Resilience for Dairy (R4D) has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101000770

Innovative solutions supporting resilience of dairy farms in Netherlands

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Topics

- What does resilience mean?
- Needs within the context of challenges Dutch dairy sector
- Strategies in general and priorities group of farmers

Meeting with farmers, education and advisors
about changes in the dairy sector (needs) and solutions

What is te meaning of resilience to you?

	Alternative term	Number of times mentioned
1	**Adaptability,** adapt, adaptation, change, cope with	8
2	**Recovering capacity**, recovery, absorbing shocks	6
3	**Robust farm concept**, resistance, own strength	3
4	**Flexibility**	2
5	**Anticipating**	2
6	**Stress resistant**	1
7	**Good revenue model**	1
8	**Tipping point**	1

Resilience

1. Robust
2. Adaptation
3. Transformation

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The Dutch dairy sector

- 14.300 dairy farms, 1.5 million dairy cows
- 4.2 % organic farmers
- 110 cows per farm per farm
- 58 ha per farm, 50 ha grassland, 8 ha maize
- 2.1 cows per ha
- 59% sand, 29% clay and 12% peat soil
- 86% farms grazing
- 9000 kg milk per cow

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Many environmental challenges

- 41% reduction NH3 by agriculture in 2030
- 55% less green house gases in 2030 vs 1990
- Water quality: low nitrogen and phosphate application;
  3 m without application along ditches
- Nitrate directive: No more derogation on manure
  -> max 43 ton manure / ha
- Biodiversity

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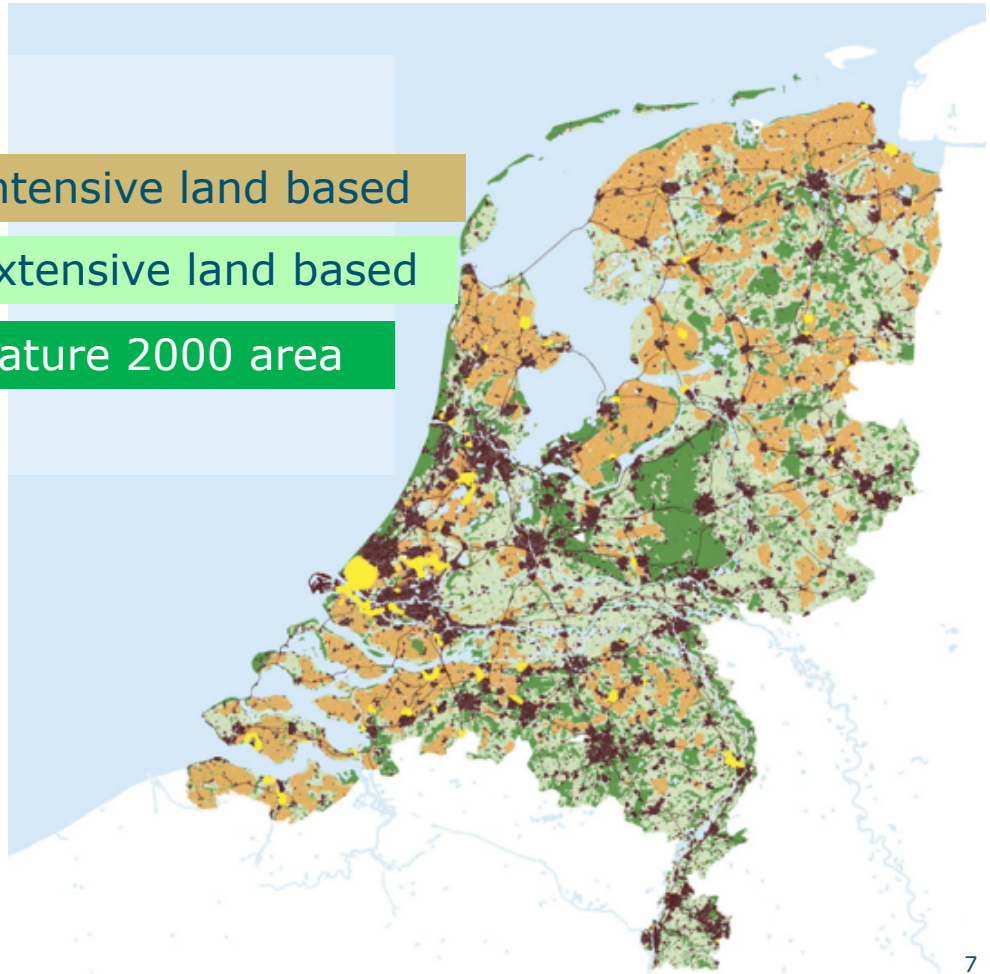
Challenge to combine reduction emissions with land use planning




