

Water Co-Governance EU project Situation in Denmark

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SEGES



Interreg
North Sea Region
WaterCoG
European Regional Development Fund



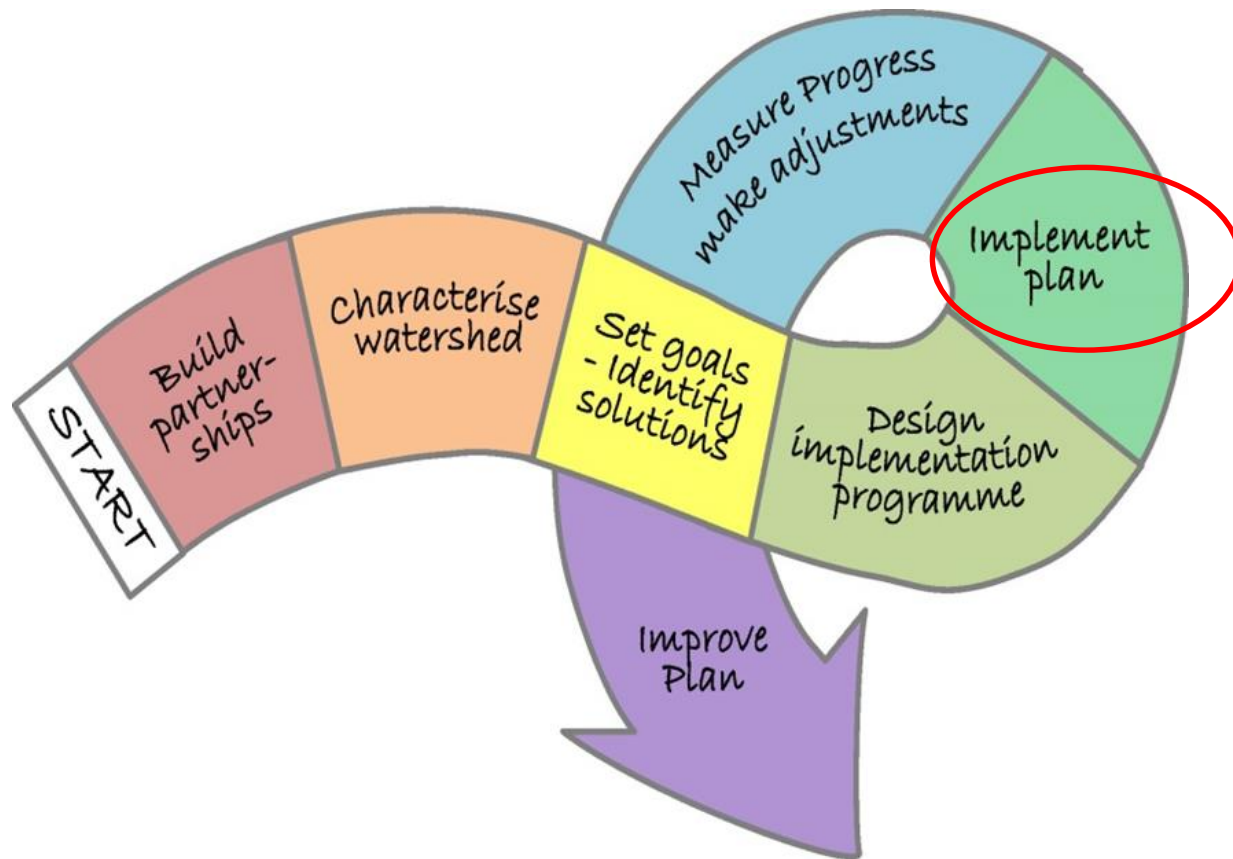
EUROPEAN UNION



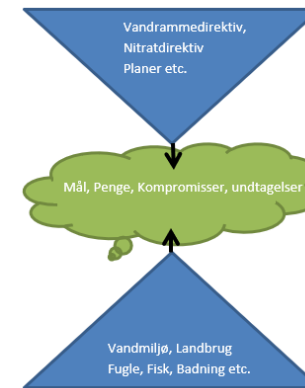
Water Co Governance project

The projects' output aims for a change in working practice that will improve the integration between top-down implementation of European and national directives and bottom-up, participatory developed solutions for improving the quality and sustainable management strategies of NSR ecosystems.

