Water-driven rural development in the Baltic Sea Region No. R094 WATERDRIVE

Danish National Pathway

Going local for more efficient watermanagement

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Project Partners

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Introduction to National Pathways in Denmark

National Pathways is part of the strategic recommendations (5.1) of the EU-funded Waterdrive project. Each of the participating countries, Estonia, Latvia, Denmark, Poland, Lithuania, Finland, Russia and Sweden, has identified 2-4 pathways deemed to be of strategic importance for efficient water management in agricultural landscapes. The pathways are systemic and fill observed gaps in the present national structures.

The Pathways will differ between countries depending on the national contexts for water management. Together, they will form a strategic roadmap for improved water management in agricultural landscapes in the Baltic Sea Region until 2030. However, the Pathways' primary target groups are national level authorities and organisations. Each pathway will include a background, an objective, a SWOT analysis and an implementation plan with identified stakeholders/target groups. The pathway objective should be reached by 2030.

The Pathways scheme belongs to the Waterdrive project organisation and the individuals who have developed it. However, each pathway should preferably be communicated and approved as a "background paper" by the relevant authorities and organisations. The pathways primarily form the basis for learning and for achieving an identified and tangible objective. They should underpin stakeholders' commitment to systemic, practical and realistic action in terms of improved water management.

The selected Danish pathways are:

1. New local services as catchment officers
2. Enhancing local water spatial planning,
3. Strengthening the advisory services in relation to multi-actor collaboration

The Danish Pathways have been selected to strengthen the Danish approach to, primarily, voluntary actions in relation to the implementation of constructed wetlands, new end of tile measures, wetlands and rewetting organic soils.

The focus of Waterdrive in Denmark is on strengthening bottom-up engagement with farmers, landowners, local municipalities and agricultural agencies supported by agri-environmental schemes AES. In Denmark, we sometimes refer to bottom-up engagement as "stadium zero" where the advisory service asks farmers how their land should be used in future.

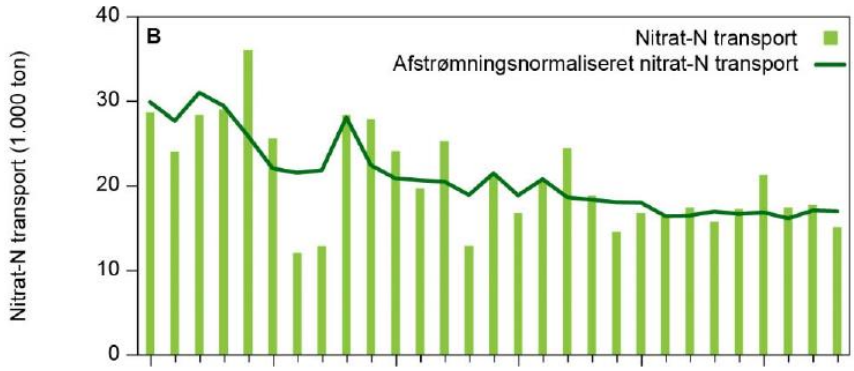
However, the bottom-up process will require a more integrated and challenging mode of collaboration between the authorities to support and nurture the process efficiently. Furthermore, new advisory functions are deemed necessary either as publicly supported or as private initiatives e.g. catchment officers, catchment teams or local facilitators. Of utmost importance is that landowners and their advisers have access to qualified digital decision support on a multiple scale from field to catchment level, and accessible financing to underpin and enhance the process. Denmark has come quite far in terms of supporting and funding the implementation of environmental measures, but it can often be challenging to fund the bottom-up process carried out by catchment officers, catchment teams or local facilitators. Long-term financing of the bottom-up process and environmental efforts remains a major challenge.

The challenge in Denmark

With regard to the national scenarios in Denmark, focus is on catchment officers, local multi-actor collaboration and the implementation of collective environmental measures such as constructed wetland and wetlands in relation to the leaching of nutrients and the rewetting of organic soils to prevent climate gas emission.

