

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

NEW SERVICES FOR WATER MANAGEMENT IN AGRICULTURAL LANDSCAPES

- a catalogue of ideas and experiences

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Sweden	Swedish University of Agricultural Sciences
	South Baltic Water District Authority/Kalmar County Administrative Board
	Swedish Board of Agriculture
Lithuania	Västervik Municipality
	Baltic Environmental Forum Lithuania
Finland	Natural Resources Institute Finland
	Finnish Environment Institute
	ProAgria Southern Finland
	Finnish Field Drainage Association
Estonia	Stockholm Environment Institute Tallinn Centre
Latvia	Jelgava Local Municipality
	Latvia University of Life Sciences and Technologies
	Union Farmers' Parliament
Poland	Agricultural Advisory Service in Brwinow
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INTRODUCTION

This catalogue of new services has been developed by partners in the Waterdrive project funded by the EU Interreg Baltic Sea Regional Programme. The intention is to introduce and discuss new services for strengthening water management in agricultural landscapes of the Baltic Sea Region.

We hope that the catalogue will inspire readers to take further action in this area. It is mainly focused at improving management on catchment level through the services of local facilitators, catchment officers, water advisers or catchment teams. The catalogue starts by introducing some prerequisites for successful implementation and continues with examples of water advisers in Poland, catchment officers in Finland, Sweden and Denmark.

Finally, the catalogue presents a vision for a governance structure and a framework for the implementation of local water management plans in Denmark.



EXPERIENCES FROM WATERDRIVE CASE AREAS



Small wetland discussion in Sweden.

EXPERIENCES FROM WATERDRIVE CASE AREAS

The catalogue's main conclusions are based on the work carried out from 2019-2021 in selected case areas where the implementation of environmental measures is ongoing or will soon take place. See the work done in the Waterdrive case areas under waterdrive.dk and case areas.

The case areas:

- Kutno County, Poland
- Zuvintas Reserve and agriculture case area, Lithuania

- Gurjevsk, Kaliningrad, Russia
- Jelgava, Latvia
- Põltsamaa, Estonia
- Ljuga River, Leningrad, Russia
- Southern Finland drainage, Finland
- Result-based payments scheme, Sweden
- Västervik, Sweden
- Odense, Denmark

Waterdrive thanks all the landowners in these areas for their willingness to address the environmental and climate challenges in collaboration with local stakeholders.

CONCLUSIONS AND RECOMMENDATIONS

The main conclusion is that new services has to have developed to solve the challenging and multiple issues concerning future water management in the agricultural landscapes of the Baltic Sea Region. The present services, incl. agricultural advisory services, are limited in their single sector and individual farm approach. The Waterdrive findings indicate that a more holistic view both in terms of geography (catchment) and in terms of substance (water management) will achieve more for ecosystems and communities affected by poor water quality, flooding and drought. However, the findings cannot

answer to questions how the new services, as catchment officers are best organized and financed but merely provide examples. It will be the country's internal structures that decide this in collaboration with local stakeholders. There is no single fit for all countries around the Baltic Sea Region. Nevertheless, the basic prerequisites for local collaboration, learning and implementation are similar. This involves working across sectors and expertise and finding a balance between substance, procedures and relationships.

Planning a two-step ditch in Sweden.



RECOMMENDATIONS

1. Governments, regional- and local authorities are strongly encouraged to pilot, test and expand the use of water management expertise and facilitation on catchment level. The pilots and tests shall ensure that landowners are getting involved in the solutions and only implement scientifically proven environmental initiative.
2. It is recommended that universities and higher education institutions include holistic water management in their curriculum. Learning and understanding the combined management challenges of substance, procedures and relationships is important. Such skills will increasingly be in demand in future.
3. Government agencies should create agricultural schemes that work in practice. Environmental measures should be implemented by legislation, announcements, funding systems and guidelines for municipalities and the agricultural advisory services. Agricultural schemes should be transparent and be based on market economy.
4. It is recommended that agricultural advisory functions strengthen their agricultural support through water management expertise and thus expand their offer to customers. With such win-win solutions, financial support for agriculture, water, climate adaption, nature and local communities will undoubtedly increase, especially in the southern parts of the Baltic Sea region affected by drought and flooding. However, farmers need qualified support in this process.
5. It would be worthwhile to expand the adviser's skills with a view to a more holistic approach to water management as a relevant reference point in the provision of agricultural advisory services for farmers/landowners.
6. Waterdrive recommends the creation of local catchment teams with different skills. Such teams would be able to address specific local challenges by deploying their expertise in ecology, water engineering, legislation and the local design of measures. They would also support local farmers and landowners at farm level by conducting swot analyses and drawing up plans for local measures and implementing them. Funding for this is often difficult in the Baltic Sea region. Multi-actor and cross-sector collaboration incurs cost and this is often is forgotten.
7. There is always a need in local catchments for systematic and long-term data collection, regular analysis and interpretation. Analysis data should be available for all stakeholders who collaborate on local challenges.
8. Implementation of environmental measures requires training agricultural advisers, local facilitators, catchment officers and catchment teams as well as close dialogue with local landowners and farmers.
9. Implementation requires building capacity throughout the entire chain. Be prepared to remove any obstacles that will emerge when new environmental initiatives are about to be implemented.

NEW SERVICES - THE NEED FOR A CHANGE

In many areas of the Baltic Sea region, agriculture and society are challenged due to the loss of biodiversity, drought, flooding and the leaching of nutrients into lakes, fjords and the sea. Alongside all these challenges agriculture has to compete in national and international markets. Consequently, there is often a strong wish on the part of agriculture to optimise cultivation on the best agricultural land and to locate environmental initiatives at the edge of the land under cultivation or right outside it.

In recent years, many new solutions have emerged that can be located at the edge of the cultivation area without significantly reducing agricultural production. There are also areas of previous importance to agricultural production that can be picked out and used for other purposes, e.g. to increase retention or biodiversity in the landscape. Re-establishing natural hydrology in the landscape can help to remove many nutrients and greenhouse gases.

New methods for tackling environmental and climate challenges often require new legislation, new environmental and agricultural schemes, land re-structuring and other ways of working. It is important to train advisory officers for such work, build capacity and find the financial means to ensure smooth and collaborative implementation in close co-operation with landowners.

The new service catalogue offers various examples of what new services are needed to ensure the implementation of environmental and climate initiatives in practice. Many challenges can often be solved in close collaboration with all local stakeholders. To a large extent, the starting point derives from the challenges from the Waterdrive demonstration areas and the experiences from many other environmental projects in the Baltic Sea region.

Waterdrive has focused on the entire chain that is needed to ensure real implementation of environmental measures in the Baltic Sea region. It is important to work with all parts of the chain at the same time and continuously improve and adjust it. Legislation, scientifically approved environmental measures, incentive structures, funding systems and the training of advisers are all tasks that need to be addressed on an ongoing basis if progress is to be maintained.

Landowners should be involved in a positive and constructive way through advisers they trust. The catalogue focuses on catchment officers, water advisers and catchment teams that have adopted an independent holistic agri-environmental water management approach alongside landowners.



