

**Ministry of Environment and Food of Denmark**  
**Danish Nature Agency/Danish AgriFish Agency**

**J.nr. 2015-6878**

**Date: 19 January 2016**

**Note**

**On groundwater protection when lifting the reduced general fertilization standards for nitrogen to the level of economic optimum**

The Danish government has reached a political agreement addressing a need for improvement of the production conditions for the food and agricultural sector. The political agreement includes a new and more targeted way of future nitrates regulation in Denmark that will be in place in 2018. A key element in the political agreement is lifting the reduced general fertilization standards for nitrogen to the level of economic optimum.

The current general fertilization standards for nitrogen and the reduction hereof to a level below economic optimum is part of Denmark's implementation of the Nitrates Directive and thereby also Denmark's implementation of the Water Framework Directive.

Lifting the reduced standards to the economic optimum level will result in increased losses of nitrogen to the aquatic environment including groundwater. Compensatory measures will be implemented in order to counter the increased loss of nitrogen.

Thus, a new targeted regulation of nitrogen will be implemented from 2018 onwards. The regulation will ensure the protection of the aquatic environment including groundwater.

In the meantime, two initiatives will be initiated:

Changes in national regulation will be implemented limiting the farmer's current flexibility in using EFA areas as an alternative to the national requirement of the sowing of catch crops. This will increase the effect of the national requirement of 240.000 ha of catch crops, as more catch crops will be sowed. These changes do not concern the regulation of the EFA areas as such.

The changes will result in a combination of voluntary buffer strips and catch crops, depending on the specific choices of farmers, with a significant effect on N-leaching. For instance, 70.000 hectares additional EFA catch crops and the maintaining of 4.000 hectares additional buffer strips that would otherwise be removed.

Mainly additional catch crops will provide a reduction of nitrogen loss to groundwater. See Note on a model for intermediate compensatory measures to avoid increased N emission (10 December 2015).

In addition, a voluntary targeted catch crop scheme will be instigated from 2017 resulting in extra catch crops (on top of the national mandatory catch crops). The need and possibility for compensating measures already in 2016 are investigated further. The scheme will target areas

with a specific need for the reduction of nitrogen leaching to the aquatic environment including groundwater. The scheme is expected to be implemented within the rules of de minimis.

In order to implement the political agreement reached by the government on 22 December 2015, initiatives have been taken as follows:

Firstly, the scientific basis for assessing the specific need for compensatory measures in terms of extra catch crops has been established. The project will link results acquired from the national nitrogen model (nitrogen leaching from the root zone when lifting the reduced general fertilization standards for nitrogen to the level of economic optimum) to individual groundwater bodies, and the expected long term increase in the concentration of nitrates will be calculated for each groundwater body. The results will be compared to the status of the groundwater bodies and a possible trend in groundwater nitrates concentration. Moreover, analyses of scenarios will be undertaken in order to determine the need for compensatory measures in specific geographical areas in order to avoid groundwater deterioration and reverse any significant and sustained upward trend in nitrates concentration. The project is carried out by the Geological Survey of Denmark and Greenland which has developed the national nitrogen model. The project is will be completed in June 2016.

Secondly, with the political agreement the government has so far allocated 152 million DKK in 2016-18 for a voluntary targeted catch crop scheme resulting in extra catch crops in order to avoid deterioration of the aquatic environment including groundwater. The need for funds in regard to protection of groundwater is based on a preliminary assessment that there will be a need for compensatory measures equivalent to the increased leaching of nitrogen in geographical areas related to groundwater bodies at risk, i.e. the groundwater quality standard for nitrate (75%) is close to being exceeded or a significant and sustained upward trend in the nitrates concentration has been identified above 75% of the quality standard. Additional funds could be allocated, if needed.



Ministry of Environment and Food of Denmark  
The Danish Agrifish Agency and The Danish Nature Agency  
Date: 27 January 2016

### Follow-up note.

## Prospects of ensuring the expected nitrogen effects from extra RDP funds for the period 2017-2021 to additional collective Nitrogen-reducing measures

The Danish government has decided to upscale funds allocated to collective nitrogen (N)-reducing measures in Denmark from the Rural Development Programme (RDP) for the period 2017-2021 as part of the effort to decrease the loss of N to the aquatic environment in Denmark. On average, an extra 100 mio. DKK yearly is assigned to additional restoration of natural wetlands, 35 mio. DKK yearly is reserved for afforestation measures, and 97,5 mio. DKK yearly is earmarked to constructed mini-wetlands. This allocation of extra funds is based on past experiences, e.g uptake by farmers, estimates from SEGES<sup>1</sup> and dialogue with the Danish municipalities.

The table below shows the calculated N-effect (reduced loss of N) as a result of the upscaling of collective N-reducing measures in Denmark for the RDP period 2017-2021<sup>2</sup> as well as the financial frame. These additional measures come on top of already planned collective RDP N-reducing measures, which contribute with an N-effect of 1300 tonnes N in 2021.

Table 1. Reduced loss of nitrogen from additional collective N-reducing measures during the RDP-period 2017-2021. Accumulated tonnes N /year.

	2017	2018	2019	2020	2021
Wetlands	77,0	154,0	231,0	308,0	385,0
Afforestation	30,1	60,2	90,3	120,4	150,5
Constructed mini-wetlands	0,0	114,5	376,3	638,1	899,9
<b>Total N-reduction pr. year</b>	<b>107,1</b>	<b>328,7</b>	<b>697,6</b>	<b>1066,5</b>	<b>1435,4</b>
<i>Yearly financial frame for the three collective measures, DKK. Million</i>					
	135	205	295	295	295
<b>Accumulated financial frame</b>	<b>135</b>	<b>340</b>	<b>635</b>	<b>930</b>	<b>1.225</b>

Note: Compared to the figures in table 2 in the previously forwarded note of 10 December 2015 the figures have been accumulated.

### The wetland measure

The environmental effects of reclaimed wetlands are well documented,

<sup>1</sup> SEGES is the newly amalgamated Knowledge Centre for Agriculture and the Danish Pig Research Centre under the Danish Agriculture & Food Council.

<sup>2</sup> In order to align with the timeframe of the Danish Implementation of the river basin management plans (2015-2021) the budget period for the N-reducing measures and RDP funds includes 2021, although year 2021 will be part of the next LDP period (2021-2027). The river basin management plans are part of the Danish obligation in the implementation of the Water Framework Directive.

including the N-effects<sup>3</sup>. A wetland reduces loss of N from agricultural fields as well as the emission of greenhouse gasses and establishes new nature, thus creating a positive impact on biodiversity.

The efficiency of N removal in wetlands may vary considerable and is foremost attributed to the size of the nutrient load, as well as the hydrological characteristics of the wetlands – especially the watercourse running through the wetland. It is ensured that wetlands and other initiatives do not conflict and “compete” for the same N by ensuring a correct geographical location for the measures. Furthermore, a monitoring programme has been set-up to supervise effects from finalized wetland projects.

Reclamation of natural wetlands was part of the recent RDP period in Denmark and continues to be implemented from 2016 with the second cycle of the river basin management plans. The experiences gained from the wetland measure under the former RDP- period show that wetlands are effective in N-reduction and that the measure has a good uptake by farmers. During the last RDP period applications for the wetland measure have exceeded the money reserved for it in the programme. Therefore, it is expected that the extra funds allocated to the wetland measure in the next RDP period will be used and applied for.

Participation is voluntary, but under the wetland measure, Danish farmers and municipalities are guaranteed a 100 percent refund of their expenses. The farmer can chose whether to sell his land to the Ministry of Environment and Food, be compensated by another piece of land, or he can obtain 20 years of compensation for his loss of income from the land. The farmer usually has no obligations in maintaining the wetland after it is established. The condition of the wetland is registered on the farm and is notified at the Danish Land Registration. The condition is therefore permanent as is the N effect.

The farmers’ incitement for participating in the wetland measure is that there is usually no income loss involved. Most of the areas suitable for wetlands are usually the least suitable for farming, often difficult to manage because they are low-lying areas with risk of flooding. It is in addition often possible for the farmers to obtain better arable land in connection with land consolidation. In addition, the wetland measure can give the farmer better hunting opportunities and some recreational values on his farm. It is therefore expected, that farmers will continue to be interested in participating in wetland projects.

In the coming years, the Ministry of Environment and Food is planning to launch new initiatives in order to facilitate the wetland measure further, e.g. establishing a mobile consulting team. Furthermore, the Ministry is considering entering a partnership with the major Danish farmer associations to secure a commitment from the farmers to

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<sup>3</sup> ”Virkemidler til realisering af 2. generations vandplaner og målrettet areal regulering”  
[http://pure.au.dk/portal/files/84646400/Virkemiddelkatalog\\_web.pdf](http://pure.au.dk/portal/files/84646400/Virkemiddelkatalog_web.pdf)

participate in the wetland measure. Also, a seminar on how to facilitate the wetland measure is held by late January 2016.

The potential for the wetland measure is in place, and the Ministry of Environment and Food will point out possible areas for projects in the river basin management plans. The allocation of extra funds under the RDP for the period 2017-2021 to the wetland measure will therefore reduce the loss of N to the aquatic environment. The effect is linearly increased as the financial framework is increased, since the potential exists and the incentives for participation in the projects are present.

### **The afforestation measure**

The afforestation measure helps to promote biodiversity and to increase the area with forest in Denmark. The focus of the measure is the protection of water resources, e.g. reduction of nutrients and binding of CO<sub>2</sub> in the soil.

Subsidies are given to the establishment of new forest. The measure is open for private landowners who may apply for the establishment of forest on existing agricultural land. Often, support is granted to the establishment of hardwood forests and a typical afforestation project covers app. 7 hectare and includes fencing surrounding the planting and establishment without deep plowing and the use of pesticides.

The adopted budget of the measure (annually 35 mio. DKK) is expected to result in the establishment of about 1,000 hectares of new forest per year. This corresponds to the commitment area for the private afforestation measure in 2015 and the existing measure to private afforestation seems to be an attractive tool for the farmers to convert agricultural land into new forest. Under the new measure the economic incentives are improved in the designated areas by giving the farmer the possibility of keeping up direct payment on the area for afforestation. Therefore, there is reason to expect that the level of commitment area from 2015 can be maintained.

The new afforestation measure will be simplified and more transparent for the applicant. With the new measure, payments are gathered in one investment rate, paid immediately after planting. The economic uncertainty is therefore considerably reduced. Furthermore, the new measure increases the number of plants in afforestation to 4,000 plants per hectare as has been requested by the industry. The lower limit for project areas eligible for grant is lowered from 5 to 2 hectares, which will make the measure more attractive for many farmers. The change takes place at the request of the industry, which estimates that the change will provide a significantly larger number of applications.

Afforestation reduces loss of N of app. 50 kg N per hectare per year in the root zone<sup>4</sup>. The specific effects in the aquatic environment will vary depending on local conditions including natural N retention. As the

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<sup>4</sup> Ibid.

measure is targeted private afforestation interventions in catchments to water bodies, the N-reducing effect of private afforestation is expected to be 30 kg N per hectare. Against this background, the expected effect of the establishment of 5.000 hectares of new forests in 2017-2021 will reduce the loss of N to surface waters by approximately 150 tonnes N per year and reduce the CO<sub>2</sub> emissions by about 16,000 tonnes per year.

The effect of the private afforestation is permanent, as the afforested area officially and legally is converted from agricultural to forest land.

### **Constructed mini-wetland measure**

Constructed mini-wetlands target N removal in agricultural drainage discharge generally considered to deliver 45-60 percent of the total N-loss to the aquatic environment<sup>5</sup>. The adopted budget of the measure (app. 97,5 mio. DKK annually) is expected to result in the establishment of about 1.000 mini wetlands in 2021 with an average effect of about 900 kg N per year per installation. The calculated average N-effect is based on research on full-scale projects made by Aarhus University.

Mini-wetlands are generally expected to reduce the N transport by 25 percent in connected drains from the fields when preconditions as to the size of the catchment area, drainage discharge of N (volume and concentration) and type of soil etc. are met<sup>6</sup>.

The efficiency of the measure depends on the correct location of the mini wetlands. In order to obtain the full N-effect, mini wetlands have to be located in areas with a mean drainage discharge of about 35-40 kg N per hectare per year, draining app. 100 hectares of catchment area. The Danish Agrifish Agency is currently leading a project in collaboration with Aarhus University to identify suitable locations with a sufficient drainage discharge. It is expected that applicants will be prioritized based on the result of this project combined with documentation of the content of N in the drainage water, which the applicant will be asked to provide. Often the suitable location of mini wetlands occurs on land, which is periodically wet and only extensively used. The farmers are not compensated for the take-up of land but only for the expenses related to the creation of the facility.

The participation in the constructed mini wetland measure is voluntary. The Ministry of Environment and Food is currently uncovering the conditions necessary to make the mini wetland measure more attractive for farmers to engage in. In this context, the Ministry of Environment and Food is investigating the possibility for the farmers to use mini-wetlands as a means to meet the regulation requirements under the new targeted N regulation, following the maintaining period of the mini-wetland measure (3 years). This is expected to enhance farmers'

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<sup>5</sup> "Virkemidler til realisering af 2. generations vandplaner og målrettet areal regulering"  
[http://pure.au.dk/portal/files/84646400/Virkemiddelkatalog\\_web.pdf](http://pure.au.dk/portal/files/84646400/Virkemiddelkatalog_web.pdf).

interests in participating in the mini wetland measure considerably. Otherwise, the reduction of N loss by constructed mini wetlands will reduce the need for other N-reducing measures within specific catchment areas. For example, this applies when Denmark in the years to come implements a more targeted N- regulation where local needs are considered.

SEGES<sup>7</sup> estimates the potential for constructed mini wetlands to be up to 3.000-10.000 installations. SEGES finds that there is a very high willingness amongst farmers to participate in the mini wetland measure due to the fact that the uptake of arable land is very limited compared to other N-reducing initiatives. Farmers would therefore be interested in constructing a mini wetland. Furthermore, SEGES has indicated that they are willing to assist with the education of agricultural advisors and hereby support farmers' applications for the measure.

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<sup>7</sup> SEGES is the newly amalgamated Knowledge Centre for Agriculture and the Danish Pig Research Centre under the Danish Agriculture & Food Council.

**Ministry of Environment and Food of Denmark**

**Danish AgriFish Agency/Nature Agency/Environmental Protection Agency**

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**Note**

**on a model for intermediate compensatory measures to avoid increased N emission**

The Danish Government is presently preparing the basis for a political agreement addressing improvement of the production conditions for the Food- and Agricultural business. The political agreement is expected to result in a new and more targeted way of regulating nitrates in Denmark in the future, expected to be in place in 2018. Key elements in the political agreement are lifting the reduced general fertilization standards for nitrogen to the level of economic optimum, annulment of the statutory buffer strips along lakes and watercourses and a minor adjustment of the, prohibition on soil tillage in the autumn.

The general fertilization standards for nitrogen and the current reduction of these standards to a level below economic optimum are currently part of the Danish implementation of the Nitrates Directive, and thereby also the Danish Implementation of the Water Framework Directive.

Lifting the reduced standards to the economic optimum level and the annulment of the requirement for mandatory buffer strips will result in an increased loss of nitrogen to the aquatic environment. The increased loss of nitrogen will be countered by compensatory measures in order to ensure an adequate implementation of the Nitrates Directive and Water Framework Directive.

The model to avoid deterioration of the aquatic environment (surface waters and groundwater) will be presented in the following.

Table 1 shows the expected need for further measures to compensate the increased loss of nitrogen to surface waters in the period 2016-2018 (based upon scientific calculations). It is assumed that the reduced fertilization standards will be increased by two thirds in 2015-2016 and by one third in 2016-2017, thus the standards will represent the economic optimum in 2016-2017.

The need for further measures in each individual year is based on a recent recalculation of the nitrogen load. The baseline for 2013-2015 is deducted in the calculation and reflected in the increased load of nutrients to individual coastal water bodies.

The figures in table 1 is based on the following decisions and calculations:

- The increased loss of nitrogen resulting from the annulment of the buffer strips (approx. 725 tonnes N),



- The increased loss of nitrogen resulting from lifting the reduced general nitrogen fertilization standards (approx. 2.740 tonnes N in 2016 increasing to 4.350 tonnes N in 2018), and
- The development of the baseline (accumulation of the effect of measures already in place, structural development etc.) contributing to the reduced loss of nitrogen.

**Table 1. Intermediate need for further nitrogen reduction in 2016-2018 resulting from increased N emission to surface waters**

<b>Year</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>
<b>Need for further nitrogen reduction to avoid deterioration (tonnes N)</b>	915	1395	1004

Note: The consequences for groundwater are not reflected in the table. The figures are aggregated at national level, and variation at coastal water level is possible.

A new targeted N-regulation is expected to ensure a sufficient protection of the surface waters from 2018. The targeted N-regulation will be explained further in a separate document, to be presented to the commission.

#### *Measures in an intermediate compensatory model*

To avoid deterioration of surface waters and groundwater the Danish Government has ensured the financing and legal basis for two intermediate compensatory environmental initiatives. On a short term basis (2016-2018) it is generally expected to be possible to target measures to avoid deterioration locally, and on a long term basis (2019-2021) the initiatives – combined with the targeted regulation – are expected to ensure a gradual improvement of the aquatic environment.

The model to avoid deterioration in the period 2016-2018 is presented in table 2 below. The model includes the following regulatory initiatives:

- Changes in national regulation of mandatory catch crops.
- Subsidy schemes to establish wetlands, mini-wetlands and afforestation, Land lease schemes with cultivation restrictions, ensuring establishment of additional catch crops.

In 2016 the increased load of nitrogen beyond baseline 2013-2015 to surface waters will be partly compensated by N-reducing measures in national legislation working in combination with the chosen EFA-types in Denmark to fulfill the greening requirement of Ecological Focus Areas (EFA) in the CAP. Further analysis is required to establish to what level each individual regulatory initiative addresses the deterioration of the groundwater status and how these can be targeted against deterioration (see further below).

**Table 2 - Intermediate compensatory initiatives (additional need for nitrogen reduction, as in table 1, and N-reducing impact in tonnes per year in surface waters)**

<b>Year</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>I</b>
<b>Need for nitrogen reduction to avoid deterioration (tonnes N in surface waters)</b>	915	1395	1004	
<b>N-reducing measures</b>				
Changes in regulation of national mandatory catch crops	1197	867	867	
Additional establishment of mini-wetlands, wetlands, afforestation (RDP-financed)		107	221	
Land lease with cultivation restrictions resulting in extra catch crops		818	693	
<b>Total</b>	<b>- 282</b>	<b>- 397</b>	<b>- 777</b>	

**Note:** It is assumed that land lease with cultivation restrictions will be carried out on 85.500 hectares in 2017 and 72.500 hectares in 2018. The scope of the initiative is targeted to ensure an impact on groundwater as well.

#### *Influence on groundwater*

The changes to the nitrogen regulation as described above will - all else being equal - increase the amount of nitrates in the groundwater. The compensatory initiatives are expected to ensure that there is no deterioration of the aquatic environment, ie. surface waters. These initiatives will also counter deterioration of ground water quality. However, since there is no certain one-to-one correlation between initiatives that counter deterioration of the quality of the surface water and the quality of the groundwater, the risk of deterioration of the groundwater can currently not be fully eliminated.

The Ministry of Environment and Food are therefore currently investigating solutions and data concerning groundwater. The Geological survey of Denmark and Greenland is currently evaluating in detail the groundwater status and the geographic distribution of necessary compensatory measures in relation to groundwater. The full evaluation will be completed in June 2016.

The preliminary assessment is that there will be a particular need for compensatory measures in geographical areas related to areas of groundwater, in which the quality standard for nitrate

(75%) is close to being exceeded or have a significant and sustained upward trend above 75% of the quality requirement regarding nitrate. It is expected that from areas where there is relatively little nitrogen loss to surface waters because the soil on the areas will withhold a larger proportion of nitrogen, nitrogen will to a certain degree leach into groundwater.

The changes to national regulation of catch-crops on farmland are expected to have an impact on groundwater. In addition, the land lease model (described below) will be targeted groundwater in order to avoid deterioration of groundwater and reverse any significant and sustained rising trends of nitrate in the groundwater.

#### *Changes in regulation of the establishment of national mandatory catch-crops*

As a condition for receiving the green payment under the CAP direct payments, farmers must comply with three greening requirements, including the requirement of ecological focus areas (EFA) on 5 per cent of the arable land on each farm. To increase the effect of a national requirement of 240.000 ha of catch crops and the EFA-areas, a flexibility given to farmers whereby they can use some EFA-areas as an alternative to the national catch crops will be removed.

A total EFA area of approximately 105,000 hectares is needed in Denmark to comply with the 5 per cent requirement. According to Danish legislation, the EFA area can be established by buffer strips, catch crops, fallow land, coppice and landscape elements. The mandatory buffer strips cf. the national Law on mandatory buffer zones contributes to EFA with approximately 24,000 EFA-hectares today.

According to the proposal by the government to repeal the requirement of additional buffer strips, which has recently been presented in parliament, the farmer can choose to apply other EFA-measures than buffer strips, to meet the EFA requirement. The alternative measures will have a positive effect on reduction of nitrogen leaching in so far as they were not already established before the annulment of the law on mandatory buffer strips. This will offset entirely the increased nitrogen loss resulting from the annulment of the law.

It is expected that farmers will mainly fulfil their resulting need for additional EFA requirements by establishing extra catch crops, maintaining existing buffer strips voluntarily or lay land fallow.

According to continued national legislation farmers must establish 240.000 ha of catch crops. At present farmers are given a flexibility to replace establishment of catch crops required by the Order on Plant Cover with alternative measures such as elements included in the EFA-measures (fallow land and coppice). In order to ensure the best possible nitrogen-reducing impact of the greening requirements, the flexibility on catch crops in the Order on Plant Cover will be removed. By not allowing farmers to replace mandatory catch crops with EFA elements such as laying land fallow or establishing coppice, the full effect on reduction of nitrogen loss is obtained for both mandatory catch crops and the EFA requirement. These elements will have a full nitrogen reducing effect, also in future years.

The Ministry of Environment and Food estimates that the changes could result in a number of different combinations of buffer strips and catch crops with a significant effect on N-leaching,

for instance; 70.000 hectares additional EFA- catch crops and the maintaining of 4.000 hectares additional buffer strips that would otherwise be removed.

The effect of the changes to national regulation of mandatory catch crops is estimated to be a reduced nitrogen loss of 1,197 tonnes N in 2016 and 867 tonnes N in both 2017 and 2018. Since the initiative is mandatory for farmers, the effect is certain and will be permanent.

The changes will provide a reduction of nitrogen loss to both surface waters and groundwater. They will be implemented through revision of the Danish Order on Plant Cover with effect from August 2016. This will not affect the Danish implementation of the greening requirements pursuant to REG (EU) 1307/2013.

#### *Land lease with cultivation restrictions of sowing of catch crops*

The Danish government will establish a new land lease scheme for 2017-2018 in order to prevent further nitrogen loss. In the scheme, the state leases farmland on a voluntary basis, imposes nitrogen-reducing cultivation restrictions on the land, such as requirements for catch crops, and then possibly re-leases it to a farmer for a limited period.

It is estimated that the scheme in 2017 will ensure a reduced nitrogen loss to the marine environment of 421 tonnes N. In order to achieve this effect in 2017, it is estimated that the state must lease between 30,000 and 90,000 hectares or up to 4 per cent of the farmed land. The leasing scheme shall work on market terms. Therefore, the economic compensation for farmers will solely be equal to the operating loss endured as a result of the restrictions on the land.

Further there is a need for an effort to sufficiently ensure the protection of the groundwater. The current analysis indicates that it will require a land lease scheme with cultivation restrictions ensuring reduction of nitrogen loss amounting to additional 818 tonnes N in 2017 and 696 tonnes N in 2018 to avoid deterioration of the groundwater status in 2017-2018. The scope of the need will as previously mentioned be further investigated by The Geological survey of Denmark and Greenland in the beginning of 2016 and assessed by June 2016, and the Ministry of Environment and Food is currently assessing various solutions to prevent deterioration in 2016 of the groundwater. A new targeted regulation is expected to ensure a sufficient protection of the groundwater after 2018.



**Ministry of Environment  
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## **The future regulation of the loss of plant nutrients to the aquatic environment in Denmark**

The future regulation of nitrates and phosphorous in Denmark is expected to be implemented in three steps. The three steps cover three different periods, *Step one – from 2016 to 2018, Step two – from 2017 and onwards* and finally *Step three – from 2018 and onwards*. The three steps will be described in the following paragraphs.

### **Step one – 2016-2018**

#### **Short term changes of the regulation of nitrates**

Regarding the short term changes of the regulation of nitrates, the regulation is described in the Note on a model for intermediate compensatory measures to avoid increased N emission, dated December 10<sup>th</sup>, 2015.

### **Step two – 2017 and onwards**

#### **Levelling the harmony rules and ensuring a more direct way of regulating phosphorous in a new regulation of livestock holdings**

*Coming into effect from 2017, the Danish government wishes to align the "harmony rules" for slaughter pigs, to ensure that the requirement is aligned with the requirement of the Nitrates Directive that specifies the amount of livestock manure per hectare to 170 kg N/ha, corresponding to 1.7 LU/ha. This means that the harmony rules' limit for holdings producing slaughter pigs will be lifted from 1.4 LU/ha to 1.7 LU/ha.*

Harmony rules set requirements for the minimum size of the area a livestock holding must have available for spreading livestock manure from the respective livestock production. The requirement is defined as a limitation in livestock units per hectare (LU/ha), based on the content of nitrogen in the respective livestock manure (ex storage). Thereby the harmony rules implement the Nitrates Directive's requirement to limit the amount of manure per hectare to 170 kg N, corresponding to 1.7 LU/ha. Since 2002, Denmark has imposed a tightened requirement for holdings producing pigs, poultry and fur bearing animals, as the harmony rule for these categories of livestock productions has been adjusted to 1.4 LU/ha.

