

[View this email in your browser](#)



Nyhedsbrev april 2017

Det er med stor fornøjelse, at vi nu udsender 6. udgave af BufferTech nyhedsbrevet. I denne udgave kan du bl.a. læse om de interessante resultater i forhold til kvælstof- og fosforreduktioner fra den intelligente bufferzone i Fillerup. Derudover har Marc Stutter fra James Hutton Institute i Skotland skrevet en beretning om installationen af en intelligent bufferzone nær Dundee, og i efteråret 2017 kombineres det halvårslige projektmøde med en studietur til netop Dundee for at besøge Marc Stutter og James Hutton Institute og høre om deres erfaringer med intelligente bufferzoner.

Der er bevilliget ca. 2 mio. kr til etablering og monitorering af 2 nye fuldskala intelligente bufferzoner og til at dokumentere effekten af ældre demonstrationsanlæg. Pengene er bevilliget via det nationale forskningsprogram NIFA og tildelt Aarhus Universitet, som hovedansvarlig, samt til Syddansk Universitet, SEGES og lokale landboforeninger. Bevillingen og udførelsen koordineres i BufferTech projektet, hvilket sikrer den fulde synergi med de allerede eksisterende aktiviteter i BufferTech. Formålet med bevillingen er at dokumentere effekterne af intelligente bufferzoner, således virkemidlet kan implementeres som nationalt virkemiddel og indgå som værktøj i vandområdeplaner mv. Dette betyder konkret, at vi i uge 18 går i gang med at etablere en fuldskala intelligent bufferzone med fuld monitorering i Sønderjylland nær Sillerup Bæk, og som vi vil formidle mere om i næste nyhedsbrev.

Du kan som altid løbende følge med i nyhederne på www.buffertech.dk

Results from Fillerup IBZ 2015-2016

Læs om de interessante resultater i forhold til kvælstof og fosfor-reduktioner fra den intelligente bufferzone i Fillerup

[Læs mere...](#)



BufferTech deltog i workshop i New Zealand

Brian Kronvang was invited as key note speaker at the New Zealand 30th National Workshop

[Læs mere...](#)



	DK	NZ
Agricultural land	62%	42%
Main crops	Arable	Pasture
Number of pigs	12.3 mill.	0.7 mill.
Number of cattle	1.4 mill.	9.6 mill.
Number of sheep	0.07 mill.	39 mill.
Number of laying hens	3.5 mill.	3.1 mill.
Number of broilers	9.7 mill.	15.7 mill.
Number of milk	2.8 mill.	0
Export DK agricultural products amount to ~20% of total exports valued at \$ 20.4 bn.		

IBZ's come to Scotland

Marc Stutter beretter om installationen af en IBZ'er, som er anlagt på James Hutton Institutes forsøgsarealer nær Dundee.

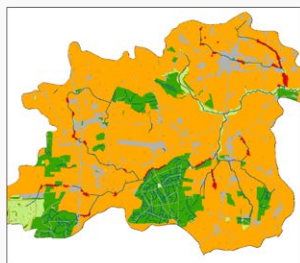
[Læs mere...](#)



Preliminary results from questionnaire data

I WP 5 er der indsamlet spørgeskemadata fra området omkring Sillerup Bæk vedrørende betallingsvillighed og randzoner.

[Læs mere...](#)



Results from Fillerup IBZ 2015-2016

Af Henning S. Jensen

Intelligent Buffer Zones are constructed as rectangular basins along streams. The basins are separated from the stream by a dike. Drainage water is collected in a deep (1 m) ditch and allowed to overflow a filterzone. The idea is that all particle bound nutrient will be retained and as the water percolates the filterbed nitrate and phosphate will be removed by denitrification and sorption to the soil, respectively. Alder trees are planted in the filterbed in order to increase water infiltration but even so, the filterbed has a limited infiltration capacity. Excess water will run to the stream through overflow pipes.

