




Dutch / EU perspective on initiatives to increase food production capabilities in responsible systems

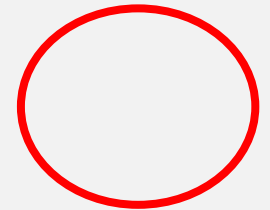
Peter W.G. Groot Koerkamp (PhD)

Professor in biosystems engineering



Some numbers!

		Canada	USA	NL
Cattle (10^6)		15	96	
Pigs (10^6)		15	61	
Poultry (10^6)		167	2 045	
People (10^6)		33.5	307.2	
Area (10^6 km ²)		9.98	9.63	
People density (km ⁻²)		3.4	31.9	
Poultry density (km ⁻²)		16.7	212.4	



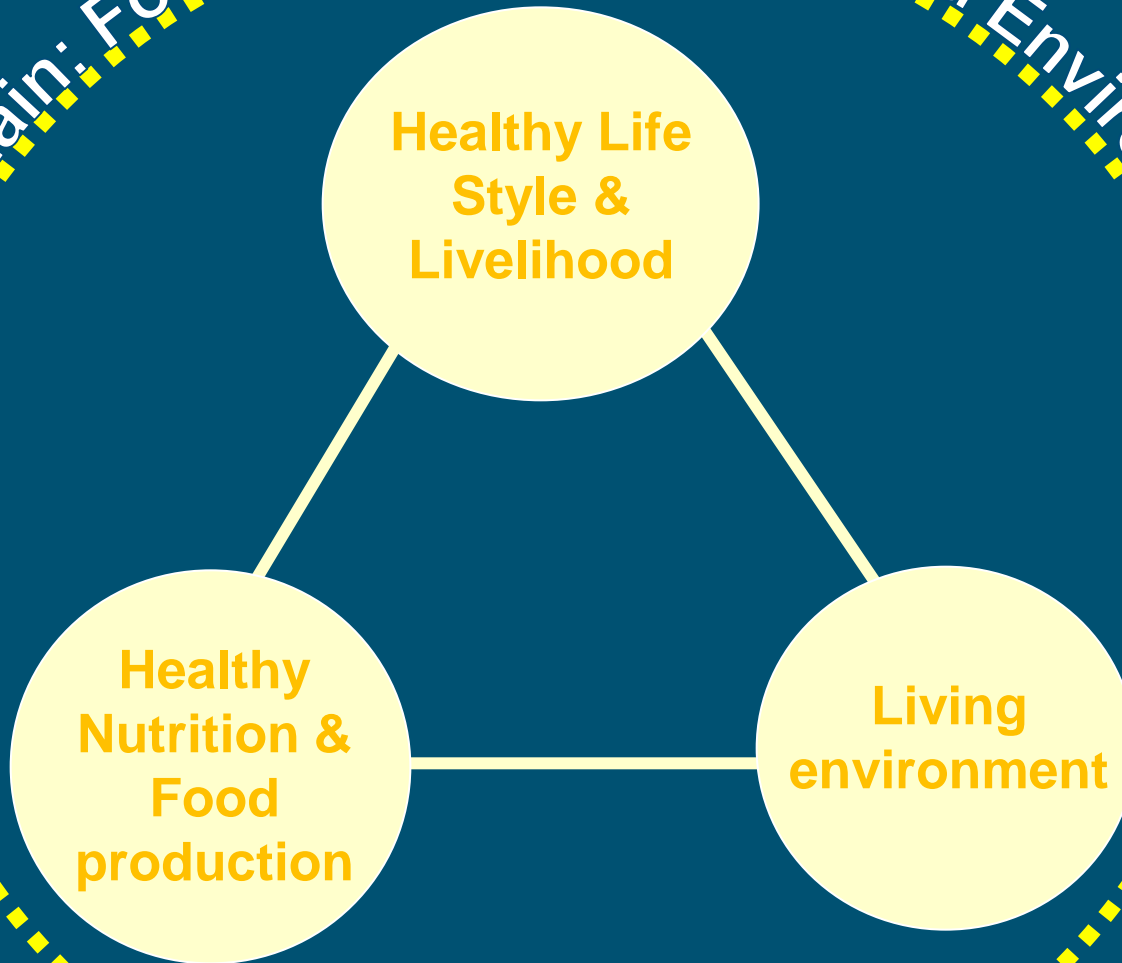
“Metropolitan agriculture”: urbanised environment as a chance
 Dutch export approx. >70% of production to NW Europe

Wageningen UR: our mission



*...To explore the potential of nature
to improve the quality of life...*

Our domain: Food, Healthy Nutrition and Environment



University, research institutes and education

Wageningen

University

DLO

Van Hall Larenstein

Research & education organized in five science groups:

1. Animal sciences
2. Plant sciences
3. Environmental sciences
4. Social sciences
5. Agrotechnology & Food sciences

Wageningen, Velp,
Leeuwarden

500 fte

4300

What is sustainability?

Meeting the needs of the present generation
without compromising the ability of
future generations to meet their needs

Brundtland, 1987

How do we love all the children
of all species for all time?

Willam McDonough

What is at stake?

Who are the 'stake-holders'?

