



# Ruminants are Essential



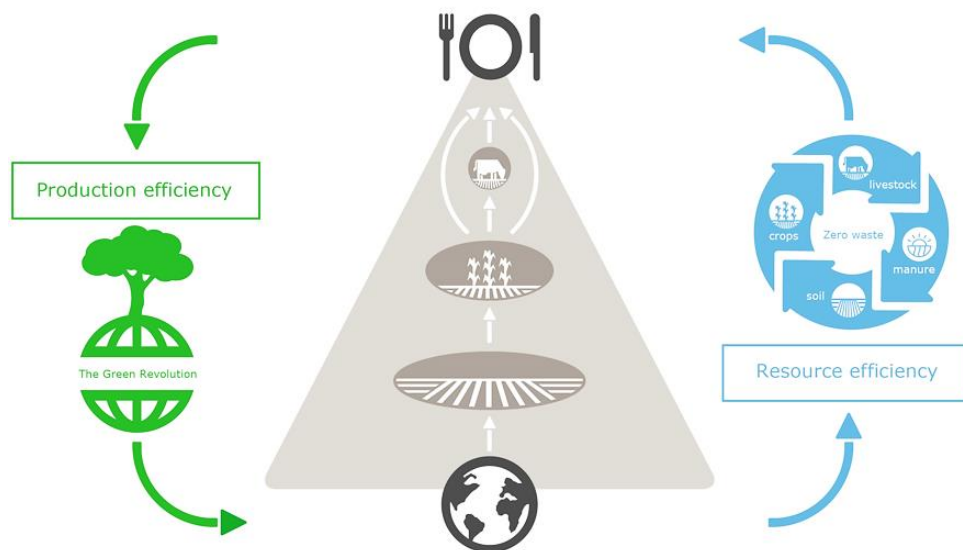
*by Martin Scholten  
&  
Jean-Louis Peyraud*



# Part 1: Ruminants for Resource Security

# Circularity: from Planet to Plates

## FOOD SECURITY



## RESOURCE SECURITY



Ministry of Agriculture, Nature and Food Quality of the Netherlands



**Agriculture, nature  
and food: valuable  
and connected**

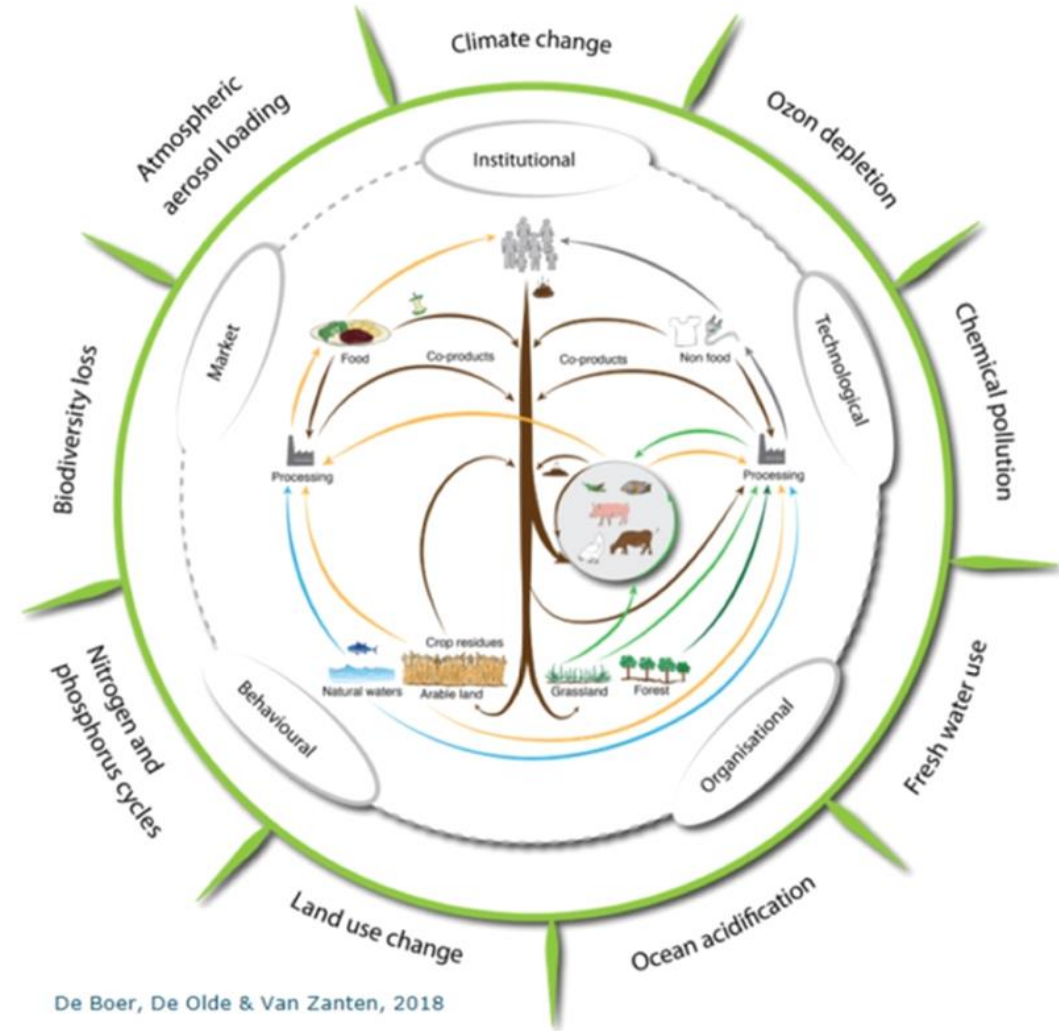
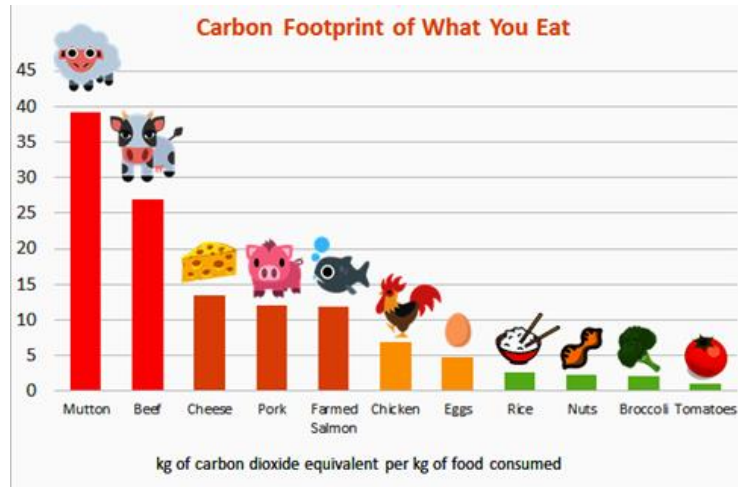
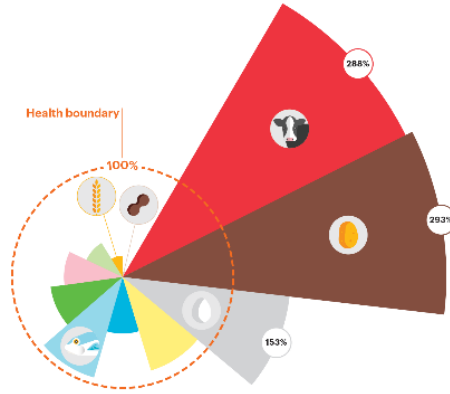
The Netherlands as a leader  
in circular agriculture



