Challenges for climate care dairy farming in Netherlands

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Topics

- 1.N crisis
- 2.Reduction potential NH3 and CH4
- 3.Research and development on research and pilot farms
- 4. Towards resilient farming







Trend in environmental fields the Netherlands

Production 1945 -----1985

Animal welfare 1970 -----

Nitrate and phosphate leaching



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The Dutch dairy sector

- 16.000 dairy farms
- •50 ha per farm maize 0 – 20 % of farm area
- Intensive: 14.000 kg milk/ha; 850.000 kg/farm





N per ha European countries in 2017





Source: CEIP 2019, WUR: W. de Vries) 5



Protest farmers and clash opinion National - Local



Challenge to combine reduction emissions with land use planning





Intensive land based Extensive land based

Agro park

Nature 2000 area

Cities, roads, etc

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How to reduce emissions?





Reduction potential NH3 on farm level (ref. 2021)

Strategie	NH3 reduction
Management	
20 gram less Crude protein per kg DM	20%
Less young stock	5%
More grazing	5%
Dilute manure with water (field)	25%
Techniques in barn	
Flushing floor	10-20%
Floor innovations (separation)	30-40%

LINVERSITY & RESEARCH Total reduction management and techniques 50-70%

Reduction potential Methane (CH4) Goal: 24% less CH4 on Dairy farm in 2030 (ref. 2021)



Scenario	Reduction
Manure management	
* cool slurry	25 - 75%
* oxidation	60 - 90%
* digest	46 - 96%
* more grazing	11 - 35%
Rumen cow	
* breeding	0.22–0.68% Per year
* additives	20-30%
* ration	0-10%



Source: WUR 2022 Vellinga, Groenestein in prep.

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Learning networks

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153 dairy farmers and 45 farm guiders 4 years

Goal: 155 gram Crude protein per kg dry matter









Optimize nutrient cycle



(Ongoing) research at Dairy campus

Units to measure emissions (Case-control)



Certification system: Low emission floors and other techniques



Green means available and < 8.4 kg NH3/cow/year

Red means no appropriate report or >8.4



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Examples floor types (definite emission factor)



Swaans concrete floor G6



Proflex Meadow



Green flag floor with flaps



Lely sphere

Network of farmers in preparation

Development separation feces and urine

- Use urine as Renure (Recovered Nitrogen from manure)
 - less cost fertilizer
 - less gass use (CO2 emission)
- Less NH3 emission
- Make feces pumpable or stackable



Add acid or water to urine or make pellets



Indication ammonia emission 2 separation techniques







Separation technique	NH3 % Of reference
1. Permeable plate	
a. Plate 1	higher
b. Plate 1 and acidification	bit lower
c. Plate 2 and acidification	lower
d. Extra flushing plate	promising
2. Cowtoilet	Ca. 2/3

Methane no reduction

Final results Cowtoilet at end 2022 Permeable plate (ZeraFlex) in development

Distribution NH₃-emission stable, storage and field

Reference: slurry from storage under slatted floor Permeable plate in combination with acidification of urine



Add water to feces to make it pumpable

Field application with injector





Flow of feces and urine on commercial farm



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4.Towards resilient farming (wider view: Europe)







Mitigation strategies

Animal - amount

Animal - breeding

Animal - feeding

Grazing and grassland

Crops

Soil and water

Housing

Storage

Spreading manure and fertilizing

Energy, general





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Energy, general



Experiments

- Farmplan
- Simulate strategies



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C Marcas, THE RESILIENT FARMER esilience Weathering the challenges of life and the land



Strategies for the future; how to be resilient?

- Scaling up
- Intensive
- Low cost
- High tech
- Specialize
- Animal
- Innovate
- Farm level







Added value



Mixed farming





Close farms



Resilience

- 1. Robust
- 2. Adaptation
- 3. Transformation

Strategies for the future

- Scaling up
- Intensive
- Low cost
- High tech
- Specialize
- Animal
- Innovate
- Farm level





- - Added value

Regional level

Solutions

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

Challenges Climate Care Cattle farming

THE

RESILIEN

FARMER

Weathering the challenges of life

and the land

Solutions:

- Management & technique
- Entrepreneurship

Ouestions

Farm and regional level