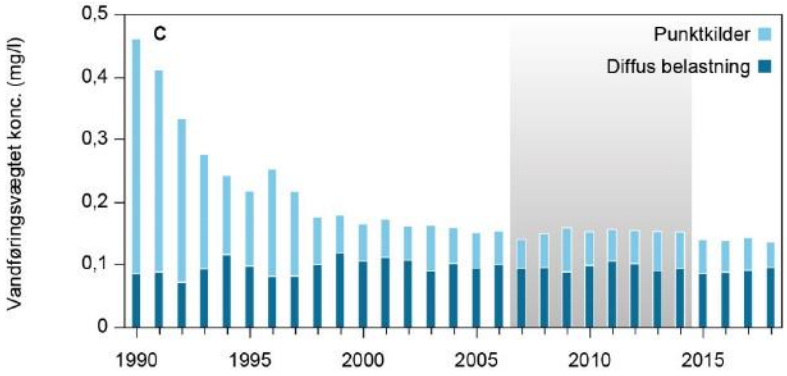
The description of the scenario should be seen in the light of the fact that nutrient leaching has not decreased much in the past 10 years in Denmark. Stronger local collaboration between all stakeholders is needed to reach the targets.

Reduction of nitrate from 1990-2018



Development of measured sea load catchments (sum of 77 catchments) as calculated annual sum for nitrate-N transport (light green bars) and runoff normalised nitrate N-transport (green line). Source: Thodsen, H, Tornbjerg, H, Rasmussen J.J, Bøgestrand, J., Larsen, S.E., Ovesen, N.B.; Blicher-Mathiesen, G., Kjeldgaard, A. & Windolf, J. 2019. NOVANA. Aarhus University, DCE – Nationalt center for Miljø og Energi, 72 s. – Videnskabelig rapport 353

Reduction of phosphorous from 1990-2018



Water flow weighted phosphorus concentration (C) for 1990 to 2018. Source: Thodsen, H, Tornbjerg, H, Rasmussen J.J., Bøgestrand, J., Larsen, S.E., Ovesen, N.B.; Blicher-Mathiesen, G., Kjeldgaard, A. & Windolf, J. 2019. NOVANA. Aarhus University, DCE – Nationalt center for Miljø og Energi, 72 s. – Videnskabelig rapport 353

Objective: Arguments for strengthening local water management in agricultural landscapes

Denmark faces several complex challenges over the next many years. A large number of projects in terms of constructed wetlands, new end of tile measures, wetlands and the rewetting of organic soils in relation to climate change remain outstanding. There is also an ongoing discussion about major land reform with land consolidation/land swop. All environmental initiatives in Denmark are on a volunteer basis.

In order to achieve the targets, many agricultural advisers, catchment officers/catchment teams, environmental and climate advisers need to be trained for the task. Under the current agricultural schemes, collaboration between landowners, the agricultural advisory service, catchment officers, municipalities and the Danish Nature Agency is not adequately financed on a long-term basis. It is important that all parties coordinate agri-environmental measures and climate projects at local level.

The catchment officer scheme is an attempt to facilitate the implementation of environmental measures at local level. The work is carried out by the agricultural advisory service in Denmark because trust has already been established. Wetlands, rewetting organic soils and land consolidation have been the main concerns of the municipalities, the Danish Nature Agency and private companies for many years. Climate gas emissions from organic soil account for a total of 20 per cent in the Danish climate account. The Danish food industry must be climate neutral by 2050. The target is for a 70 per cent reduction in climate gas emissions by 2030.

The topic for discussion in 2021 is whether catchment officers should play a bigger role in these objectives going forward. Seen from this perspective, should Danish agriculture catchments in risk areas be managed this way before 2030. For the various targets to be reached there is a need for:

a. Local water mangement plans and spatial planning.
b. Long-term funding of local facilitators, catchment officers and catchment teams.
c. Funding of 1,000 -2,000 constructed wetlands to reach the target.
d. Funding of new drainage measures/end of tile measures
e. Funding of 12,500 hectares of wetlands taken permanently from intensive production
f. Funding the rewetting of 50-100,000 hectares organic soils taken permanently from intensive production
g. Funding multifunctional land consolidation

The total cost will be substantial and these targets can only be implemented at political level.

Swot analysis

The swot analysis is based on the implementation of the most common agri-environmental measures such as constructed wetlands, wetlands and rewetting of organic soils.

