Centre for Economic Development, Transport and the Environment

REPORTS 74 | 2021

Baltic Sea Cooperation for Climate Resilience – Flood and Drought Risk Management

Conclusion report

PARKKILA PEKKA

Baltic Sea Cooperation for Climate Resilience – Flood and Drought Risk Management

Summary report

PARKKILA PEKKA

REPORTS 74 | 2021

BALTIC SEA COOPERATION FOR CLIMATE RESILIENCE - FLOOD AND DROUGHT RISK MANAGEMENT CONCLUSION REPORT

Centre for Economic Development, Transport and the Environment for Southwest Finland

Cover image:

ISBN 978-952-314-988-5 (PDF)
ISSN 2242-2854 (Online)

URN:ISBN:978-952-314-988-5

www.doria.fi/ely-keskus

Contents

Introduction

This report is a summary of the work that was done during the Baltic Sea Cooperation for Climate Resilience – Flood and Drought Risk Management project.

The project was funded by the Finnish Ministry for Foreign Affairs and supervised by the Finnish Ministry of Agriculture and Forestry. The project was coordinated by the Centre for Economic Development, Transport and the Environment of Southwest Finland, and it was conducted in cooperation with the Finnish Environment Institute, the Natural Resources Institute Finland and Centre for Economic Development, Transport and the Environment of Pirkanmaa.

The main goals of the project were twofold. Firstly, the project aimed to create an overall picture of the Baltic Sea countries regarding how each country has been implementing climate change adaptation methods in their respected areas and what are the best practices for Finland to implement. Secondly, the project aimed to create lasting networks between professionals of different nations to continue sharing knowledge between the Baltic Sea countries. The COVID-19 pandemic caused changes to the original project plans and hindered the networking efforts.

The project was executed by producing four reports based on four themes: adaptation of urban areas, adaptation of rural areas, adaptation in policy and adaptation of water supply and sanitation. These reports raised further questions that were investigated in series of three workshops, which were commissioned from Tyrsky Consulting Ltd.

This summary report will present the summaries of each of the produced reports. All the relevant findings and policy recommendations are gathered in the Conclusions section of this report.

Key conclusions include:

- Stakeholder involvement has a key role in climate change adaptation since most adaptation measures are done in a wide scale and involving a large variety of stakeholders from different backgrounds will help planners to form the best possible solutions.
- The need for knowledge. Almost all adaptation methods require more data to be utilised effectively. We require more information on the effectiveness of different methods and data to forecast problems, such as droughts.
- Stormwater management is a key to combating wastewater overflow. Therefore, nature-based solutions can have multi-beneficial effects on adapting to both droughts and floods if done in the watershed level.

Summaries of the reports

Adaptation to Climate Change in the Baltic Sea and Arctic Regions

Governance and policy tools across countries

Adaptation to Climate Change in the Baltic Sea and Arctic Regions: Governance and policy tools across countries – Report

Writers: Berninger, Kati; Tiusanen, Maria; Tynkkynen, Oras (2021) Tyrsky Consulting Ltd.

Language: EN

Link to the original report: https://urn.fi/URN:ISBN:978-952-314-929-8

Objective and methods

The objective of this study was to collect and synthesize information about climate adaptation policies and governance in the Baltic Sea and Arctic regions. The countries and territories included are Sweden, Denmark, Faroe Islands, Greenland, Norway, Iceland, Germany, Poland, Estonia, Latvia, Lithuania, Russia, Belarus, Canada and the USA. The results of the study will be used to develop the adaptation policy and processes in Finland. Hopefully, it can also inform and inspire other countries. The report is based on a literature study about adaptation planning and coordination in the target countries and regions. The document review was complemented with interviews of national experts.

