

**Waterdriven rural development in the Baltic Sea Region No. R094  
WATERDRIVE**

# **Waterdrive Case areas**

**New and innovative solutions  
plus key findings in Waterdrive  
case areas**

**2019-2021**

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Ecohydrology

Baltic Environmental Forum Lithuania

Jelgava Local Municipality

Northwest Research Institute of  
Agricultural Economics and Organisation  
(NWRIAEO)

Institute for Engineering and  
Environmental Problems in Agricultural  
Production (IEEP)

Finnish Field Drainage Association

KVVY, Water Protection Association of  
the River Kokemäenjoki

Västervik Municipality

L&F SEGES

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## Project Partners

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Sweden	Swedish Board of Agriculture
Sweden	Västervik Municipality
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Finland	Natural Resources Institute Finland
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Russia	Northwest Research Institute of Agricultural Economics and Organisation (NWRIAEO)
Russia	Institute for Engineering and Environmental Problems in Agricultural Production – branch of Federal State Budgetary Scientific Institution “Federal Scientific Agroengineering Center VIM (IEEP)
Russia	Administration of Guryevsk city district



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## Waterdrive case areas

Between 2019 and 2021, eight Waterdrive case areas were involved in multi-actor water management engagement. Landowners, local municipalities and stakeholders, government agencies, the advisory service, catchment officers and private companies provided input as to how to solve the various environmental challenges brought about by the leaching of nutrients, the loss of biodiversity, climate change, drought and flooding. All the work undertaken in the case areas - success stories, case areas, focus groups and measures - is available at [www.waterdrive.dk](http://www.waterdrive.dk)

No.	Waterdrive case areas	Leader
1.	Kutno County case area, Poland	Janusz Dąbrowski, Katarzyna Izydorczyk, Kinga Krauze & Wojciech Frątczak
2.	Zuvintas Reserve and agriculture case area, Lithuania	Elvyra Miksyte
3.	Gurjevsk case area, Kaliningrad, Russia	Irina Popova
4.	Jelgava case area, Latvia	Ingars Rozitis
5.	Ljuga River case area, Leningrad, Russia	Mikhail Ponomarev
6.	Southern Finland drainage case area, Finland	Mikko Ortamala
7.	Västervik case area, Sweden	Gun Lindberg & Anders Fröberg
8.	Odense case area, Denmark	Anne Sloth & Frank Bondgaard

## New and innovative solutions plus key findings from Waterdrive case areas from 2019-2021

The partner workshop held on 5 May 2021 was based on the work undertaken in the Waterdrive case areas between 2019 and 2021. Prior to the meeting, the case area leaders singled out several innovations and key findings based on the case area work. The main focus was to identify the most important innovations and key findings to ensure the implementation of environmental measures in the Baltic Sea Region. All the innovations and key findings from the case areas are available in the appendix.

10 important steps to kick-off local implementation of agri-environmental measures were defined by the case areas and at the workshop.

<b>1. Monitoring</b>	Improvement of local monitoring, analysis, and interpretation of data. Monitoring data available for all stakeholders on the website.
<b>2. Test &amp; pilots</b>	Case areas and demonstration sites for the implementation of agri-environmental measures are important as a first step in involving landowners. Pilots and tests should ensure that landowners become involved in local solutions and implement scientifically proven environmental initiatives only.
<b>3. Agricultural schemes, AES</b>	Rural development programmes and funding systems for agri-environmental measures, catchment officers, catchment teams, water managers, water advisers and local facilitators are crucial for ensuring real progress in the landscape.
<b>4. Spatial planning</b>	Holistic water management plans should be elaborated at local level in sub-catchment scenarios or local action plans, and developed by expert teams in collaboration with catchment officers, water managers, farmers, landowners and other stakeholders. Digitalisation of land drainage systems/water/soil/climate/geology data management system that allows for point-based analysis for the establishment of new agri-environmental measures. The right measures in the right place.
<b>5. Agricultural advisory service/municipality and other services</b>	The agricultural advisory service, the municipalities and other services involving water management specialists, catchment officers, catchment teams, water managers, water advisers and local facilitators need to ensure more holistic water management in close collaboration with landowners.
<b>6. Capacity building</b>	Capacity building requires the involvement of expert groups with a holistic view, who are searching for a "balance" and an inter-disciplinary approach based on specialist knowledge in agriculture, water, nature, biodiversity, forestry.  The implementation of environmental initiatives is often highly dependent on long-term funding.
<b>7. Education, training &amp; support</b>	Expert teams should support local water partnerships in terms of educational programmes and in providing training in holistic water management, the impact on water quality and quantity, agricultural practices within the context of water retention in the landscape, efficient water use and the implementation of agri-environmental measures, agrotechnical solutions etc.
<b>8. Multi-actor collaboration</b>	Consolidation of local partnerships, teams and networks to encourage commitment between all stakeholders in the area.  Collaboration between landowners, farmers, catchment officers, catchment teams, water advisers, municipalities and local authorities to establish common objectives that generate "win-win" concepts for reduced eutrophication and increased harvest.
<b>9. Implementation</b>	Implementation of agri-environmental measures.
<b>10. Monitoring effects</b>	Monitoring the effect of all the agri-environmental measures in the landscape.

Before the meeting, the Waterdrive case area leaders were asked to assess whether all these steps were in place in their local area as this is crucial for actual implementation. In general, there was a lack of long-term funding for environmental initiatives in all countries.

	Lithuania	Russia	Latvia	Poland	Denmark	Sweden	Finland
<b>Monitoring</b>	x	x	x	x	x	x	x
<b>Test &amp; pilots</b>			x	x	x	x	x
<b>Agricultural schemes, AES</b>	x				x	x	x
<b>Spatial planning</b>	x	x	x		(x)	x	x
<b>Agricultural advisory service/municipality or other services</b>	x		x	x	x	x	x
<b>Capacity building</b>			x	x	x	x	x
<b>Education training &amp; support</b>	x	x		x	x	x	x
<b>Multi-actor collaboration</b>	x	x	x	x	x	x	x
<b>Implementation</b>			x		x	x	x
<b>Monitoring effects</b>					x	x	x

### Waterdrive partner workshop 5 May 2021

Multi-actor collaboration and monitoring were highlighted during the workshop chat rooms. It is important to establish local collaboration between landowners and residents to prevent any disputes from arising and to find mutually satisfactory solutions. The challenge is that good infrastructure attracts people, which means co-existence with intensive agriculture.