Category	Considerations
Strengths	1. Well-functioning governmental and municipal institutions 2. New environmental measures have a great scientifically proven environmental effect in relation to leaching of nutrients and greenhouse gas reduction 3. Legislation and agricultural schemes are in place for some of the environmental measures. Funding for constructed wetlands, wetlands and rewetting organic soils is in place. 4. Catchment officers/catch teams/ independent local facilitators are working in the case areas at single and multiple farmer level.
Weaknesses	1. Lack of long-term funding for local and regional catchment officers/catch teams/independent facilitators. 2. Funding systems, compensation amount, one-time compensation or annual payments which are not adjusted to the market economy. 3. Unclear collaboration structures and platforms 4. Individual versus collective implementation of environmental measures (all farmers are connected in the tile system) 5. Maintenance of environmental measures with pumps and woodchips is a challenge. 6. Shared investment and shared responsibility for implementation of environmental measures can be complicated. 7. Ineffective agricultural schemes
Threats	1. Low environmental effect of environmental measures 2. Crop, livestock and food prices. 3. Legislation and pressure from the Danish state. 4. The involvement and collaboration do not work. 5. The state/agency does not remove the most pressing obstacles. 6. The variation in land prices 7. Lack of long-term funding for environmental efforts
Opportunities	1. The new service involving catchment officers/catchment teams/ local facilitators works. 2. Establishing transparently funded collaboration platforms 3. Funding for environmental measures is in place. 4. Contracts for collaboration. Shared investment and shared responsibility for the implementation of environmental measures. 5. If all parties want to progress with environmental measures, then there is an opportunity to establish transparent collaborativ4 platforms.

Designing the implementation & involvement plans

At the moment, the way in which the main measures - constructed wetlands, wetlands and rewetting organic soils - can be implemented in Denmark is clear. However, the different environmental measures have very different implementation processes. A constructed wetland is very simple to carry out together with a few landowners. However, wetlands, rewetting organic soils, maindering of streams and land consolidation in collaboration with several landowners can be highly complex.

As regards the implementation of environmental measures, it is important to obtain commitment on many levels and to ensure that financing itself is in place. In Denmark, sourcing funding for this work will be crucial.

a. Funding for bottom up processes that involve landowners from the beginning is often difficult. . Collective start-up meetings are currently used for SEGES projects.

b. Long-term and consistent funding of local and independent facilitators is important as this ensures they can work on long-term objectives and also maintain the momentum required to sustain local environmental objectives. Advisers who can deliver locally involved bottom-up implementation processes are critical.

c. Implementation of environmental projects such as constructed wetlands, wetlands, the rewetting of organic soils and land consolidation require skilled advisers at all levels. It is becoming increasingly complex to achieve environmental objectives in Denmark and the coming decades will require greater collaboration across all levels.

Bottom-up implementation & involvement plan.	
Political anchoring	Local Farmers Union Local politicians at municipality level
Technical landscape assessments Is it possible to implement the different measures in the landscape?	The advisory service Catchment officers/catchment teams Local municipality The Nature Agency Spatial planners Hydrologists Etc.
Landowner meetings/ collective start-up meetings Are landowners really interested in the different environmental initiatives?	Landowners Landowner representatives Agricultural advisory service Catchment officers
Public meetings between all parties What is the view of the local population on the various environmental initiatives?	Landowners Locals The advisory service Catchment officers Municipality Nature Agency NGO
Implementation	All

Going local for more efficient water management in Denmark

Project Waterdrive and many other Danish environmental and climate projects show that landowners must be involved at an early stage if the projects are to succeed. In Denmark, all aquatic environment initiatives are established on a voluntary basis on land belonging to individual landowners. Therefore, a public forum needs to be established at an early stage so that landowners can be involved and offer input before the project is too advanced to change. Our experience is that this encourages voluntary participation.

For this reason, it is crucial that sufficient funds are allocated to project stakeholders on an ongoing basis. In Denmark, these are often municipalities and nature agencies, independent advisers, facilitators, catchment officers or catchment teams with knowledge of agriculture and the local area.

Independent advisers can foster collaboration from the outset by ensuring close interaction between project stakeholders, government institutions, agricultural associations, the agricultural advisory service, and local actors. Due to their independence, advisers can help to achieve a balance between the different interests of all stakeholders. Solutions acceptable to all parties often emerge through communication.

Volunteering is a cornerstone of aquatic environment projects and it is important that landowners are involved, heard and gain ownership. Indeed, ownership is a key element at all stages and among all other actors involved in the process – whether these are government actors, those who are politically elected within the municipal and agricultural spheres, technical staff in municipalities and in agriculture or other stakeholders able to influence the implementation.

Implementation

There may be particular challenges in ensuring collaboration between stakeholders at the regional and local level. There is often no shared view and little understanding of each other's situation. Past experience has shown that stakeholders at regional level, in particular, are primarily focused on their own agenda and organisation and that they lack incentives to find common solutions. Moreover, geographical differences hinder knowledge-sharing, leading to siloed approaches. There is a need, therefore, to strengthen planning collaboration between regional and local levels.