Water Co Governance project



Directives

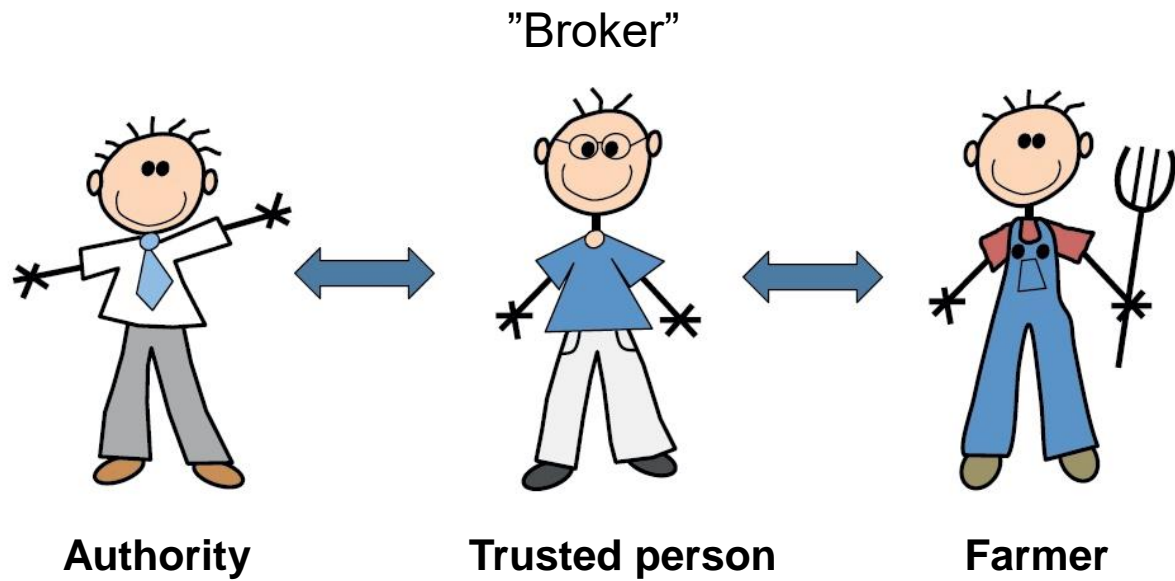


Nature, Environment

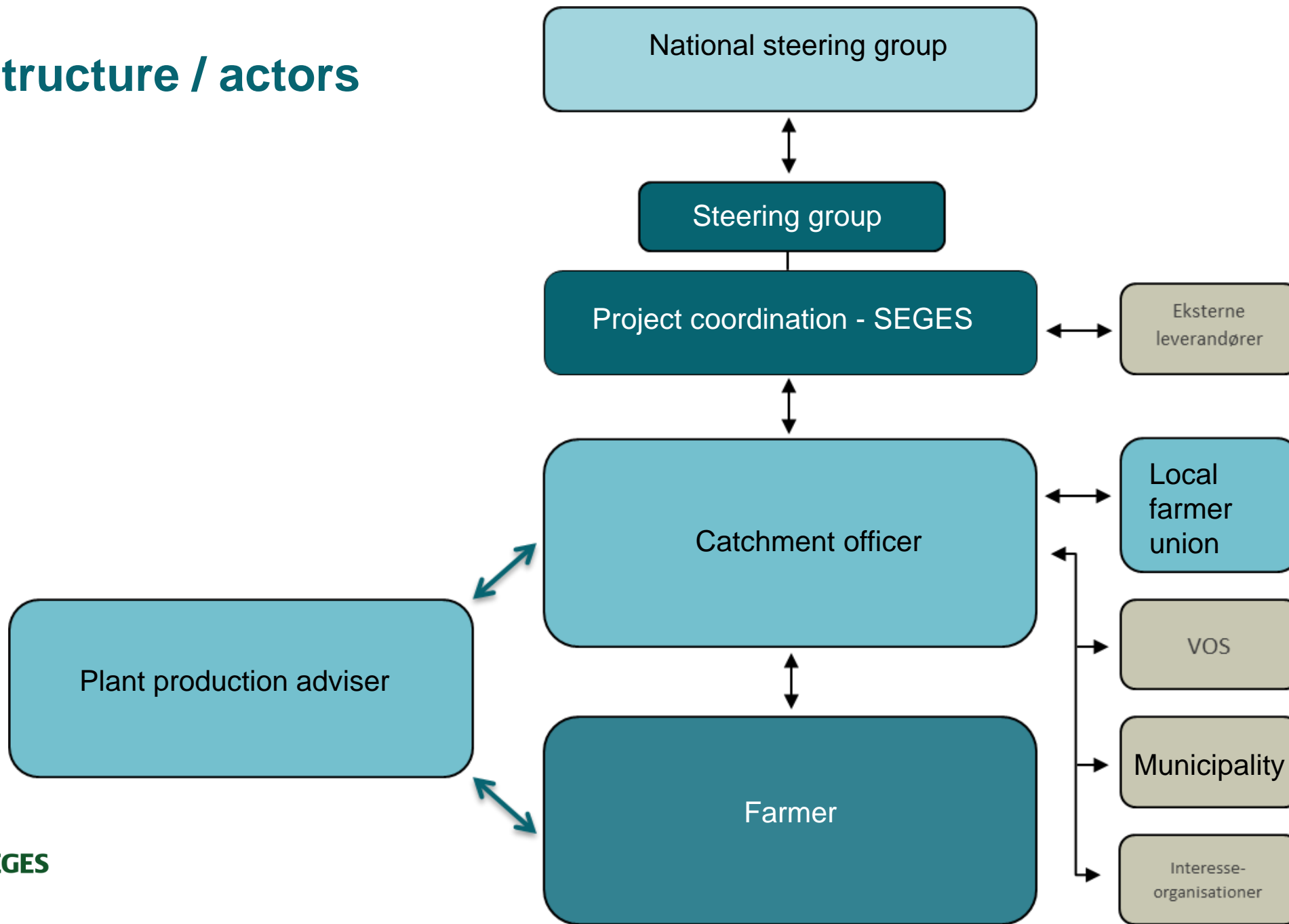
Government decision 2015: "Landbrugspakken"

- Optimizing N quotas (smaller correction - allowing farmers to use a little more N)
- Wetlands: 400 million kr. (already 1000 million kr)
- Constructed wetlands 390 million kr.
- More forest: 140 million kr.
- Targeted catch crops

"Oplandskonsulent" – Catchment officer



Structure / actors



Catchment officer – new concept in Danish water management

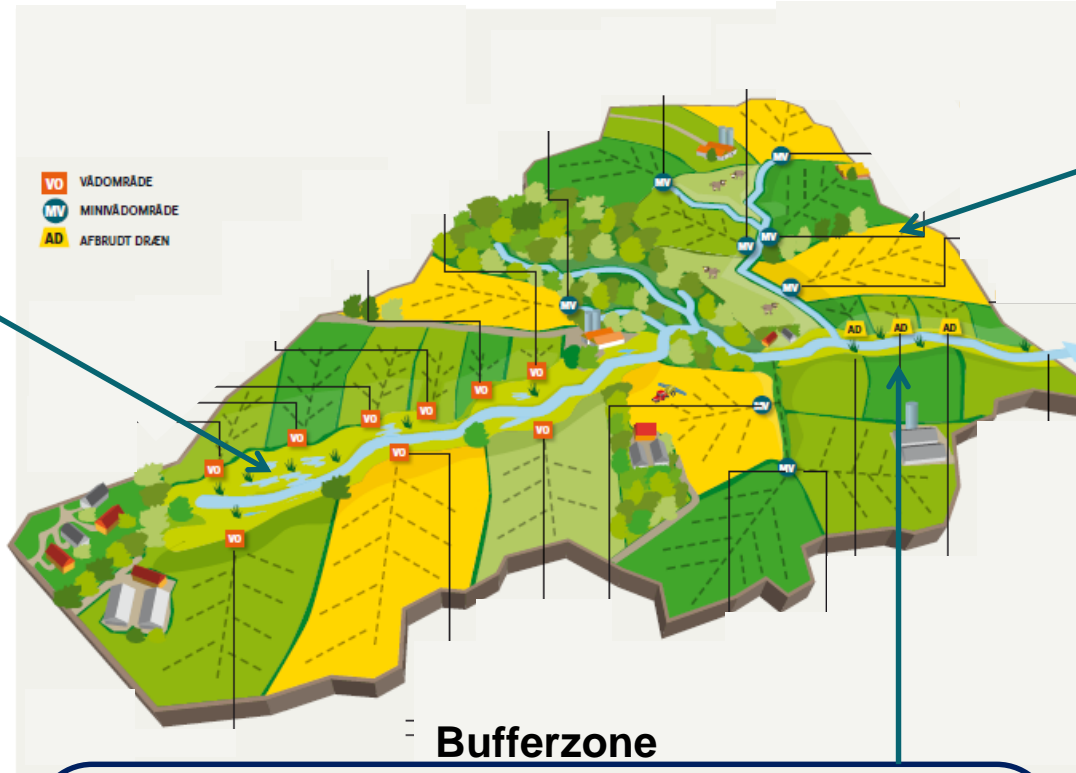
- Tested in WaterCoG in 2016
- National Program in 2017
- 25 Catchment officers (16 full time)
- Budget: 8 million eur over 4 years
- 50 % payed by farmers (farmer union) and 50 % payed by the government
- No direct payment for the farmer
- Applications:
 - April 2018: 78 constructed wetlands
 - April 2019: 338 constructed wetlands



Visions for the targeted nutrient mitigation – restore landscape filters

Kjærgaard, 2018. Kombiner virkemidlerne, og find den optimale løsning. Landbrugsavisen 21. juni 2018.

