

# Nitrous Oxide (N<sub>2</sub>O) Measurements in Field Trials

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4th NFTN Conference 2026

Bedriftsudledningsprogrammet

nnovationsfonden

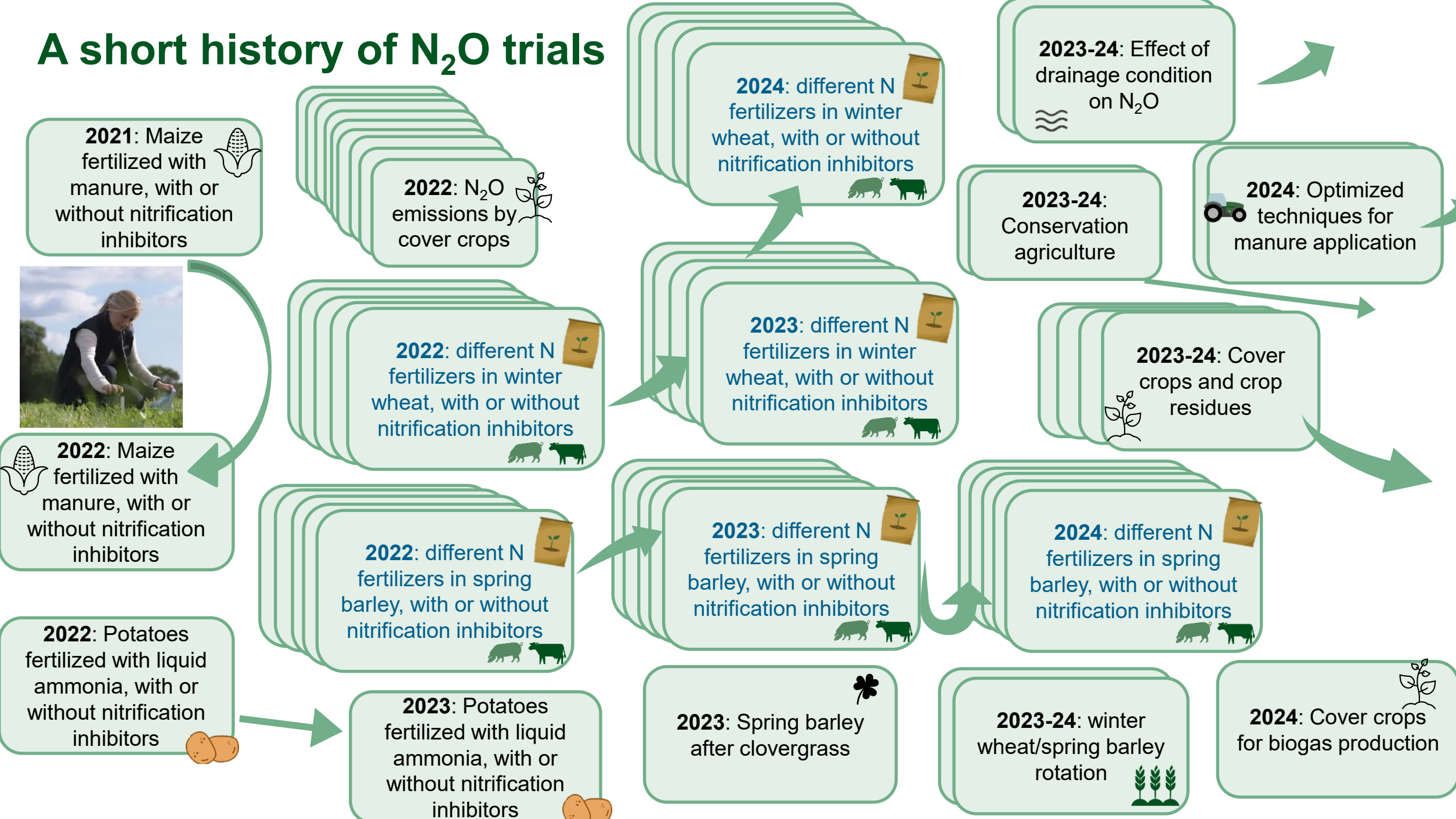