Nitrogen (N) enters the IBZ in Fillerup as nitrate (nearly 100%) while phosphorus (P) enters as 50% particle bound and 50% phosphate. We have calculated retention of N and P for the period June 2015 to June 2016. Annual average concentration of total N and total P in the inlet was 5.75 mg N L^{-1} and $0.052 \text{ mg P L}^{-1}$. The annual retention of N was 1100 kg ha^{-1} which is 31% of the inlet N. It should here be noted that 68% of the water was bypassing the IBZ (overflow) which means that the dimensioning of the system but also the infiltration capability of the filterbed should be better adapted to the expected water load. For phosphorus the retention amounted to 24 kg ha^{-1} equivalent to 42% of the inlet P. Most of this was retained as particle bound P and only 14% was retained in the filter. The low adsorption of phosphate in the filter is likely due to the very low phosphate concentration in the inlet water. We anticipate that the absolute P retention is high because much particulate P from the overflow water also was retained.



Picture. IBZ in Fillerup

The results obtained here are very promising. For the first time we have construction that retains both N and P from agricultural drainage water and at the same time is a buffer against high run-off events without requiring much space.

The idea of applying Intelligent Buffer Zones as a targeted mitigation option against nutrient emissions from fields was mentioned in the new Danish Agricultural Package 'Landbrugspakken' adopted by the Danish Parliament in February 2016. The Ministry of Environment and Food submitted an official requirement to the project leader in October 2016 to investigate if results from the two experimental IBZs

under BufferTech was available and if these results could document that IBZs could be included as an approved mitigation measure under Danish Agricultural Package targeted regulation from 2018. The project leader, in an official answer, promised to be able to deliver a note to the Ministry at summer 2017 with the final results from IBZ testing under BufferTech, but also pointed to the need for further demonstration and testing of IBZs. At the end of 2016 the BufferTech project (WP4) applied for funding to construct and monitor two new demonstration IBZs and the funding was granted from the NIFA research funding in December 2016. The first full scale demonstration IBZ will be constructed in spring 2017 and monitored for nutrient retention during 2017/18 under the BufferTech project.

BufferTech deltog i workshop i New Zealand

Af Brian Kronvang

Brian Kronvang was invited as key note speaker at the New Zealand 30th National Workshop 'SCIENCE AND POLICY: NUTRIENT MANAGEMENT CHALLENGES FOR THE NEXT GENERATION.'

Background

In New Zealand, Regional Councils have developed land management policy and regulations to address the adverse effects of intensive farming on water and soil quality. For a number of years the Annual February Workshop has included presentations on research and best on-farm management practices to mitigate adverse effects of agricultural practices. The experiences in Denmark with environmental policy identifying gaps in science have parallels with the situation in New Zealand, where the Regional Councils are at various stages of implementing policy that is reliant on sound science.



The Annual Workshop attracts 250+ delegates who are 'technical' representatives from across the agricultural and horticultural sectors, regional and central government planners and crown research scientists. This year workshop had a programme with specific theme titles:

- Increasing Productivity and Reducing the Environmental Footprints
- The Role of Nutrient Budgeting in Farm and Environmental Management

- Smart Tools and Technologies
- Contaminants and Soil Quality
- Farm, Catchment and Community Solutions

The workshop attracted presentations that covered technical, policy and economic perspectives relating to production and environmental aspects of nutrient, soil and water management in New Zealand primary production systems.

I held a Key Note presentation with the title: '30 YEARS OF NUTRIENT MANAGEMENT LEARNINGS FROM DENMARK: A SUCCESSFUL TURNAROUND AND NOVEL IDEAS FOR NEXT GENERATION'.

The presentation included information about first results of the IBZ solution for managing nutrients together with other different solutions.

Tommy Dalgaard did also held a presentation which were titled NUTRIENT BUDGETING FOR FARM AND ENVIRONMENTALMANAGEMENT IN DENMARK - EXAMPLES FROM CONTRASTING FARM TYPES.

