

# Sustainable dairy Production in NL

AHDB Outlook 2015  
Maarten Vrolijk

Februari 11 2015  
Livestock Research



WAGENINGEN **UR**  
*For quality of life*

# Our research themes



Breeding &  
Genomics



Livestock &  
Environment



Innovative  
husbandry  
systems



Animal  
Nutrition



# Dutch dairy sector in 2014

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- 17.600 dairy farms
- 350 dairy farms with on farm dairy processing
- Average size 85 cows, 750.000 kg/year
- 12 billion kg milk (appr. 70 % export)
- ~20 dairy companies (FrieslandCampina 75%)
- 870 million € investments in processing
  - Aware/Fonterra, FrieslandCampina, CONO, a.o.
- April 2015: end of EU quota system



# Investments Dairy Processors (billion €)

2012-2014

Fr. 1.1

Ger. 1.0

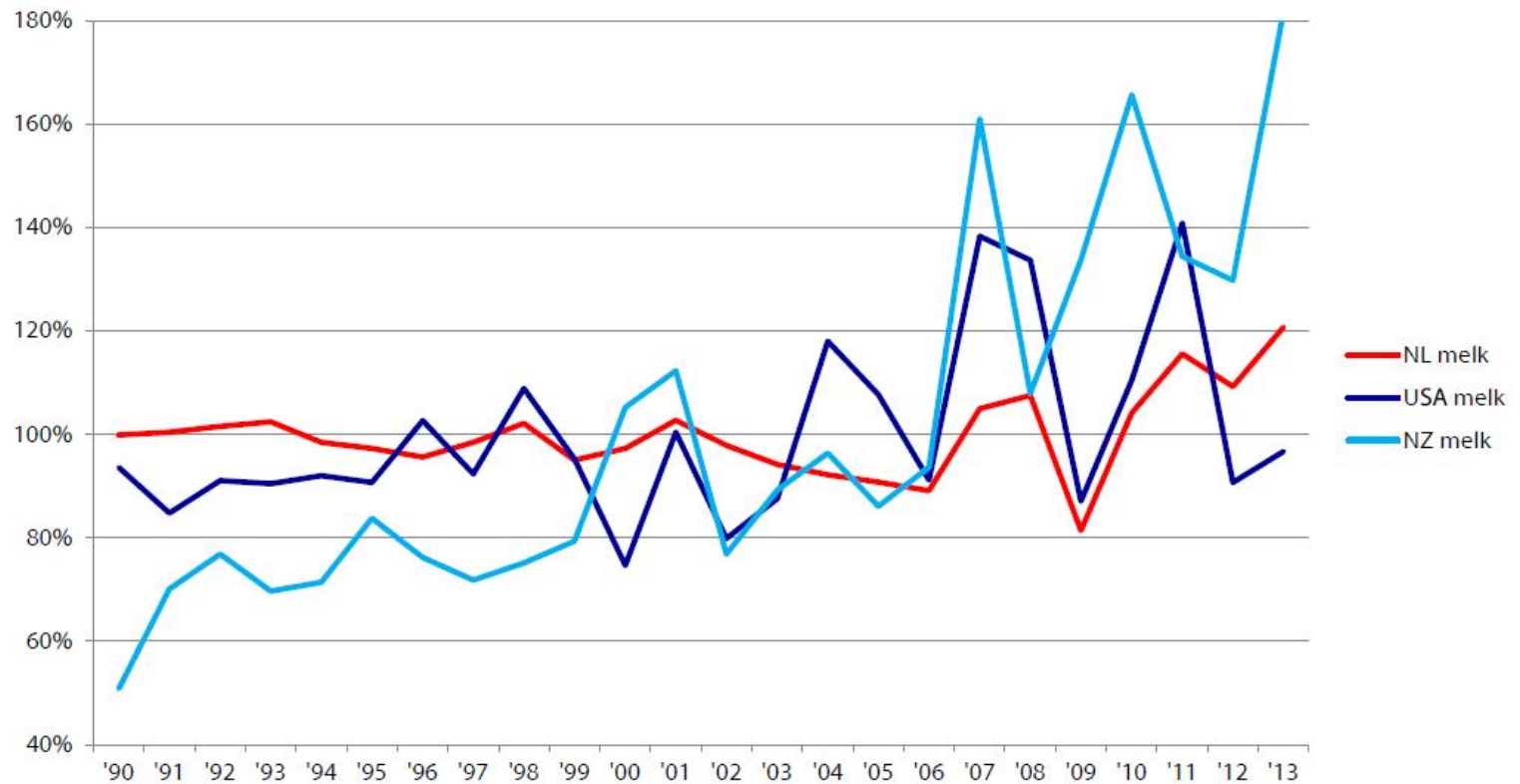
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NL. 0.9

