

Global perspectives for climate smart cattle farming and breeding

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WAGENINGEN UR

For quality of life

What I want to tell you

- The world need more cattle
- Cattle with a short shadow
- Cattle because of their rumen
- Feed and treat the genes
- Adapt to the societal challenges
- Not by breeding alone
- In a broad and global cooperation

Acknowledgements



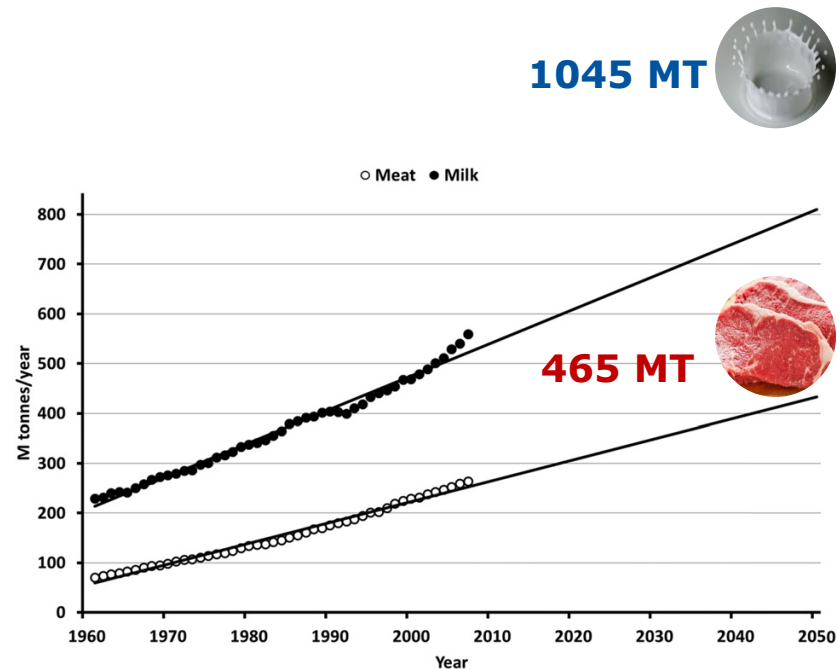
Global Nutrition Security

Healthy food and nutrition
for 9 billion people in 2050
within the capacity of our planet

