

DANISH EXPERIENCE WITH CATCHMENT OFFICERS AND IMPLEMENTATION OF NITROGEN MITIGATION PRACTICES

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Danish regulation to reduce nutrient losses from agriculture

To meet the EU requirements of good ecological status in all Danish coastal waters in 2027, there has been a continuous and increasing effort to reduce nutrient loss from agriculture. In Denmark the focus of the regulation is to reduce nitrogen losses to the many estuaries and shallow coastal waters surrounding the land. Initially the regulation has been focused on agricultural practices based on general regulation methods, the so-called mandatory regulation of the individual farmer. The first measures were either economically beneficial due to the increased nutrient utilization or relatively cheap to apply. As the regulation has increased so has the costs for the farming business. The primary instrument to make a further reduction in nutrient losses from the farmed area is an increased percentage of catch crops, that will require a shift from high yielding winter cereals to lower yielding spring crops. An alternative to catch crops is set aside which has a specific conversion factor and is an expensive measure to reduce the nutrient loss.

To meet the ecological targets without severe economic consequences there has been a gradual shift towards edge-of-field mitigation measures. In the latest political agreement on agriculture, it was decided that the remaining reduction of 4500 tons N could be met with voluntary collective measures based on funding schemes like constructed wetlands, river valley- and peatland restoration projects and reforestation. These measures are called collective measures because the effect is attributed to all farmers in the catchment and not the individual farmer. The political agreement also included an environmental guarantee with a two-year assessment on the progress in implementing the voluntary collective measures. If the implementation of the measures is lower than anticipated the level of mandatory regulation will be increased, so that in 2027 the combined effect of additional collective and mandatory measures reduces the nitrogen losses with 4500 tons N.

Economic consequences of mandatory regulation

The Ministry of Environment has calculated the necessary reduction in nitrogen to meet the target for each of the Danish catchments (Miljøministeriet, 2021). In some of the catchments there is no need for further reductions. In other catchments it will be necessary to reduce the nitrogen losses with approx. 50 %. The combined sum of the reductions amount to 4500 tons N (Figure 1).

Historically the implementation of collective measures has only amounted to 1500 tons N in a corresponding period. To assess the consequences of an increased mandatory regulation of 3000 tons N if the rate of implementing collective measures is unchanged, SEGES

Innovation has developed a tool to model the cheapest combination of catch crops and alternatives for each farm based on the present choice of crops for a given requirement of

