

GEUS 17. maj. 2016

Camilla Husted Vestergaard

Flemming Gertz

Planter og Miljø

WP 5 - TRENDS

TReNDS

Transport and Reduction of Nitrate in Danish Landscapes at various Scales



Innovation Fund Denmark

RESEARCH, TECHNOLOGY & GROWTH



WP5 - EMISSION BASED REGULATION

Hypothesis H: In collaboration with stakeholders, new concepts for emission based regulation can be developed that allows the inclusion of local scale data and observations in future national regulations.

		2015				2016				2017				2018			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
5	Emission based regulation																
5.1	Catalogue of instruments to reduce nitrate load																
5.2	Monitoring concepts and techniques for emission based regulation																
5.3	Test passive sensors for in stream control monitoring																
5.4	Stakeholder involvement in evaluation of emission based monitoring																
D5.1	Principles for emission based regulation (papers/guidance)																
M5.1	Monitoring concepts ready for test																

5.1 CATALOGUE OF INSTRUMENTS TO REDUCE NITRATE LOAD

- Current knowledge described
 - In sketches
 - In photos
 - In simple words

miljøtiltag
MINIVÅDOMRÅDER MED ÅBNE BASSINER I KUPERET TERRÆN

Et minivådområde med åbne bassiner anlægges i tilknytning til markdræn og fungerer ved, at drænevandet ledes over i åbne bassiner, hvor processer som sedimentation, planterøg og biokemi medvirker til at reducere koncentrationen af nitrat og fosfor.

PLACERING OG ETABLERING:
Minivådområder skal placeres i forbindelse med et dræningsland på mindst 20 ha og tilpasses terrænets hældning, for at undgå opstrømning eller tilbagehold i drænen. En effektiv form for udvaskning af vand, hvis størrelsen på et minivådområde er på 2% af dræningslandet.

OMKOSTNING
Etableringsudgifter ligger mellem 270.000-530.000kr. for 1 ha.

EFFEKT
N-effekten varierer mellem **20-30%** afhængig af dræneafstrømning og det aktuelle N-hold fra marken.
P-effekten varierer mellem **30-50%** afhængig af det aktuelle P-hold fra marken.

SÅDAN VIRKER TILTAGET
Underrubrik forklarer lidt mere om, hvad det er tværsnittet viser.

Og måske er der brug for nogle yderligere detaljer, som kan beskrives her.



KOMPENSATION
Der ydes kompensation for etablering under Landdræningsprogrammet 2017-2020.

SEGES

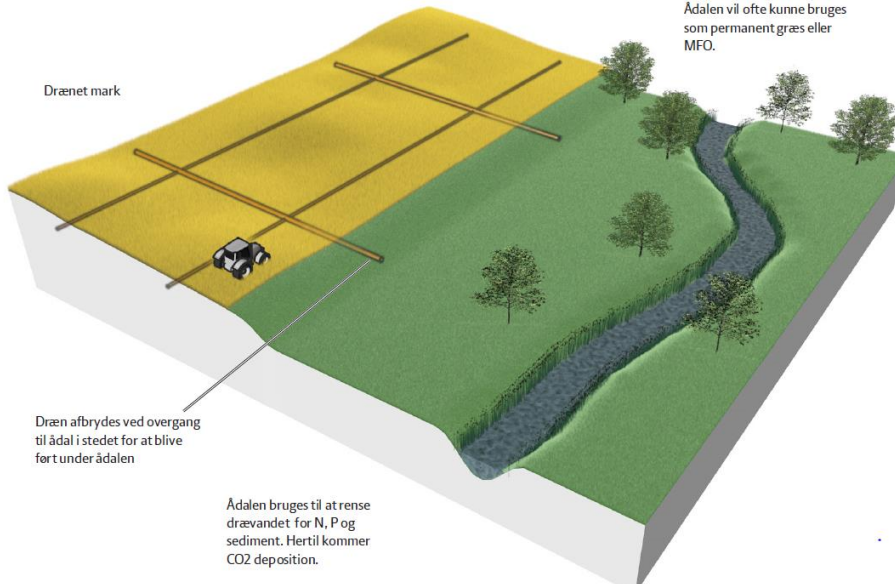
Afbrudt dræn

Drænet mark

Ådalen vil ofte kunne bruges som permanent græs eller MFO.