Synthesis of the results

Broadly speaking, large western and Nordic countries as well as older countries have more advanced adaptation policies and governance. The USA is somewhat of an outlier mainly because of its highly irregular federal leadership on climate action. On a more detailed level, the studied countries and regions show both significant similarities and notable differences in approaches. Five have both a national adaptation strategy and plan, two have only a strategy and two have only a plan. Faroe Islands, Greenland, Iceland, Belarus and the USA do not have such documents yet. Some countries have preferred to integrate both mitigation and adaptation in the same strategy. On sectoral adaptation work, the approach differs from mandatory sectoral action plans in Sweden to no separate sectoral adaptation documents at all in Germany, Lithuania and Poland. In most other countries, a few key sectors have prepared adaptation strategies or action plans. Finland, Germany and Sweden have regular reporting and reviewing cycles, and Lithuania has a regular reporting cycle. Other countries seem to have more ad hoc reporting and reviewing cycles, or the system is just being developed. Only Finland and Norway have laws that include adaptation governance at the national level. Germany does not have a dedicated law at a federal level, but nine federal states have established legislation on adaptation. The ministry in charge of adaptation is in most countries the ministry of the environment, which indicates that adaptation is still seen as an environmental issue. In Finland, the ministry in charge is the Ministry of Agriculture and Forestry, whereas in Denmark it is the Ministry of Climate and Energy. The most common approach in regional and local adaptation work is that subnational adaptation strategies are voluntary, but they are supported by projects (e.g. Germany, Poland, Norway). However, regional adaptation plans are obligatory in Sweden, as local adaptation action plans are in Denmark. Both countries provide support for the subnational level. Countries use national adaptation strategies and action plans to set priorities for policies and action. The processes for setting the priorities vary but may involve inter-ministerial committees, expert working groups, stakeholder dialogues and public consultations. Sources include vulnerability and risk assessments, existing scientific literature and specifically commissioned studies. Priorities are defined in various ways but

often cover different sectors (e.g. health) and cross-cutting measures (e.g. information). Some priorities focus more on concrete measures and tools. Several countries underline the need to mainstream adaptation and integrate it into existing processes and governance levels rather than dealing with it as a stand-alone issue.

Most countries have governmental working groups in place to coordinate the work across sectors. In some countries, these working groups include representatives of different stakeholders. Subnational working groups also exist in some countries – for example, there is a coordination network for municipalities in Denmark.

Stakeholder engagement varies from non-existing in Russia and Belarus to a systematic involvement process in, for example, Germany. Methods include hearings, workshops and seminars and involvement in official working groups. Knowledge sharing is an important part of stakeholder engagement. Denmark, Germany, Norway, Poland and Sweden have a dedicated portal for sharing information on adaptation. Finland has a climate change portal that includes both mitigation and adaptation issues.

Several sources of EU funding are available for financing adaptation research, planning or measures, mainly for EU countries. They include structural funds, LIFE programmes and EU research programmes. Norway funds adaptation in, for example, Estonia and Latvia. National funding for improving the knowledge base includes research and innovation funding. Moreover, for example, Sweden, Denmark, Norway, Germany and Canada provide funding for various adaptation activities, also at a local level.

International cooperation forms an integral part of development cooperation in countries like Germany and the Nordic countries. The countries around the Baltic Sea (Estonia, Finland, Denmark, Germany, Latvia, Lithuania, Poland and Sweden) are collaborating around the implementation of the Baltic Sea Region strategy and action plan for adaptation. Neighbouring countries (Belarus, Iceland, Norway and Russia) are also involved. Finland, Norway, Russia and Sweden take part in the Barents cooperation. Canada, Finland, Denmark, Iceland, Norway, Russia, Sweden and the USA are also members of the Arctic Council. Local cooperation across borders is often established around flood risk or water management planning. For example, Poland cooperates with Germany in flood protection on the Odra River and Denmark with Germany and the Netherlands in the adaptation of the Wadden Sea.

The biggest challenges in the adaptation policies across countries cluster around three issues: the need to improve the awareness and political priority of adaptation, challenges in coordination across sectors and levels and the lack of funding or human resources dedicated for adaptation. In addition, the need for more knowledge, capacity and tools or technologies is also mentioned.