Issues of sustainability: people, planet, profit

- Animal welfare & health
- Veterinary and zoonotic diseases (AI, CSF, BSE)
- Local environmental burden (air, water, ground)
- Global environmental burden (climate)
- Limited non-renewable resources (minerals, P_2O_5 , soil, water, energy)
- Product quality and health
- Low or negative margins in primary production
- Labour conditions
- Succession (costs / willingness)
- Power issues: retail, chain, farmer, consumer
- Future of the countryside
- Space requirements & allocation / issues of scale
- Global trading relations (north-south, WTO)

Clear, but depends on place, culture, time, perceptions,

Societal issues (1)



**MEAT
THE
TRUTH**



www.vroomshoop.geenmesthoop.nl



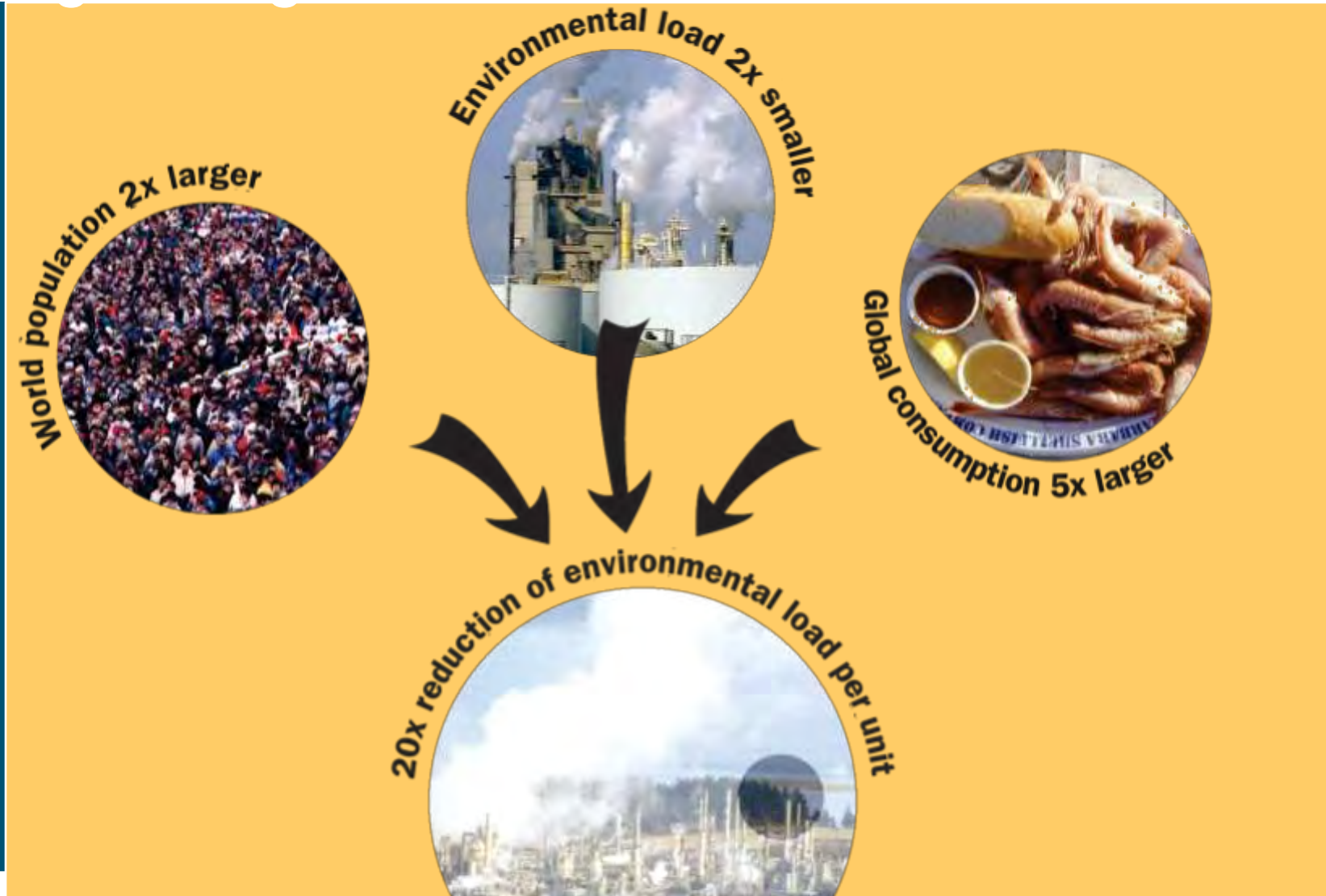
Veerman: We importeren voer, we exporteren varkens en de rommel houden we hier

Societal issues! (2)

Year	issue	Costs (€) / info	Animals culled
1996	BSE (CJ)	Zoonotic / some died	
1997	Pig pest	€1.3*10 ⁹	2.5*10 ⁶ culled
1999/2003	Dioxine in feed	And in food	Sells down
2001	Foot & Mouth Disease		265*10 ³ culled
2002	MPA hormone in feed		20*10 ³ culled
2003	HP avian influenza	€2.5*10 ⁹ / 1 man died	30*10 ⁶ culled
2008	Bluetongue goats (dairy)		
2009-2010	Q-fever goats	Zoonotic >10 ³ man ill, >10 died	> 10 ³ (?)
2010/2011	MRSA / ESBL bacteria	Health control men	None yet