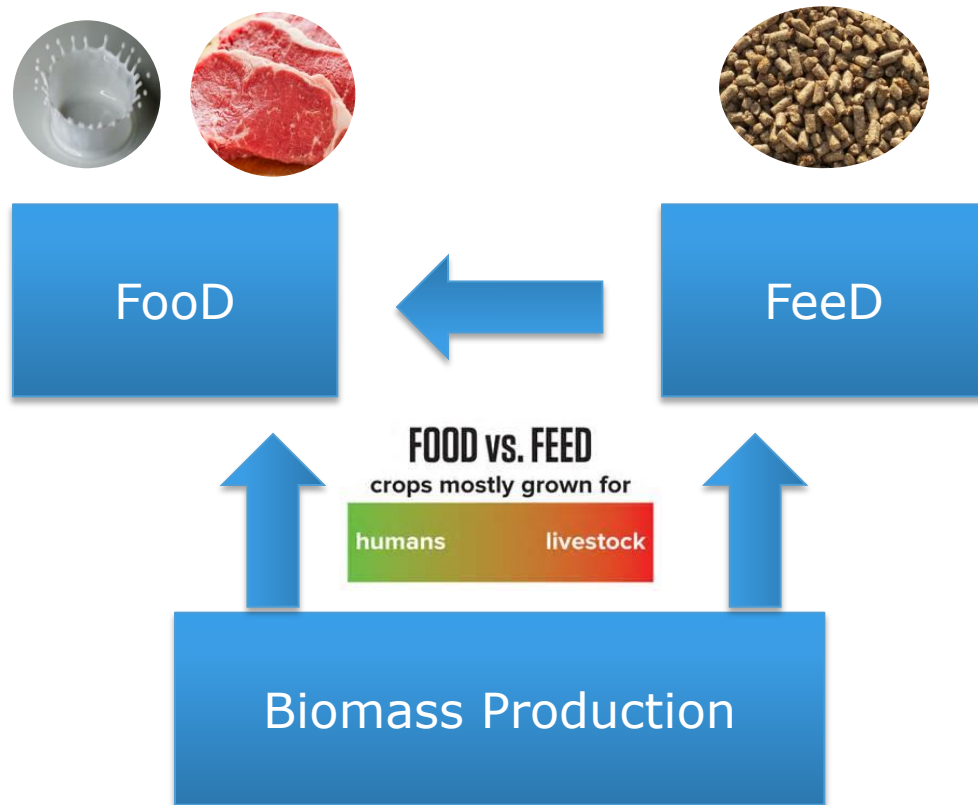


Why the world need cattle

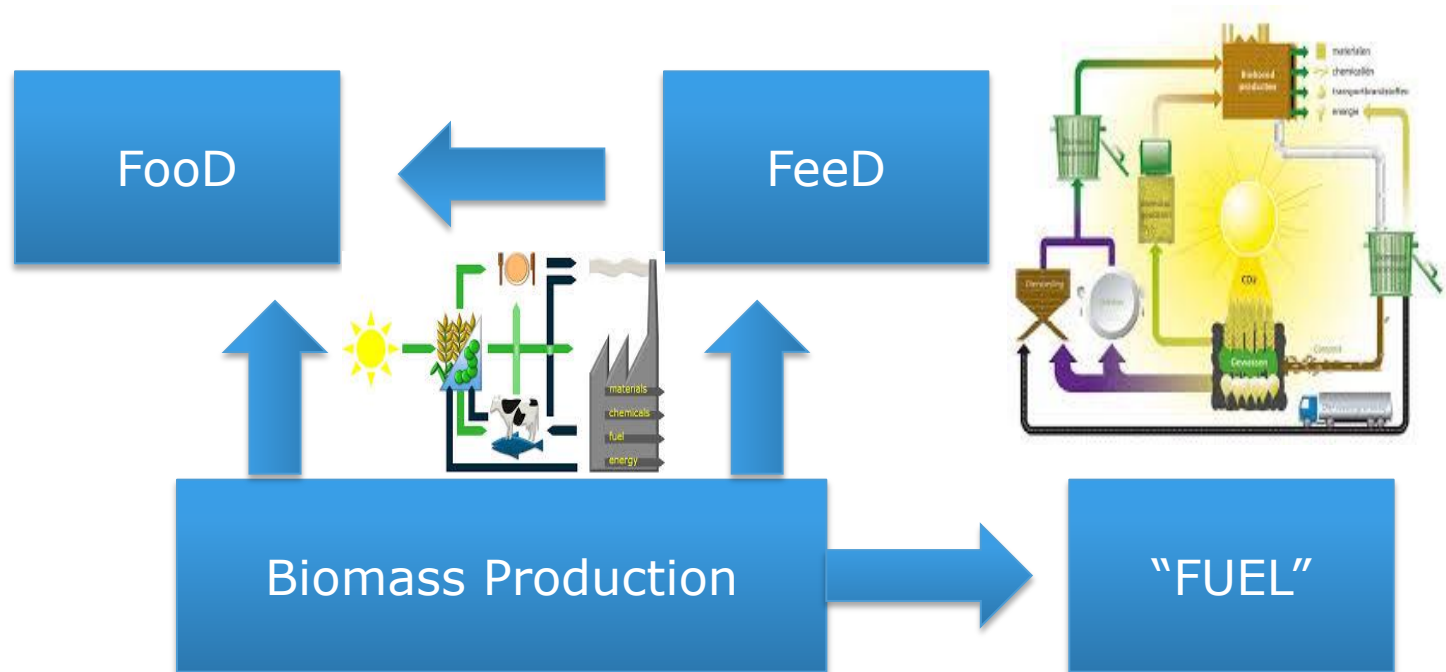
- Animal proteins are needed for Nutritional Food Security
- Ruminants covert raw biomass (feed) into nutritious meat and milk
- More people can afford to consume cattle proteins