Riparian lowland



Constructed wetlands

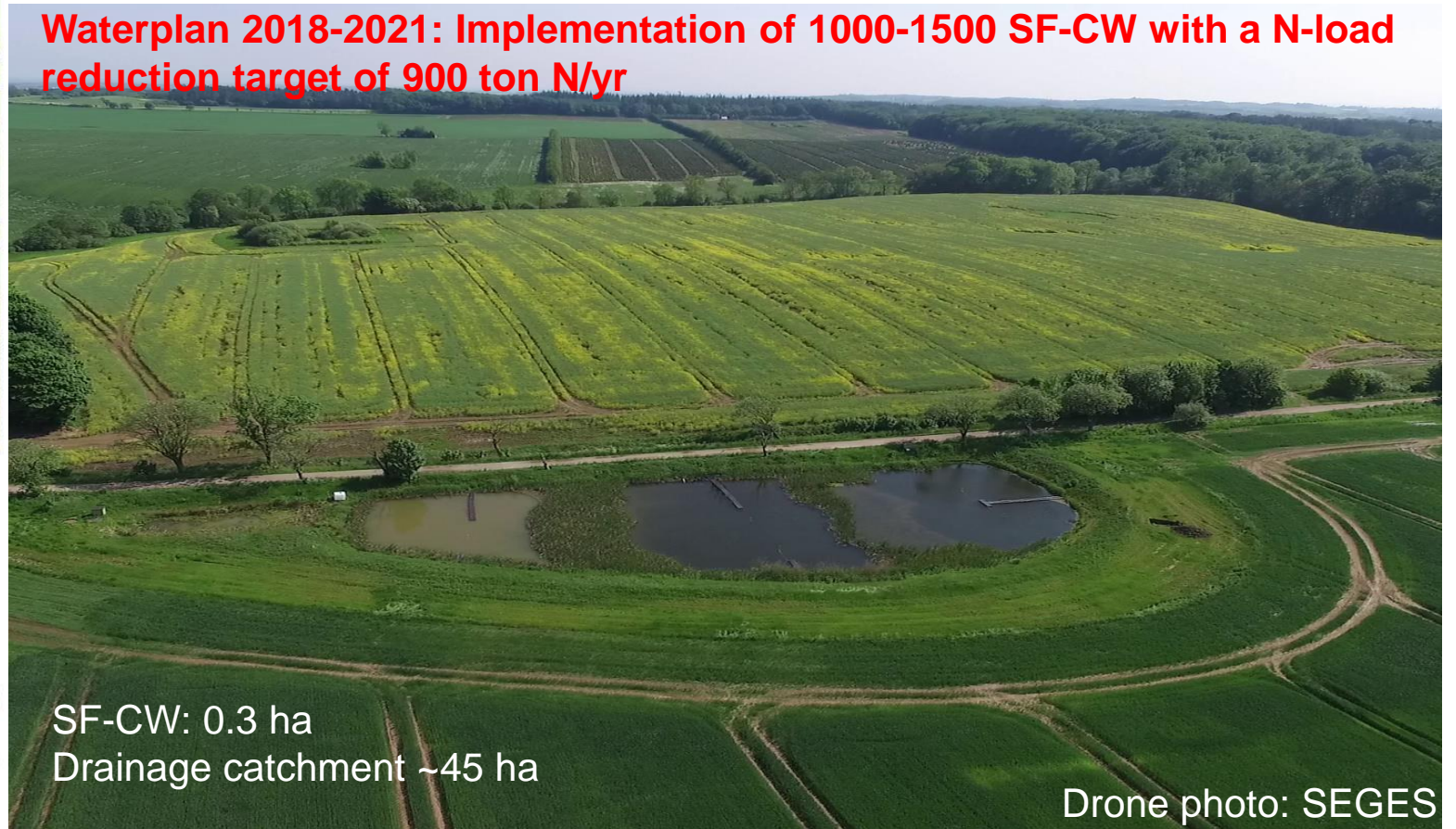


Danish surface-flow constructed wetland – Fillerup

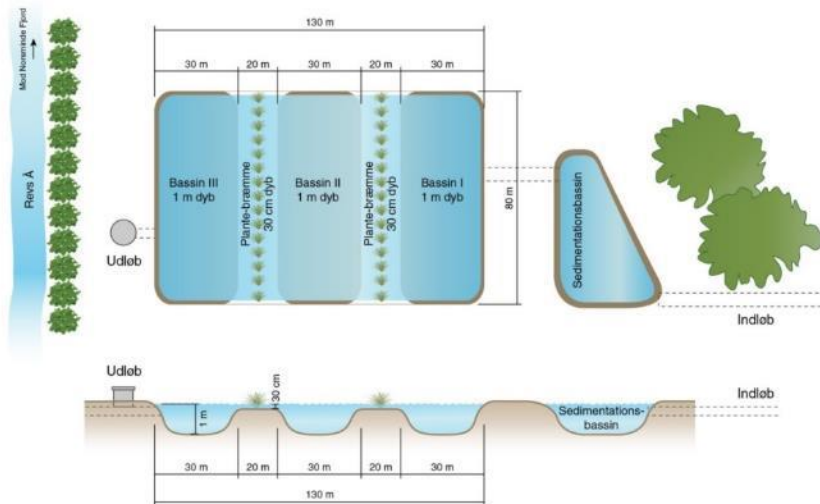
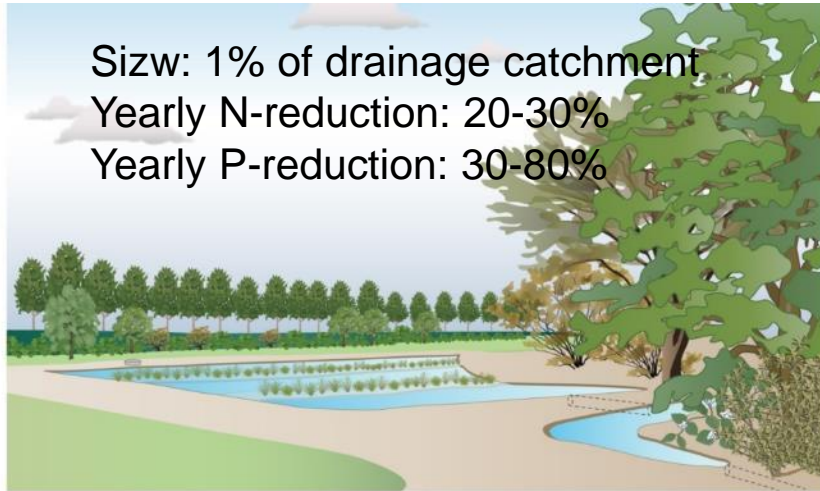
Constructed in 2010 in the Norsminde Fjord Catchment, Odder, Denmark by DLMO, SEGES, AU

Size: 1% of drainage catchment
Yearly N-reduction: 20-30%
Yearly P-reduction: 30-80%

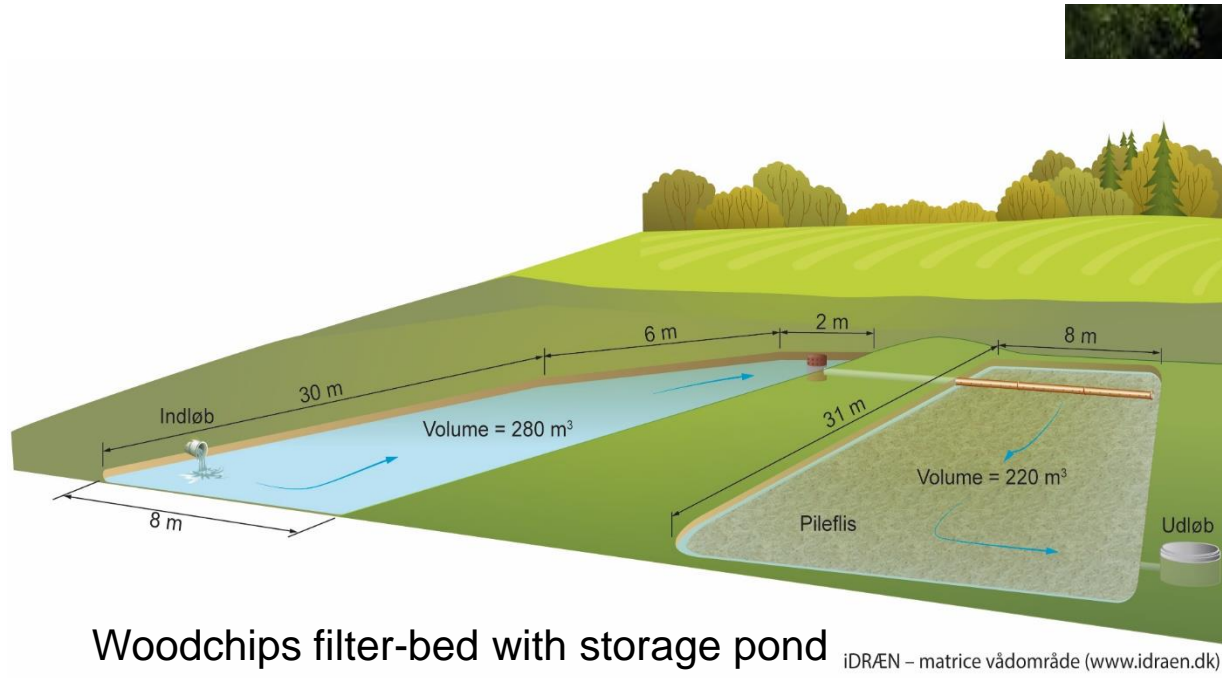
Waterplan 2018-2021: Implementation of 1000-1500 SF-CW with a N-load reduction target of 900 ton N/yr



25 SF-CW constructed in DK in 2010-2015
Kjaergaard et al., (2014; 2017; 2019)



Full-scale bioreactor prototype including storage pond



Drainage catchment ~25 ha
Bioreactor 220 m²/m³



Woodchips filter-bed with storage pond
Size: 0,2-0,25% of drained catchment

iDRÆN – matrice vådområde (www.idraen.dk)

