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Monitoring of Flemish farms benefiting from derogation: Design & organisation of a well-balanced and simplified monitoring network

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VLAAMSE
LAND
MAATSCHAPPIJ



Vlaanderen
is open ruimte

Bodemkundige
Dienst van België vzw

ILVO
Instituut voor Landbouw
en Visserijonderzoek

Introduction

- 1991: Nitrate Directive (Europe)




Manure Decree (Flanders)



Manure Action Programme (MAP)

- Code of good agricultural practice
- Action program: mandatory measures

 Introduction


- Action program: mandatory measures
 - Ensuring that: “The amount of livestock manure applied to land each year, including by the animals themselves, shall not exceed a specified amount per hectare”


The specified amount per hectare be the amount of manure containing 170 kg N.

However:

Member States may fix different amounts but justified on objective criteria f.e.

- Long growing seasons
- High nitrogen uptake




 Introduction

- High manure pressure in Flanders
 - Intensive livestock production
- Derogation request
 - 170 kg N → 250 kg N/ha/y organic manure

September 2015: third request granted


- Conditions EU Commission:
 - Individual farms
 - Flemish government
 - Monitoring
 - Controlling
 - Reporting



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Selection & set-up

- EU - Monitoring network
 - Monitoring/Comparison N & P: soil, water, losses
 - At least 150 farms
 - Representative – all soils, crops, fertilisation practices
- Flemish government:
 - 160 farms
 - 1 crop
 - 1 fertilisation strategy
 - 1 soil type
 - Extra approach at farm level – 3 parcels/farm
- *But*



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Selection & set-up

3 fertilisation strategies

Dero op deroedrijf

Zand	Zandleem	Leem	Klei
Grasland	Grasland	Grasland	Grasland
Gras-klover	Gras-klover	Gras-klover	Gras-klover
Gras-mais	Gras-mais	Gras-mais	Gras-mais
Mais onderz. gras	Mais onderz. gras	Mais onderz. gras	Mais onderz. gras
Wintertarwe	Wintertarwe	Wintertarwe	Wintertarwe
Bieten	Bieten	Bieten	Bieten

Non-dero op deroedrijf

Zand	Zandleem	Leem	Klei
Grasland	Grasland	Grasland	Grasland
Gras-klover	Gras-klover	Gras-klover	Gras-klover
Gras-mais	Gras-mais	Gras-mais	Gras-mais
Mais onderz. gras	Mais onderz. gras	Mais onderz. gras	Mais onderz. gras
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Non-dero op non-deroedrijf

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Gras-mais	Gras-mais	Gras-mais	Gras-mais
Mais onderz. gras	Mais onderz. gras	Mais onderz. gras	Mais onderz. gras
Wintertarwe	Wintertarwe	Wintertarwe	Wintertarwe
Bieten	Bieten	Bieten	Bieten

All soils - 4

72 combinations
160 farms
Conclusions???

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Selection & set-up



- **Fertilisation strategy**
 - Farm with derogation - derogation request on monitored parcels
 - Farm with derogation - no derogation request on monitored parcels
 - Farm without derogation- no derogation request on monitored parcels

In fact: no derogation

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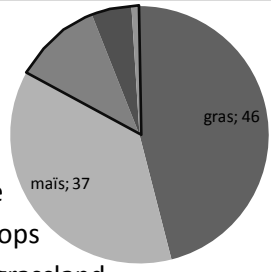
Bedrijfsselectie & proefopzet

- **Soil type**
 - Focus sandy & sandy loam soils
 - Largest Flemish farming acreage
 - Most frequent request of derogation – dairy farms
 - Cfr previous monitoringnetwork
 - Susceptibility leaching







Selection & set-up

- **Crop**
 - Limited acreage
 - Beets
 - Winter wheat & triticale
 - New possible derogation crops
 - Maize undersown with grassland
 - Importance
 - derogation farms meeting legal conditions ↔ Not common non-derogation farms
 - Grassland mixed with clover
 - High interest
 - Expected expansion of acreage
 - Specific request Flemish government



