

# System innovations

## Cow Power

Alexandre Family EcoDairy

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Livestock Research



WAGENINGEN **UR**  
For quality of life



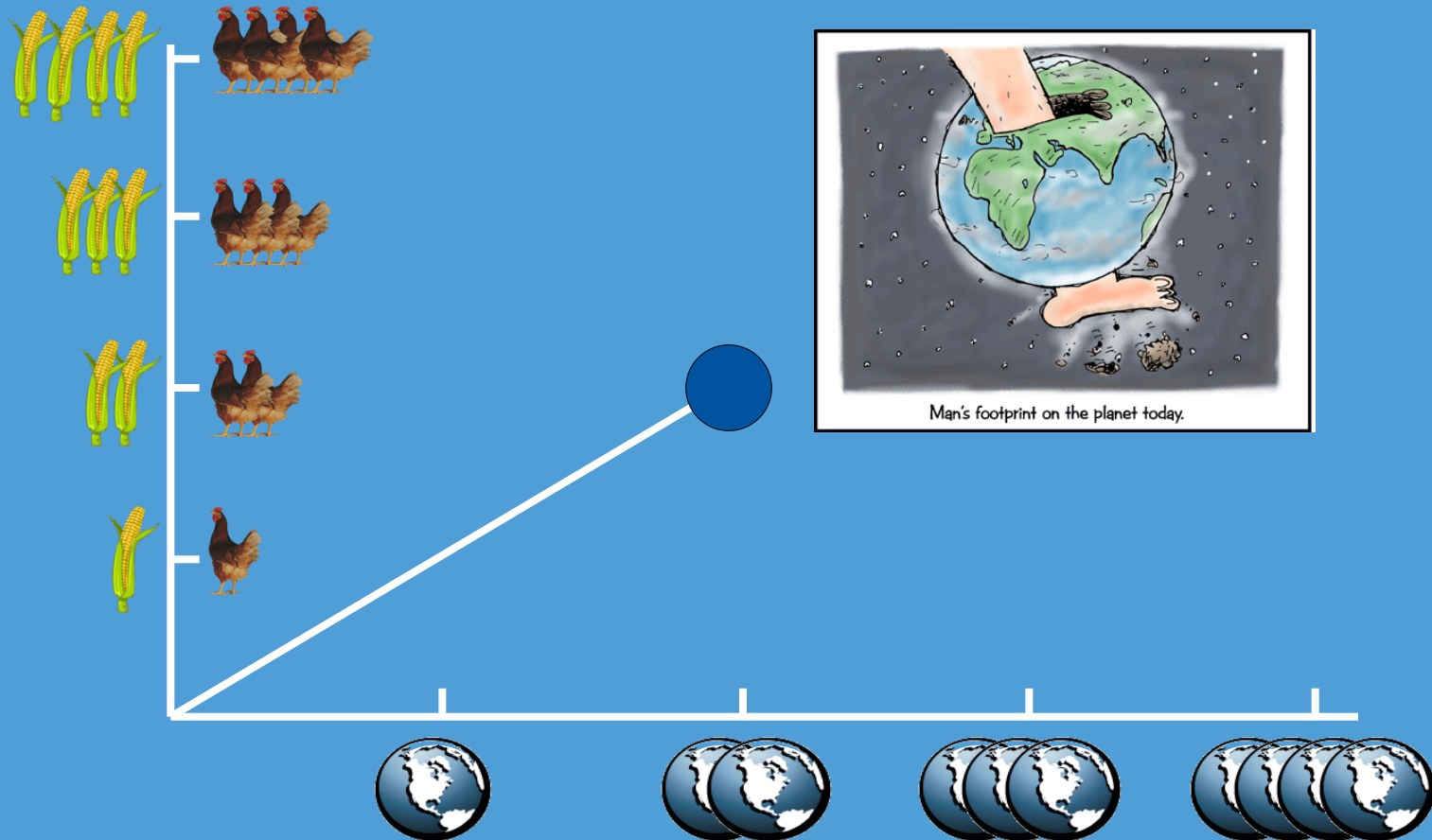


# Earth overshoot day

- Earth Overshoot Day = the day we have used all the resources for that year
- 1992 → October 21
- 2002 → October 03
- 2012 → August 22
- 2014 → August 19
- 2016 → August 08