Recommendations

Based on the best practices and identified gaps from other countries, we propose the following preliminary recommendations for Finland:

1. Foundational work
   - Introduce a systematic and iterative process
   - Set clear goals and indicators
   - Present sectoral strategies
   - Focus more on the Arctic
2. Local adaptation action
   - Require municipalities to prepare plans
   - Allocate funding to local and regional work
   - Establish a nation-wide municipal cooperation body
3. Information and visibility
   - Set up a master’s programme on adaptation
   - Establish a competition for adaptation actions
4. Dialogue and coordination
   - Set up a Climate Adaptation Leaders Forum
   - Establish a cooperation body for health and social adaptation
5. International cooperation
   - Take initiative to create a joint Nordic adaptation policy

Baltic Sea Cooperation for Climate Resilience / Adaptation of Water Supply and Sanitation

Good practices on managing sewer overflows and WWTP bypasses

With the climate change bringing more torrential rains, there is increased need to manage and reduce combined sewer overflows (CSO) and wastewater treatment plant (WWTP) bypasses resulting from rain events. Overflows and bypasses can have harmful local consequences for the environment and even for human health. CSOs and bypasses are in essence diluted with rainwater but nowhere near clean – and as has become evident, urban runoff is by no means clean water either. CSOs and urban runoff have also been noticed as sources of pollution in the evaluation of the urban wastewater treatment directive (91/271/EC), which until now has only taken notice of CSOs in the footnote.

The purpose of this study was to ascertain how overflows and bypasses are managed in other countries of the Baltic Sea region. The amount of existing literature on the topic is limited and mostly available in the language of the country where it was written. For this reason, the material was mostly gathered as interviews from water utilities and national water utility associations and from some researchers. Example cases were found in Estonia (Tallinna Vesi), Sweden (VA SYD), Denmark (Aarhus Vand, VA Svendborg) and Germany (Hamburg Wasser). The scope of the study is very broad, and detailed technical comparisons were left out.

In overview, management practices were largely similar in the studied countries. There was no single solution that could be introduced as completely new, but some utilities had interesting approaches to old problems.

The primary solution for reducing overflows and bypasses in all the countries was to separate existing combined sewers. Another measure practiced by all the interviewed utilities was local management on runoff by green infrastructure, in public spaces as well as on private property. Eliminating runoff from private properties was considered pivotal yet challenging. Therefore, some of the interviewed utilities had estimated it was cost-efficient to offer a payment to property owners if they agree to manage stormwater locally on their property instead of directing it into the sewer. VA SYD and Aarhus Vand had also allocated staff to communicate with private property owners about runoff management issues. Aarhus Vand and VA SYD had also put great effort into finding and eliminating all the sources of excess water leaking into the sewers.

The most prominent technical feature was sewer control systems coupled with meteorological data. Such systems were being developed on the utility level, but also in larger research projects (NOAH, Future City Flow). Using weather data to (semi-)automatically operate sewer systems according to the flow enables the optimisation of the existing system capacity and changes the approach from reactive to proactive. Such systems would, of course, require a high level of digitalisation and widespread monitoring of the network, which requires funding.

One major challenge encountered everywhere was the lack of usable data – regarding both the network and the amounts, causes and effects of overflows. Data is necessary for the water utilities to operate their network and to plan ahead. Sufficient data is also needed in order to draft effective legislation that does not become disproportionately costly. The vicious cycle here is that data is required for better and cost-effective planning, but acquiring more data requires investments.

Other common challenges were the lack of room for building new infrastructure, above and below

Centre for Economic Development, Transport and the Environment

Baltic Sea Cooperation for Climate Resilience / Adaptation of Water Supply and Sanitation

Good practices on managing sewer overflows and WWTP bypasses – Report

Writers: Valkonen, Kaisa; Lindqvist, Pepe; Syvälä, Riitta (2021) ELY-Centre of the Pirkanmaa Region

Language: FI

Link to the original report:
https://urn.fi/URN:ISBN:978-952-314-904-5

ground, and the pressure for tightening the price cap. That is why Svendborg had begun implementing a system for analysing wider environmental-economical-societal benefits when choosing a renovation method. Aarhus Vand has another approach, as it is partnering in a project to create affordable methods for network and overflow monitoring and data acquisition.

This study confirmed that overflow management more or less equals stormwater management. No solutions for local treatment/handling of overflows or bypasses came up in the examples. This emphasises the importance of renovation measures and network design and surveillance as well as green infrastructure. To avoid having to build emergency solutions in the future, it is important to consider the effects of climate change in contemporary planning. Problems with privately owned sewer pipes and lacking data quality also came up frequently in recent Finnish projects concerning overflows.