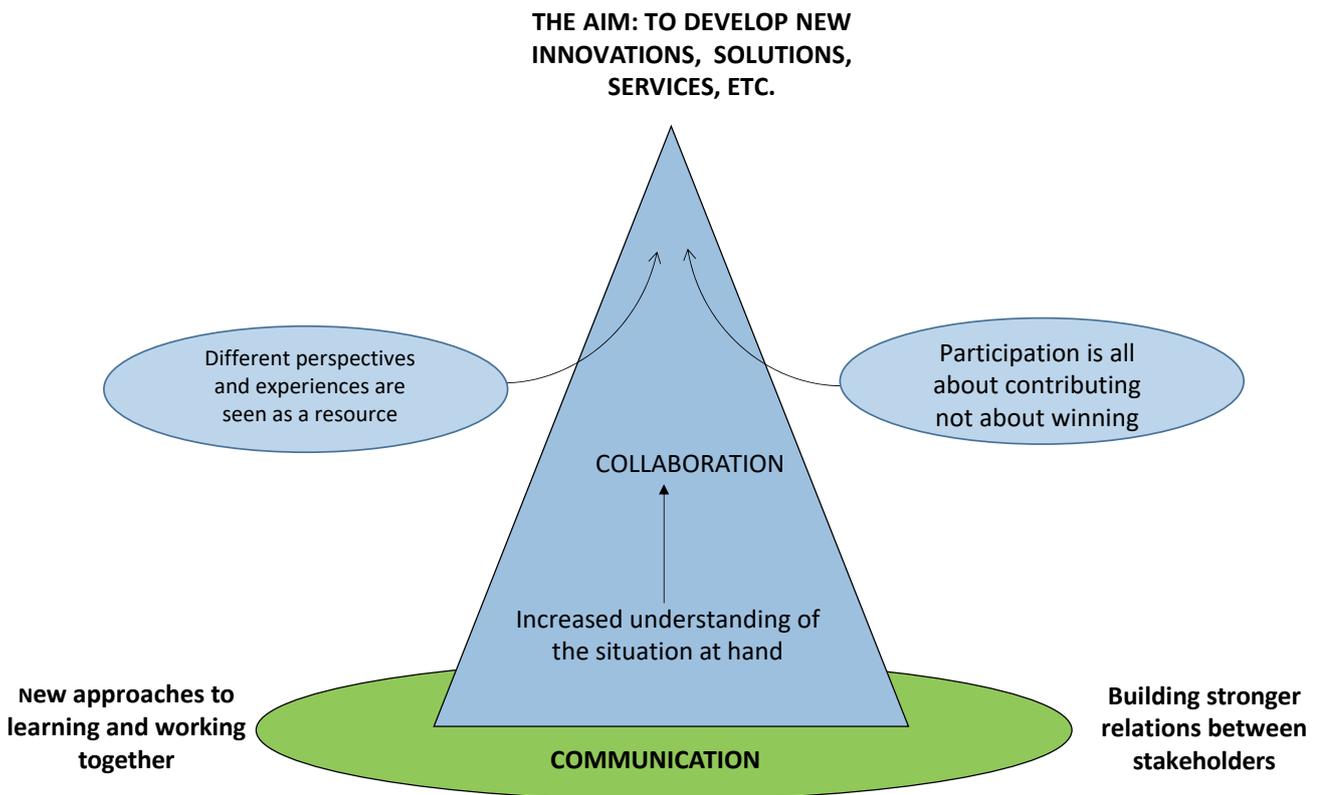
MANAGING MULTI-ACTOR COLLABORATION - THE MAIN SUCCESS FACTORS FOR NEW SERVICES

Waterdrive and WaterCog have identified some basic prerequisites for successful local work with landowners, authorities and others. More information about the "progress triangle" and "the water snake" can be found below.

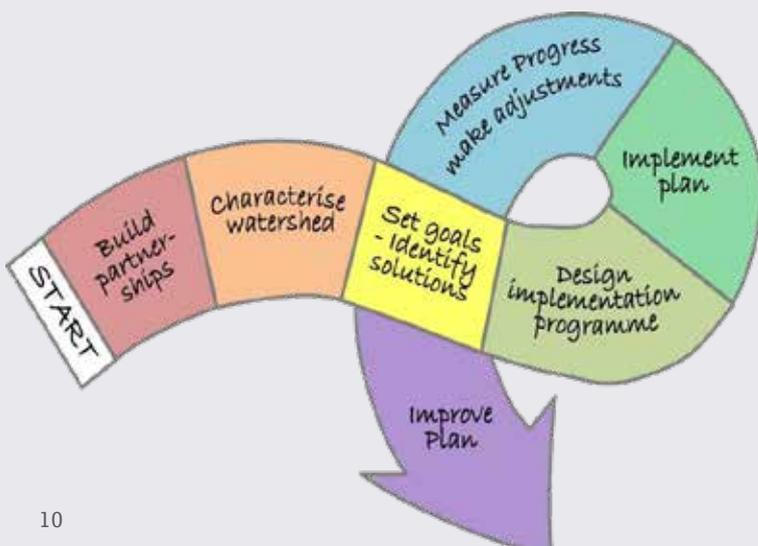
"How relationships, procedures and substance are managed will determine how successful you will be."
Staffan Lund. Sveriges Landbrugsuniversitet SLU

Read more at www.waterdrive.dk under Leadership

THE PROGRESS TRIANGLE



The progress triangle or multi-stakeholder partnerships illustrates the importance of new ways of working together and developing our relations to reach common goals.



THE WATER SNAKE

Figure from WaterCoG. Interreg North Sea Region.

BUILDING PARTNERSHIPS

Complex challenges are best solved together, which is why it is important to establish local partnerships that can take an active position on the efforts to be implemented and also ensure that all parties feel involved and heard. A partnership that is always ready to change the existing conditions if decisions prove not to work. Multi-actor co-operation is the best way to ensure sustainable and long-lasting solutions.

CHARACTERISING WATERSHED

Clear and transparent objectives are important for all parties when working with loss of diversity, drought, flooding and the leaching of nutrients into lakes, fjords and the sea. It is important that the government sets goals, both national and local. This is the first step towards articulating any challenges and beginning discussions as to how they can be solved.

It is important that local spatial planning, the characterisation of catchments of waterbodies and their recipients, the monitoring of nutrients and biodiversity, the risk of flooding and drought are all professionally monitored. Monitoring programmes are the first step towards determining the current status and for deciding the direction of further work. Without precise goals, it is difficult to move forward.

SET GOALS – IDENTIFY SOLUTIONS AND DESIGN OF IMPLEMENTATION PROGRAMMES

With the goals set, the work to find solutions can commence. It is very important that there is research-based evidence for the chosen environmental solutions as landowners need to be sure of getting recognition for the environmental and climate efforts that are necessary. Ideally, the implementation programme should be drawn up in close collaboration with the many actors in the area. This should be done to ensure that the incentive structures are in place for all stakeholders. The incentive structures can be many and varied, with financial incentives weighing heavily. The question: What's in it for me? is often raised.

DESIGN IMPLEMENTATION PROGRAMME

Designing a good plan can take a considerable time. Capacity has to be built up on many fronts and legislation, government executive orders and local approvals must all work in tandem. Support and compensation schemes must be established that landowners can see themselves getting actively involved in. It is important that advisers are trained for the task and that good guidelines and tools for

calculating environmental and climate effects are established. Construction requirements may have to be prepared to implement the environmental measures. Responsibility for drawing up these plans will often lie with public authorities.

PLAN IMPLEMENTATION

It is important to anchor environmental work locally at local government level and within the framework of the farmers' union. Early involvement of landowners is imperative as they are the ones who will largely decide whether the plans can actually be implemented on their land. The start-up work can be carried out by catchment officers or local facilitators tasked with hearing landowners' views. Funding these should be considered very early in the process.

If landowners are positively disposed, technical cross-disciplinary partnerships between the local municipality, spatial planners, hydrologists, catchment officers, the Nature Agency and other local stakeholders etc. can commence.

This collaboration can help to determine how – and which – environmental measures can be implemented in the landscape. It is important that implementation plans and measures are flexible and can be adjusted to the landscapes where the work is to be undertaken. As landscapes very often differ, there will always be unforeseen challenges that cannot be anticipated from a desk.

MEASURING PROGRESS & MAKING ADJUSTMENTS

Government implementation programmes and research-based monitoring programmes must be continually adjusted to achieve the goals. As not all implementation programmes necessarily go as planned, ongoing government and research-based pro-active participation and involvement are important. Unforeseen challenges will often crop up. It is therefore important to meet with local stakeholders on a regular basis to drive progress, as continuous collaboration and focus always promote a common understanding of the challenges.

IMPROVEMENT

It is important to be appreciative of the efforts of all stakeholders. At the same time, the implementation programmes should always be adjusted and improved as experience is accumulated over the years. Success will often depend on how good stakeholders are – at all levels – at changing direction so that everyone involved in the programmes is actually in a position to implement them.