The discussion highlighted the fact that there are huge differences between countries and regions as well as the objectives of the various measures. Not only is collaboration a challenge, but the role each stakeholder plays also needs to be established.

The workshop also underlined both the need to improve national monitoring on a broad scale and the need to monitor the effects of specific measures at a detailed level. A clear description of monitoring activities, including variables and process, is required. Monitoring in Russia will be improved by local people inputting results online, the digitisation of data and drainage systems.

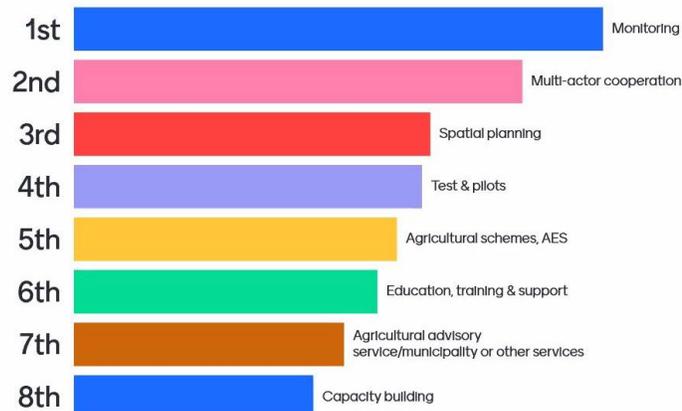
Spatial information is required to better understand the sources of nutrient loss. Specific goals are important, both short and long-term, in relation to water quality, quantity, GHG emissions, and biodiversity.

Financial support is crucial for monitoring, planning, multi-actor collaboration and implementation, especially in the long-term.

All the participants in the partner meeting were asked:

***“What is the most logical order for implementing environmental measures?”***

1. Agricultural advisory service/municipality or other services
2. Capacity building
3. Test & pilots
4. Multi-actor collaboration
5. Monitoring
6. Test & pilots
7. Agricultural schemes, AES
8. Spatial planning
9. Education training & support
10. Agricultural advisory service/municipality and other services
11. Capacity building



*Results from the Mentimeter test 12 May 2021*

The responses from the voting show that monitoring, multi-actor collaboration, spatial planning and test & pilots are regarded as crucial in terms of the first steps needed to kick-off the implementation of environmental measures.

However, if visible environmental effects are to be achieved, it is crucial to address all eight steps simultaneously. Multi-actor collaboration will often encounter challenges if no agri-environmental schemes or measures are in place. Many landowners want to see progress and not just talk.

## The role of the farming community in strengthening water management in the Baltic Sea Region 16 June 2021

It is clear from the Waterdrive case areas that the role of the farming communities needs to be strengthened if smarter and more effective water management of the agricultural landscape is to be achieved. Holistic and smart water management, which benefits agriculture, the environment and society, is of key importance. But how can we move forward and what motivates agricultural communities?

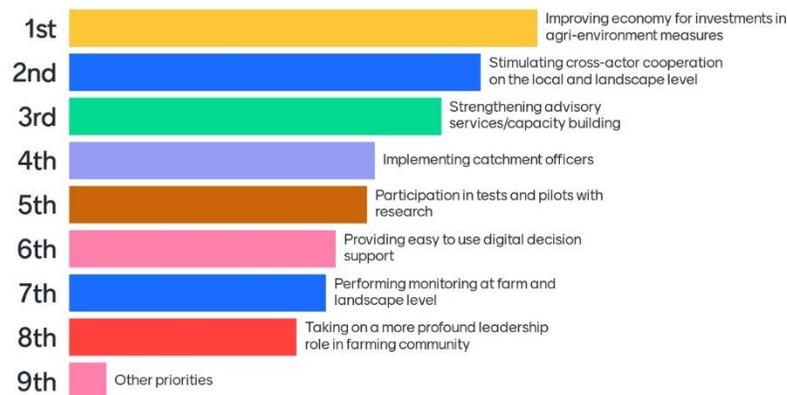
All participants at the meeting were asked to rank the following 10 questions/statements:-

1. Strengthening the role of farmers – what are the key ways forward?
2. Stimulating cross-actor collaboration at local and landscape level.
3. Providing easy-to-use digital -based support.
4. Assuming a more significant leadership role in the farming community.
5. Improving the financial benefits of investments into agri-environmental measures.
6. Strengthening advisory services/capacity building.
7. Implementing catchment officers.
8. Contributing research to tests and pilots.
9. Monitoring at farm and landscape level.
10. Other priorities

The answers to the Mentimeter test were

### Strengthening the role of farmers – what are the key ways forward?

Mentimeter



Results from the Mentimeter test 16. June 2021

The voting responses show that improving the financial benefits of investments in agri-environmental measures, stimulating cross-actor collaboration at local and landscape level and strengthening advisory

services/capacity building are considered crucial in terms of the first steps needed to kick-off the implementation of environmental measures.

However, tests and pilots in a partnership between farmers, local stakeholders and researchers can often be a first step to ensure progress.



Constructed wetland. Photo Anders Fröberg

## Appendix

### New and innovative solutions and key findings in Waterdrive case areas

#### Svete River, Jelgava case area, Latvia by Ingars Rozitis

Young farmers in this particular case area have demonstrated their interest in developing local leadership groups. This case illustrates the potential for establishing local action group leaders as a link between landowners and catchment officer.

A lack of experience in monitoring the effectiveness of environmental measures in different regions of the country is a major factor in the search for greater knowledge and for implementing the right measures in the right place.

Good water quality targets for freshwater bodies is essential as production on farmland areas increases.

The value of productive farming comprises many agro-economic aspects, including agro-technical benefits. Water quality improvement requires more specific knowledge and skills on the part of farmers and private/government advisory service.