It is necessary to emphasize that harmony rules do not regulate the size of livestock productions as such. They contribute to the management of the environmental impact from livestock production and are regulated through national legislation dealing with and issuing permits for livestock production. So even when the harmony rule is adjusted from 1.4 LU/ha to the Nitrates Directives limit of 1.7 LU/ha, an increase in livestock production at specific holdings would require a specific permit.

By defining the harmony rules as a limitation of livestock units per hectare, an indirect limitation of application of phosphorus from livestock manure is ensured. Hence, Denmark has no direct general limitation of application of phosphorus from livestock manure.

Nevertheless, application of phosphorus is regulated in connection with environmental permits issued for livestock holdings. When granting a permit, the local municipalities will assess the environmental impact of the specific livestock holding. This assessment also covers the application of phosphorus from livestock manure and may result in limitation of phosphorus surplus for specific areas of the respective livestock holding.

Levelling the harmony rules for slaughter pigs from 1.4 LU/ha to 1.7 LU/ha will result in a larger amount of livestock manure applied to the arable areas of these livestock holdings. To ensure that this higher concentration of livestock manure does not compromise the reduction of phosphorus surplus in certain areas, a new and direct regulation of the application of phosphorus from livestock manure will be implemented simultaneously with lifting the harmony rules.

This new regulation of phosphorus (e.g. through phosphorus limits) is a prerequisite for an expected new and more emission-based regulation of livestock productions.

#### *A new and more emission based regulation of livestock holdings*

The Danish government will propose a new and more emission based regulation of livestock holdings when granting permits to installations for animal husbandry. The regulation will ensure a simpler and more flexible regulation designed as a permit based on an environmental assessment of the production area in the stable, rather than the number of animals produced in the stable. Besides being simpler and easier to enforce and control, this method targets the emissions of ammonia from livestock holdings in a more precise way.

As a prerequisite for this emission based regulation of permits for installations for animal husbandry the Danish government will propose a separate regulation of the actual installations for the animal production sites (stables, storage vessels i.e.) and the regulation of the spreading of the livestock manure on arable land. Thus the change in regulation implies that the permit for the holding will no longer cover the spreading of livestock manure which instead will be dealt with through general regulation.

The new separate regulation of the spreading of the livestock manure will generally ensure a level of protection of the environment corresponding to the level of protection ensured by the existing regulation through the specific permits and will consist of the following elements:

### *Phosphorus*

Today, livestock production results in manure generally containing more phosphorus than the actual crop uptake within the crop rotation. When introducing direct regulation for phosphorus application on farmland, it will be ensured that the regulation of phosphorus is in compliance with the objectives of the Nitrates Directive and the Water Framework Directive, concerning reduction of the loss of phosphorus to the aquatic environment. This will be introduced as a general regulation and will thereby no longer be the result of an individual assessment by the local municipalities of a specific livestock holding in connection with granting permits for production.

### *Erosion of phosphorus*

There will be a need to also generally ensure the reduction of loss of phosphorus through erosion. Therefore general requirements will be introduced such as

- use of specific spreading techniques,
- establishing strips along lakes and watercourses, where application of phosphorus is not allowed and/or
- specific requirements regarding tillage
- Others.

### *Nitrogen*

Since the leaching of nitrogen from livestock manure is more pronounced than from commercial fertilizers, a new regulation of the spreading of livestock manure will also include additional requirements to ensure a reduction of nitrogen leaching. This regulation will consist of individual requirements for establishing catch crops designed for each holding based on information from the fertilizer accounting system instead of individual assessments by the local municipalities like today.

As a whole it is the government's aim, that a new, simpler and more flexible regulation of livestock production will ensure regulation in compliance with the Nitrates Directive, the Water Framework Directive and other relating directives and at the same time ensure a less time consuming regulation of high quality to the satisfaction of both farmers and authorities.

## **Step three – 2018 and onwards**

### **A targeted regulation of nitrogen leaching at farm level**

*The Danish government currently considers different approaches for deployment of a new mandatory, targeted regulation with effect from 2018, based on the need to further reduce the nitrogen load of each water body. The regulation will be instrumental for the Danish implementation of the Water Framework Directive. Targeted regulation is assumed to reduce nitrogen emissions in total by app. 1.200 tonnes in 2019, rising to app. 3.700 tonnes in 2021. One model for deployment of the regulation is described in the following.*

A targeted regulation implies a differentiation of nitrogen regulation depending on geographically defined needs for reducing nitrogen loss to the aquatic environment, including ensuring reduced nitrogen leaching to ground water. The

regulation is expected to be based on the emission of nitrogen at farm level. This will be implemented as an individual limit at farm level to a specific level of nitrogen leaching (kg N) to the root zone per hectare of arable land.

Firstly, an upper limit allowance to nitrogen leaching per catchment area will be calculated for each of the coastal waterbodies that are appointed pursuant to the Water Framework Directive. This will be based on a calculation of the nitrogen retention from root zone to coastal waterbody including model assumptions on soil retention in the catchment area. Secondly at farm level, a calculation will be made of the actual emission from the farm, based on model based calculations on nitrogen loss from the field (root zone retention). The calculated emission from each farm must not exceed the assigned allowance to specific nitrogen leaching at farm level. The fertilizer plan and accounting system that Denmark has already applied for a number of years will be used as the base for control at farm level.

The targeted regulation will ensure a more flexible regulation at farm level. The regulation will be accompanied by a catalogue of relevant measures to reduce nitrogen leaching. This catalogue will enable each farmer to combine a set of measures at farm level which ensure that nitrogen leaching does not exceed the assigned allowance.

DRAFT





**Ministry of Environment  
and Food of Denmark**  
Environmental  
Protection Agency

Danish EPA Commerce,  
Industry and Agriculture  
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## **Note on the consequences of adjusting the “harmony rules” for growers and finishers (pigs for slaughter) to 1.7 livestock unit per hectare**

Harmony rules set requirements for the minimum size of the area a livestock holding must have available for spreading livestock manure from the respective livestock production. The requirement is defined as a limitation in livestock units per hectare (LU/ha), based on the content of nitrogen in the respective livestock manure (ex. storage), where 1 LU is equal to 100 kg N in livestock manure in the best modern production system with the lowest ammonia emission. Thereby the harmony rules implement the Nitrates Directive's requirement to limit the amount of manure per hectare to max. 170 kg N, corresponding to 1.7 LU/ha in the best production system. Since 2002, Denmark has imposed a tightened requirement for holdings producing pigs, poultry and fur bearing animals, as the harmony rule for these categories of livestock productions has been adjusted to 1.4 LU/ha.

### **Situation**

On 22 December 2015, the Danish government and political parties representing a majority of the seats in the Danish Parliament agreed on a package of initiatives that will strengthen the Danish agriculture and food sectors. One of the initiatives is to adjust the Danish harmony rules for growers and finishers (pigs for slaughter) to 1.7 LU/ha from the current 1.4 LU/ha.

This implies that farms with growers and finishers can spread manure from growers and finishers on a smaller area leading to lower costs of transportation and potential gains for the holdings from sales of farmland. The adjusted harmony rules may lead to a more concentrated use of livestock manure from fertilization – however neither exceeding fertilizing standards for the respective crops nor the Nitrates Directive limit of 170 kg N/ha on farm scale. Nevertheless, the farmer will still have incentives to utilize the nutritious value of the manure on a larger area, if this value exceeds the costs of transportation.

### **Harmony rules today**

Currently, the average density of livestock in Denmark is approximately 0.9 LU/ha. The maximum permitted livestock density, according to the harmony rules in Denmark, is not fully utilized due to a combination of market situation, financial limitations, legal barriers and environmental concerns. This note aims to describe how the legal regulation ensures that any significant consequences for nitrate leaching, from potential increase in livestock production in Denmark due to an increase of the harmony rules, are prevented.

If the individual farmer does not have enough farmland to comply with the harmony rules, he may need to make agreements with other owners of farmland to

spread manure. Another possibility is to export manure to manure treatment facilities. Approximately 60 % of the growers and finishers in Denmark are produced on holdings that have 1.4 or more LU/ha.

### **The current system of livestock approvals**

All establishments, expansions or modifications of livestock holdings must receive a permit to go through with the changes in compliance with the Environmental Approval Act of Livestock Holdings regardless of (current and aspired) livestock density at the respective farm. This implies that the local authorities process each application according to the act and approve or deny the changes applied for.

The act sets minimum thresholds in order to ensure environmental protection for odour, ammonia emissions, leaching of nitrates and phosphorus surplus, which all applicants must comply with in order to obtain an approval. The local authorities assess the environmental impact on a local and national scale together with the minimum requirements. If the approval is given, it will be on a set of conditions that ensures no significant negative effect on the surrounding environment.

The approval system is expected to be changed towards 2018 as described in the separate note on "The future regulation of the loss of plant nutrients to the aquatic environment in Denmark". The changes are not expected to affect the general level of environmental protection and will not change the fact that all establishments, expansions or modifications of livestock holdings must receive a permit or equivalent, in the future regarding the environmental impact from the actual animal housing, manure and silage storage facilities etc. Regarding the spreading of manure, the new system will ensure a protection of the environment corresponding to the current level through a new set of general rules.

### **Specific elements of the approval system that affect the number of livestock**

#### *Elimination of all extra nitrates leaching in areas with increasing numbers of livestock*

In order to comply with the Habitats Directive, the local authorities must take into account, whether the amount of livestock units within the catchment area increases with the changes applied for. If the amount of livestock is increasing (with more than 1 % since 2007), the approval will include requirements on measures that eliminate the extra nitrate leaching to surface water from livestock manure compared to a standard amount of nitrates leaching from a crop farm not using livestock manure. In most cases, this requirement will be met by establishing larger areas with catch crops within the farm area.

If a permit to produce livestock is given during a period where the number of livestock units within the catchment area has increased, the permit will contain a permanent set of conditions to neutralize the effect of increased pressure. In the updated system, holdings within the catchment areas with increasing number of livestock units will receive a yearly common requirement of establishing a larger area with catchment crops. This requirement will apply to and be shared between all livestock holdings within the catchment area.

#### *Limitations in vulnerable Natura 2000 catchment areas*

For farmland within catchment areas adjacent to Natura 2000 aquatic areas sensitive to nitrates, the area will have lower livestock limits than the harmony rules. This means that approvals for livestock holdings will contain requirements of stricter harmony rules (limiting livestock density to a lower number of LU/ha).

This lower limit may be transferred to compensating actions, such as establishment an additional area of catch crops, if the farmer wishes to have a higher livestock density than the harmony rules allow.

In the future approval system, this regulation will consist of individual requirements for establishing catch crops designed for each holding based on information from the fertilizer accounting system instead of individual assessments by the local municipalities like today.

#### *Phosphorus regulation*

In the current system, phosphorus in the manure is indirectly regulated in the harmony rules and directly in certain areas (app. 12 %) where phosphorus surplus is limited. Increasing the harmony rules from 1.4 LU/ha to 1.7 LU/ha may lead to a locally higher application rate of livestock manure on some farmland. From growers and finishers, the maximum application may increase from max. 34 kg P/ha to 40 kg P/ha with the adjusted harmony rules. To ensure that this higher concentration of livestock manure usage does not lead to unacceptable negative environmental effects, a new and direct regulation of the application of phosphorus from livestock manure will be implemented simultaneously with levelling the harmony rules. It is discussed if other animal types should also be able to use 1,7 LU/ha, and in that case the direct phosphorus regulation will take even higher potential application into account.

#### *Regulation of ammonia emissions from the livestock housing*

In case of establishment, expansion and modifications of livestock farms, the basic regulation is that ammonia emissions from animal housing and manure storage facilities must be reduced by 30 percent in accordance with a reference animal housing system. The requirement may be met by reducing ammonia loss in both existing and new facilities. As long as the total livestock production is unchanged or only increasing slightly, this requirement for 30 percent reduction will ensure that ammonia emissions are reduced.

#### **Control**

The councils of the Danish municipalities are the supervisory authority for environmental inspections on all agricultural farms. The municipalities must inspect all livestock farms of more than 3 LU regularly. Larger livestock farms are inspected about every third year, smaller livestock farms about every sixth year.

These minimum frequencies for inspections are laid down in a specific statutory order about environmental inspections. The frequency of inspections is not only determined by the size of the farm, but by a systematic appraisal of the environmental risks as well.

The inspector will check compliance with all the environmental regulation of which the council of the municipality is the supervisory authority, including provisions in the Danish Order on commercial livestock, livestock manure, silage, etc. In the future approval system this will not change.

## **Ministry of Environment and Food of Denmark**

### **The Danish AgriFish Agency**

**J.nr.:** 15-8097-000137

**Date:** 13 January 2016

#### **Follow-up note**

#### **Expected effect on N and P-leaching resulting from a minor adjustment to the prohibition on soil tillage during autumn/winter**

At a meeting by video link on 16 December 2015 concerning a new Danish nitrogen regulation, the European Commission requested further information on the consequences concerning N- and P-leaching of the planned adjustment to the prohibition on soil tillage.

This note describes the adjustment to the existing prohibition and provides information on the effects of the prohibition on N- and P-leaching.

#### *Existing and future exceptions to the prohibition on soil tillage*

The general prohibition on soil tillage on areas where the following crop is a spring crop in Denmark is a measure to reduce nitrogen leaching from arable land during autumn/winter. The prohibition is effective from harvest until either 1 November or 1 February depending on the soil type (clay/sand). Since the introduction of the prohibition, a number of exceptions have been added, omitting e.g. areas with winter crops and catch crops, areas with perennial woody plants and organically farmed areas. These and other exceptions have been added in order to allow earlier tillage on areas, where early tillage is necessary, for example in order to allow for mechanical weed control on areas where the use of pesticides is prohibited.

Three further areas have been recognized as being specifically problematic to the farmers and are planned to be included on the list of exceptions:

1. Preceding the establishment of sugar beets
2. On soil types with a high relative content of clay (JB 7-9 according to the Danish soil classification system)
3. Following harvest of maize on sandy soils

The rationale behind the addition of the new exceptions is to allow for a proper preparation of the seedbed and to avoid soil compaction (exceptions no. 1 and 2) and to allow for mechanical pest control against the European corn borer (exception no. 3).

#### *N-effects of the prohibition on soil tillage*

The prohibition on soil tillage during certain periods has been estimated by Aarhus University to reduce N-leaching from the root zone by approximately 10 kg N/ha. Before the introduction of the prohibition, the majority of farmers already followed the deadlines of the prohibition

(there is a "deadweight loss"). Even though this behaviour is beneficial to the environment, these areas are not included in the estimation of the N-effect of the prohibition.

When excluding the deadweight loss from the calculations, the expected effect of the existing prohibition is an N-effect corresponding to a reduction of 341 tons of N/year to the marine environment. The three new exceptions described in this note are estimated to result in an increase in N-leaching of approximately 66 tons. Thus, with the inclusion of the new exceptions, the expected effect of the adjusted prohibition is approximately 275 tons N/year. The small increase in N-leaching following from the inclusion of the new exceptions should be considered in relation with the large deadweight loss, which is not included in these calculations.

It should be noted, that the calculated effect of the adjusted prohibition is dependent on the exact setup of the exceptions, which is still in progress. It is expected, though, that the adjusted effect will not vary considerably from the one calculated in this note.

#### *P-effects of prohibition on soil tillage*

The prohibition on soil tillage can affect P-leaching in areas with a risk of P-leaching by erosion, surface runoff or transport of water through macro pores in the soil. Depending on local conditions, the effect on P-loss can be either positive or negative. On one side, risk of loss of P by erosion is increased by early soil tillage. On the other side, if the timing of the soil tillage is improper, it might result in compaction of the soil, which can increase the risk of P-leaching by surface runoff and macro pore flow. On this basis, Aarhus University has not been able to estimate the effect of the prohibition on P-leaching.

## **Ministry of Environment and Food of Denmark**

### **The Danish AgriFish Agency**

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### **Follow-up note**

#### **The nitrogen and phosphorus effect of statutory buffer strips**

This note gives a short description of the nitrogen and phosphorus effect of statutory buffer strips as a follow up to the note of 10 December 2015 (j.nr. 2015-6878), where the Ministry of Environment and Food explained a model for intermediate compensatory measures to avoid deterioration of the aquatic environment (surface waters and groundwater) to the Commission. This model includes an annulment of the requirement of statutory buffer strips, which currently cover 25,000 hectares.

#### *The nitrogen (N) effect*

The estimates of N reduction effect of the 25,000 hectares present mandatory buffer strips are estimated by Aarhus University to up to 1,039 tonnes N. Since this is the upper estimate and there is a very high uncertainty in data, the Ministry of Environment and Food estimates, that the loss in practice is more likely to be approx. 725 tons N, as described in the note of 10 December 2015. This loss in nitrogen effect will be handled as described in "Follow up note – Model for intermediate compensatory measures to avoid increased N emission". This note describes in details how the increased N emissions are handled, including the expected effect concerning the voluntary maintenance of buffer strips to meet the EFA requirements.

#### *The phosphorus (P) effect*

Aarhus University has estimated the P effect of 25,000 hectares buffer strips to be 3-19 tons P annually on condition that the buffer zones are harvested. While harvesting is not statutory, the effect in practice could be less.

Part of the P effect will be maintained, due to the persistence that there on the majority of the same streams and lakes will still be a demand for 2 meter buffer strips according to §69 of the Watercourse Act ("Vandløbsloven"). In addition, a part of the P effect of mandatory buffer stripes will be maintained because of the EFA requirements, where the Ministry of Environment and Food estimates that a significant part of the present buffer strips will be maintained on a voluntary basis.

A more targeted establishment of buffer strips can also optimize the P effect. Work will continue in the Ministry of Environment and Food with this instrument towards the implementation of the targeted regulation.

## **Ministry of Environment and Food of Denmark**

**The Danish AgriFish Agency**

**J.nr.: 15-8097-000137**

**Date: 13 January 2016**

### **Follow-up note**

#### **Further elaboration on the targeted nitrogen regulation in Denmark from 2018 and onwards**

The future targeted regulation of nitrogen is expected to be implemented from 2018 and onwards. The regulation will be mandatory for all farmers and is assumed to reduce nitrogen emissions by approximately 3,800 tons nitrogen in 2021. The regulation will be based on four main principles:

1. The leaching access in each coastal waterbody is differentiated geographically in order to meet the nitrogen target in each coastal waterbody (in total 90 coastal waterbodies in Denmark). In the calculation of the leaching access, the average retention from the root zone to the coastal waterbody is taken into account.
2. Each farm is appointed a leaching permit to the water environment. The permit is calculated as the maximum nitrogen leaching from the root zone per hectare (kg N per hectare). Each farm within a catchment area will be appointed the same leaching permit per hectare.
3. Each farmer is given flexibility in the choice of instruments (e.g. catch crops, buffer strips, reduced nitrogen application etc.) in order to comply with the leaching permit. The instruments all contribute to reduce nitrogen leaching at farm level, and the relevant combination of instruments will help farmers ensure that the leaching permit is not exceeded. The number of instruments that the farmers can choose from will expectedly be increased up to the implementation of the targeted regulation.
4. Compensation to farmers for costs involved with the compliance of the reduced leaching permit. It is expected that the targeted regulation will contribute to a reduced nitrogen contribution to the coastal water bodies by approx. 3,800 tons in 2021.

It should be emphasized that the targeted regulation is part of a bigger conversion of the Danish nitrogen regulation. From 2017, a voluntary targeted scheme resulting in extra catch crops (on top of the mandatory catch crops) will be instigated. The scheme will be targeted to areas with specific needs to reduce nitrogen leaching to the aquatic environment including ground water. The scheme will reduce nitrogen emissions by 818 tonnes in 2017 and 693 tonnes in 2018.

Besides the above-mentioned initiatives, a series of collective efforts will be established in 2017-2021. This includes for example re-established wetlands, constructed wetlands and

afforestation. These initiatives will be funded through the Rural Development Programme. The collective efforts will reduce nitrogen emissions by 1,435 tonnes in 2021.

Furthermore, it is noted that the Danish Nitrate Action Plan is currently being revised in accordance with the Nitrates Directive. It is expected that a new Nitrates Action Plan 2016-2020 will be effective from August 2016.

The Danish River Basin Management Plans are currently undergoing revision in accordance with the Water Framework Directive. Updated River Basin Management Plans are expected to be finalized in the first half of 2016.

The implementation of all the above-mentioned initiatives is currently undergoing comprehensive work. The completion of the initiatives requires close coordination within the Ministry of Environment and Food and continuous dialogue with the Commission to ensure compliance with all relevant EU legislation.



## **Ministry of Environment and Food of Denmark**

### **Danish AgriFish Agency/Nature Agency/Environmental Protection Agency**

**J.nr. 2015-6878**

**Date: 10. December 2015**

#### **Note**

#### **on a model for intermediate compensatory measures to avoid increased N emission**

The Danish Government is presently preparing the basis for a political agreement addressing improvement of the production conditions for the Food- and Agricultural business. The political agreement is expected to result in a new and more targeted way of regulating nitrates in Denmark in the future, expected to be in place in 2018. Key elements in the political agreement are lifting the reduced general fertilization standards for nitrogen to the level of economic optimum, annulment of the statutory buffer strips along lakes and watercourses and a minor adjustment of the prohibition on soil tillage in the autumn.

The general fertilization standards for nitrogen and the current reduction of these standards to a level below economic optimum are currently part of the Danish implementation of the Nitrates Directive, and thereby also the Danish implementation of the Water Framework Directive.

Lifting the reduced standards to the economic optimum level and the annulment of the requirement for mandatory buffer strips will result in an increased loss of nitrogen to the aquatic environment. The increased loss of nitrogen will be countered by compensatory measures in order to ensure an adequate implementation of the Nitrates Directive and Water Framework Directive.

The model to avoid deterioration of the aquatic environment (surface waters and groundwater) will be presented in the following.

Table 1 shows the expected need for further measures to compensate the increased loss of nitrogen to surface waters in the period 2016-2018 (based upon scientific calculations). It is assumed that the reduced fertilization standards will be increased by two thirds in 2015-2016 and by one third in 2016-2017, thus the standards will represent the economic optimum in 2016-2017.

The need for further measures in each individual year is based on a recent recalculation of the nitrogen load. The baseline for 2013-2015 is deducted in the calculation and reflected in the increased load of nutrients to individual coastal water bodies.

The figures in table 1 is based on the following decisions and calculations:

- The increased loss of nitrogen resulting from the annulment of the buffer strips (approx. 725 tonnes N),

- The increased loss of nitrogen resulting from lifting the reduced general nitrogen fertilization standards (approx. 2.740 tonnes N in 2016 increasing to 4.350 tonnes N in 2018), and
- The development of the baseline (accumulation of the effect of measures already in place, structural development etc.) contributing to the reduced loss of nitrogen.

**Table 1. Intermediate need for further nitrogen reduction in 2016-2018 resulting from increased N emission to surface waters**

<b>Year</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>
<b>Need for further nitrogen reduction to avoid deterioration (tonnes N)</b>	915	1395	1004

Note: The consequences for groundwater are not reflected in the table. The figures are aggregated at national level, and variation at coastal water level is possible.

A new targeted N-regulation is expected to ensure a sufficient protection of the surface waters from 2018. The targeted N-regulation will be explained further in a separate document, to be presented to the commission.

#### *Measures in an intermediate compensatory model*

To avoid deterioration of surface waters and groundwater the Danish Government has ensured the financing and legal basis for two intermediate compensatory environmental initiatives. On a short term basis (2016-2018) it is generally expected to be possible to target measures to avoid deterioration locally, and on a long term basis (2019-2021) the initiatives – combined with the targeted regulation – are expected to ensure a gradual improvement of the aquatic environment.

The model to avoid deterioration in the period 2016-2018 is presented in table 2 below. The model includes the following regulatory initiatives:

- Changes in national regulation of mandatory catch crops.
- Subsidy schemes to establish wetlands, mini-wetlands and afforestation, Land lease schemes with cultivation restrictions, ensuring establishment of additional catch crops.

In 2016 the increased load of nitrogen beyond baseline 2013-2015 to surface waters will be partly compensated by N-reducing measures in national legislation working in combination with the chosen EFA-types in Denmark to fulfill the greening requirement of Ecological Focus Areas (EFA) in the CAP. Further analysis is required to establish to what level each individual regulatory initiative addresses the deterioration of the groundwater status and how these can be targeted against deterioration (see further below).

**Table 2 - Intermediate compensatory initiatives (additional need for nitrogen reduction, as in table 1, and N-reducing impact in tonnes per year in surface waters)**

Year	2016	2017	2018	I
<b>Need for nitrogen reduction to avoid deterioration (tonnes N in surface waters)</b>	915	1395	1004	
<b>N-reducing measures</b>				
Changes in regulation of national mandatory catch crops	1197	867	867	
Additional establishment of mini-wetlands, wetlands, afforestation (RDP-financed)		107	221	
Land lease with cultivation restrictions resulting in extra catch crops		818	693	
<b>Total</b>	<b>- 282</b>	<b>- 397</b>	<b>- 777</b>	

**Note:** It is assumed that land lease with cultivation restrictions will be carried out on 85.500 hectares in 2017 and 72.500 hectares in 2018. The scope of the initiative is targeted to ensure an impact on groundwater as well.

#### *Influence on groundwater*

The changes to the nitrogen regulation as described above will - all else being equal - increase the amount of nitrates in the groundwater. The compensatory initiatives are expected to ensure that there is no deterioration of the aquatic environment, ie. surface waters. These initiatives will also counter deterioration of ground water quality. However, since there is no certain one-to-one correlation between initiatives that counter deterioration of the quality of the surface water and the quality of the groundwater, the risk of deterioration of the groundwater can currently not be fully eliminated.

The Ministry of Environment and Food are therefore currently investigating solutions and data concerning groundwater. The Geological survey of Denmark and Greenland is currently evaluating in detail the groundwater status and the geographic distribution of necessary compensatory measures in relation to groundwater. The full evaluation will be completed in June 2016.

The preliminary assessment is that there will be a particular need for compensatory measures in geographical areas related to areas of groundwater, in which the quality standard for nitrate

(75%) is close to being exceeded or have a significant and sustained upward trend above 75% of the quality requirement regarding nitrate. It is expected that from areas where there is relatively little nitrogen loss to surface waters because the soil on the areas will withhold a larger proportion of nitrogen, nitrogen will to a certain degree leach into groundwater.