# Within the Planetary Boundaries?

## Current Diets vs Planetary Health Diet

### Global



De Boer, De Olde & Van Zanten, 2018



# The Principle: Zero Waste

- Optimized use natural & renewable resource
- No waste of produced biomass
- Valorisation of residual biomass as coproducts
- Interconnected integration within foodsystem



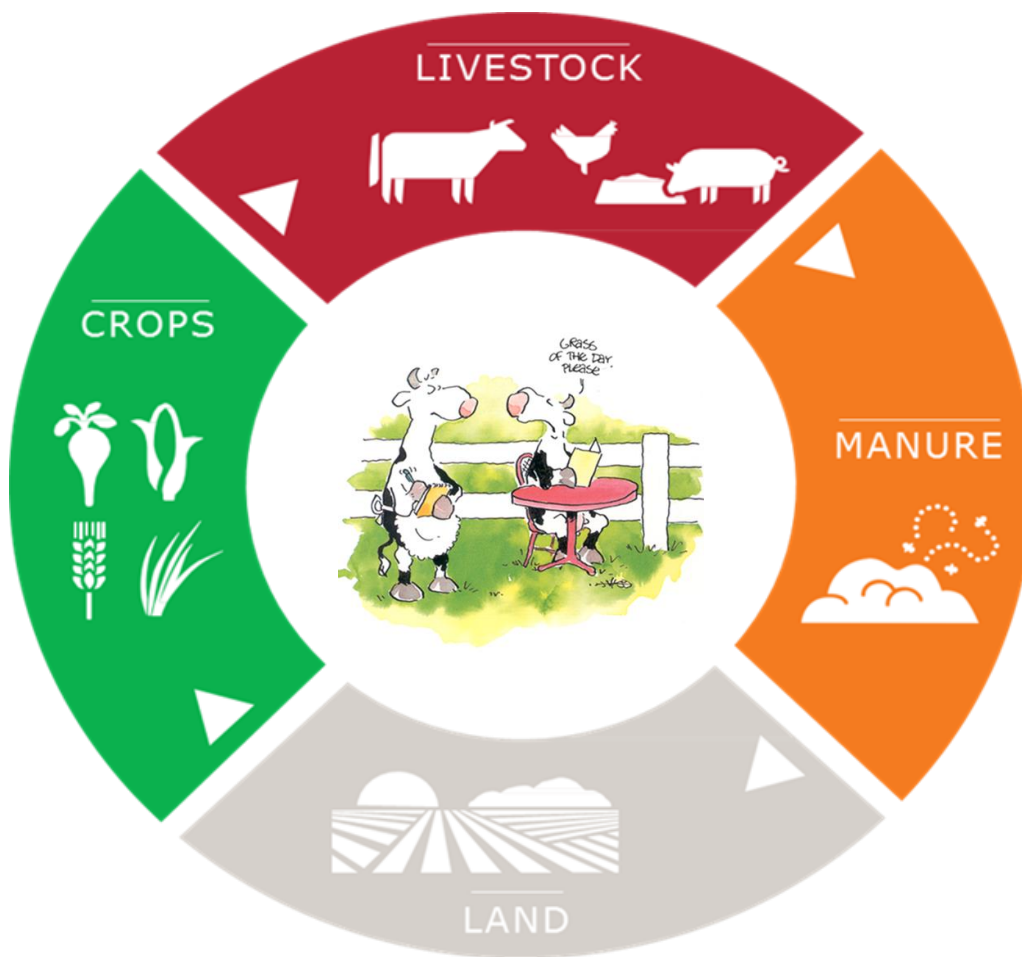
- Circular Fertilizers
- Circular Feed
- Circular Food