The municipality does not have a strong impact on farmers or catchment officers under government legislation. The catchment officer service should be connected to the Rural Development Programme’s implementation supervisory services.

An increase in students in the Drainage Engineering Program in Latvia is essential for better water quality management. Latvia University of Life Sciences and Technologies offers the only study programme under the Faculty of Life Science and Technologies.

As a catchment officer, I have identified a lack of knowledge about the work of farmers from an agrotechnical perspective. The problem is that there are no agricultural advisory experts in holistic water management.

#### *Innovations and suggestions for the future:*

- Lack of experience in monitoring the effectiveness of environmental measures
- Potential for the formation of a local action group leader in the case area
- No experts in holistic water management, but there are agricultural advisory experts in production
- The catchment officer service should be linked to the Rural Development Programme
- The water quality improvement perspective requires more specific knowledge and skills and needs to be improved for both farmers and (private/government) advisory services.
- Increase the number of students in drainage engineering programmes

#### Odense case area in Denmark by Anne Sloth & Frank Bondgaard

In Denmark, the Rural Development Programme comprises wetlands, the rewetting of organic soils and constructed wetlands. Waterdrive’s main focus is the collaboration between

catchment officers and local municipalities as well as the implementation of constructed wetlands.

In catchment 42.320.119, it is theoretically possible to establish approximately 6 hectares of constructed wetland with an effect of 2.478 kg N/year and 20.4 – 23.3 kg P/year at a cost of approx. 591,000 €. Realistically, it is unlikely that this number of hectares can be covered. The reasons for this may vary between location and landowners.

Theoretically, there are many deployment options and in general, farmers are positively disposed to adopting the right measures. However, in reality there are many challenges. Based on this project and with my experience as catchment officer, some of the reasons are:

- The demands on the catchment area from having 80% of the area with crops in rotation
- Deep drains - are pumps the solution to this?
- § 3 protected nature where constructed wetlands are not permitted
- Possible costs of pumps for 10 years – are “pump-unions” the answer to this?
- Open drain ditches protected by § 3 in the Nature Conservation Act, i.e. we are not permitted to lead water through a constructed wetland
- Obtaining permits from the municipalities sometimes takes a very long time

Solutions would be more readily available if rules were less strict, if there were more options and and if we (advisers and representatives from the municipality and government) generally learned to collaborate more closely to identify all opportunities and then select the best. We ought to be pursuing the same goals.

*Innovations and suggestions for the future:*

- Stronger collaboration between landowners, farmers, catchment officers, municipalities, the Nature Agency and local authorities. Together they have the skills to protect the environment and nature.
- Catchment officers are already established, but cross-sector catchment teams could be an option
- Long-term funding of catchment officers/catchment teams
- Funding systems under the Rural Development Programme that could handle and fund multi-actor and cross-sector collaboration.
- A rural development programme that focuses more on addressing the challenges: a programme that is flexible and offers more leeway.
- Change the RDP programme if it proves not to work. This will accelerate progress.
- Never leave a demonstration/case area without progress being made.

[Kutno County case area, Poland by Janusz Dąbrowski \(CDR\), and Katarzyna Izydorczyk, Kinga Krauze, Wojciech Frątczak \(ERCE PAN\)](#)

**Overall objective:** to apply a holistic approach to water management at case area level while directly linking with wider land-based activities to facilitate wider impact of the Waterdrive project at national level through:

a) Service innovation - design and test the new type of agricultural advisory service – Water Adviser. The current public agricultural advisory service needs to broaden its focus from being purely productivity-based to assuming a holistic approach which embraces efficient water management at multi-farm level as a precondition for long-term profitability. Waterdrive has provided the tools essential for demonstrating the risks related to climate change, the opportunities from NBS implementation and the advantages of systemic solutions.

b) Organisational innovation – the launch of the Local Water Partnerships (LWP), an initiative of the Polish Ministry of Agriculture. The main goal of LPW is to bridge the gap between country and local water management and to create a consultation and decision-making platform at county (powiat) level. The Waterdrive project contributed to the development of the LPW concept based on the Kutno case study experiences.

At site specific level, Waterdrive is to develop an Action Plan to assist Bedlno commune to adapt to temporary water shortages, including the joint creation and management of a controlled drainage system, the selection of responsive agricultural practices, and the use of nature-based solutions to optimise the landscape structure. The Action Plan has been collaboratively developed by the main actors: the water authority, the water company (farmers'/landowners' association), local and regional authorities.

Lessons learned from Waterdrive:

- The recent droughts affecting farmers/residents have transformed water management from a theoretical research/administrative issue into a critical element affecting agricultural production.
- Consequently, the need for closer collaboration has been recognised by all actors. This has resulted in improved communication between water companies (farmer/landowner associations) and Wody Polskie (the water management authority) leading to joint, complementary actions, e.g. controlling the outflow from drainage systems (the so-called river channel retention). However, even stronger input (e.g. by local and regional authorities) is required to establish concrete and long-lasting collaborative schemes.
- At national level, the attitude towards funding rural water management has evolved from being limited to the construction and operation of water facilities to enabling new funding mechanisms (under European (RDP) and national funds) for hydro-technical amenities and nature-based solutions (wetlands, mid-field afforestation, periodically flooded areas).
- Suggestions/recommendations:
  - Improved access to data: a common database is needed, covering an inventory of land drainage facilities as well as water, soil, climate, geology and biodiversity data that allows for enhanced local analyses and development of local solutions harmonised at catchment level.
- Ensuring that the sub-catchment/area scenarios (e.g. Action Plans) for restoration and management of water resources is a widely used, common basis for any investments/implementations; these should be further developed by the experts in cooperation with water managers and farmers, landowners and other interested parties according to the following rules:
  - The proposed measures (their type/location) should be analysed at catchment level;
  - The expert group should be able to generate a holistic approach, i.e. the group should cover a number of disciplines within agriculture, water, biodiversity, forestry, climate, and economy;
  - The expert team should support Local Water Partnerships.