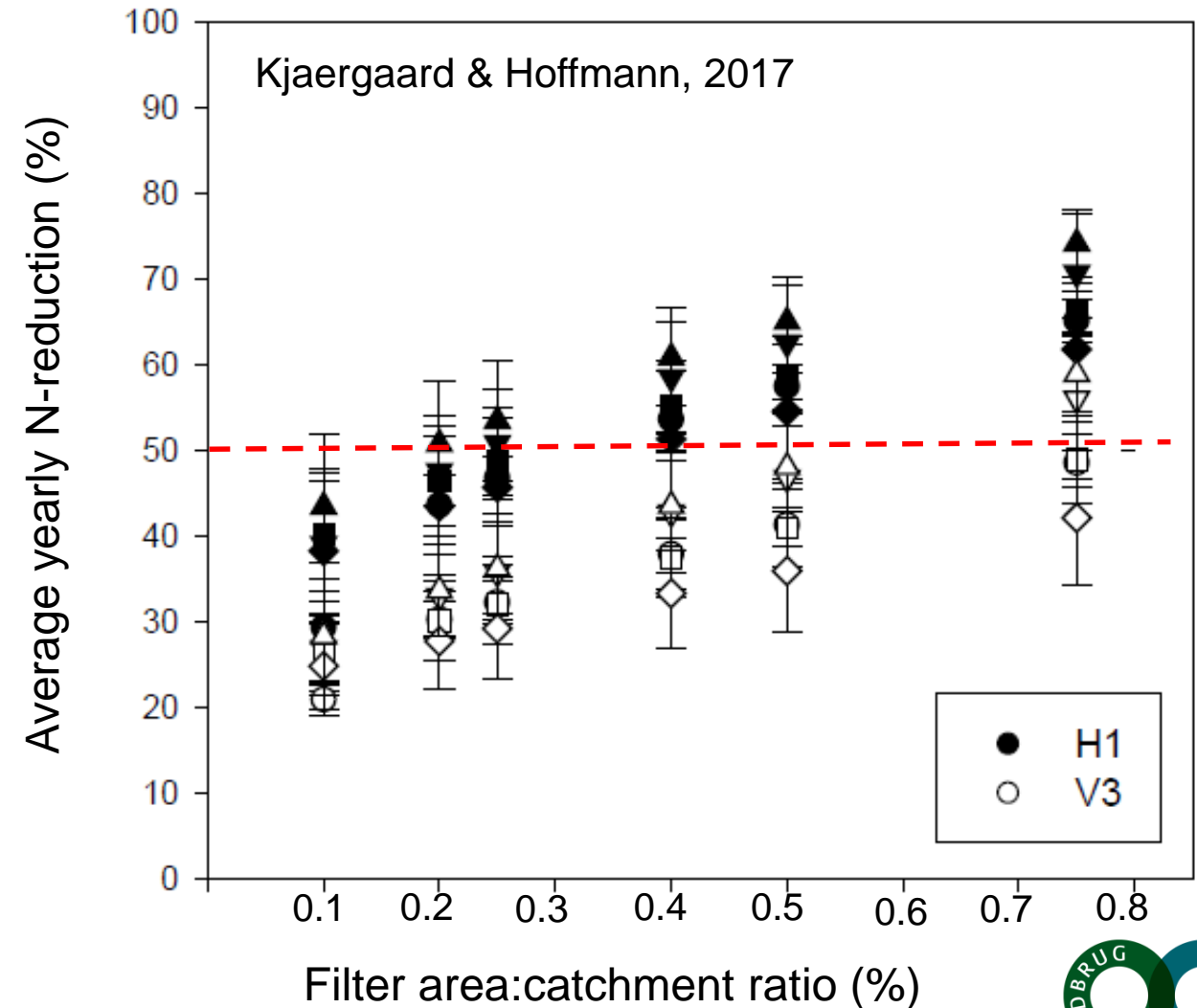
Guidelines for the Danish Ministry (Hoffmann & Kjærgaard, 2018)
Guidelines for advisers and constructors (Kjærgaard, 2019)

Photo: SEGES

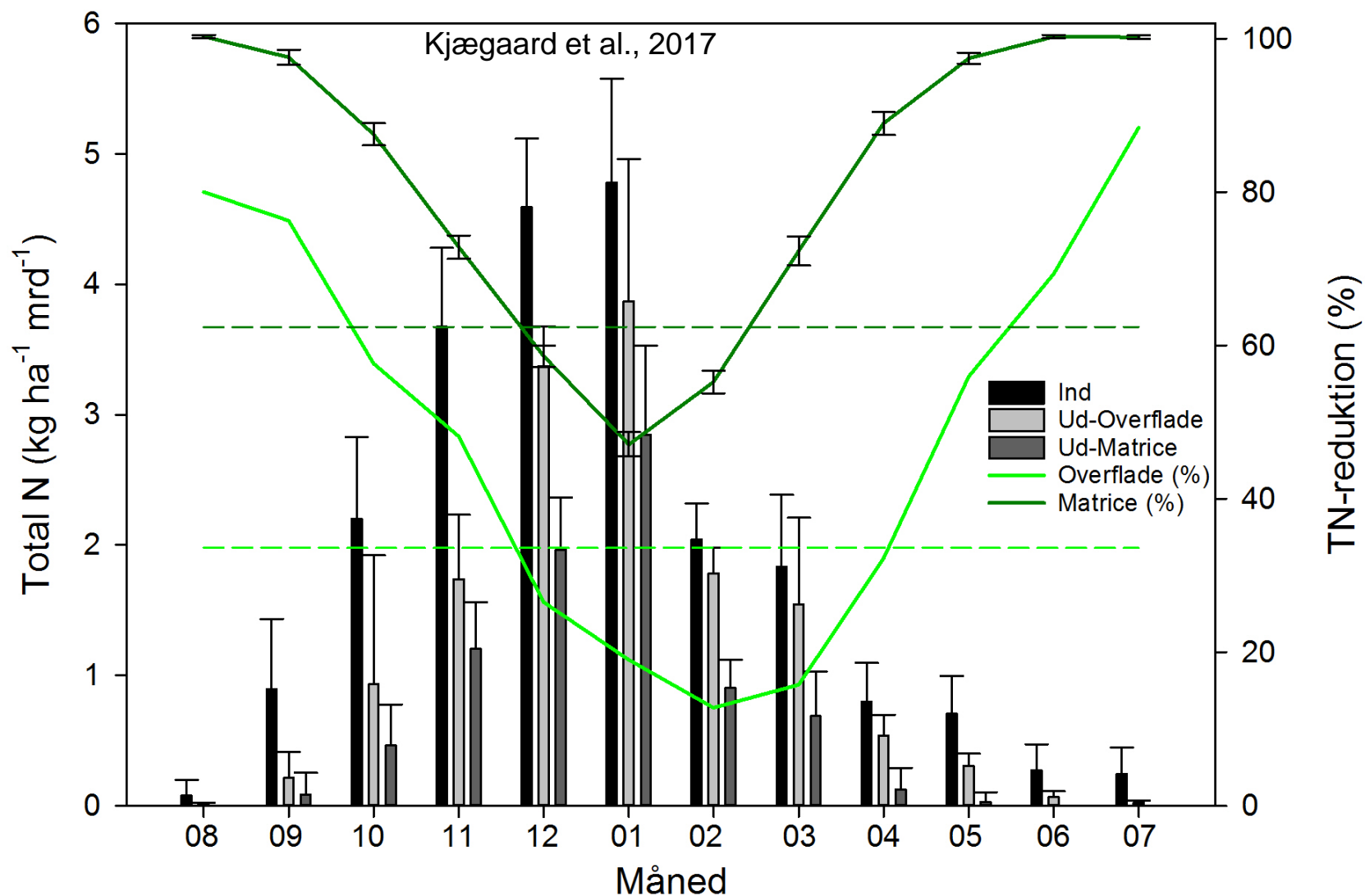
Operational model for estimating bioreactor efficiency

