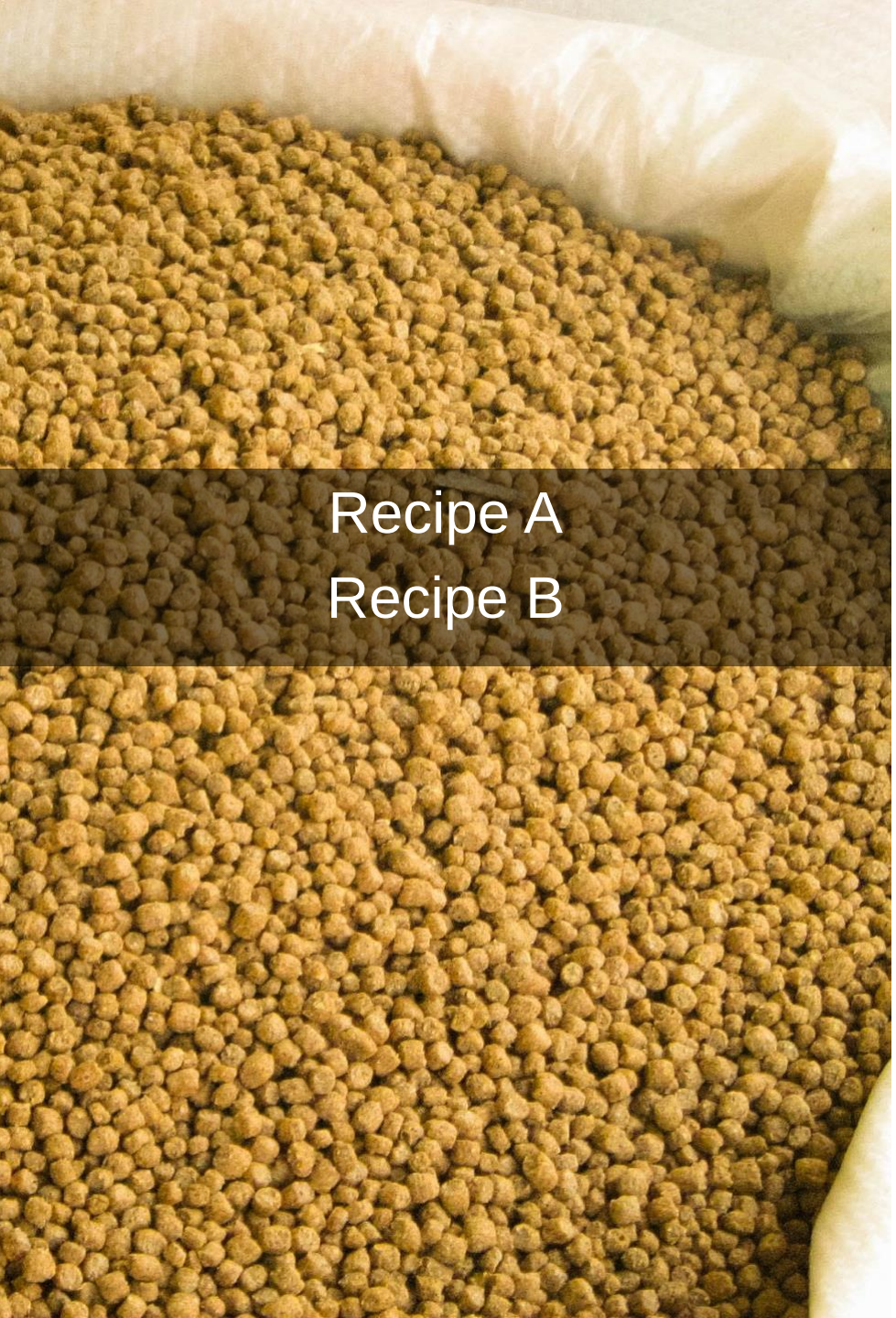
Major challenges and opportunities concerning former foodstuff

- Development of innovative closed supply chains
- Innovation of drying processes
- Innovations in risk reduction
  - Heat treatment
  - Detoxification treatments



In conclusion: major opportunities and challenges

- Standardisation content of feed not in competition with human consumption (definitions & guidelines for transition)
- Development of innovative closed supply chains
- Innovations in technology and risk reduction
  - Heat treatment
  - Detoxification treatments

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Our vision

A responsible food chain for future generations

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Thank you for your attention
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