Future collaboration

Solutions can be found by promoting greater coordination between regions and localities when siting aquatic environment initiatives. A starting point could be the water catchment level. Consideration should be given as to whether regional and local expert groups could be merged to make the best possible use of the expertise available. Each team would receive input from the national level, ensuring that work at both the regional and local levels would be based on common professional standards.

The overall regional plan for collective efforts is advisory in nature. The plan identifies priorities which are then qualified by local knowledge and implemented by local authorities. It is imperative to ensure local ownership of the regional master plan. This can be done in two ways:

- The master plan for aquatic environment measures must be grounded in local knowledge of areas such as water flow paths, topography, nature and soil conditions. It is crucial, therefore, that the setting of priorities is a shared task. Input and knowledge from the municipal level – from stakeholders such as municipal government and agricultural agencies – should be included in the plan.

- The comprehensive plan for aquatic environment measures should also be seen as feasible by local actors. It is therefore important that decision-makers at both the municipal and the agricultural levels have ownership of the plan, which can be achieved through ongoing dialogue throughout the preparatory phase.

Contact-forum with knowledge facilitation

- Collaborative capacity could be strengthened in the form of a regional secretariat for water catchment coordination. Such an entity would provide a single-entry point for project leaders seeking knowledge regarding region-wide implementation of environmental initiatives.