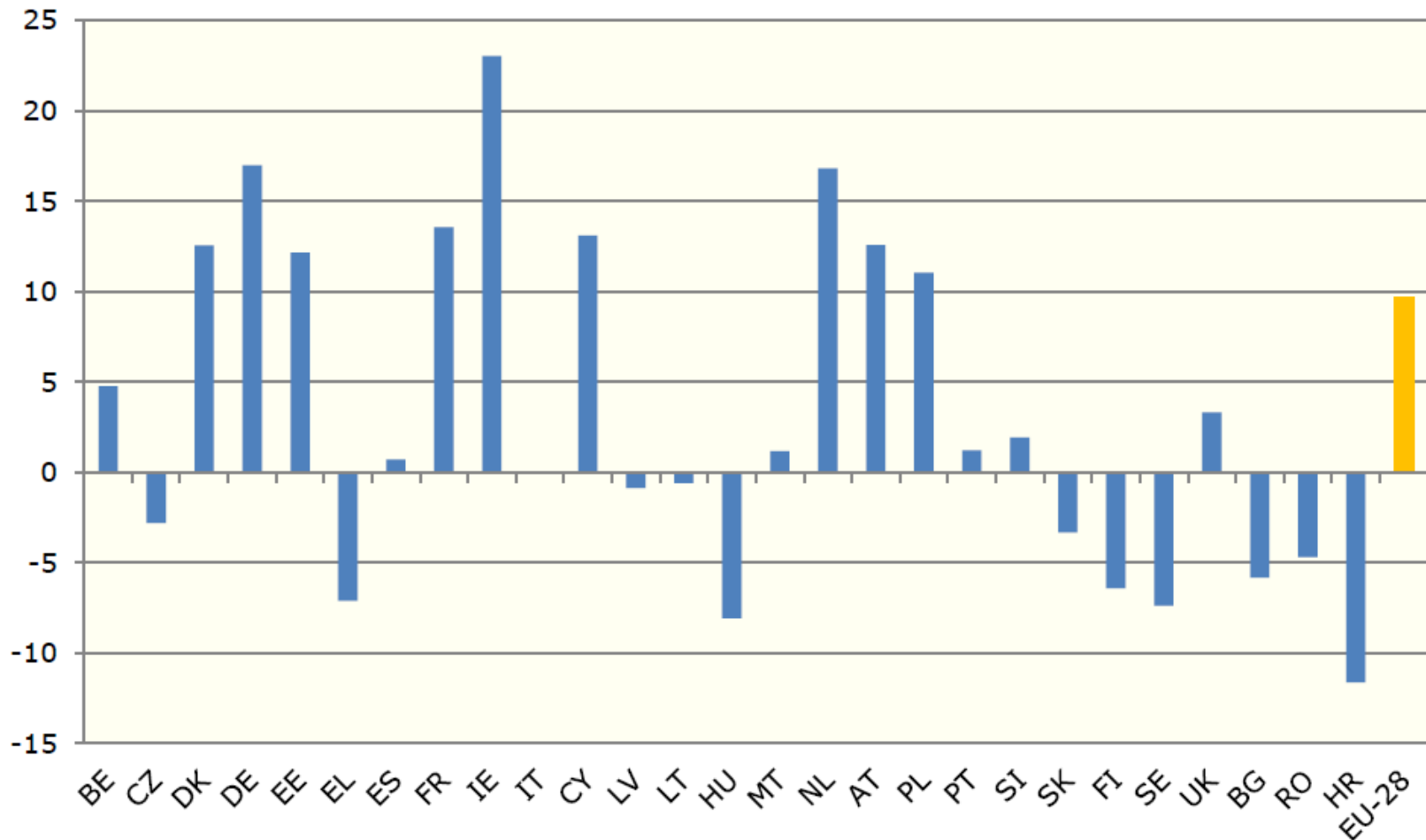




..... met toegenomen melkprijsvolatiliteit

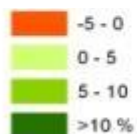
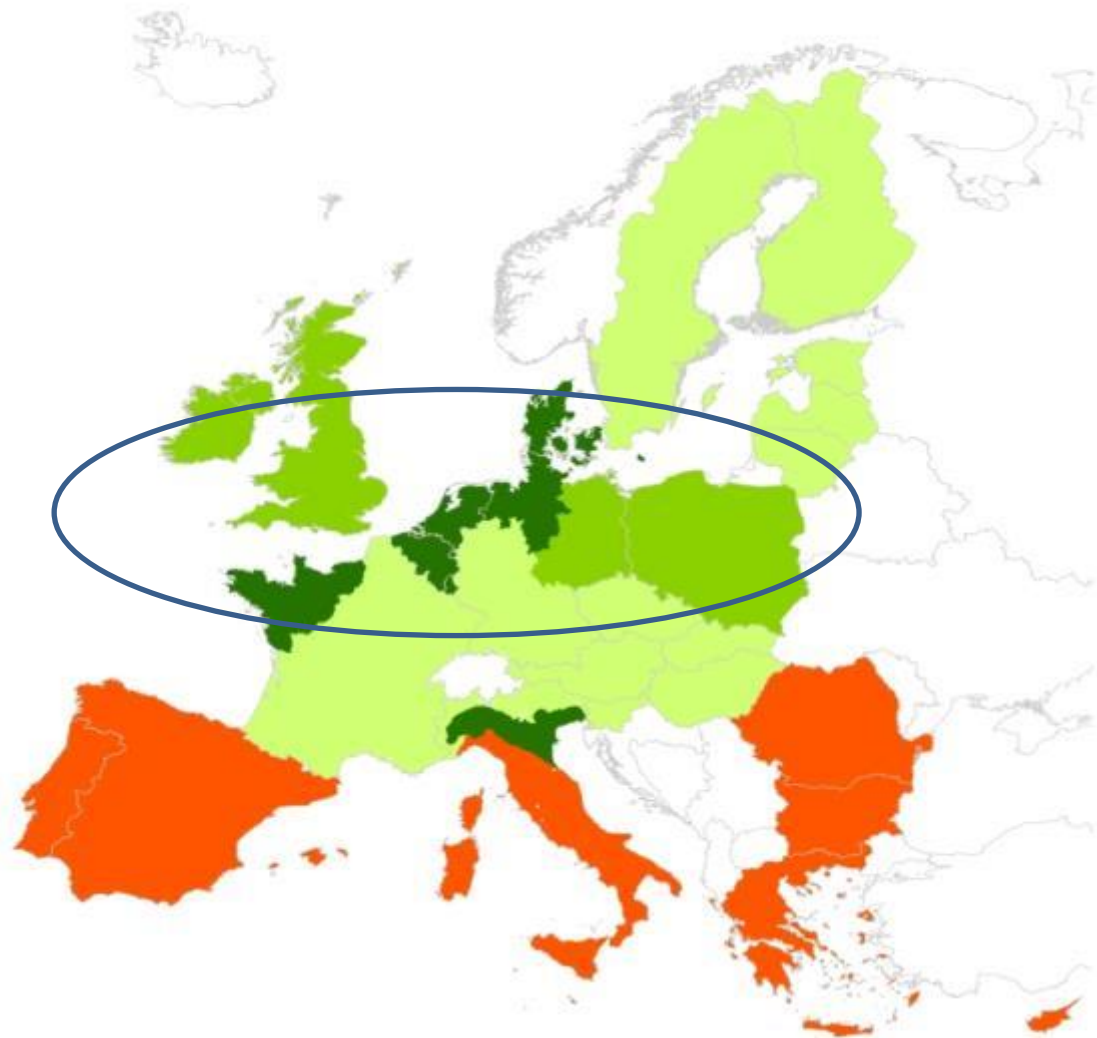


# Expected % change in national milk deliveries 2023 compared to 2012



# Change in milk production 2013-2023

(in %)



Source: Wageningen UR,  
2008 and 2013



# Outlook towards 2050 (FAO)

- 2 billion people more
- Increased food demand ( $>1\%$  / year)
- More animal protein in diet
- Milk demand increases 50%