Green house gasses (GHG)
Water quality & quantity
Biodiversity
CO_2
Goals Dutch Dairy Chain 2030
Animal welfare & health
Soil Quality & nutrients
Circular food production
Farm income
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Issues around Agricultural Agreement

- Stimulus to keep less animals, more grass and extensive
- Stimulus to innovate and secure them
- Measure emissions and manage with sensor technology
- Certified calculating system / mineral accounting system
- Urge to society and retail:
  for higher agricultural prices
  and payment for eco services

Highest scoring major changes and their importance

Major change (in the next 10 years)	Avg. score importance (1-5 range)
Sustainability themes	
Environment	4.30
Soil fertility	4.10
Greenhouse gases	3.90
Animal welfare	3.70
Circular agriculture	
Circular agriculture	4.00
Entrepreneurship / diversification	
Milk price / bonus price	4.00
Farm succession	3.60
Policy The Netherlands	
Inconsistancy of government policy	3.80
Environmental permits	3.80
Land rent laws	3.50
EU policy	
CAP: doing more for less money	3.80
Farm2Fork policy	3.50
Economy / costs	
Cost increases	4.00
Market and society	
Dairy cooperatives less dominant	3.50

Highest scoring adaptations and their relevance

Adaptation to increase resilience	Average score of relevance (range 1 to 5)
Develop a revenue model	
Create margins	4,5
Improving valorization milk/meat	4,2
Generate money for adaptations	4,0
Identify opportunities and seize them	
Identify opportunities	4,5
Be aware of opportunities and threats	4,4
Making a (business) plan to prepare for the future	
Make a medium-term plan	4,4
Personal development / knowing personal strengths	
Know your strengths and weaknesses	4,3
Acquire knowledge	4,3
Adapt farm / develop business	
Preparing soil for the future	4,2
Exploit the social environment	
Communicate, collaborate and connect	3,3

Strategies for the future; which direction?

- Scaling up ⟺ Scaling down
- Intensive ⟺ Extensive / grazing
- Low cost ⟺ Added value
- High tech ⟺ Natural
- Specialize ⟺ Mixed farming
- Animal ⟺ Plant
- Innovate ⟺ Close farms
- Farm level ⟺ Regional level

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Strategies for the future

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Solutions group farmers

1. Optimize and Adapt
   - less emissions
   - welfare
   - biodiversity
2. Transform
   - new business
     (food, energy, ...)
   - entrepreneurship

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Examples adaptation and new revenue model

- Housing system in relation to animal welfare, manure quality and lower emissions of ammonia and methane
    - Sand bedding in cubicles
    - Freewalk housing
    - Separation urine and feces
- Added value milk: freewalk cheese and A2 milk
- Energy production:
    - collect methane from manure storages
    - Produce hydrogen (H2)
- Total concept: precision farming, climate, nature and circular