The changes to national regulation of catch-crops on farmland are expected to have an impact on groundwater. In addition, the land lease model (described below) will be targeted groundwater in order to avoid deterioration of groundwater and reverse any significant and sustained rising trends of nitrate in the groundwater.

#### *Changes in regulation of the establishment of national mandatory catch-crops*

As a condition for receiving the green payment under the CAP direct payments, farmers must comply with three greening requirements, including the requirement of ecological focus areas (EFA) on 5 per cent of the arable land on each farm. To increase the effect of a national requirement of 240.000 ha of catch crops and the EFA-areas, a flexibility given to farmers whereby they can use some EFA-areas as an alternative to the national catch crops will be removed.

A total EFA area of approximately 105,000 hectares is needed in Denmark to comply with the 5 per cent requirement. According to Danish legislation, the EFA area can be established by buffer strips, catch crops, fallow land, coppice and landscape elements. The mandatory buffer strips cf. the national Law on mandatory buffer zones contributes to EFA with approximately 24,000 EFA-hectares today.

According to the proposal by the government to repeal the requirement of additional buffer strips, which has recently been presented in parliament, the farmer can choose to apply other EFA-measures than buffer strips, to meet the EFA requirement. The alternative measures will have a positive effect on reduction of nitrogen leaching in so far as they were not already established before the annulment of the law on mandatory buffer strips. This will offset entirely the increased nitrogen loss resulting from the annulment of the law.

It is expected that farmers will mainly fulfil their resulting need for additional EFA requirements by establishing extra catch crops, maintaining existing buffer strips voluntarily or lay land fallow.

According to continued national legislation farmers must establish 240.000 ha of catch crops. At present farmers are given a flexibility to replace establishment of catch crops required by the Order on Plant Cover with alternative measures such as elements included in the EFA-measures (fallow land and coppice). In order to ensure the best possible nitrogen-reducing impact of the greening requirements, the flexibility on catch crops in the Order on Plant Cover will be removed. By not allowing farmers to replace mandatory catch crops with EFA elements such as laying land fallow or establishing coppice, the full effect on reduction of nitrogen loss is obtained for both mandatory catch crops and the EFA requirement. These elements will have a full nitrogen reducing effect, also in future years.

The Ministry of Environment and Food estimates that the changes could result in a number of different combinations of buffer strips and catch crops with a significant effect on N-leaching,

for instance; 70.000 hectares additional EFA- catch crops and the maintaining of 4.000 hectares additional buffer strips that would otherwise be removed.

The effect of the changes to national regulation of mandatory catch crops is estimated to be a reduced nitrogen loss of 1,197 tonnes N in 2016 and 867 tonnes N in both 2017 and 2018. Since the initiative is mandatory for farmers, the effect is certain and will be permanent.

The changes will provide a reduction of nitrogen loss to both surface waters and groundwater. They will be implemented through revision of the Danish Order on Plant Cover with effect from August 2016. This will not affect the Danish implementation of the greening requirements pursuant to REG (EU) 1307/2013.

#### *Land lease with cultivation restrictions of sowing of catch crops*

The Danish government will establish a new land lease scheme for 2017-2018 in order to prevent further nitrogen loss. In the scheme, the state leases farmland on a voluntary basis, imposes nitrogen-reducing cultivation restrictions on the land, such as requirements for catch crops, and then possibly re-leases it to a farmer for a limited period.

It is estimated that the scheme in 2017 will ensure a reduced nitrogen loss to the marine environment of 421 tonnes N. In order to achieve this effect in 2017, it is estimated that the state must lease between 30,000 and 90,000 hectares or up to 4 per cent of the farmed land. The leasing scheme shall work on market terms. Therefore, the economic compensation for farmers will solely be equal to the operating loss endured as a result of the restrictions on the land.

Further there is a need for an effort to sufficiently ensure the protection of the groundwater. The current analysis indicates that it will require a land lease scheme with cultivation restrictions ensuring reduction of nitrogen loss amounting to additional 818 tonnes N in 2017 and 696 tonnes N in 2018 to avoid deterioration of the groundwater status in 2017-2018. The scope of the need will as previously mentioned be further investigated by The Geological survey of Denmark and Greenland in the beginning of 2016 and assessed by June 2016, and the Ministry of Environment and Food is currently assessing various solutions to prevent deterioration in 2016 of the groundwater. A new targeted regulation is expected to ensure a sufficient protection of the groundwater after 2018.



**Ministry of Environment  
and Food of Denmark**  
Environmental  
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## **The future regulation of the loss of plant nutrients to the aquatic environment in Denmark**

The future regulation of nitrates and phosphorous in Denmark is expected to be implemented in three steps. The three steps cover three different periods, *Step one – from 2016 to 2018, Step two – from 2017 and onwards and finally Step three – from 2018 and onwards.* The three steps will be described in the following paragraphs.

### **Step one – 2016-2018**

#### **Short term changes of the regulation of nitrates**

Regarding the short term changes of the regulation of nitrates, the regulation is described in the Note on a model for intermediate compensatory measures to avoid increased N emission, dated December 10<sup>th</sup>, 2015.

### **Step two – 2017 and onwards**

#### **Levelling the harmony rules and ensuring a more direct way of regulating phosphorous in a new regulation of livestock holdings**

*Coming into effect from 2017, the Danish government wishes to align the "harmony rules" for slaughter pigs, to ensure that the requirement is aligned with the requirement of the Nitrates Directive that specifies the amount of livestock manure per hectare to 170 kg N/ha, corresponding to 1.7 LU/ha. This means that the harmony rules' limit for holdings producing slaughter pigs will be lifted from 1.4 LU/ha to 1.7 LU/ha.*

Harmony rules set requirements for the minimum size of the area a livestock holding must have available for spreading livestock manure from the respective livestock production. The requirement is defined as a limitation in livestock units per hectare (LU/ha), based on the content of nitrogen in the respective livestock manure (ex storage). Thereby the harmony rules implement the Nitrates Directive's requirement to limit the amount of manure per hectare to 170 kg N, corresponding to 1.7 LU/ha. Since 2002, Denmark has imposed a tightened requirement for holdings producing pigs, poultry and fur bearing animals, as the harmony rule for these categories of livestock productions has been adjusted to 1.4 LU/ha.

It is necessary to emphasize that harmony rules do not regulate the size of livestock productions as such. They contribute to the management of the environmental impact from livestock production and are regulated through national legislation dealing with and issuing permits for livestock production. So even when the harmony rule is adjusted from 1.4 LU/ha to the Nitrates Directives limit of 1.7 LU/ha, an increase in livestock production at specific holdings would require a specific permit.

By defining the harmony rules as a limitation of livestock units per hectare, an indirect limitation of application of phosphorus from livestock manure is ensured. Hence, Denmark has no direct general limitation of application of phosphorus from livestock manure.

Nevertheless, application of phosphorus is regulated in connection with environmental permits issued for livestock holdings. When granting a permit, the local municipalities will assess the environmental impact of the specific livestock holding. This assessment also covers the application of phosphorus from livestock manure and may result in limitation of phosphorus surplus for specific areas of the respective livestock holding.

Levelling the harmony rules for slaughter pigs from 1.4 LU/ha to 1.7 LU/ha will result in a larger amount of livestock manure applied to the arable areas of these livestock holdings. To ensure that this higher concentration of livestock manure does not compromise the reduction of phosphorus surplus in certain areas, a new and direct regulation of the application of phosphorus from livestock manure will be implemented simultaneously with lifting the harmony rules.

This new regulation of phosphorus (e.g. through phosphorus limits) is a prerequisite for an expected new and more emission-based regulation of livestock productions.

#### *A new and more emission based regulation of livestock holdings*

The Danish government will propose a new and more emission based regulation of livestock holdings when granting permits to installations for animal husbandry. The regulation will ensure a simpler and more flexible regulation designed as a permit based on an environmental assessment of the production area in the stable, rather than the number of animals produced in the stable. Besides being simpler and easier to enforce and control, this method targets the emissions of ammonia from livestock holdings in a more precise way.

As a prerequisite for this emission based regulation of permits for installations for animal husbandry the Danish government will propose a separate regulation of the actual installations for the animal production sites (stables, storage vessels i.e.) and the regulation of the spreading of the livestock manure on arable land. Thus the change in regulation implies that the permit for the holding will no longer cover the spreading of livestock manure which instead will be dealt with through general regulation.

The new separate regulation of the spreading of the livestock manure will generally ensure a level of protection of the environment corresponding to the level of protection ensured by the existing regulation through the specific permits and will consist of the following elements:

### *Phosphorus*

Today, livestock production results in manure generally containing more phosphorus than the actual crop uptake within the crop rotation. When introducing direct regulation for phosphorus application on farmland, it will be ensured that the regulation of phosphorus is in compliance with the objectives of the Nitrates Directive and the Water Framework Directive, concerning reduction of the loss of phosphorus to the aquatic environment. This will be introduced as a general regulation and will thereby no longer be the result of an individual assessment by the local municipalities of a specific livestock holding in connection with granting permits for production.

### *Erosion of phosphorus*

There will be a need to also generally ensure the reduction of loss of phosphorus through erosion. Therefore general requirements will be introduced such as

- use of specific spreading techniques,
- establishing strips along lakes and watercourses, where application of phosphorus is not allowed and/or
- specific requirements regarding tillage
- Others.

### *Nitrogen*

Since the leaching of nitrogen from livestock manure is more pronounced than from commercial fertilizers, a new regulation of the spreading of livestock manure will also include additional requirements to ensure a reduction of nitrogen leaching. This regulation will consist of individual requirements for establishing catch crops designed for each holding based on information from the fertilizer accounting system instead of individual assessments by the local municipalities like today.

As a whole it is the government's aim, that a new, simpler and more flexible regulation of livestock production will ensure regulation in compliance with the Nitrates Directive, the Water Framework Directive and other relating directives and at the same time ensure a less time consuming regulation of high quality to the satisfaction of both farmers and authorities.

## **Step three – 2018 and onwards**

### **A targeted regulation of nitrogen leaching at farm level**

*The Danish government currently considers different approaches for deployment of a new mandatory, targeted regulation with effect from 2018, based on the need to further reduce the nitrogen load of each water body. The regulation will be instrumental for the Danish implementation of the Water Framework Directive. Targeted regulation is assumed to reduce nitrogen emissions in total by app. 1.200 tonnes in 2019, rising to app. 3.700 tonnes in 2021. One model for deployment of the regulation is described in the following.*

A targeted regulation implies a differentiation of nitrogen regulation depending on geographically defined needs for reducing nitrogen loss to the aquatic environment, including ensuring reduced nitrogen leaching to ground water. The



regulation is expected to be based on the emission of nitrogen at farm level. This will be implemented as an individual limit at farm level to a specific level of nitrogen leaching (kg N) to the root zone per hectare of arable land.

Firstly, an upper limit allowance to nitrogen leaching per catchment area will be calculated for each of the coastal waterbodies that are appointed pursuant to the Water Framework Directive. This will be based on a calculation of the nitrogen retention from root zone to coastal waterbody including model assumptions on soil retention in the catchment area. Secondly at farm level, a calculation will be made of the actual emission from the farm, based on model based calculations on nitrogen loss from the field (root zone retention). The calculated emission from each farm must not exceed the assigned allowance to specific nitrogen leaching at farm level. The fertilizer plan and accounting system that Denmark has already applied for a number of years will be used as the base for control at farm level.

The targeted regulation will ensure a more flexible regulation at farm level. The regulation will be accompanied by a catalogue of relevant measures to reduce nitrogen leaching. This catalogue will enable each farmer to combine a set of measures at farm level which ensure that nitrogen leaching does not exceed the assigned allowance.

DRAFT

**To:** [redacted]  
**Cc:** Måne Gudborg (magu@naturerhverv.dk), jakm@naturerhverv.dk (jakm@naturerhverv.dk), Sofus Rex (sofur@mfvm.dk), Mette Lise Jensen (møje@nst.dk), Christian Vind (chvin@mfvm.dk), Thomas Bruun Jessen (tbr@nst.dk), lopies@naturerhverv.dk (lopies@naturerhverv.dk), Helle Bach Rungø (helba@mfvm.dk), Olsen, Hans Peter (hapol@mst.dk)  
**Fra:** Lidde Bagge Jensen (lidsj@mst.dk)  
**Titel:** SV: Bilateral meeting with the Commission on Nitrate Action Programme in november 2015  
**Sendt:** 11-11-2015 13:47:43  
**Bilag:** Suggested agenda bilateral meeting DK Nitrate Action Programme Nov 2015.docx;

Dear [redacted]

Thank you for suggesting possible dates for a bilateral meeting. A meeting on November 27th will suit us very well.

As we briefly talked about on the phone this monday, we fully understand, that the Commission wishes to focus the discussion on the substance of the Nitrate Action Programme measures and therefore representatives from DG Agriculture will not be attending this meeting.

We hereby enclose a suggestion for the agenda for the meeting.

Please let us know, if the suggested agenda rises any questions or remarks.

Prior to the meeting, we expect to send you further background material and we will also inform you of the participants attending from Denmark.

Best regards

Lidde

Lidde Bagge Jensen  
Head of Function  
Industry and Agriculture  
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lidsj@mst.dk

Danish Ministry of Environment and Food  
Environmental Protection Agency  
Strandgade 29  
DK - 1401 Copenhagen K  
Phone: (+45) 72 54 40 00  
www.mst.dk

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**Fra:** [redacted]  
**Sendt:** 6. november 2015 15:56  
**Titel:** Lidde Bagge Jensen  
**Cc:** Hans Peter Olsen; Helle Bach Rungø (MFVM-DEP); magu@naturerhverv.dk; jore@naturerhverv.dk; Thomas Bruun Jessen;  
**Emne:** RE: TIL KOMM: Udkast til svar til Kommissionen: DK presentation - 62nd Nitrates Committee - 1 December

Dear Lidde,

Thank you for having confirmed Denmark second presentation at the next Nitrates Committee.

Regarding your request for a bilateral meeting during the last week of November, we are available either on the 26<sup>th</sup> or on the 27<sup>th</sup> in the afternoon, from 15:00 to 17:00. Would one of these dates suit you?

Considering the limited time available, we would like to focus the discussion on the substance of the Nitrate Action Programme measures. Based on the outcome of the discussion, we will certainly coordinate thereafter with our agricultural colleagues.

Best regards,

[redacted]

[redacted]



[redacted]

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**From:** Lidde Bagge Jensen [mailto:lldbj@mst.dk]

**Sent:** Thursday, October 29, 2015 11:29 AM

**To:** [REDACTED]

**Cc:** Hans Peter Olsen; Helle Bach Rungø (MFVM-DEP); 'magu@natureerhverv.dk'; Joan Reimann (NaturErhvervstyrelsen); Thomas Bruun Jessen

**Subject:** VS: TIL KOMM: Udkast til svar til Kommissionen: DK presentation - 62nd Nitrates Committee - 1 December

Dear [REDACTED]

We hereby confirm that Denmark will give the second presentation on the derogation request on the Nitrates Committee meeting on December 1st 2015.

We would also like to inquire, whether it will be possible to arrange a bilateral meeting with the Commission at the end of November prior to the meeting in the Nitrates Committee?

Representatives from Denmark are currently having meetings with the Commission, DG Agri, on different possibilities concerning financing measures in relation to mandatory requirements in the water management plans. We therefore suggest that a possible meeting with the Commission by the end of November also includes participants from DG Agri, as a coming revision of the Nitrates Action Programme and possible financing of measures are all included in an overall solution for a more targeted regulation of nitrate in Denmark in the future.

If such a meeting is possible, will you kindly suggest possible dates, preferably during the last week of November?

Please, do not hesitate to contact me, if the above rises any questions or reflections.

We are looking forward to your reply.

Best regards

Lidde

Lidde Bagge Jensen  
Head of Function  
Industry and Agriculture  
Phone: (+45) 41 31 85 60  
lldbj@mst.dk

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Phone: (+45) 72 54 40 00  
www.mst.dk

---

**Fra:** [REDACTED]

**Sent:** 23. oktober 2015 17:16

**Til:** Lidde Bagge Jensen

**Emne:** DK presentation - 62nd Nitrates Committee - 1 December

Dear Lidde,

Could you please kindly confirm if Denmark is going to make its second presentation on the derogation request at the next Nitrates Committee of December the 1<sup>st</sup>?

Kind regards

[REDACTED]

[REDACTED]



[REDACTED]

NOTAT

Miljø- og Fødevareministeriet  
Miljøstyrelsen

Erhverv  
J.nr. 001-13765  
Ref. lidbj  
Den 10. november 2015

**Suggested agenda for the second bilateral meeting between  
representatives from Denmark and from the EU Commission, DG  
Environment, on November 26th, 2015**

1. Short introduction of participants and objective of the meeting
2. An overview of the overall solution for a future targeted regulation of nitrogen in Denmark including focus on administration and control, including
  - a. process for improving the scientific basis for the future river basin management plans and the future regulation of nitrates
  - b. short term model for transition of regulation
3. Expected revision of the Nitrogen Action Programme
4. Outline of the presentation to be made on the meeting in the Nitrates Committee on December 1rst
5. AOB

**Til:** [REDACTED]  
**Cc:** Måne Gudborg (magu@naturerhverv.dk), Joan Reimann (NaturErhvervstyrelsen (jore@naturerhverv.dk), Helle Bach Rungø (helba@mfvm.dk), Thomas Bruun Jessen (tbr@nst.dk), Olsen, Hans Peter (hapol@mst.dk)  
**Fra:** Lidde Bagge Jensen (liddj@mst.dk)  
**Titel:** VS: TIL KOMM: Udkast til svar til Kommissionen: DK presentation - 62nd Nitrates Committee - 1 December  
**Sendt:** 29-10-2015 11:28:58

Dear [REDACTED]

We hereby confirm that Denmark will give the second presentation on the derogation request on the Nitrates Committee meeting on December 1st 2015.

We would also like to inquire, whether it will be possible to arrange a bilateral meeting with the Commission at the end of November prior to the meeting in the Nitrates Committee?

Representatives from Denmark are currently having meetings with the Commission, DG Agri, on different possibilities concerning financing measures in relation to mandatory requirements in the water management plans. We therefore suggest that a possible meeting with the Commission by the end of November also includes participants from DG Agri, as a coming revision of the Nitrates Action Programme and possible financing of measures are all included in an overall solution for a more targeted regulation of nitrate in Denmark in the future.

If such a meeting is possible, will you kindly suggest possible dates, preferably during the last week of November?

Please, do not hesitate to contact me, if the above rises any questions or reflections.

We are looking forward to your reply.

Best regards

Lidde

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Environmental Protection Agency  
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Phone: (+45) 72 54 40 00  
www.mst.dk

---

**Fra:** [REDACTED]  
**Sendt:** 23. oktober 2015 17:16  
**Til:** Lidde Bagge Jensen  
**Emne:** DK presentation - 62nd Nitrates Committee - 1 December

Dear Lidde,

Could you please kindly confirm if Denmark is going to make its second presentation on the derogation request at the next Nitrates Committee of December the 1<sup>st</sup>?

Kind regards

[REDACTED]

[REDACTED]



European Commission  
DG Environment  
Unit ENV B.1 Agriculture, Forests and Fisheries  
Av. de Beaulieu 5 - 1180, Brussels  
+32 2 29 85339  
env@ec.europa.eu

**Til:** [Redacted]  
**Cc:** Lidde Bagge Jensen (lidsj@mst.dk), Olsen, Hans P ter (hapol@mst.dk), Thomas Bruun Jessen (tbr@nst.dk), Sofus Rex (sofur@mivm.dk), Mette Lise Jensen (melie@nst.dk), jakm@naturerhverv.dk (jakm@naturerhverv.dk), Wibke Christel (wibch@mst.dk), [Redacted], Christian Vind (chvin@mivm.dk), Marie Guldborg (magu@naturerhverv.dk), Helle Bach Rung  (helba@mivm.dk)  
**Fra:** Lidde Bagge Jensen (lidsj@mst.dk)  
**Titel:** Background material for the bilateral meeting with the Commission on Friday, November 27th  
**Sendt:** 25-11-2015 20:35:18  
**Bilag:** Presentation at the bilateral meeting with EU Comm nov 27 (3).pptx; Overview of future regulation Denmark 251115.docx;

Dear [Redacted]

I hereby enclose background material for the bilateral meeting with the Commission on Friday, November 27<sup>th</sup>.

Should the material give rise to any questions prior to the meeting, please do not hesitate to contact me.

We are looking forward to the meeting.

Best regards

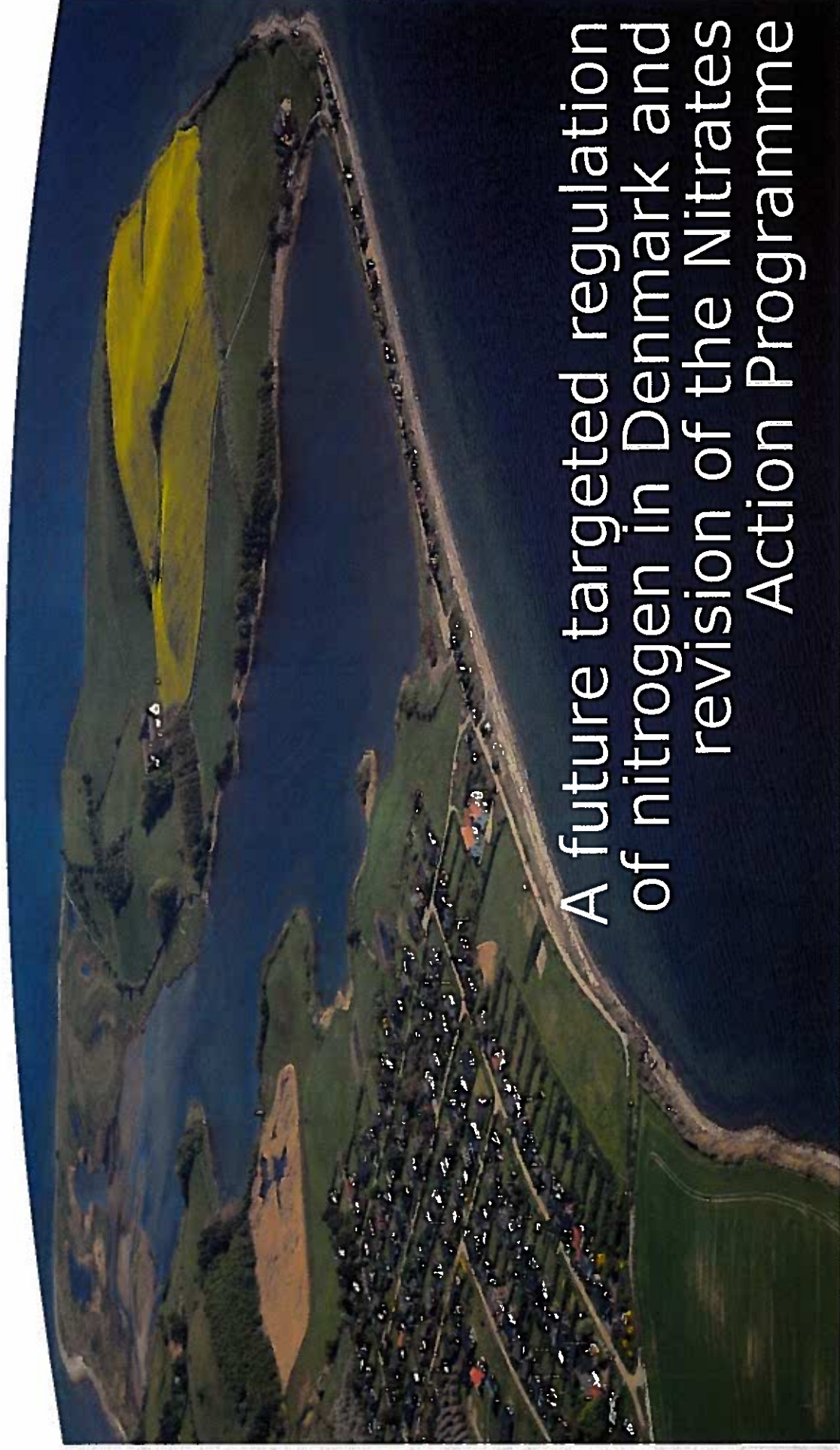
Lidde

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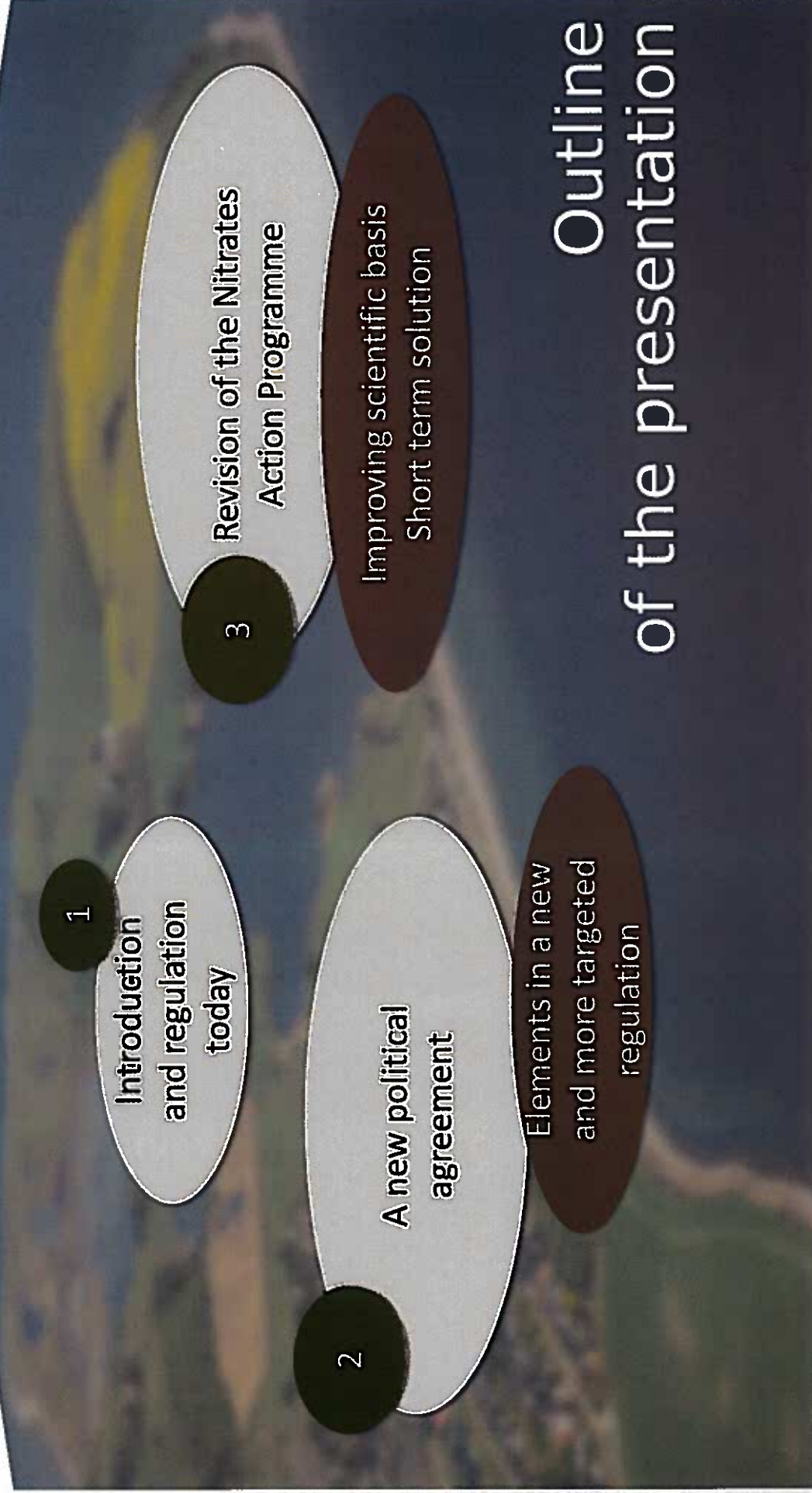
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Ministry of Environment and Food