Despite the differences in responsibilities, storm water management was seen as a grey area everywhere. In Sweden and Denmark, a design rain is used to divide the responsibility between the municipality and the water utility. However, public spaces and private properties complicate the mix.

To summarise, solutions exist, but the room and resources for implementing them are limited. The question lies in allocating the measures so that they are sufficient for environmental health within the available resources.

The three focal points found in the study that require more attention are

1. Data quality and acquisition
2. Network management and design
3. Management and treatment of storm water.

Data is needed to make better decisions and for planning, and affordable measuring techniques are required to acquire better data. Decision support methods analysing the environmental health risks and the cost-benefit ratio of the options are therefore recommended, as are methods for optimising the existing infrastructure, be it a sewer network or public spaces for water retention. Storm water is at the root of everything, but the responsibilities around it are unclear. It is likely that there will be requirements for stormwater quality in the near future.

Natural Flood Risk Management Solutions in the Baltic Sea Region

This report describes the current state of natural flood risk management and its strategies, challenges and good practices in the coastal Baltic Sea countries (Finland, Sweden, Denmark, Germany, Poland, Estonia, Latvia, Lithuania). The conclusions and recommendations presented in the report are based not only on a country-by-country review but also on other literature related to the topic.

Floods are the most common and damaging natural disasters in the world, and climate change is expected to increase the risk of flooding. Flood risk has also increased in the Baltic Sea region due to factors affecting the flood water retention capacity in the environment, such as urbanisation, intensified agriculture and changes in forestry. Natural flood risk management has been used to try and divert these trends and increase the use of natural, multipurpose and cost-effective methods. The methods include wetlands for retaining flood waters, restoring flood forests and the natural meandering of rivers, utilising and restoring flood-prone areas, runoff water infiltration and using water-permeable surfaces instead of asphalt.

Implemented natural flood risk management measures focus mainly on small-scale solutions, often in urban areas, but to gain wider benefits in flood risk management, measures should be implemented in a large scale and in catchment areas. The report is mainly focused on large-scale measures, primarily ones related to the requirements of flood risk management that could be utilised in other countries or regions. Some measures that can be easily utilised include the methods used for the planning and evaluation of measures, although clear development needs were also identified for them, such as considering diverse benefits.

Based on the report, measures for natural flood risk management have been implemented in all Baltic Sea countries. The largest amount of experience concerning natural flood risk management has been amassed in Denmark, Poland, Germany and Sweden. Different types of floods have been taken into account, but natural measures have mainly been focused on small-scale runoff water floods. Natural measures should be implemented on a broad scale for them to have an impact on flood risk management. Effective means of promoting natural flood risk management at the state level include strategies that include concrete measures and opportunities for organising funding. Some measures that have been found useful are early stakeholder participation and extensive cooperation, highlighting the diverse benefits especially in the long term, widespread awareness of different methods and their benefits, and monitoring and documentation for the needs of future projects.

SYKE
Finnish Environment Institute

Natural Flood Risk Management Solutions in the Baltic Sea Region – Report

Writers: Parjanne, Antti; Marttunen, Mika
(2021) Finnish Environment Institute

Language: FI

Link to the original report:
http://urn.fi/URN:ISBN:978-952-11-5348-8

Drought Risk Management in the Baltic Sea Region

Climate change related weather phenomena are estimated to become more common in the Baltic Sea region. Drought periods that occur during growth seasons diminish the water resources that are usable for the crops, resulting in the subnormal yields. Severe drought seasons will increase the prices of the produce and reduce the amount of fodder for the livestock, which may lead to forced butchering of animals. The drought of 2018 caused severe financial losses to agriculture in many Baltic Sea countries. Long drought seasons will also reduce the amount of water that is usable for a communal water supply, and water companies may have to begin regulating water usage. Reduced surface waters can also have a negative effect on wildlife, water transport and recreational activities.

Drought seasons have forced Baltic Sea countries to subsidise the financial losses caused by the drought and seek proper adaptation methods for future droughts. This report mainly focuses on agricultural adaptation methods. The main methods for drought risk management in agricultural sector involve cultivation methods that increase and maintain soil's ability to absorb moisture, such as reduced tillage and increasing soil's organic content. The possibility of drought should be considered when planning crops and crop rotations.