- Triggering new funding mechanisms to stimulate and ensure cooperation between beneficiaries to guarantee greater efficiency per investment. This requires:
  - Development of the relevant criteria and indicators for evaluating applications and awarding complementary investments that enable holistic solutions in water management;
  - Prioritising projects with multiple beneficiaries;
  - Preference for investment projects that combine hard measures with soft ones i.e. the building of social and human capital, institutional capacity, broader awareness of biodiversity, climate change, land use, etc.
- Launch of farmer-targeted education programme aimed at understanding the water cycle/processes in the landscape and enabling farmers to become responsible water managers, improving quality and quantity, e.g. through water-efficient agricultural practices --> connection with Water Adviser.
- Introduction of a new type of agricultural advisory service into the Ministry of Agriculture and Rural Development’s national advisory system.
- Advancing the concept of Local Water Partnerships to provide new and effective communication and managerial tools to allow for a participatory approach to planning processes at county level (engaging farmers and their organisations, other rural actors, agricultural advisers).

### Zuvintas Reserve and agriculture case area, Lithuania by Elvyra Miksyte

Dovinė catchment – an area framed by two Natura 2000 areas, but lack of local knowledge on water issues, awareness and data to support action. Between two Natura 2000 areas there are state-owned fishery ponds.

- The impact of ponds is not well known or easily assessed and is controversially debated among stakeholders.
- Waterdrive monitoring shows that the activities of Simnas fishponds affect the quality of water bodies and may also have a significant impact on the amount of water in the catchment.
- In order to ensure the protection of the ecosystems in the protected areas, the activities of Simnas fishery ponds must be balanced with the protection needs of the protected areas. The aim must be to reduce the impact on Žuvintas biosphere reserve.
- There is a need for close cooperation between stakeholders on minimising the impact of fishery ponds on the catchment and protected areas.
- Main stakeholders identified for the task: Ministry of Environment, Ministry of Agriculture, Fisheries Service under the Ministry of Agriculture, State Service for Protected Areas, Meteliai Regional Park Directorate, Žuvintas Biosphere Reserve Directorate, Management of Simnas fishery ponds, Environmental Protection Agency, NGOs and academic institutions. It is also important to involve the Lithuanian Hydrometeorological Service and municipalities.
- A concrete action plan is needed for the Dovine River catchment, reconciling economic and environmental objectives and comprehensively considering the impacts of the decisions at the catchment level. Practical solutions on how to implement catchment-based water management are needed.

- An improved monitoring and efficient bottom-up structure is needed to ensure that the data is collected and analysed and that work is actively being carried out to find solutions. However, no one knows how to make this work in practice. There is a lack of local leadership. Catchment officers could be a solution.
- A great deal of work with farmers and local stakeholders is needed to raise awareness and promote agri-environmental measures where most needed.

Innovations and suggestions for the future:

- Improve local monitoring and most importantly, analysis and interpretation of data. Long-term data would allow for the identification of appropriate water management solutions in the catchment.
- Improve farming practices via targeted promotion of agri-environmental measures, work closely with farmers to strategically transform their farms and farming practice to become more sustainable. Also, high quality individual consultations focused on environmentally friendly farming practices tailored to the needs of a specific farm and result-based payments coupled with expert consultations.
- Catchment officers in Natura 2000 areas or other local catchment-based actors are needed. They would work actively with catchment issues and stakeholders. Catchment officers would provide a crucial link with decision-making stakeholders who currently lack a local level in their decision making. Catchment officers could be facilitators implementing catchment-based water management.

[Gurjevsk case area, Kaliningrad, Russia by Irina Popova & Ljuga River case area, Leningrad, Russia by Mikhail Ponomarev](#)

Innovations and suggestions for the future:

- Network for monitoring water quality by local inhabitants and for posting the data on a common specialised website on the Internet.
- Consolidation of water users in a joint decision-making partnership (WUP) and cooperation between local focus groups for the use of WUP tools.
- Water management specialist consultancy (advisory) service (catchment officers).
- GIS systems with the necessary satellite and local data for planning agro-ecological measures in specific watersheds as well as popular visualisation maps available to the public.
- Demonstration sites in agricultural areas with implemented advanced environmental water protection measures (modern controlled drainage systems, constructed wetlands, etc.).

### Luga River case area 1 - Suida area (IAERD of SPC RAS, PP20)

The Leningrad region and the Luga River case area, in particular, are developing agricultural regions with large intensive production farms. This creates high environmental risks.

In many cases, farm drainage systems and municipal drainage ditches have not been renovated for many years. The State has introduced financial support by way of subsidies for all farms that have invested in the renovation of their drainage systems. Several farms in the case areas have undertaken some of this work and continue to invest. Every year, the State allocates funding for the improvement, cleaning and repair of federal and municipal amelioration objects.

The current situation provides opportunities for the introduction and implementation of various environmental measures in the region's water management. But the awareness of farmers, regional and municipal authorities of advanced environmental measures and their efficiency is very low.

The idea behind the case area's project activities is to inform stakeholders about the measures and start the development of the first demonstration case in the Leningrad region. For this reason, the agricultural fields at the research farm located in the case area (Suida river catchment) were selected as a good site for developing several water management solutions to decrease nutrient runoff and for a phased introduction.

The site has been visited, described and a reconstruction project for the existing drainage system has been studied. It was developed in 2009, but has not been implemented. The reclaimed area measures 173.8 hectares. Water samples from the drainage channels and the Suida River have been taken to gain an understanding of the nutrient runoff from the agricultural fields throughout the seasons.

It is proposed that the list of environmental measures be analysed and the most relevant and economically feasible solutions selected for implementation, i.e. : 1 – Drainage renewal (with controlled drainage); 2 - Constructed wetland; 3 - Nutrient (phosphorus) sedimentation pond; 4 - Buffer zones (intelligent buffer zone, saturated buffer zone); 5 – Two-stage ditch, bevelling ditch; 6 - Filter ditch (lime filtration drainage); 7 - Structure liming. It may be possible to recommend a combination of two-three measures.

The case area report will include an application analysis of measures, with financial recommendations and possible environmental effects. Based on the report and consultation with the focus group, one or two measures will be prioritised. The technical project for the reconstruction of the drainage system will include these measures and investment suggestions.