Brussels - 27 November 2015



A future targeted regulation  
of nitrogen in Denmark and  
revision of the Nitrates  
Action Programme





# Introduction

1

Introduction  
and regulation  
today

Since the 1990's:

- Annual Nitrogen discharges to coastal waters reduced from more than 100,000 tons of nitrogen to approximately 57,000 tons
- Annual phosphorus loss reduced from approximately 5,500 tons to approximately 2,300 tons.
- The status of the Danish water environment is generally stabilizing or improving
- The status of our coastal waters has to be improved even further

# Regulation of nitrates today

1

Introduction  
and regulation  
today

- Largely based on general fertilizer standards reduced by appr. 20 pct. compared to economic optimal level
- General requirements for catch crops on respectively 10 or 14 percent of the arable land on each farm
- General measures to secure the environmental impact from livestock production/manure
- Fertilizer account system

# Political agreement under preparation

2

A new political  
agreement

Elements in a new  
and more targeted  
regulation

Elements in the political agreement concerning the  
new regulation are expected to be

- lifting of the national fertilization application standards for nitrogen
- lifting the harmony rules for slaughter pigs
- generating an ambitious process for when and how to implement a more targeted regulation and
- transforming the required additional buffer strips along lakes and watercourses into a flexible and voluntary measure

# Elements in the overall solution

2

A new political agreement

Elements in a new and more targeted regulation

- Improved scientific knowledge on the nutrient load in the aquatic environment
- Implementation of a short term model for reduction of nitrogen loss
- Adoption of river basin management plans
- Adopting a model for a future targeted regulation of nitrogen
- Adopting a new regulation of live stock holdings
- A new regulation of phosphorous

# Improving the scientific basis

3  
Revision of the Nitrate  
Action Programme

Improving scientific basis  
Short term solution

- Implies recalculating nitrogen load, baseline and thereby need for reducing the nitrogen load.
- The results from the research institutes are expected by mid December 2015.
- Includes estimation of the effect of lifting the nitrogen application standards on nitrate leaching

# The future Nitrate Action Programme

3  
Revision of the Nitrate  
Action Programme

Improving scientific basis  
Short term solution

The future Nitrates Action Programme

- the measures already included according to Annex II and III
  - application of fertilizer to steeply sloping, water-saturated, flooded, frozen or snow-covered ground, near water courses
  - capacity of storage vessels and measures to prevent water pollution by run off and seepage,
  - procedures for land application,
  - vegetation cover (catch crops),
  - periods when application of fertilizer is prohibited,
  - submission of fertilizer accounts and
  - specified amount per hectare 170 kg N (harmony-rules) where the member states may allow a higher amount (derogation)

# The future Nitrate Action Programme

3

Revision of the Nitrate Action Programme

Improving scientific basis  
Short term solution

The future Nitrates Action Programme

- The most significant expected change
  - lifting of the national fertilizer application standards
  - the principle for establishing fertilizer standards will be maintained
  - over a period of two subsequent planning periods

Detailed knowledge on the specific application of nitrate fertilization due to fertilizer accounts.

## Future nitrogen application standards

3

Revision of the Nitrate Action Programme

Improving scientific basis  
Short term solution

- The research institute has calculated that lifting the nitrogen application standards to the level of economical optimum will result in a nitrogen loss to coastal waters of additional appr. 3.600 tons pr. year.
- In the current draft for an assessment of the effects of certain plans and programmes on the environment (SEA) we assess scenarios of lifting the application standards by 1/3 and 2/3 respectively.



# Future nitrogen application standards

3

Revision of the Nitrate Action Programme

Improving scientific basis  
Short term solution

- The additional nitrogen loss will be compensated by as follows:
  - In the coastal waters additional nitrogen loss is accepted to a level where it does not cause a deterioration of the status of surface water bodies with reference to the WFD, C-461/13
  - Reduction of nitrogen loss as a result of the so called baseline including the effect of existing measures such as organic farming, wetlands, reduction of arable land a.o.
  - Establishment of further measures such as voluntary measures ensuring reduction of nitrogen loss at farm level.

# The future Nitrate Action Programme

3  
Revision of the Nitrate Action Programme

Improving scientific basis  
Short term solution

The future Nitrates Action Programme

- On a longer term
  - lifting the so called harmony rules for livestock holdings producing slaughter pigs
  - new and more emission based regulation of live stock holdings
  - new and more direct way of regulating phosphorous fertilization

We expect to discuss these changes with the Commission during next year, 2016.

Ministry of Environment and Food  
The Danish Environmental Protection Agency

Danish EPA Commerce,  
Industry and Agriculture  
J.nr. 001-13765  
Ref. lidbj  
November 19th, 2015

**Overview of the overall solution for a future targeted regulation of nitrogen in Denmark**

*Introduction*

Denmark has over the last number of years reduced the loss of phosphorus and nitrogen to the aquatic environment. Annual Nitrogen discharges to coastal waters have been reduced from more than 100,000 tons of nitrogen to the current level of approximately 57,000 tons of nitrogen, while annual phosphorus loss has almost been halved with a decrease from approximately 5,500 tons to approximately 2,300 tons per year.

The effort to reduce the environmental impact from nitrates and phosphorous began in the late 1980s and has been a remarkable success. However, Denmark has now reached a point, where it is becoming more and more costly to reduce the loss further by the means of general regulation.

The good news is that the effort has paid off. Today we can observe less pronounced oxygen depletion as well as reduced algal growth, while the spread of eel grass is improving. The status of the Danish water environment is generally stabilizing or improving even further. Nonetheless, we have not reached our goals yet. The status of our coastal waters has to be improved even further in the future to meet the objectives in the EU directives. Simultaneously, we must consider the efforts to be undertaken carefully, as coherence between economic and environmental objectives is essential.

*The regulation today in short*

The current Danish fertilizing regulation is largely based on general fertilizer standards that are reduced to a certain degree in comparison to the economic optimal level. Furthermore, we have general requirements for establishing catch crops on respectively 10 or 14 percent of the arable land on each farm. Additionally, we have measures to secure the environmental impact of increasing livestock density per agricultural area amongst other regulation measures, primarily concerning the Nitrates Directive.

The general requirements are the same for all holdings, regardless of the vulnerability and the distance to the surrounding aquatic environment or underlying groundwater. Moreover we currently do not account for the reduction of nitrogen, naturally occurring in the soil, on its way to the aquatic environment.

Therefore, the Danish Government intends to create a new solution for a future targeted regulation.

#### *A new political agreement*

The Danish Government is presently preparing the basis for a political agreement addressing improvement of the production conditions for the Food- and Agricultural business. Amongst others this political agreement is expected to consist of elements, that combined will result in a new and more targeted way of regulating nitrates in Denmark in the future. Elements in the political agreement concerning the new regulation are expected to be elements such as

- lifting of the national fertilization application standards for nitrogen
- lifting the harmony rules for slaughter pigs
- generating an ambitious process for when and how to implement a more targeted regulation and
- repealing the required additional buffer strips along lakes and watercourses.

The elements of a new regulation directly involve changes in the way we implement both the Nitrates Directive and the Water Framework Directive to day.

#### *Elements in a new and more targeted solution*

A new and more targeted solution can be defined as a solution, where implementation of the Nitrates Directive in the future Nitrate Action Programme and the future River Basin Management Plans according to the Water Framework Directive are two clearly defined separate implementation initiatives that together ensures the necessary and targeted effort to obtain the environmental goals of our aquatic environment.

By implementing a Nitrates Action Programme with measures that ensures a regulation of nitrates clearly specifying the obligations according to the Nitrates Directive a new solution will ensure an efficient and yet clearly sufficient implementation of the directive. The measures are defined to ensure the objective of the directive of reducing water pollution caused by nitrates from agricultural sources and preventing further such pollution and consists with the specifications of the directive.

A future targeted solution consists of new river basin management plans following the Water Framework Directive ensuring efficient targeted measures that ensure the necessary reduction of nitrogen loss to the aquatic environment on top of the measures that are already ensured by more general regulation. The measures following the Water Framework Directive are the main key to the emphasis on targeted solutions.

In order to ensure compliance with the legal obligations of the EU, the possible increase of nitrogen loss to the aquatic environment should be matched by the necessary environmental compensatory measures. The need for compensatory measures will be further evaluated. This evaluation will be carried out as part of the process to improve the scientific basis for deciding on a new regulation.

In Denmark, the drinking water supply is based solely on groundwater, which only undergoes a simple water treatment (aeration and filtration). In order to safeguard the drinking water interests it is therefore necessary to ensure via compensatory measures that nitrate in newly formed groundwater does not exceed the limit value from the EU drinking water directive of 50 mg/l.

*Process to improve the scientific basis for the future river basin management plans and the future regulation of nitrates NST*

The scientific basis for the next river basin management plans are currently being improved by researchers. This implies recalculating nitrogen load, baseline and the need for reducing the nitrogen load. The results from the research institutes are expected by mid December 2015. Also, the effect of current measures such as reduced nitrogen application standards are being calculated to ensure sufficient compensatory measures to correspond to the lifting of measures, that are presently in use.

*Compensating measures*

Aarhus University, has calculated the effect in the marine environment at the national level of lifting the nitrogen application standards to the level of economic optimum. The effect is an additional loss of nitrogen to the marine environment of appr. 3600 tonnes of nitrogen pr. year. It is expected that the effect of lifting the nitrogen application standard by one third of the present reduction is appr. 1200 tonnes of N per year, and by two thirds appr. 2.400 tons N per year. Please note that the specific amounts have yet to be finalised. To ensure, that this additional loss of nitrogen is still within the legal obligations of EU directives in relation to nature, surface water, ground water and climate, three lines of compensating measures will be implemented:

1. additional nitrogen loss is accepted to a level where it does not cause a deterioration of the status of surface water bodies with reference to the WFD.
2. the effects from the so-called baseline (cf. Water Framework Directive).
3. In so far as the first two points leaves a deficiency in reduction of the additional nitrogen discharge, further measures will be implemented.

*Issues on possible financing of measures through the Rural Development Programme*

It is foreseen that requirements of reduced leaching targets for fertilizers for individual farmers in specific sensitive areas will be compensated through the Rural Development Programme. This is possible according to article 30 of regulation (EU) 1305/2013, which enables area-based compensations for income losses or extra costs when linked specifically to Water Framework Directive requirements.

An initial discussion with the European Commission Services (AGRI) on the perspectives of introducing such a compensation scheme took place on 21 October 2015. The Danish authorities have now drafted a measure description explaining in more detail how this scheme would meet the need for such a compensation within the legal framework. Further discussions with Commission services (AGRI, ENVI) will facilitate the process of finally deciding the details of this measure.

*The future Nitrates Action Programme*

The future Nitrates Action Programme is expected to consist primarily of the measures already included as measures according to Annex II and III. These measures consists as hitherto of measures addressing

- application of fertilizer to steeply sloping, water-saturated, flooded, frozen or snow-covered ground,
- application of fertilizer near water courses (2 meters strip along water courses),

- capacity of storage vessels and measures to prevent water pollution by run off and seepage (alarms a.o.),
- procedures for land application,
- vegetation cover (catch crops),
- periods when application of fertilizer is prohibited,
- minimum capacity of storage vessels,
- submission of fertilizer accounts and
- Specified amount per hectare 170 kg N (harmony-rules) where the member states may allow a higher amount (derogation)

The major changes in the future Action Programme are expected to be the lifting of the national fertilization application standards for nitrogen.

*Lifting of the reduction of the national fertilization application standards*

In the future Nitrates Action Programme it is expected, that the present reduction of the national fertilization application standards for nitrogen by approximately 20 pct. of the economically optimal level of application is lifted gradually to a level corresponding to the economically optimal level. This gradual lifting of the present reduction of the nitrogen application standards will be carried out in compliance with the obligations in the EU directives relating to the environment, nature, surface water and groundwater. It is intended that the expected environmental effect of a gradual lifting of the reduced nitrogen application standards will be met by other measures to ensure that the future nature and environmental efforts in the agricultural sector as a whole in Denmark continue to meet the EU directives and international obligations.

The principles for establishing fertilization standards in the future is expected to be maintained by establishing a starting point at the economically optimal supply of nitrogen as specified by the National Fertilization Standard Committee in Denmark. For the purpose of determining the average economic optimal nitrogen fertilization standard forecasts are made for the coming planning period (August 1. till July 31.) through experimental results on yield increases. Standards are specified for each crop category by default yield for climatic zones, soil type and special irrigation needs. It is expected, that the reduction of the nitrogen standards will be lifted over a period of two subsequent planning periods.

In general farms registered in the Register of Fertilizer Accounts are obliged to submit a fertilizer account every year to the Danish AgriFish Agency for registration and control. Every year the Danish AgriFish Agency publishes information on the application standard for nitrogen for all individual crops, the standard nitrogen contents in livestock manure from different types of livestock and the required minimum utilisation rate. On the basis of this information, each farm calculates the farm nitrogen quota.

*Further expected changes in the Nitrates Action Programme*

In the future Nitrates Action Programme further changes are expected on a longer term. Amongst these expected changes is lifting the so called harmony rules for livestock holdings producing slaughter pigs. This element is expected to be carried out in connection with the establishment of a new and more emission based regulation of live stock holdings and an expected new and more direct way of regulation phosphorous fertilization. As these changes are expected to be carried out on a longer term and, thus, be the basis for subsequent Nitrate Action Programmes, they will not yet be described in more detail.

**Til:** [REDACTED]  
**Cc:** Majken Seerup Schmidt (NaturErhvervstyrelsen) (MSS@naturerhverv.dk), Olsen, Hans Peter (hapol@mst.dk), Helle Bach Rungø (helba@mfvn.dk), [REDACTED] Wibke Christel (wibch@mst.dk)  
**Fra:** Lidde Bagge Jensen (lidsj@mst.dk)  
**Titel:** SV: Bilateral meeting with the Commission on Nitrate Action Programme in november 2015  
**Sendt:** 25-11-2015 11:03:12  
**Bilag:** Bilag 6 Udkast\_presentation i Nitratkomiteén #2\_nitrathandlingsplan\_MST\_....pdf;

Dear [REDACTED]

I hereby enclose the draft presentation, that Denmark will give on the meeting in the Nitrates Committee on December 1st.  
As you mentioned in your mail earlier, last minute changes may still be made after our meeting with the Commission on Friday.

Best regards

Lidde

Med venlig hilsen

**Lidde Bagge Jensen**  
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**Fra:** [REDACTED]  
**Sendt:** 24. november 2015 14:08  
**Til:** Lidde Bagge Jensen  
**Cc:** Wibke Christel  
**Emne:** RE: Bilateral meeting with the Commission on Nitrate Action Programme in november 2015

Dear Lidde,  
Thank you for your understanding. Wednesday is acceptable for us.  
Kind regards,  
[REDACTED]

---

**From:** Lidde Bagge Jensen [mailto:lidsj@mst.dk]  
**Sent:** Tuesday, November 24, 2015 12:33 PM  
**To:** [REDACTED]  
**Cc:** Wibke Christel  
**Subject:** SV: Bilateral meeting with the Commission on Nitrate Action Programme in november 2015

Dear [REDACTED]

Thank you for your mail.

We are very much aware of the need to send you the presentation for the Nitrates Committee meeting before hand for the interpreters. We expect to be able to send you the presentation by the end of tomorrow, Wednesday, at the latest. We hope, that this will be acceptable.

The very best regards,

Lidde

Med venlig hilsen

**Lidde Bagge Jensen**  
Cand.agro.  
Funktionsleder  
Erhverv  
Mobil: (+45) 41 31 85 60  
lidsj@mst.dk

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Miljøstyrelsen

Strandgade 29  
DK - 1401 København K  
Tlf.: (+45) 72 54 40 00  
www.mst.dk

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**Fra:** [REDACTED]  
**Sendt:** 25. november 2015 17:39  
**Til:** Lidde Bagge Jensen  
**Emne:** RE: Bilateral meeting with the Commission on Nitrate Action Programme in november 2015

Dear Lidde,

I know that you were meant to present us the outline of the presentation to be made at the next Nitrates Committee this Friday. However, to allow the interpreters to study the materials and provide a due interpretation service, we would need to receive the presentation within the shortest possible delay.

Further changes, if needed, can be made after our meeting on Friday.

Thank you in advance and best regards,

[Redacted]

---

**From:** Lidde Bagge Jensen [mailto:lldbj@mst.dk]  
**Sent:** Monday, November 23, 2015 1:56 PM  
**To:** [Redacted]  
**Cc:** [Redacted]  
**Subject:** VS: Bilateral meeting with the Commission on Nitrate Action Programme In november 2015

Dear [Redacted]

We hereby send you the information on the Danish delegation for the bilateral meeting with the Commission on Friday, the 27 th of November 2015, 15.00-17.00.

Do you have further information on the location for the meeting?

We are looking forward to the meeting.

Full name	Date of birth	Passp/ID-nr.	Nationality	
<ul style="list-style-type: none"><li>• Mr. Christian Vind</li><li>• Mr. Hans Peter Olsen</li><li>• Ms. Helle Bach Rungø</li><li>• Mr. Jakob Møgelvang</li><li>• Ms. Marie Guldborg</li><li>• Ms. Lidde Bagge Jensen</li><li>• Ms. Wibke Christel</li></ul>	[Redacted]	[Redacted]	[Redacted]	(head of delegation)

Best regards

Lidde

Lidde Bagge Jensen  
Head of Function  
Industry and Agriculture  
Phone: (+45) 41 31 85 60  
lldbj@mst.dk

Danish Ministry of Environment and Food  
Environmental Protection Agency  
Strandgade 29  
DK - 1401 Copenhagen K  
Phone: (+45) 72 54 40 00  
www.mst.dk

---

**Fra:** [Redacted]  
**Sent:** 12. november 2015 10:06  
**Til:** Lidde Bagge Jensen  
**Cc:** Hans Peter Olsen; Helle Bach Rungø (MFVM-DEP); Christian Vind (MFVM-DEP); JAKM@naturehverv.dk; lopies@naturehverv.dk; magu@naturehverv.dk; Mette Lise Jensen; Thomas Bruun Jessen; Sofus Rex (MFVM-DEP)  
**Emne:** RE: Bilateral meeting with the Commission on Nitrate Action Programme In november 2015

Dear Lidde,

As agreed, we have set the meeting date for the 27th. Regarding the agenda, we agree with your proposal.

We are looking forward to the background material and the list of participants.

Best regards

[Redacted]  
[Redacted]





---

**From:** Lidde Bagge Jensen [mailto:lldbj@mst.dk]

**Sent:** Wednesday, November 11, 2015 1:48 PM

**To:** [redacted]

**Cc:** Hans Peter Olsen; Helle Bach Rungø (MFVM-DEP); Christian Vind (MFVM-DEP); Jakob Møgelvang (NaturErhvervstyrelsen); lopies@naturerhverv.dk; magu@naturerhverv.dk; Mette Lise Jensen; Thomas Bruun Jessen; Sofus Rex (MFVM-DEP)

**Subject:** SV: Bilateral meeting with the Commission on Nitrate Action Programme In november 2015

Dear [redacted]

Thank you for suggesting possible dates for a bilateral meeting. A meeting on November 27th will suit us very well.

As we briefly talked about on the phone this monday, we fully understand, that the Commission wishes to focus the discussion on the substance of the Nitrate Action Programme measures and therefore representatives from DG Agriculture will not be attending this meeting.

We hereby enclose a suggestion for the agenda for the meeting.

Please let us know, if the suggested agenda rises any questions or remarks.

Prior to the meeting, we expect to send you further background material and we will also inform you of the participants attending from Denmark.

Best regards

Lidde

Lidde Bagge Jensen  
Head of Function  
Industry and Agriculture  
Phone: (+45) 41 31 85 60  
lldbj@mst.dk

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Environmental Protection Agency  
Strandgade 29  
DK - 1401 Copenhagen K  
Phone: (+45) 72 54 40 00  
www.mst.dk

---

**Fra:** [redacted]

**Sent:** 6. november 2015 15:56

**Til:** Lidde Bagge Jensen

**Cc:** Hans Peter Olsen; Helle Bach Rungø (MFVM-DEP); magu@naturerhverv.dk; jore@naturerhverv.dk; Thomas Bruun Jessen;

**Emne:** RE: TIL KOMM: Udkast til svar til Kommissionen: DK presentation - 62nd Nitrates Committee - 1 December

Dear Lidde,

Thank you for having confirmed Denmark second presentation at the next Nitrates Committee.

Regarding your request for a bilateral meeting during the last week of November, we are available either on the 26<sup>th</sup> or on the 27<sup>th</sup> in the afternoon, from 15:00 to 17:00. Would one of these dates suit you?

Considering the limited time available, we would like to focus the discussion on the substance of the Nitrate Action Programme measures. Based on the outcome of the discussion, we will certainly coordinate thereafter with our agricultural colleagues.

Best regards,

[redacted]

[redacted]



---

**From:** Lidde Bagge Jensen [mailto:lldbj@mst.dk]  
**Sent:** Thursday, October 29, 2015 11:29 AM  
**To:** [REDACTED]  
**Cc:** Hans Peter Olsen; Helle Bach Rungø (MFVM-DEP); 'magu@naturerhverv.dk'; Joan Reimann (NaturErhvervstyrelsen); Thomas Bruun Jessen  
**Subject:** VS: TIL KOMM: Udkast til svar til Kommissionen: DK presentation - 62nd Nitrates Committee - 1 December

Dear [REDACTED]

We hereby confirm that Denmark will give the second presentation on the derogation request on the Nitrates Committee meeting on December 1st 2015.

We would also like to inquire, whether it will be possible to arrange a bilateral meeting with the Commission at the end of November prior to the meeting in the Nitrates Committee?

Representatives from Denmark are currently having meetings with the Commission, DG Agri, on different possibilities concerning financing measures in relation to mandatory requirements in the water management plans. We therefore suggest that a possible meeting with the Commission by the end of November also includes participants from DG Agri, as a coming revision of the Nitrates Action Programme and possible financing of measures are all included in an overall solution for a more targeted regulation of nitrate in Denmark in the future.

If such a meeting is possible, will you kindly suggest possible dates, preferably during the last week of November?

Please, do not hesitate to contact me, if the above rises any questions or reflections.

We are looking forward to your reply.

Best regards

Lidde

Lidde Bagge Jensen  
Head of Function  
Industry and Agriculture  
Phone: (+45) 41 31 85 60  
lldbj@mst.dk

Danish Ministry of Environment and Food  
Environmental Protection Agency  
Strandgade 29  
DK - 1401 Copenhagen K  
Phone: (+45) 72 54 40 00  
www.mst.dk

---

**From:** [REDACTED]  
**Sent:** 23. oktober 2015 17:16  
**To:** Lidde Bagge Jensen  
**Emne:** DK presentation - 62nd Nitrates Committee - 1 December

Dear Lidde,

Could you please kindly confirm if Denmark is going to make its second presentation on the derogation request at the next Nitrates Committee of December the 1<sup>st</sup>?