A plant's water intake can only be truly increased through irrigation. Cost-effectiveness of irrigation on cereal and forage production has been researched. If irrigation turns out to be increasingly cost-beneficial, water storing during spring runoff should be increased. Catchment area level planning and investments for water storage is required.

Difficulties on water management caused by drought periods have so far been local and mostly limited to the islands in the Baltic Sea. If the water consumption increases significantly due to irrigation, communal water supply companies should taka part in the planning of catchment level water use and storing to ensure water supply in future scenarios.

Luke
NATURAL RESOURCES INSTITUTE FINLAND

Drought Risk Management in the Baltic Sea Region – Report

Writers: Salo, Tapio; Myllys, Merja; Parkkila, Pekka (2021) Natural Resources Institute Finland (Luke)

Language: FI

Link to the original report:
http://urn.fi/URN:ISBN:978-952-380-327-5

Conclusions

Adaptation of urban areas

Climate change related risks for urban areas are a combination of a high population density and heavily constructed landscapes where buildings and pavement interfere with the natural flow of water.

Urban areas are facing risks of both fluvial and pluvial floods but also coastal floods. Due to the concentrated nature of infrastructure in urban areas, large water management efforts may be hard to implement. Also, droughts and long summer heats can form a problem to urban areas in the form of heat islands. Intense heat can cause risk for health and infrastructure.

Commonly used solution to mitigate both issues is utilising a combination of nature-based solutions (NBS) and traditional water management methods (Grey methods). This can mean adding more green surface areas in the form of green roofs and walls to absorb the water or small ponds and storing the excess water to be used later in a heat period as a cooling or watering instrument. Heaviest cloudbursts will still require traditional methods to remove water from imperviable surfaces. This requires more excessive use of the separate sewage systems and methods to manage overflows.

Fluvial floods are especially a problem for urban areas that have a river with a large upstream watershed. Fluvial flood management can be separated into two different principles: directing waterflow to a less harmful location or by water retention. Urban areas always have limited space to use either method, so fluvial flood risk protection should be done upstream before water enters heavily constructed areas.

Planning flood management solutions in rural areas can ideally be multifunctional and also aid rural areas to combat drought.

The Natural Flood Risk Management Solutions in the Baltic Sea Region report gives following recommendations for flood risk management in urban areas:

Recommendations for policy and finance instruments

Nature-based solutions do not need their own strategy or program, but they should be integrated into a more large-scale policies, such as climate change adaptation or nature risk management.

Strategic flood risk management, which considers not just natural solutions but also different synergy options, should be included in every flood risk management plan. Ecosystem-based flood risk management and setting goals together with water management, nature conservation and ecosystem services should be considered as a part of higher-level planning. This kind of planning should involve multidisciplinary group of experts of different fields. Same principle should be used in the decision-making where different views from various levels of governance is important.

Using and combining different kinds of financial options is a requirement for implementing truly integrated solutions and to gain the multi-beneficial outcome. On a national level, it is important to actively advertise the different available financial instruments and to give guidance to local and regional operators on how to utilise and apply different financial instruments. Creating positive conditions for international cooperation is also important.

On both national and international level, there should be more support for finding innovative solutions for financial instruments and payment systems, such as stormwater bills or lowered taxation.

Finance for nature-based measures can also be looked through other benefits than flood risk management, and win-win solutions in which costs can be divided to several beneficiaries should always be favoured.

Solutions that support planning and implementation

Goals for flood risk management should be sufficiently detailed. However, implementation should be done in a large scale. In order to consider nature-based flood risk management in the early stages of the planning process and to identify all the viable options, it is important to use a checklist that contains all possible flood risk management

methods and compile a list of the usable case-specific methods from it. At the same time, it is important to gather information on the already implemented methods, by creating a costs and benefits analysis, and the effectiveness of different methods. This data can then be utilised on the planning of next implementations.

