Innovation in animal feeding

A key driver in the concept of sustainable precision livestock farming

Leo den Hartog[1,2] and Reinder Sijtsma[1]

[1] Nutreco R&D, Quality Affairs and Sustainability

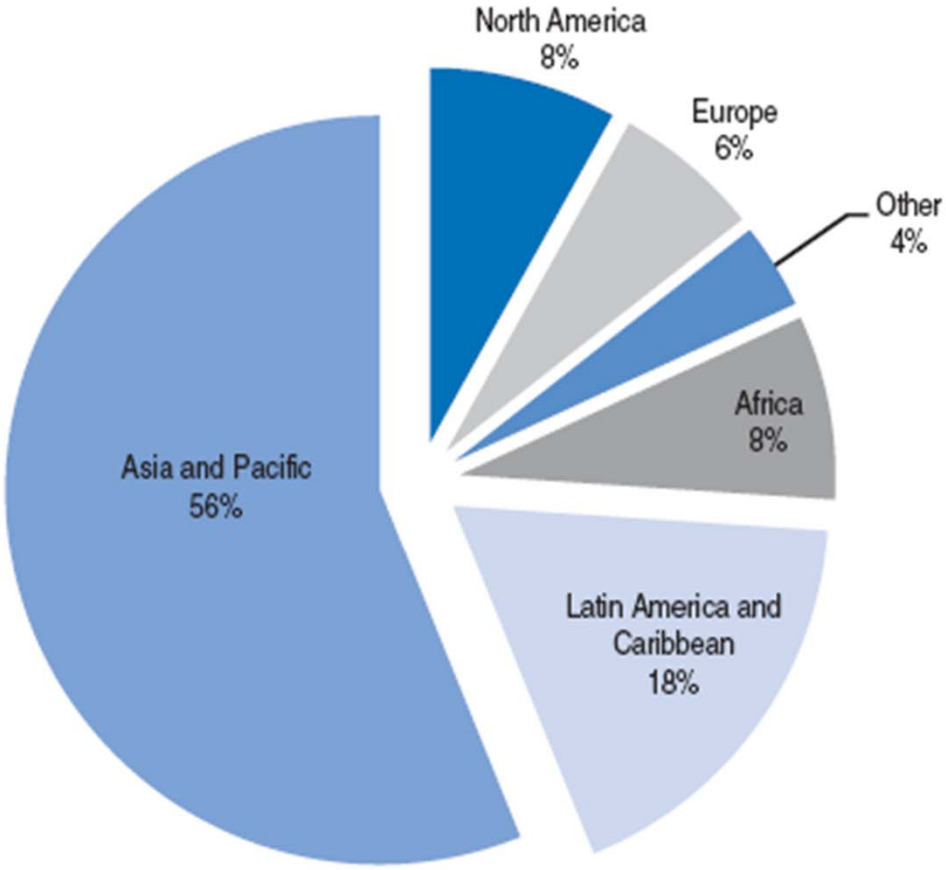
[2] Wageningen University

Leo.den.Hartog@nutreco.com

feeding the future

Increase in meat demand (2009-11 – 2021)

- **In 2022 we need to produce 20 million tonnes more meat than we did in 2009/11**
- **Growth in developing countries will capture 82% of the additional global consumption.**



Source: OECD and FAO Secretariats.