Kind regards

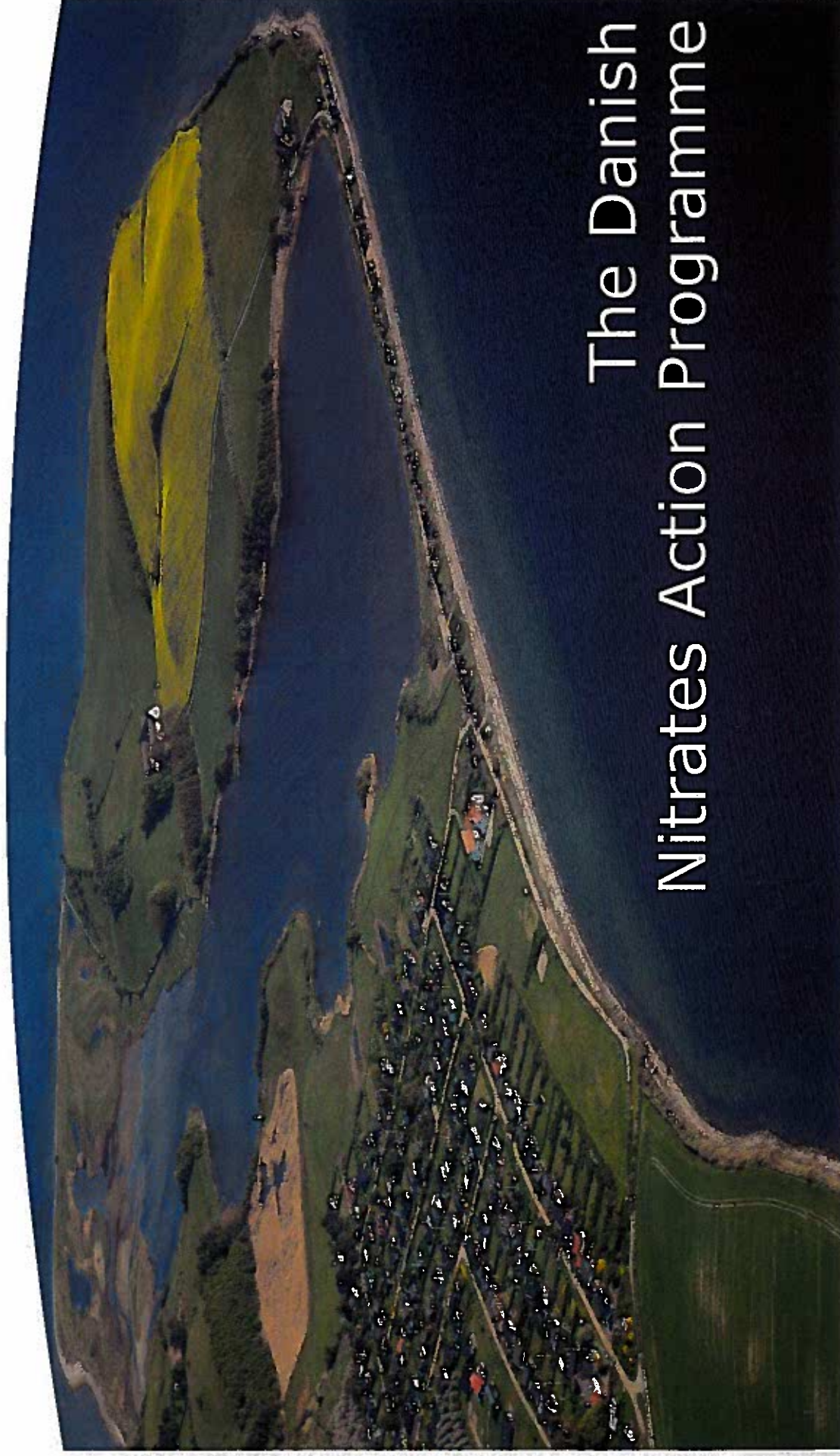
[REDACTED]  
[REDACTED]



2<sup>nd</sup> presentation in connection with the  
request for renewal of the Danish  
derogation from the Nitrates Directive

Ministry of Environment and Food

Brussels - 01 December 2015



# The Danish Nitrates Action Programme

# 2<sup>nd</sup> presentation in connection with the request for renewal of the Danish derogation from the Nitrates Directive

Ministry of Environment and Food

Brussels - 01 December 2015

1

Introduction  
& Basics

2

Overview on the  
elements of the Danish  
Implementation of the  
Nitrates Directive

3

Protection of the aquatic  
environment in other  
environmental regulation

## Outline of the presentation

# The Danish case

Brussels - 01 December 2015

**Population: 5.6 million (2013)**  
**Total land area: 43.000 km<sup>2</sup>**  
**62 % agricultural land**

**Since 1992:**  
**The whole national territory of Denmark has been assigned as Nitrate Vulnerable Zone (Art. 3)**

**Conclusions from presentation of State & trends in Danish water quality (1990-2013):**

- 43% reduction in N field balance
- 80% reduction in P field balances
- 40-50% reduction in nitrate concentration in upper oxic groundwater
- 43% reduction of N load from diffuse sources to coastal & marine waters
- 50% reduction of N concentration in lakes & coastal waters



# Danish National regulation implementing the Nitrates Directive

Brussels - 01 December 2015

There are 4 statutory orders, which contain the main legal elements of the Danish way of implementing:

#594: Order on commercial livestock, livestock manure, silage, etc. (05/15)  
("Bekendtgørelse om erhvervsræsmæssigt dyrehold, husdyrgødning, ensilage m.v.")

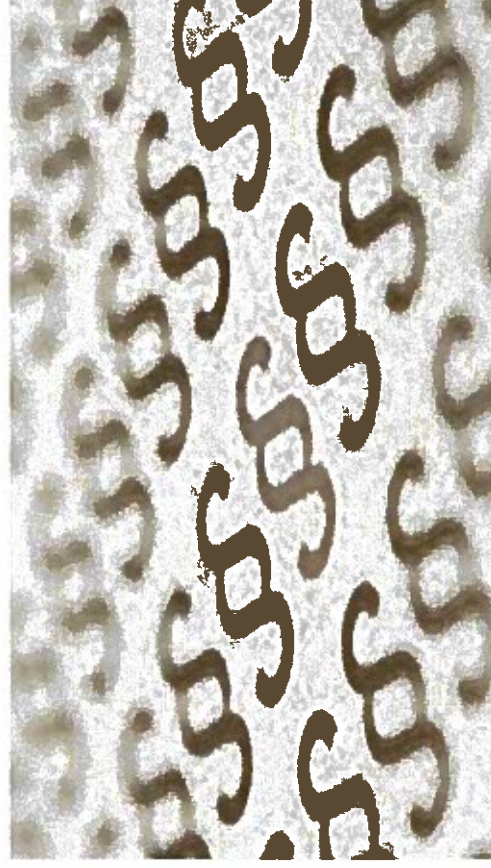
#500: Consolidated Act on farms' use of fertilizer and on plant cover (05/13)  
("Bekendtgørelse af lov om jordbrugets anvendelse af gødning og om plantedække")

#929: Order on farms' use of fertilizer in the planning period 2015/2016 (05/15)  
("Bekendtgørelse om jordbrugets anvendelse af gødning i planperioden 2015/2016")

2

Overview on the elements of the Danish Implementation of the Nitrates Directive

#973: Order on plant cover and cultivation-related measures (08/15)  
("Bekendtgørelse om plantedække og dyrkningsrelaterede tiltag")



# Good Agricultural Practice & Nitrates Action Programme

Brussels - 01 December 2015

2

Overview on the elements of the Danish Implementation of the Nitrates Directive



- **No application of liquid animal manure or digestate after harvest & until Feb 1**
- Extension of application period in autumn until Oct 1 or 15 under certain conditions (e.g. seeding of winter rape, grass, sugar beets, etc or in case of heavy local summer rainfalls)
- **No application of solid manure, silage liquor or mineral fertilizer from Nov 15 – Feb 1**



- **No application of animal manure, digestate or mineral fertilizer on slope areas with a gradient >6 degrees & within 20 meters from a water course, lake (>100 m<sup>2</sup>) or coast line.**
- Allowed application of liquid mineral fertilizer & injection of liquid animal manure in parallel direction to the bank/shore/coast on slope areas with a gradient >6 & <12 degrees



- **No application of animal manure, digestate, silage liquor, processing waters or mineral fertilizer to water-saturated, flooded, frozen or snow-covered grounds**

# Good Agricultural Practice & Nitrates Action Programme

Brussels - 01 December 2015

2

Overview on the elements of the Danish Implementation of the Nitrates Directive

- **No application of animal manure, digestate, silage liquor, processing waters or mineral fertilizer within 2 meters broad buffer strips around natural lakes (with tributary/outflow or >100 m<sup>2</sup>) and along open, natural water courses as well as around artificial lakes & watercourses, which according to the river basin managements plans should reach good ecological potential or higher**



- **Minimum 100 meters distance of slurry tank to open water courses or lakes (>100 m<sup>2</sup>), etc.**
- **Capacity of the storage tanks corresponding to no less than 6 months production**
- **Solid, impermeable floors & well-functioning drainage system in animal stables & other similar constructions on farm**
- **Requirements for storage of solid manure/compost/silage liquor, etc.**



- **Ban on slurry broad spreading – liquid animal manure & digestate has to be applied with trail hose/shoe or injected**
- **Injection obligatory on bare soil & fodder grass fields (technologies listed by the EPA can substitute slurry injection, e.g. acidification)**
- **Incorporation of solid manures as soon as possible, but at the latest 6 hours after application**





# Good Agricultural Practice & Nitrates Action Programme

Brussels - 01 December 2015

2

Overview on the elements of the Danish Implementation of the Nitrates Directive

- **Obligation for all farms (>10 ha) to establish catch crops on at least 10% of their fields' area over the winter season**
- **Obligation for farms with high livestock density (> 0.8 LU/ha) to establish catch crops on 14% of their fields' area**
- **N in incorporated catch crops is accounted for with up to 25 kg N/ha in the following year**



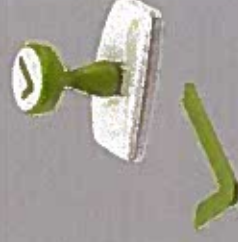
- **Obligatory fertilizing planning in the national (IT-based) Fertilizer Accounting system for all farms with a annual gross turnover > DKK 50.000 (= approx. 6700 €) &**
  - livestock of > 10 livestock units (1 LU=100 kg N ex storage)
  - animal density > 1.0 LU/ha
  - reception of > 25 tons animal manure or other organic fertilizer within one planning period
  - voluntarily for other farms to avoid tax on N-fertilizer
- **→ approx. 40.000 holdings (=90%) registered with fertilizer accounts**



- **Nationwide fixed nitrogen application standards**

depending on:

- crop,
- soil type,
- irrigation scheme etc.



# The obligatory Fertilizer Accounting System

Brussels - 01 December 2015



## Registration of information on:

- type of crops & the N standard norm for the respective crops (based on nationally centralized calculation of the economic optimum)
- type of livestock & the N resulting from livestock production
- use of fertilizers – both manure & commercial fertilizer
- delivery of fertilizer & exchange of fertilizer or manure
- establishment of catch crops
- number of livestock units (coupled to the national central animal husbandry register)
- general facts on the holding, i.e. address, stable construction, etc

## A maximum N-quota is automatically calculated

for each registered farm on the basis of:

- choice of crops in the planning period
- size of cultivated area with the crops
- pre-crops composition
- soil type (sandy vs. loamy soils)
- expected yields
- irrigation of the fields
- N forecast

## Setting of share of manure-N, to be accounted for:

type of animal manure	efficiency
pig slurry	75 %
cattle slurry	70 %
mink/poultry manure	70 %
deep litter	45 %
liquid fraction after manure processing	85 %

# Administrative control & farm inspections

Brussels - 01 December 2015

2

Overview on the elements of the Danish Implementation of the Nitrates Directive



- Control based on Fertilizer Accounting System
- Annual evaluation of criteria for selection & description of motivation for the current year's criteria
- Administrative control of approx. 2.5 % of all (39,875) farms that submit a fertilizer account every year
- Administrative control of approx. 2.7 % of the (1,481) farms using the derogation



**On-farm inspections by the Danish Agrifish Agency**  
 → Control of regulations on limitation of the land application of fertilizers

- On-farm inspections on approx. 1.2 % of all farms that submit a fertilizer account every year
- On-farm inspections on approx. 6.9 % of the farms using the derogation
  - 50 inspections in january – february
  - 52 general inspections

# Examples of other protective measures

Brussels - 01 December 2015

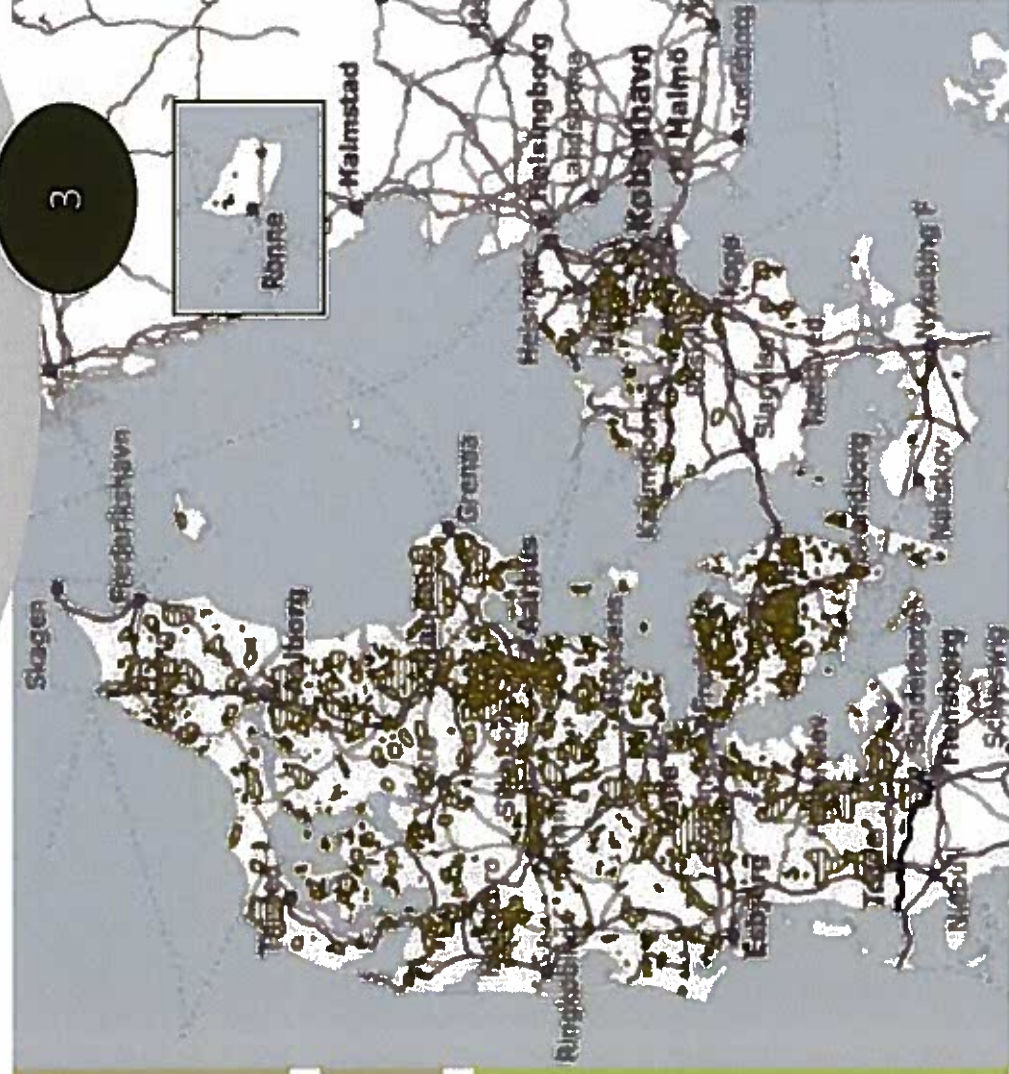
Nationwide mapping of areas of special drinking water interests & catchments to public water supplies → delineation of “nitrate-sensitive areas for drinking water abstraction” (NFI)

covering approx. 19% of the Danish territory

- Farmers can be obliged to use measures, which secure a sufficiently low nitrate concentration in the root zone water, e.g. by
  - establishment of additional catch crops, or
  - alternative on-site means, which have been proven to reduce nitrate leaching

Protection of the aquatic environment in other environmental regulatory

3

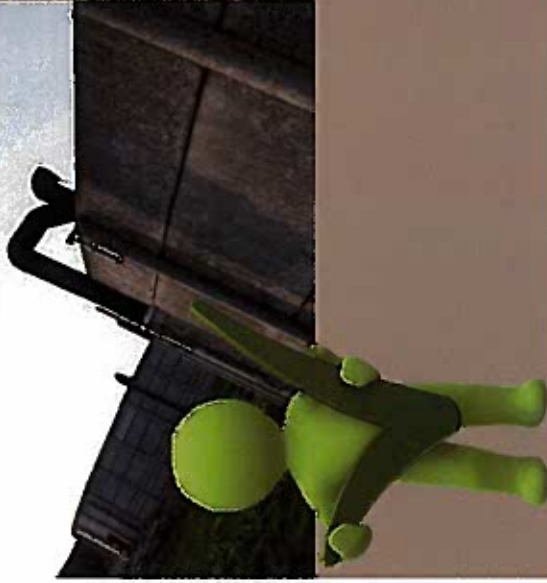


# Examples of other protective measures

Brussels - 01 December 2015

Protection of the aquatic environment in other environmental regulation

3



## "Slurry tank inspections"

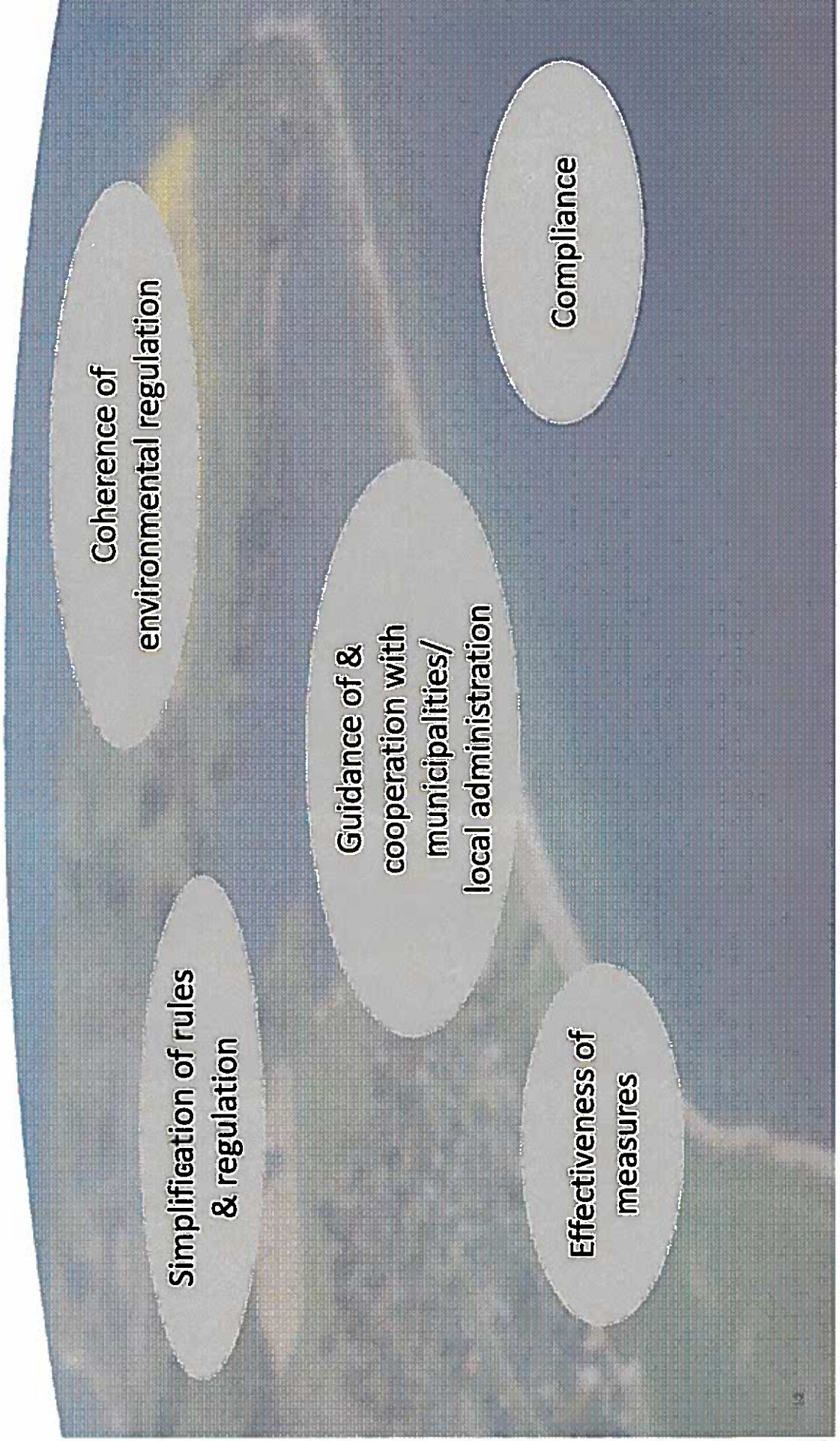
- Farmers are obliged to ensure an **inspection of their containers (with a capacity >100m<sup>3</sup>) at least every 10 years by an authorized inspector**
- applies to **all open and closed tanks** for storage of liquid animal manure & silage liquor
- Inspection obligatory **every 5 years**, if slurry tank is located within <100 meters distance to an open water course or lake (>100m<sup>2</sup>)

## "Authorized inspectors"

- inspectors with **special training & official authorization** check approx. 2,300 tanks annually in terms of **quality, condition & stability of concrete walls**, etc.
- **Immediate repairs & report** to the central inspection secretariat & respective municipality, possibly including some stipulations

# Further development of Danish regulation – focus & priority areas:

Brussels - 01 December 2015



Ministry of Environment and Food

Thank you for your attention!



Questions are welcome!

Til: [REDACTED]  
Cc: Maja Guldberg (magu@naturerhverv.dk), Joan Reimann (NaturErhvervstyrelsen (jore@naturerhverv.dk), Helle Bach Rungø (helba@mfvm.dk), Thomas Bruun Jessen (tbr@nst.dk), Olsen, Hans Peter (hapol@mst.dk)  
Fra: Lidde Bagge Jensen (lbdj@mst.dk)  
Titel: VS: TIL KOMM: Udkast til svar til Kommissionen: DK presentation - 62nd Nitrates Committee - 1 December  
Sendt: 29-10-2015 11:28:58

Dear [REDACTED]

We hereby confirm that Denmark will give the second presentation on the derogation request on the Nitrates Committee meeting on December 1st 2015.

We would also like to inquire, whether it will be possible to arrange a bilateral meeting with the Commission at the end of November prior to the meeting in the Nitrates Committee?

Representatives from Denmark are currently having meetings with the Commission, DG Agri, on different possibilities concerning financing measures in relation to mandatory requirements in the water management plans. We therefore suggest that a possible meeting with the Commission by the end of November also includes participants from DG Agri, as a coming revision of the Nitrates Action Programme and possible financing of measures are all included in an overall solution for a more targeted regulation of nitrate in Denmark in the future.

If such a meeting is possible, will you kindly suggest possible dates, preferably during the last week of November?

Please, do not hesitate to contact me, if the above rises any questions or reflections.

We are looking forward to your reply.

Best regards

Lidde

Lidde Bagge Jensen  
Head of Function  
Industry and Agriculture  
Phone: (+45) 41 31 85 60  
lbdj@mst.dk

Danish Ministry of Environment and Food  
Environmental Protection Agency  
Strandgade 29  
DK - 1401 Copenhagen K  
Phone: (+45) 72 54 40 00  
www.mst.dk

---

Fra: [REDACTED]  
Sendt: 23. oktober 2015 17:16  
Til: Lidde Bagge Jensen  
Emne: DK presentation - 62nd Nitrates Committee - 1 December

Dear Lidde,

Could you please kindly confirm if Denmark is going to make its second presentation on the derogation request at the next Nitrates Committee of December the 1<sup>st</sup>?

Kind regards

[REDACTED]  
[REDACTED]

  
European Commission  
DG Environment  
Unit ENV B.1 Agriculture, Forests and Soils  
Avenue de Waterloo 5 - 1150 Brussels  
Tel: +32 2 29 45336  
http://ec.europa.eu



**To:** [REDACTED]  
**Cc:** jakm@naturerhverv.dk (jakm@naturerhverv.dk), mehch@mst.dk (mehch@mst.dk), Helle Bach Rungø (helba@mfvm.dk), Olsen, Hans Peter (hapol@mst.dk), Wibke Christel (wibch@mst.dk), Joan Reimann (NaturErhvervstyrelsen (jore@naturerhverv.dk))  
**Fra:** Lidde Bagge Jensen (lidbj@mst.dk)  
**Titel:** Request for extension of Danish Nitrate Action Programme oct 2015  
**Sendt:** 07-10-2015 09:53:46  
**Bilag:** Request for extension of Danish NAP oct 2015.pdf;

Dear Claudia Olazabal,

I hereby enclose a request for extension of the current Danish Nitrate Action Programme.

Should you require more information on the matter, please let us know.

We are looking forward to your reply.

Best regards,

Lidde Bagge Jensen

Kind regards

Lidde Bagge Jensen  
Head of Function  
Industry and Agriculture  
Phone: (+45) 41 31 85 60  
lidbj@mst.dk

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Environmental Protection Agency  
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**Ministry of Environment and Food**  
**The Danish Environmental Protection Agency**

European Commission – Directorate General  
Environment  
ENV.B.1 – Agriculture, Forests and Soils  
Claudia Olazabal  
1049 Bruxelles  
BELGIUM

Danish EPA Commerce,  
Industry and Agriculture  
J.nr. MST-12412-00082  
Ref. lidbj  
October 7, 2015

Dear Mrs Claudia Olazabal,

**Request for an extension of the Danish Nitrate Action Programme**

The current Danish Nitrate Action Programme covers the period 2008-2015.

As a consequence of a recent change of government, there is now a resolve from the Danish government to change the way we regulate nitrate from agricultural sources as we have presented at the meetings with the Commission on Sept 17<sup>th</sup> and 25<sup>th</sup>, 2015. Thus we are planning to revise our Nitrate Action Programme in accordance with this changed way of regulating nitrate. However, it will not be possible to have the revised new Nitrate Action Programme ready prior to January 1, 2016.

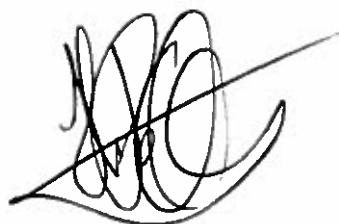
Therefore, we hereby ask the Commission to accept that the current Nitrate Action Programme, including adjustments, has legal validity as the Danish Nitrate Action Programme beyond the end of the year 2015 and until we present a revised Nitrate Action Programme.

We will as previously inform the Commission of any adjustments to the current action programme during the first half of 2016. We expect to introduce adjustments to the current programme that will be in accordance with the legal framework of the Nitrates Directive.