www.supremetech.dk

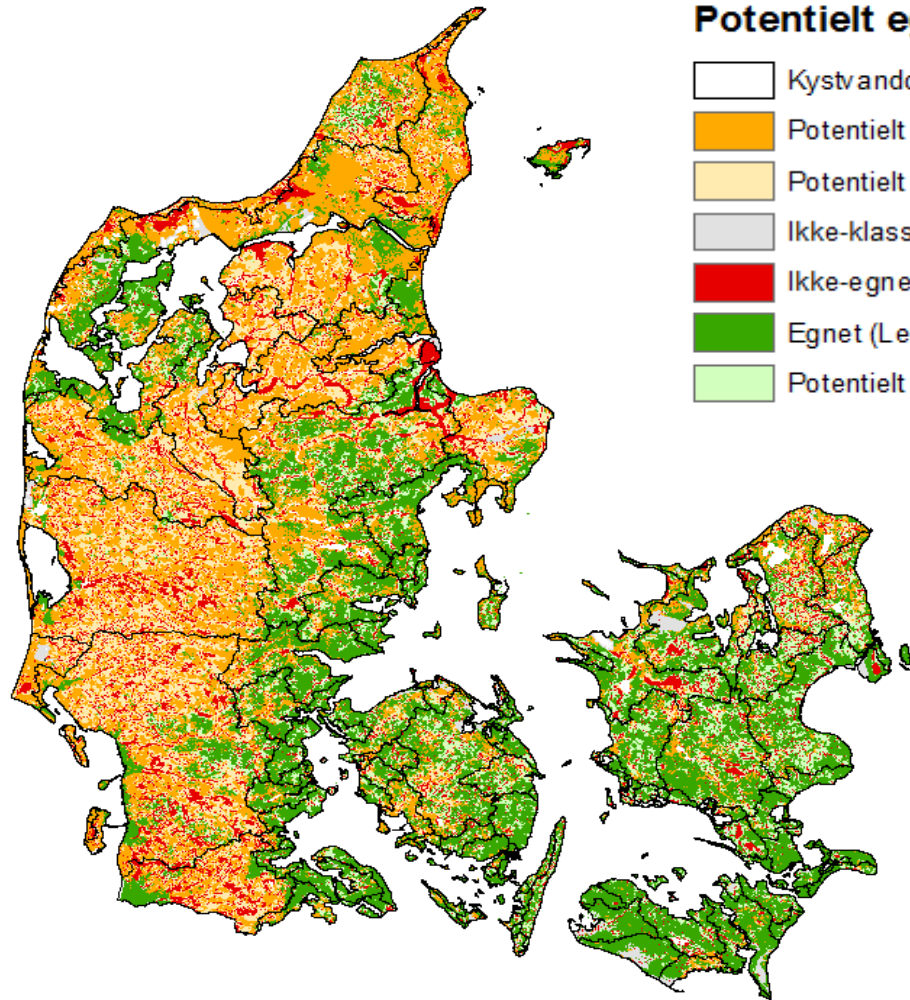
Kjærgaard, C., Hoffmann, C.C. 2017. Vurdering af kvælstofeffekt, virkemiddels-scenarier og omkostningseffektivitet ved anvendelse af minivådområder med filtermatrice. SupremeTech rapport www.supremetech.dk



Surface-flow versus bioreactor

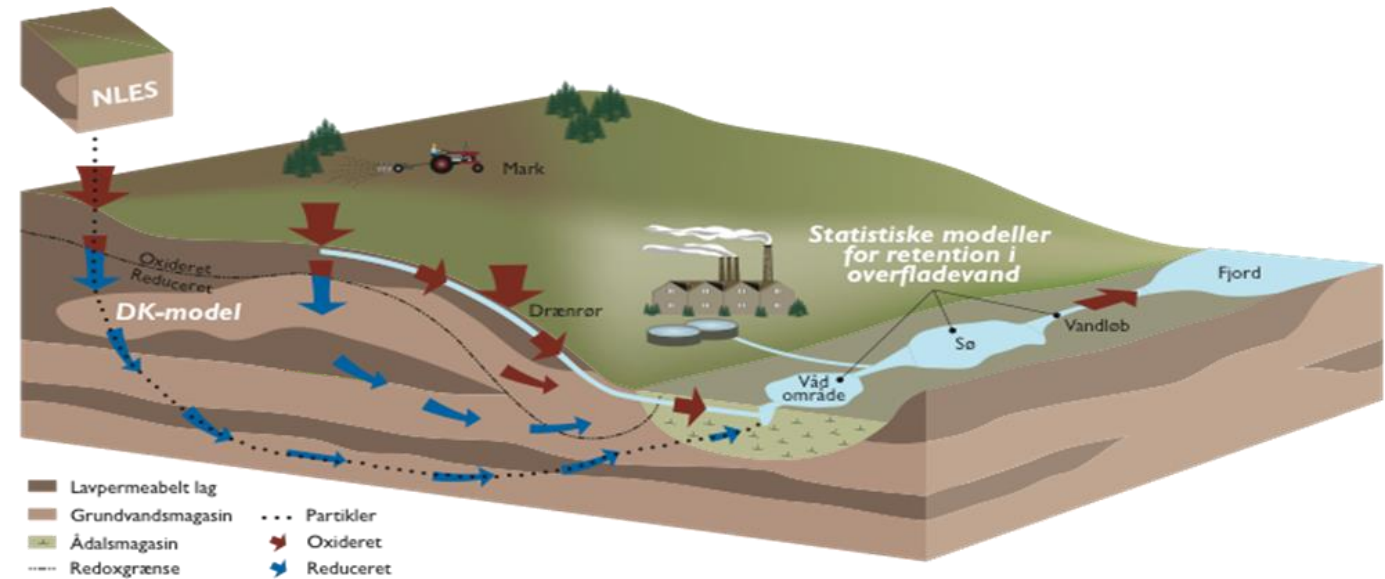


Egnede landbrugsarealer (Potentiale kort)