CATCHMENT OFFICER TEAMS AND HOLISTIC WATER MANAGEMENT IN FINLAND

THE CHALLENGES

In Finland, the cost of renovating the basic/arterial drainage channels has proved to be considerable. Moreover, due to changes in the agricultural context, the implementation of measures has become more challenging and complex.

One significant factor/cause of the nutrient load from agricultural areas is the poor condition of the agricultural soil. The main reasons for this are monoculture as well as insufficient drainage capacity and the drainage depth of the drainage channels. This has resulted in waterlogged fields and problems with flooding which in turn has led to wetter, less ideal moisture conditions in terms of both plant growth and soil bearing capacity. Additionally, monoculturally farmed fields with less than optimal water management tends to be compacted, which also worsens the infiltration and water storage capacity. The underlying reason for the whole situation is the repair costs of the drainage infrastructure combined with soil subsidence, the increased flow-rate of runoff as well as the changed hydrological conditions due to climate change. The basic drainage needs to ensure the proper functioning of the field/tile drainage, which in turn is a basic requirement for maintaining a good soil structure and good growing conditions. Improving the drainage alone will not necessarily improve soil structure and growing conditions. Rather, what is often required is a more comprehensive plan for improving soil conditions. Once the basic requirements for sustainable farming have been met, environmental measures can be planned and implemented in a cost-effective manner.

TARGETED HOLISTIC CATCHMENT AREA RENOVATIONS AS A SOLUTION

Water management should be planned more holistically than currently. Aspects such as land use, agricultural production and the environment should be taken into account. Water management on a larger

“In collaboration with the authorities and water management planners, landowners who benefit from drainage (so-called drainage corporate bodies) should assume responsibility for maintaining the condition of basic drainage channels. Water management should also be an integrated part of farm-specific advice.”

scale should always be in the hands of the authorities. Regional supervisory authorities (ELY-centres in Finland) should have an overall understanding of the hydrological characteristics, ecological state of the water bodies as well as the different forms of land use on a regional scale. The needs of agricultural production (as well as other forms of land use linked to the use or protection of water), the need to reduce the nutrient load, as well as other necessary information (endangered species, state of fish and crayfish stocks, location of acid sulphate soils and peatlands) should always be available to the authorities. The authorities should be responsible for drawing up general water management plans according to the requirements of the region. These should include relevant information about the need for basic drainage channel restorations, water protection measures, waterway restorations, etc. The regional authority (ELY-centre) could be the facilitator of a regional water management network, which would include stakeholders relevant to the characteristics of that region.

Holistic agri-environmental water management contains field drainage and basic drainage as well as comprehensive runoff management where aspects such as biodiversity and fishery are taken into account. Holistic water management aims to remove flooding and waterlogging problems on agricultural land on agricultural lands as well as improve the growing conditions and the soil structure, and in this way decrease the nutrient and sediment load. A holistic approach seeks to improve conditions for agricultural production in a coordinated manner while ensuring water and environmental protection at the same time.

Systematic, phased implementation on a catchment-scale is more likely to secure better results in terms of sufficient drainage on agricultural land as well as decreased nutrient load. In order to reduce the cost of renovation, a more systematic approach should be adopted in preference to the current unsystematic and random operating model/activities.

Different governance levels of water management in agriculture and forestry in Finland. From the top:

1. National level
2. Regional level (ELY Centres or Metsähallitus' regional administration)
3. Catchment area level
4. Parcel and drainage project level. Water management planning should be intensified at levels 2 and 3 marked with a red dotted line.

FINLAND

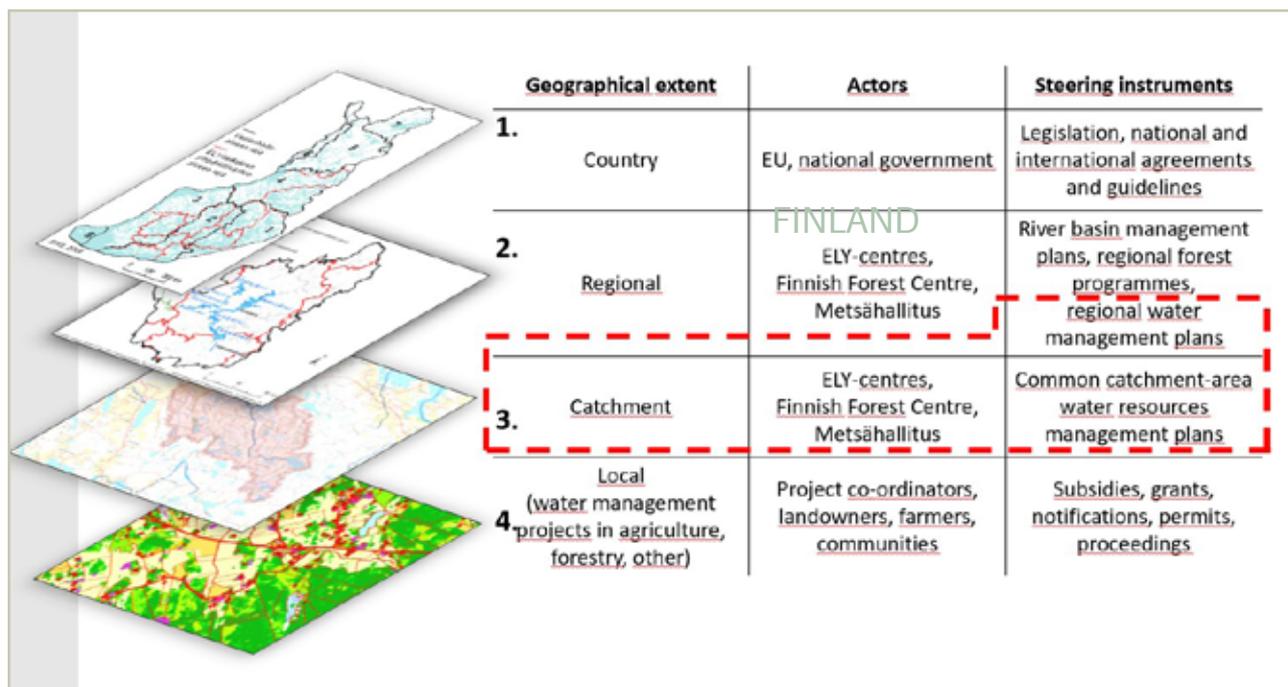


Diagram from *Water management guidelines for agriculture and forestry*, Ministry of Agriculture and Forestry, Helsinki 2020. Pub.2020:12.

THE STRUCTURE FOR IMPLEMENTING THE SOLUTION

The authorities' role should be to steer activities in a geographically comprehensive way and to set the framework (i.e. through general regional water management plans) in order to identify and justify the measures to be implemented. The authorities should produce and distribute the information required for planning.

In large-scale, holistic water management planning and implementation, the role of each stakeholder needs to be clearly defined and understood. The planning and implementation of water management has largely been transferred to the private sector - consultants and advisory services. Judicial review is still undertaken by the government bodies. There is a need for a clear chain of operation, from the catchment area to the waterbody, that would include drainage corporate bodies, authorities, fishery regions, (participants) associations, foundations, planners, contractors, researchers, advisers, farmers and landowners. The responsibility of implementing measures cannot rest solely on individual stakeholders. More comprehensive collaboration is needed. Every institution/organ should have a clear strategy that would steer their activities towards better wa-

ter management, which subsequently would lead to a good ecological status of water bodies in accordance to the Water Framework Directive.

Restoration/renovation measures should be implemented holistically on a catchment scale in order to decrease the external nutrient load and to enable efficient cultivation. Planned measures should be listed and prioritised in order to implement the most acute measures first and thereby target the most critical sources of nutrient loading. This would require the state of the channel and waterbody networks to be comprehensively mapped, first through analyzing existing datasets (orthophotos, digital elevation models, soil data), and then more accurate surveying of specific sites prior to the implementation of measures. The aim would be a comprehensive dataset describing agricultural areas suffering from poor drainage, waterlogging and recurrent flooding.

Denmark and Sweden have some experience of regional coordinators (catchment officers). The task of the coordinators would be to point out/suggest/propose options (technical, procedural, financial) to the stakeholders, and to implement measures in accordance with the authority's guidelines.