[You can read the conference paper abstracts here](#)



	DK	NZ
> Agricultural land:	62%	42%
> Main crops:	Arable	Pasture
> Number of pigs:	12.3 mill.	0.7 mill.
> Number of cattle:	1.6 mill.	9.6 mill.
> Number of sheeps:	0.07 mill.	39 mill.
> Number of laying hens:	3.5 mill.	3.1 mill.
> Number of broilers:	9.7 mill.	15.7 mill.
> Number of mink:	2.8 mill.	0
> Export: DK: agricultural products amount to ~20% of total exports valued at \$ 20.4 bn.		

Table 1. Comparison between Danish and New Zealand agriculture

IBZ's come to Scotland

Af Marc Stutter

During 2015 a version of the IBZ design was installed in arable fields at the James Hutton Institute's Balruddery Farm near to Dundee, NE Scotland. The aims of this were four-fold: to act as a demonstration site for the provision of multiple benefits in riparian zones; to provide scientific evaluation of the N, P, sediment benefits and biodiversity interactions; to specifically examine the role of trees in the IBZ for N, P uptake and biomass returns; and to strengthen the link with the BufferTech project by providing a complimentary 'observatory'.



Four replicate plots of 30 m lengths of IBZ were established, half with alder and half with hybrid willow. Observations have focussed on quarterly survey for biodiversity (plants and insects) comparing with the fields, soil solutions, ditch and stream water nutrient chemistry. Typical to the region and land use the site has tile drains and several of these were broken into the IBZ ditches. In the soil solutions and ditch waters nitrate concentrations are high (up to 16 mgN/L) and phosphate has been noted up to 500 µgP/L, but are typically 20-100 µgP/L.

Early on we noticed that the site's soils are quite dry with limited sample volumes being gained from our soil tension lysimeters and this is requiring a redesign of sampling water nutrient flows through the system. The trees are growing well and following their end of year one management cut returned 2-6 dry matter tonnes per hectare. In biodiversity terms the margins are generally beneficial for insects, especially spring breeders but the tree plots remain in a transition state, still young for comparisons with true wooded areas.



The farm hosts a number of farming industry knowledge exchange events and the IBZ plots have been used on several occasions as part of site tours. Key topics raised by practitioner visitors have included: the allowance of CAP greening rules to incorporate IBZs where there is a harvest taken (of biomass) since greening zones dictate no cropping; whether field drains need to maintain periods of rapid flushing to stop them silting up that the connection with the ditches doesn't allow; and on the practicalities of biomass harvesting and on-farm use.

Additional work has looked at a green manure experiment where 'designer vegetation' plots (selected for P phyto-accumulation) have been grown and harvested annually for several years. This material is then transplanted onto mini field plots of barley for yield assessment alongside conventional fertiliser and combination green manure-chemical fertiliser mixes. Recently, in connection with this and other biodiversity work we hosted a three-week visit to Scotland from the BufferTech project's Sandra Hille.

Ongoing work will continue to assess the IBZ multiple benefits and provide demonstration and we have a legacy beyond the end of the BufferTech duration through Scottish Government funding. The farm managers are pleased with the installation of the margins as part of farm infrastructure as they have their own novel interests in 'magic margins' using tiled ridgers (potato cultivation equipment) to create mini-ridged features perpendicular to the base of fieldslopes. For the IBZ plots we are working in 2017 to switch methods to enable mass balance approaches that will compliment better data collection in the central project.

The Scottish buffers team: Marc Stutter, Tim George, Lawrie Brown, Jenni Stockan.