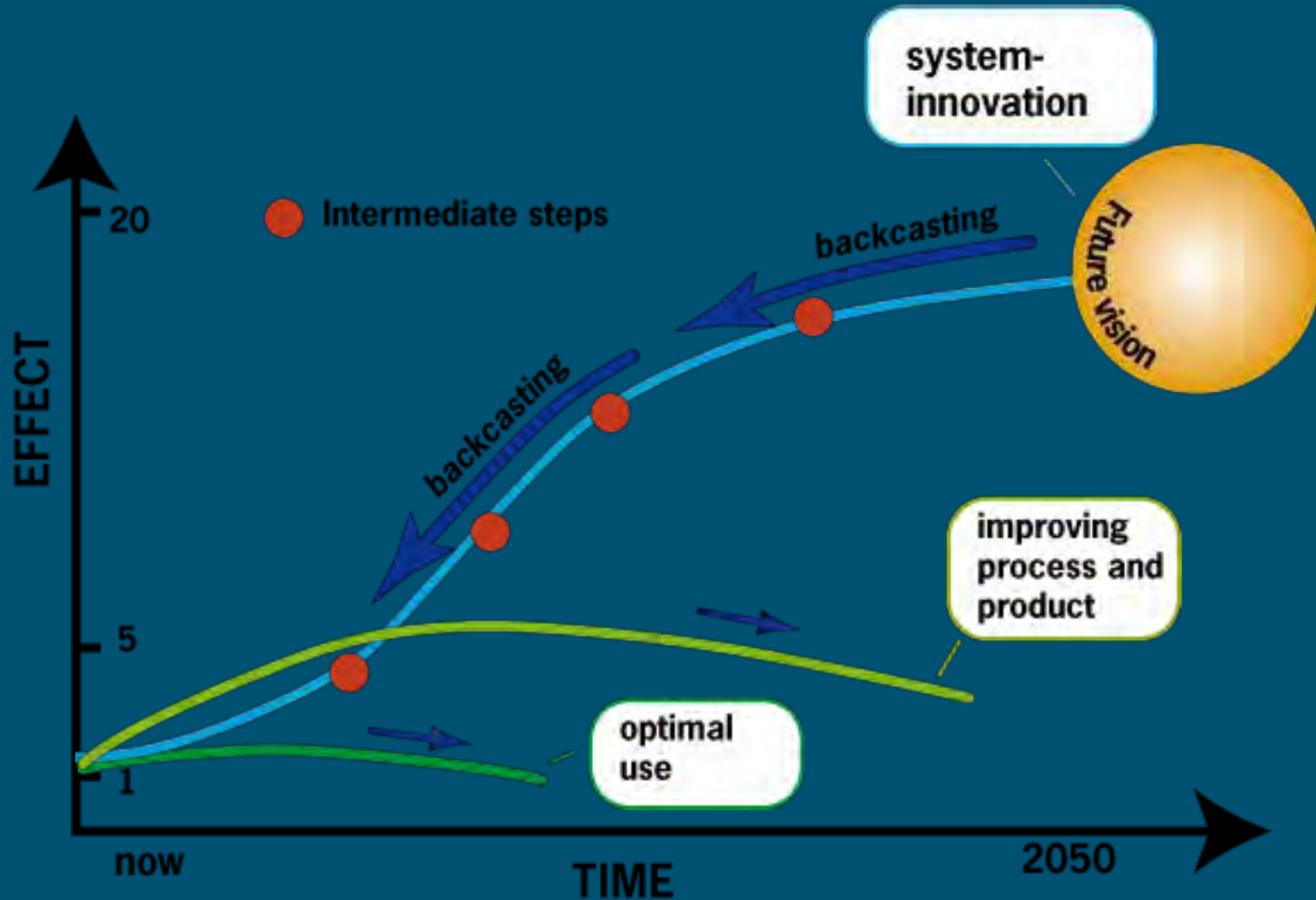
Long term goals: 20 times better!



Three ways of striving for sustainability

- Optimal use
 - Reduce waste, better use, recycling
- Improving process and product
 - Same product, same production process, but with less undesired side effects
- System innovation
 - Rethinking functions & needs
 - Reflection on the inevitability of current standards and practices
 - De-coupling of 'wicked links': structural connections between desired and undesired effects
 - Redesign: on the drawing table and in practice
 - Experimenting in niches (Strategic Niche Management)