Supplies remain tight and prices volatile

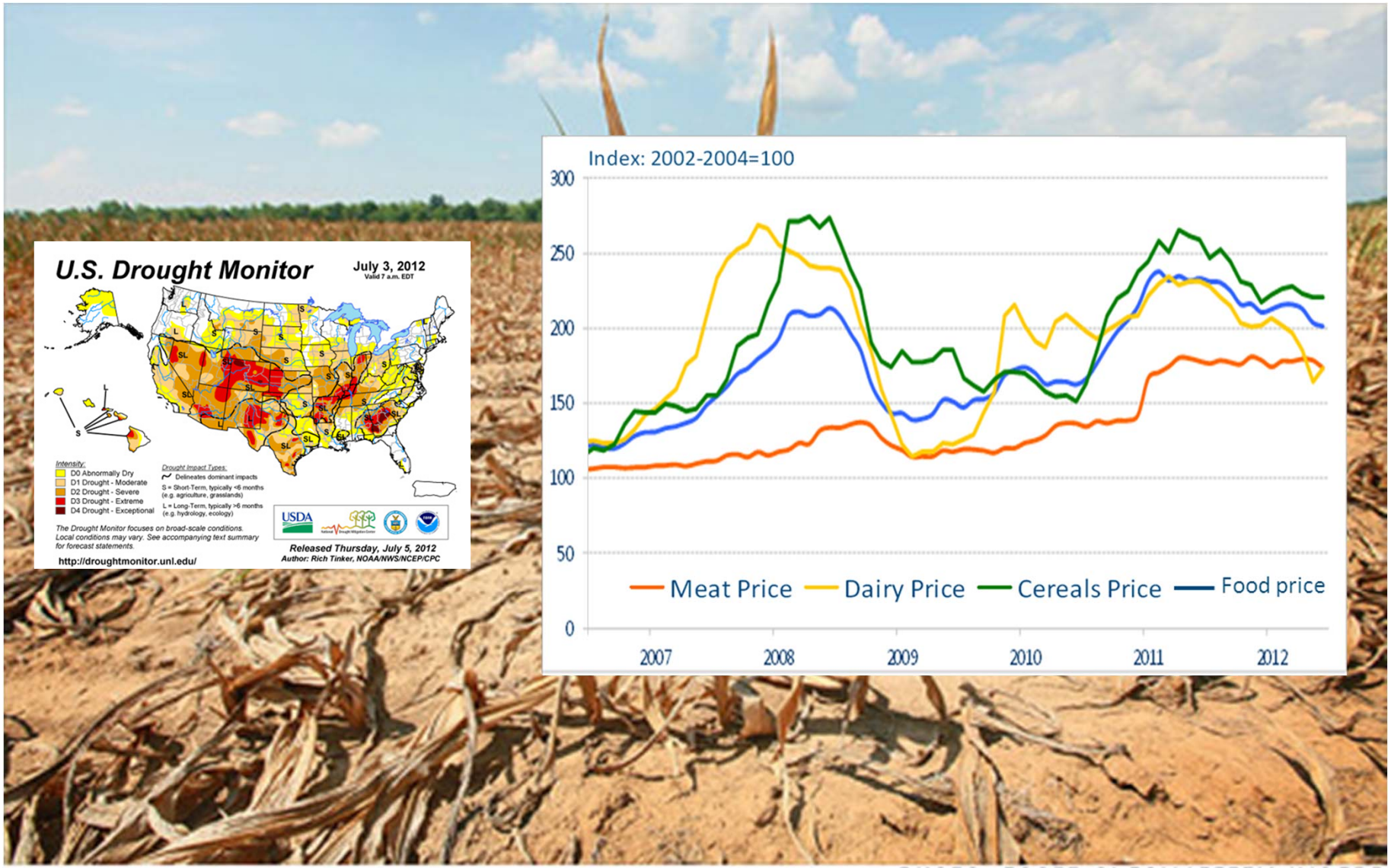
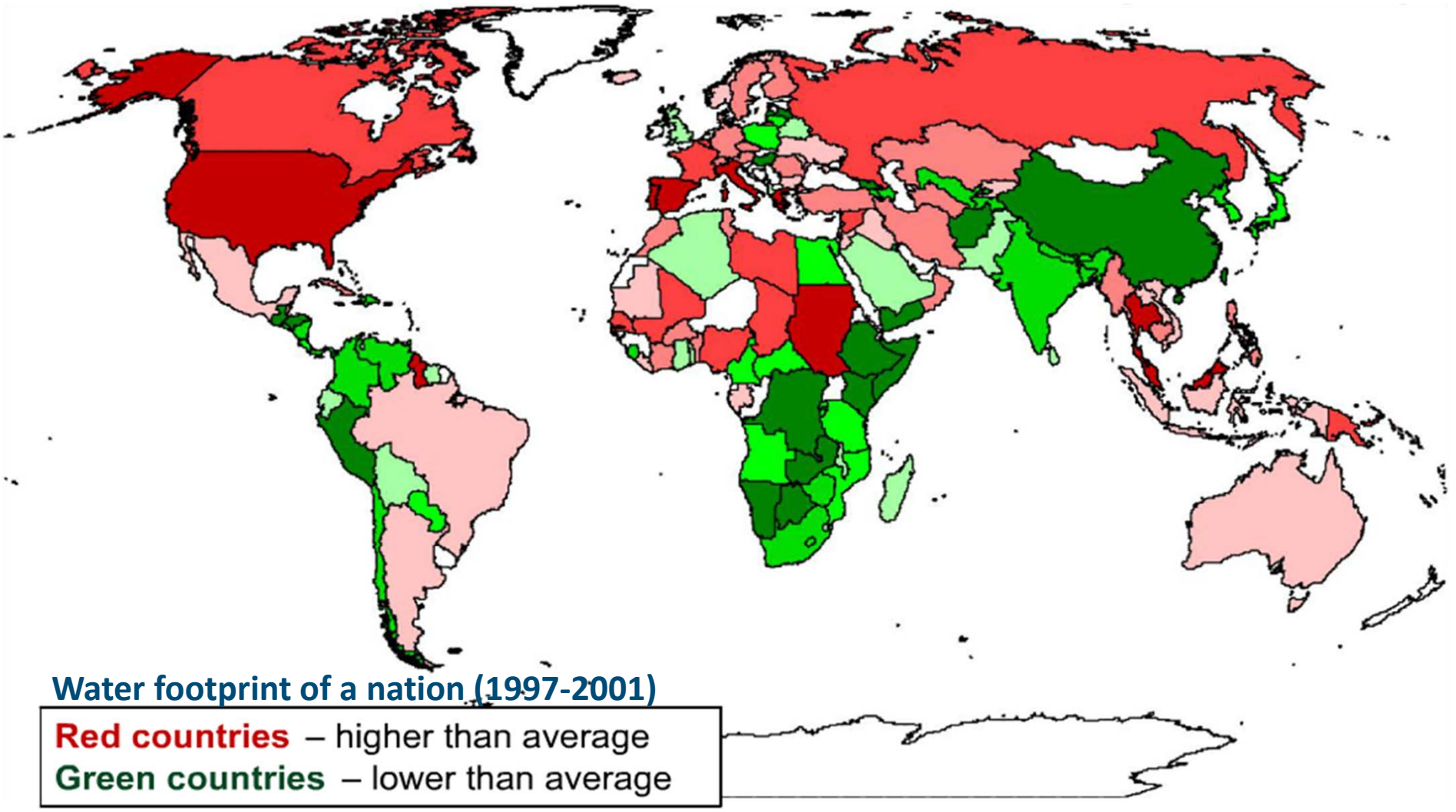