Promilleafgiftsfonden for landbrug

STØTTET AF

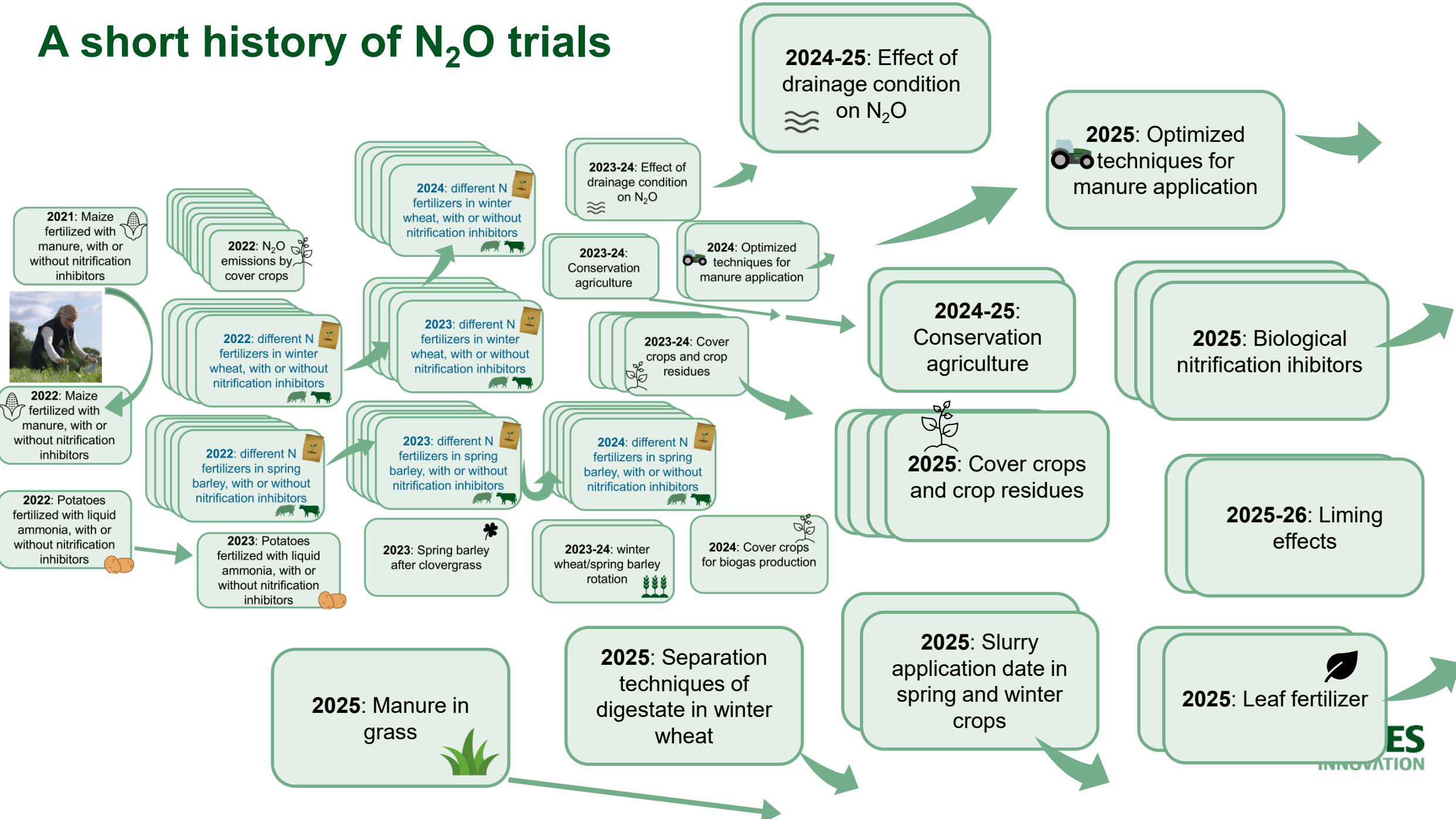
**SEGES**  
INNOVATION



# A short history of N<sub>2</sub>O trials



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From 1 trial in 2021...