Relative effect



Examples of system innovations in the past

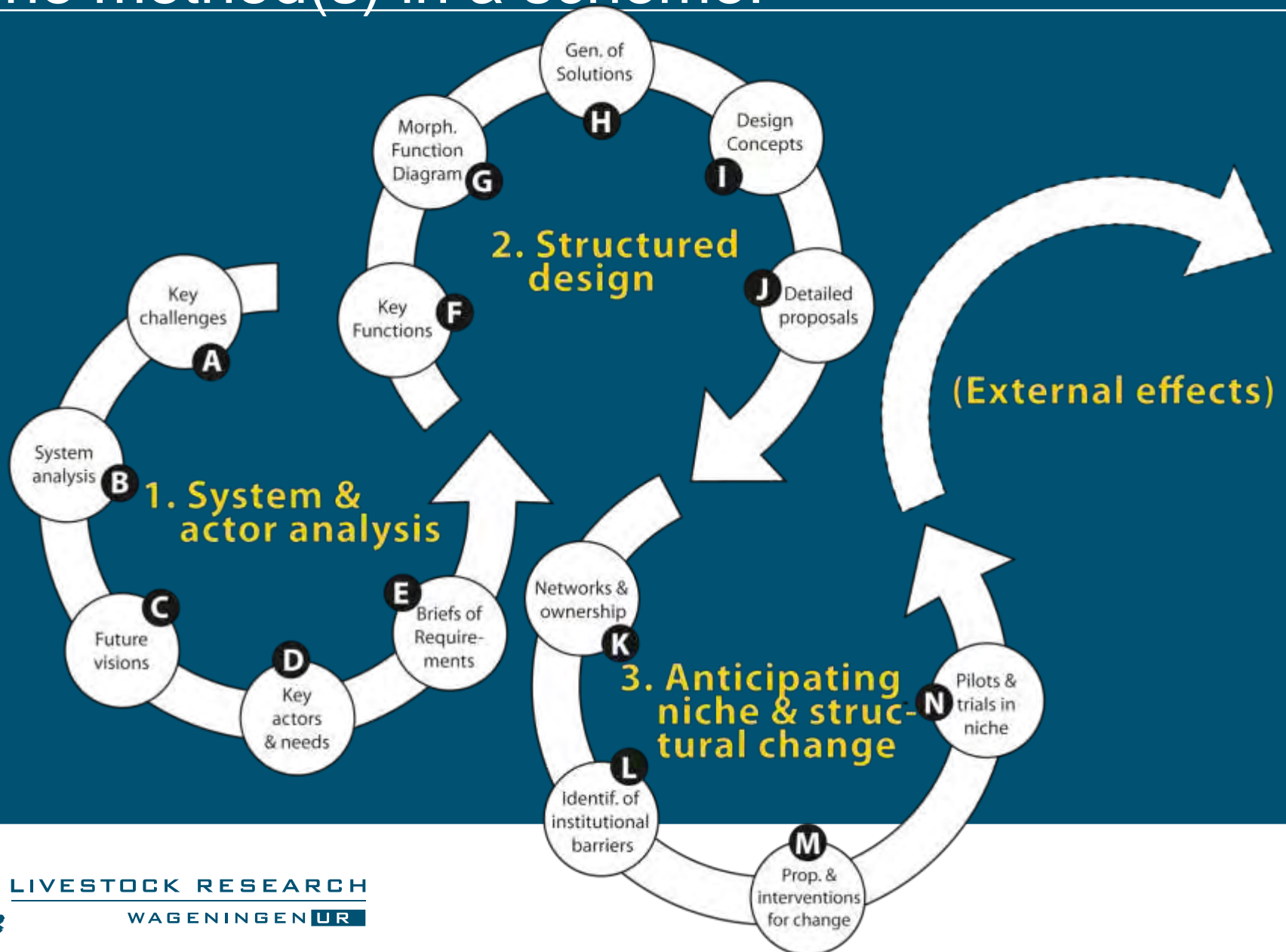
- Steam engines
- From horse to car
- From coal to gas
- Contraceptives
- From telephony to the internet
- From analog to digital
- Major social, cultural, economical and political impact, ultimately changing the 'landscape' (MLP): transition

Our challenge: how to *deliberately* strive for system innovations and transition in animal husbandry, to attain 'integral sustainability'?

Our approach to system innovation

- Approach: *Reflexive Interactive Design*
- Combines a range of methods (also from social sciences!):
 - Holistic approach – long term goals
 - System analysis including societal issues
 - Structural causes of sustainability issues; identification of wicked links
 - Reflexivity on current standards and practices
 - Interaction with all stakeholders (creativity, analysis, design realization)
 - Investigation of needs (ITA, Welfare research, Consumer research)
 - Structured design to synthesize needs
 - Strategic Niche Management (innovation theory)
- Design is prominent: vehicle for process of communication & change
- Design of new husbandry systems that transcend common oppositions and dilemmas

The method(s) in a scheme!