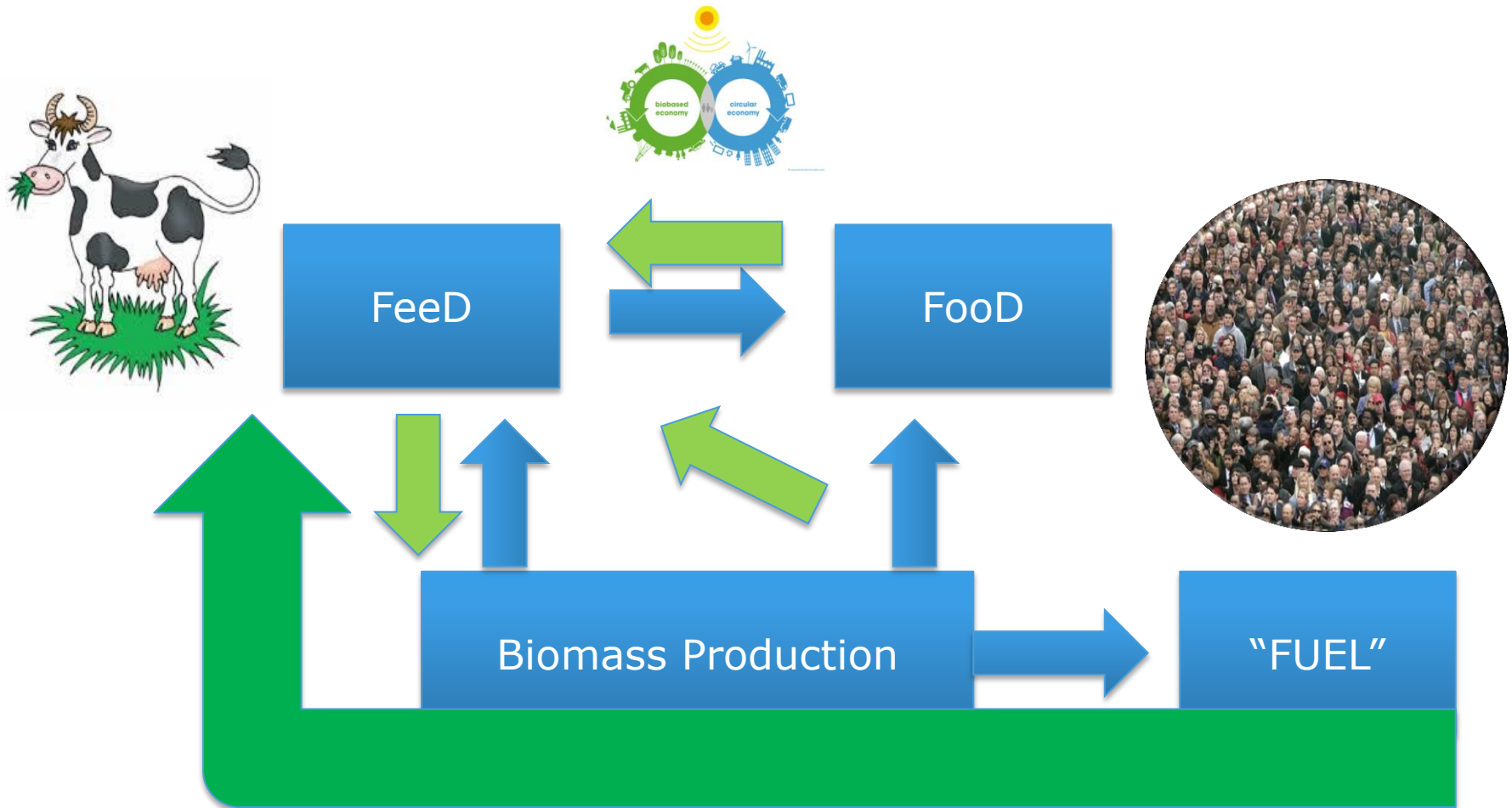
1. An Agrofood Economy: Production of "Proteins"



2. A Biobased Economy: Production of “Fuels”



3. A Circular Biomass-based Economy: the "Nexus"



Why cattle are gold



- Coverts biomass in nutritious and appreciated food
- Contributes to optimal use of produced biomass in a circular economy
- Serves the (agro)ecosystem functions
- Adaptive to global diversity



Johan Cruyff's famous wise words

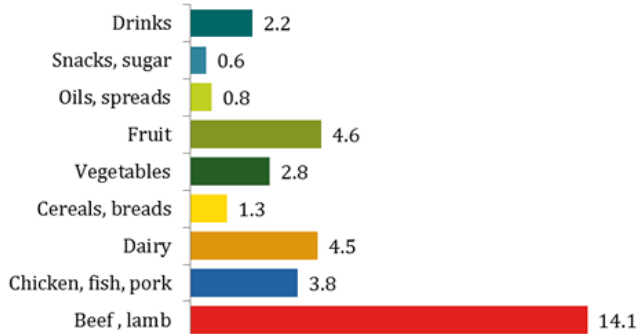
“Elk voordeel heb ze nadeel”



“Every advantage has a disadvantage”