- gras 2013
- maïs
- wintertarwe/triticale
- suiker-voederbieten
- gras-klaver



Selection & set-up

- Result: 10 combinations

Dero op derobedrijf				Non-dero op derobedrijf				Non-dero op non-derobedrijf			
Zand	Zandleem	Leem	Klei	Zand	Zandleem	Leem	Klei	Zand	Zandleem	Leem	Klei
Grasland	Grasland	Grasland	Grasland	Grasland	Grasland	Grasland	Grasland	Grasland	Grasland	Grasland	Grasland
Gras-klaver	Gras-klaver	Gras-klaver	Gras-klaver	Gras-klaver	Gras-klaver	Gras-klaver	Gras-klaver	Gras-klaver	Gras-klaver	Gras-klaver	Gras-klaver
Gras-mais	Gras-mais	Gras-mais	Gras-mais	Gras-mais	Gras-mais	Gras-mais	Gras-mais	Gras-mais	Gras-mais	Gras-mais	Gras-mais
Mais onderz.	Mais onderz.	Mais onderz.	Mais onderz.	Mais onderz.	Mais onderz.	Mais onderz.	Mais onderz.	Mais onderz.	Mais onderz.	Mais onderz.	Mais onderz.
Wintertarwe	Wintertarwe	Wintertarwe	Wintertarwe	Wintertarwe	Wintertarwe	Wintertarwe	Wintertarwe	Wintertarwe	Wintertarwe	Wintertarwe	Wintertarwe
Suiker-voederbieten	Suiker-voederbieten	Suiker-voederbieten	Suiker-voederbieten	Suiker-voederbieten	Suiker-voederbieten	Suiker-voederbieten	Suiker-voederbieten	Suiker-voederbieten	Suiker-voederbieten	Suiker-voederbieten	Suiker-voederbieten