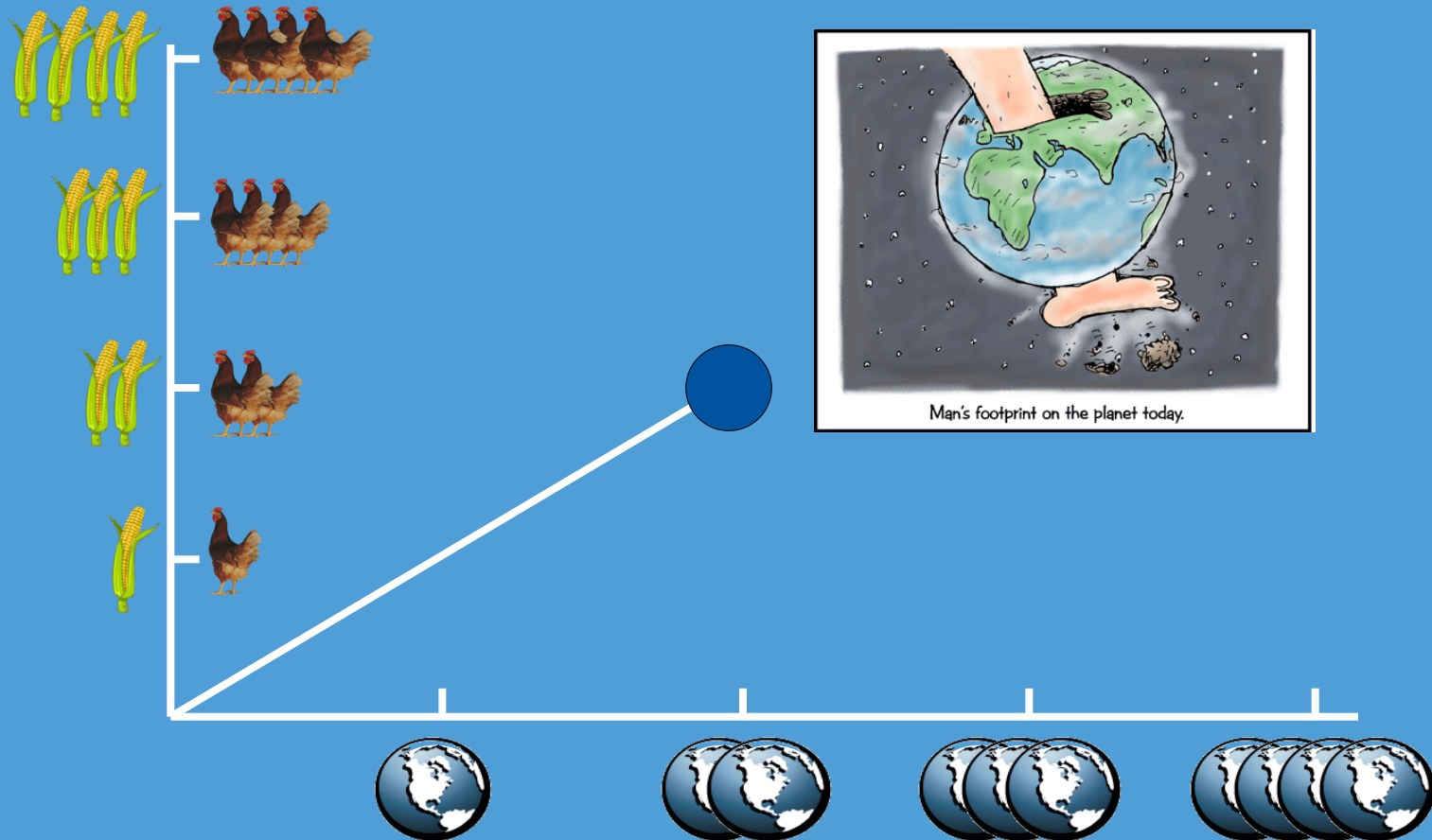


# Milk production towards 2050

**The larger part of the “new” milk will be produced and consumed in developing countries**

	Milk production (billion kg)		Increase (billion kg)	Growth rate (%/year)
	2006	2050		
World	664	1077	413	1.1
Developing countries	305	662	357	1.8
Sub-Saharan Africa	22	59	37	2.3
North East- North Africa	36	76	40	1.7
Latin America & Caribbean	71	125	54	1.3
South Asia	135	319	184	2.0
East Asia	42	82	40	1.5
Developed countries	358	412	54	0.3

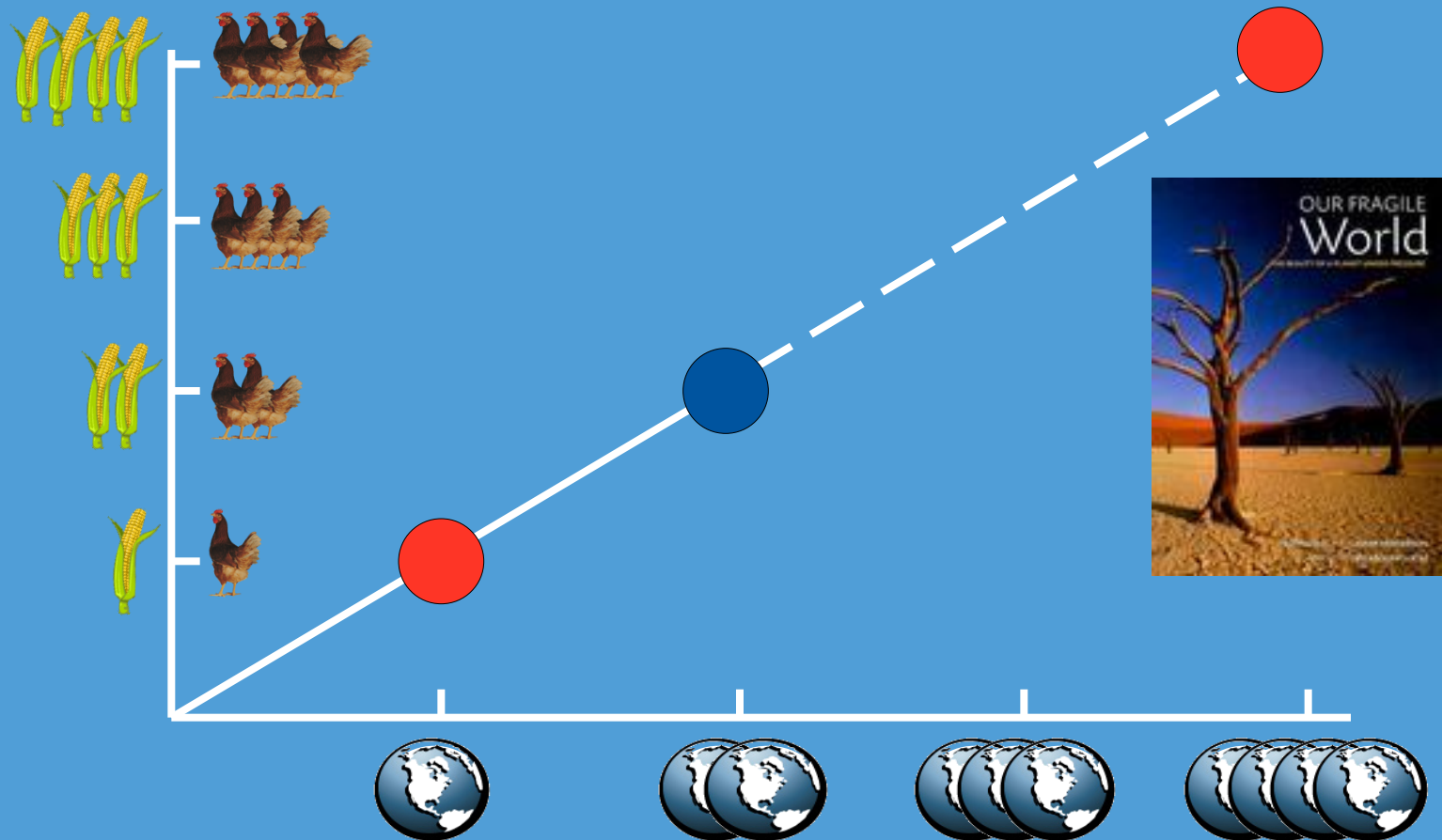
# We are exceeding the carrying capacity