We expect to be able to present a revised Nitrate Action Programme to the Commission prior to the end of July 2016.

We would be most grateful for a reply to the request as soon as possible.

Yours sincerely,



Hans Peter Olsen  
Head of Division, Industry and Agriculture  
Danish Environmental Protection Agency  
+45 72544108  
hapol@mst.dk

**Til:** jakm@naturerhverv.dk (jakm@naturerhverv.dk), Helle Bach Rungø (helba@mfvm.dk), Olsen, Hans Peter (hapol@mst.dk)  
**Cc:** Majken Seerup Schmidt (NaturErhvervstyrelsen) (MSS@naturerhverv.dk), Wibke Christel (wibch@mst.dk), mehch@mst.dk (mehch@mst.dk)  
**Fra:** Lidde Bagge Jensen (liddj@mst.dk)  
**Titel:** VS: Request for extension of Danish Nitrate Action Programme oct 2015  
**Sendt:** 09-10-2015 22:04:48  
**Bilag:** Reply to Request for extension of Danish NAP oct 2015.pdf;

Kære Hans Peter

Hermed svaret fra Kommissionen om forlængelse af nitrathandlingsplanen, hvor det fremgår, at Kommissionen noterer sig den ønskede forlængelse, og at det er op til den enkelte medlemsstat at sikre regler, der sikrer opfyldelse af direktivets mål.

Det fremgår således, at Danmark har ret til at forlænge gyldigheden af den gældende nitrathandlingsplan.

Jeg synes, at vi skal læse svaret nøje, og drøfte, hvordan sagen videre håndteres umiddelbart efter ferien.

Hilsen Lidde

Med venlig hilsen

**Lidde Bagge Jensen**  
Cand.agro.  
Funktionsleder (SK)  
Erhverv  
Mobil: (+45) 41 31 85 60  
liddj@mst.dk

Miljø- og Fødevarerministeriet  
Miljøstyrelsen

Strandgade 29  
DK - 1401 København K  
Tlf.: (+45) 72 54 40 00  
www.mst.dk

---

**Fra:** [Redacted]  
**Sendt:** 9. oktober 2015 18:03  
**Til:** Lidde Bagge Jensen  
**Emne:** RE: Request for extension of Danish Nitrate Action Programme oct 2015

Dear Lidde,

Please find attached the reply to the letter concerning the extension of the Danish Nitrate Action Programme. The letter was also sent by post.

Have a nice weekend,

[Redacted]

[Redacted]



---

**From:** Lidde Bagge Jensen [mailto:liddj@mst.dk]  
**Sent:** Wednesday, October 07, 2015 9:54 AM  
**To:** OLAZABAL Claudia (ENV); [Redacted]  
**Cc:** Hans Peter Olsen; Wibke Christel; Joan Keimann (NaturErhvervstyrelsen); Jakob Møgelvang (NaturErhvervstyrelsen); Mette Hee Christensen; Helle Bach Rungø (MFVM-DEP)  
**Subject:** Request for extension of Danish Nitrate Action Programme oct 2015

Dear Claudia Olazabal,

I hereby enclose a request for extension of the current Danish Nitrate Action Programme.

Should you require more information on the matter, please let us know.

We are looking forward to your reply.

Best regards,

Lidde Bagge Jensen

Kind regards

**Lidde Bagge Jensen**  
Head of Function  
Industry and Agriculture  
Phone: (+45) 41 31 85 60  
lbdj@mst.dk

Danish Ministry of Environment and Food  
Environmental Protection Agency  
Strandgade 29  
DK - 1401 Copenhagen K  
Phone: (+45) 72 54 40 00  
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**EUROPEAN COMMISSION**  
DIRECTORATE-GENERAL  
ENVIRONMENT  
Directorate B - Natural Capital  
ENV.B.1 - Agriculture, Forests and Soil  
The Head of Unit

Ref. Ares(2015)4207938 - 09/10/2015

Brussels, **09 OCT. 2015**  
MB/cna/Ares(2015)

Hans Peter Olsen  
Head of Division  
Industry and Agriculture  
Danish EPA  
Strandgade 29 - DK -  
1401 Copenhagen K  
+45 72544108  
hapol@mst.dk

Dear Mr Olsen,

I would like to thank you for your letter of 7 October 2015 on the current status and expected revision of the Danish Nitrate Action Programme.

I take note of your intention of extending the validity of the existing Action Programme beyond the end of the year 2015 and until a revised Programme, expected by the end of July 2016, will be put in place. In this regard, I would like to remark that Art. 3 (7) of the Nitrates Directive specify that Member States shall review and if necessary revise their action programmes, including any additional measures taken pursuant to paragraph 5, at least every four years.

Changes in the national legislation are fully under the responsibility of the Member States, which must define action programme measures in line with the requirements of the directive and aimed at achieving its objective of preventing and reducing nitrate pollution. Denmark is thus entitled to extend the validity of the current Action Programme. As regards the acceptance of this extension, I would like to clarify that while the legislation does not require that the Commission formally approves the Action Programmes, the Commission is tasked to monitor the application of the Nitrate Directive and take action if it finds that the national measures are incomplete or fail to achieve the results required by the Directive.

Please, do not hesitate to contact us should you have additional information you would like to share with us.

Yours sincerely,

Claudia OLAZABAL

**Til:** [REDACTED]  
**Cc:** Joan Keimann (NaturErhvervstyrelsen (jora@naturerhverv.dk), Annette Schneider Nielsen (anschn@um.dk), Christian Vind (chvin@mfvm.dk), Jesper Olsen (jeols@mst.dk), Helle Bach Rungø (helba@mfvm.dk), claudia.olazabal@ec.europa.eu (claudia.olazabal@ec.europa.eu), Wibke Christel (wibch@mst.dk), jakm@naturerhverv.dk (jakm@naturerhverv.dk), Olsen, Hans Peter (hapol@mst.dk)  
**Fra:** Lidde Bagge Jensen (lldbj@mst.dk)  
**Titel:** Presentation for the meeting with the Commission on Sept 25th on nitrate regulation  
**Sendt:** 24-09-2015 16:48:08  
**Bilag:** Presentation water in DK meeting with commission 20150925 lldbj 230915 (4) [Skrivebeskyttet] [Kompatibilitetsilstand].pdf;

Dear [REDACTED]

I hereby enclose the presentation, that we would like to discuss with the Commission at our meeting tomorrow.

The presentation consists of slides addressing the following topics:

1. Status of the aquatic environment & development of the water quality in Denmark, including use of the current derogation
2. Overall thoughts on expected changes in the new Danish Nitrates Action Programme
3. Possible timeframe for revision of the Action Programme & the derogation, incl. formalities regarding the extension of the current Programme for a limited period of time

I apologize for the late forwarding of the presentation.

We will bring the presentation to the meeting as paper hand-outs as well.

Best regards

Lidde

Kind regards

Lidde Bagge Jensen  
Head of Function  
Industry and Agriculture  
Phone: (+45) 41 31 85 60  
lldbj@mst.dk

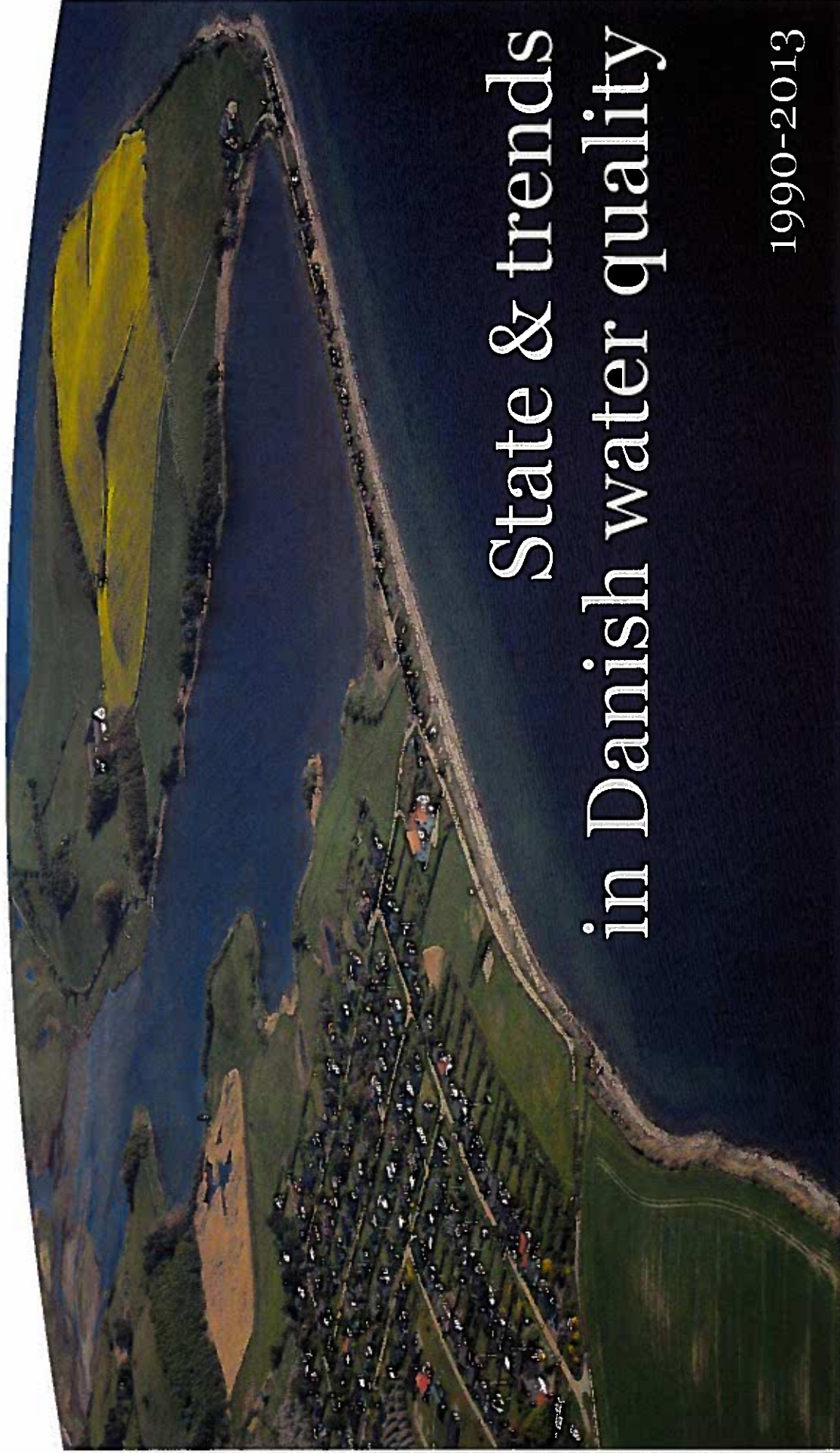
Ministry of Environment and Food  
Environmental Protection Agency | Strandgade 29 | DK-1401 Copenhagen K | phone: +45 72 54 40 00 | mst@mst.dk | www.mst.dk

# Meeting on Sept 25th, 2015

## Agenda

1. Status of the aquatic environment & development of the water quality in Denmark, incl. use of the current derogation
2. Overall thoughts on expected changes in the new Danish Nitrates Action Programme
3. Possible timeframe for revision of the Action Programme & the derogation, incl. formalities regarding the extension of the current Programme for a limited period of time
4. Misc.

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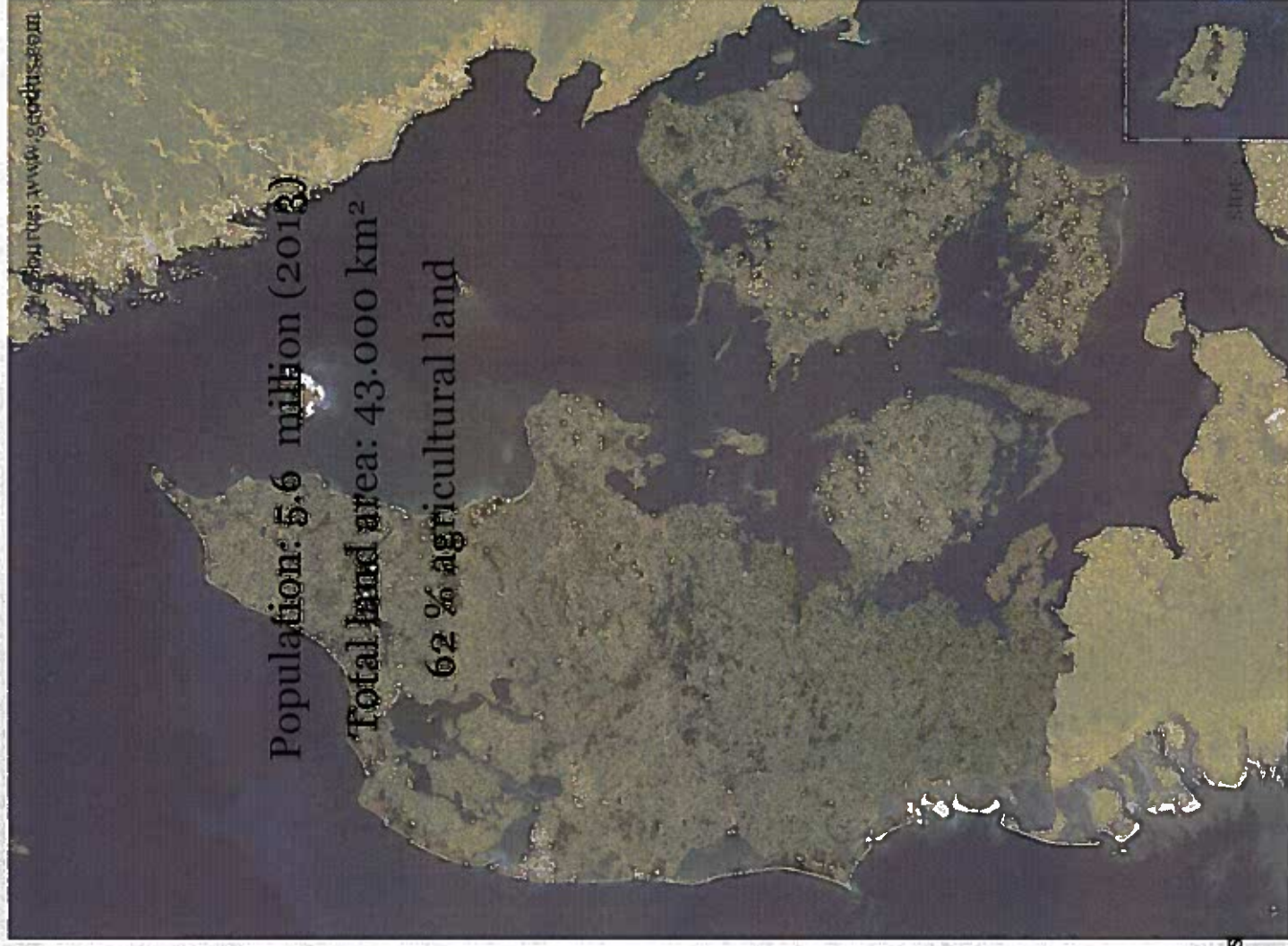
# State & trends in Danish water quality

1990-2013



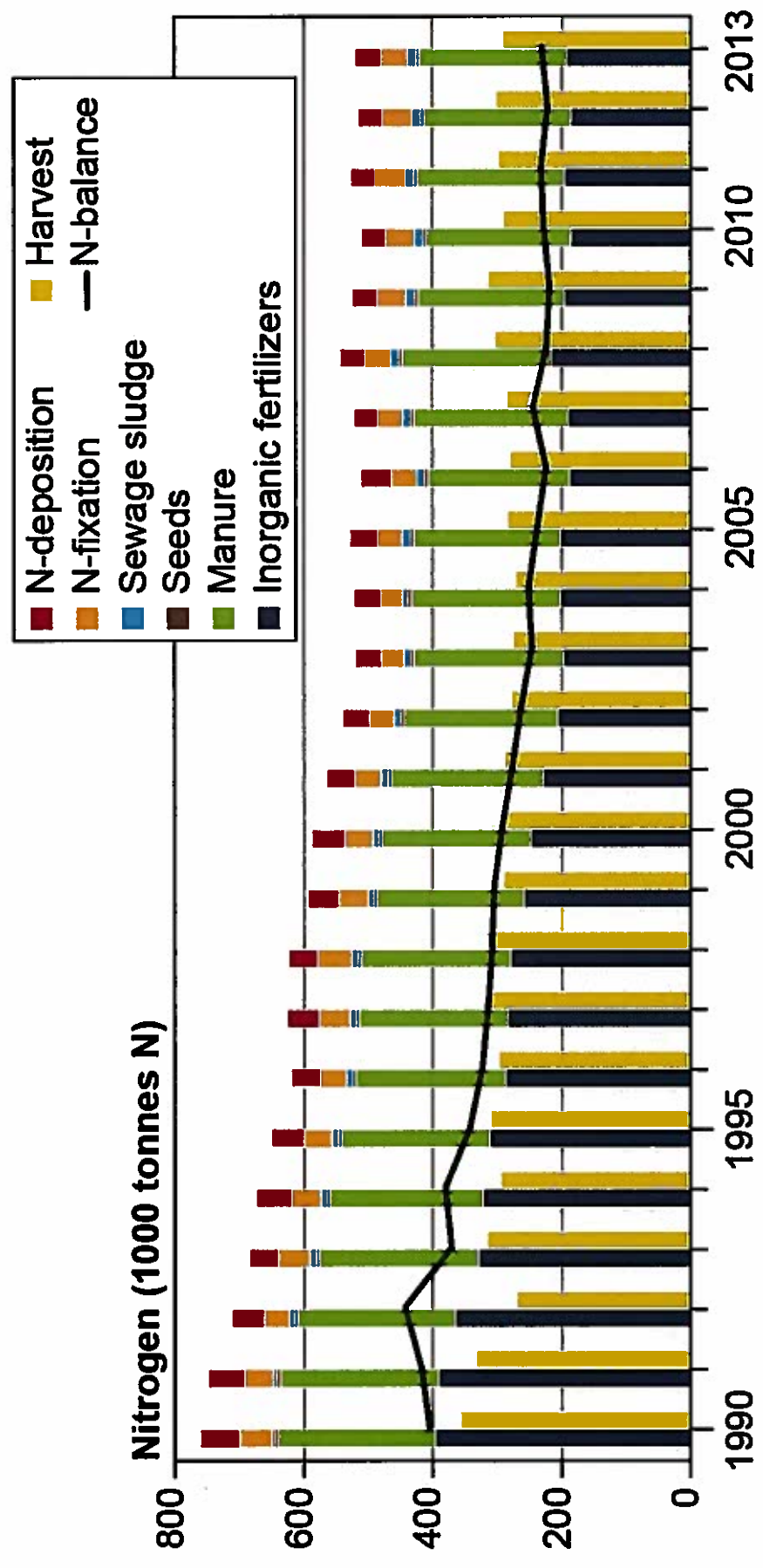
# Content

- **Field balances**
- **Groundwater**
  - in mini-catchments &
  - throughout the national territory
- **Surface waters – concentration & loads**
- **Conclusions - state & trends**
- **Status of derogation use**
- **Data & figures from DCE & GEUS:**
  - Bjerring et al., 2015
  - Blicher-Mathiesen et al., 2015
  - Hansen et al., 2015
  - Thorling et al., 2015
  - Wiberg-Larsen et al., 2015



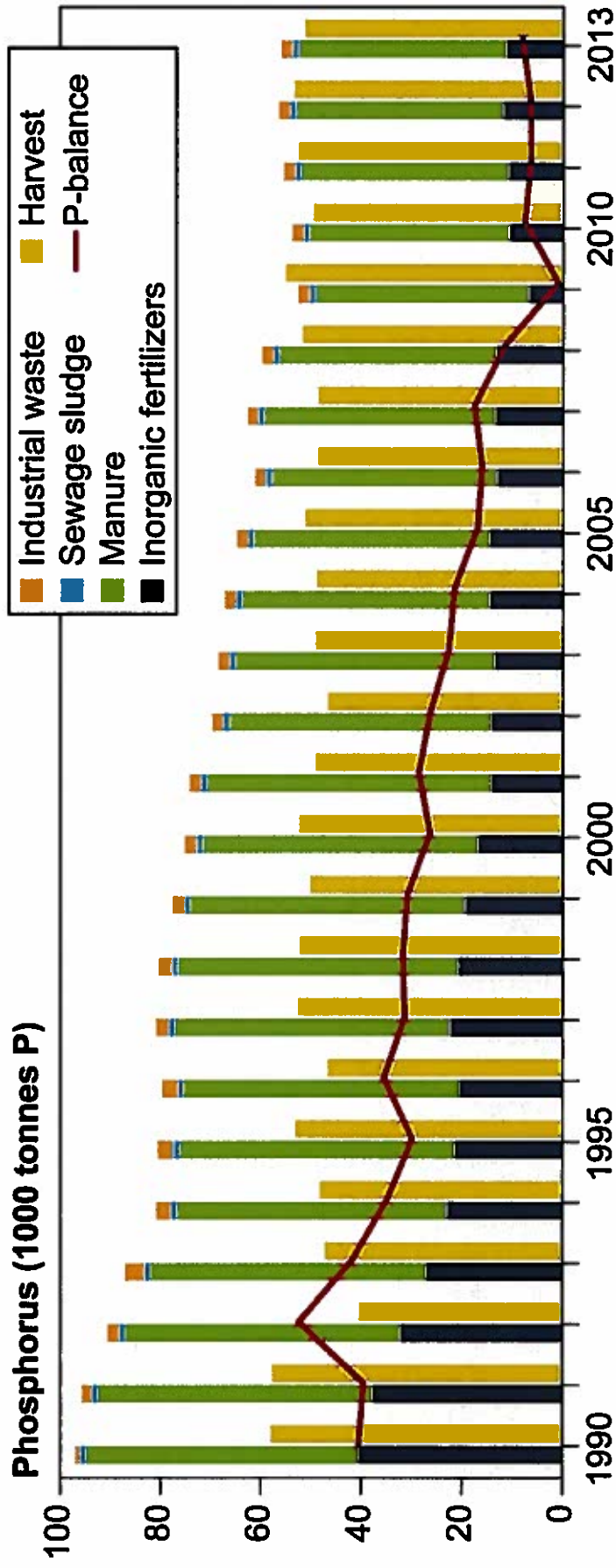
# Danish field balances for nitrogen

→ Reduction of 43 % in the field balance 1990-2013

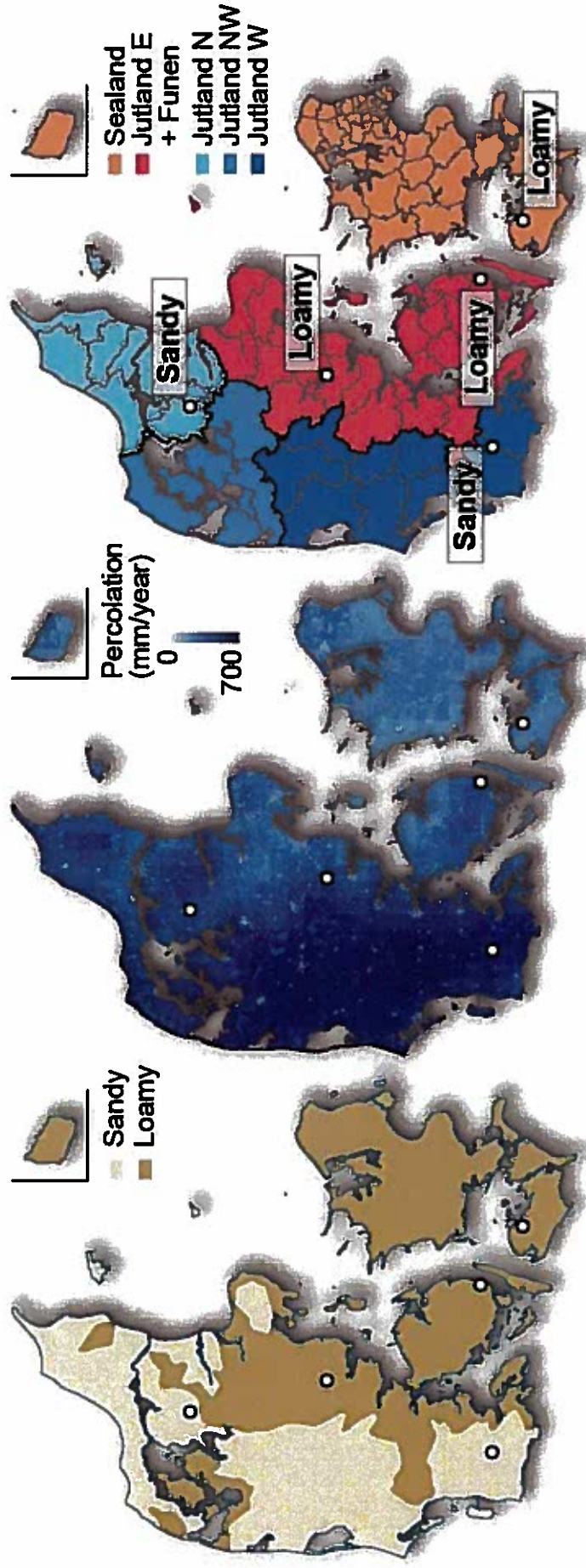


# Danish field balances for phosphorus

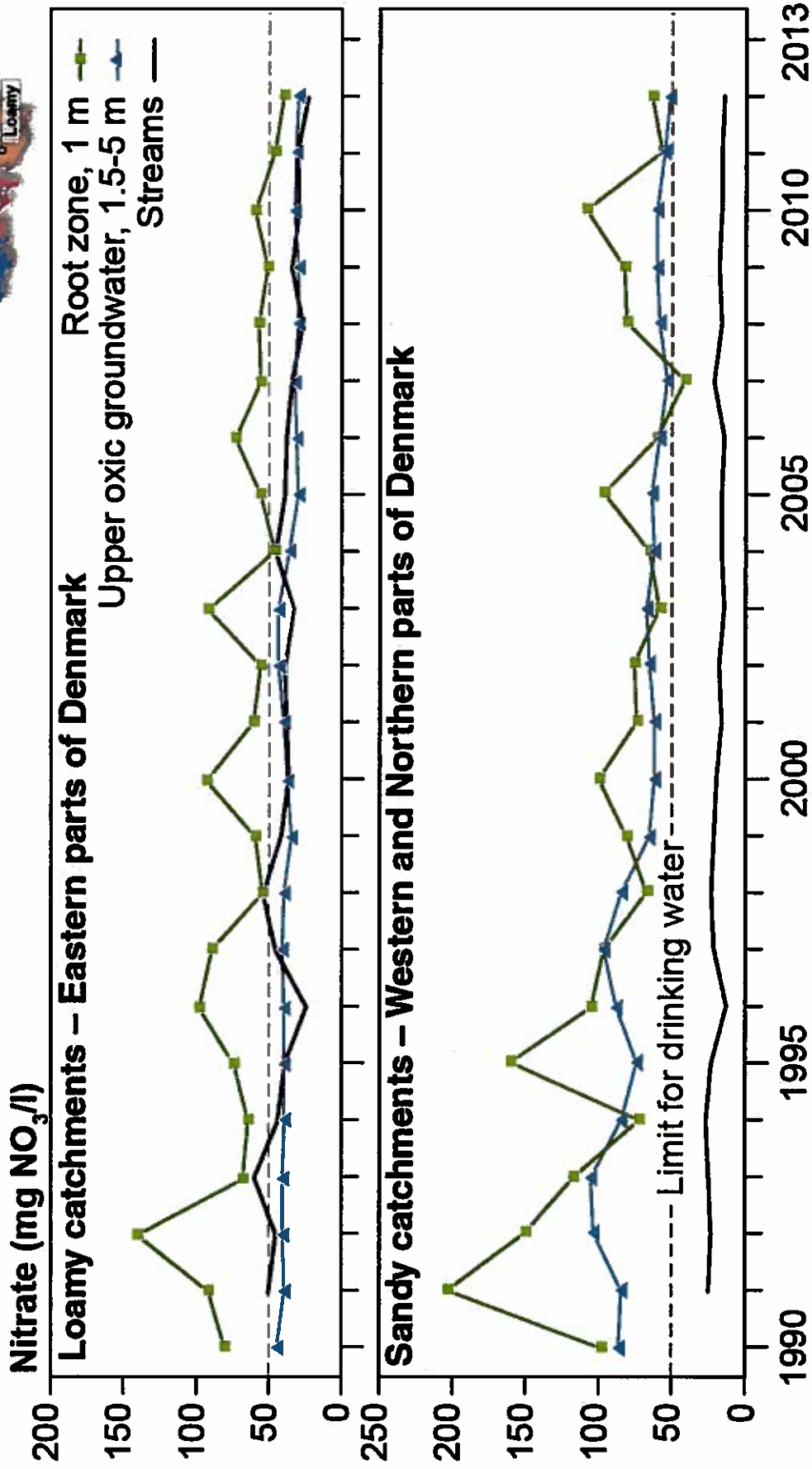
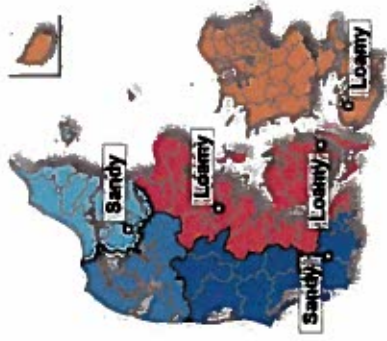
→ Reduction of 80 % in the field balance 1990-2013