CATCHMENT OFFICER TEAMS

Information about holistic water management should primarily be targeted at farmers, landowners and drainage corporate bodies in the risk areas. Activities should inspire the confidence of local actors. Advisory services (holistic approach taking into account the production economy and the environment) should be permanent and activate local actors.

Catchment officers could be a link between governmental and local levels. Practice has shown that trust is different between local actors and authorities and advisory organisation. The activity of Catchment officer cannot be created by one person or organisations. Expert teams from different organisations should be resourced in order to improve holistic advice and catchment area renovationholis-

"The role of catchment officer cannot be assumed by one person or organisation. Teams of experts from different organisations should be deployed in order to improve holistic advice and catchment area renovation."

tic advising and catchment area renovations. "A coordinated approach could work across different sectors.

Most of the funding should be secured from the government and some from the private sector, some can be collected from the private sector like foundations. The aim is to address water quality and production economy issues as well as the requirements of the fisheries sector and biodiversity. The capital value of the land and infrastructure maintenance, which draws on the know-how of various stakeholders, are also important.



A two-stage ditch, with both flood plain on both sides.



A two-stage ditch, with one sided flood plain.

CATCHMENT AREA-BASED HOLISTIC WATER MANAGEMENT PLANNING PROCESS

Steps:

- Risk area surveys. Identify risk areas by spatial analysis, thematic maps, modelling, satellite photos
- Targeting. Choose catchment areas and waterbodies for renovation on a regional basis based on the size of the waterbody do an assessment. Depending on the size of the waterbody, assess whether a collaboration group (catchment officer team), negotiation committee or other collaborative body should be established.
- Activate landowners. In collaboration with the municipalities, advisory organisations and local stakeholders, members of the committee to activate landowners of the most at-risk areas by means of targeted information.
- Field measurements. Planners to carry out field measurements together with landowners surveys regarding drainage requirements and current status as well as studies into the potential for implementing water protection structures and other necessary measures, i.e. fisheries rehabilitation, improvement to recreational values, etc.
- Decisions of local actors. After the necessary surveys and initial studies, the decision-making local actors, such as the drainage corporate body / water protection association, to decide on the implementation of the measures required for rehabilitation.
- Planning and implementation. Draw up the final plans, complete the required assessment for the authorities, acquire licenses, secure financing and procure contractors. Exact site markers to the sites, such as marker poles.
- Maintenance. Draw up a wider regional action plan and maintenance plans to secure the financing and implementation of any further action required, including any future structural maintenance.

A bottom dam, allowing fish migration.



HOLISTIC WATER MANAGEMENT

MONITORING

- Monitoring plan (water quality and ecology, fisheries)
 - Monitoring of ecological status, fisheries, benthos and crayfish
 - Soil drills (groundwater)
 - Valuable landscape areas and biotopes
 - Wells and other water management structures (drinking and wastewater)
 - Bridges and other infrastructure
 - Acid sulphate soils (test holes)
 - Trees, shrubs (shady vegetation)
 - Valuable forest habitats
 - Excavation during the driest time (flow monitoring m³/s)
-

BASIC DRAINAGE

- Ditch maintenance
- Reorganisation of drainage corporate bodies
- Structures for water level control during summer
- Two-stage ditches
- Flood protection (embankments, pumping, flood ledges)

LOCAL DRAINAGE

- Subsurface drainage systems
 - Improved management of surface flow (lime filtration drainage)
 - Drainage flow management, controlled drainage (control wells)
 - Options for sub-surface irrigation (water reservoirs, ponds, pumping of additional water)
 - Service and maintenance of underground drainage (flushing)
 - Field levelling
 - Soil structure improvement (mechanical, substrate additions, amelioration, soil reclamation)
 - Farm level flow control of production premises (storage sites, outdoor paddocks, washing sites, etc.)
-

ENVIRONMENTAL WATER MANAGEMENT AND RUNOFF MANAGEMENT

- Constructed wetlands, sedimentation ponds
 - Bottom thresholds, dams and adjustable dam constructions for controlled adjustment of summertime water level
 - River and lake restorations
 - Habitat restorations (fishery, benthos, crayfish)
-

Main author: Mikko Ortamala KVVY, Water Protection Association of the River Kokemäenjoki, Finland with support from Kaj Granholm, Baltic Sea Action Group, Helena Aijo, Salaojayhdistys & Olle Haggblom, Salaojayhdistys



WATER ADVISERS - A NEW TYPE OF AGRICULTURAL ADVISORY SERVICE IN POLAND

BACKGROUND

The fragmentation of farm holdings is the main characteristic of Polish agriculture and has an impact on the structure of agricultural advisory services. There were 1.4 million farms in Poland in 2018. However, their structure has a significant impact on the way in which the advisory service operates:

- Slightly more than a half of farms in Poland (52.6%) cover not more than 5 ha of agricultural land areas. In those farms there are 12.8% of the agricultural land areas.
- Slightly more than half of all farms in Poland (52.6%) cover no more than 5 ha of the agricultural land area. These farms account for 12.8% of agricultural land.

Any attempt to modify farmers' behaviour in terms of a more rational usage of the limited water resources on their farms requires a targeted effort by the advisory services at farm level. Moreover, the awareness of farming communities of new approaches to water management is rather low as it mainly relates to seasonal droughts.

THE MAIN FEATURES OF AGRICULTURAL ADVISORY SERVICES

The system of public agricultural advisory services is one of the main tools for delivering governmental policies in the area of agriculture and rural development.

The structure of this system is based on:

- 16 Provincial Agricultural Advisory Centres covering the whole area of Poland delivering services directly to farmers,
- Agricultural Advisory Centre in Brwinów. Agricultural Advisory Centre supports the Provincial Agricultural Advisory Centre methodically and didactically,
- A network of advisers providing services within the framework of Chambers of Agriculture,

- Private advisers operating on before commercial basis.

Advisers operating within the public advisory system form the backbone of the entire Polish system. There are over 4,000 people who provide services in the field of agriculture and rural development. The vast majority of public advisers have graduated from agricultural universities.

As regards the agricultural advisory services and support for the implementation of CAP, all public and private advisers have to be certified following appropriate training. Two-thirds of advisers are public, the rest work within the private sphere.

IDENTIFICATION OF THE MAIN CHALLENGES

Agricultural advisers operating within the framework of the CAP and RDP programmes are mainly concerned with:

- Farm profitability,
- Assisting farmers in meeting all requirements imposed by national and EU regulations.

The issues related to water management at farm network level are regarded as an addition to the agricultural advisory process.

THE OBJECTIVE OF THE WATERDRIVE PROJECT

To facilitate a gradual process of modification to the way in which the public agricultural advisory services operate and implement a more holistic approach to water resources management at farm/farm network level.

WATER ADVISERS STEP BY STEP

The steps described were implemented at the case study and coordinated at national level to ensure a co-herent impact of all the activities at all levels.

Step 1

Establishment of a team of experts on water issues operating within the framework of the Agricultural Advisory Centre.

The experts represent:

- Agricultural advisory services,
- Research centres,
- Farmers' organisations.

The role of the team of experts is to provide assistance in the development of a holistic training programme for a new type of agricultural advisory service – water adviser.

Step 2

To test new solutions by applying step-by-step approach in the case study area of Kutno in close collaboration with the Regional Agricultural Advisory Centre in the Łódź region during the implementation of the Waterdrive project.

Step 3

Development of three-session training programme based on a holistic approach to water management at farm network levels – August 2020.

Step 4

Test training programme among a group of more than 40 agricultural advisers across Poland – September/October 2020.

Step 5

In-depth analysis of case area experiences and delivery tests has led to the Agricultural Advisory Centre submitting a formal proposal to the Ministry of Agriculture and Rural Development. The proposal is for a new type of water advisory service to within the existing national system of public advisory service.

Step 6

Reviewing the water adviser training materials by the team of experts on water issues – February-September 2021

Step 7

Delivering some additional training sessions to the new type of agricultural advisers based on the revised training materials.