# Reducing or increasing production: not an option











20:54

leif.zenger



53%

3 RETWEETS 1 FAVORIET



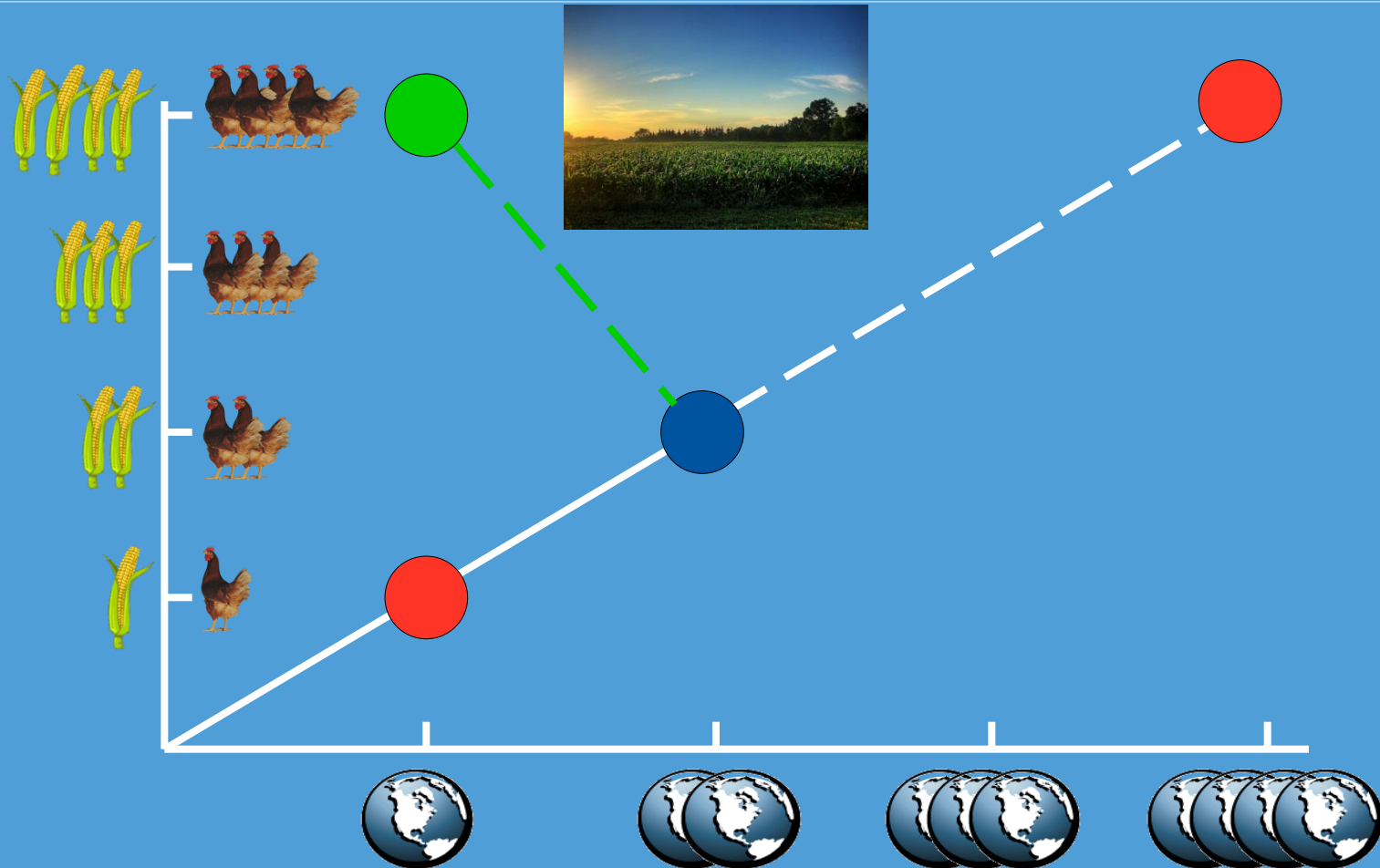
TractorPicsDaily @TractorPictures  
#towing #big