It is recommended to begin by solely looking for nature-based solutions. If that is not possible, it is recommended to chain up smaller nature-based implementations. If that is not possible, turn to hybrid models in which nature-based solutions are combined with Grey methods. And lastly, if there are no other prementioned options, Grey measures should be used. Grey methods are especially useful when fast adaptation methods are needed.

Whichever method is selected, it should be planned in a way that it can be supplemented by other methods if adaptation to climate change requires it.

Participation and cooperation of different stakeholders

Cooperation with different stakeholders is vital for the success of a flood risk management project. This becomes emphasised on projects in which measures are done at a watershed scale and there are multiple stakeholders. By incorporating a large variety of stakeholders and finding solutions that all can stand behind, one can ensure that a project has a higher chance of success.

It is important that the planning team also includes representatives from a wide range of disciplines in order to ensure that the benefits of nature-based solutions for different goals are achieved. The multidisciplinary team should include, for example, spatial planners with a good overview of the area, water management experts with hydrological and technical expertise and limnologists/biologists having expertise on habitat preferences of certain species. Spatial planners can also bring knowledge of nature-based solutions into a zoning process and through that nature-based solutions can be more easily taken into consideration on a strategic level planning in the region.

Other important aspects are increasing policy maker commitment to the nature-based solutions and the participation of local inhabitants. Regional level officials can have a crucial role on bringing crucial knowledge of NBS and good practices to the attention of flood risk management projects and to the politicians who in the end decide on what actions come to fruition.

Dataflow and sharing

A precondition to implementing nature-based solutions is to have more effective methods and practical knowledge. Knowledge is required to make valid arguments during decision-making and to rouse public debate. For the nature-based solutions to become prominent methods, we need stronger guidelines and training at the national level. There is still a need for pilot projects that will demonstrate newer methods and their combinations and to monitor their impacts and effectiveness. A typical problem is that the monitoring ends when the project ends. Most of the ecological benefits, for example, will be achieved in a longer time period.

Needs of further research on nature-based solutions

- More knowledge on how large-scale, nature-based solutions can be utilised in rural areas and on a watershed and regional level.
- More knowledge on how effective the combinations of nature-based solutions and grey methods, so called hybrid methods, are.
- More knowledge on how we can effectively change grey systems into a more natural direction or how to supplement existing structures with additional nature-based solutions.
- Comprehensive evaluation of nature-based solutions and what is the best way to approach all possible stakeholders.
- More knowledge on the monitoring of already existing measures, knowledge on upkeep costs and on the effects on quality – especially for health and welfare.
- More knowledge on how to simplify existing data to better support decision-making.
- More knowledge on the effects of winter conditions on different NBS methods. For example, how ice and snow affects permeable surfaces.

Adaptation of rural areas

Rural areas suffer from both droughts and floods, and the risks caused by climate change to rural areas are most notably in a form of yield losses of crops through either too much or too little water. In Finland, drought is and will be irregularly occurring temporary situation that is often overshadowed by flood risks since floods usually occur suddenly and create more direct damage than droughts do.

Therefore, adaptation of rural areas should be focused on overall water management in which methods can affect both risks at the same time.

The Drought Risk Management in the Baltic Sea Region report gives the following recommendations for drought adaptation:

Data based service for prioritising drought risk prevention methods

A need of a service that will calculate the need of irrigation based on different types of crops, soil types and weather data/forecasts. This calculation would be complemented by water flow data. A user can estimate the effects of drought periods on different watersheds and direct adaption measures to the most critical places. This data can then also be used as a part of early drought warning system.

More knowledge on water conserving soil cultivation

More data should be gathered on water conserving soil cultivation and soil improvement methods. Also, a quantitative estimate on how much each method increases water availability to crops. This knowledge should be used to create instructions on how to apply different water conservation methods.

Effectiveness analysis on drought prevention methods

Knowledge on how different methods like soil cultivation, breeding of crops or water storages create benefits. Continued by a cost-benefits analysis. This data would give better understanding about the suitability of different measures in different situations.

Clear instructions for acquiring irrigation permits

In many cases, farmers have issues finding a reliable source of water to be used in irrigation. There is a need to make clear instructions on acquiring irrigation permits: when do you need one and how do you apply for it.