Freewalk housing

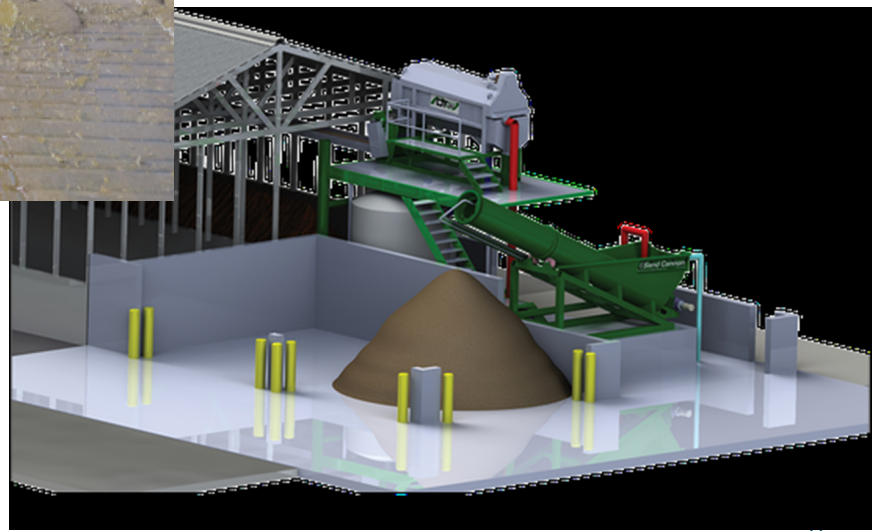

Woodchips bedding


Cowgarden with permeable artificial floor

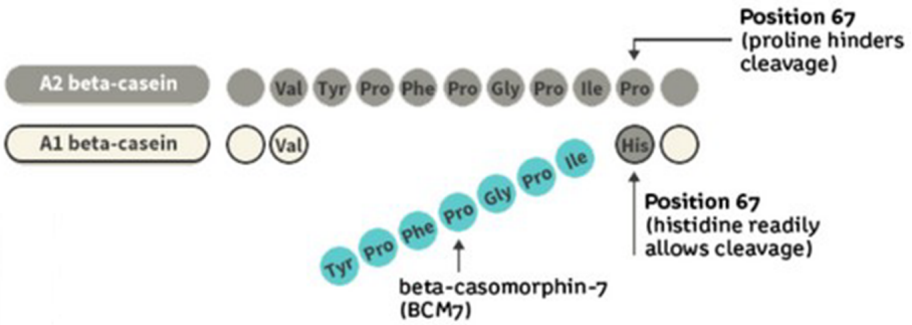
Sand with bedding cleaner


Slovenie

Sand in cubicles



Freewalk cheese and A2 milk



Oxidation by burning methane or .... capture

Capture, Compress

Filter, Gas pipes

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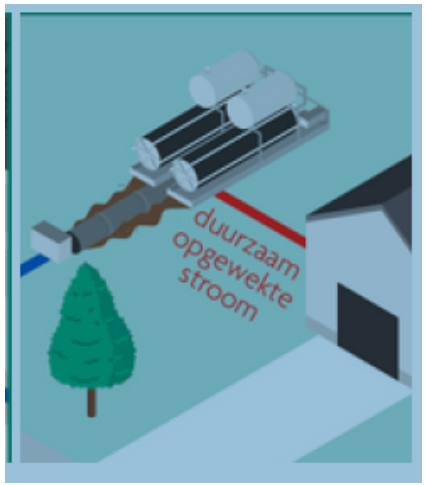
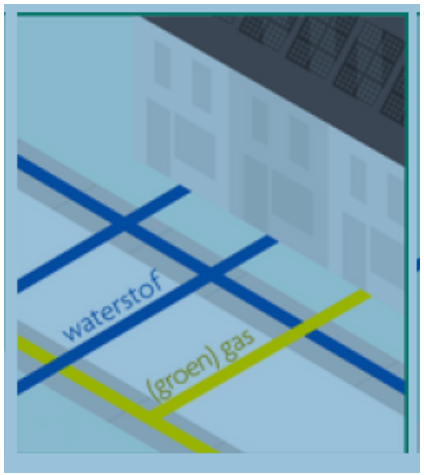
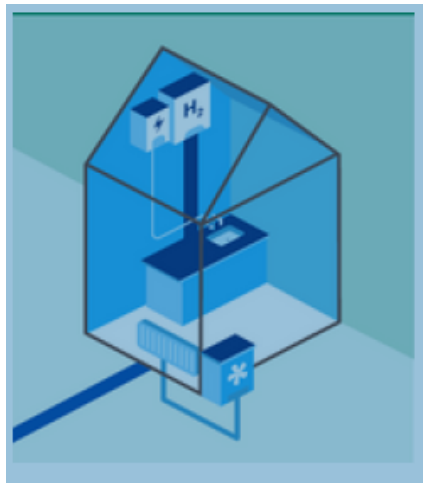
Hydrogen (H2) for 70 neighbours







Hydrogen production:

* Solar panels and windmill
* Electrolyser
* Storage and pressure unit

Double gas network:

* Hydrogen
* Green gas
* Using existing gas network

Homes:

* Insulation up to label B
* Solar panels
* Heat pomp
* Hydrogen boiler

Innovation centre De Marke

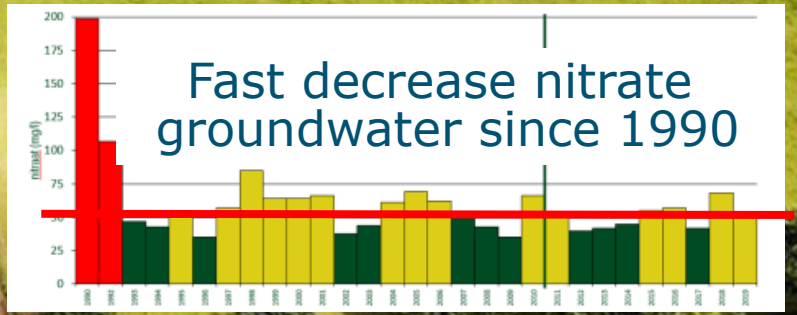
Producing food, energy, eco-services, nature

Digester

Optimize nutrient cycle

Precision farming

cows and field



How to respond to key changes?

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Questions?