21-08-14

3 RETWEETS 10 FAVORIETEN



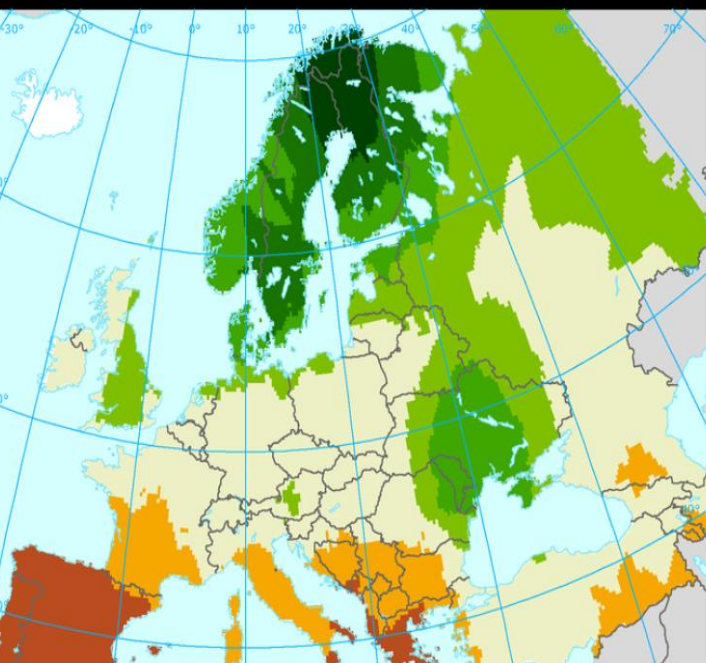
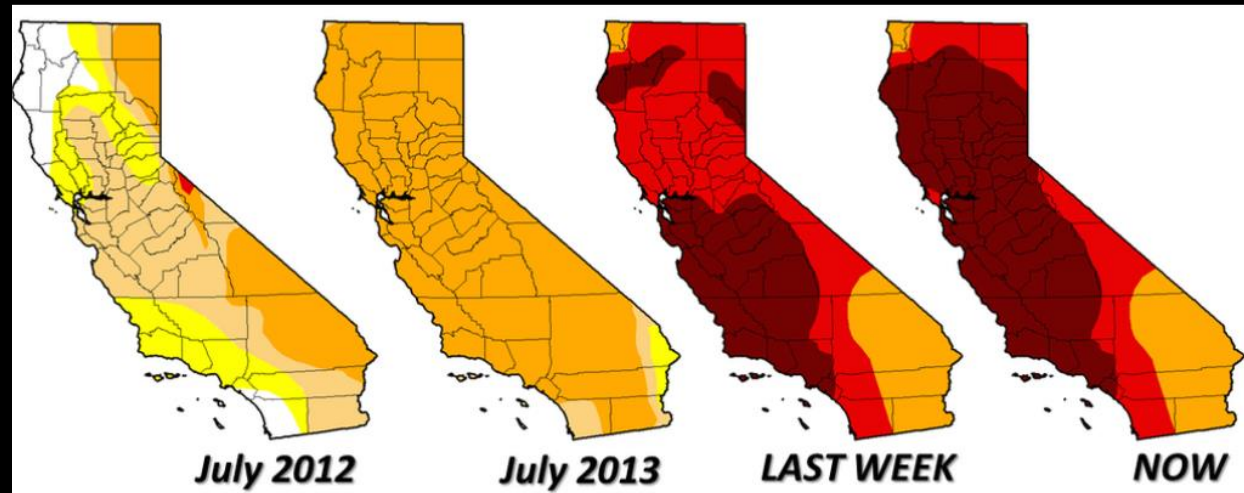
# But we can make a shift in another direction











**Projected changes in  
water-limited crop yield**

(%)

- - 25 to - 15
- - 15 to - 5
- - 5 to 5
- 5 to 15
- 15 to 25
- 25 to 35
- > 35

□ No data

□ Outside coverage



# A double task is a challenge for all of us!!



## *Feeding the world within the carrying capacity of planet earth*



### 2x2

- Doubling Production
- Halving Ecological Footprint



# Sustainability

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## Definition Brundtland:

“Sustainable development is development that meets the *needs* of the present without compromising the ability of future generations to meet their own *needs*.”



# Main challenges (1)



How to combine the needs of society with dairy craftsmanship and entrepreneurship into a successful dairy farm?



# Main challenges (2)

- Reducing emissions (N, P, NH<sub>3</sub>, CO<sub>2</sub> and CH<sub>4</sub>)
- Disposal of excess manure (€ 10 – 20 / ton)
- High land prices (€ 30.000 - €80.000 / ha)
- High investments in expansion (from 80 to 150 cows/farm)
- Milk price volatility
- Less direct payments CAP EU
- Rising feed costs



# Faith of NL dairy farmers in future dairy?

## YES

- Increase in world demand
- Strong processors and export
- Strong entrepreneur-ship and skills

## DOUBTS

- Tough environmental regulation / risk of restriction number of cows
- Overproduction / low milk price
- High feed price
- High land price



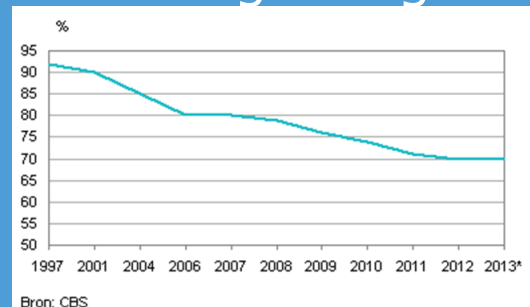
# Responsible growth dairy NL

- Voluntary agreement between government, farmers unions, dairy processors and NGO's
  - Only extra milk production if extra manure surplus is avoided
  - Land-based dairy sector
  - Realizing goals of “Sustainable Dairy Chain”
  - Increase in manure processing and export



# Ambitions *Sustainable Dairy Chain* 2020

1. Improving energy efficiency and production (-2%/year) including energy neutral dairy chain
2. Reducing greenhouse gasses (-20% of 1990 level)
3. Animal health and welfare: improve longevity and reduce antibiotics; new stables integrated sustainable
4. Biodiversity and environment
  - 100% sustainable soya + palm pit kernels by 2015
  - Decrease N- and P-leakage and NH<sub>4</sub>-emission
  - Improve biodiversity
5. Maintain level of of farms grazing



# Projects *Sustainable Dairy Chain 2020*

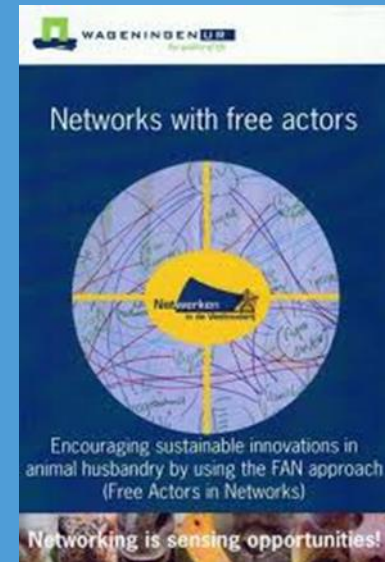
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- Building new, more sustainable production plants
- Decrease and re-use energy and water
- Wind and solar Energy
- Green gas milk trucks
- Dubbel deck retail trailers
- Container ship transport



# Research Projects Sustainable Dairy

- Cows & Opportunities
- Annual Nutrient Cycling Assessment (ANCA)
- My Sustainability
- AMS + Grazing / Amazing Grazing
- Cow Power / Cow Garden
- Bedded Pack Farms
- Smart Dairy Farming
- Animal Husbandry Networks
- EDF / GDF / IFCN a.o.





