MOMENT
modern water management

LAND USE

– FARMING, FORESTRY AND WATER

MOMENT
modern water management

RESULTS

THE MOMENT PROJECT

BACKGROUND

The MOMENT project has been implemented through cooperation between seven regions in four countries around the South Baltic Sea. All regions are members of the Euroregion Baltic (ERB) that was established in 1998 with the main objective to develop a long-term, politically governed cooperation between the member regions.

The project has aimed at reducing the discharge of nutrients and hazardous substances to the Sea by using modern water management methods. This has included the establishment of Water Users Partnerships (WUP), allowing a "bottom up" approach starting at a local level and working within river catchment areas independent of administrative boundaries.

A central part of the MOMENT project has been to carry out a number of concrete actions of best practice character, aiming at disseminating sustainable technology, decreasing outlet of nutrients and hazardous substances, and/or minimizing the negative effects of these substances, all actions aiming at enhancing the environmental status of the Baltic Sea. Thirteen innovative pilot area measures have been implemented. The project has been co-financed by the South Baltic Cross-border Cooperation Programme 2007-2013.

IMPLEMENTED CONCRETE ACTIONS

I. LAND USE:

Wetlands for nutrient reduction and fish reproduction, Kalmar, SE (Report 4.1.1)
Forestry and water, Kalmar, SE (Report 4.1.2)
Effective uptake of nutrients, Torsås, SE (Report 4.1.3)
Forestry and water quality management, Torsås, SE (Report 4.1.4)

II. SEWAGE FROM SINGLE FAMILY HOUSES:

Solutions for treatment of waste water from single houses, Kalmar, SE (Report 4.2.1)
Biogas production using sludge from small scale sewage plants, Ronneby, SE (Report 4.2.3)

III. TREATMENT OF STORMWATER:

Stormwater management plans for Gargzdai and Priekule towns, LT (Report 4.3.1)
Ecological adapted stormwater treatment, Kalmar, SE (Report 4.3.2)
Ecological adapted stormwater treatment, Kretinga, LT (Report 4.3.3)
Stormwater treatment in central urban areas, Kalmar, SE (Report 4.3.4.1)
Restoration of stormwater polluted recipients, Kalmar, SE (Report 4.3.4.2)

IV. INFORMATION AND COMMUNICATION:

GIS information system, Gdansk, PL (Report 4.4.1)
Information campaign on phosphorus free detergents, Klaipeda, LT (Report 4.4.2)

THEMATIC AREA

LAND USE – FARMING AND FORESTRY

The picture shows the pond part of the wetland for sedimentation and irrigation.

Four studies have been carried out within the thematic area Land use – farming and forestry. They deal with methods for reducing nutrients and hazardous substances, stakeholder cooperation, classification and advisory methods for water in forests and fish reproduction.

The focus has been on small and diffuse sources of pollution and developing innovative best practices. All of them have been implemented in two pilot areas in Kalmar County, Sweden – Bruatorp River and Snarje stream catchment areas in Torsas and Kalmar Municipality respectively.

HIGHLIGHTS OF THE ACTIONS:

1. **Design and construct a wetland with multipurpose use.**
2. **Application of a holistic system for classification of waters in forests and a new advisory approach to land owners on how to take water issues into consideration in forestry.**
3. **A model developed for how to, through a holistic view, bottom up perspective and stakeholder cooperation increase the number of concrete water actions in a specific catchment area. Concrete examples of actions.**
4. **Demonstrations of simple, cheap and effective measures for improved upstream water quantity management in river basins.**

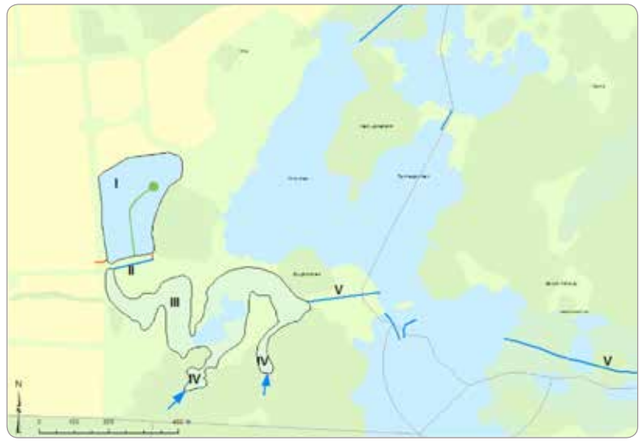
WETLANDS FOR NUTRIENT REDUCTION AND FISH REPRODUCTION IN SNARJE STREAM BASIN, SWEDEN