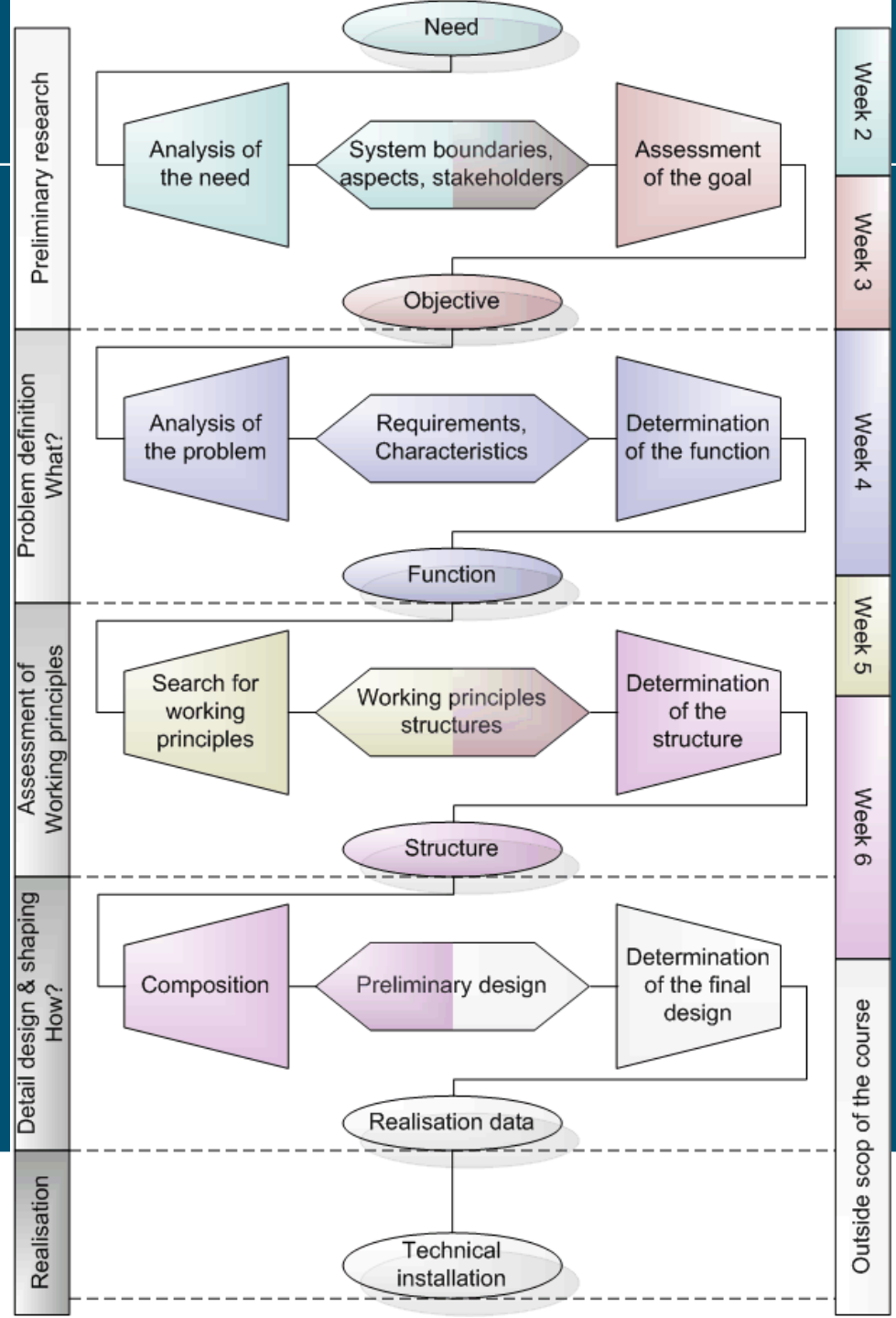


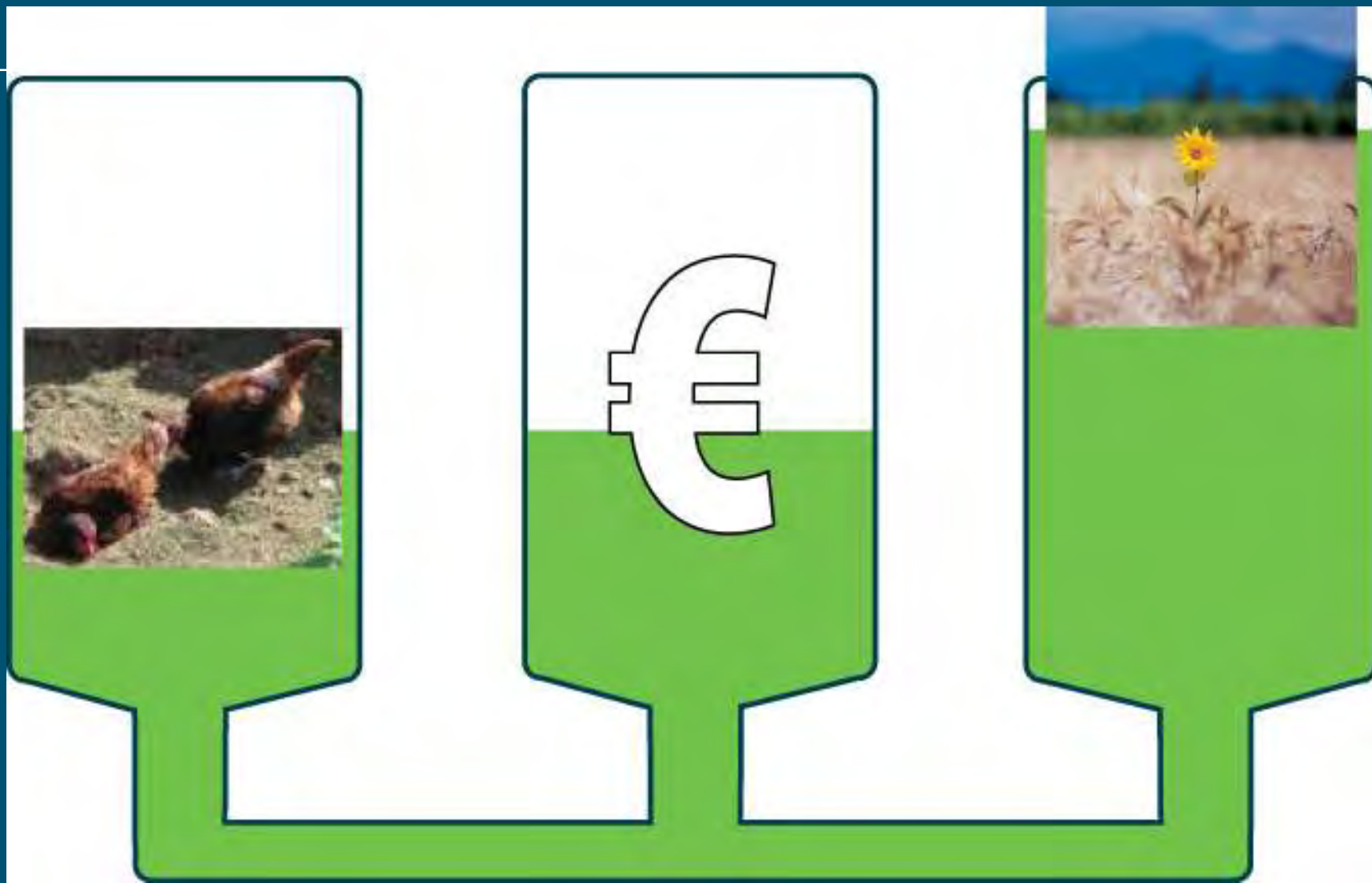
Reflexief Interactief Ontwerpen (RIO)