# Dairy Campus



Inspire to create

# Dairy Campus in development



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# Sino Dutch Dairy Development Center



China Agricultural  
University

WageningenUR

FrieslandCampina



WAGENINGEN **UR**  
For quality of life

Inspire to create



# Sustainability issues in Dutch dairy farming

## ■ Environment

- Local: manure surplus, ammonia, nitrate, dust; Global: climate change

## ■ Animal Welfare

## ■ Economy

- Profit & continuity
- Labor (quantity & quality)

## ■ Use of natural resources & biodiversity

- Global footprint, LCA, north-south relation
- Limited resources (energy, minerals)

## ■ Health (of man and animal)

- Veterinary risks; antibiotics and residues; hormones

## ■ Landscape



# The problem & the challenge

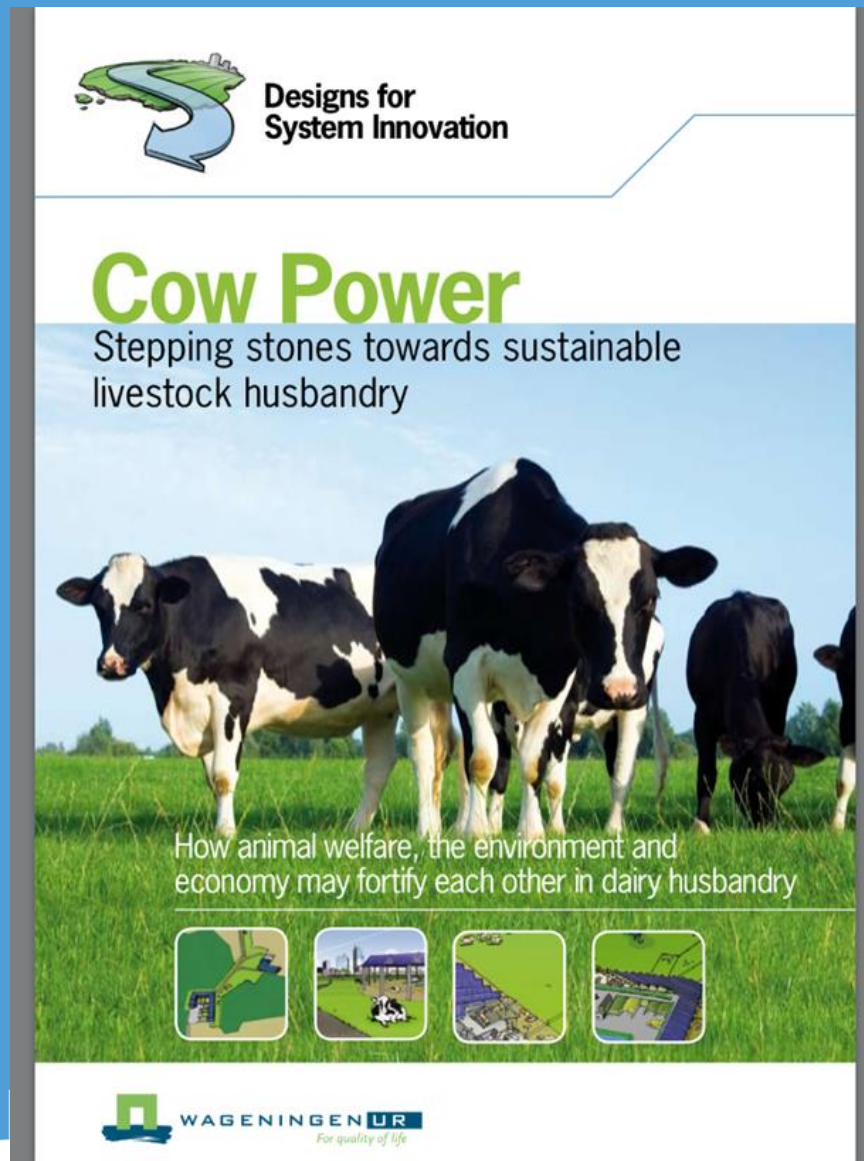
- Traditional approach and experience: small adaptations of current systems hardly improve welfare
- Welfare improvements are often in contradiction with economy & environment
- These goals cannot be met at the same time
- Solution & approach:
  - Design for inspiration and stimulation for sustainable development
  - Use adequate design method & redesign
  - Set aside current assumptions and be reflexive







# Cow Power



<http://edepot.wur.nl/12251>



# BoR Citizen / Consumer (critical elements)

- Enough space for free movement of cows
- Animals well treated (like brother and sister)
- Feed is fresh and on natural basis
- Willing to pay little higher price for animal welfare
- Natural environment for animals
- Animal products (milk, meat) are tasty
- Fair and sustainable production process
- Professional attitude of farmers
- Enough margin for farmers, to make a good living
- Quality assurance by regulations / Q-programs