Over 40 field advisers across Poland are trained as water advisers.

Water advisers in Poland.

THE RESULTS OF THE WATERDRIVE INTERVENTION

The proposal to include a new type of agricultural advisory service into the national system of public advisory services was put forward to the Ministry of Agriculture and Rural Development.

FIGHTING DROUGHT BY SECURING WATER RETENTION IN THE LANDSCAPE

Joint management and renovation of the drainage system to reduce water outflow. The use of good agricultural practices to increase soil water retention. Optimisation of the landscape structure to regulate the water cycle.

TODAY	WATER MANAGERS IN THE FUTURE
Management of drainage systems and channels	Main tasks Protection/establishment of small water bodies Reconstruction of drainage systems in order to ameliorate the soil - controlled drainage system Cultivation of catch crops and soil embedding crops (intercropping)
	Minor tasks Establishment of shelter belts Afforestation of selected, unproductive lands Establishing and protection of ecotone meadows and wetlands

Based on [Kutno County, Poland Selected implementation area: Bedlno commune](#)

CATCHMENT OFFICERS IN SWEDEN

BACKGROUND

Measures against eutrophication with either involuntarily through compliance with Swedish law or voluntarily (see Figure 1). The former covers measures undertaken by e.g. wastewater treatment plants, industries as well as specific measures at farm level, whereas the latter concerns measures taken to abate nutrient runoff from e.g. agricultural land. Voluntary measures are triggered by being funded or partly funded by national funds.

On this basis, there has been a will to increase the number of voluntary measures that are undertaken in Sweden. Therefore, in 2018, the Swedish Agency for Marine and Water Management (SwAM) was instructed by the Swedish government to fund and establish a “support function” for catchment officers in 20 pilot areas in Sweden. The idea was for catchment officers to work as intermediaries between authorities and landowners to increase the number of voluntary measures undertaken. The funding system for measures in Sweden is complicated and Funding voluntary measures in Sweden is complex and extensive and involves subsequent reporting.

In addition to advising on the location and appropriateness of various measures, catchment officers were also tasked with easing the administrative burden of planning and reporting specific measures, c.f. fig. 2.

SwAM, therefore, called on municipalities, counties and other organisations to recruit catchment officers. 20 pilot areas with catchment officers were established, funded by a total grant of approx € 35 MM (37 MM SEK) during the autumn of 2018. The funding covered the work for 2018-2020, but an extra grant of € 1.3 MM (14 MM SEK) for 2021 was also extended. Beyond 2021 funding for catchment officers will not take place through direct funding from SwAM but via other national funds.

Catchment officers are employed by different “home organisations” – some are employed by municipalities, others by County Administration Boards, others by non-governmental organisations such as the Federation of Swedish Farmers, Water Councils, and the Rural Economy and Agricultural Society.

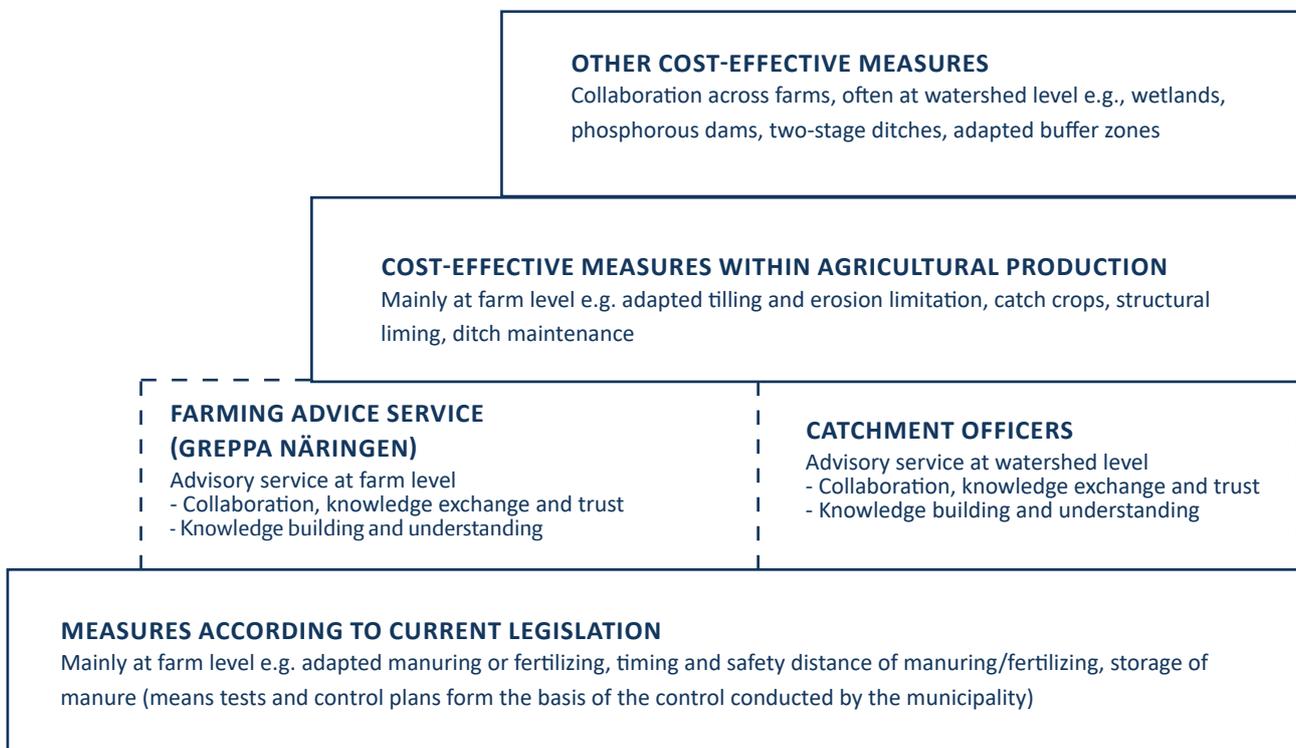


Figure 1. Ladder of implementation of eutrophication measures within agriculture, where the lowest “step” on the ladder corresponds to measures required under to current legislation. Further steps are voluntary and the two top steps are performed with or without financial compensation (translated from Redovisning av regeringsuppdrag, HaV:s Dnr 1177-2018).

EUTROPHICATION MEASURES TODAY

The main tasks of the catchment officers since their establishment has been to increase the measures carried out by landowners, primarily in the agricultural landscape. The steps that the catchment officers are required to follow and navigate are described in Figure 2 and below. Many of the steps are parallel processes:

Start-up: sound precedent is what is required when embarking on eutrophication measures. There are various ways in which local measures can be implemented. It is important that one party takes the initiative and has a clear vision. Financing the measure(s) is important even at this stage. For example, is the funding for the catchment officer included in the application or should the application only include the measure itself?

Knowledge of the catchment area: knowledge of the area needs to be gained at an early stage. This is to identify environmental problems, the causes and the measure(s) required. Identify knowledge gaps. Continuous knowledge acquisition is then required. At this stage, it is important to ascertain the measures that need to be carried out according to legislation and how voluntary measures can complement and contribute. Can voluntary measures be coordinated in time and/or geographically with measures undertaken via the state and municipal controls?

The number of measures needed for a certain water body is presented in the five water district River Basin Management Plans (RBMP) developed by the Swedish Regional Water Authorities. The measures are also presented on the public website VISS (Water Information System Sweden). Note that the measures are suggestions and not legally binding.

- **Organisation and collaboration:** The organisational issue is particularly important at the start. How should the organisation and networks be constructed and who should participate in the different steps of the process? Collaboration between the different actors is then continuous throughout the process.

- **Vision and goal:** Vision and goal: Involving all actors in the pursuit of a common vision and goal is important. How can cost-effective measures be achieved? Can agreement be reached on future collaboration?
- **Follow-up:** Once it is established that knowledge and data are available, follow-up need to be planned and commenced. Follow-up involves monitoring changes in the environment and the effects of the measures. It also relates to other action that needs to be undertaken, such as informing landowners and other actors and keeping track of reporting and the number of measures implemented.
- **Planning of measures:** When planning and prioritising measures, a collaboration process aims to identify and allocate the appropriate and most cost-effective measures for the area in question. A local action plan can result from this planning process.
- **Financing of measures:** If the planned measure(s) require financing from national funds, these need to be identified and applied for.