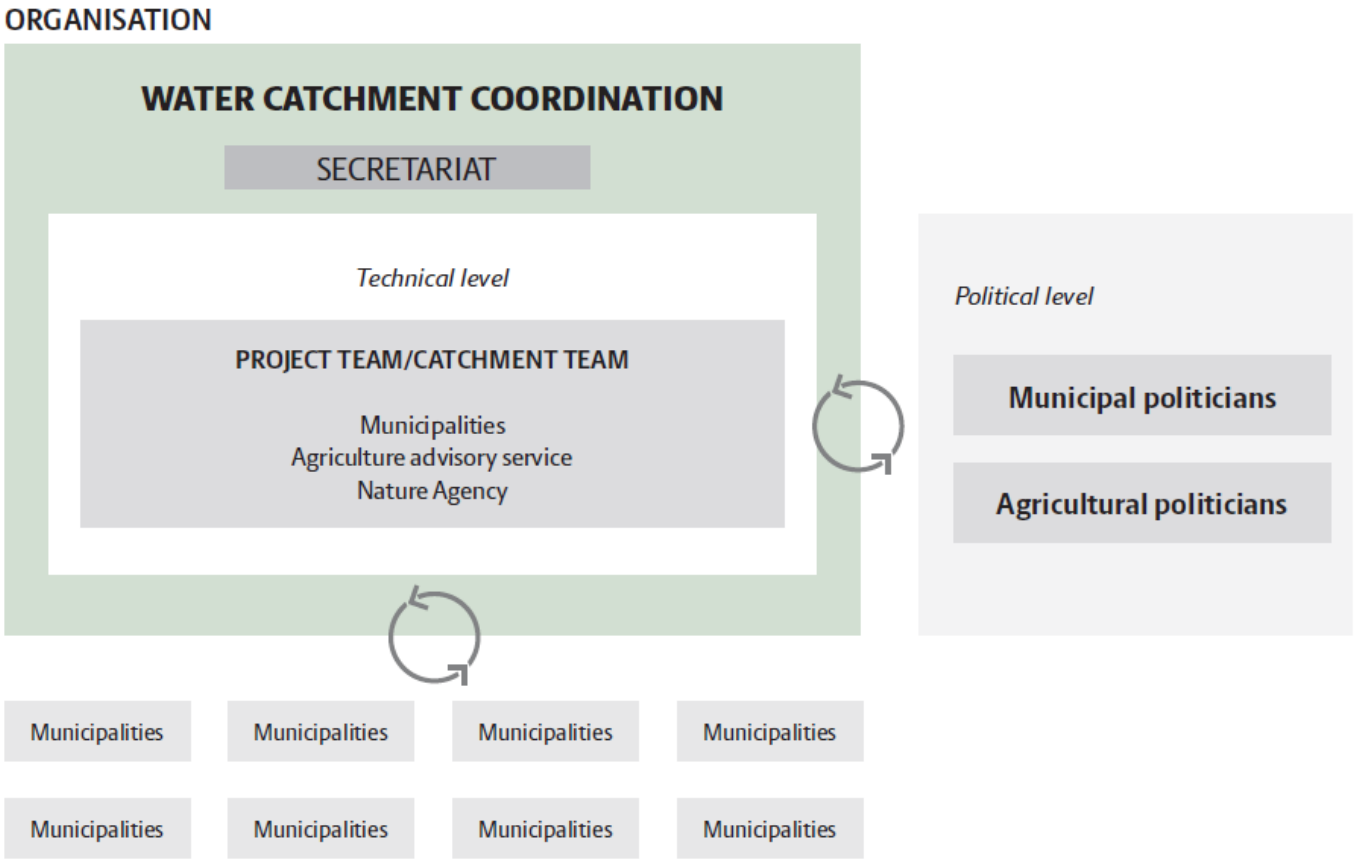


Figure. Water catchment coordination. By Flemming Gertz

- Initially, planning collaboration could be organised for the main catchments, but they could perhaps be amalgamated and adapted to optimise resources. In order to ensure ownership, collaboration should consist of professionally trained individuals from municipalities, the agricultural sector and the Danish Nature Agency.
- Local knowledge at municipal level (or lower) should be brought into play through a partnership between the project team and actors with local knowledge. These will typically be municipal project owners or catchment consultants/agricultural advisers with local knowledge.
- Collaboration should comprise a project team, which is regularly updated on knowledge and tools and which draws up the master plan, as well as a secretariat to coordinate collaboration with the actors.
- The political level is not part of water catchment coordination. Thus, there is no decision-making element in this respect. The process guides implementation work and builds on the collective input of stakeholders and an advisory masterplan. The political level will be kept regularly updated to increase ownership at this level, too.

The text is based on "Proposal for optimised cooperation in the implementation of collective environmental measures" Flemming Gertz, SEGES and has undergone slight revision. This has been done in collaboration with Anne Sloth Velas, Catchment Officer at the Danish Agricultural Advisory Service Funen, Project Manager Thorben Enghart Jørgensen Odense municipality Funen, Project Manager Jannik Seslef, Assens municipality Funen , Flemming Gertz, SEGES and Frank Bondgaard, SEGES

Stakeholder analysis

The stakeholder analysis is based on the "Stakeholder mapping report" in the Horizon 2020 project EFFECT undertaken by specialist Mads Lægdsgaard Madsen, SEGES, in the Waterdrive case area

In 2020, the private advisory service companies, Centrovise and LMO, were merged to form the advisory company, Velas. Velas has many farmers as customers in the Waterdrive case catchment area of Odense fjord.

Subjects	**Key players**
Local residents	Farmers
Universities	Catchment officers
Farmers Unions	
Political secretary of Farmers Union	
Crowd	**Context setters**
Velas (LMO)	The Danish Environmental Protection Agency
Danish Society for Nature Conservation	The Danish Agency for Agriculture
DOF Birdlife	The Danish Nature Agency
	Agricultural advisers in Velas (DLBR)
	Municipality, Head of department
	EU