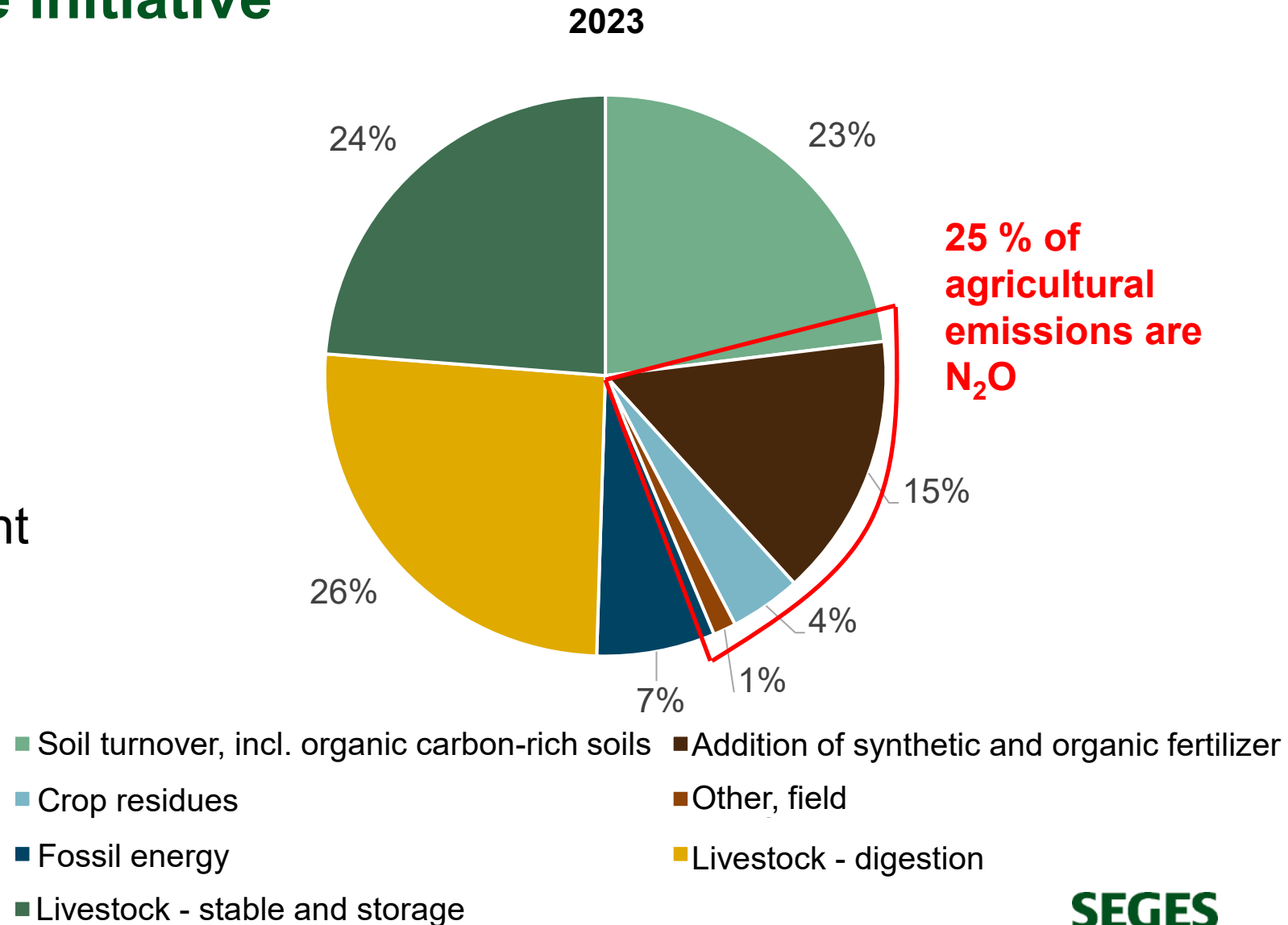
...to 21 trials in 2022 → 22 trials in 2023  
→ 16 trials in 2024

→ 17 trials in 2025 and counting

**77 trials from 2021-25**

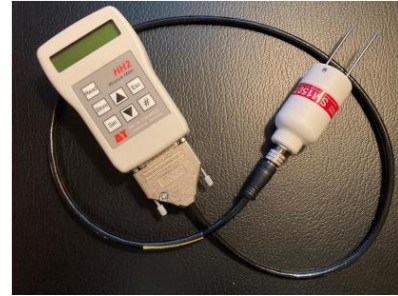
# The purpose behind the initiative

- Contribute data to support the development of disaggregated national emission factors for N<sub>2</sub>O
- Develop climate friendly fertilization and management strategies
- Give farmers options for action





# The methodology applied





# A milestone

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## Agriculture, Ecosystems and Environment

journal homepage: [www.elsevier.com/locate/agee](http://www.elsevier.com/locate/agee)



Contradicting default nitrous oxide emission factors: Average nitrous oxide emissions from mixed organic fertilizer application are higher than those from synthetic nitrogen fertilizers on Danish agricultural soils