Funding is applied for by the landowner - with the help of a catchment officer (assuming one has been appointed) and approved by the County Administrative Boards (CAB). Generally, there are insufficient funds to cover the amount applied for, which is why the strategy adopted by many CABs has been to either establish application rules (e.g. what type of measures receive funding) or award funds on a "first come first served" basis.

- **Implementation of measures:** The permit process begins, contractors procured and physical measurements of the landscape carried out.

Measures to abate nutrient runoff from agricultural land are, to a large degree, guided by the amount of government funding. The most common measures currently deployed are: adapted buffer zones and "normal" buffer zones, catch crops, lime-filter ditches and wetlands. These can be funded or partly funded by the European Common Agricultural Policy (CAP) or Swedish national funds (LOVA and LONA) (see figure 3).

SWEDEN

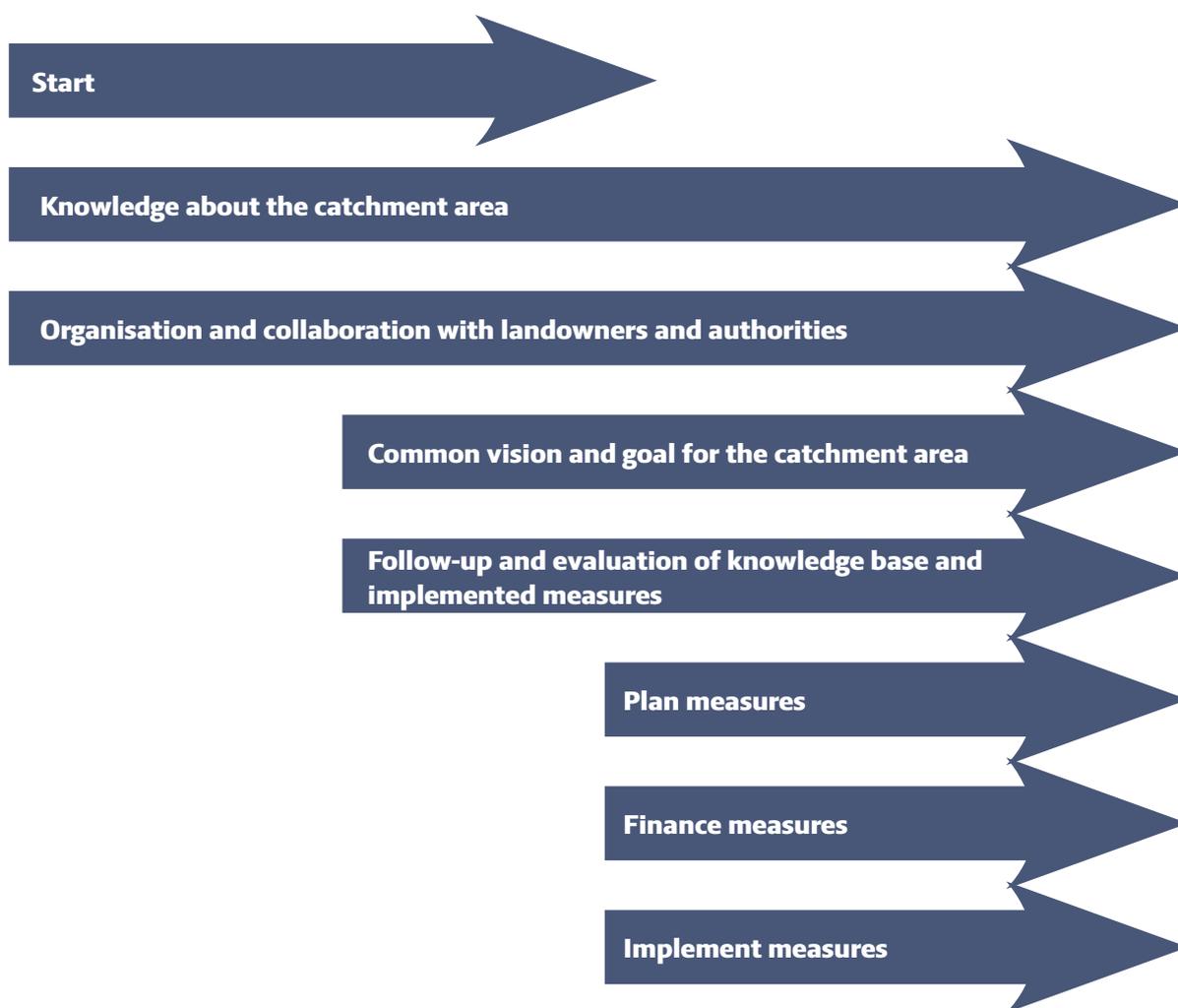


Figure 2. Process towards the implementation of measures navigated by the catchment officers, from start to finish (developed from Redovisning av regeringsuppdrag, HaV:s Dnr 1177-2018).

SUGGESTED MEASURES TODAY	CATCHMENT OFFICERS IN FUTURE
Adapted buffer zones Catch crops Lime-filter ditches Phosphorus dams Structural liming Two-stage ditches Wetlands	Will not only work on measures to abate eutrophication but also to e.g. reduce contaminants, enhance biodiversity, and to mitigate consequences of climate change (floods and droughts)

Figure 3. Environmental measures – mitigate runoff from nutrients (N and P)

SWEDEN

ENVIRONMENTAL MEASURES IN FUTURE

In order to be effective, measures will need to encompass different objectives. Measures are already being carried out in Southern Sweden to combine the abatement of nutrient runoff with the retention of water in the landscape or the rewetting of it, i.e. eutrophication measures combined with climate mitigation measures.

There is also a need to combine eutrophication measures with, e.g. biodiversity measures.

IMPEDIMENTS

The availability of short-term funding for measures and catchment officers poses a major problem. Until 2019, only national funds were available for measures. Parallel with specific funds for the recruitment of catchment officers (described above) other national funds also became available to cover salary costs. As all available funds are project-based,

funding is only available for one specific project and lasts for a couple of months or a maximum of three years. Establishing expertise and trust - essential pre-requisites for catchment officers - generally takes longer than the project itself. The current funding scheme therefore risks delaying or even preventing measures from being carried out.

In future we hope that long-term funding is secured for catchment officers and that the concept is spread beyond the 20 pilot areas in Sweden. Long-term funding secures long-term planning and hence actual measures being carried out in the landscape.

Furthermore, as explained above, measures are today funded by at least three different funding schemes spread across different authorities. This is complicated and burdensome to navigate. We hope that future funding applications and reporting will be easier in future.



Filter ditch with lime



Two-step ditch



Constructed wetland

CATCHMENT OFFICERS IN DENMARK

BACKGROUND

Denmark has 5.7 million inhabitants, a land area of only 42,434 km² but with a coastline of 7,314 km, with many shallow coastal waters vulnerable to eutrophication. With 63% of the land area of Denmark used for agricultural production, the main environmental focus has, for many years, been to reduce nitrogen to coastal waters. Water management in Denmark primarily follows two main planning tracks.

- a. Governmental water environment action planning
- a. Regional and municipal sector planning.

The plans have helped reduce diffuse nitrogen and phosphorus surplus in a "top-down" management in the form of general rules and legislation. The downside of the relatively strict regulation and "top-down" management tradition is a general lack of ownership on the part of farmers to develop and implement new measures.

NEW TARGETED REGULATION & CATCHMENT OFFICERS

Agriculture currently competes in an international market. It is therefore of benefit to agriculture that areas used for agricultural purposes are optimised for cultivation and that the majority of environmental measures are carried out outside the cultivation area. This was the reason why the Danish government decided on a new programme for more targeted measures in 2015.