INTRODUCTION

Wetlands perform an array of ecological functions in what we have only recently begun to appreciate. In Sweden, land owners could receive national support to drain wetlands until the beginning of the 90´s as they were rather seen as a hazard than a resource. Today, scientists recognize the environmental benefits that wetlands provide, and now state the importance of preserving rather than eliminating our wetland resources. Wetlands can have many different functions, e.g. it can purify water by reducing hazardous substances, it can be used for irrigation, it can prevent flooding, it can create habitats for fish and wildlife or simply just be a site for recreation.

DECLINE OF PERCH AND PIKE

In the south eastern part of Sweden a severe decline of perch and pike populations have been noticed since the 1980s. The reason for this is not known but one reason could be that their natural breeding habitats have in many areas decreased due to drainage or overgrowth of vegetation. Re-establishing wetlands, in a proper way, could therefore not only reduce excessive nutrient loads reaching the Balic Sea but also create vital breeding habitats for declining pike and perch populations.



The wetland area at Stavlo, Kalmar Municipality.

MULTIPURPOSE WETLAND

Kalmar municipality has since many years recognized the problems of eutrophication and the decline of perch and pike populations in the nearby coastal areas. This resulted in the project idea with the main objective to construct a multipurpose wetland that both reduces amounts of nutrients and at the same time enhances fish reproduction. Wetlands are usually made for one purpose, this study presents the process and work to design and construct a wetland for multipurpose use.

Wetland description

I. Underwater zone – pond for sedimentation and recycling of phosphorus. This pond is also used for irrigation.

II. Binding of loose phosphor in for example limestone cartridges.

III. Marsh – Wetland with denitrification and good environments for fish reproduction.

IV. Phosphorus traps in the form of deeper batches close to the entrance from the ditches. Particles can be deposited. Can be complemented with limestone cartridges in order to manage unbound phosphorus.

V. Recreated migratory routes.

THE WETLAND PROCESS

Once a site was selected (Stavlo north of Kalmar urban area) the planning and design of the wetland could start. The wetland includes two parts: a pond with a combination of nutrient reduction through sedimentation, plant uptake, denitrification and irrigation, and a wetland where the nutrients are separated and fish reproduction is stimulated. The wetland part requires special permission from the Environmental Court, since the water area exceeds 5 hectares. Therefore the pond part of the project was implemented in a first stage. The procurement process was started, and the County Administrative Board's permission to construct the pond was given. Geotechnical surveys were conducted; water samples were taken from the ditch leading into the pond, and fish investigations were carried out.

MAIN RESULTS

The main project results are a developed method/process for locating, designing and constructing "multipurpose" wetlands and the construction and building of the pond part of a combined wetland for fish reproduction and nutrient reduction.

CONCRETE EFFECTS AND COSTS

- A rough estimation of the reduction of nutrients in the wetland shows a span of P-reduction from 4.5 to 40 kg P per year and for N from 0.5 to 2 tons per year.
- Recirculation of P via irrigation is calculated to create a reduction of emissions to the sea with 4.5–9 kg P per pond emptying.
- Another rough estimation shows a P-reduction cost of 250–2 200 EUR per kg P and year, and N-reduction cost of 5–20 EUR per kg N and year.
- Moreover, the wetland has two other purposes: fish reproduction and irrigation. This will give additive values to the wetland. The increased number of predatory fish will give more opportunities for sport fishing and a better water quality as there will be changes in the ecosystem thanks to predatory fishes.
- The possibility for irrigation can give a 20–25 % increase of yield in irrigated fields.