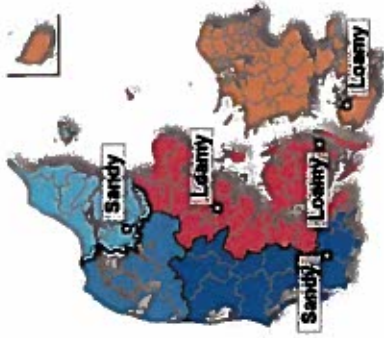
# Agricultural catchment monitoring sites in Denmark (mini-catchments)



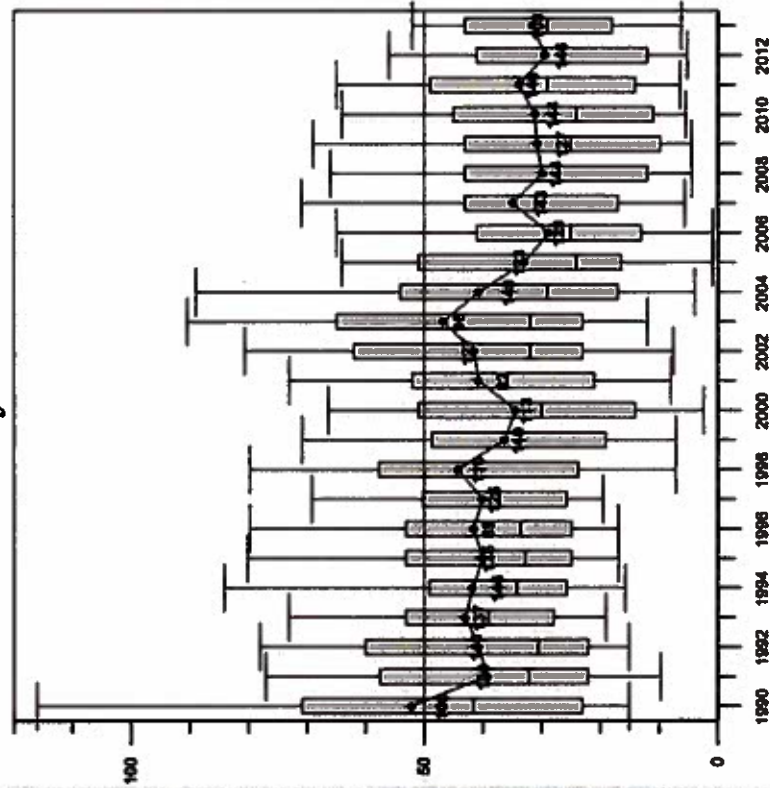
# Measured nitrate concentrations in five agricultural catchments



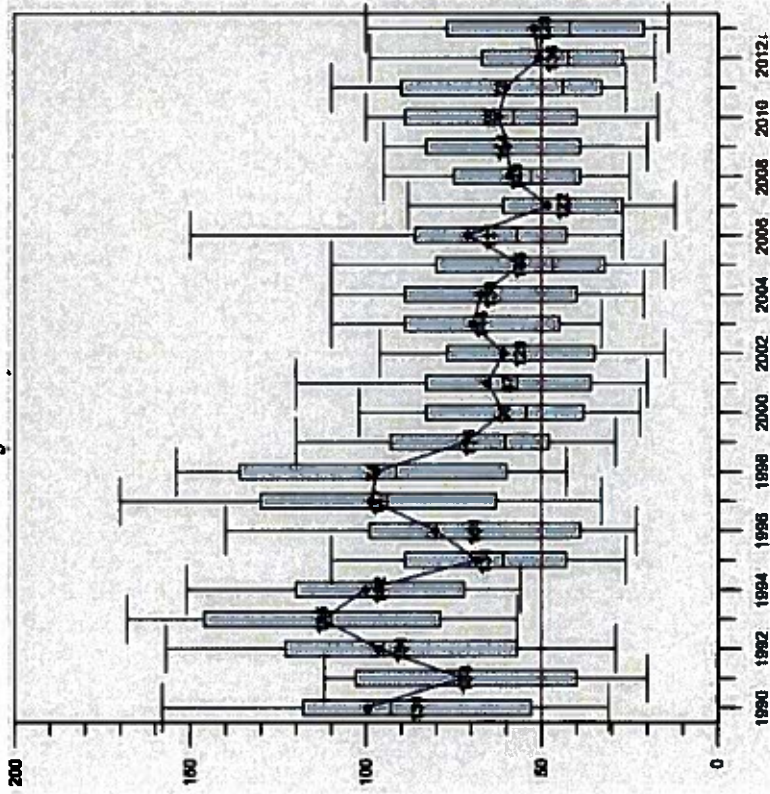
# Measured nitrate concentrations in five agricultural catchments



Nitrate concentration in the oxic groundwater 1990-2013  
in loamy catchments

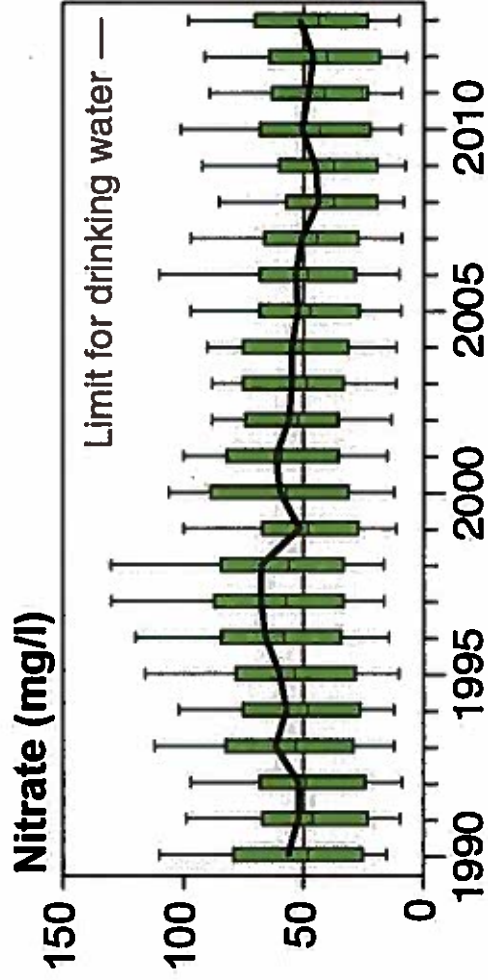
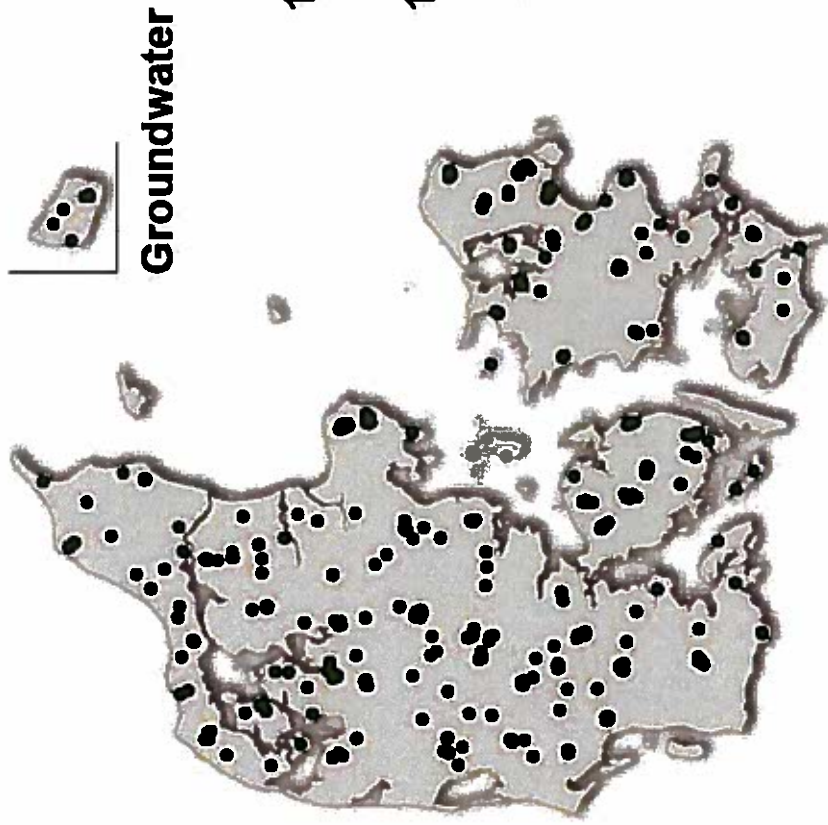


Nitrate concentration in the oxic groundwater 1990-2013  
in sandy catchments



# Groundwater throughout whole Denmark

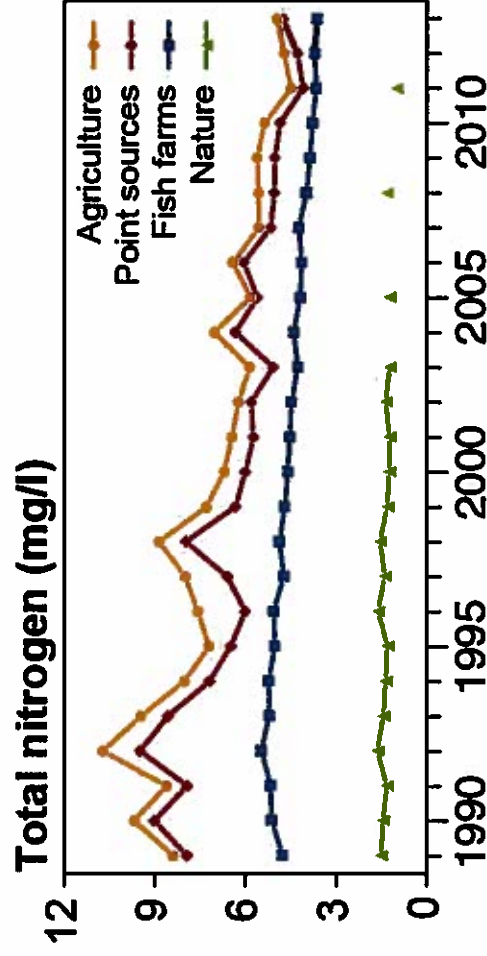
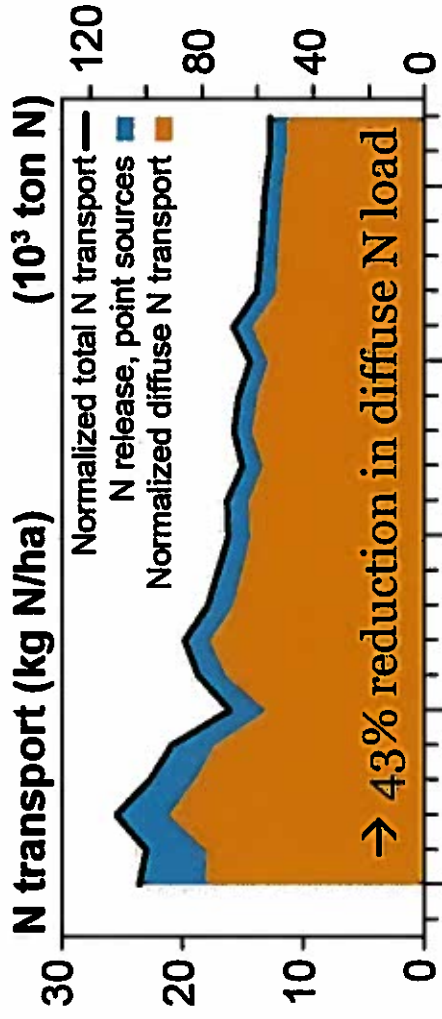
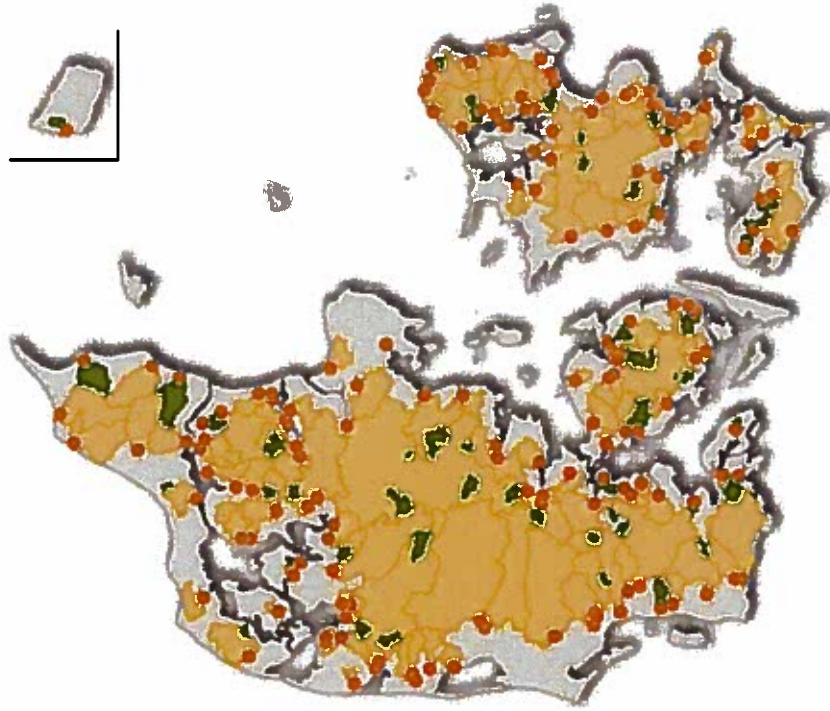
Nitrate concentration in monitored wells in oxic groundwater (3-100 meter below surface - not drinking water)



# State & trends in surface waters

Nitrogen loads from rivers to coastal & marine waters

- Catchment area
- (small agriculture catchments)
- Catchment area near coastal monitoring stations





# Conclusions

State & trends in Danish water quality 1990-2013

Field balance at national level:

- Nitrogen - 43 %
- Phosphorus - 80 %

Agricultural catchments:

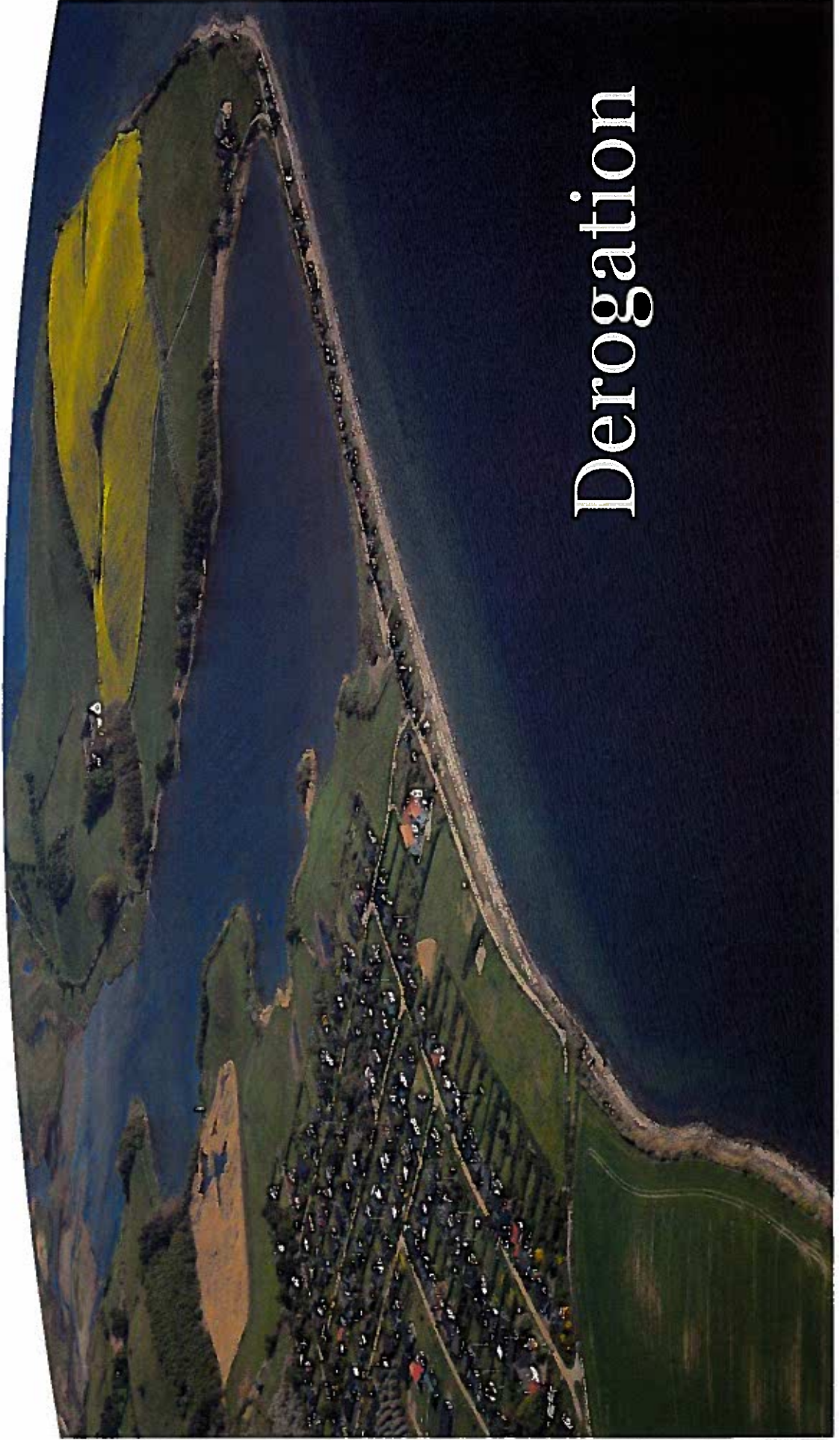
decreasing trends in nitrate concentration in:

- root zone water
- upper oxic groundwater
- streams

Whole territory:

- low N concentrations in & decreasing loads to surface waters
- decreasing nitrate concentration predominantly in young groundwater

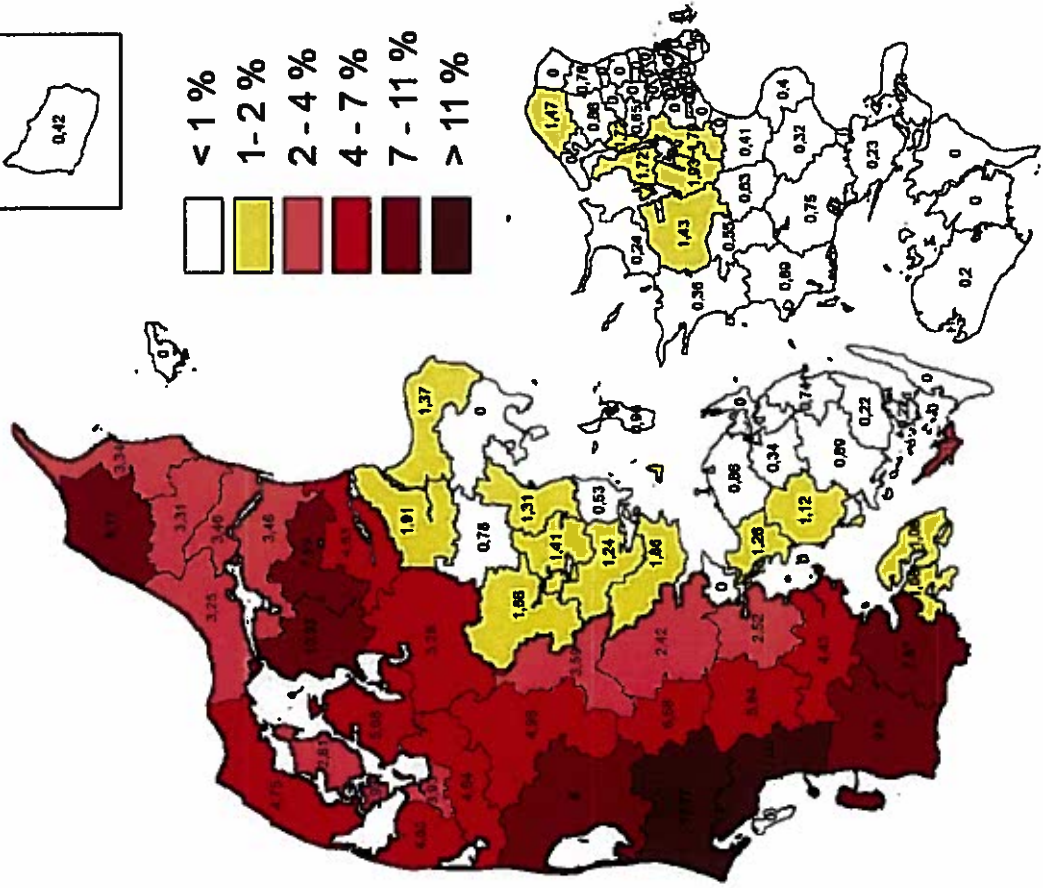
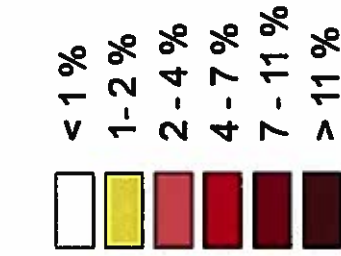
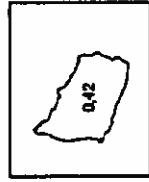
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# Derogation