### Luga River case area 2 – IEEP (PP21) area

Implementation of the Waterdrive activities in the Luga case area is being carried out in connection with the CBC project LUGABALT 2. Thanks to this collaboration, we have access to all target groups (farmers, largescale agricultural enterprises, municipality administration, NGO, students and experts).

Our regular trips to the pilot case area enable us to communicate with representatives from the agricultural enterprises and the municipality's administration. Their main request is for more information about the diminishing negative impact of manure on the environment in the case area. The desire for more

knowledge on the part of the municipality is motivated by an actively involved public in the Luga district while agricultural enterprises are motivated by regional and federal authorities.

Over the past six months, we have presented the pilot case area representatives with the following:

- Interactive tool for organic fertiliser distribution on the region’s land (at two local seminars);
- Two on-line webinars entitled 'School for Farmers' (we are going to arrange at least one webinar each month). The content of one seminar was based on the results of our questionnaire for farmers in the Leningrad region;
- Guidelines for farmers on manure management.

We have four meetings with the IDAVANG enterprise (located in the pilot case area) to elaborate on the technical regulations for manure management based on a holistic approach to water protection.

The main problem in the Luga case area is the substantial difference between small farmers and major agricultural enterprises. Small farmers want to be more environmentally friendly and are ready to take measures to decrease negative impact. Such measures are simple and inexpensive, but they need support from expert consultants (free of charge). Experts cannot work without payment.

The major agricultural enterprises have funds and have access to experts, but they are usually not very motivated to be environmentally friendly. Moreover, they cannot implement all necessary environmental measures because most of them are very expensive and cannot be implemented at speed.

NGOs and the public need capacity building and training in a holistic approach to water management.

We will continue the training and capacity building vis à vis the target groups:

- at the School for Farmers (next event at the school will be held during the 2nd International Agricultural Conference on 19 May 2021 at our Institute);
- use of the interactive tool for manure distribution;
- provide direct expert support for farmers and agricultural enterprises and other representatives of the project and target group.

*Innovations and suggestions for the future:*

- Network for monitoring water quality by local inhabitants (*municipal monitoring*) and for posting the data on a common specialised website on the Internet.
- Consolidation of water users in a partnership for joint decision-making (WUP) and collaboration within local focus groups with a view to using WUP tools.
- GIS systems with the necessary satellite and local data for planning agro-ecological measures in specific watersheds as well as popular visualisation maps available to the public.
- Demonstration site in agricultural areas with implemented advanced environmental water protection measures, for example, modern controlled drainage systems, constructed wetlands (*Kaliningrad could not implement this. We would otherwise have included this as a prime example and as an innovation for the Kaliningrad case area*).
- Online school for farmers in the case area.

### Southern Finland drainage case area, Finland Mikko Ortamala

#### *Innovations and suggestions for the future:*

- Catchment area-based holistic water management planning focuses on the development potential of agricultural production and environmental protection as being as multidimensional as possible. A holistic drainage approach in agricultural fields means the functionality of basic and local drainage, including control of surface flows, while taking biodiversity, water quality and fishery into account. Well-functioning basic drainage in fields enables the functionality of local drainage and supports soil structure improvement. When the soil structure and growth potential are in good condition, this ensures effective crop cultivation. At the same time, nutrient loss and loading into natural water systems can be reduced. Unfortunately, this is currently not the case in Finnish agricultural water management, where problems are typically tackled sporadically without a holistic, catchment-scale approach.
- The objective of this presentation is to briefly describe:
  - 1) the expected potential of catchment area-based holistic water management planning,
  - 2) the tools and measures that can be applied (spatial analysis, measurement techniques, modelling of load areas) and
  - 3) the potential and challenges of using nature-based solutions as a part of drainage projects.
- Drainage renovation measures should be implemented in a catchment area with a holistic approach to decrease the nutrient load to waterbodies and to support effective farming practices. The renovation objects should be listed so that the actions are targeted systematically, beginning with the objects most critical to drainage and nutrient loss. This calls for an extensive study of the condition of the drainage system, starting with the basic material (aerial photos, height/contour data, soil structure data), the choice of objects followed by a field study. The objective is to map flood risk and assess drainage needs. Flood risk and erosion modelling could be a tool for the preliminary study, but nutrient outflow and drainage needs’ assessment cannot be solely based on modelling. Additional field measurements and studies of the site are required. Combined with risk area mapping, the activities of the local drainage cooperative bodies should be identified. This should be done together with drainage planning experts systematically and nationwide, and not only in terms of the risk zones.
- 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 carried out by the state. 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, (participant) associations, foundations, planners, contractors, researchers, advisers, farmers and landowners. The responsibility for implementing measures cannot lie solely with individual stakeholders. More comprehensive collaboration is needed. Every institution/organ should have a clear strategy to steer their activity towards better water management. This would subsequently lead to a sound ecological condition of water bodies in accordance with the Water Framework Directive.

- Restoration/renovation measures should be implemented holistically at catchment level in order to reduce the external nutrient load and to enable efficient cultivation. Planned measures should be listed and prioritised in order to implement the most important measures first and thus target the most critical sources of nutrient loading. This would require the condition of the channel and waterbody networks to be comprehensively mapped, first through analysing existing datasets (orthophotos, digital elevation models, soil data), and then through more accurate surveying of specific sites prior to implementing the measures. The aim would be for a comprehensive dataset describing agricultural areas suffering from poor drainage, waterlogging and recurrent flooding.
- The task of the coordinators would be to point out/suggest/propose options (technical, procedural, economic) to the stakeholders, and to implement measures in accordance with the authority's guidelines. Information about holistic water management should primarily be targeted at farmers, landowners and drainage corporate bodies in risk areas. Activities should inspire the confidence of local actors. Advice (holistic approach taking into account the production economy and the environment) should be on a long-term basis and activate local actors. Catchment officers could form a link between governmental and local levels. Experience has shown that the level of trust differs between local actors and authorities and advisory organisations. The work of catchment officers cannot be covered by one person or organisation. Expert teams from different organisations should be resourced to improve holistic advice and catchment area renovation. Collaboration and team thinking could work across different sectors. Most of the funding should be secured by the State, some can be sourced from the private sector, such as foundations. The aim is to protect the production economy and water quality as well as fisheries, biodiversity, the capital value of the land and the maintenance of infrastructure through the regional know-how of the different stakeholders.
- Drainage and soil condition surveys are key factors in planning measures in an agricultural environment (professional advisers organise surveys). Measures should be based on the prevailing need and adapted to local conditions (topography, soil types, flow, economy and ecology, etc.). Cost-effectiveness, channel dimensioning/mass calculations and soil growth status (chemical, physical and biological status of the soil) must be taken into account in the design of measures.