CONCLUSIONS AND RECOMMENDATIONS

- **Taking the high level of nutrient loads reaching the Baltic Sea into account, Lithuania, Poland and Russia should also consider the possibility of increasing funding for wetland construction.**
- **Experts from the ERB Water Core Group representing Poland, Sweden, Russia and Lithuania all consider wetlands, if constructed, placed and managed in a proper way, an effective tool of retaining nutrients from reaching the Baltic Sea. However, as fish reproduction is not seen as a problem in coastal areas of Poland, Lithuania and Russia, other functions would considered to be of higher significance meaning that the introduction of multipurpose wetlands is still seen as interesting.**
- **Increase knowledge amongst both officials and landowners about the significant role that wetland habitats, if constructed in a proper way, has on reducing nutrient loads and improving biodiversity.**
- **The process of constructing a wetland that exceeds 5 ha requires a permit from the Swedish Environmental Court, a process which is both time consuming and costly for the applicant. The MOMENT project recommends that the permit from the Swedish Environmental Court required for wetlands exceeding 5 ha should be changed to 10 ha.**
- **Information and dialogue is a key issue. Involving local Water Users Partnership creates a bigger understanding for the needed measure and helps to recruit more interested landowners. Local data that otherwise would not be available can also be highlighted by involving local stakeholders.**

INFORMATION

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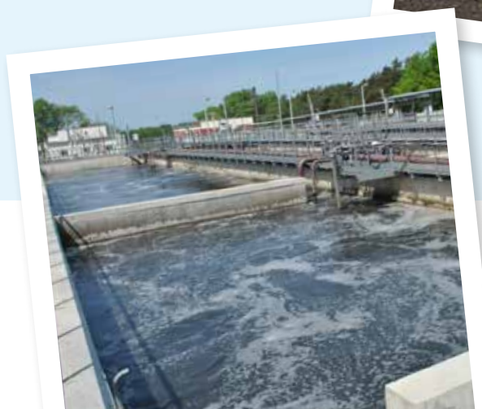

FORESTRY AND WATER

INTRODUCTION

The contribution of harmful substances from forest areas to the Baltic Sea has not yet been as heavily debated as the contribution from other sectors of society, i.e. agriculture, waste water treatment plants and other point sources, airborne pollution etc. Nevertheless, studies show that when water bodies within forest areas are managed inadequately, significant amounts of harmful substances are released with potential damage on sensitive habitats with high environmental values.

STREAM CLASSIFICATION AND ADVICE TO FOREST OWNERS

The second study (Report 4.1.2, Forestry and water) has also been carried out in the Snarje stream catchment area by the Swedish Forest Agency (SFA), Region East. The study has focused on a general environmental classification system of a stream basin, developed by WWF, including inventory, classification, information and advice. The work included the following steps and aspects:

- Classification of watercourses. A number of stream sections have been determined, each of them given a classification, based on the so called "the blue goal classification" in combination with SFA:s GIS-layers. The sections have been divided into four classes: (a) untouched aquatic environment, with very high environmental values, (b) enhanced consideration, where there might be a need for protection measures against normal forestry management practices, (c) specific actions, which means that some actions are required to increase the values in and around the watercourse, and finally (d) general considerations for water sections with low sensitivity and low ecological values.
- A number of demonstration objects have been established along the stream.
- Participation and information at WUP meetings.
- Individual advice to landowners concerning buffer zones, landscaping, wood ash recycling, tree species selection, etc.
- Counselling support during the cleaning of ditches and drainage.
- Advice and information to landowners, the general public, politicians, as well as associations, about managing waterways and basins.
- The use of SFA:s funds in order to dam ditches and create wetlands, financed by the EU Rural Development Programme (LBP), and national funds.
- Ensure participation of expert/ specialist at field trips that can give accurate information.

MAIN RESULTS

The main project results are, first of all, a new system for classification of waters in forests and, secondly, a new advisory approach to land owners on how to take water issues into consideration in forestry. The classification method is considered to give a good overview, a holistic one, of the environmental values along the entire watercourse.

FURTHERMORE:

- **Eleven demonstration locations have been developed, which have provided unique opportunities to demonstrate history, recommend measures and engage into discussions.**
- **The method requires smaller resources than property based classification, but is naturally not as precise since the classification is made for longer sections of the watercourse.**
- **The River Inspection Walks were highly appreciated. They led to many eye-openers and lively discussions.**
- **The project shows that right advice to forest owners, both when they are to e.g. cut trees and want to construct drainage ditches, can reduce emissions evidently.**

A view of a sport fish pond along the Snarje stream.