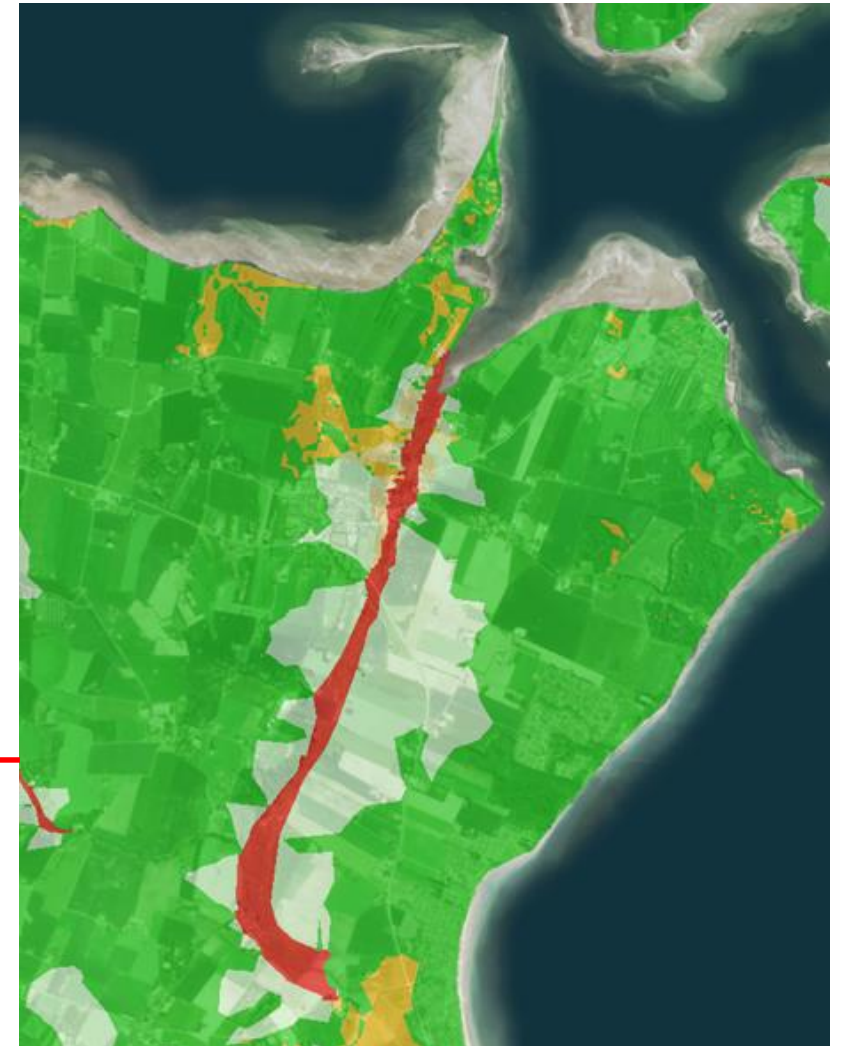
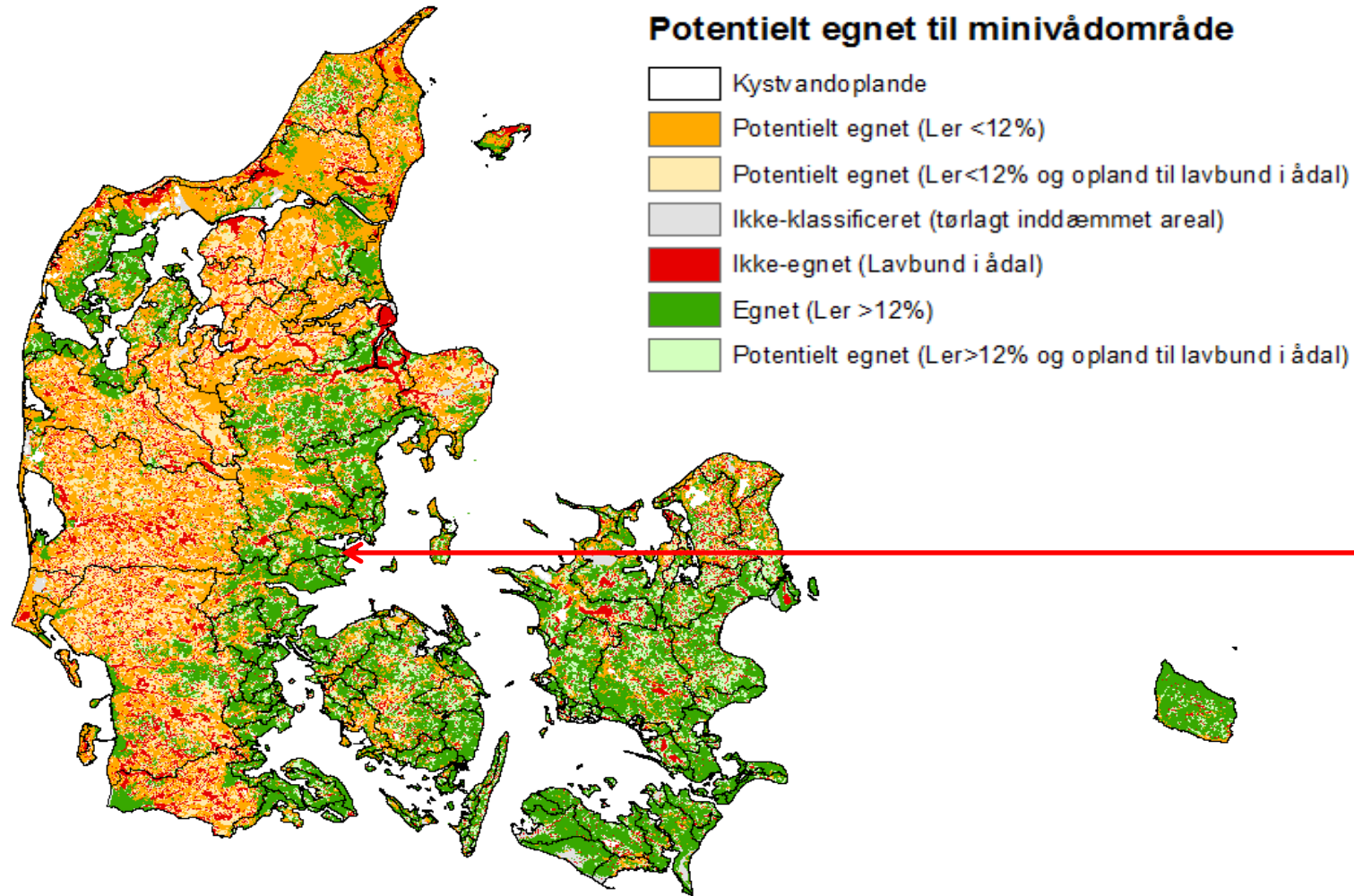


Potentielt egnet til minivådområde

- Kystv andoplande
- Potentielt egnet (Ler <12%)
- Potentielt egnet (Ler <12% og opland til lavbund i ådal)
- Ikke-klassificeret (tørlagt inddæmmet areal)
- Ikke-egnet (Lavbund i ådal)
- Egned (Ler >12%)
- Potentielt egnet (Ler >12% og opland til lavbund i ådal)

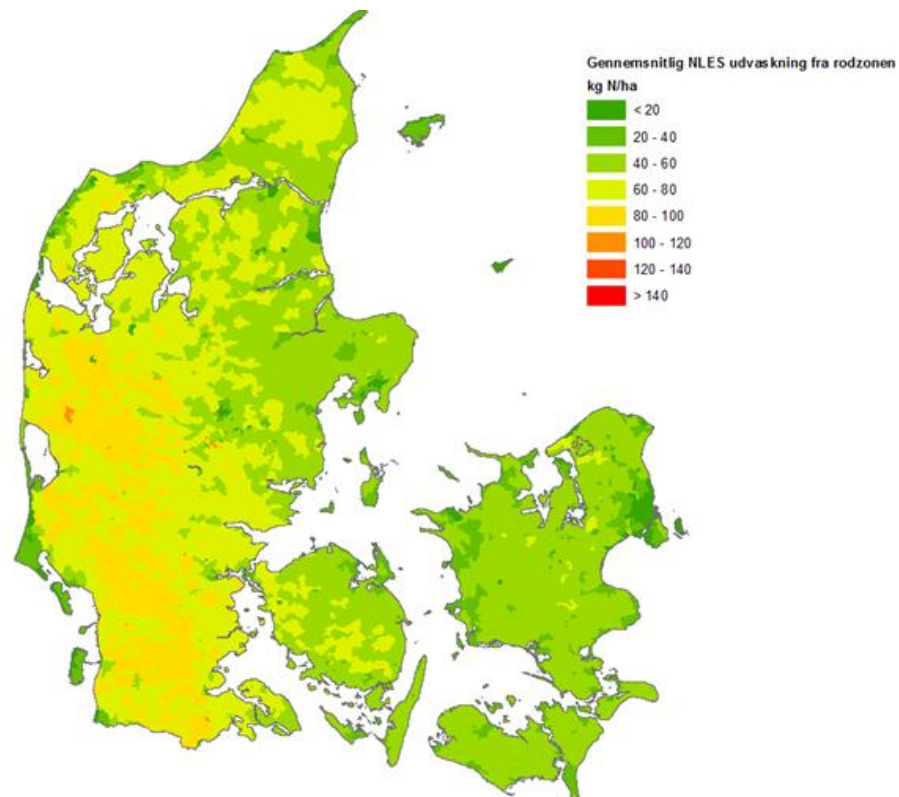


Egnede landbrugsarealer (Potentiale kort)