### ***Västervik case area, Sweden Gun Lindberg and Anders Fröberg***

In Västervik municipality, we have been working with the advisory service (local catchment officers) for landowners and farmers for many years. The farmers are generally positive about implementing measures, but they need help: help in selecting from the available measures, where to start (SWOT analyses), how to finance, contact with other authorities and how to plan the measures and find new solutions.

The prioritisation of catchment areas is based on previous monitoring and data modelling that show where the nutrient load is high.

Below is a description of how a catchment officer works, step by step, in a smaller catchment area, in collaboration with the farmer/landowner:

- **Building partnerships.** Initial dialogue with farmers in the catchment area. Meetings in small groups and individually in the field. Information about measures and how they should be implemented in

their area and on their farms. Appointments for meetings in the field (interested farmers/landowners). An important role of the catchment officer is sharing information and knowledge.

- **Local action plan.** SWOT analyses are carried out on farms in collaboration with landowners. Problem areas in fields become interesting sites for measures. Investment plans and priorities are drawn up.
- **Financing.** Calculation of costs for investments and actions. Funding opportunities from national and regional funds. Applications for grants to regional and national authorities are normally made by the municipality.
- **Agreement** – When the farmer/landowner is ready to implement a measure, a written agreement is signed. This contains a plan of action, when, by whom, costs, and future maintenance.
- **Procurement.** The farmer/landowner does not always implement the measures themselves. If necessary, the catchment officer can help with procurement.
- **Implementation.** While the farmer/landowner is digging/working, the catchment officer can provide support by phone and on site. Adjustments are made in consensus.
- **Final inspection.** When the work is completed, an approval inspection is performed by the catchment officer.
- **Monitoring.** The catchment officer follows up the measure in collaboration with the farmer/landowner.
- **Reporting.** Contact with the relevant authorities is undertaken by the catchment officer. The catchment officer reports the implemented measures to the funding authorities. Arc-GIS is used for map construction.

### Suggestions for the future:

Suggestions for the future for an organisation with a catchment officer service at local level.

- Act locally to build up knowledge and commitment among stakeholders in the area.
- Find and prioritise farmers who have expressed a strong interest to start with
- Carry out a SWOT analysis at field/watercourse level with landowners – turn problem areas in the field into interesting sites for implementing measures.
- Develop a Local Action Plan for the watercourse and the farm together.
- Keep things simple. Use clear objectives.
- Set common objectives that generate a "win-win" concept - reduced eutrophication, climate adaptation, biodiversity and increased harvest.
- Holistic view - close to farmers/landowners and stakeholders

Västervik municipality is one of 20 pilots in Sweden that has been working with catchment officers since 2019 – the **LEVA Network**. The pilots are based in different areas; in regional boards, in municipalities and in WUPs. The Swedish Agency for Marine and Water Management has published a report based on interviews with catchment officers. The conclusions of the LEVA areas' experience are summarised in the report, and cost-effective measures and incentives have been identified. Finally, areas for improvement are identified and highlighted to strengthen the planning of measures. Planned and implemented local measures in the LEVA areas, as well as modelling in sub-basins, show that there is potential for more

voluntary measures against eutrophication in the agricultural landscape, even in a scenario where current levels of food production are maintained.

### Conclusions from the catalogue: New services for water management in agricultural landscapes - a catalogue of ideas and experiences

#### Conclusions and recommendations

The main conclusion is that new services have to be developed to solve the challenging and multiple issues relating to future water management in the agricultural landscapes of the Baltic Sea Region. The present services, incl. agricultural advisory services, are limited with 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 questions as to how the new services, such as catchment officers, are best organised and financed but merely provide examples. There is no single fit for all countries around the Baltic Sea Region. Nevertheless, the basic prerequisites for local collaboration, learning and implementation are more or less the same. This involves working across sectors and expertise and finding a balance between substance, procedures and relationships.

#### Recommendations:

1. Governments, regional and local authorities are strongly encouraged to pilot, test and expand the use of water management expertise and facilitation at catchment level, and/or connected to the implementation of river basin management plans, and to emphasise cross-sector, local level and holistic water management. The pilots and tests should ensure that landowners become involved in the solutions and only implement scientifically proven environmental initiatives.
2. Universities and higher education institutions are recommended to include “holistic water management” in their curriculums. It is about learning and understanding the combined management challenges of substance, procedures and relationships. It is envisaged that the request for such expertise will increase in the future.
3. State agencies should create agricultural schemes that work in practice. Environmental measures should be implemented through legislation, announcements, funding systems and guidelines for municipalities and the agricultural advisory services. Agricultural schemes should be transparent and based on market economy.

4. It is recommended that agricultural advisory functions strengthen their traditional agricultural support through water management expertise and thus expand their offer to customers. It is likely that financial support will increase for such win-win solutions for agriculture, water, climate adaption, nature and local communities, especially in the southern parts of the Baltic Sea Region affected by drought and flooding. However, farmers need qualified support in this process.
5. However, it is worth recommending an extension to the adviser’s skills based on a more holistic approach to water management as a relevant reference point in the provision of agricultural advisory services for farmer/landowners.
6. Waterdrive recommends the creation of local catchment teams with very different skills, teams that have to solve specific local challenges, skills such as ecology, water engineering, authorities/laws and the local design of measures. Support for local farmers and landowners at farm level by carrying out swot analyses and plans for local measures and implementing them. The challenge throughout the Baltic Sea region is that funding for such collaborations and local facilitators is often very difficult. Multi-actor and cross-sector collaboration always comes at a cost. This is often forgotten.
7. There is always a need for systemic and long-term data collection in local catchments, regular analysis and interpretation. Analysis data should be available to all stakeholders working together on local challenges.
8. The implementation of environmental measures needs educational programmes for, and training of, agricultural advisers, local facilitators, catchment officers and catchment teams and a close dialogue with local landowners and farmers.
9. Always be aware of capacity building throughout the whole chain if real implementation is to happen. Be prepared to remove any obstacles that will emerge as new environmental initiatives are implemented.