CONCLUSIONS AND RECOMMENDATIONS

- **This study shows that if we can increase the knowledge amongst landowners and other actors about how to make the right decisions regarding water and forestry, there will be less emissions of nutrient, sludge, nitrogen and mercury. In the same time, if we have information/knowledge about which areas that are most sensitive and have the highest ecological values that needs to be protected, measures can be placed were they are needed the most.**

- **Experts from the ERB Water Core Group representing Poland, Sweden, Russia and Lithuania all consider that the advice and classification method used within this project could be of interest in all parts of the south Baltic Sea area. The need to protect sensitive waters within forest areas can be found in many places. The ERB Water Core Group also recognizes the need to increase the knowledge about how to manage sensitive forest waters amongst officials and forest owners. Therefore, it would be interesting to further investigate possibilities to apply the method and advice used within this project in other regions around the south Baltic Sea area.**

INFORMATION

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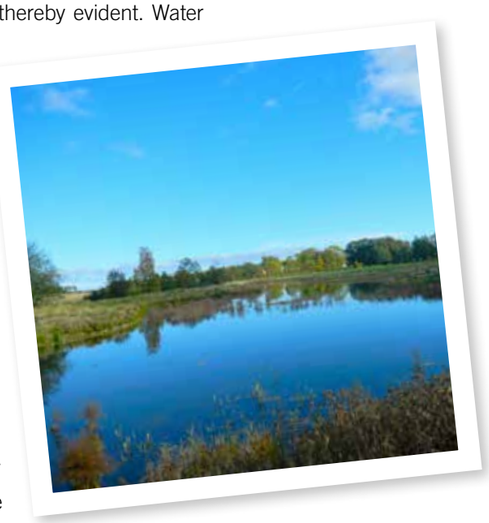
EFFECTIVE UPTAKE OF NUTRIENTS

INTRODUCTION

Nutrients and hazardous substances are transported from their sources through smaller water courses and eventually reach the ocean. Emissions that are released from one area within a given catchment can thereby affect another area that has not released any emissions at all. The need to tackle anthropogenic emissions of nutrients and hazardous substances in a holistic way becomes thereby evident. Water needs be seen as a common resource and work to improve water quality issues needs thereby to be carried out within drainage areas.

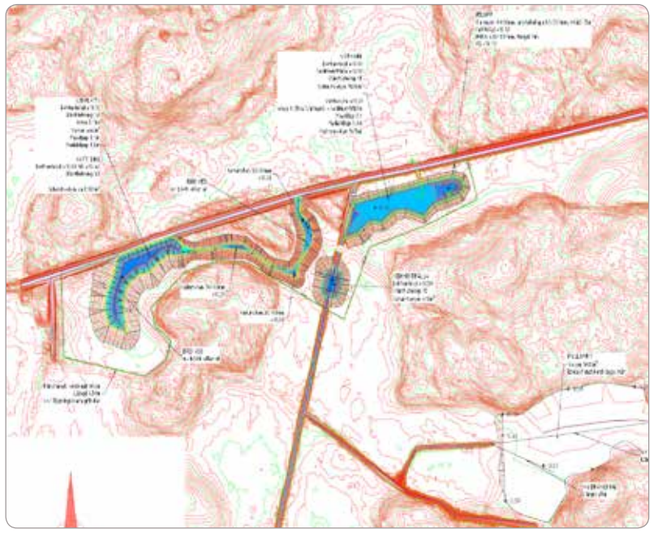


EXPERIENCE

The third study has been carried out in the Bruatorp River catchment area in the Municipality of Torsas in Kalmar County. The project has tested a method for how to, with a holistic view and a bottom up perspective, develop a package of well anchored concrete measures, designed and ready for implementation. After an inventory and identification of problems and potential measures, the process started to develop more concrete descriptions of potential measures in the catchment area. Several interesting locations for measures were identified, technical designs were developed, and the concerned land owners were contacted in an early stage. Field visits with land owners and other interested parties were organised with discussions on a wide range of potential measures, all with focus on three aspects of water quality: ecological, chemical and hydro-morphological quality. Through dialogue between the land owners and other stakeholders a common view and understanding was reached giving a holistic approach towards what measures for the whole catchment were needed.

DETAILED DESIGNS FOR CONCRETE MEASURES

Detailed designs for 10 pilot measures were developed, including flooding areas and sedimentation basins, sediment traps and phosphorus filters, restoration of meanders, new wetlands; many of them also creating new habitats for fish including possibilities for spawning, especially in sites relatively close to the shore of the Kalmar strait.