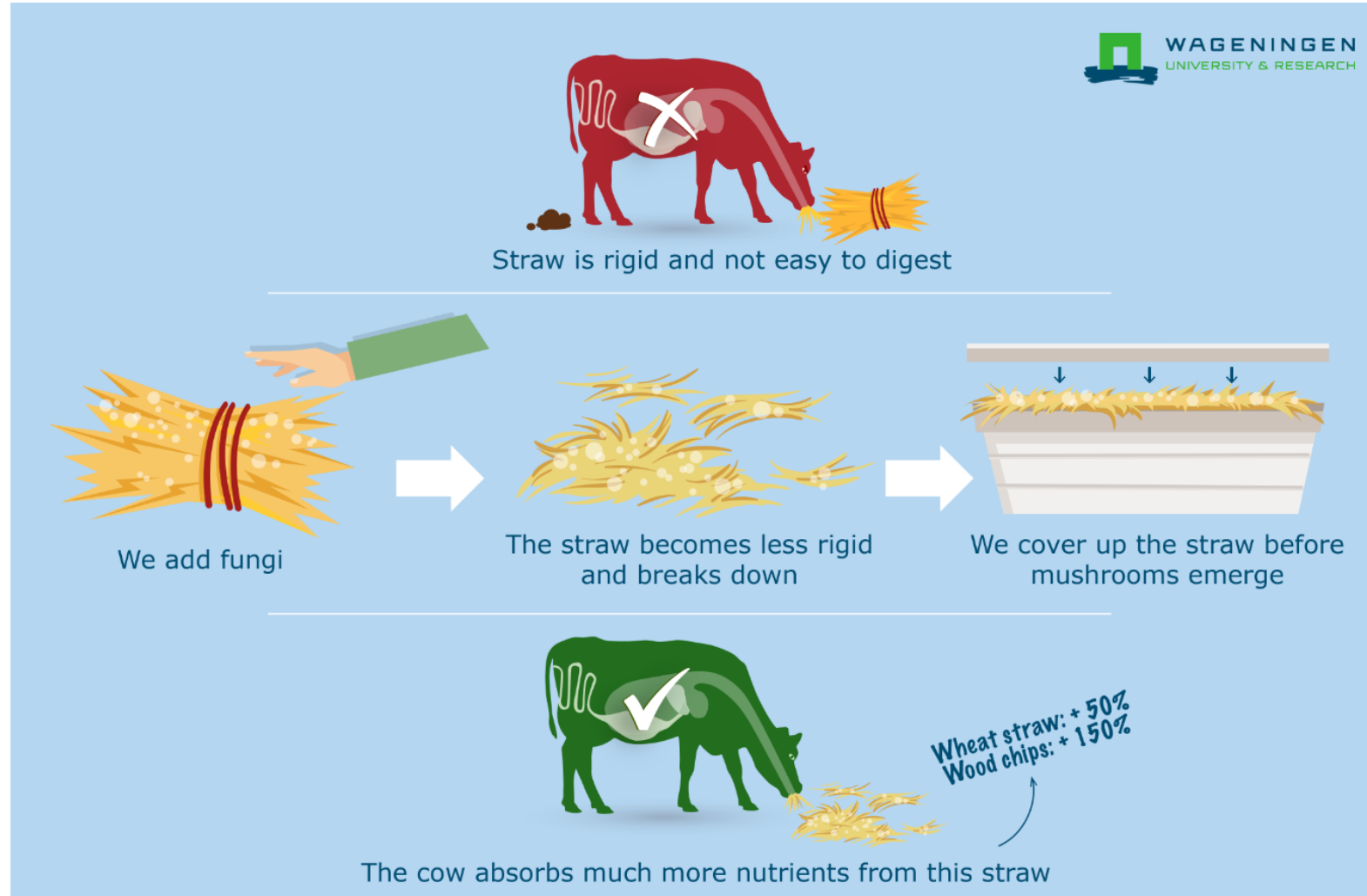
**UNBOUNDED SMART**



# The Champions: Ruminants

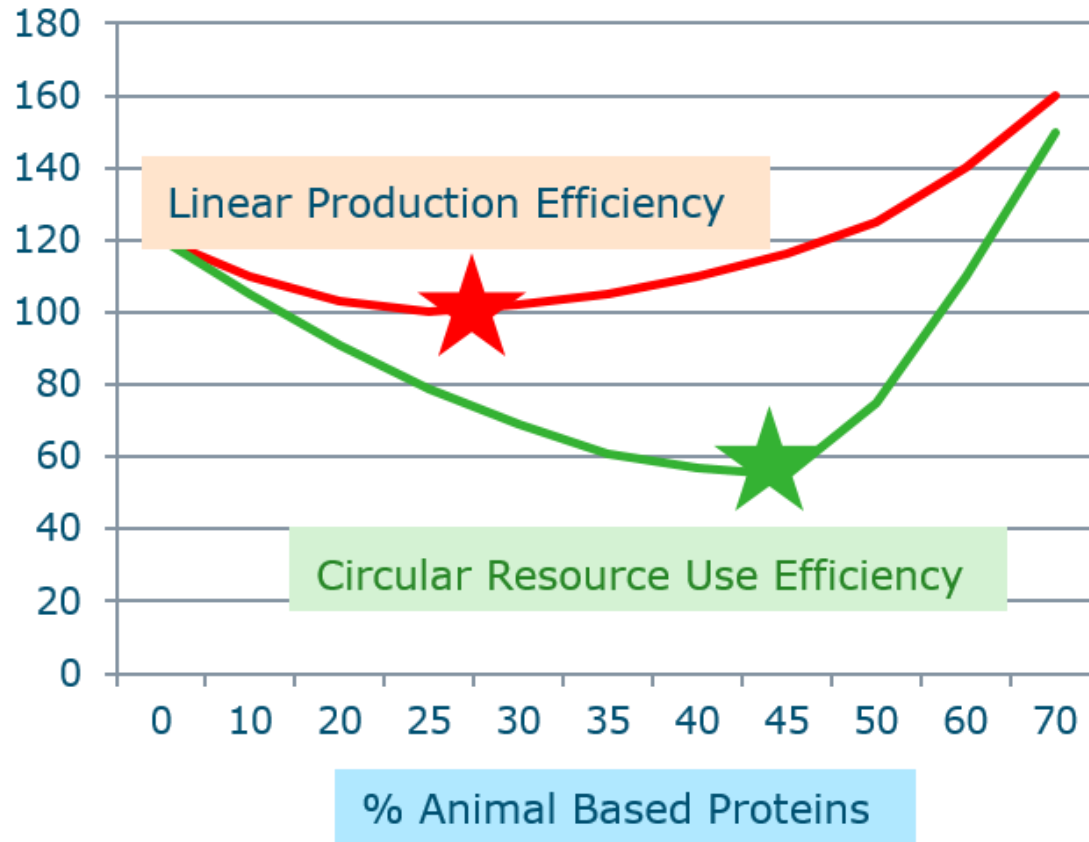


# The Story of the Ethiopian Cow



# No Circularity without Ruminants !

Production of Human Edible Proteins per Hectare of Land without Depletion of Productivity and Biodiversity