No active monitoring

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Selection & set-up

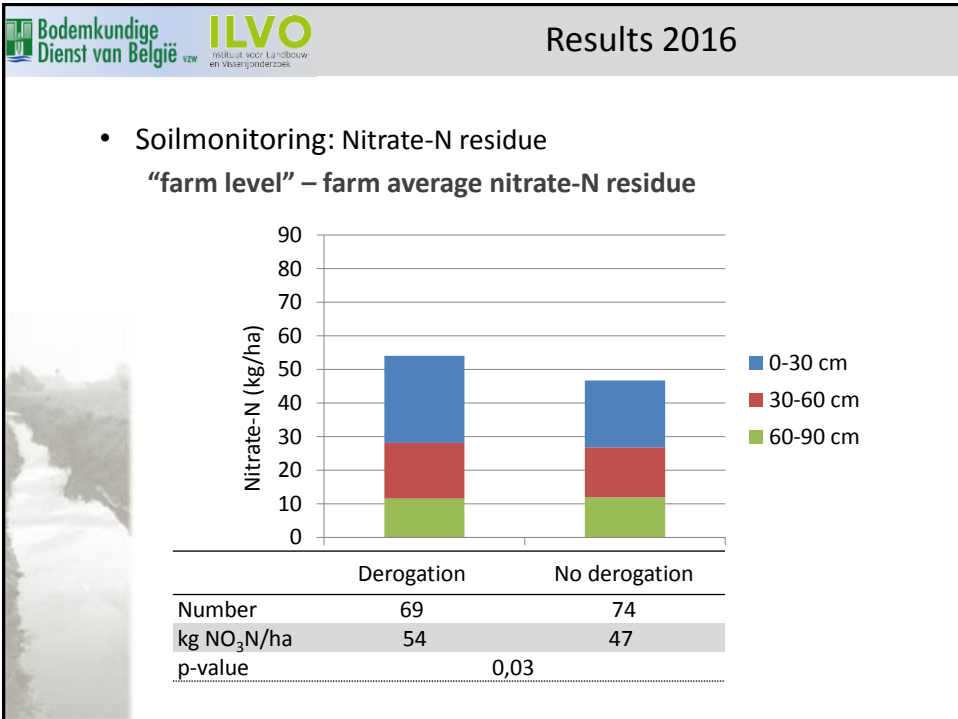
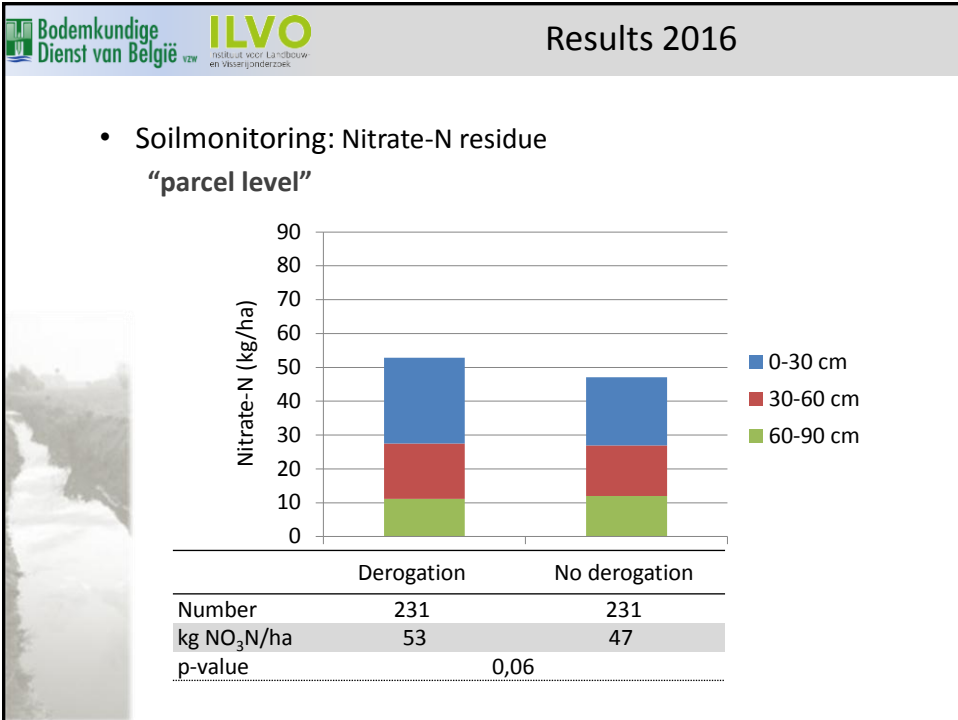
- 160 farms & 10 combinations
- Equal distribution derogatie & non-derogation (80-80)
- Sand & sandy-loam: 90-70
- Grassland, maize, grass & clover: 18-17-10


strategy	Derogation Derogation farm				No derogation Non-derogation farm				Total
	grass	maize	Grass & clover	Total	grass	maize	Grass & clover	Total	
Soil type									
Sand	18	17	10	45	18	17	10	45	90
Sandy loam	18	17	-	35	18	17	-	35	70
Total	36	34	10	80	36	34	10	80	160

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Materials & methods


- Monitoring:
 - Fertilisation
 - Yield (farmer - experimental harvest)
 - Soil:
 - Nitrate-N residue
 - Nitrate-N reserve spring
 - P-AL (0-90 cm) – selection of parcels
 - Water:
 - Nitrate soil water
 - Phosphate soil water
- Comparison: ANOVA
- Exploring statistics





First conclusions

- Monitoring network
 - Robust and solid
 - Efficient
 - Shortcomings of former network remediated
- Soilmonitoring-2016: N
 - Nitrate-N residue clearly below Flemish threshold values
 - Little difference derogation-no derogation
 - Statistical significance cfr practical relevance




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