# BoR dairy cow: some examples

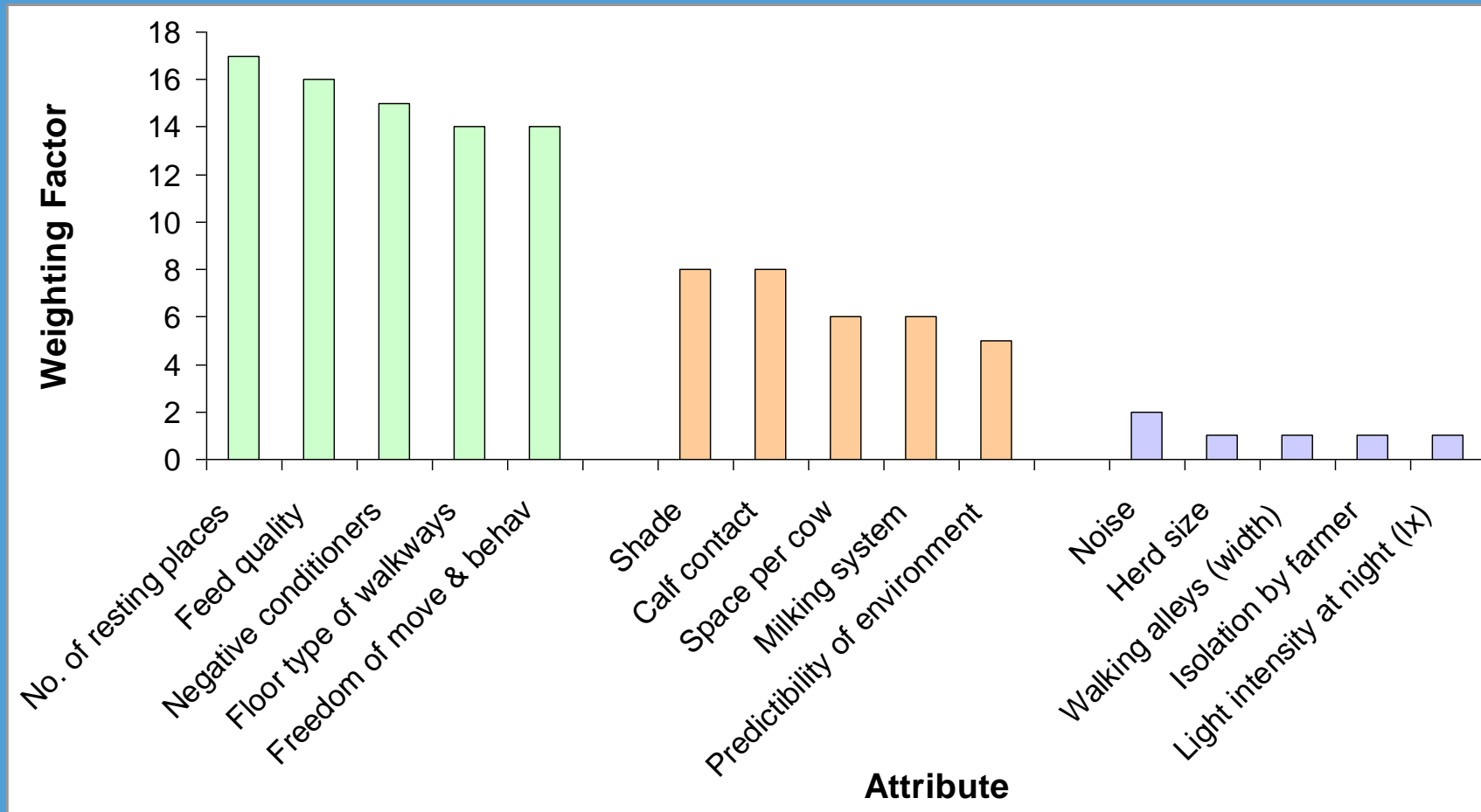
- Number of resting places:
  - $>1$  per cow
- Freedom of movement & behaviour:
  - $\geq 360$  m<sup>2</sup> per cow
  - Indoor and outdoor access
- Size of resting area
  - Free resting place (no obstacles)
- Floor type of walk ways
  - Friction, roughness, hardness





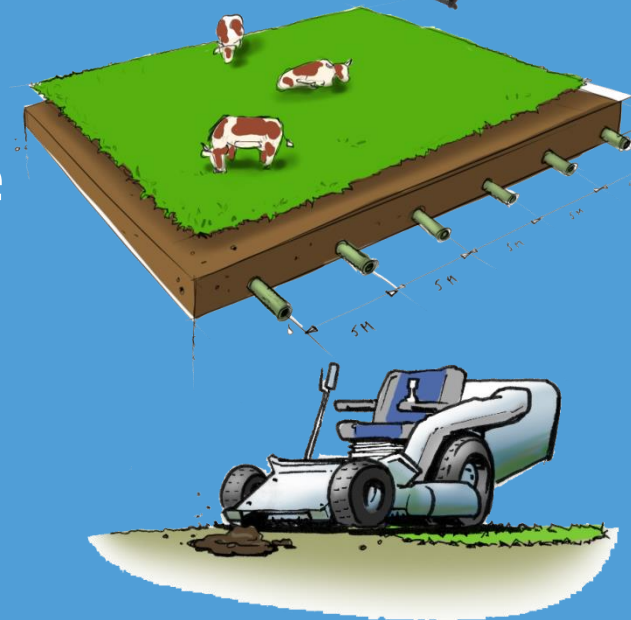
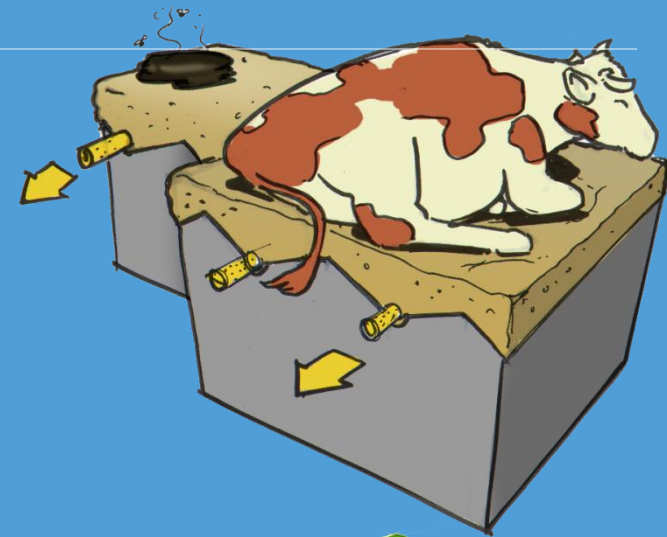
# Welfare scores: WF of the attributes

The top 5, mid 5 and last 5 attributes (42 in total)



# Key solutions to overcome contradictions

- Allow for much more space, but cheap
  - Equip all areas with dry, non-slippery floors
  - Outside and inside as one continuous whole
  - Limit 'inside' to basic shelter
- Keep faeces and urine apart in the system
  - Various solutions possible on floors and grounds
  - Process them as separately applicable fertilizers



# A. All needs of the cow



- Enough space all year round
- Enough resting place(s)
- Freedom of choices
- Sufficient floors
- Locomotion
- No stress treatments or injuries
- Enough feed / good quality





## B. Minerals are useful products



- Use of plants
- No power of feed
- Separate faeces and urine
- No artificial fertilizer
- More organic drymatter and better quality of life in soil

## C. Share €, labour and land



- Space for cow without an expensive stable
- Shared investments in milking parlour, machines, land, etc
- Co-operation
- Higher yield in grass- and cropproduction
- Energy production
- Higher quality of labour
- New functions

## D. Soil is ecosystem



- Use organic drymatter in manure
- Intensification and extensification on the same farm
- Optimize management of N fertilizer (quantity, type of fertilizer, exact gifts at right place, etc)
- Minimize tillage
- No soil compression