Why cattle are accused

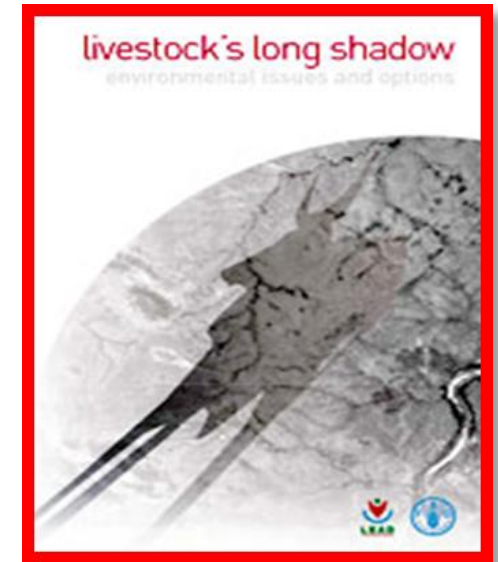
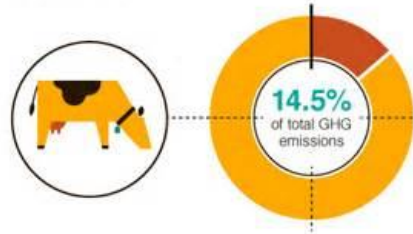
Carbon Intensity of Eating: g CO₂e/kcal



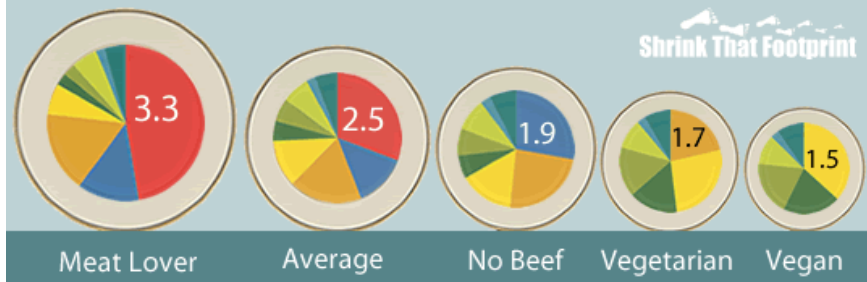
Note: Figures are grams of carbon dioxide equivalents per kilocalorie of food eaten (g CO₂e/kcal). Intensities include emissions for total food supplied to provide each kilocalorie consumed. This accounts for emissions from food eaten as well as consumer waste and supply chain losses. All figures are based on typical food production in the USA. Estimates are emissions from cradle to point of sale, they do not include personal transport, home storage or cooking, or include any land use change emissions

Sources: ERS/USDA, LCA data, IO-LCA data, Weber & Matthews 

Livestock contributes 7,100 MTCO₂e/year or 14.5% of total global GHG emissions.



Comparing Carbon Footprints (t CO₂e)



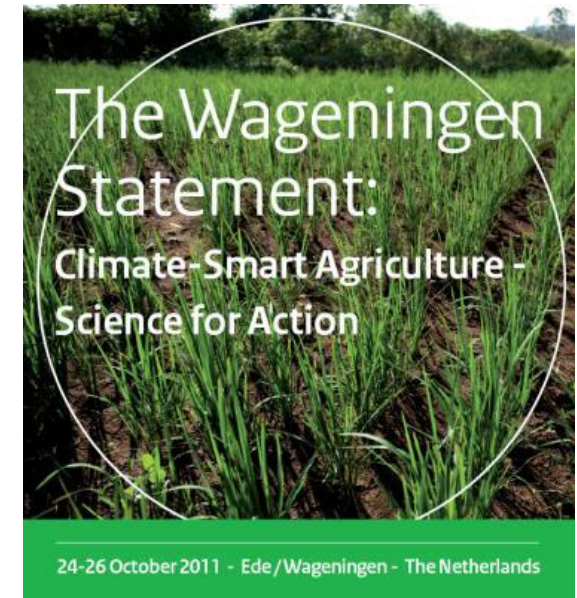
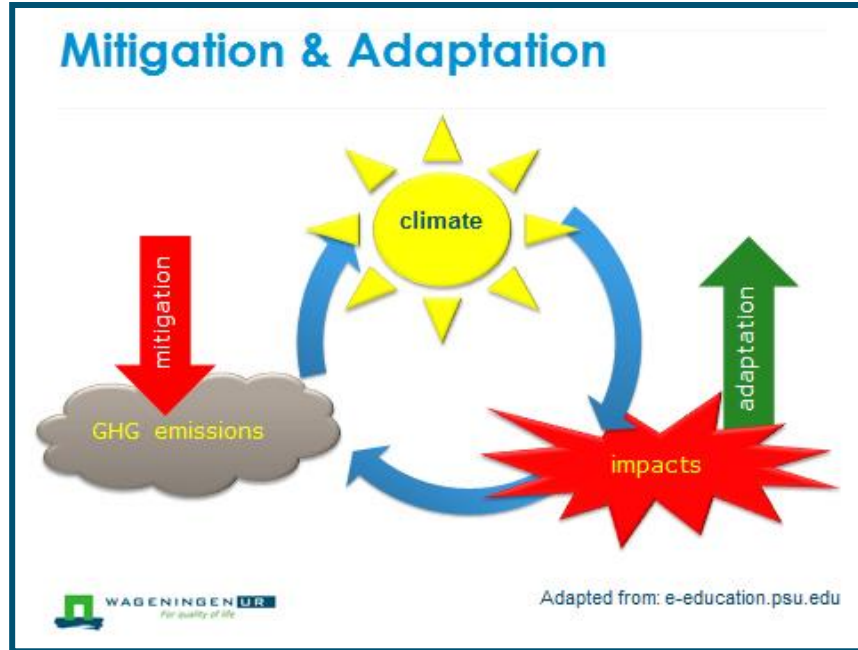
Myth busters needed