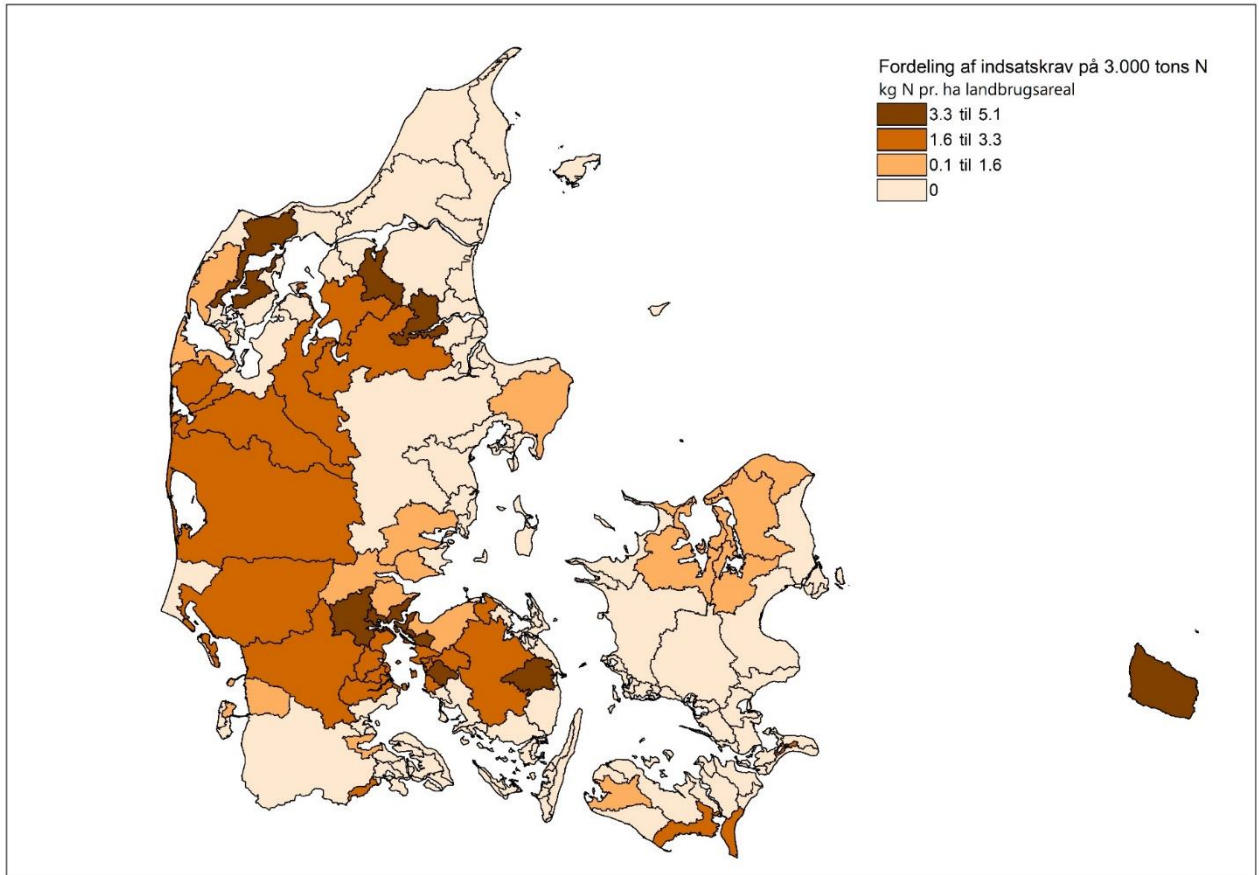


Figure 1. The distribution of the necessary reduction in nitrogen losses from each catchment with an increase in mandatory regulation on 3000 tons N.

mandatory regulation. SEGES Innovation has calculated the losses for each farm and for each catchment. In the catchments with a required reduction in nitrogen losses of up to 50 % the yearly economic losses may be up to approx. 2000 NZ\$ per hectare.

Experiences with implementation of collective measures

In Denmark wetland restoration started approx. 25 years ago. Initially the objective was primarily to improve the wetlands as a habitat and nature area. Gradually the objectives of the individual projects has shifted towards nutrient reduction as the funding from the European Union has focused on implementing the Waterframe Directive. In Denmark the municipalities/regional councils and the Nature Agency can apply for funding from the European Union to finance projects with wetland restoration.

If the farmers should avoid further regulation on their individual farms, it will be necessary to establish approx. 8000 constructed wetlands and restore 25.000 hectare of natural wetlands. In some of the most vulnerable catchments it will be necessary to apply a drain filter solution on almost every drainage system.

In 2017 it became possible for the individual farmer to apply for funding for constructed wetlands from a scheme based on design criteria developed by Aarhus University inspired by