Compilation of answers from case areas and new service catalogue

<p>1. Monitoring</p>	<ol style="list-style-type: none"> <li>1. The water quality improvement perspective requires more specific and greater knowledge and skills – both as regards farmers and (private/government) advisory service experts. (Latvia)</li> <li>2. Improved access to data: need for an inventory of land drainage facilities and digitalisation of land drainage maps; need for a water/soil/climate/geology data management system that allows for point-based analysis (Poland)</li> <li>3. Improved local monitoring and most importantly, analysis and interpretation of data. Having long-term data would allow for the identification of appropriate water management solutions in the catchment (Lithuania)</li> <li>4. Network for monitoring water quality by local inhabitants and posting the data on a common specialised website on the Internet (Lithuania)</li> <li>5. Network for monitoring water quality by local inhabitants (municipal monitoring) and posting the data on a common specialised website on the Internet. (Russia)</li> </ol> <p><i>Improvement of local monitoring, analysis, and interpretation of data. Monitoring data available for all stakeholders on the web.</i></p>
<p>2. Test &amp; pilots</p>	<ol style="list-style-type: none"> <li>1. Lack of experience for monitoring the effectiveness of environmental measures (Latvia)</li> <li>2. Never leave a demonstration/case area without any progress being made (Denmark)</li> <li>3. The proposed measures (their type/location) should be analysed at catchment level (Poland)</li> <li>4. Improving farming practices via targeted promotion of agri-environmental measures, work closely with farmers to strategically transform their farms and farming practice to become more sustainable. Also, high-quality individual consultations focused on environmentally friendly farming practices tailored to the needs of a specific farm and result-based payments coupled with expert consultations.</li> <li>5. Demonstration sites in agricultural areas with implemented, advanced environmental water protection measures (modern controlled drainage systems, constructed wetlands, etc. (Lithuania)</li> <li>6. Increased knowledge provides greater understanding of the measures</li> <li>7. Demonstration site in agricultural areas with implemented, advanced environmental water protection measures, e.g. modern controlled drainage systems, constructed wetlands (Kaliningrad could not implement this. We would otherwise</li> </ol>

	<p>have included this as a first example and as an innovation for the Kaliningrad case area). (Russia)</p> <p><i>Case areas and demonstration sites for the implementation of agri-environmental measures are important as a first step in involving landowners. Pilots and tests must ensure that landowners become involved in local solutions and only implement scientifically proven environmental initiatives.</i></p>
<p>3. Agricultural schemes, AES</p>	<ol style="list-style-type: none"> <li>1. The catchment officer service should be connected to the Rural Development Programme (Latvia)</li> <li>2. Funding systems in the Rural Development Programme that can handle and fund multi-actor and cross-sector collaboration (Denmark)</li> <li>3. A Rural Development Programme that is more focused on solving the challenges, a programme that is flexible and offers more leeway (Denmark)</li> <li>4. Change the RDP programmes if they prove not to work. This will accelerate progress. (Denmark)</li> <li>5. Financing mechanisms should stimulate cooperation between beneficiaries to guarantee greater efficiency from investments. Development of criteria and indicators for evaluating applications to enable holistic and systemic solutions for water management in a given area; Allow multiple beneficiaries; Investment projects should be combined with soft measures (e.g. educational programmes as an obligatory element (Poland)</li> <li>6. Drainage renovation measures should be implemented in a catchment area with a holistic approach to decrease the nutrient load to waterbodies and to support effective farming practices. The renovation objects should be listed so that actions are targeted systematically, beginning with the objects most critical to drainage and nutrient loss (Finland)</li> <li>7. Responsibility for implementing measures cannot lie solely with individual stakeholders, but more comprehensive collaboration is needed. Every institution/organ should have a clear strategy to steer their activity towards better water management. This would subsequently lead to a sound ecological condition of water bodies in accordance with the Water Framework Directive (Finland)</li> <li>8. Most of the funding should be secured by the State, some can be sourced from the private sector, such as foundations. The aim is to protect the production economy and water quality as well as fisheries, biodiversity, the capital value of the land and the maintenance of infrastructure through the regional know-how of different stakeholders (Finland)</li> </ol> <p><i>Rural development programmes and funding systems for agri-environmental measures, catchment officers, catchment teams, water</i></p>

	<p><i>managers, water advisers and local facilitators are crucial for ensuring real progress in the landscape.</i></p>
<p>4. Spatial planning</p>	<ol style="list-style-type: none"> <li>1. Catchment area-based holistic water management planning focuses on the development potential of agricultural production and environmental protection as being as multi-dimensional as possible (Finland)</li> <li>2. Improved access to data: need for an inventory of land drainage facilities and digitalisation of land drainage maps; need for a water/soil/climate/geology data management system that allows for point-based analysis (Poland)</li> <li>3. The basis for investment/implementation should be the elaborated sub-catchment/area scenarios (e.g. Action Plans) for water resource restoration and management developed by expert teams in collaboration with water managers and farmers, landowners and other stakeholders (Poland)</li> <li>4. GIS systems with the necessary satellite and local data for planning agro-ecological measures in specific watersheds as well as popular visualisation maps available to the public (Lithuania)</li> <li>5. Develop a Local Action Plan for the watercourse and the farm in dialogue with stakeholders (Sweden)</li> <li>6. Keep things simple. Use clear objectives. (Sweden)</li> <li>7. Set common objectives that generate a "win-win" concept - reduced eutrophication and increased harvest (Sweden)</li> <li>8. Restoration/renovation measures should be implemented holistically at catchment level to reduce the external nutrient load and to enable efficient cultivation. Planned measures should be listed and prioritised in order to implement the most important measures first and thus target the most critical sources of nutrient loading (Finland)</li> <li>9. Drainage and soil condition surveys are key factors in planning measures in an agricultural environment (professional adviser to organise surveys). Measures should be based on the prevailing need and adapted to local conditions (topography, soil types, flow, economy and ecology, etc.). Cost-effectiveness, channel dimensioning/mass calculations and soil growth status (chemical, physical and biological status of the soil) must be taken into account in the design of measures. (Finland)</li> <li>10. Consolidation of water users in a joint decision-making partnership (WUP) and cooperation among local focus groups for the use of WUP tools (Russia).</li> <li>11. GIS systems with the necessary satellite and local data for planning agro-ecological measures in specific watersheds and popular visualisation maps available to the public (Russia)</li> </ol>