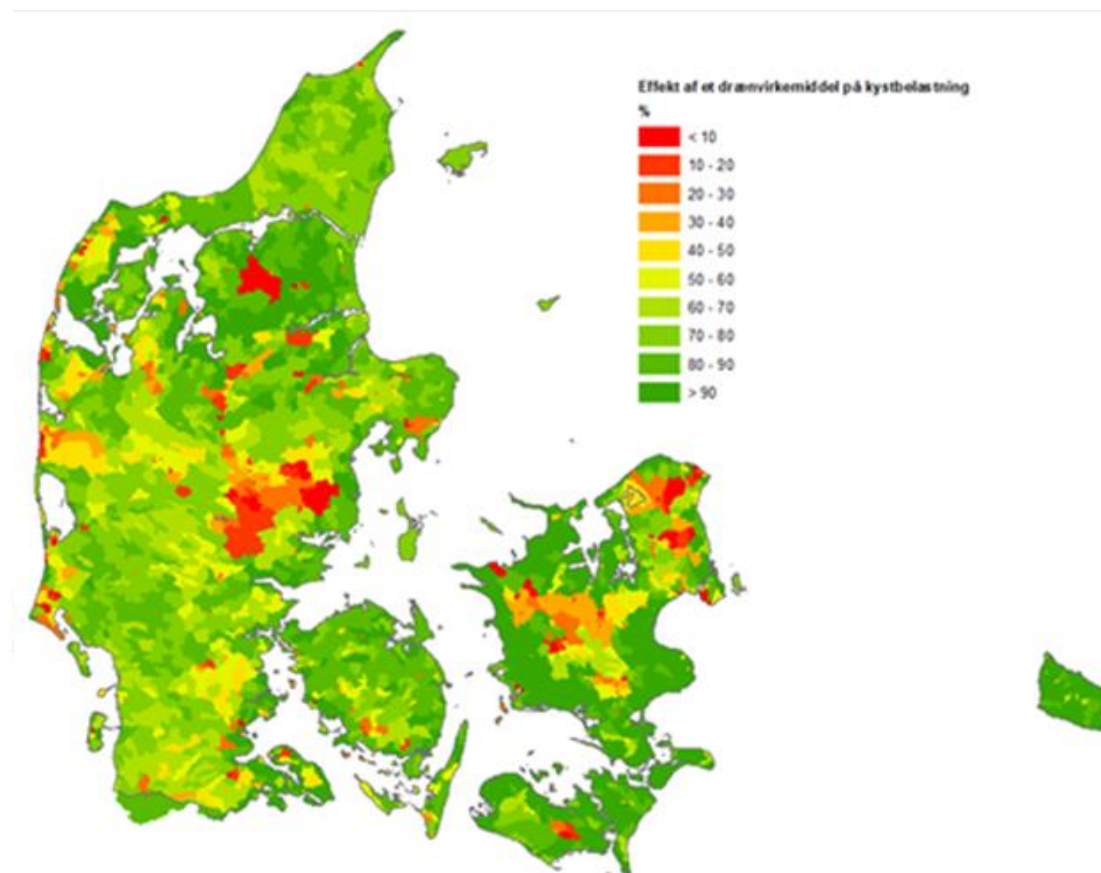


N-effekt

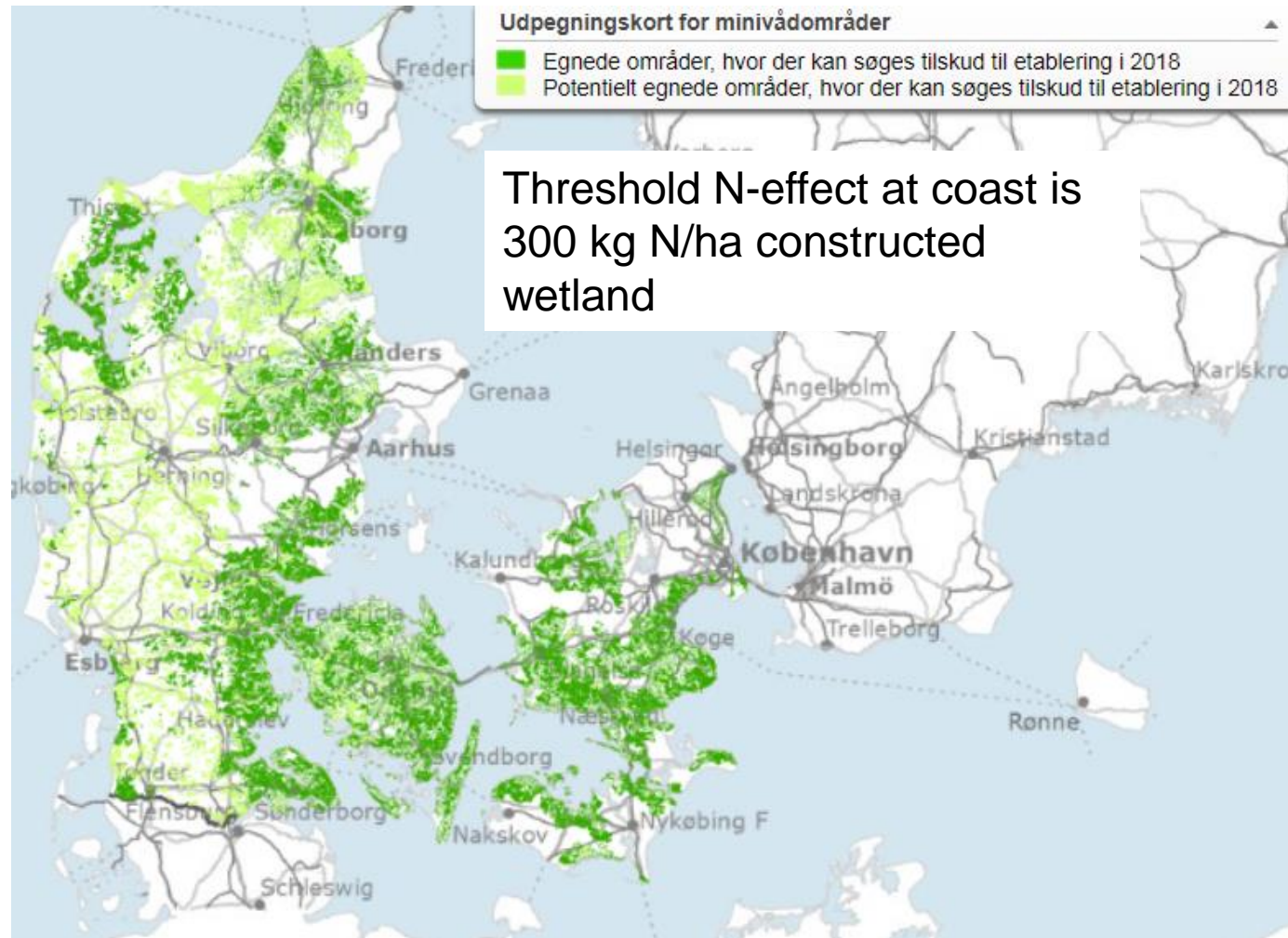
N-tab fra rodzone



N-effekt korrigeret for N-retention i overfladevand



National priority map



Tools – "Scalgo Live"

The screenshot displays the SCALGO LIVE web application interface. At the top left, the logo "SCALGO LIVE" is visible. To its right, there are map style controls: "Basiskort" (selected), "Skærmbkort", "Luffoto", and "Veje & stednavne". Further right is an address input field labeled "Adresse ..." and a user email "seza@seges.dk" with help and settings icons. The main map area shows a 3D topographic view with a green highlighted polygon and a red boundary line. A scale bar in the bottom left indicates 500 m. A "Vandoplandsværktøj" (Water Planning Tool) panel is open in the top left, showing "Vælg højdemodel:" (Select elevation model) with a dropdown menu set to "Danmark/2015/Bygninger (lavningsfri)". A "VANDOPLANDSINFORMATION" (Water Area Information) panel in the bottom right displays: "Lgd, Br: 9.596827, 56.376579" and "Areal: 1,59 km²", with an "eksporter" (export) button. The SEGES logo is located in the bottom left corner of the slide.