PHOTO: SCOTT OLSON/GETTY IMAGES

Water: we need more crop per drop



Source: World Bank Institute

Required growth in agriculture, to feed the growing global population:

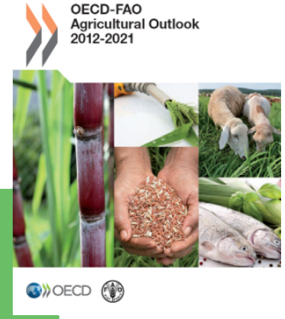
	2050
• Expansion of worldwide arable land	**+ 9 %**
• Increase in cropping intensity	**+ 14 %**
• Yield increase	**+ 77 %**

A time for change

Agricultural production needs to increase by **60%** over the next **40 years** to meet the rising demand for food

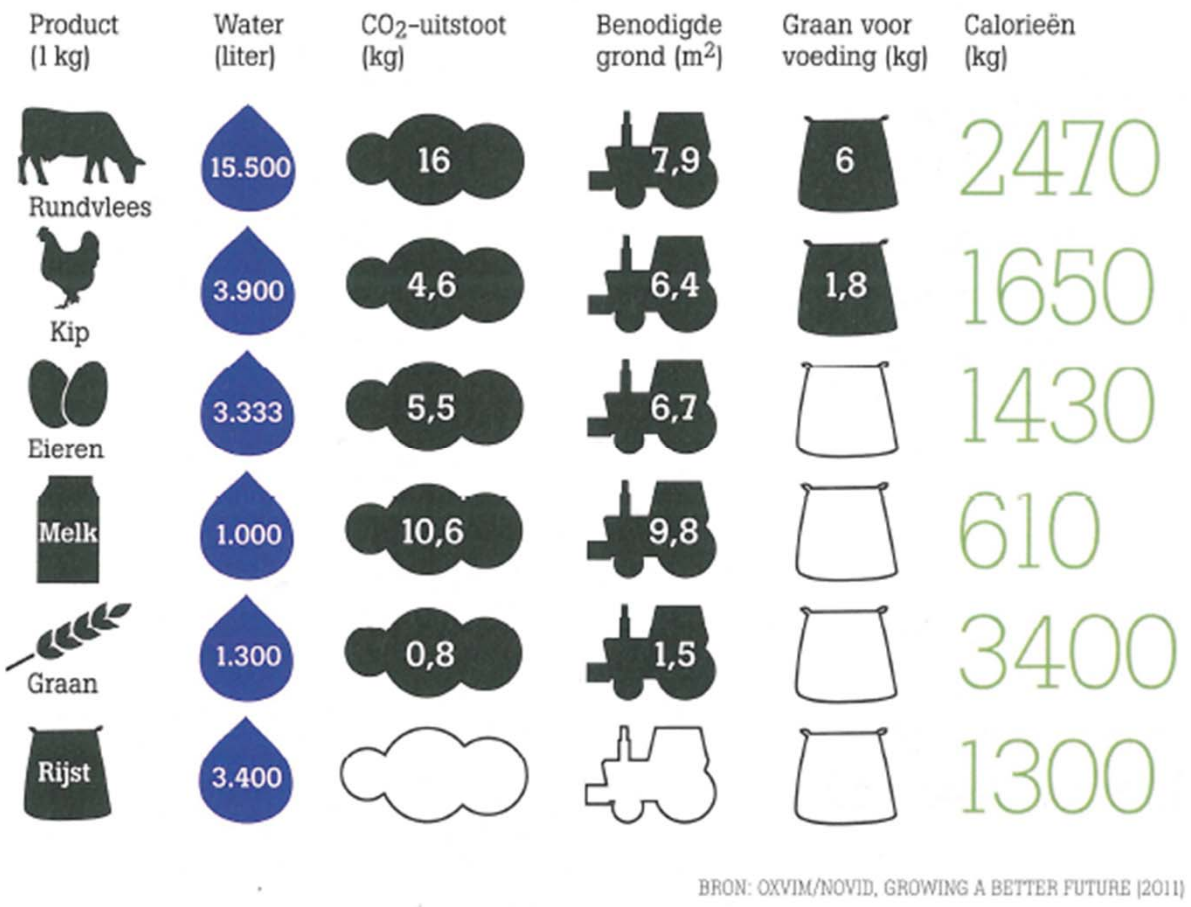
Total arable land is projected to increase by **only 69 Mha** (less than 5 %) by 2050