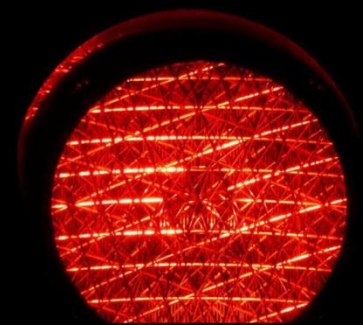
# We are exceeding the carrying capacity



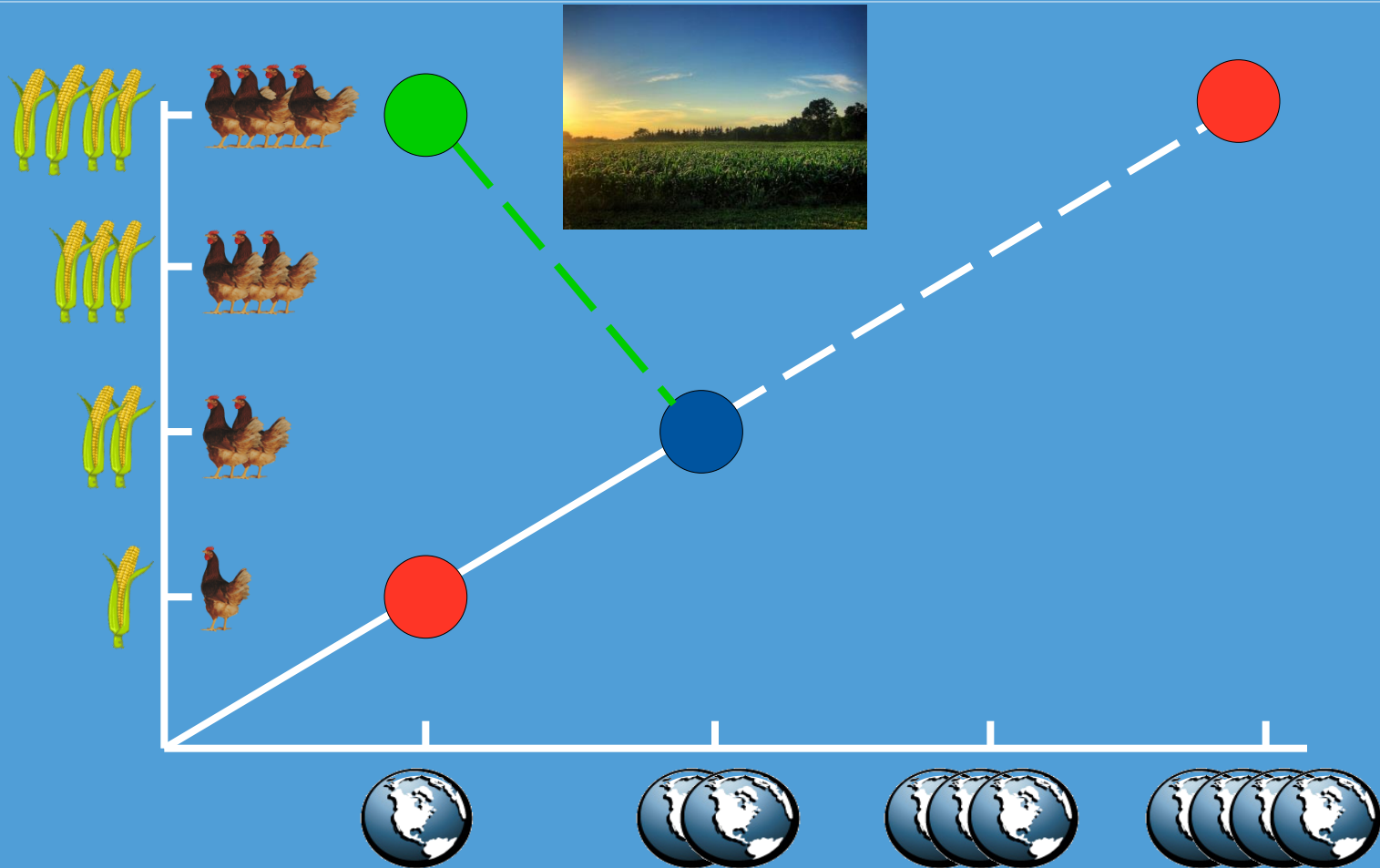








# But we can make a shift in another direction





# 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 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



# Dust concentrations and emissions: major concern in laying hen houses

- EU ban on battery cages > shift towards loose housing on litter floors > emissions of  $PM_{10}$  in NL increased with a factor 17 (1995 to 2014) (Winkel et al., 2016)
- Effects on residents in farming areas: increased prevalence of pneumonia, lower lung function, more exacerbations and medicine use in COPD patients (Heederik et al., 2016)
- Animal welfare problem swapped for air quality problem! (Winkel et al., 2016; Proposition nr. 1)





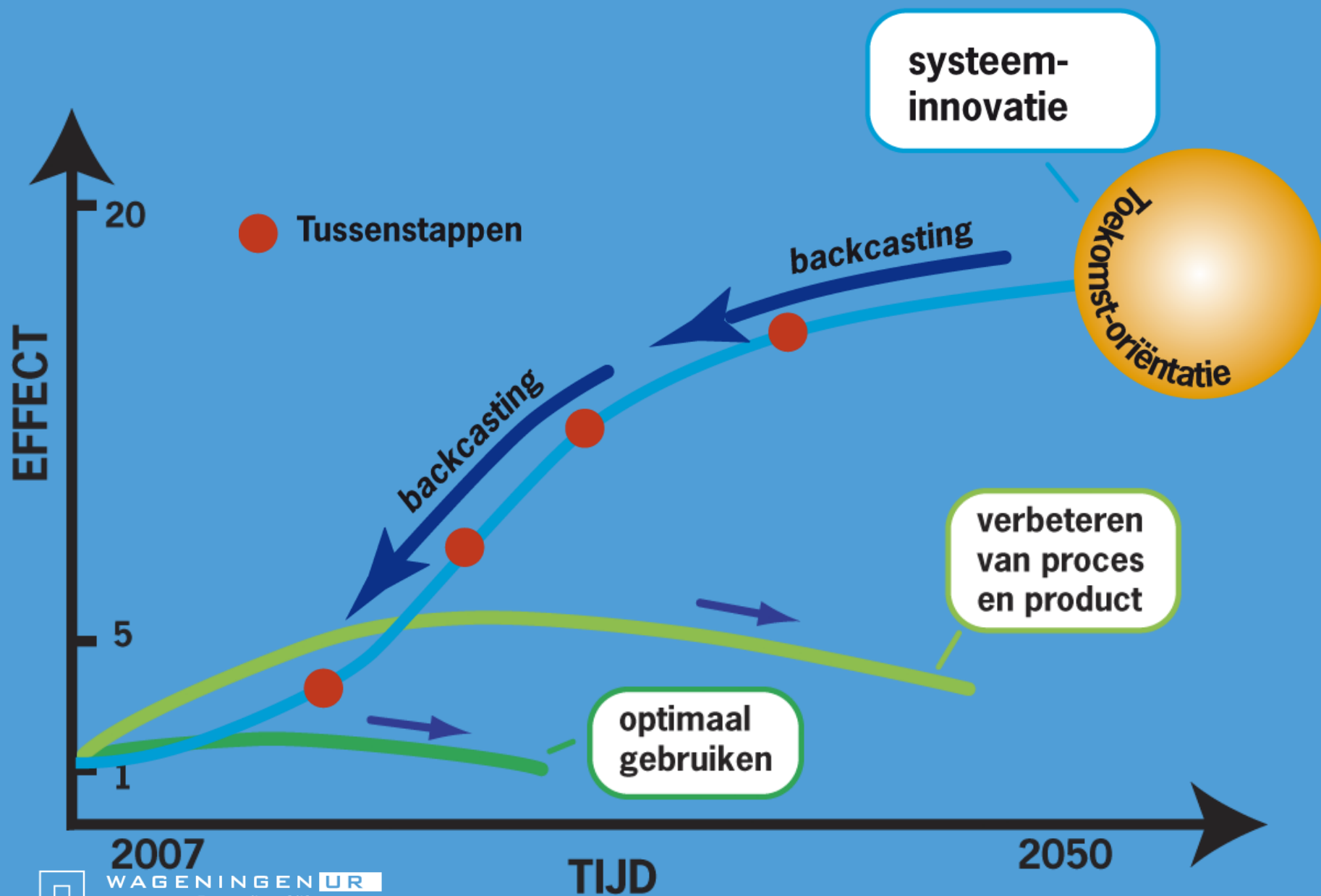
# Combating dust in laying hen houses by integrated system design