Dræn afbrydes ved overgang til ådal i stedet for at blive ført under ådalen

Ådalen bruges til at rense drænevandet for N, P og sediment. Hertil kommer CO₂ deposition.

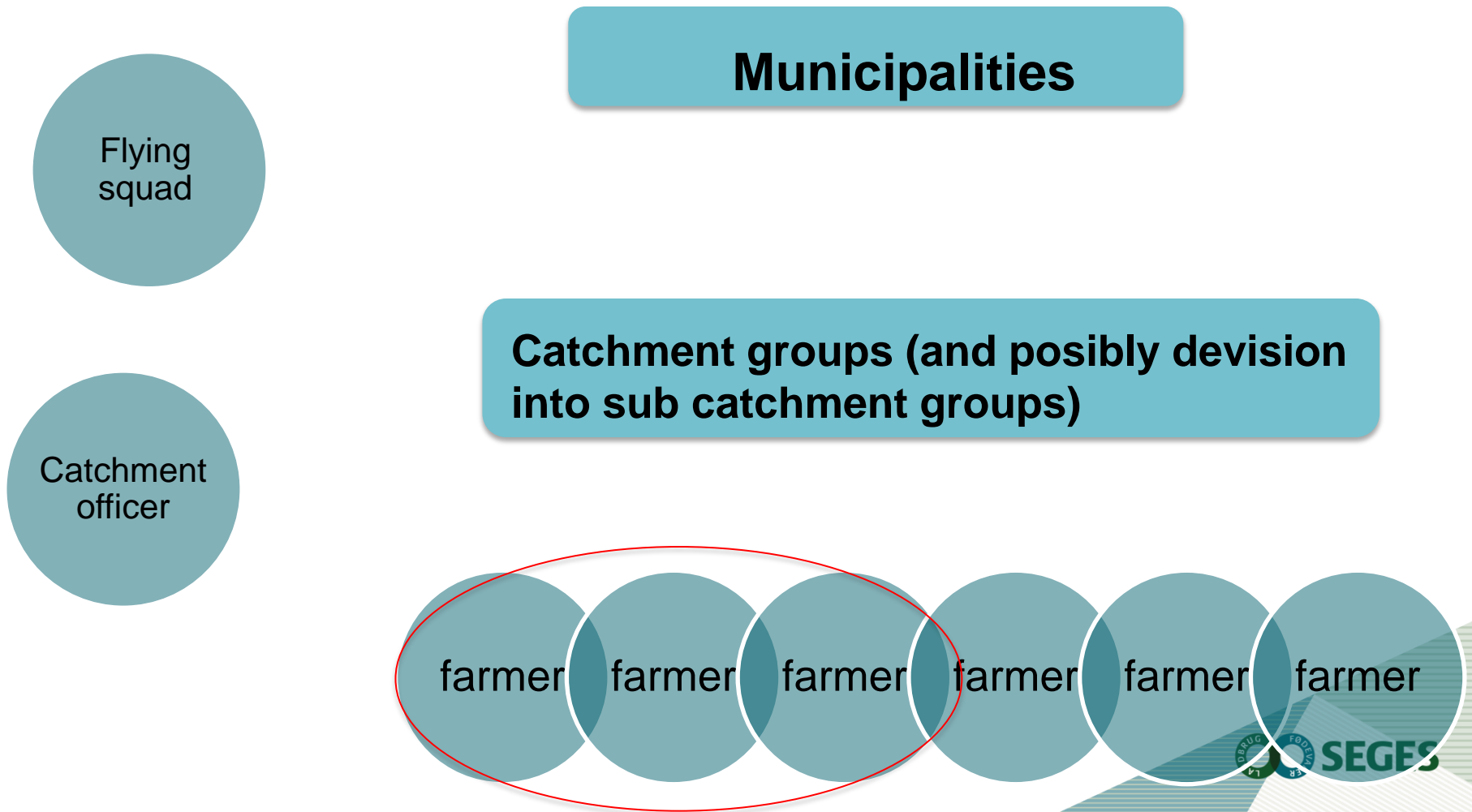


5.2 MONITORING CONCEPTS AND TECHNIQUES FOR EMISSION BASED REGULATION

- Concept
- Techniques (Camilla)

CONCEPT

ENVIRONMENTAL MEASURES ARE TO BE INITIATED “FROM THE BOTTOM” IN ORDER TO SUCCEED



WP5 - EMISSION BASED REGULATION

Hypothesis H: In collaboration with stakeholders, new concepts for emission based regulation can be developed that allows the inclusion of local scale data and observations in future national regulations.

		2015				2016				2017				2018			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
5	Emission based regulation																
5.1	Catalogue of instruments to reduce nitrate load																
5.2	Monitoring concepts and techniques for emission based regulation																
5.3	Test passive sensors for in stream control monitoring																
5.4	Stakeholder involvement in evaluation of emission based monitoring																
D5.1	Principles for emission based regulation (papers/guidance)																
M5.1	Monitoring concepts ready for test																

OVERVIEW

- **Catalogue of instruments to reduce nitrate load**
- Presentation of equipment
- Own impressions
- Laboratory test
- Field test with consultant and farmers
- Field areas (Holtum and Fensholt)
- **Monitoring concepts and techniques for emission based regulation**
- **Contact to farmers**

EQUIPMENT

Method	Product	Range (mg NO ₃ ⁻ -N L ⁻¹)	Protocol	Waist
Nitrate sensor	NeuLog NUL-241	0,1-14.000	Appendix 1	Non
Nitrate sensor	YSI Professional Plus	0-200	Appendix 2	Non
Nitrate sticks	AquaChek	0-50	Appendix 3	Nitrate sticks
Spectrofotometry	Spectroquant Colorimeter	0,3-30	Appendix 4	Cadmium