	<p><i>Holistic water management plans should be elaborated at local level in sub-catchment scenarios or through local action plans and developed by expert teams in cooperation with catchment officers, water managers, farmers, landowners and other stakeholders. Digitalisation of land drainage systems/ water/soil/climate/geology data management system that allows for point-based analysis for the establishment of new agri-environmental measures. The right measure at the right place.</i></p>
<p>5. Agricultural advisory service/municipality or other services</p>	<ol style="list-style-type: none"> <li>1. No experts in holistic water management. Rather, there are agricultural advisory experts</li> <li>2. Water advisers - To continue activities aimed at the introduction of a new type of agricultural advisory service into the national scheme for specialisations as approved by the Ministry of Agriculture and Rural Development as part of the national framework for agricultural advisory systems (Poland)</li> <li>3. Catchment officers in Natura 2000 areas or other local catchment-based actors are needed to work actively with catchment issues and stakeholders. Catchment officers would provide a crucial link to decision-making stakeholders who currently lack a local level in their decision-making. Catchment officers could be facilitators implementing catchment-based water management. (Lithuania)</li> <li>4. Consultancy (advisory) service of water management specialists (catchment officers).</li> <li>5. The task of the coordinators would be to point out/suggest/propose options (technical, procedural, economic) to the stakeholders, and to implement measures in accordance with the authority’s guidelines. 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. Advising (holistic approach taking into account the production economy and the environment) should be on a long-term basis and activate local actors. Catchment officer could form a link between governmental and local level. Experience has shown that the level of trust differs between local actors and authorities and advisory organisations. The work of the catchment officer cannot be covered by one person or organisation. Expert teams from different organisations should be resourced to improve holistic advice and catchment area renovation. Collaboration and team thinking could work across different sectors. (Finland)</li> <li>6. Online school for farmers in the case area (Russia)</li> </ol>

	<p><i>There is a need in the agricultural advisory service, in the municipalities and other services for water management specialists, catchment officers, catchment teams, water managers, water advisers and local facilitators to ensure more holistic water management in close collaboration with landowners.</i></p>
<p>6. Capacity building</p>	<ol style="list-style-type: none"> <li>1. This activity requires the involvement of an expert group with a holistic view; looking for a "balance" - an interdisciplinary approach based on specialist knowledge of agriculture, water, nature, biodiversity, forestry, climate (Poland)</li> <li>2. Long-term funding of catchment officers/catchment teams (Denmark)</li> </ol> <p><i>Capacity building requires the involvement of expert groups with a holistic view, searching for a "balance" and an interdisciplinary approach based on specialist knowledge in agriculture, water, nature, biodiversity, forestry.</i></p> <p><i>In terms of actual implementation, environmental tasks are often very dependent on long-term funding.</i></p>
<p>7. Education, training &amp; support</p>	<ol style="list-style-type: none"> <li>1. Increase in the number of students in drainage engineering programmes (Latvia)</li> <li>2. The expert team should support the Local Water Partnerships</li> <li>3. Educational activities aimed at farmers to get them to understand the water cycle/processes in the landscape and to shape their positive role in terms of impact on water quality and quantity; educational programmes dealing with agricultural practices within the context of efficient water use, reduction of water absorption in crops as well as agrotechnics -&gt; connection with Water Adviser (Poland)</li> </ol> <p><i>Expert teams should support local water partnerships as regards education and training in holistic water management, impact on water quality and quantity, agricultural practices in the context of water retention in the landscape, efficient water use and implementation of agri-environmental measures, agrotechnical solutions etc.</i></p>
<p>8. Multi-actor collaboration</p>	<ol style="list-style-type: none"> <li>1. Potential for the formation of a local action group leader in the case area (Latvia)</li> <li>2. Stronger collaboration between landowners, farmers, catchment officers, municipalities, the Nature Agency and local authorities. Together they have the skills to protect the environment and nature. (Denmark)</li> <li>3. Catchment officers are already established, but cross-sector catchment teams could be an option. (Denmark)</li> <li>4. Catchment teams (Finland)</li> <li>5. Further and deeper involvement in network for Local Water Partnership activities at national level to provide new, effective</li> </ol>

	<p>communication and managerial instruments allowing for participation in planning processes at county level of all relevant local actors (farmers and their organisations, other rural actors, agricultural advisers).</p> <ol style="list-style-type: none"> <li>6. Consolidation of water users in a joint decision- making partnership (WUP) and collaboration among local focus groups for the use of WUP tools (Lithuania)</li> <li>7. Act locally to create commitment between stakeholders in the area (Sweden)</li> <li>8. Conduct SWOT analysis with landowners at field/watercourse level</li> <li>9. Set common objectives that generate a "win-win" concept - reduced eutrophication and increased harvest. (Sweden)</li> <li>10. Holistic work close to farmers/landowners and stakeholders (Sweden)</li> <li>11. 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 carried out by the State. 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, (participant) associations, foundations, planners, contractors, researchers, advisers, farmers and landowners. (Finland)</li> </ol> <p><i>Consolidation of local partnerships, teams or networks to create commitment between all stakeholders in the area. Cooperation between landowners, farmers, catchment officers, catchment teams, water advisers, municipalities and local authorities to set common objectives that generate a "win-win" concepts for both reduced eutrophication and increased harvest for landowners.</i></p>
9. Implementation	
10. Monitoring	

STØTTET AF

**Promille**afgiftsfonden for landbrug