Watershed-level planning for water management

Watershed-level planning of nature-based flood risk management should also include water storage pools. We should have better knowledge on how and where water storage pools can be established. This data should include an analysis of soil types drought sensitivity, forms land use and suitability for specialized crops, such as lettuce or strawberries.

Watershed-level planning together with flood and drought risk management can have multi-beneficial outcomes and, therefore, it is highly recommendable. Multi-beneficial solutions should have better chance of acquiring financial support. Currently, there are no form of financial support for water retention actions if the storage pool is primarily used for irrigation purposes.

Use treated wastewater in irrigation

Treated wastewater could be used as a water source for crops, such as sugar beet or starch potato. Unfortunately, this method is only usable during summer, but it could potentially benefit crop yields and nutrient management in waterbodies.

More knowledge is required on what are the parameters that wastewater could be used within. To make this method viable, there is a need for some legislative work and consumer atmosphere should also be made more acceptable towards the use of treated wastewater.

Adaptation of water utilities

Although heavy rains can influence water quality of surface water sources, drought is the main risk concerning water supply and storm waters are the main risk concerning wastewater treatment plants. Drought causes increased water consumption and reduced water resource, which can lead into water shortages caused either by the lack of water or the lack of transportation capability.

The Drought Risk Management in the Baltic Sea Region report gives following recommendations to combat drought-related problems in water supply:

Reduction of leakage through automatic measuring

Leakage prevention in freshwater pipelines is one of the most sustainable ways to save water. This becomes increasingly important during dry seasons. The Danish example on reducing leakage could be a viable option also for Finland. By increasing the amount of remote readable flow meters, water companies can pinpoint even smallest ruptures quickly and begin the repair process.

Taxation benefits for water companies in return of low leakage

Finland should consider using flexible taxation/fine procedure on water companies based on the Danish leakage prevention model that leans on financial incentives and in which under 10% leakage gets taxation benefits. This will give water companies a strong incentive to start fixing ruptures and, therefore, save water and reduce the need of constantly finding additional water sources.

The Baltic Sea Cooperation for Climate Resilience / Adaptation of Water Supply and Sanitation report gives following recommendations for managing risks in wastewater treatment:

Stormwater management

Stormwater management is also a part of climate change adaptation for wastewater treatment plants. Controlling stormwaters will also help managing overflows and bypasses. Responsibilities for stormwater management require clarification. In future, it is possible that the quality of stormwaters will also be regulated by law.

None of the WWTP facilities that were studied in the Adaptation of Water Supply and Sanitation report had specific actions for treating overflows and bypasses. Local overflow and bypass treating solutions should be a subject of further studies since total overflow prevention is not always possible.

Infrastructure management and long-term designs

Wastewater and stormwater networks' condition should be known better by the operators for them to optimally utilise the network capacity. Increased rainfall due to climate change should be considered when designing new pipeline and treatment systems. Designing process should also include risk and cost benefit analyses and decision-making tools to reach an optimal outcome.

Data collection, parsing and sharing

Data is required for better decision-making and to avoid implementing useless methods. This requires further studies on the effectiveness of different methods but also real time network flow data to identify where the problem areas are.

Data gathering should be able to be conducted without unreasonable costs. New and affordable measuring methods are required to accomplish this.

Adaptation for policy and education

The Adaptation to Climate Change in the Baltic Sea and Arctic Regions report analysed governance and policy tools in other Baltic Sea countries. Based on the best practices and identified gaps from other countries, the report proposes the following preliminary recommendations for Finland:

Introduce a systematic and iterative process

Clearly schedule the periodic monitoring, evaluation and updating of the adaptation policy. This leads to an iterative planning cycle, which enables learning and adjusting plans according to lessons learned.

Set clear goals and indicators

Integrate quantitative goals for different sectors and measures in the adaptation policy. Regularly follow the progress towards these goals with a set of indicators available in a public dashboard.

Present sectoral strategies

Complement overarching national policy with adaptation strategies for key sectors. Delegate the task to sectoral ministries and their national agencies in cooperation with key stakeholders.

Focus more on the Arctic

This should happen together with neighbouring Arctic countries and the Saami Parliament. The Saami should also be supported in their adaptation planning and action.