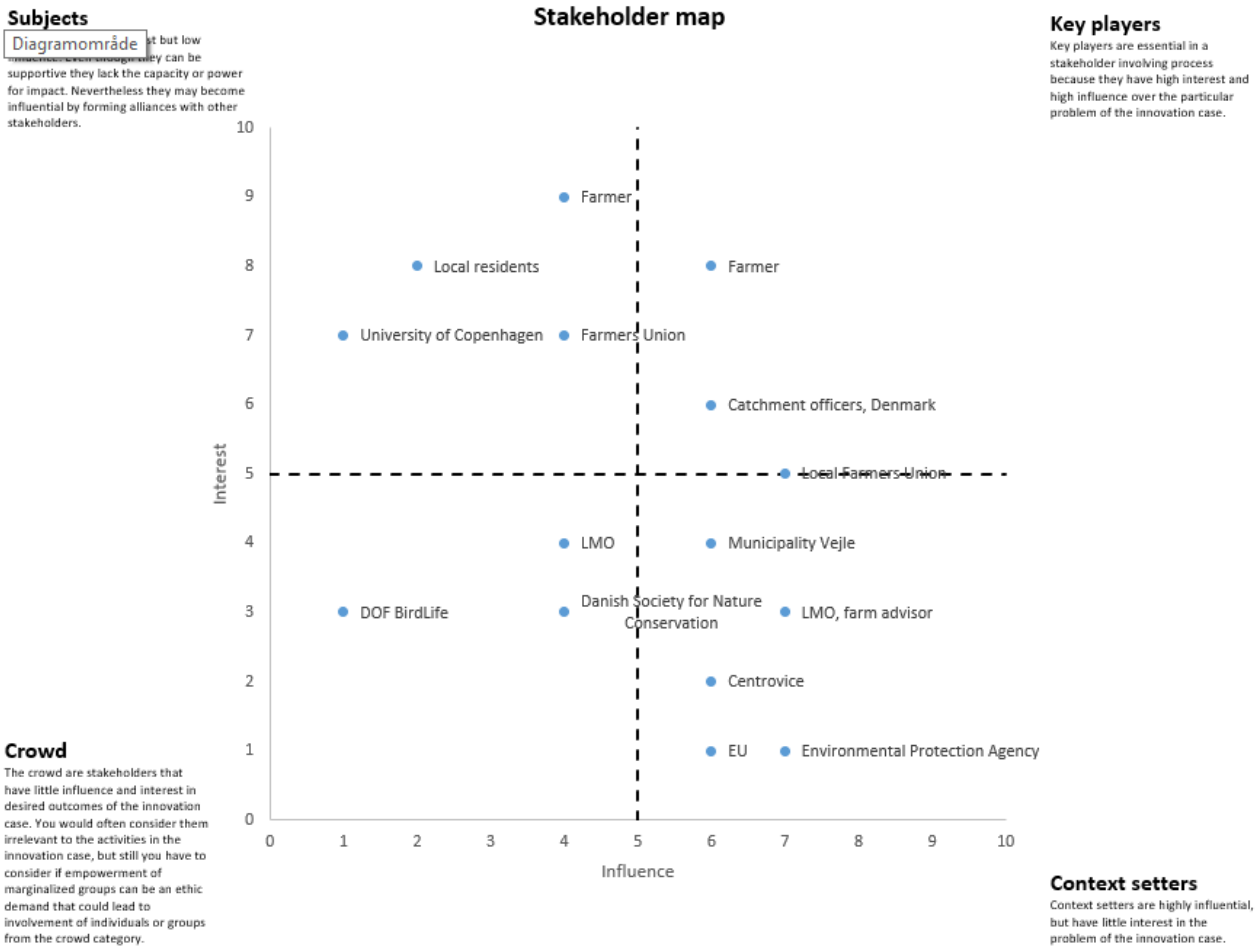


Figure. The stakeholder map from the local advisory service company Velas' case study.

Key players are essential in the process involving stakeholders because their level of interest is high, and they are influential in matters of innovation.

The crowd/NGO/the advisoryservice are stakeholders that have little influence or interest in the desired outcomes of the innovation case. They could be considered as irrelevant to the innovation case's activities. However, the empowerment of marginalised groups could be an ethical requirement that could lead to the involvement of individuals or groups from the Crowd category

Context setters are highly influtial but can have little interest in the probem of the innovation case.

Subjects have high interest but low influence. Even though they can be supportive but can lack the capacity or power for impact. Nevertheless they may become influential by forming alliances with other stakeholders.

Visualising the impact by 2030

Catchment officers - new local services

In 2021, catchment officers are only involved in the implementation of constructed wetlands in Denmark. By 2030, catchment officers, in collaboration with landowners, farmers, local municipalities and the Nature Agency, will be involved with the full range of environmental and climate initiatives on a more holistic basis. It is likely that catchment officers and catchment teams will be supported by local political facilitators.

Enhancing local water spatial planning

There has been a shift towards more locally-based water management plans. Environmental efforts will be based on local water management plans which, in turn, will be based much more on the landscape of the different catchment areas (lakes, fjords and the sea). In a collaboration between all local stakeholders, local plans will be drawn up for where it is most appropriate to locate environnmental and climate initiatives. Implementation and investment plans will be supported by agri-environmental schemes based on the market economy. Landowners and farmers will be seen much more as real business partners. The views and feedback of landowners will be taken seriously to drive momentum throughout the entire implementation process.

Strengthening the advisory services vis-à-vis multi-actor collaboration

By 2030, strong local collaboration will have been established between local catchment officers, catchment teams, the agricultural advisory service, the Nature Agency and the municipalities. The Danish Environmental Protection Agency and the Danish Agency for Agriculture will follow up and support local initiatives closely with very flexible agri-environmental schemes. The schemes will take more account of the very different types of landscapes and local challenges. There will be no one-size-fits-all solution.