Avoiding meat and dairy is single biggest way to reduce your impact on Earth

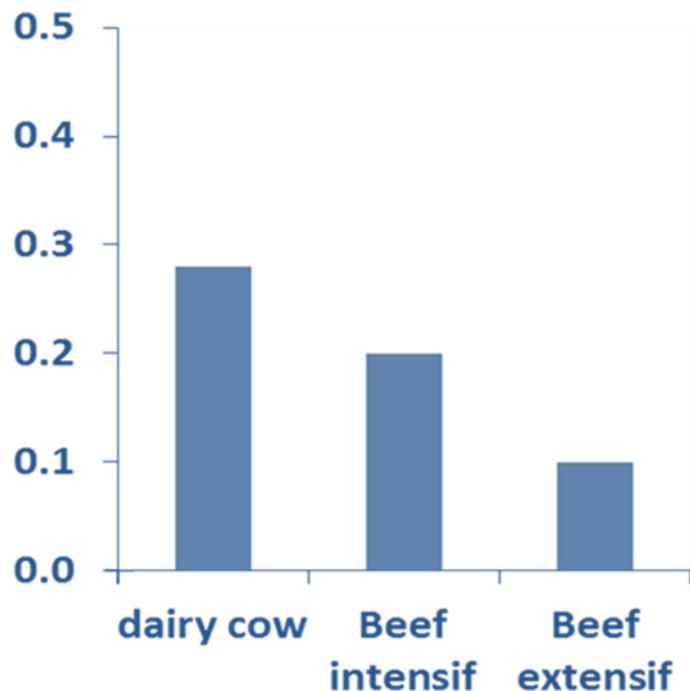




# Part 2: Ruminants between Food and Feed

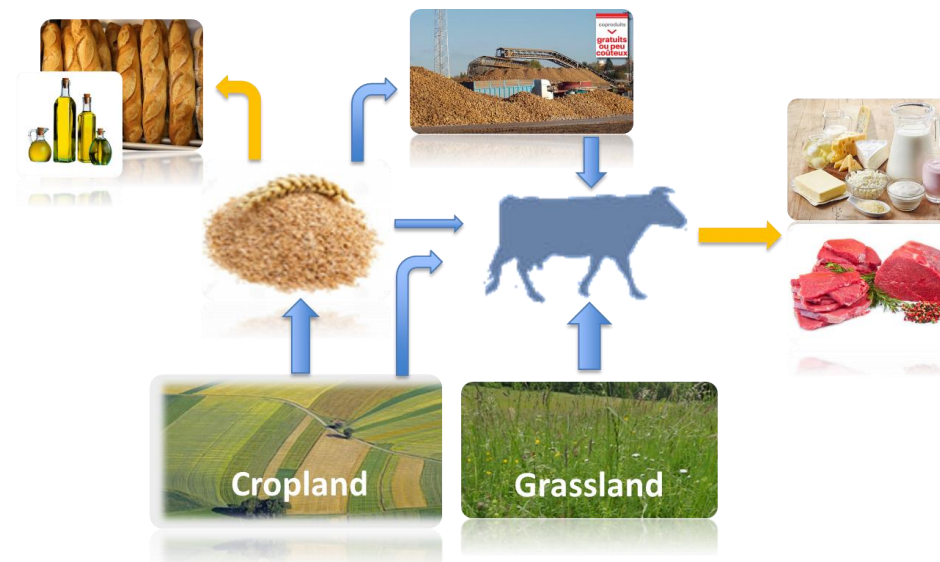
# Ruminants for Circular Feed

**Kg protein of animal origin / kg of plant protein**



*Peyraud et al (2014)*

- Ruminants are champions of recycling: more than 70% of animal feed are not edible as human food.