Require municipalities to prepare plan

Municipalities could meet the requirement individually or together, for instance at the level of urban regions. To help in preparing these plans, municipalities should be provided training and expert assistance.

Allocate funding to local and regional work

The funding can be both investment and project support for local and regional adaptation measures. Also funding for awareness raising for different target groups would be useful.

Establish a nation-wide municipal cooperation body

The role of the body would be to raise awareness and exchange experiences about local adaptation work. The body could be integrated into existing cooperation models in mitigation (e.g. Hinku and Canemure) or set up separately.

Set up a master's programme on adaptation

The programme could be a joint undertaking by several universities, possibly including universities in neighbouring countries.

Establish a competition for adaptation actions

The open competition would showcase concrete actions by, for example, local governments, companies, universities and civil society.

Set up a Climate Adaptation Leaders Forum

A high-level forum should raise the profile of adaptation action and bring together key decision makers from various fields and sectors.

Establish a cooperation body for health and social adaptation

The health and social sector are still behind other sectors in adaptation planning. A good model is from Canada where the Canadian Coalition for Global Health Research (CCGHR) established a Working Group on Climate Change and Health (WGCCH).

Take initiative to create a joint Nordic adaptation policy

Nordic cooperation is an important forum for ambitious policy initiatives. However, there is no joint policy or action plan in adaptation. Finland should take initiative to create it.

DOCUMENTATION PAGE

Publication series and numbers
Reports 74/2021

Area(s) of responsibility
Environment and Natural Resources

Author(s)
Pekka Parkkila

Date
December 2021

Publisher
Centre for Economic Development, Transport and the Environment for Southwest Finland

Financier/commissioner
Ministry of Foreign Affairs of Finland

Title of publication

Baltic Sea Cooperation for Climate Resilience – Flood and Drought Risk Management
Conclusion report

Abstract

This report is a summary of the work that was done during Baltic Sea cooperation for climate resilience – drought and flood risk management -project.

The project was funded by Finnish ministry of foreign affairs and supervised by Finnish Ministry of agriculture and forestry. Project was coordinated by the Centre for Economic Development, Transport and the Environment of Southwest Finland and it was conducted in cooperation with Finnish environmental institute, Natural Resources Institute Finland and Centre for Economic Development, Transport and the Environment of Pirkanmaa.

Main goals of the project were twofold. Firstly, project aimed to create an overall picture on the Baltic sea nations regarding how each nation have been implementing Climate change adaptation methods on their respected areas and what are the best practices for Finland to implement. Secondly to create lasting networks between professionals on different nations to continue sharing knowledge between Baltic Sea countries. Covid 19- pandemic caused changes to the original project plans and hindered the networking efforts.

Project was executed by doing four reports, based on four themes: adaptation of urban areas, adaptation of rural areas, adaptation in policy and adaptation of water supply and sanitation. From these reports rouse further questions that were investigated in series of three workshops, that were commissioned from Tyrsky consulting ltd.

This conclusion report will present the summaries from each of the constructed reports. In the conclusions section of this report are gathered all the relevant findings and policy recommendations.

Keywords
Baltic Sea, cooperation, climate resilience, flood management, drought risk management, flood, drought
Conclusion report

ISBN (print)	ISBN (PDF)	ISSN-L	ISSN (print)	ISSN (online)	
	978-952-314-988-5			2242-2854	
www		URN		Language	Number of pages
www.doria.fi/ely-keskus		URN:ISBN:978-952-314-988-5		English	19

Place of publication and date
Seinäjoki 2021

REPORTS 74 | 2021

BALTIC SEA COOPERATION FOR CLIMATE RESILIENCE – FLOOD AND DROUGHT RISK MANAGEMENT
CONCLUSION REPORT

Centre for Economic Development, Transport and the Environment for Southwest Finland

ISBN 978-952-314-988-5 (PDF)

ISSN 2242-2854 (Online)

URN:ISBN:978-952-314-988-5

www.doria.fi/ely-keskus | www.ely-keskus.fi

Ministry for Foreign Affairs of Finland

TYRSKY consulting

Luke
NATURAL RESOURCES INSTITUTE FINLAND

SYKE
Finnish Environment Institute