- **Systeem- en actoranalyse:**
 - Probleemanalyse
 - Analyse voorraden en stromen
 - Structurele oorzaken duurzaamheids-issues
 - Behoeften actoren: Programma's van Eisen (PvE)
- **Methodisch ontwerpen**
 - Gestructureerd ontwerpproces
 - Sleutelfuncties, ontwerpprincipes, functiediagram
 - In ontwerpatelier, dus samen met spelers in en om de sector
- **Anticiperen op niche-vorming en structurele verandering**
 - Verankering: eigenaarschap van ideeën; vervolprojecten; pilots
 - Meeleren door interactiviteit

Engineering Design

a transformation of the problem & need into 'requirements', 'functions', and 'solutions'









LIVESTOCK RESEARCH
WAGENINGEN UR

Houden van Hennen – Laying Hen Husbandry



Houden van hennen

Nieuwe ontwerpen voor
leggen en duurzame houderij





Phase 1: Research & development in *Houden van Hennen* (2003-2004)



Production of eggs in Europe: is there a problem?

Natural
production
system

Battery cages
forbidden in 2012!

Beak trimming
forbidden in 2006

how to prevent
Avian Influenza!

The image of free
range systems?

Environmental
issues

Economics of
current
alternatives?

More sustainable,
and robust!

Welfare and health
can't be served both



What are challenges & perspectives for the future?

production
rewarded by
society

Happy hens with
good production

Satisfied poultry
farmers

No more public
debate and threats

Environmental
friendly production

Better price for a
better product

Sustainable
production

Welfare and health
in balance



Detailed research with citizen panels

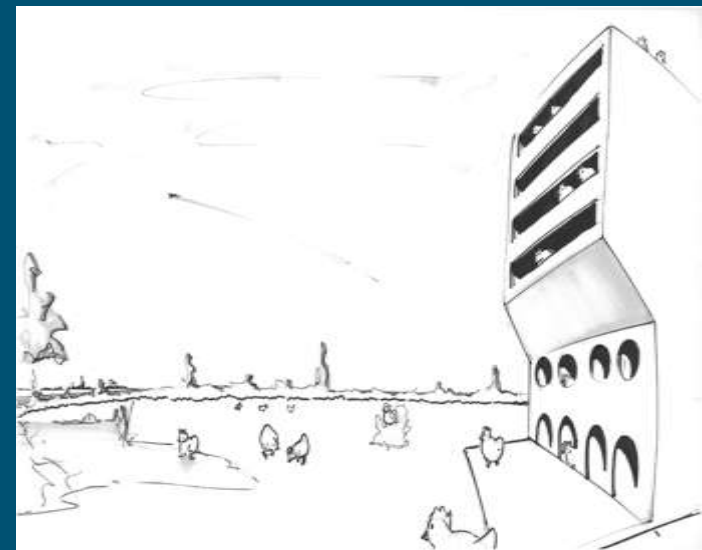
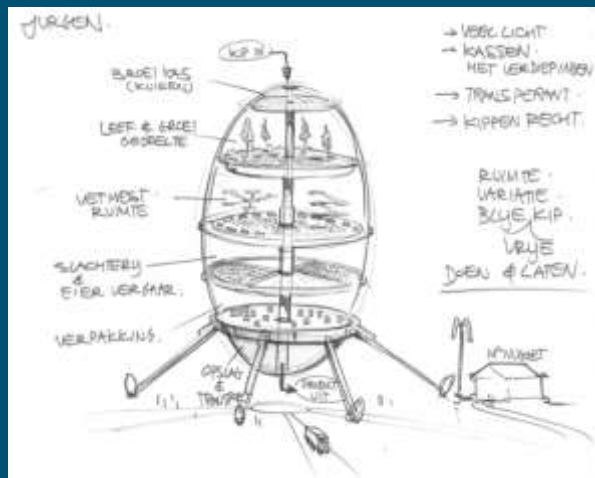
- Three separate sessions with 8 participants from three different *Mentality*-groups
- One day sessions on **ideal laying hen husbandry**
- Cognitive, sensory and emotionally triggered
- Visual spin off by professionals making artists impressions and cartoons
- End of the day: guided fantasy on ideal laying hen husbandry