Additional production will have to come from ***increased productivity***



Source: OECD/FAO (2012), *OECD-FAO Agricultural Outlook 2012-2021*, OECD Publishing and FAO.

Doubling food production, while halving footprint

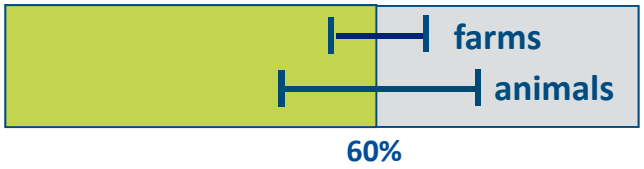


For animal production efficiency is key!

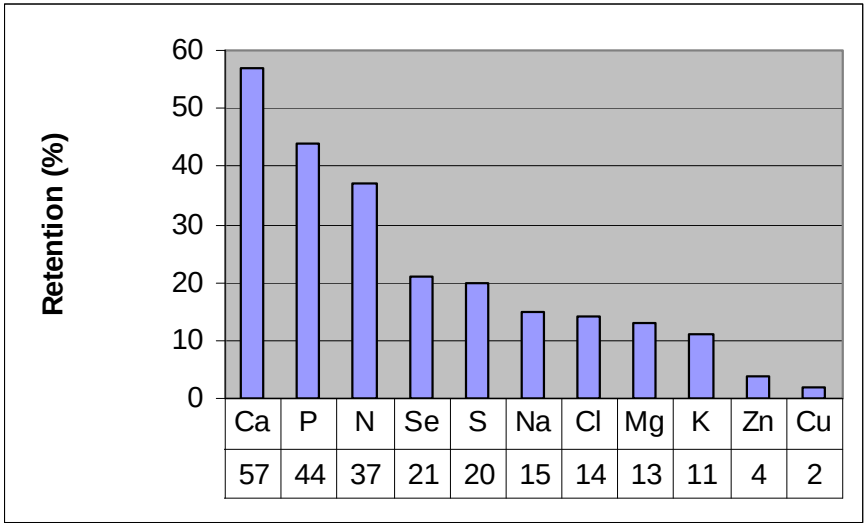
Empower farmers to reach the full potential of their animals