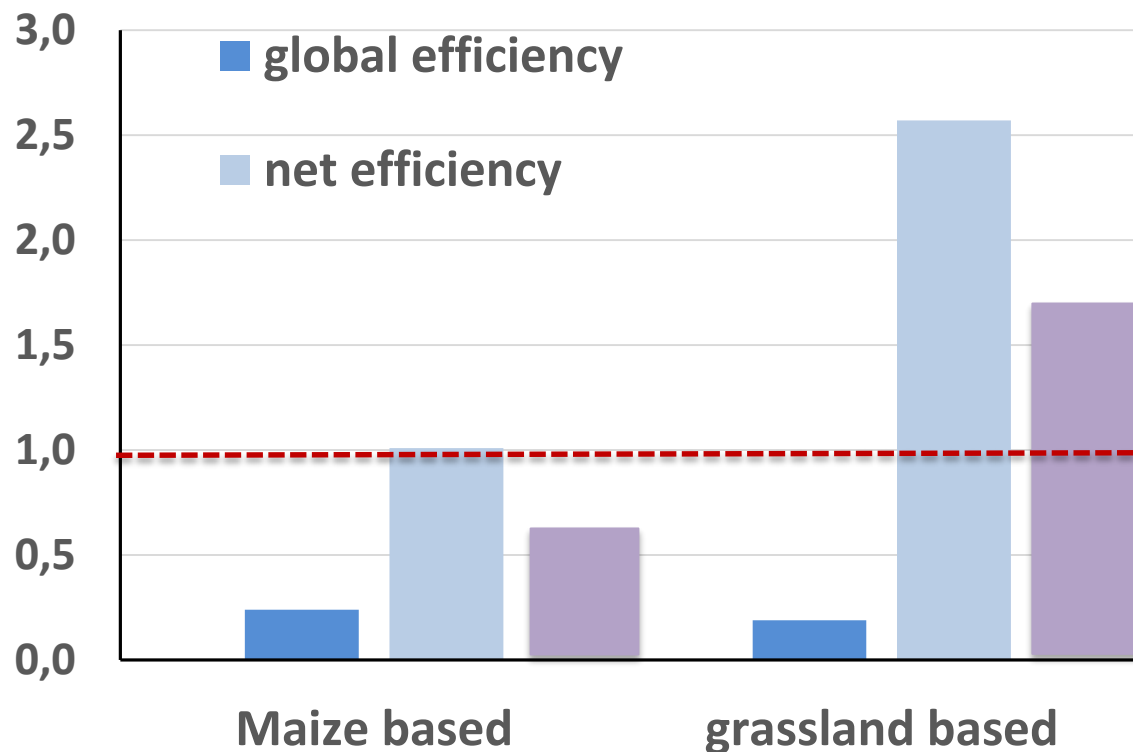


- Competition between feed for animal and food for human does in fact concern those proteins of plant origin that are consumable by human but are actually consumed by animals.

# Dairy systems foster Food Security

**Kg of animal protein (milk + meat)/kg of edible plant protein**

Kcal of animal product / kcal of edible plant energy



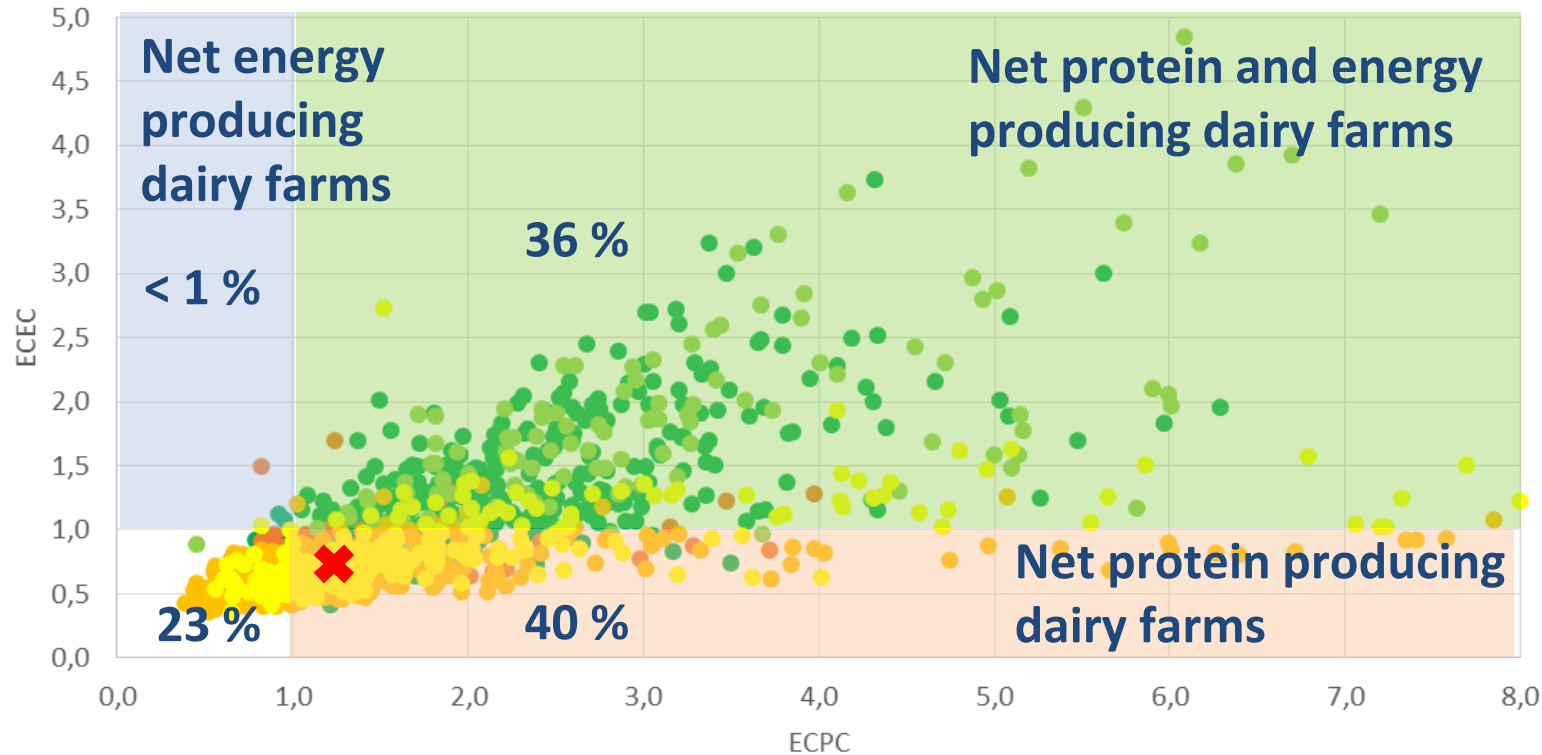
*Far from being in competition with human nutrition, dairy systems contribute to food security*

<b>Human edible fraction</b>	<b>26</b>	<b>10</b>
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Adapted from Laisse et al (2016, 2017, 2018)

# Comparison of Dairy Systems

## Net energy production



- Grassland based – mountain area
- Grassland based – plain area
- Maize based – mountain area
- Maize based – plain area
- Mixed – plain area