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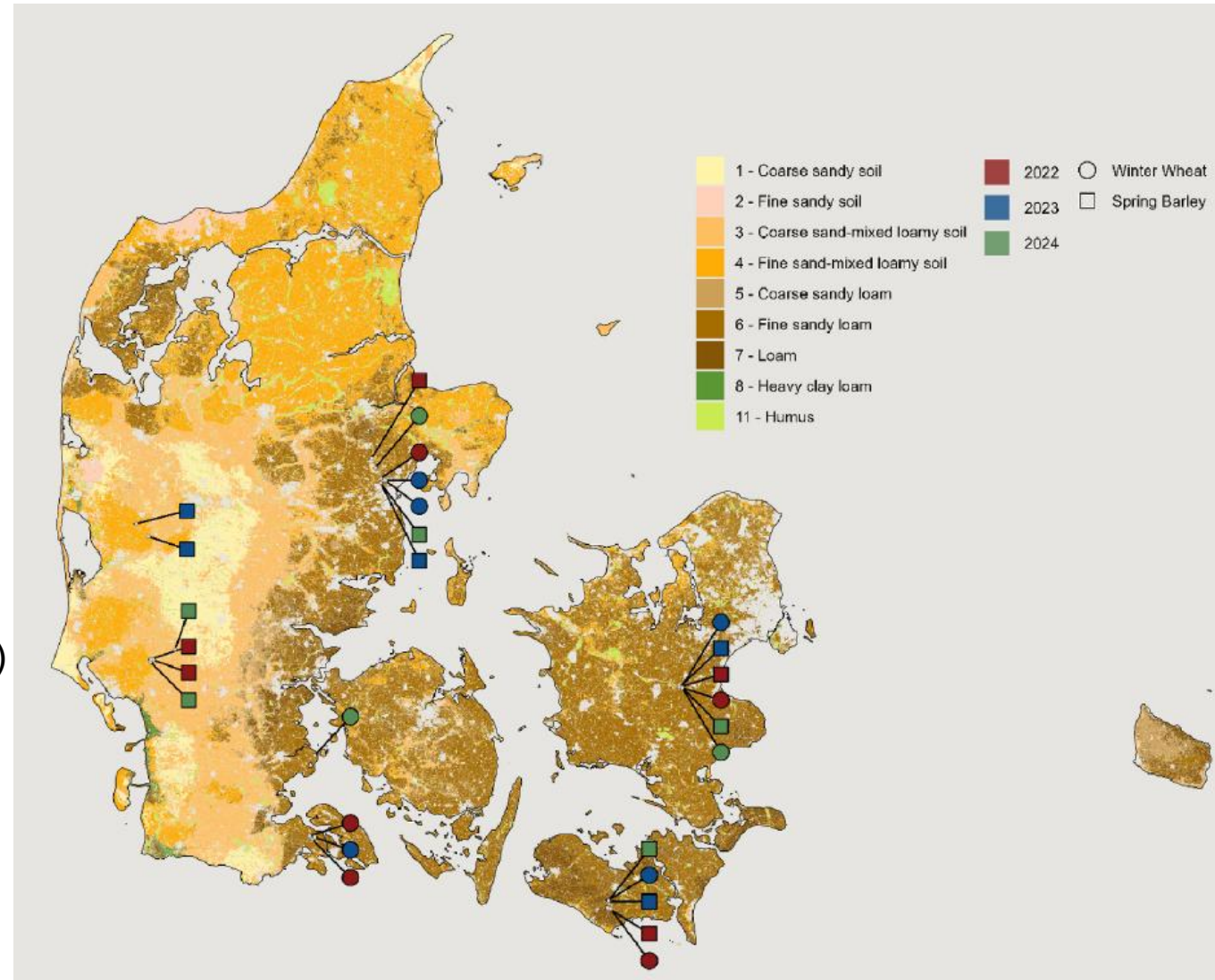
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# N<sub>2</sub>O measurements during the growing season

- **28 field trials:** 2022, 2023, 2024
- **Crops:** winter wheat or spring barley
- **Field management:** typical Danish field practices
- **Fertilization:**
  - Synthetic fertilizer
  - Pig manure
  - Cattle manure
  - Digestate

+ synthetic starter fertilizer  
( $\approx \frac{1}{3}$  of total N-dose)
- **Control:** unfertilized reference