Citizen panels: results

- Functional and visual clues
- Ideas of solutions
- General conclusion: differentiation among citizens on what 'ideal' means

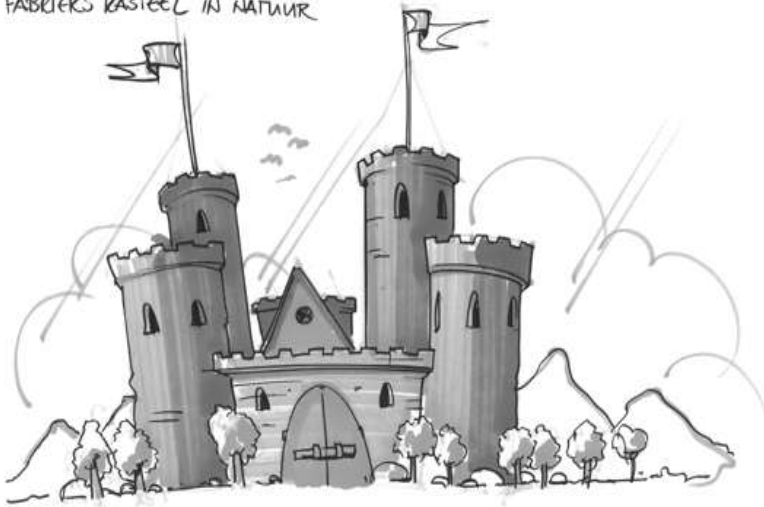
Citizen & consumer views: post-materialist

High-tech



& nature

FABRIEKS KASTEEL IN NATUUR

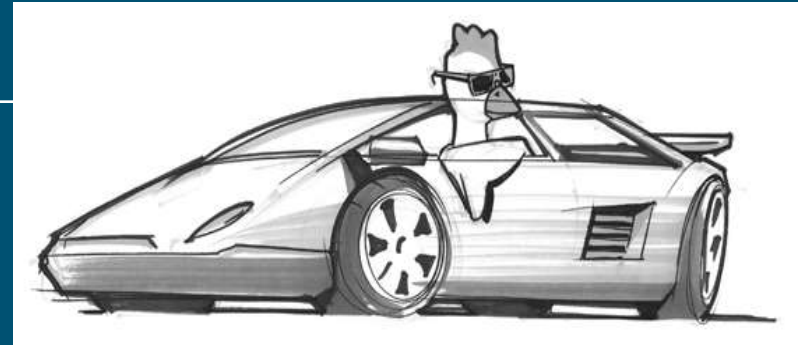


Traditional bourgeois

Romantic views



Cosmopolitan



Dynamic life & privacy



Concept 1: 'The Roundel'



Concept 2: 'The Plantation'



The movie!

<http://www.youtube.com/watch?v=fyD1nkdL4Cs>

or search for 'laying hen husbandry'
on youtube.com

Key innovative elements

- Space requirements of laying hen based on ethological needs: 2200 cm²/hen
- Functional differentiation in layout of system
- Design centers around main activity of hen: foraging
- Outdoor integrated element of system
Solution for outdoor run (avian influenza risks)
- Designs fit different submarkets (consumer groups)
- Designs show how laying hen husbandry may be 'sexy'

Phase 2: Incubation

Conquering obstacles

(2004-2006)



Phase 2: Incubation

- Difficult quest for financing
 - Project is too far ahead (in terms of integration) to fit current criteria for subsidy
 - One subproposal is found 'too cheap' to be financed
 - Farmers' risk difficult to get subsidized
- Local regulation hurdles
 - Spatial regulation does not fit an extensive system without an outdoor area.
 - One of the partners wins trial on environmental license, thanks to his partnership in Houden van Hennen.
- Network of farmers not able to transcend from farm to market
 - Lack of knowledge, lack of risk taking capacity, different insights on what the concept is about

Phase 3: Realization of pilots in niches (2006 - now)