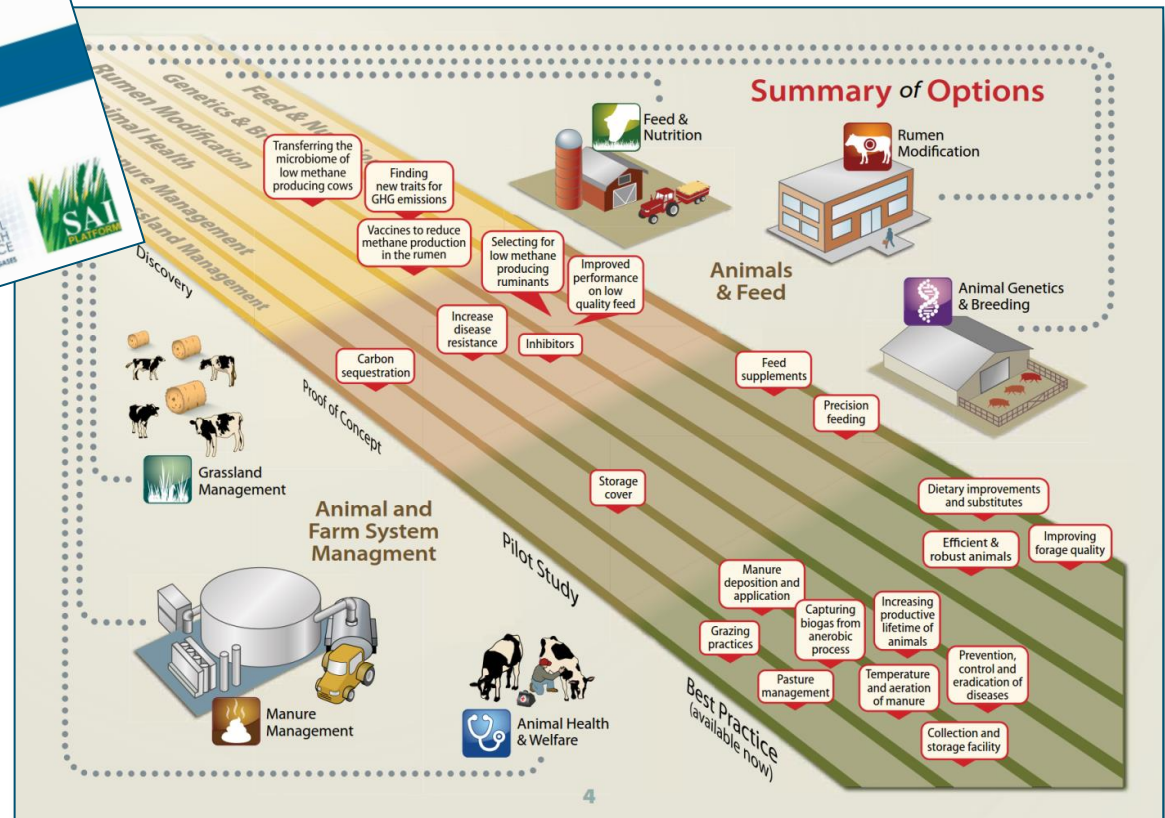
- Summing up LCA's single products in a Linear Model
- Do not account for integration in a Global Agro-Ecosystem
- Ignores the variation in Feed for Food Footprint
- Do not envisage optimal land use for human edible protein production