**Fig. 2 – Dust bath unit for laying hens with one-way entrances to sand or turf on conveyor belts at the bottom, and perches that enable hopping to one-way exits in the top. Transparent walls let sunlight in and makes dust bath behaviour visible from the outside.**

Source:

Van Weeghel et al. (2016). Involving the animal as a contributor in design to overcome animal welfare related trade-offs: The dust bath unit as an example. *Biosystems Engineering* 145:76-92.









# Critical successfactors co-creation

- Knowing new roles of each other
- Respect for each other and roles
- Common goal, all actors active
- Common language
- Joint reflection and learning
- Continuous efforts in creating learning environment
- Needs more time and effort than expected, point of trouble
- Celebrate success







**Dairy is our future**





# 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



# 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



# 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



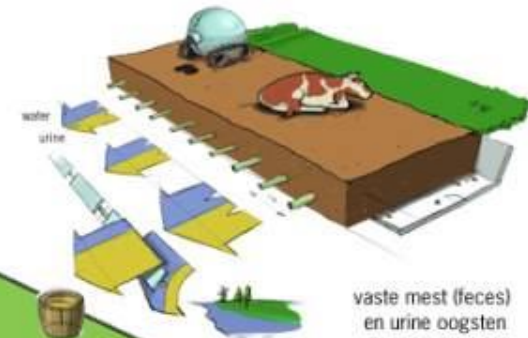
# De Meent

## Jaarrond de ruimte

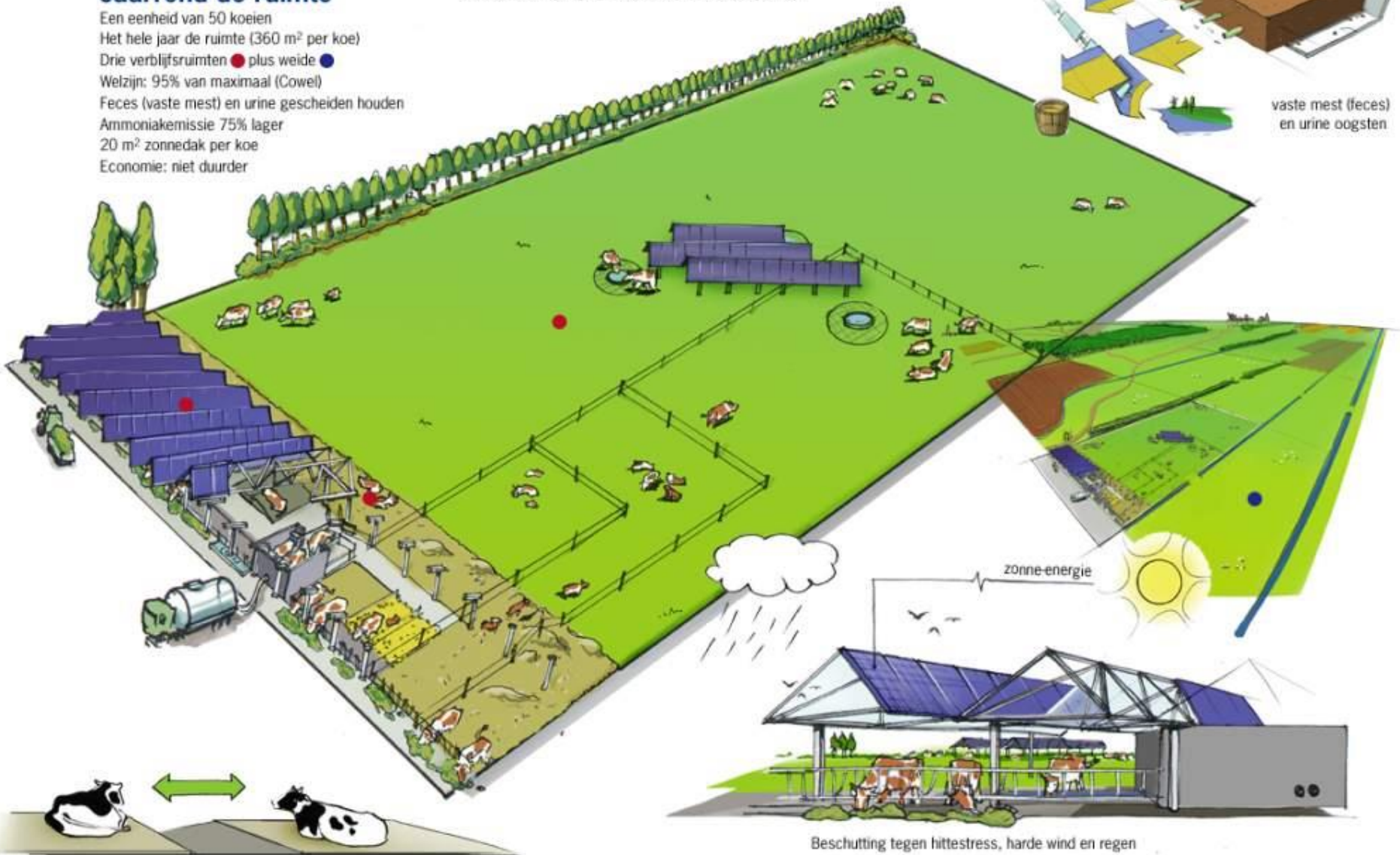
Een eenheid van 50 koeien  
Het hele jaar de ruimte (360 m<sup>2</sup> per koe)  
Drie verblijfsruimten ● plus weide ●  
Welzijn: 95% van maximaal (Cowel)  
Feces (vaste mest) en urine gescheiden houden  
Ammoniakemissie 75% lager  
20 m<sup>2</sup> zonnedak per koe  
Economie: niet duurder