For quality of life





# Cow Garden



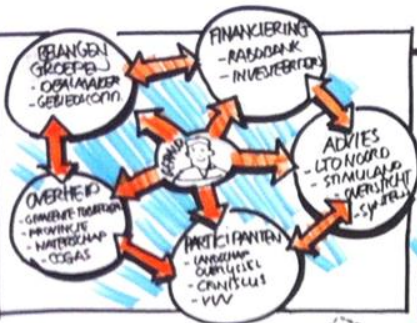


# Cow Garden





NETWORK



# ERVE HILBERT

DUURZAAM BOEREN IN TWENTE

COMFORT STAL

MARKGRAVEN

TURBERGEN

MEST RAFFINAGE

ACTIE PLAN

ZORG ERF



ROOD VOOR GROEN

INNOVATIES

GERALD

MIJN AMBITIES

- ZORGELOOS BOEREN MET DUURZAME IDEEËN
- BOEREN MET NATUUR- WATER EN MAATSCHAPPELIJKE ZORGEN
- BOEREN MET NIEUWE "NOABERS"
- BOEREN MET CULTUUR- HISTORISCH BESEF

WIN WIN

DUURZAAM BOEREN

GROENE DIENSTEN

OPLOSSINGEN MET MEERWAARDE

- DUURZAME COMFORTSTAL
- NIEUW LANDGOED (ROOD VOOR GROEN)
- ZORG ERF
- MEST RAFFINAGE
- GREEN DEAL

VAN VERLEDEN NAAR DE TOEKOMST



ANNE

JEANNE

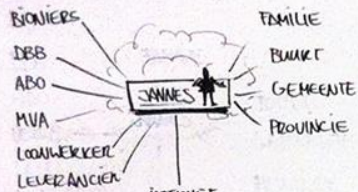
KAS

LUC





# Frisian Forrest



HOUD  
GESTROOIDE  
CV

MAIS

GRAS

VOEROPSLAG

OPSLAG DUNNE  
FRACTIE

ERFWATER  
KROESZUINERING

JANNES & FAMILIE

MMM...!!  
DAT LIGT LEKKER

BODEMLEVEN  
VERBETEREN

TOEKOMST BESTENING-BEDRIJF

31 DEC 2012  
- STOKEN OP HOUTSNIPPERS  
- OPEN DAG

1 JULI 2012

- HOUTSNIPPERS UITLOOP  
 - GRONK PERSJAFFEN → ERFAR-SPOLING  
 - CONTACT VERVALTIGERS / SCHOLIEREN  
 - BODEM VERVALTBAREHEID GEMIDDELSEERD  
 - EXTERNE ADVISEURS RANDELEGEN  
 - MESTSCHEIDER UITPROBEREN  
 - ANALYSE JANNESJEFERS

DIEPSTROOISEL  
BOX



## SLEUTEL INNOVATIES

- MEST SCHEIDEN IN DUNNE & Dikke FRACTIE
- REGIONAAL KRINGLOOP SLUITEN
- Dikke FRACTIE ALS STROOISEL LAAG
- ZELFVOORZIENEND IN VOER DOOR BETER GRAS-MANAGEMENT
- SUBSIDIE VOOR GROENE DIENST
- ONDERHOUD HOUT-WOLLEN DOOR VERJ-WILLIGERS EN SCHOLIEREN

## AMBITIES

- MINERALEN KRINGLOOP SLUITEN
- NIEUWE CONTROLEerbare STAL VOOR KOE & BOER
- MEER RENDEMENT MET DEZELFDE OMVANG
- DE KOE IN DE WEI HOUDEN!

VOER





# VRIJLOOP SCHENKERIJ

## PROMOTIE

- VVV
- VECHTEL RECREANTEN
- SAMENWERKING EXTERNE (BUREAU CAMPAGNE)
- MARKETING BUREAU

## VERGUNNING

- PROVINCIE
- GEWENT
- GEWENT

## OMGEVING

- NIET OVERZICHT
- GEWENT
- LANDSCHAP OVERZICHT
- GE + RI DIENSTEN

## STAL

- ID AGRO
- NATUURLIJKE MITIGATIE

## FINANCIERING

- ACCOUNTANT
- BANK

## BODEM KRINGLOOP

GRAS

URINE

MEST

COMPOST

IK BEN KUSTIG & GEZOND!

VRIJLOOP STAL

BEELUCHTING

THEE TUIN

DE STAL STAAT!

TOTAL PLATTE FINANCIËN KAN

VERGUNNING AANVRAG LOOPT

MAKCHT BODEM HANDELIJKE

BEELD OVER INRICHTING ERF & STAL

KRINGLOOP OP BEDRIJF BI BEELD

OVER 3 JAAR

OVER 1 JAAR

1 JULI

7 MARCH

NOW DAT IS HET BOEREN LEVEN!

BELEVING VOOR BURGERS

TONGVEESTAL

VEEL LICHT IN HET

## INNOVATIES

- \* VRIJLOOP STAL
- \* KOEÏN BUITEN
- \* ZONNEPANELEN
- \* WARMTE BODEM BENUTTEN
- \* VRUCHTBARHEID GROND VERBETERN
- \* COMPOST GOED BENUTTEN
- \* WANDEL PAD
- \* THEE HUIS

WELZIJN:  
EEN GEZONDE KOE IS  
EEN PRODUCTIEVE KOE

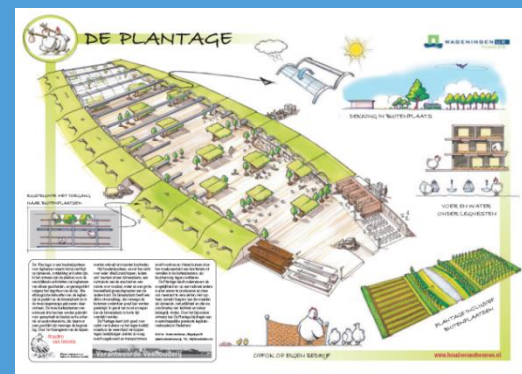
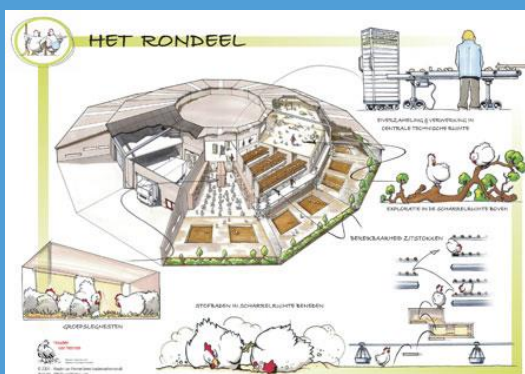
MELK

AMBITIES VAN KARIN LANGENKAMP  
VRIJLOOP VAN KOEÏN: MEER NATUURLIJKE GEZOND  
ENERGIE NEUTRAAL  
OPENHEID: LIEVER ZIEK WELKE DOOR  
KRINGLOOP DENKEN BODEM VERBETERN





# From science to realisation



# More information



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