Example of plans and actions along the Gris creek: wetland with a new side branch, a sediment trap and a fish habitat.

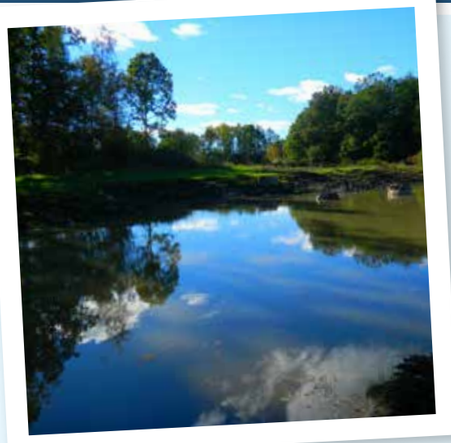
MAIN RESULTS

- **A developed method for stakeholder co-operation, design and implementation of concrete measures for decreased outlets of nutrients from farming land, and at the same time creating habitats for fish.**
- **Detailed design of 10 pilot measures.**
- **Construction of a wetland with a new side branch, sediment trap and fish habitat (see figures).**
- **Construction of an irrigation dam and fish spawning site.**

Many of the designed measures have due to obvious time limits not been possible to implement during the project period, but they are still of interest for later implementation.

CONCRETE EFFECTS AND COSTS

- **If all planned measures would be implemented in the catchment area of the Gris stream, a yearly reduction of about 25 kg P and 1 000 kg N would be reached.**
- **The preconditions for pike reproduction would be improved.**
- **The wetlands constructed for irrigation would add to the figures of nutrient reduction.**
- **Through new wetlands and dams, water will be better available for animals and plants, also during dry periods.**
- **The total cost for implementation of all planned measures is estimated to about 230 000 EUR.**
- **During a 10 year period, the cost per kg nutritive substance is estimated to about 20 EUR.**



CONCLUSIONS AND RECOMMENDATIONS

- **One of the main advantages of the developed technical designs is that it will be easier to find financing for further actions/projects. The new and innovative approach of the project is that a set of measures were developed in a working group of the WUP in order to improve the status of the whole catchment area of the stream.**
- **The prestudie has proven to be a good instrument to start discussing more concretely in both the WUP and the working group. It can therefore be a good instrument to start up concrete investments in a catchment area.**
- **The technical design has been a crucial tool for developing collaboration with certain land owners. It is not only a paper showing a wetland, it is also the last step for them before the permission procedure and finding financing.**

INFORMATION

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"One of the big successes is probably the fact that the designed measures not only focus on nutrient reduction in the river, but also improve the hydromorphological and ecological quality directly."

Mr Stan Weyns
Pilot area coordinator

FORESTRY AND WATER QUALITY MANAGEMENT IN UPSTREAM PARTS OF RIVER CATCHMENT AREAS

INTRODUCTION

Diffuse water pollution comes from many different sources, which may be individually small, but their collective impact can lead to severe environmental problems. The most common way to deal with pollution arising from diffuse sources is to implement measures in lower parts of catchment areas after that the pollution has accumulated causing environmental threats. In the lower parts near coastal areas prices on land are high which can make suitable sites for potential measures impossible to implement. Instead, if measures are places close to where the pollutions arise, even in the upper parts of a catchment area, the accumulated negative effects could perhaps be prevented.

The fourth study has also been implemented in Bruatorp River catchment area. The initial aim was to find methods for increasing water quality and biodiversity in upper parts of catchment areas, and at the same time implement actions to keep more water in the forests during fast spring floods creating better conditions for irrigation and biological life in the river during dry summer seasons. Many small measures in the upper parts of catchment areas are estimated to be both cheaper and more effective than bigger measures in agricultural land close to the coast.

MAIN OBJECTIVE

The main objective has been to inspire and engage landowners of their knowledge of water management principles in forests: Meetings, discussions, information materials and a pilot demonstration site should inspire forest owners to implement simple but cost-effective measures, possible for almost all of them to manage economically. A number of activities have been carried out in a time chain: small group discussions, workshops with WUP members, advanced discussions with experts, information materials, and riverside walks with WUP members.