USABILITY OF EQUIPMENT



http://www.123rf.com/stock-photo/landscape_architects.html



<http://www.albertmorell.com/4160/470463/projects/farmer>



<http://hagenspot.blogspot.dk/2007/11/car-trubble.html>



www.shutterstock.com · 234423355

<http://www.shutterstock.com/similar-113272825/stock-vector-chemical-laboratory-ware.html>

METHOD OF TEST IN LAB

- Aim: Determination of accuracy and precision of equipment for nitrate measurement in drainage water.
- A test of the equipment is made in order to determine a standard curve of potassium nitrate made in milliQ water in order to *examine the linearity within the measuring area and the stability of the calibration.*
- Test of drain water; whether the measurement methods are exposed to a matrix output from the drain water.
- Each equipment is tested within its range.
- The equipment is calibrated due to the product directions.

METHOD OF TEST IN FIELD

- Aim: The purpose is to gain experience with the use of measuring equipment for farmers and consultants

- 2 experiments

1st experiment (Fensholt)

1. Training of consultant
2. 3 visits with 3 landowners/farmers
3. Registration of measurements in drains and comments on the equipment (consultant and farmers)
4. Evaluation with SEGES and interviews

2nd experiment (Holtum)

1. 1 visit with 2 farmers and consultant
2. Observation/interviews/perspectives

EXPECTED RESULTS

- Expectations of equipment and method
- Needs of farmers
- Needs of consultant
- Hand experience of farmers
- Hand experience of consultant
- Possible uses for the equipment
- Fulfilment of expectations
- Perspectives on monitoring concepts and techniques for emission based regulation
 - App concept for registration of data → database for consultant measurements (Water shed officer)