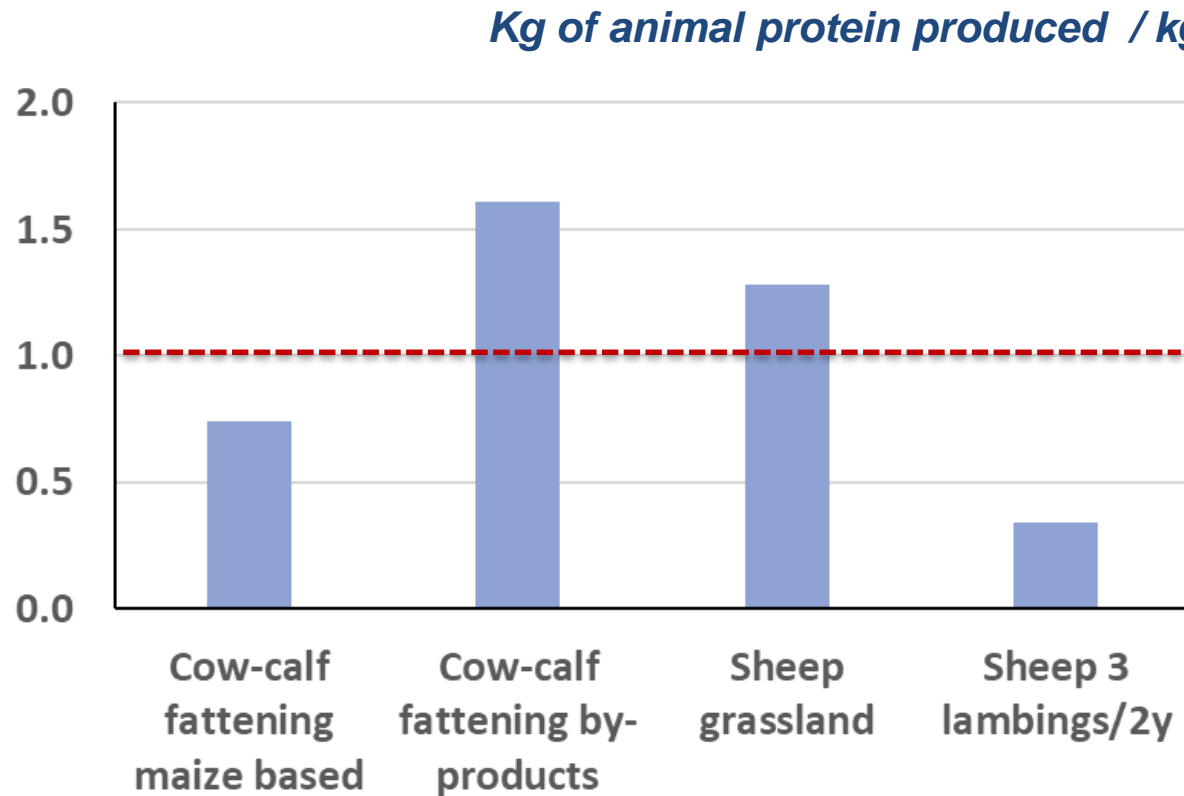
Rouillé et Biene (2018), unpublished

## Net protein production



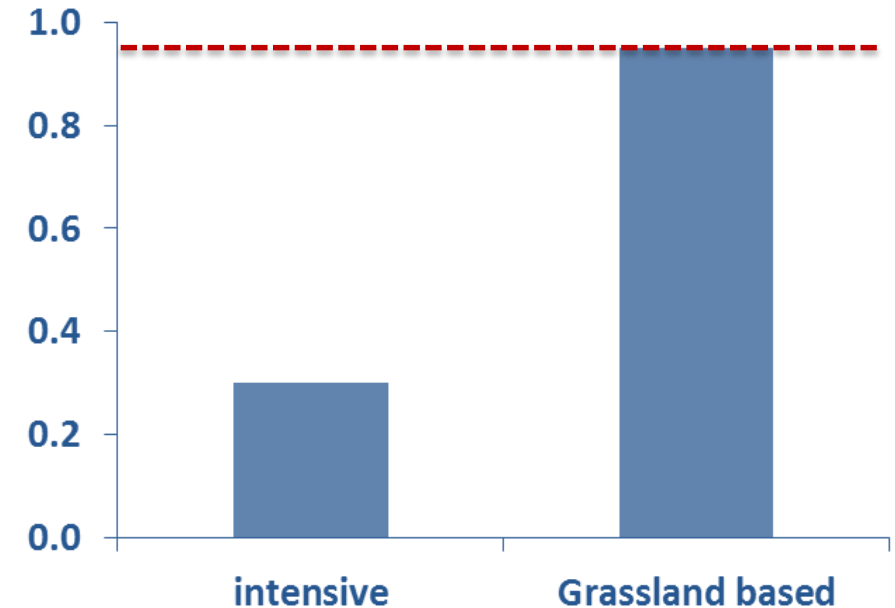
# Contribution of various Beef and Sheep Systems to Protein Security

- French Beef and Sheep Systems



*Adapted from Laisse et al (2016, 2017, 2018)*

- English Beef Systems



*Adapted from Wilkinson (2011)*

# Food from marginal Land? Ruminants can do!!!

- Ruminants contribute to food security by grazing marginal land that are not able to produce plant products
- In Europe, permanent Grasslands and rangelands cover 73 M ha (40% Eu AA)
- At world level, 3.35 billion ha are grazed by 360 million cattle and 600 million small ruminants and provide 25% of world animal product

*Sere and Steinfeld, 1996*



# **Part 3: Real Carbon Footprint of Ruminants**





# Climate Smart Cattle

## 50% reduction

- Genotyping low methane production for selection
- Improving feed quality and digestibility, rumen microbes
- Improving animal health and husbandry conditions
- Manure management: collection, storage and utilisation
- Improving C sequestration soils
- Precision Livestock Farming



- More efficient use of Crops
- No specific Feed production
- Better Agricultural Land use
- Low emission Husbandry
- Smart use of Manure
- Biobased Organic Fertilizing
- More Carbon Sequestration



  
 climatesmart  
 40% extra!!