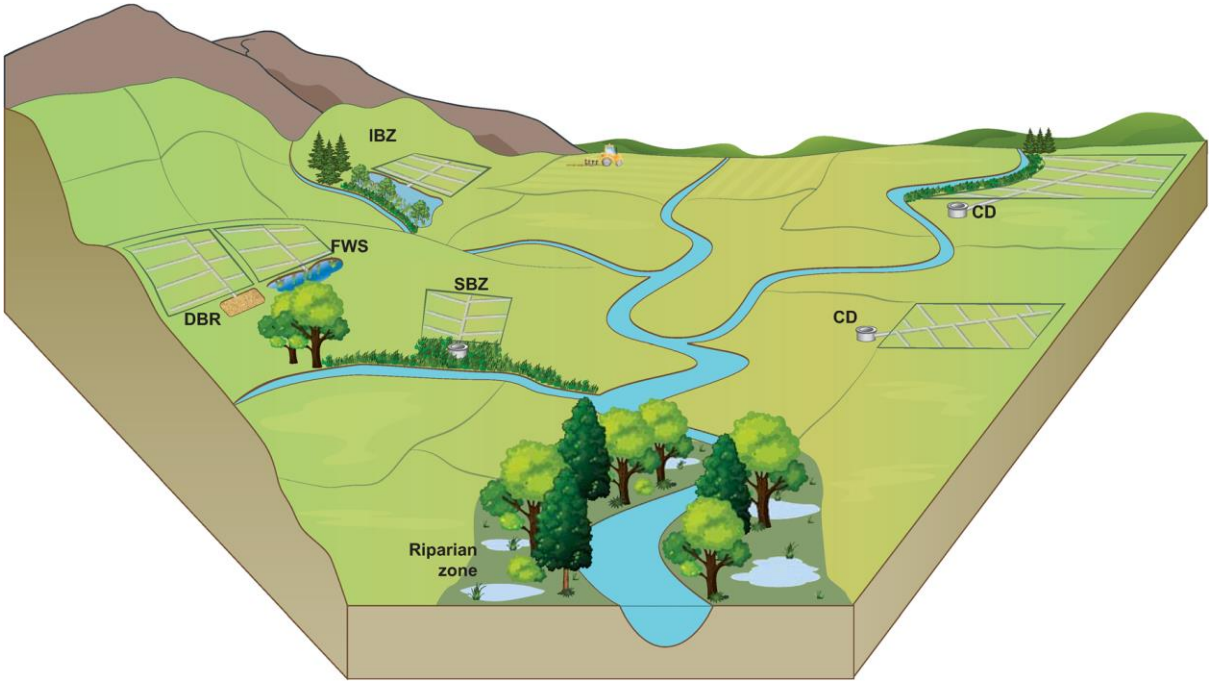
Long-term financing will have been secured for advisers, catchment officers and local political facilitators who will work with local initiatives.

The agricultural landscape in 2030

By 2030 a major change in the agricultural landscape will have occurred. Landowners will have constructed wetlands, constructed wetlands with woodchips, buffer zones with grass, integrated buffer zones and saturated buffer zones on the borders of their fields.

A major land reform, which is based on the local involvement of all stakeholders, will have been initiated to prevent the loss of nutrients into the aquatic environment, greenhouse gas emissions, protect the groundwater and increase biodiversity. Much agricultural land will have been taken out of production in the river valleys and set aside for nature and biodiversity. Streams in wetland projects will have been brought back to their original locations in the landscape and organic soils will be rewetted in many places. Multifunctional land consolidation will become much easier to facilitate after the reform.

The natural retention of water in the landscape will have been recreated in many places.



Nutrient reduction efforts in Denmark since 1985. Modified after Carstensen et al., 2020. Conceptual diagram of potential locations of free water surface constructed wetlands (FWS), denitrifying bioreactors (DBR), controlled drainage (CD) and saturated (SBZ) and integrated buffer zones (IBZ) on mineral soils in a small catchment

Figure from: Efficiency of mitigation measures targeting nutrient losses from agricultural drainage systems: A review. Environmental Effects of a green Bio-Economy. Mette Vodder Carstensen, Fatemeh Hashemi, Christian Hoffmann, Dominizak, Joachim Audet, Brian Kronvang