Improvement still possible……

1 Genetic potential fattening pigs



2 Nutrient utilisation



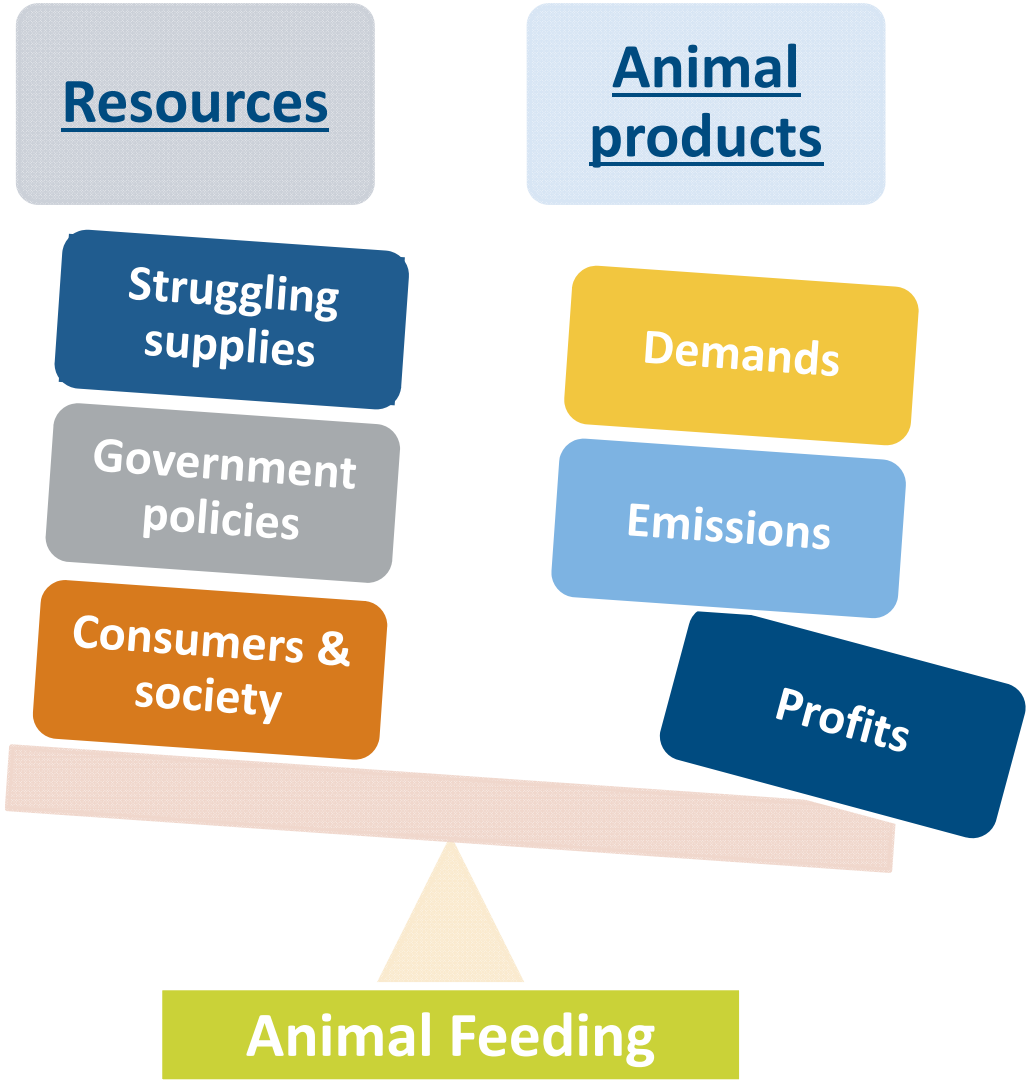
Source: Nutreco, 2010 Compilation of data

3 Nutrient digestibility

Digestibility of organic matter on 14 different pig farms

BW (kg)	Digestibility (%)
40	*77 – 84*
70	*78 – 86*

Animal feeding is an essential link



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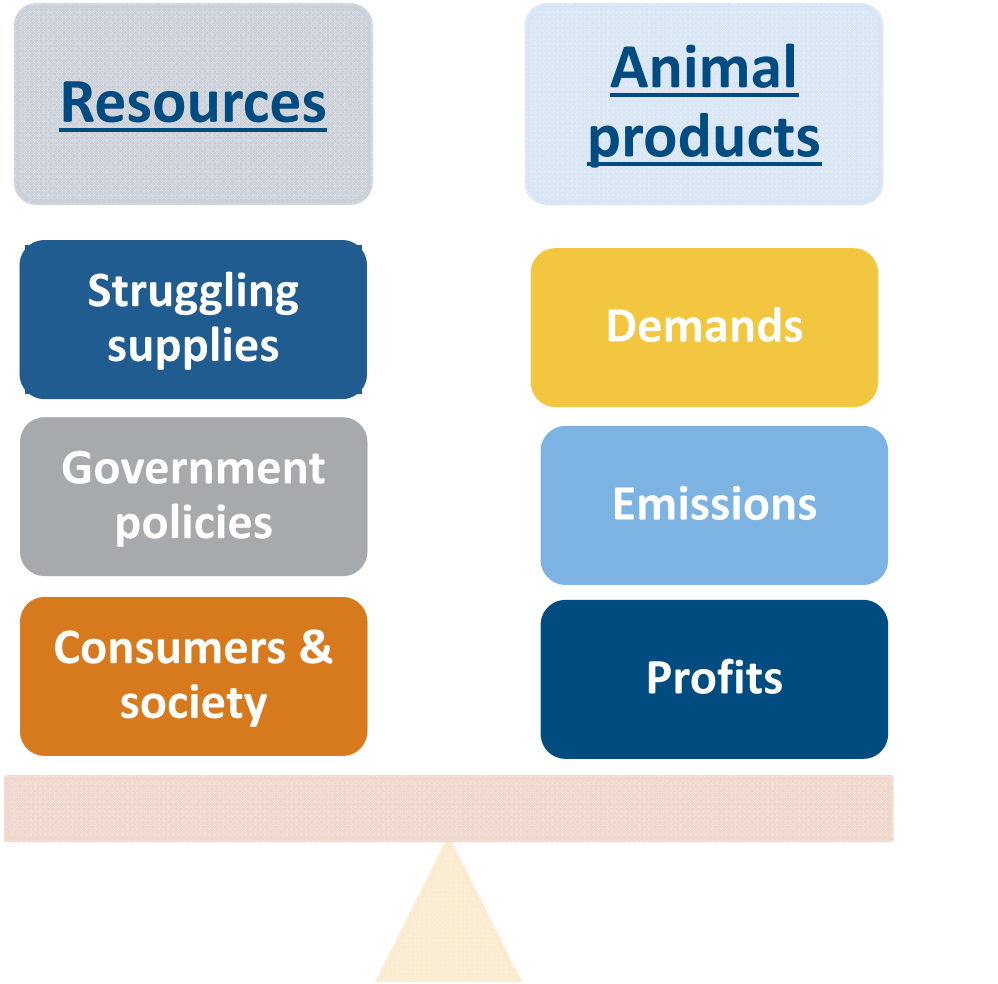