Tools – "GIS – designing tool"

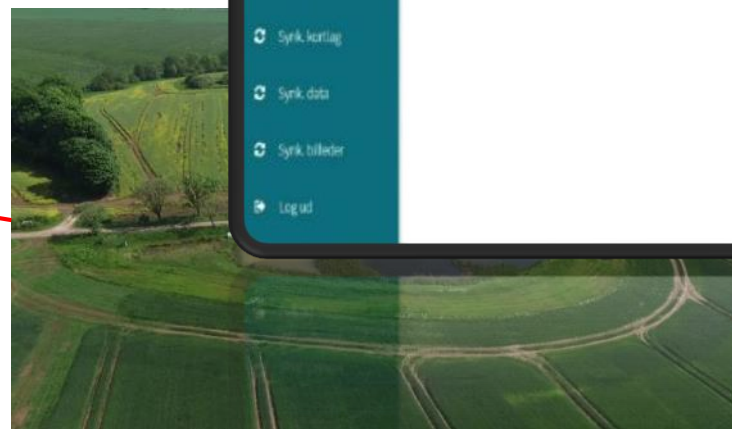
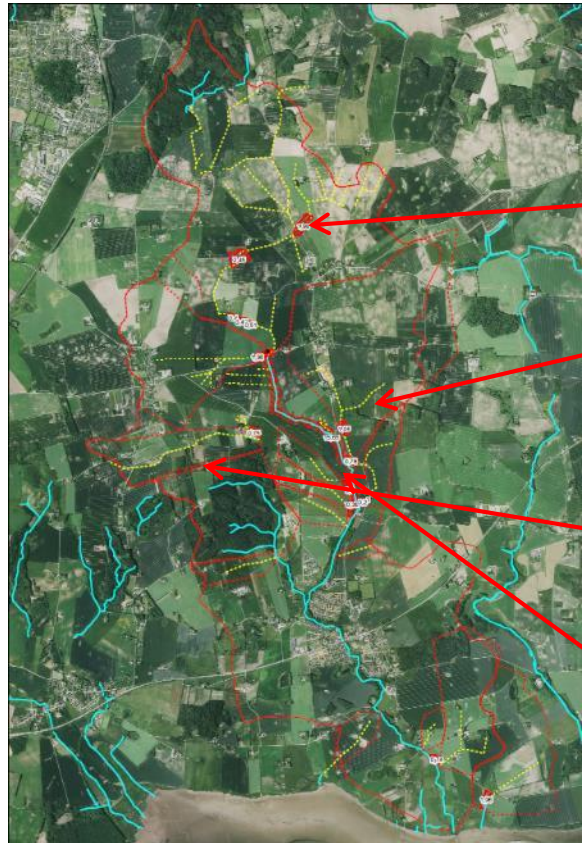
The image displays a GIS software interface for designing water management structures. The top part shows a site plan with various basins and ditches. A dialog box for 'Dige' (ditch) properties is open, showing parameters like 'Indvendig hældning i grader' (0.2) and 'Bredde på udvendig dyp, m' (15). To the right, a data table summarizes the components.

Tema	Navn	Areal, Ha	Areal, kvm	Arealfordeling, %	Afgraves, kbm	Påfyldes, kbm	Volumen, kbm	SORTERING	Tabel
Bassin	Bassin	0,38	3.822	0,0	4.108	-1	4.107	1	Bassin_Højdekurveflader
Lavvandsområde	Lavvandsområde	0,35	3.517	0,0	1.107	0	1.107	1	Bassin_Højdekurveflader
Sedimentationsbassin	Sedimentationsbassin	0,07	675	0,0	731	0	731	1	Bassin_Højdekurveflader
Bassin	-- SUM --	0,38	3.822	47,7	4.108	-1	4.107	2	Bassin_Højdekurveflader
Lavvandsområde	-- SUM --	0,35	3.517	43,9	1.107	0	1.107	2	Bassin_Højdekurveflader
Sedimentationsbassin	-- SUM --	0,07	675	8,4	731	0	731	2	Bassin_Højdekurveflader
-- SUM --	-- SUM --	0,80	8.014	100,0	5.946	-1	5.945	3	Bassin_Højdekurveflader
Dige	Dige - Indvendig skrænt	0,01	136	0,0	0	-29	-29	1	Dige_Højdekurveflader
Dige	Dige - Kronetop	0,20	2.005	0,0	0	-640	-640	1	Dige_Højdekurveflader
Dige	Dige - Udvendig skrænt	0,03	261	0,0	0	-56	-56	1	Dige_Højdekurveflader
Dige	-- SUM --	0,24	2.402	100,0	0	-725	-725	2	Dige_Højdekurveflader
-- SUM --	-- SUM --	0,24	2.402	100,0	0	-725	-725	3	Dige_Højdekurveflader
-- SUM --	-- SUM --	1,04	10.416	0,0	5.946	-726	5.220	1	TOTAL SUM --

The bottom part of the image shows a volume calculation map with a color-coded legend for 'Volumenberegning' (Volume Calculation). The legend indicates different volume ranges in kbm (cubic meters):

- 0,5 til 1,35 (Red)
- 0,25 til 0,5 (Light Red)
- 0 til 0,25 (Pink)
- 0,25 til 0 (Light Green)
- 0,5 til -0,25 (Green)
- 0,8 til -0,5 (Dark Green)
- alle andre (White)

Tools - "Kollecto" – collect data in field / administration



Kollecto

I/S Faugaard
Faugaardsvej 30 8300 Odder

Projekter
Kort

Tiltag	Startdato	Notat
Mini-vådområde	Projekt gennemført	2 X
Mini-vådområde	Ønsker at sege projektet	0 X

Synk kortlag
Synk data
Synk billeder
Log ud

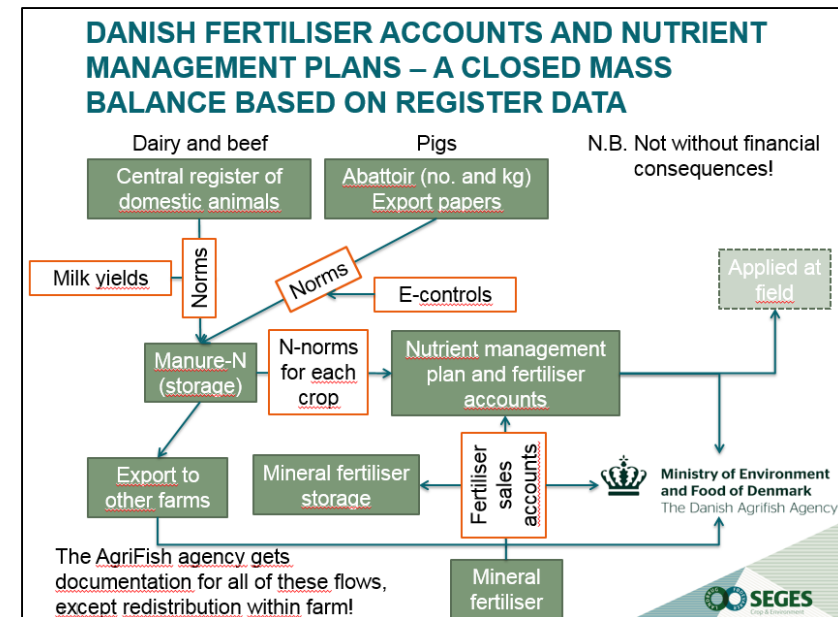
Fillerup
Lundgård

Thank you for your attention



From general N regulation towards targeted N regulation

Time	Plan	Significant elements in legislation:
1985	NPO-plan	-regulation of allowed animal unit per ha. - min. storage capacity for animal manure
1987	Water Environm. Plan I	-50 pct reduction in N-leaching from agr. -65 pct "autumn green fields" -Slurry in autumn only to wintercov. fields
1992	Action plan for sustainable agriculture	-Slurry only to grass or oilseed rape in autumn -Max. N-standards for crops (N-quota per farm) -Min. utilisation of nitrogen in animal manure -Fertilizer plans and -accounts.
1998	Water Environm. Plan II	-10 pct decrease of N-standards (The N-quota) - 6 percent "super" green fields in autumn -15 pct higher utilization of N in animal manure
2003	Water Environm. Plan III	-Target for decrease of P surplus -More wetlands - 10/14 pct. covercrops (10 at <80kg manure-N pr ha., 14 at >80 kg manure N pr. ha)
2011-2013	WFD	-More cover crops -Establishment of wetlands
2016	Agricultural package WFD 2. gen plans	- Area specific regulation based on need to obtain "Good Ecological Quality" - N-standards back to financially optimal levels (gain of ~160\$ pr. ha) - Max. 170 kg N pr. ha (previously 140) for pig production



Development in production and environmental impact