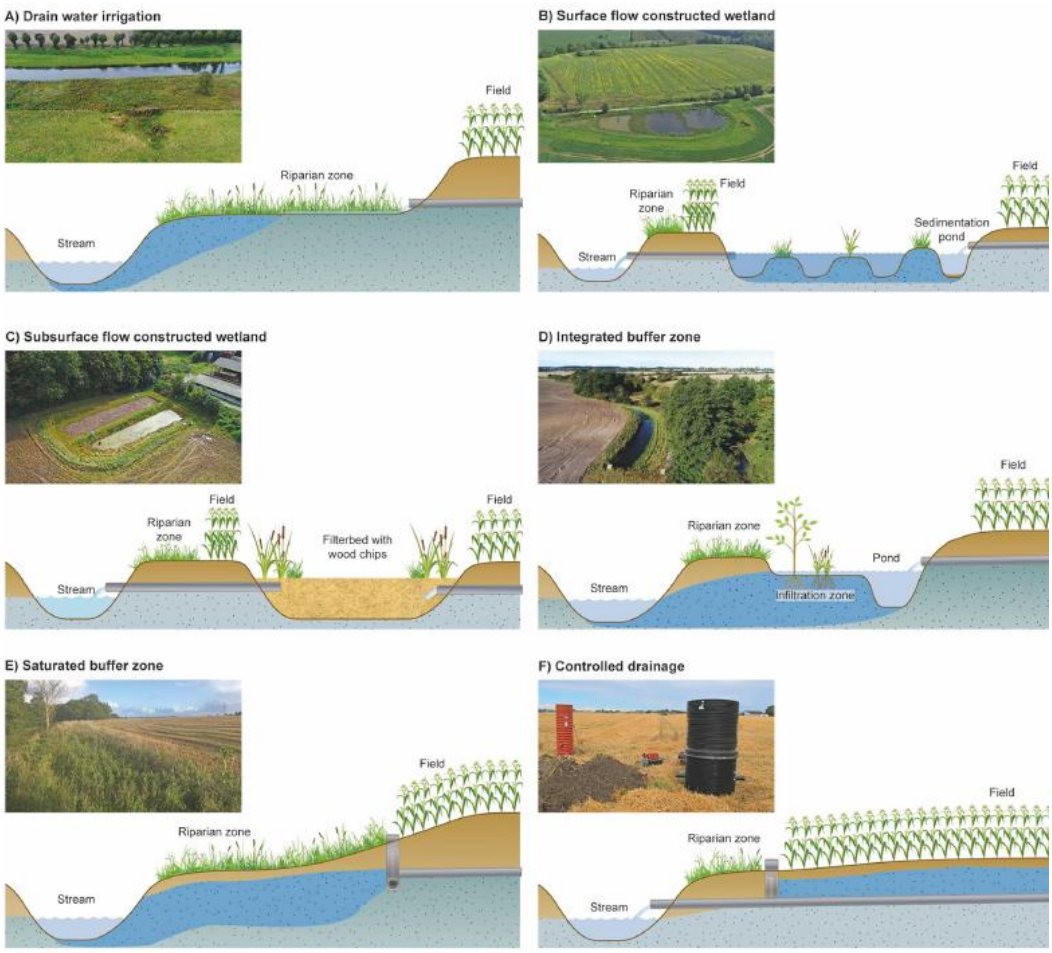


Fig. 3. Nutrient transport mitigation measures used in Denmark. Modified after Carstensen et al., 2020.

Conceptual scheme of the five drainage mitigation measures (end of tile measures). Figure from: An overviev of nutrient transport mitigation measures for the improvement of water quality in Denmark. Ecological engineering Mette Vodder Carstensen, Christian Hoffmann, Dominizak, Joachim Audet, Charlotte Kjaergaard

Appendix

Nr. 353: Vandløb2018 NOVANA (Watercourse 2018 NOVANA)
https://dce2.au.dk/pub/SR353.pdf

Work in case area and focus group meetings in Waterdrive www.waterdrive.dk

https://www.kl.dk/forsidenyheder/2021/maj/dn-kl-og-lf-med-faelles-plan-for-udtagning-af-landbrugsjord/

Stakeholder mapping report. EFFECT, Horizon 2020. Specialist Mads Lægdsgaard Madsen, SEGES. EFFECT project https://project-effect.eu/

Proposal for optimised cooperation in implementation of collective environmental measures:

https://sp.landbrugsinfo.dk/Afrapportering/innovation/2020/Sider/pm_20_7855_Rapport_SAMARBEJDE_OM_DE_KOLLEKTIVE_KVAELSTOFVIRKEMIDLER.pdf?download=true