Lankerenhof

inspired by the Plantation

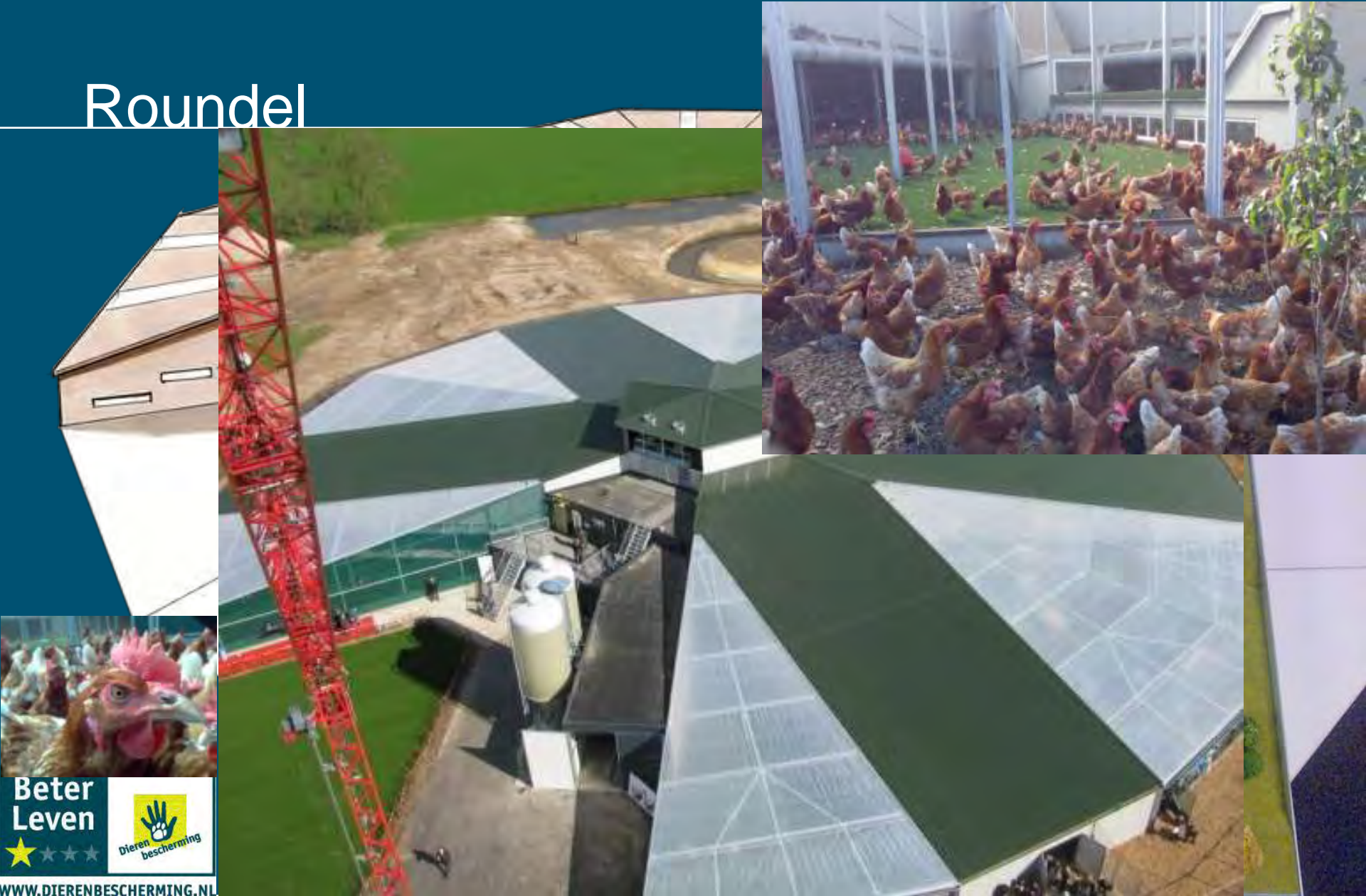


Realization of pilots in niches: 1

One farmer develops his own variant of the Plantation and builds it (Lankerenhof): opened june 2007

- Eggs sold as organic, partly as special regional product
- Subsidies for research by WUR
 - PhD project on emissions from organic aviary housing systems and outdoor run (LCA)
 - Animal behaviour studies (e.g. rearing hens in daylight with outdoor run)
 - Economical evaluation
- But very little room for risk mitigation of farmer
- Farmer wins Ekoland Innovation Prize (organic farming)
- More info: www.lankerenhof.nl (dutch only)

Roundel



Beter Leven
★★★★★
WWW.DIERENBESCHERMING.NL

Dieren bescherming



Realization of pilots in niches: 2

An egg packer and a system builder (Vencomatic) further develop the Roundel, with WUR assistance and partial supportive government funding (2006-now)

- Eggs sold as special product by AH supermarket
- New egg-chain organized by new company
- E.g. 3 stars Better Life of Dutch Org. Animal Welfare
- Various changes in contracts, structures, etc.
- First Roundel: April 10th 2010, second Feb 11th 2011
- More info: www.rondeel.org

Summary of redesign in Laying Hen Husbandry

- Phase 1 (2003-2004): research & development
 - Wageningen UR has lead, in interaction with stakeholders
- Phase 2 (2004-2006): incubation of ideas & concepts
 - Several attempts of farmers and entrepreneurs
 - Mixed responsibilities between WUR and others
- Phase 3 (2006-now): realisation of pilots in niches
 - Individual farmer boldly builds a new system
 - System builders & egg trader develop another system, and establishes collaboration with two farmers
 - Wageningen UR is supportive

Our track record

Design for system innovation

Stepping stones to sustainable livestock production

www.duurzameveehouderij.wur.nl

for information, brochures, reports, scientific publications, graphics, etc. (also in English)



Thanks for your attention

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