Consequently, a new national management concept comprising catchment officers was implemented in 2017 to support a "bottom up" approach. The new

In Denmark, 25 catchment officers are employed in 5 different teams throughout the country.

concept has a potential for introducing a suite of new targeted drain filter solutions that each have different ecosystem services and suites different locations in the landscape. It is crucial that the best measure is chosen for each location in order to optimize environmental impact and costs. This will only succeed with a "person on the ground" with knowledge of the landscape, drainage, a suite of measures and a direct and trusting relationship with the landowner.

Catchment officers act as intermediaries between landowners and other stakeholders and authorities. They assist in identifying win-win solutions and optimising communication between the different actors. Moreover, they investigate what is required to implement measures and help farmers with start-to-finish solutions. At no cost to the farmer, catchment officers assist in facilitation. They are located across the country, according to what action is required in the respective coastal catchment area.

There are 25 catchment officers in Denmark. As 50 per cent of their salary is paid by farmers unions and 50% by the government, the farmer is not responsible for payment on an individual basis. Experience to date shows that it is possible to change farmers' "no engagement" attitude vis-a-vis legislation-based measures towards a combination of legislation and voluntary measures such as wetlands and drain filter solutions.



Danish catchment officers in collaboration with landowners and contractors.



Danish catchment officers in collaboration with landowners and contractors.

ENVIRONMENTAL TASKS

The main focus for catchment officers in 2021 is the implementation of restored river valley wetlands, drainpipe constructed wetlands and afforestation.

Rewetting organic soil to reduce CO2 emissions, multi-functional land consolidation and new drainpipe environmental measures as intelligent buffer zones are some of the tasks for the future.

2021	CATCHMENT OFFICERS IN FUTURE
<p><i>Agricultural advisers:</i> Mandatory fertilizer plans and fertiliser accounts Mandatory and voluntary catch crops Afforestation</p>	<p>Constructed wetlands Constructed wetlands with woodchips Afforestation Intelligent buffer zones New measures</p>
<p><i>Catchment officers:</i> Constructed wetland Constructed wetlands with woodchips</p>	<p><i>Catchment officers support and collaborate with the local municipality and Nature Agency.</i></p>
<p><i>Municipality and Nature Agency:</i> Wetlands including land consolidation Rewetting organic soil including land consolidation</p>	<p>Multifunctional land consolidation River valley wetlands including land consolidation Rewetting organic soils including land consolidation</p>

DENMARK



Wetlands



Constructed wetlands



Constructed wetlands with woodchips



Rewetting organic soil



Organic soil profiles

THE MAIN CHALLENGE

The challenge is to build up local professional capacity to ensure progress when implementing environmental measures with short-term financing. Local facilitators who can ensure strong collaboration between all stakeholders in addition to long-term financing are important. This is often not taken into account when it comes to effective implementation. Catchment officers in action in Denmark.



Catchment officers in action in Denmark.

LOCAL FACILITATION AND GOVERNANCE - A SUGGESTION FOR THE FUTURE FROM 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 of the projects. Indeed, ownership is a key element at all stages and with all other actors involved in the process – whether government actors, those who are politically elected within the municipal and agricultural spheres, technical staff in municipalities and in agriculture and 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 for each other's situation. Past experience has shown that stakeholders at regional levels, 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 water catchment levels. 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 with local knowledge and implemented by local authorities. It is imperative to ensure local ownership of the regional master plan. This will 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 must 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 preparation 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.
- Initially, collaboration in planning could be organised in relation to the main catchments, but they can perhaps be amalgamated and adapted to optimise resources. In order to ensure ownership, collaboration must consist of professionally trained individuals from municipalities, agriculture and the Danish Nature Agency.

- Local knowledge at the municipal level (or lower) must be brought into play through a partnership between the project team and the 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 will draw up the master plan, and 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.

IMPLEMENTATION TAKES TIME

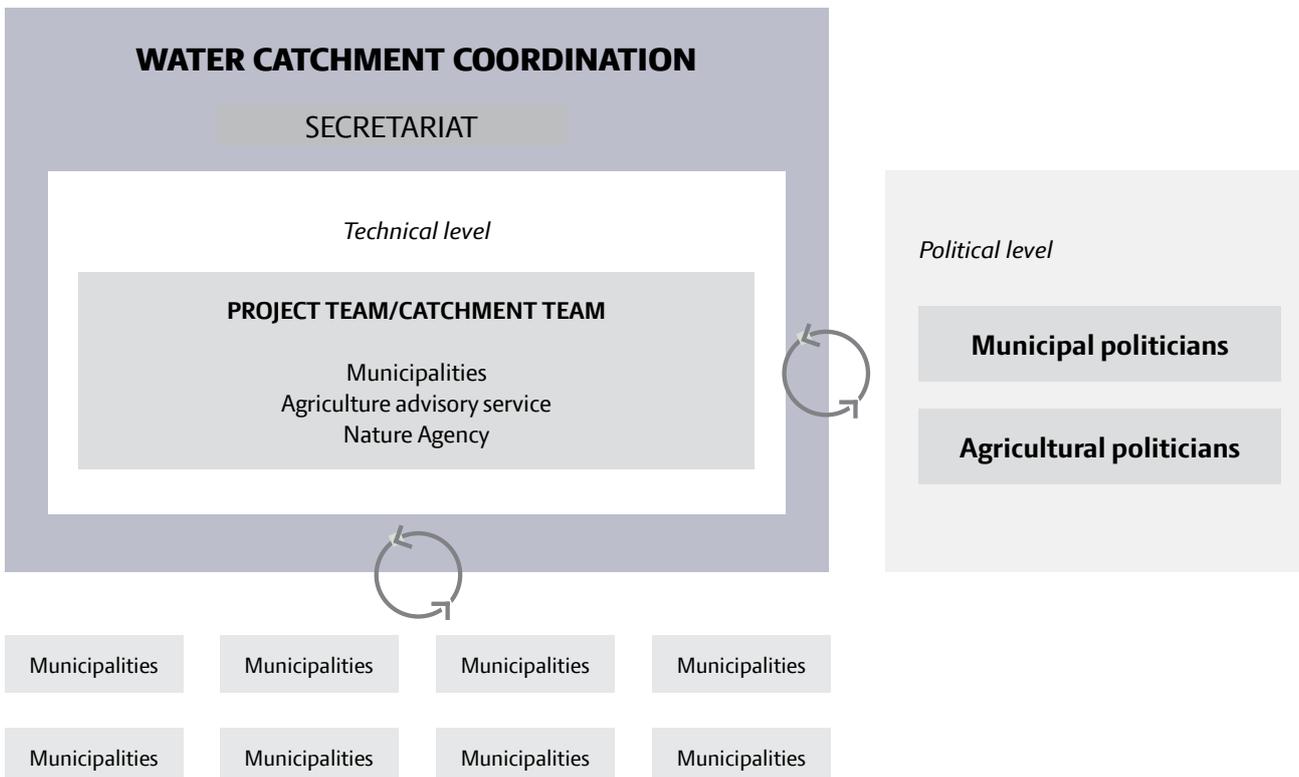
It can take years to build a mechanism that ensures smooth implementation of aquatic envi-

ronment measures. It is important that there is research-based evidence for implementing the selected environmental initiatives as landowners should be certain of receiving recognition. Approvals, legislation, government executive orders, incentive structures, subsidy schemes, compensation and construction requirements must be in place prior to implementation. In Denmark, work is ongoing to improve all links in this chain.

Long-term and consistent funding of local and independent facilitators is important, as it ensures they can work towards long-term objectives and also maintain momentum in regard to local environmental objectives. Advisers who can deliver locally involved bottom-up implementation processes are critical.

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

ORGANISATION



FRAMEWORK FOR ORGANIZING “BOTTOM-UP” IMPLEMENTATION

A team of catchment officers, agricultural advisors and municipality representatives in Denmark has developed a framework to facilitate their work with

local holistic water management. It comprises all steps from political anchoring to action implementation.