Climate Smart Cattle



Mitigation Perspectives



Mitigation Perspectives



**Perspective:
40+% methane reduction**



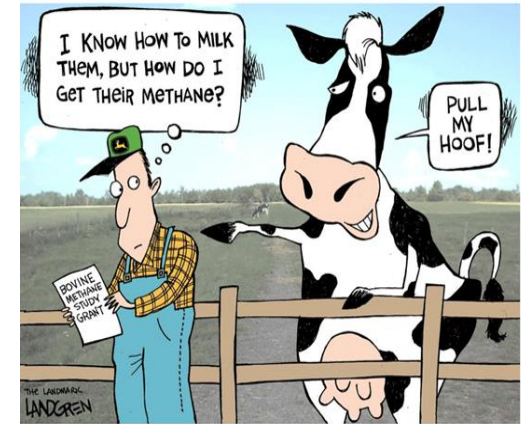
- Genotyping low methane production for selection
- Improving feed quality and digestibility, rumen microbes
- Improving animal health and husbandry conditions
- Manure management: collection, storage and utilisation
- Improving C sequestration soils
- Precision Livestock Farming

Adaptation Perspectives

- **Use Biodiversity:** More adaptive breeds with traits from local breeds



METHAGENE



- **Use Rumen Potential:** mobilize proteins from alternative, regional feed-stocks