Ruimte voor beweging, vrije keuze en sociaal gedrag

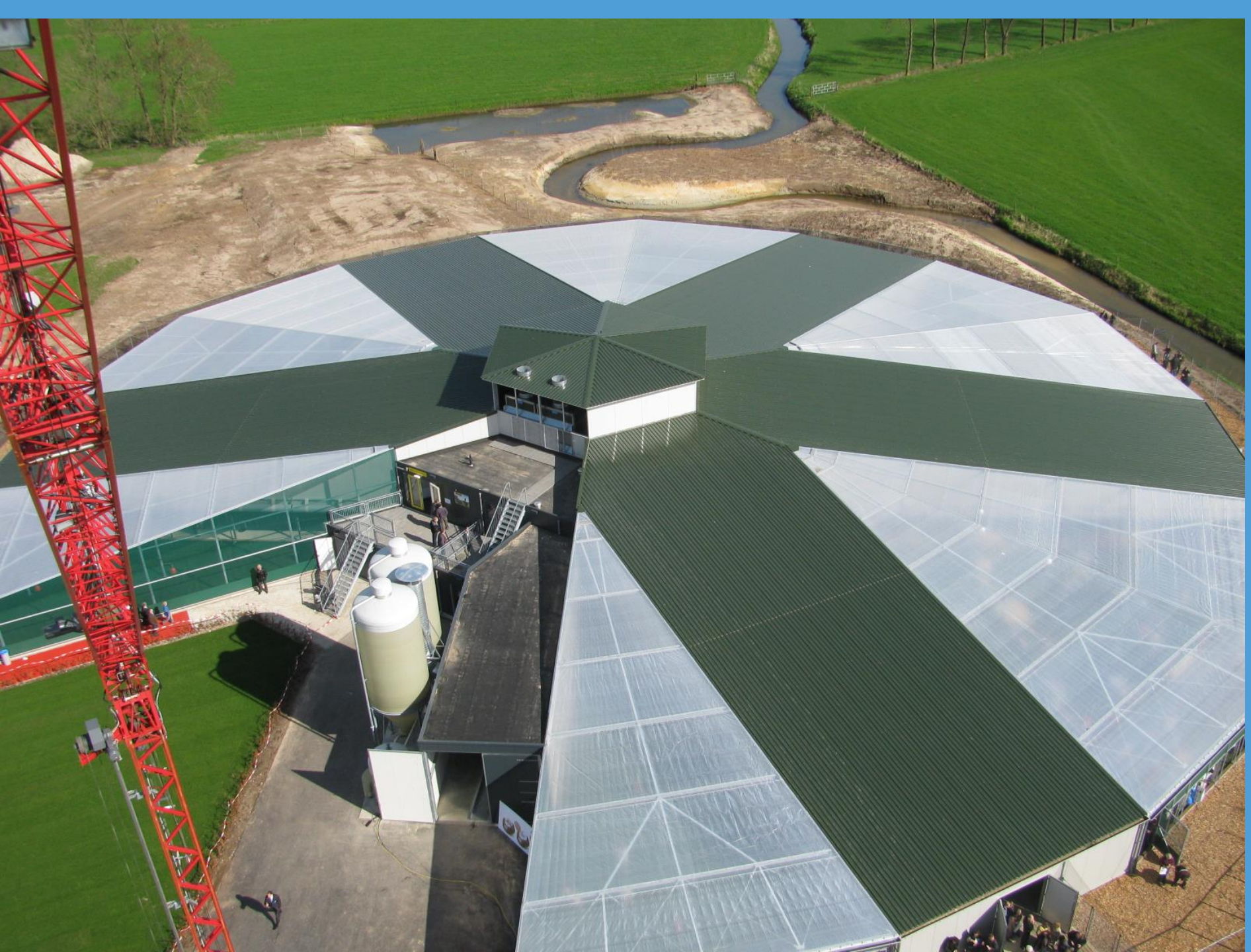


vaste mest (feces)  
en urine oogsten



Ruime ligplaats en afstand tot elkaar











# Windstreek















For quality of life





# Cow Garden



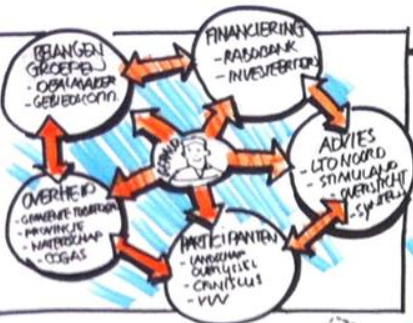


# Cow Garden





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

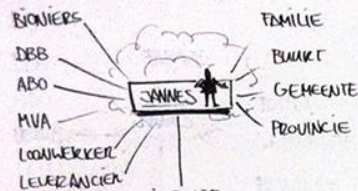
KAS

LUC





# Frisian Forrest



HOUD  
GESTROOKE  
CV

MAIS

GRAS

VOEROPSLAG

OPSLAG DUNNE  
FRACTIE

ERFWATER  
KROESZUVERING

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 VERWILLIGERS / SCHOLIEREN  
- BODEM VERLICHTBAARHEID GEMIDDELD

7 MARCH 2012  
- EXTERNE ADVISEURS RANDELEGEN  
- MESTSCHEIDER UITPROBEREN  
- ANALYSE JANNESJEFERS

DIEPSTROOSEL  
BOX



## SLEUTEL INNOVATIES

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

## AMBITIES

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

VOER





# VRIJLOOP SCHENKERIJ

## PROMOTIE

- VVV
- VECHTEL RECREANTEN
- SAMENWERKING EXTERNE (B.V. DE VRIJLOOP SCHENKERIJ)
- MARKETING BUREAU

## VERGUNNING

- PROVINCIE
- GEWENT
- GEWENT

## FINANCIERING

- ACCOUNTANT
- BANK

## STAL

- ID AGRO
- NATUURLIJKE MITIGATIE

## OMGEVING

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

## WANDEL PAD



**AMBITIES VAN KARIN LANGENKAMP**

VRIJLOOP VAN KOEËN: MEER NATUURLIJKE GEBOEGE

ENERGIE NEUTRAAL

OPENHEID: LIEFDE ZIEK WAT JE DOET

KRINGLOOP DENKEN: EENKEURIGHEID



URINE  
MEST

IK BEN KUSTIG & GEZOND!

VRIJLOOP STAL

BEELUCHTING



TONGVEESTAL  
VEEL LICHT IN HET



WELZIJN:  
EEN GEZONDE KOE IS  
EEN PRODUCTIEVE KOE



## INNOVATIES

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











# More information



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