# Part 4: Additional services by Ruminants

# Ruminants produce healthy, tasty and appreciated Food

## TMR



6- 10

## Grass feed



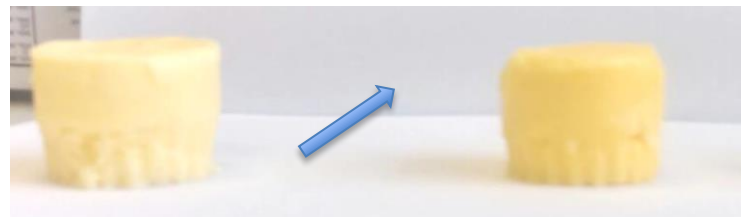
1 - 3

$\omega 6 / \omega 3$

Vit A, B6, B9

Color and taste intensity

Public perception



Similar trends with meat



### Free-range milk

Waitrose: 120 d/year  
Morrisons: 120 d/year; 6h/day  
Asda: 180 d/year



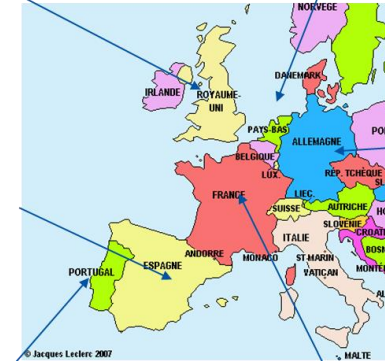
### Leche de pastoreo

Larsa: 120 d/year; 6h/d



### Leite de pastagem

Terra Nostra (Bel) : 365 d/year



### Friesland Campina

A range of products : 120 d/year 6h/d



### Weidemilch

Arla Foods: 120 d/year 6h/d ; non-GMO  
Pro Weideland: 120 d/year ; 6h/d ; non-GMO  
Schwarzwaldmilch : 150 d/year; 8h/d



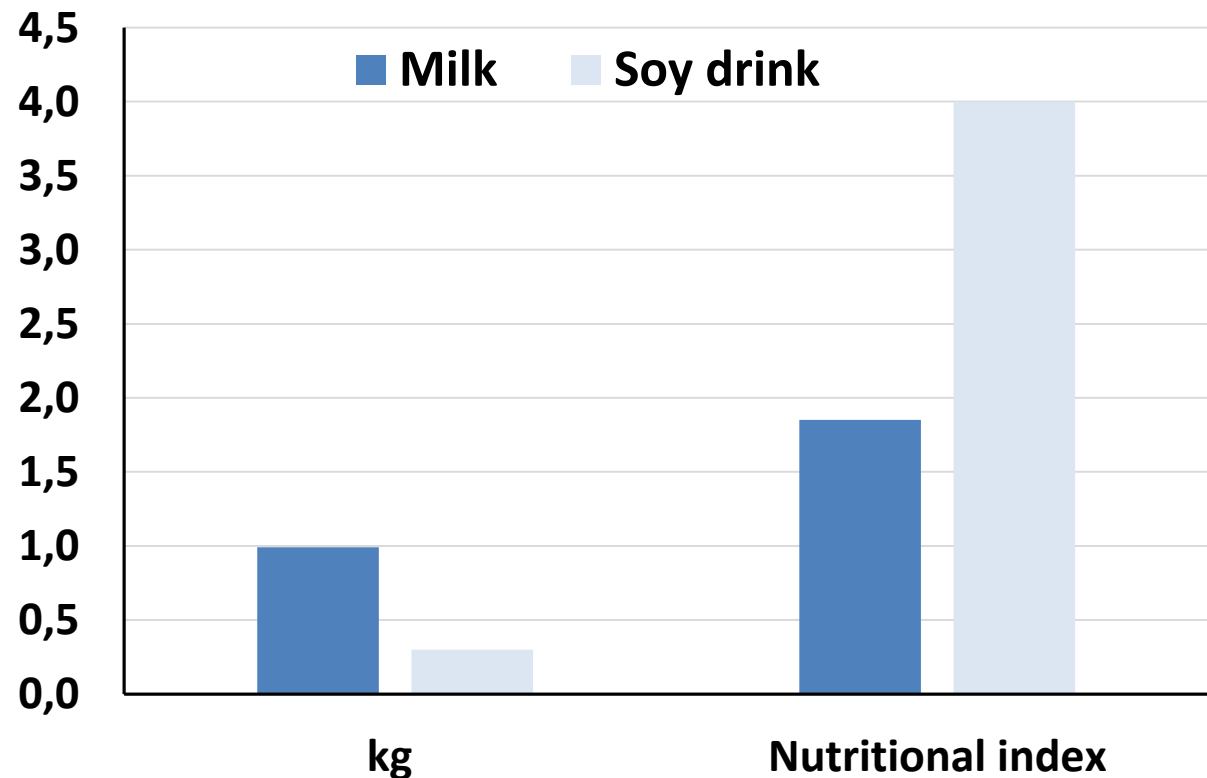
### Lait de pâturage

Prospérité fermière: 170 d/year ; non-GMO  
Lactalis: 200 d/year ; non-GMO  
Bel: 180 d/year ; non-GMO  
Bretagne: 150 d/year...