RMG NETWORK
RUMEN MICROBIAL GENOMICS NETWORK



More Breeding Perspectives

Ingredients to create genetic change

Facilities:
phenotypes

Animal
Populations

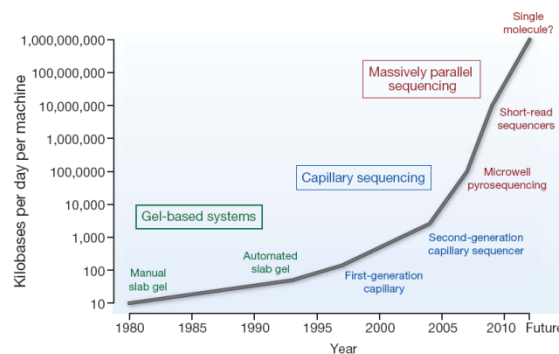
Human
capacity:
creating
innovations

Genomics:
DNA
information

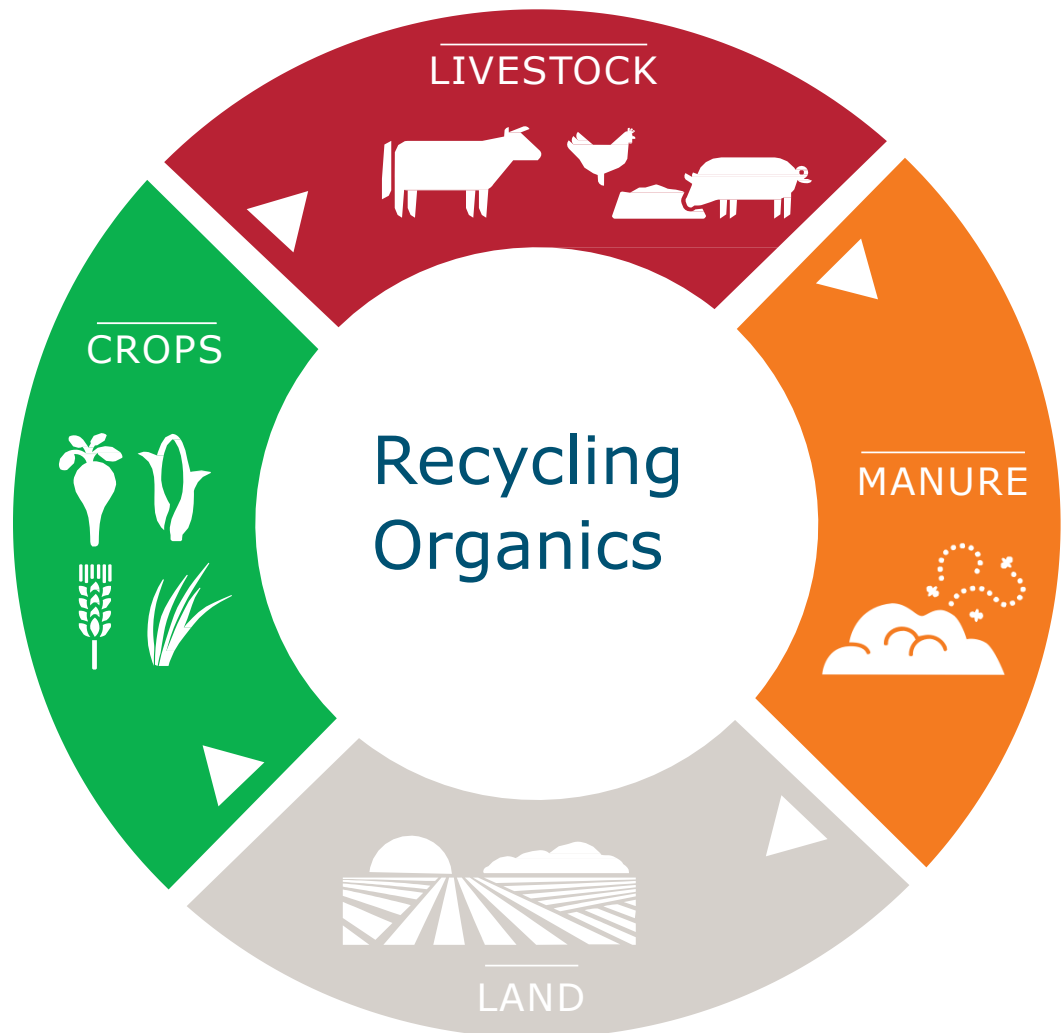
High
performance
computing

Combination is essential to
realize innovations

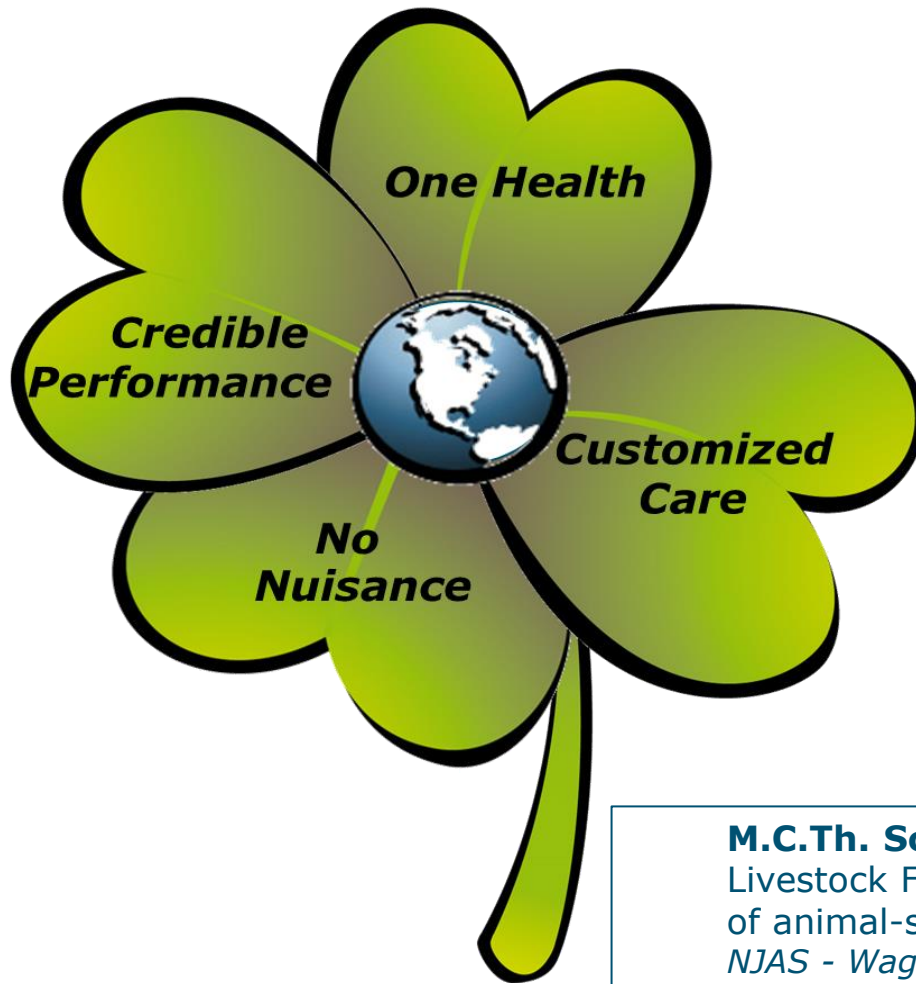
- Gene Editing
- Reporter Genes
- Infectivity Genes
- Trans-genese
- Cis-genese
- **Epi-genetics**