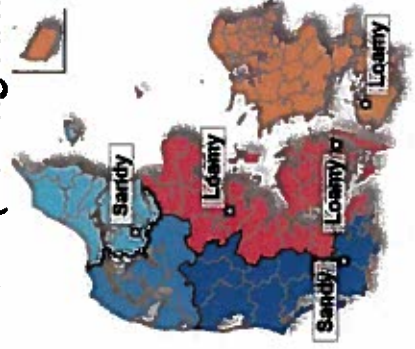
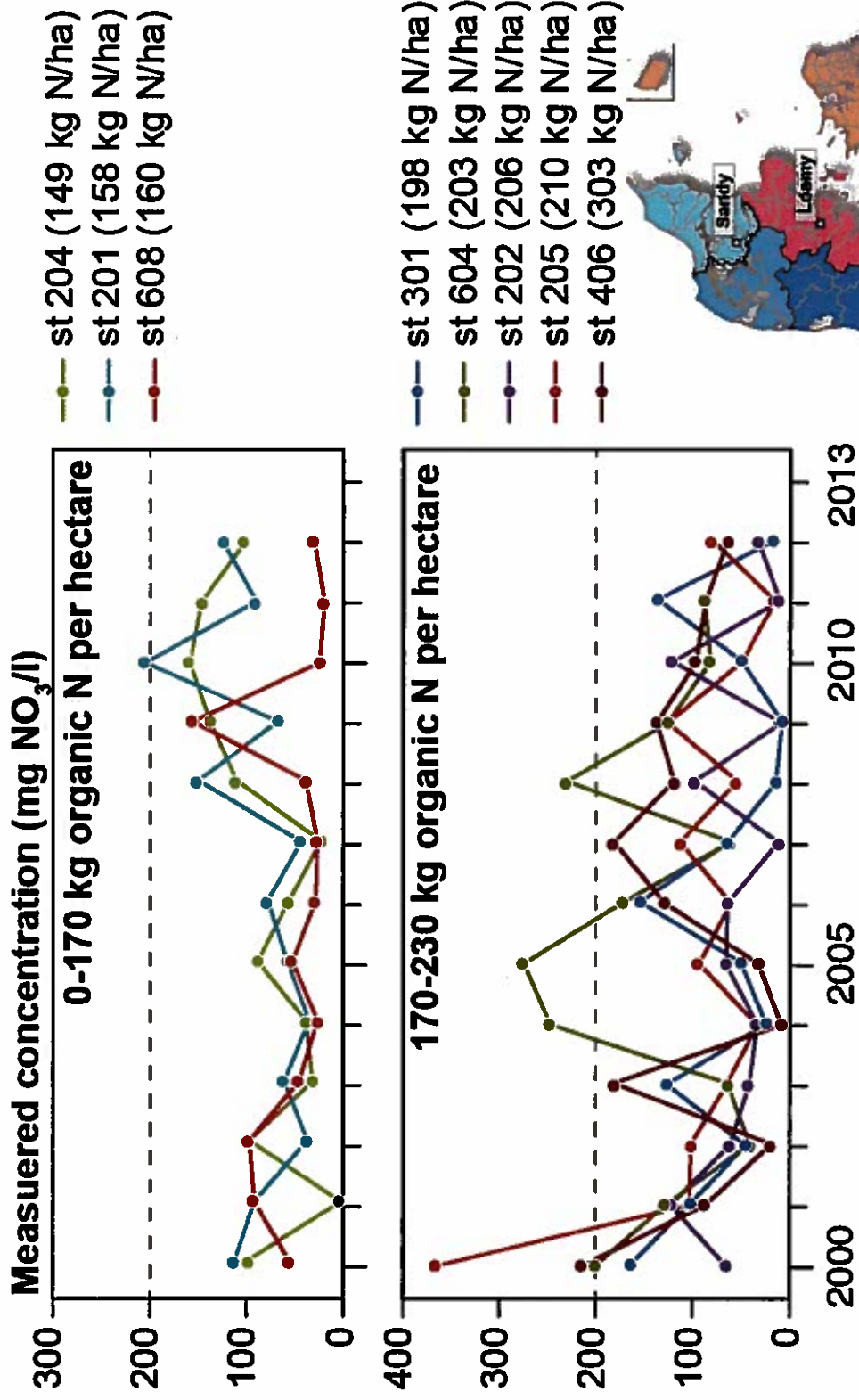
# Derogation – state of usage

## Cattle holdings encompassed by the derogation



	2011	2012	2013
<b>Farms</b>	1,607	1,652	1,481
<b>Area (1000 ha)</b>	164	175	162
<b>Area (%)</b>	7.4	7.1	6.7
<b>LU (1000 LU)</b>	342	366	335
<b>LU (%)</b>	14	16	15
<b>LU/ha</b>	2.08	2.08	2.06

# Measured nitrate concentrations in the root zone from fields with different use of organic N



# Conclusions

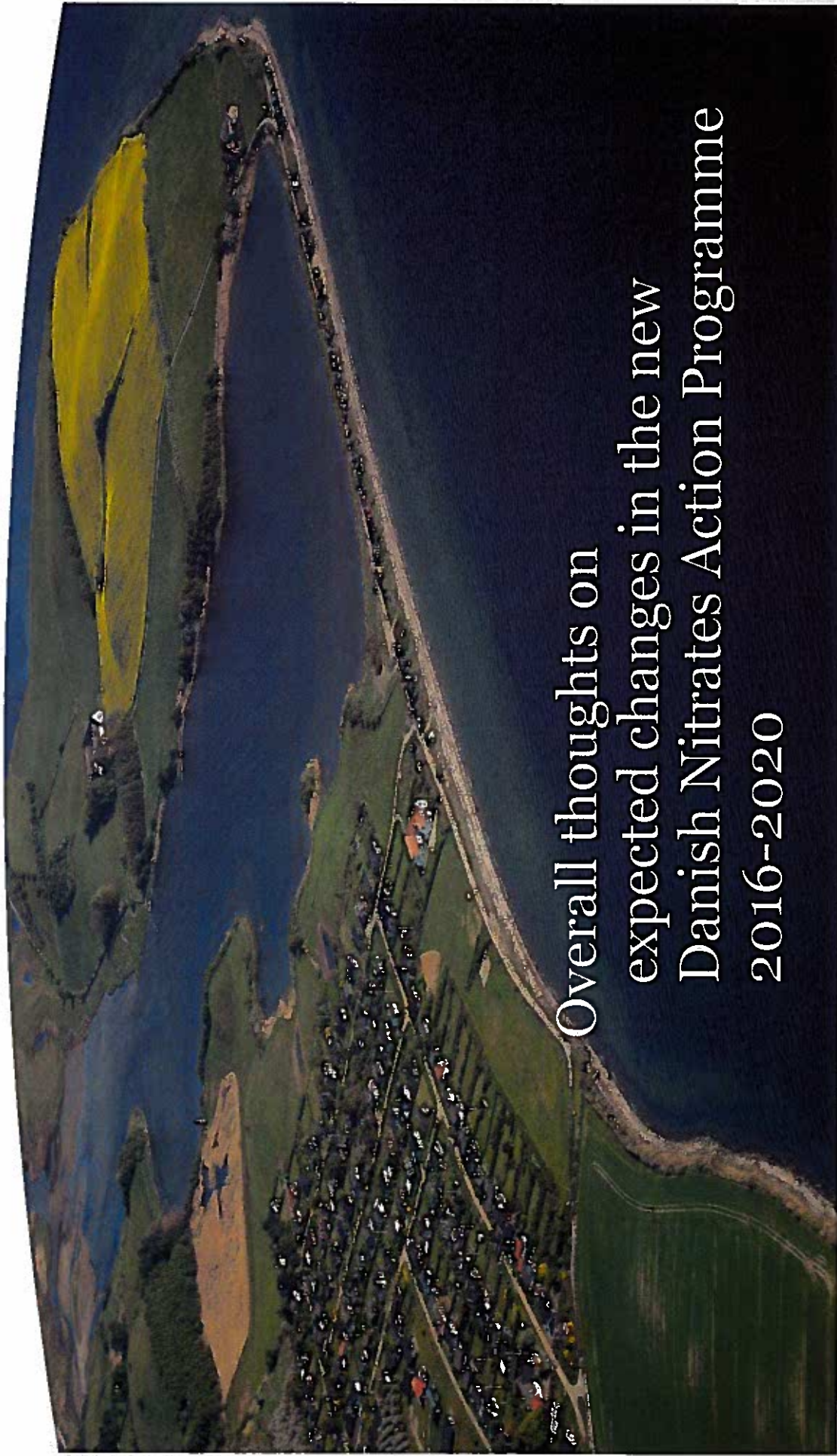
## Derogation

### Usage of derogation:

- on ca. 7 % of agricultural area
- circa 15 % of livestock units
- especially in the sandy regions

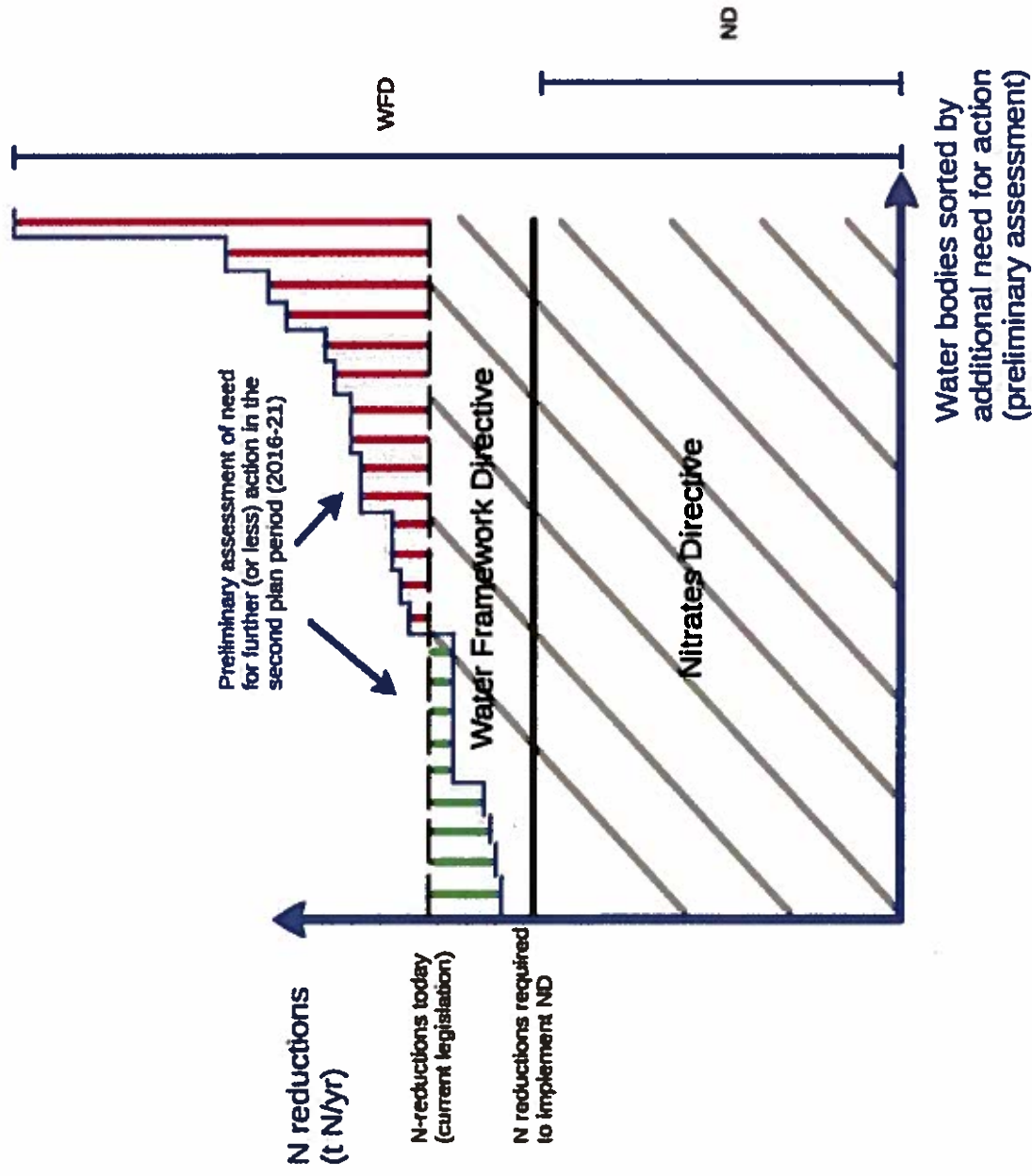
No clear difference in nitrate concentration in root zone water - independent from use of organic N

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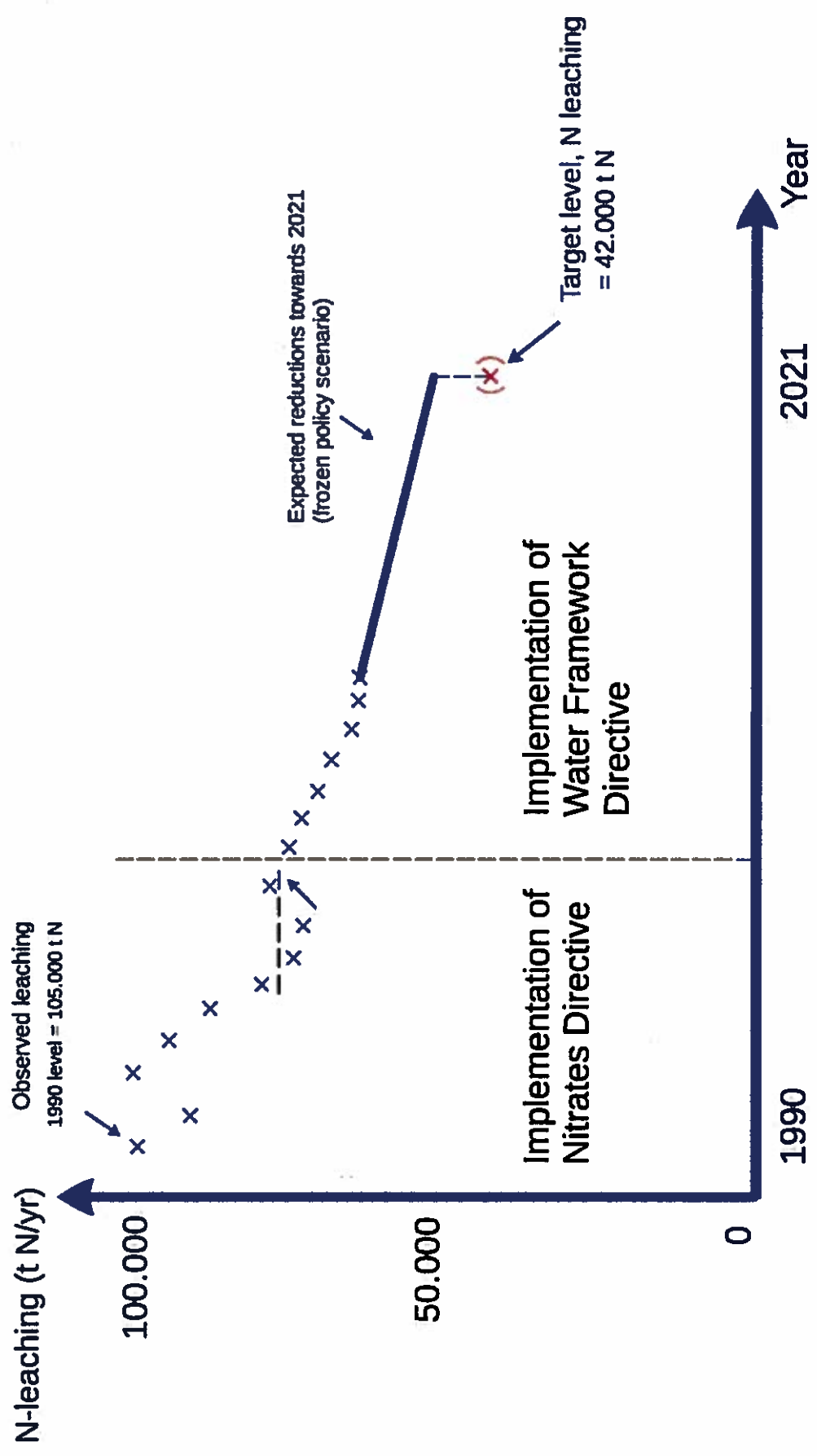


Overall thoughts on  
expected changes in the new  
Danish Nitrates Action Programme  
2016-2020

# Overview on new regulation in DK



# N-leaching





# Nitrogen Regulation Committee

**Participants:** Representatives from different ministries, including

- Ministry of Environment and Food
- Ministry of Finance
- Ministry of Business and Growth

**Task:** Preparing basis for political decision on

- Necessary reduction of nitrogen discharge
- New model for targeted nitrogen regulation

**Timeframe:**

- Political decision expected by the end of this year

# Implementation of the Nitrates Directive in Danish legislation

Annex II (Code of good practice)	Annex III
<ul style="list-style-type: none"> <li>• Application of fertilizer to steeply sloping, water-saturated, flooded, frozen or snow-covered ground</li> <li>• Application of fertilizer near water courses (2 meters strip along water courses)</li> <li>• Capacity of storage vessels and measures to prevent water pollution by run off and seepage (<b>alarms</b> a.o.)</li> <li>• Procedures for land application</li> <li>• Vegetation cover (catch crops)</li> </ul>	<ul style="list-style-type: none"> <li>• Periods when application of fertilizer is prohibited</li> <li>• Minimum capacity of storage vessels</li> <li>• Limitation of the land application of fertilizers based on a balance between requirements of the crops and the supply from the soil a.o.</li> <li>• Fertilizer accounts</li> <li>• Specified amount per hectare (170 kg N (harmony-rules). The member states may allow a higher amount (derogation))</li> </ul>

# Rough time schedule

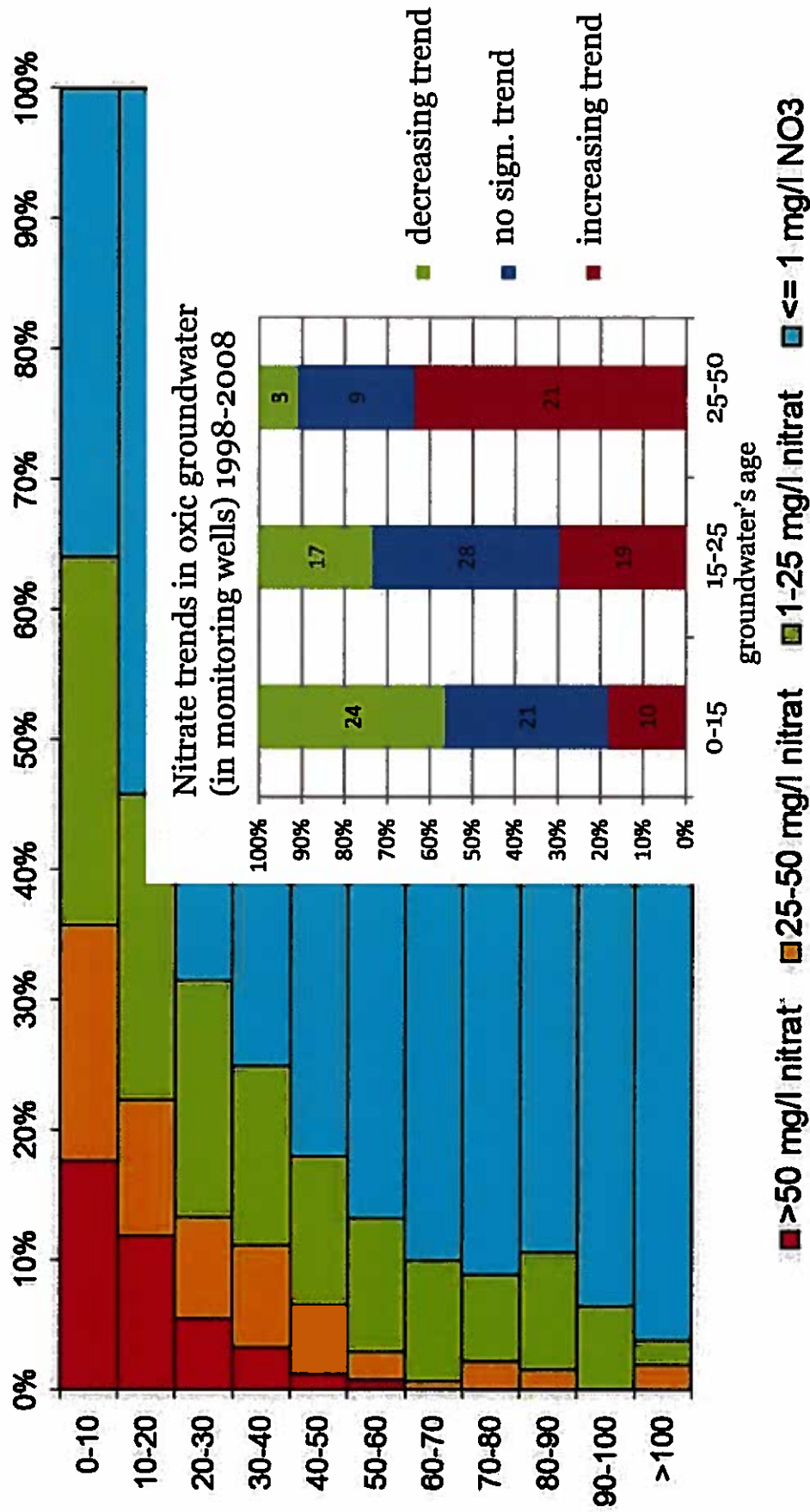
<b>Date</b>	<b>Activity</b>
<b>Sept. 2015</b>	<b>Negotiation meeting with the Commission</b>
<b>Oct. 2015</b>	<b>1st presentation to the Nitrate Committee Requesting an extension of the present Nitrate Action Programme</b>
<b>Dec. 2015/Jan 2016</b>	<b>Draft for revised Nitrate Action Programme and SEA</b>
<b>Dec. 2015</b>	<b>2nd presentation to the Nitrate Committee</b>
<b>March 2016</b>	<b>3rd presentation to the Nitrate Committee</b>
<b>June 2016</b>	<b>The Commission will receive the revised Nitrate Action Programme</b>
<b>June 2016</b>	<b>Voting on the derogation decision on the Nitrate Committee</b>
<b>August 2016</b>	<b>The new derogation is valid from August 1st</b>

# The following slides are extra slides



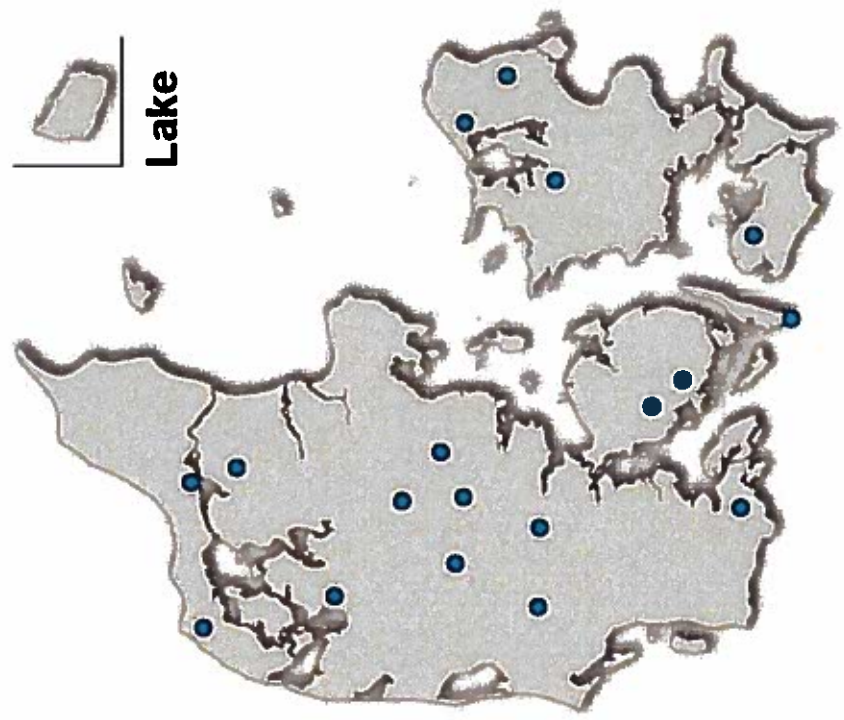
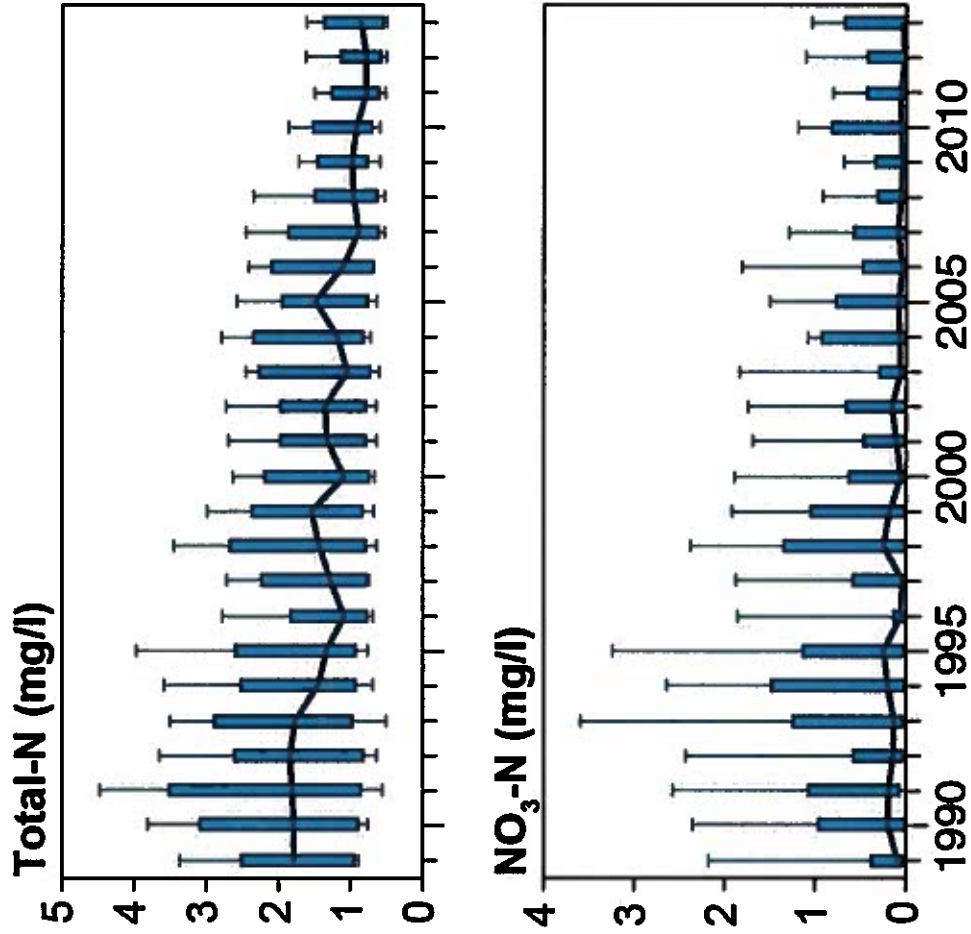
# Groundwater throughout whole Denmark

Nitrate concentration in all types of groundwater (2013) at different depths below surface



# State & trends in surface waters

## Nitrogen loads to lakes



# State & trends in surface waters

N concentration in marine & near coastal waters

- Coastal areas
- Marine waters