A pilot demonstration site consisting of blocking a ditch to restore a forest wetland and plant a protection zone has been implemented, partly by about 30 participants of a water conference during 2012.

MAIN RESULTS

Main results include increased knowledge among public authority experts/representatives and land owners about possible small and relatively cheap water management measures in upstream forest parts of river/stream/creek catchment areas.

Information material in the form of a brochure and an inspiration guide have been compiled and distributed during meetings, conferences and river side walks. The material is available (in Swedish) for download at the WUP:s website www.vattenorganisationer.se/bruatorpsan

WWW | www.vattenorganisationer.se/bruatorpsan
The Bruatorp River WUP website

CONCRETE EFFECTS AND COSTS

Calculations show that e.g. a simple stop up of a drainage ditch could be made for some five euro excluding working time costs for the land owner. A cubic metre of water stored in upper parts of a catchment area through such simple measures, would not cost more than 0,02 EUR, equal to one euro for storing 50 cubic metres.

This is estimated to be very cost effective with positive effects on flora and fauna in the forest area and decreased outlets of nutrients and hazardous substances to the Baltic Sea.

CONCLUSIONS AND RECOMMENDATIONS

- Delivering easy to understand, easy to use and very concrete information material has proved to be a key action.
- A main conclusion is that measures are needed higher up in catchment areas and many small measures are probably more effective, if taking both environmental and economic aspects into account, than a few large ones in agricultural land close to the coast. Simple, cheap and small scale measures can easily be implemented in large numbers, and thereby have a higher net environmental effect than larger measures that are harder to implement due to much higher costs.
- The idea behind the project was to create collaboration with many local land owners through the WUP concept. Land owners should be influenced and inspired of the potential that simple small scale and un-expensive measures could have on the environmental status of the Baltic Sea, if many landowners really would implement such measures. The environmental effect of the project depends therefore completely on the way the project manages to inspire land owners to small scale measures. The project success therefore depends on having a well functioning WUP in the catchment area. If not, it would require much more work within information and communication towards relevant target groups.
- Taking future climate change scenarios carried out by the Swedish Metrological and Hydrological Institute into account, the need for irrigation will increase during the summer season and the access amounts of precipitation will increase during the other seasons. Therefore, one could also predict, that the need to buffer larger amounts of water during spring that can be used for irrigation during the summer season will become even more important in the future.

INFORMATION

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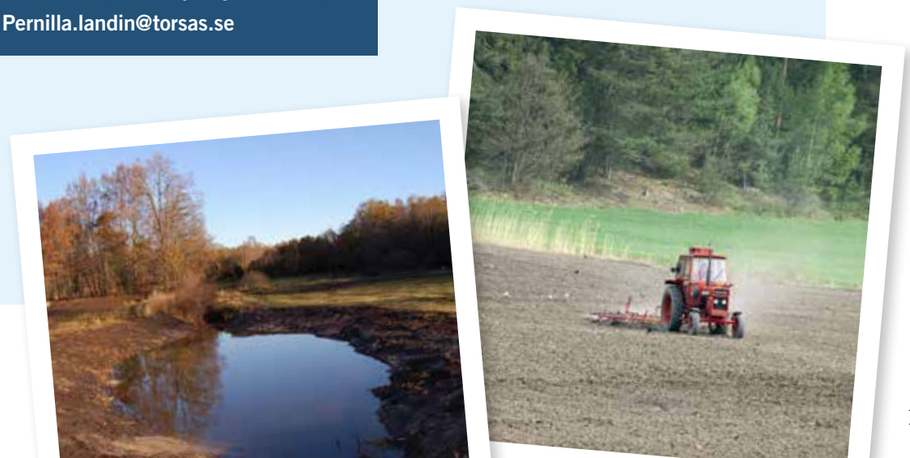

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THE MOMENT PROJECT

In cooperation between seven regions in four countries around the South Baltic Sea area the project MOMENT aims at reducing the outflow of nutrients and hazardous substances by modern water management. This includes the establishment of Water User Partnerships allowing a "bottom up" approach starting at a local level and working within river basins letting the water set its own independent borders. The project is co-financed by the *South Baltic Cross-border Cooperation Programme 2007-2013* and runs from September 2009 until June 2013.

Find information and all reports on www.momentproject.eu

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South Baltic PROGRAMME

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