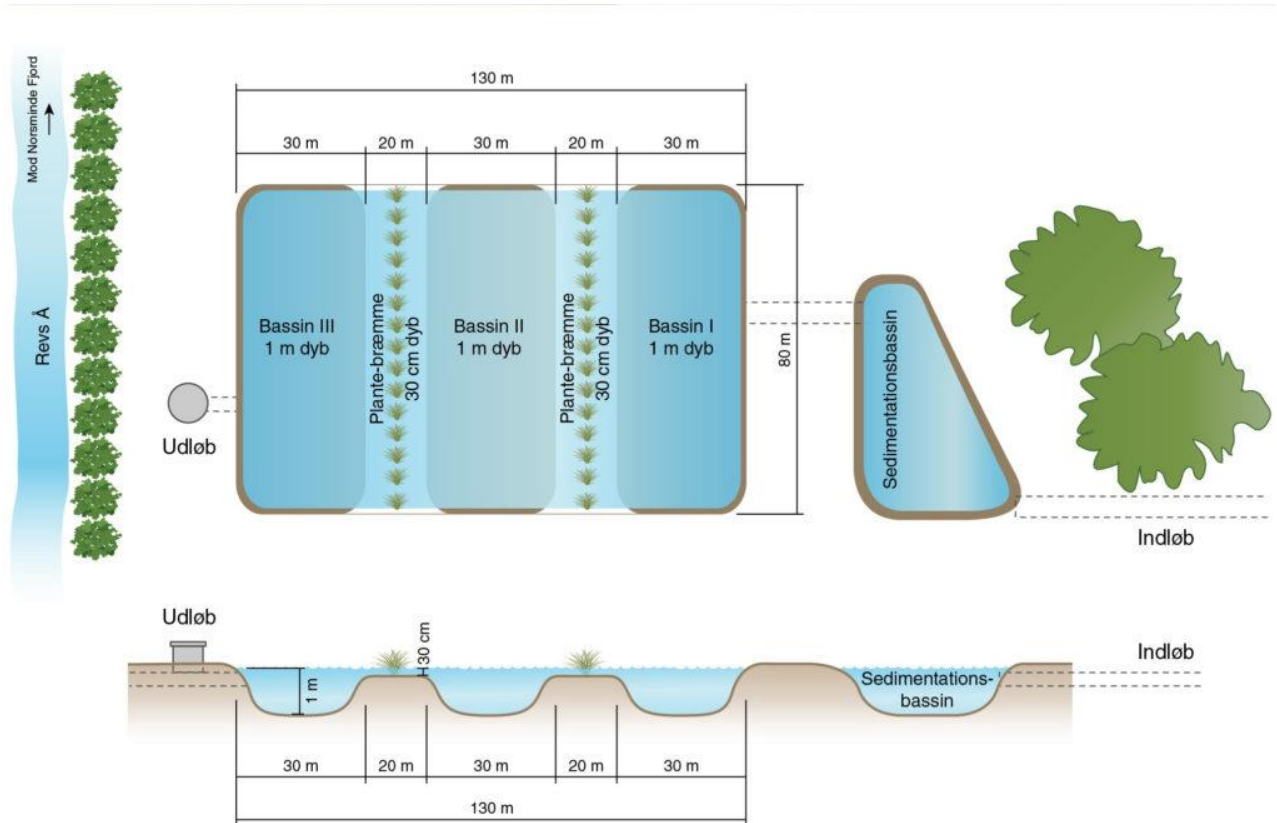


Figure 2. The recommended design for constructed wetlands developed by Aarhus University with shallow, vegetated areas and larger 1-meter-deep areas (Ministeriet for Fødevarer, Landbrug og Fiskeri Landbrugsstyrelsen, 2022)

initial guidelines from NIWA in New Zealand (Figure 2). The funding scheme for constructed wetlands makes it possible to make approx. 300 constructed wetlands yearly.

In recognition that it would be complicated as well as time consuming for the individual farmer to find the appropriate locations, make the specific design and apply for funding and permits it was decided to establish a corps of catchment officers in Denmark inspired by international experiences. The Danish Farmers Organization (L&F) and the former Ministry of Environment and Agriculture agreed to make an equal contribution to the funding of the catchment officers for the initial period.

Since 2017 SEGES Innovation has been managing the national network of locally based catchment officers, which work for free for the individual farmer. Most of the officers are employed within the agricultural advisory service system within plant production, environment, or nature.

The catchment officers have initially focused on constructed wetlands, as the farmer himself can apply for EU-funding and is responsible for completing the project according to rather specific design criteria and location in the landscape. To date the catchment officers has applied for funding of 800 constructed wetlands and 300 projects been completed.

Effort to increase the speed of implementing collective measures

From 2023 it has been agreed by a majority of political parties that the state will provide the entire funding of the catchment officers until 2027. In the same agreement it has been decided that the catchment officers in addition to helping with constructed wetlands also has to assist municipalities and the Nature Agency with the dialogue with landowners with large wetland- and peatland restoration projects.

To motivate the farmers to implement collective measures the catchment officers have tested different approaches of communication. Initially it was aimed towards the individual farmer based on letters, webpages, phone calls, social media, and field demonstrations. Gradually it has shifted towards organizing collective start-up meetings for all farmers within a catchment. The joint meetings have several advantages. Initially most farmers are skeptical and rejective towards the environmental targets decided by the government. When the farmers realize that they can decide the type and location of measures their mindset gets constructive. During their discussions the farmers develop a mutual and often positive attitude towards the task. With the combined knowledge it is also possible to locate the best position of measures along each drain within the catchment. In addition, there is instantly recognition by colleagues and neighbors to the farmers who decides to implement measures on their farms to help with the mutual task. This recognition is crucial for maintaining motivation after the meeting and during the often long and complicated project period.

References

Miljøministeriet, 2021, Forslag til vandområdeplanerne 2021-2027

Ministeriet for Fødevarer, Landbrug og Fiskeri Landbrugsstyrelsen, 2022, Minivådområdeordningen 2022 Etablering af åbne minivådområder