A lot of progress – but also much variation

In productivity (NL)	25% worst	25% best
• Raised piglets per sow/yr	23,9	29,9
• Feed conversion swine	2,87	2,44
• Milk production per cow/yr	6620	9640

- If top 30 swine producing countries would produce like NL, pork production would **double**
- If the average milk production would be like NL, milk production would **triple**

Source: Agrovision and CRV stats

Today's dairy farming in % of 1960's

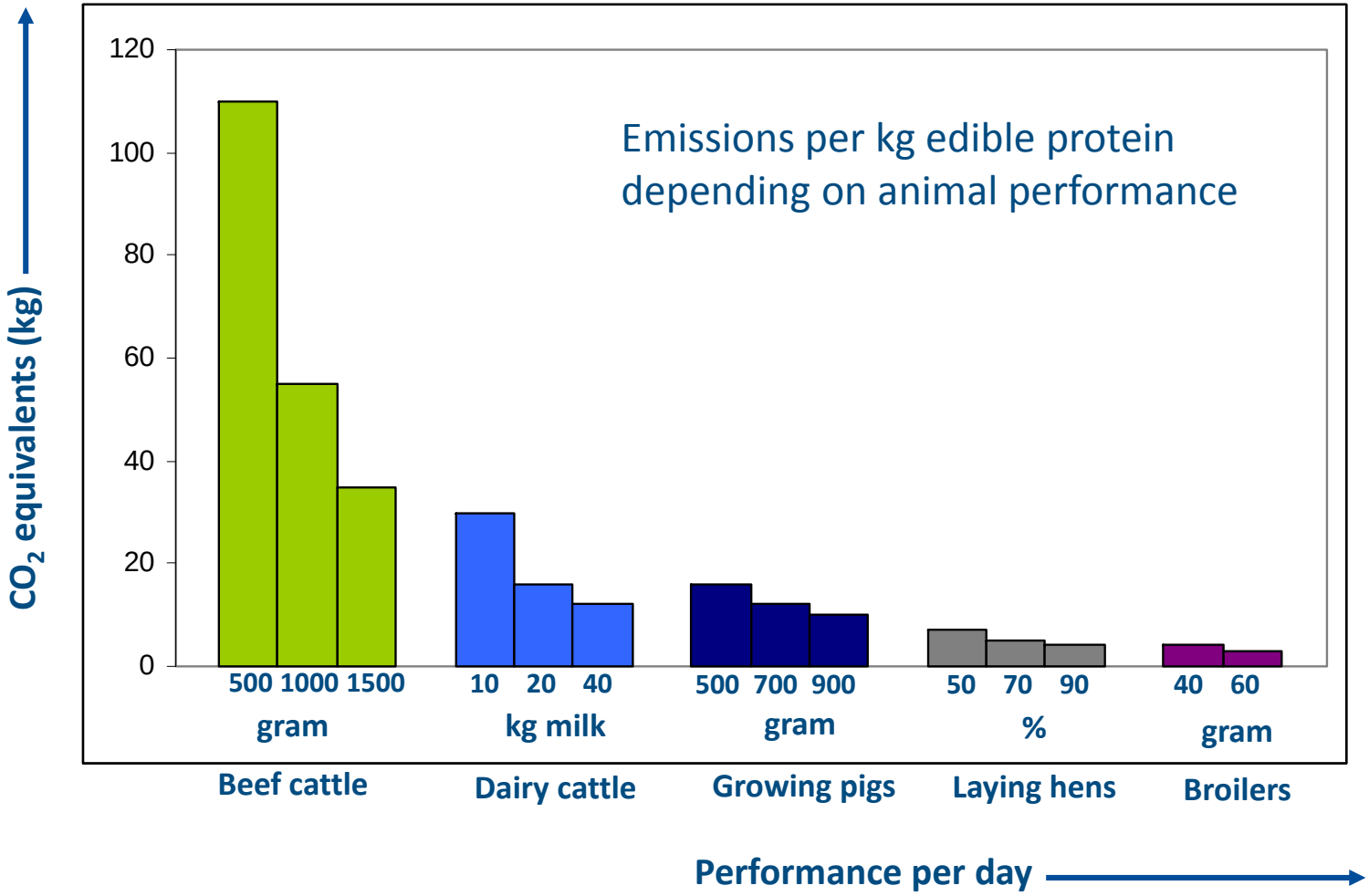
Per kg of milk:

- 10% of land
- 21% of animals
- 23% of feed
- 35% of water

Emissions per kg of milk:

- 24% of manure
- 37% of CO_2
- 43% of methane

Efficiency decreases the environmental footprint



Flachowsky & Hachenberg, 2009

Strategies to reduce nutrient excretion & emission

Improving nutrient digestibility and availability

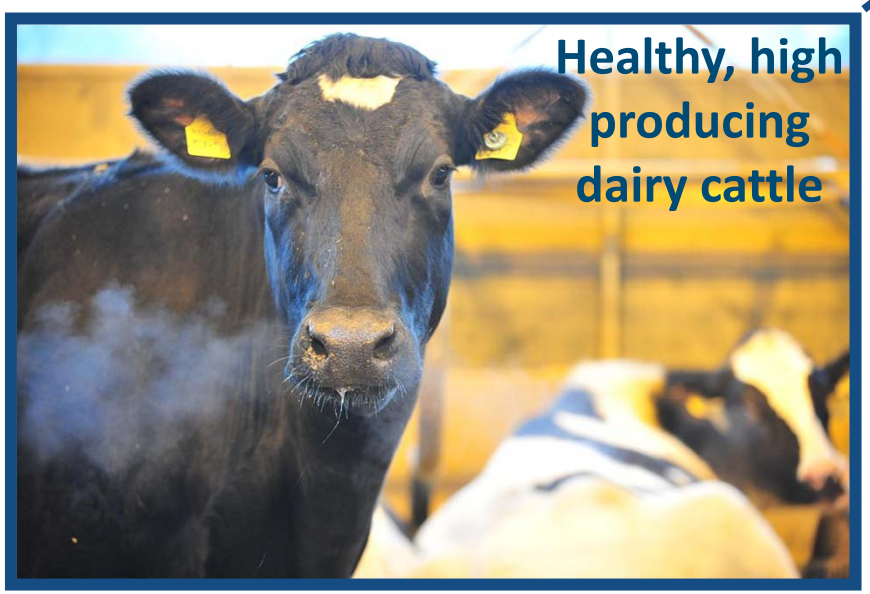
- Feed manufacturing technology
- Choice of feed materials
- Feed additives
  - Feed enzymes
  - Organic trace elements
  - Dietary stabilisers of enteric microflora
  - Rumen enhancers
- Plant breeding

Research focus areas

2.Predictable performance

5. Environmental Footprint

1.Feed value



7.Beef nutrition & product quality

3.Efficiency additives (Rumen modifiers)