# Ruminants provide Nutrition

Kg eq CO<sub>2</sub> / unit



**% NNR in 100 g of product x Number of nutrients > 5% of NNR / 21**  
**NNR = Nordic Nutrition Recommendation**

## Animal based products

- AA balance
- PUFA
- Minerals (Ca...)
- Vitamins
- Anti oxydants
- Cholin



*Adapted from Smedman et al. (2010)*



# Ruminants produce Biodiversity

- Diversity of forage species (including honey plants) and grassland types

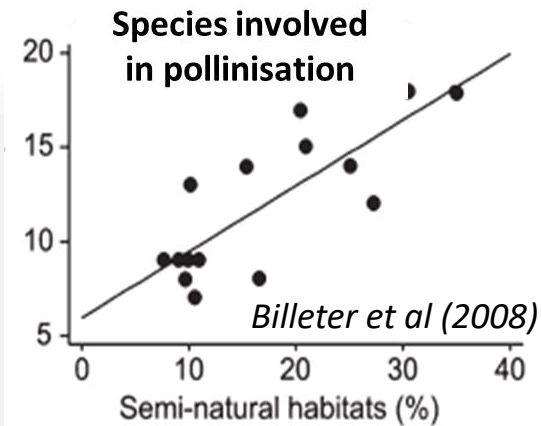
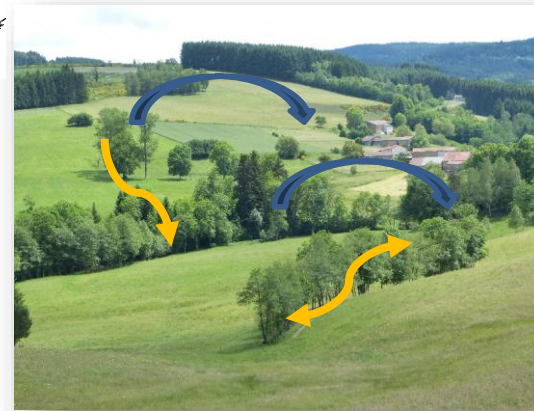


“About 50% of the endemic plant species of Europe are dependent on the grassland biotope”  
(Eckhard et al., 2009)  
(Grasslands = 40% European AA)

- Diversification of soil uses in landscapes and maintenance of open habitats (with grasslands)



Bocage (hedges, groves, selvedges, ...)



Open fields



1 LU maintains 90 m of hedge



# Ruminants foster Soil Quality



**Manure  
Grassland**



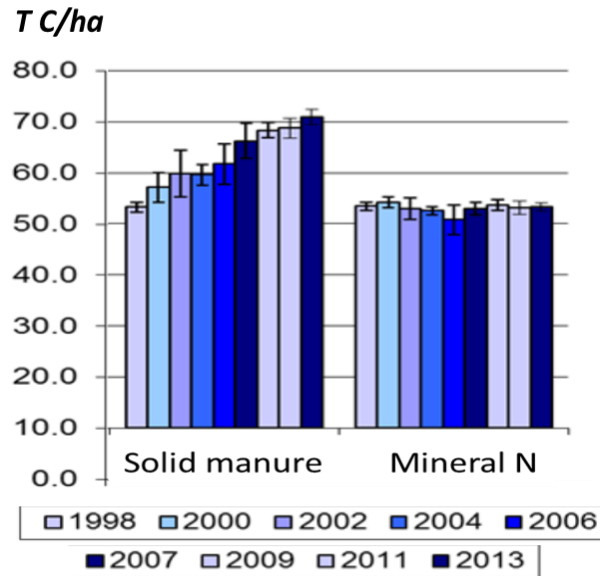
**Chemical fertility**



**More biomass  
High soil OM  
Less erosion**

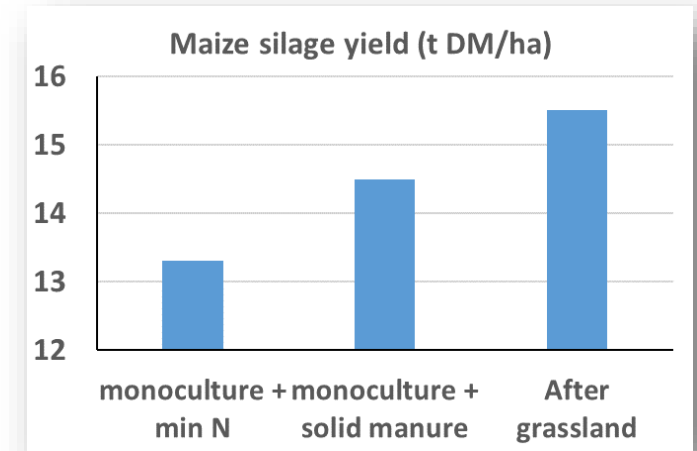
**Structural stability**

**Biological fertility**



<b>OM (t/ha)</b>	<b>40</b>	<b>80</b>
<b>Erosion (t OM/ha/y)</b>	<b>3.6</b>	<b>0.3</b>

<b>Invertebrates (t/ha)</b>	<b>0.5</b>	<b>3.5</b>
<b>Microbes (µg/g soil)</b>	<b>8.0</b>	<b>11.6</b>



*Crécom trial (1984-2006)*

*Gobat et al, 2003 (Le sol vivant) and GIS Soil (2012)*

# Ruminants boost Food Security

In developing economies, ruminants:

- contribute to intensifying agriculture by providing fertilizers
- provide workload in small family farms



# Take home Messages

- Think twice: do not step into a simple protein transition
- Nutritious Resource Security by Circularity need Livestock
- Ruminants are Champions in Circularity
- The “shadow of cattle” can be mitigated  
..... and counterbalanced!
- Grass and other marginal crops is the basics...  
..... the residuals from the food system is the bonus
- Planetary boundary management **REQUIRES:**  
**unbiased metrics and realistic models**





# SAVE THE DATES

## ATF events in 2019

- **ATF-EAAP Special Session**  
Aug. 26<sup>th</sup>, 2019  
Ghent, Belgium
- **ATF 9<sup>th</sup> Seminar**  
Nov. 6<sup>th</sup>, 2019  
Brussels, Belgium
- **ATF & CDB Stakeholder event**  
Nov. 6<sup>th</sup>, 2019 afternoon  
Brussels, Belgium



Towards climate smart  
European livestock farming

# Thank you!



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