Preliminary results from questionnaire data

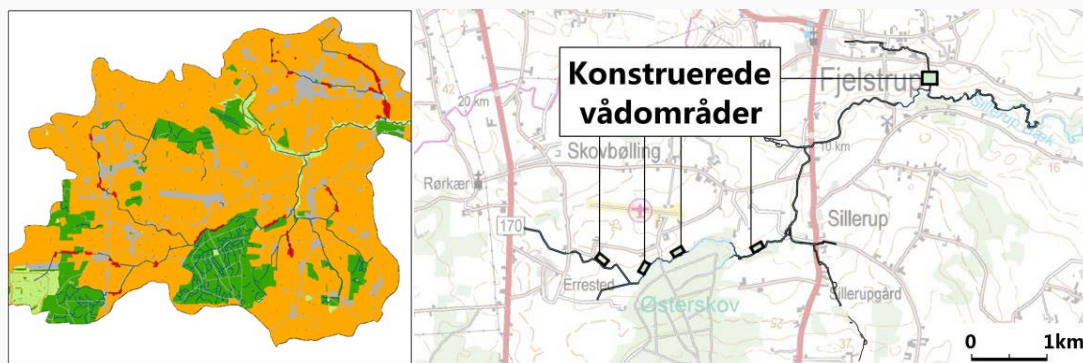
Af Kennet Christian Uggeldahl

The questionnaire data collected by WP5 during spring and summer 2016 has been prepared for analysis, and some initial models have been estimated. The data was collected using two slightly different surveys (see the BufferTech newsletter from October 2016), one for the area around the stream Sillerup Bæk in Haderslev Municipality, and one from the whole of Denmark. In the analysis we estimate separate models for these two surveys, and below we have outlined some of the results from the models estimated for the Sillerup Bæk sample.

For Sillerup Bæk, the preliminary analysis indicates that respondents, on average, are willing to pay around 370 DKK per year for increasing the buffer strip width to 9m from the current 2m. However, this value varies considerably within the respondents, as indicated by a standard deviation of 820 DKK/year (which means that roughly 33 % consider an increase of the buffer strip width as negative). Respondents seem to be indifferent about having a 2m or a 20m buffer strip (indicating that 20m is probably seen as too wide, since 9m is preferred over 2m). Regarding the vegetation and the possibility of harvesting in the buffer strip, the model indicates that people are indifferent about changing either the vegetation in the buffer strip or the harvesting intensity. However, respondents seem to be split over their preferences for having energy crops in the buffer strips, as about half of the sample prefer this and the other half dislike it. However, due to the small sample size in the Sillerup Bæk survey, the variables representing vegetation and harvesting are hard for the model to

estimate, meaning that care has to be taken in the final interpretation. In the survey respondents also indicated their preference for establishing five IBZs along Sillerup Bæk. The locations of these were chosen using an erosion risk analysis (see map). On average, respondents are willing to pay 210 DKK/year for having these five IBZs established. As with the other variables in the model, we find a large standard deviation of this value, indicating significant differences between respondents (with 36 % having a negative preference for IBZs). As expected, the result shows that respondents prefer better water quality to worse, and dislike having to pay a higher price for a new buffer strip policy.

In the upcoming analysis of the data, we will focus on the reasons for the large differences in preferences between respondents. We hypothesize that some of these will be explained by e.g. socio demographic and attitudinal variables.



Left. Risk areas for P losses (red). Right. Map used in the survey to illustrate the location of the IBZs ("Konstruerede vådområder") to the respondents

Kommende arrangementer

Land Use and Water Quality Conference 2017

LUWQ2017 konferencen afholdes for 3. gang i Den Haag, Holland i perioden 29. maj til 1. juni 2017 (se <http://www.luwq2017.nl>). BufferTech er arrangør for en special session om Buffer Strips og deltager med flere indlæg - [se konferencens program her](#)

dNmark International Konference

Fra den 26.-28.6.2017 afholder dNmark Alliancen en international konference om *Innovative solutions for sustainable management of nitrogen* på Aarhus Universitet i Aarhus

Konferencen har sin egen [hjemmeside](#), hvor du finder al nødvendig information

Kontakt

Irene Asta Wiborg
SEGES
iaw@seges.dk

Sebastian Zacho
SEGES
seza@seges.dk

Brian Kronvang
Institut for Bioscience - Aarhus Universitet
bkr@bios.au.dk



InnovationsFonden

FORSKNING, TEKNOLOGI & VÆKST I DANMARK

This email was sent to seza@seges.dk

[why did I get this?](#) [unsubscribe from this list](#) [update subscription preferences](#)

SEGES · Agro Food Park 15 · Aarhus 8200 · Denmark

MailChimp