6.Young animals: Life start sets life performance

4.Transition

Vision development transition specialties dairy cows

Close up period

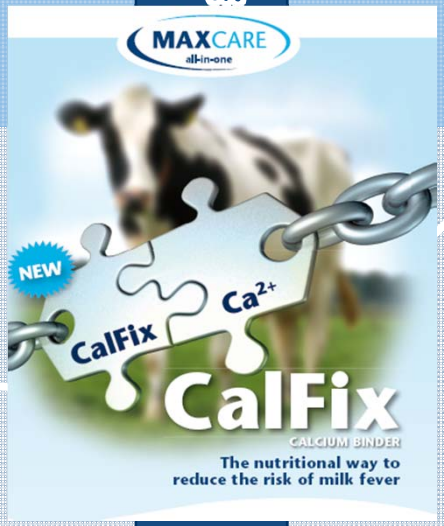
Milk production

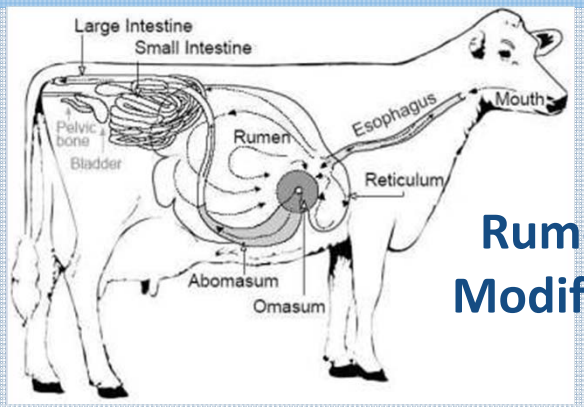
Milk fever

Negative Energy Balance

Rumen acidosis

Fresh cow management





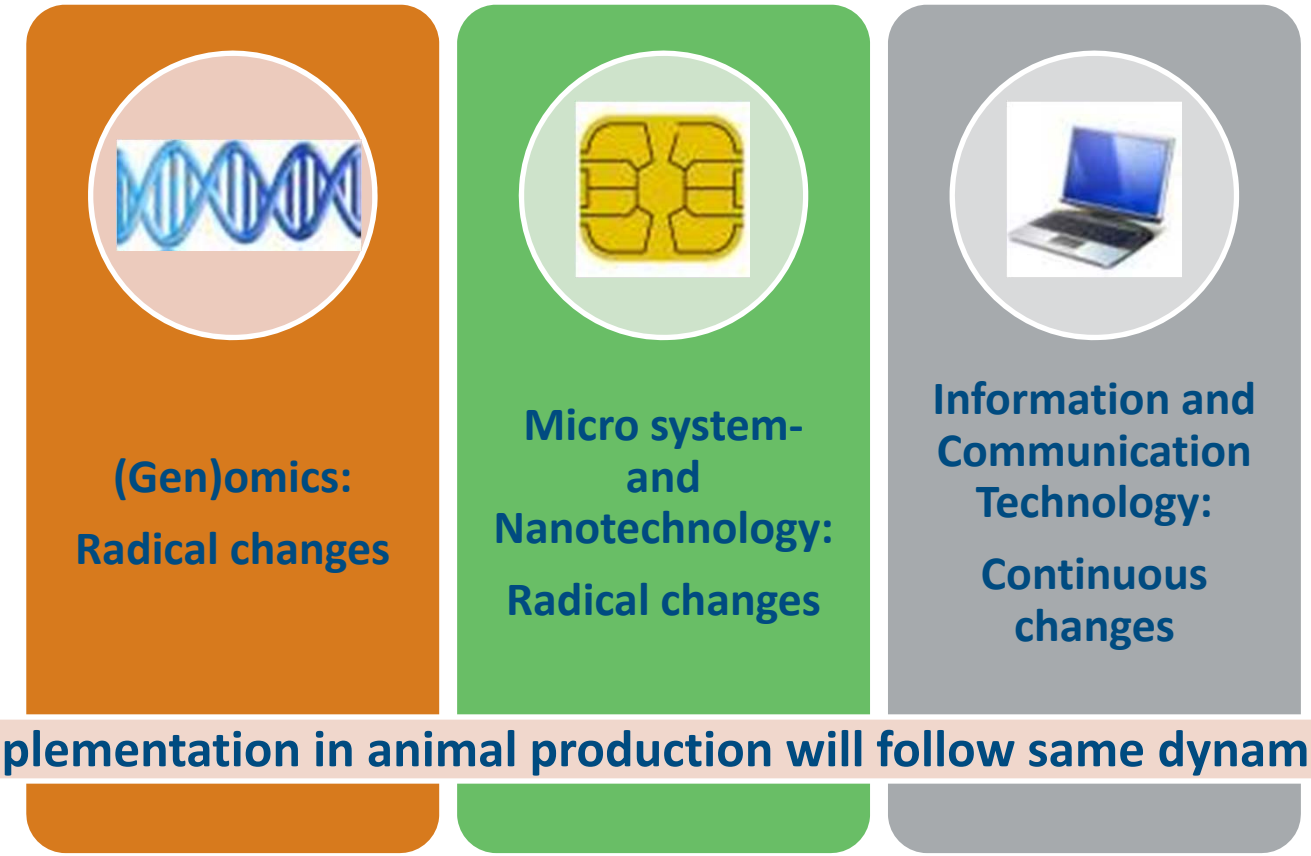
Rumen Modifiers

Milk production

Time post partum

Mainstream technologies to bring the changes

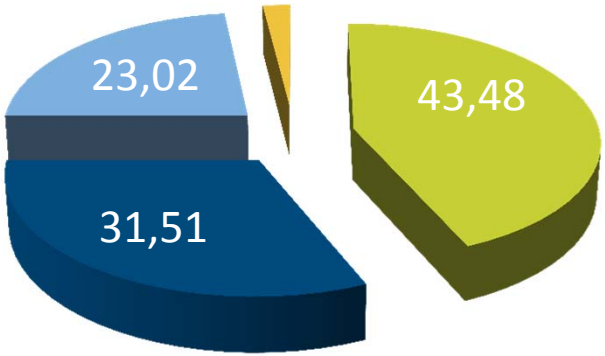
Applied technologies



Consumer acceptance

95% of consumers are food buyers

- Food produced by modern agriculture
- Neutral or supportive of using efficiency-enhancing technologies to grow food



Why?

- Taste
- Cost
- Nutrition
- Other

4% are lifestyle buyers

- Ethnicity and vegetarianism, organic, local and Fair Trade
- Money is not a factor

Source: Jeff Simmons, Elanco Animal Health, 2011

The future of animal feeding:
a change in business model is required

Old model

- Maximise productivity
- Food security
- Productivity & Rationalisation

Current model

- Optimise profitability
- Efficiency

New model

- Optimise sustainable profitability
- Balance: Economy, ecology & society

Sustainable Precision Livestock Farming