2022

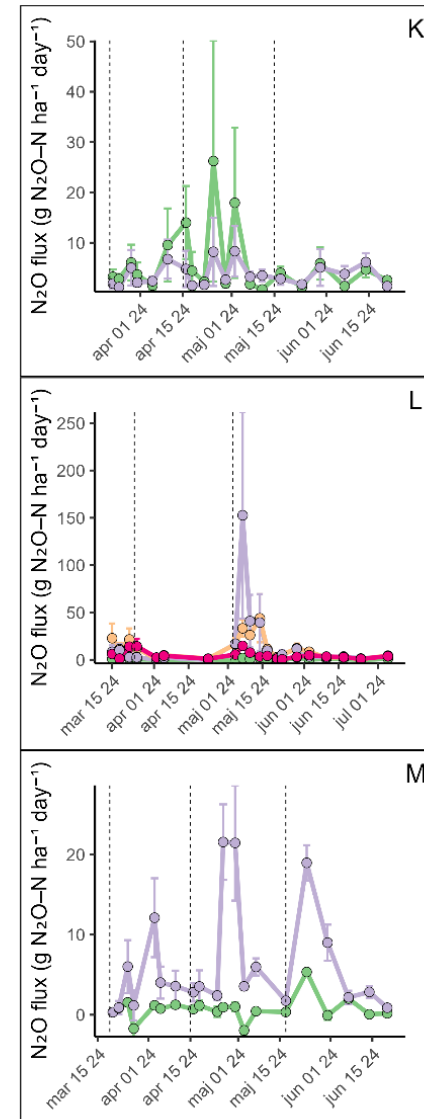
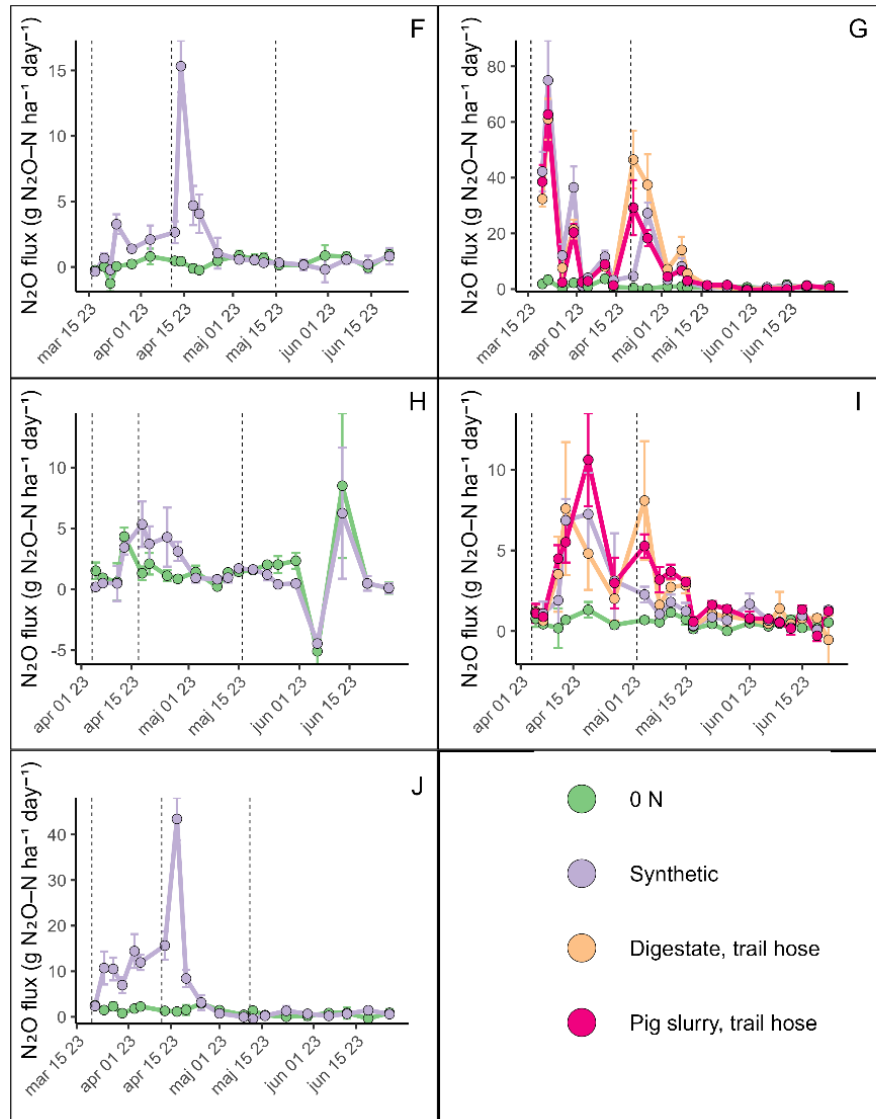
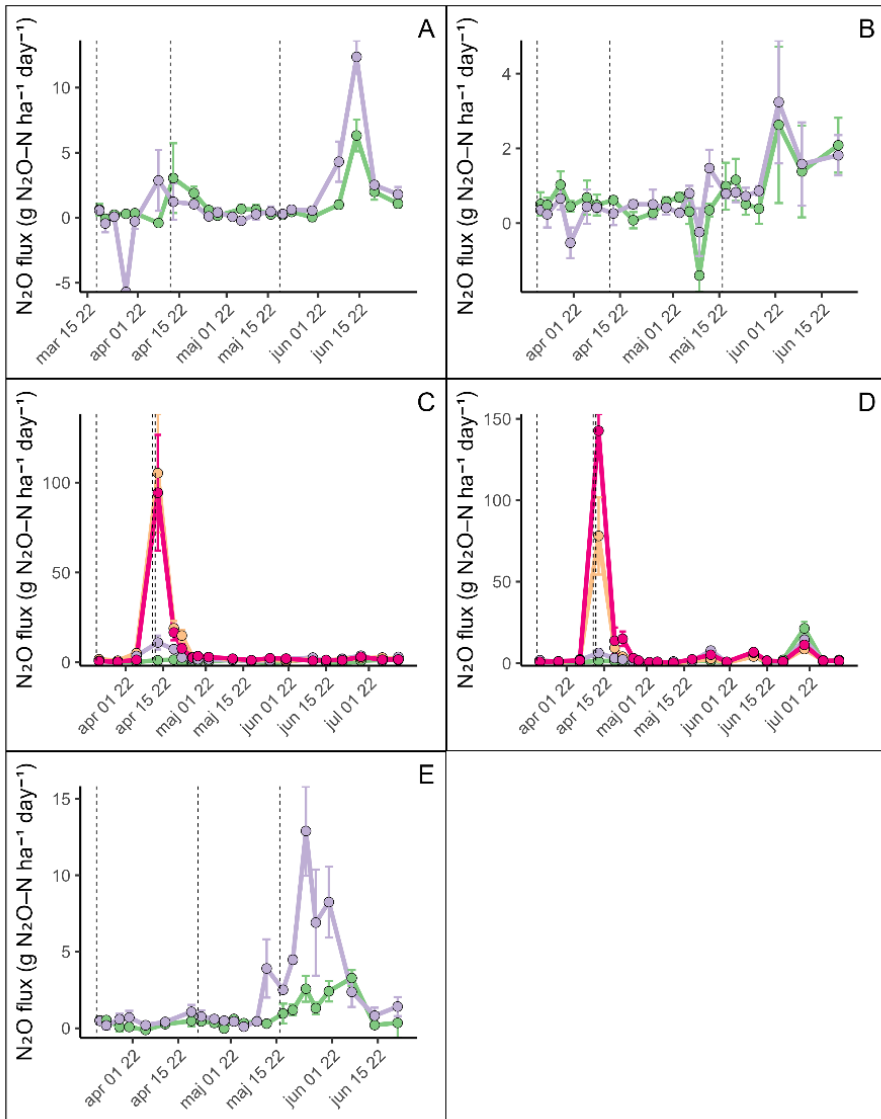
2023

2024

2022



2023

2024



- 0 N
- Synthetic
- Digestate, trail hose
- Pig slurry, trail hose

Emission factors ([Emission<sub>fertilized</sub> – Emission<sub>control</sub>] / applied N)

Eller et al. 2026	Winter wheat (avg ± SE)	Spring barley (avg ± SE)	}	IPCC 2006	%	
Synthetic fertilizer	0,16 ± 0,06	0,11 ± 0,03		1		
Digestate	0,37 ± 0,10*	—	}	1	%	
Pig manure	0,38 ± 0,09*	—				
Cattle manure	—	0,38 ± 0,05*				

*\*Including starter fertilizer*



## Future trials

- Automated chambers for higher temporal resolution
- Nitrification inhibitor test
- Nitrogen balance (ammonia, ammonium, nitrate, nitrous oxide, plant N)





A person is visible in the background, working in a field. There are several white equipment boxes or sensors placed in the field, some with cables connected to them. The field is filled with green crops, likely corn, and the sky is blue with some clouds.

**A huge thank you to all NFT employees, DTI, our  
collaborators and funding bodies**

**Thank you for listening**