LOCAL FACILITATION OF WATER MANAGEMENT PLANS - A PLAN FOR “BOTTOM UP” IMPLEMENTATION

	ORGANISATION ACTORS		ACTIVITY	
	Multi-actor collaboration	Local facilitators	Single farms	Several farms
Political anchoring	Local Farmers Union & local politicians at municipality level		Management of decisions and leadership of projects	
Technical landscape assessments	The advisory service Catchment officers Local municipality The Nature Agency Spatial planners Hydrologists Etc.		Assessments of the landscape opportunities for implementation of environmental measures. Effect on the environment and climate.	
Landowners meeting	Landowners Landowner-representatives The advisory service Catchment officers	Independent facilitators	A meeting for information and discussion about opportunities and solutions. Grants, subsidies and management of upcoming processes. Lead and landowner representatives	
Public meeting	Landowners The advisory service Catchment officers Municipality Nature Agency NGO	Catchment officers Catchment teams	Collaboration at a more public level	
Implementation	Landowners Landowner-representatives The advisory service Catchment officers Local municipality The Nature Agency NGOs Private companies Contractors		Constructed wetlands Constructed wetlands with woodchips Intelligent buffer-zones Saturated buffer-zones Rewetting organic soil Nature	Wetlands Rewetting org.soils Nature Multifunctional land consolidation Instruments: Land consolidation One-time compensation



Main authors: Flemming Gertz, SEGES and Frank Bondgaard, SEGES with support from Anne Sloth, Velas, Catchment Officer at the Danish Agricultural Advisory Service, Fyn, Project Manager Thorben Enghart Jørgensen, Odense municipality, Fyn and Project Manager Jannik Seslef, Assens municipality, Fyn.

IBZ Intelligent bufferzone, SEGES



IBZ Intelligent bufferzone, SEGES

SOME QUOTES FROM THE WATERDRIVE PARTNERSHIP

FINLAND

- *Without funding you can't implement any solutions or environmental measures.*
- *Successful cross-sectoral discussion on many levels need good and including facilitation.*
- *Good coordination is needed to implement cross-sectoral measures efficiently.*

DENMARK

- *Create realistic platforms that are truly capable of implementing environmental measures.*
- *Ensure that "top down" and "bottom up" are always firmly connected*
- *If the agricultural schemes do not work, change them very quickly.*

POLAND

- *Lack of sufficient public support or grants for investments aimed at water-related activities.*
- *Training of agricultural advisors: They should ensure the long-term economic survival of farms as business entities.*

SWEDEN

- *Catchment officers and spatial planners need to work better together*
- *Stronger links, including physical links between all stakeholders.*



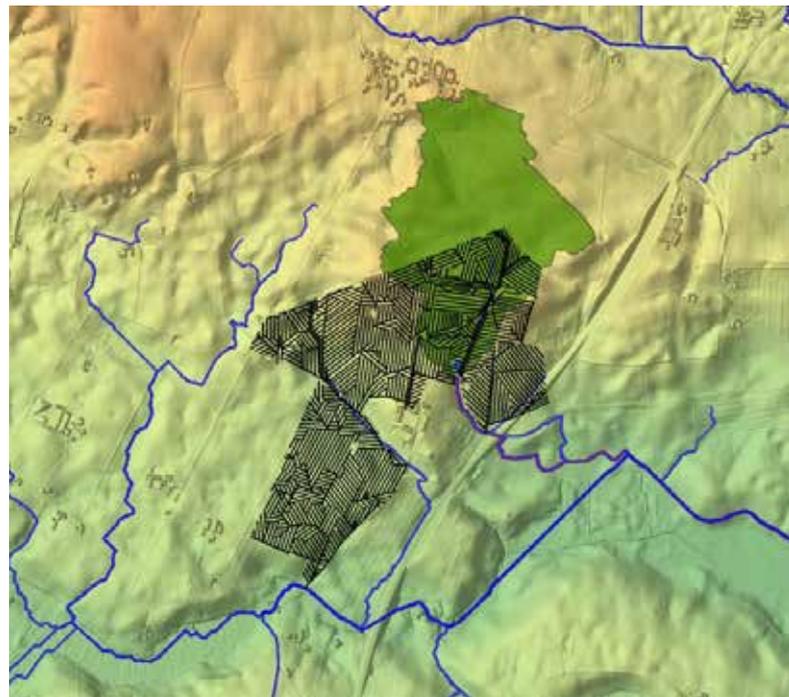
NEED FOR TRAINING AND EDUCATION



Catchment officers training with Trimble GPS equipment

There are several steps in the implementation process that require skills and ongoing training.

- Good communication skills to liaise with farmers and landowners.
- Implementation often requires a confident person able to engage landowners and stakeholders.
- Environmental measures specialist.
- Outreach farm visits for good potential locations.
- The catchment officer/team must be able to pick out and locate different environmental measures in the landscape.
- Specialist in GIS tools, SCALGO, Trimble GPS equipment and other programmes.
- Apply for municipal approval of environmental measures.
- Preparation of funding applications to agencies.
- Collaboration with landowners and contractors when establishing environmental measures in accordance with current rules in the guidelines.



SCALGO, SEGES



LEARNING MORE FROM THE LEADERSHIP MANUAL

Open and sustainable stormwater treatment.

The complexity of many water and land management situations is related to the multiple issues, stakeholders, objectives and parties involved as well as the difficulties of predicting the consequences of measures adopted in socio-ecological systems. Such complexity suggests that progress is only possible if we continuously learn from our experiences.

Three factors represent the different domains in which progress can occur: relationships, procedures, and substance, also referred to as “the progress triangle”. Decisions and multi-stakeholder partnerships must incorporate all these domains: Collaborative water and land management; tools and procedures; strengthening relationships between involved parties.

The progress triangle also reminds us that substantive progress depends on how good we are at implementing innovative methods. Substance represents the issues, often both practical and scientific. Procedure and methods represent how we choose to work together - from the overall project design to specific tools to reinforced learning. Relationships represent the importance of trust, power equality and constructive dialogue among everyone involved.

THE LEADERSHIP MANUAL IS
AVAILABLE AT [WATERDRIVE.DK](https://www.waterdrive.dk)

It is important to remember that innovative water management at landscape level always includes the whole triangle. It also means that different perspectives and experiences are learning resources and that participation is about contributing, not winning. If stakeholders adopt such attitudes, the potential for sustained improvements is higher.

Furthermore, the three domains overlap and affect one another. By applying new methods and tools we support the learnings and the outcomes, and if we focus on building trust, we create better preconditions for future collaboration.

LEARNING MORE FROM THE LOCAL PARTICIPATORY TOOLBOX

The Local Participatory Toolbox will help you to familiarise yourself - with some useful methods and tools for facilitating local participation in water management projects. By offering tips and recommendations, collaboration between different stakeholder groups should be more easily achieved/facilitated.

This handbook will give you some useful tips for administering/facilitating or leading a water management project. Moreover, it can also be applied to other thematic projects. It provides some useful recommendations and puts forward methods and tools for how to achieve cross-sectoral stakeholder participation within a project.

PURPOSE AND AIM

The Local Participatory Toolbox is intended to promote local participatory processes in water management. As a result, it is important to help actors on different levels to create an understanding at the benefits of collaboration. Target groups are local/regional authorities, farmers/land owners and rural communities found in typical agricultural landscapes around the Baltic Sea Region.

The toolbox aims to convey the more theoretical frameworks for local cross-sector collaboration at a practical and inspirational level by pointing out hands-on tools and methods. It focuses on encouraging bottom-up processes. This is intended to help resolve the lack of cross-sector collaboration in the area of water resource management.

The Local Participatory Toolbox focuses on the sociological context and will help to identify joint objectives, facilitate collaboration and prepare action plans. The output will be used for building capacities and as a source of inspiration for the target groups aiming to improve participatory local water management.

The participatory toolbox handbook is available at waterdrive.dk

WATERDRIVE

water-drive.eu

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An aerial photograph of a rural landscape. A stone-lined ditch or drainage channel runs diagonally from the top left towards the bottom center. The ditch is filled with water and surrounded by dense, green vegetation, including tall grasses and leafy plants. The surrounding area is a vast, open field of shorter, green grass. The lighting is bright, suggesting a sunny day.

THE PARTICIPATORY TOOL-
BOX HANDBOOK IS AVAILA-
BLE AT WATERDRIVE.DK