Integrated Approach: 1. Agro-Ecological

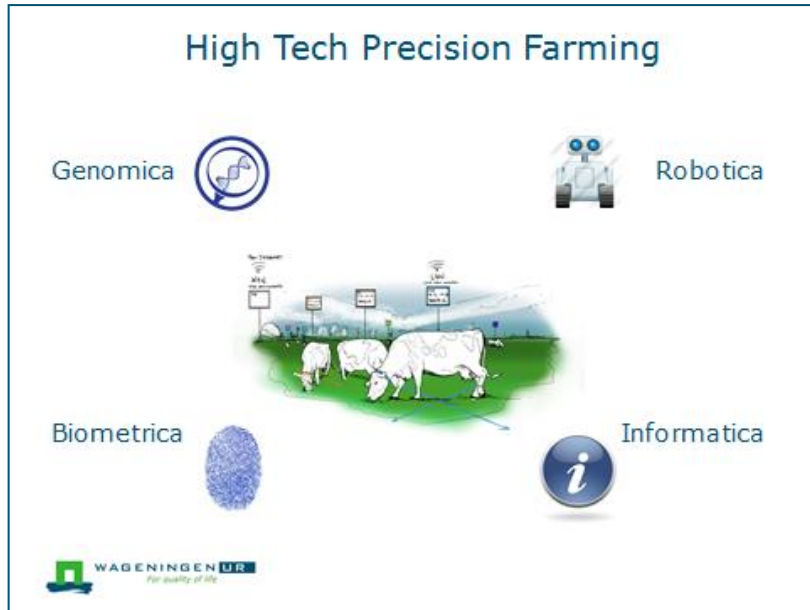


Integrated Approach: 2. Complete Care



M.C.Th. Scholten, I.J.M. de Boer, B. Gremmen, C. Lokhorst;
Livestock Farming with Care: towards sustainable production
of animal-source food
*NJAS - Wageningen Journal of Life Sciences, Volume 66, November
2013, Pages 3–5*

Integrated Approach: 3. Smart Farming



How to implement Precision Livestock Farming?

atf animal task force
A European Public-Private Platform

Big Data Farm Practice Innovations

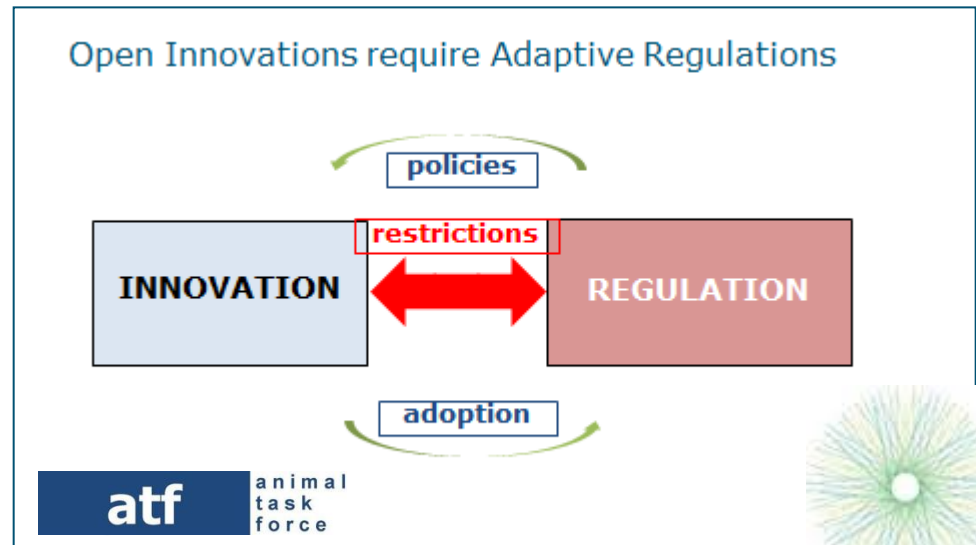
High-Tech

Welcome

Animal Task Force & EAAP Special Session
Monday 31 August 2015 14:00h - 18:00h
EAAP Annual meeting 2015 | Warsaw - Poland

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Integrated Approach: 4. Open Innovation



Integrated Approach: 5. Global Scope

Impact of Global Cooperation in Research



In summary: What I have told you, is for discussion:

- The world need more cattle
- Cattle with a short shadow
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SHORTLY

Foster the Cattle to Feed the World
within the capacity of planet earth



Thanks!



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