IWRM Action Hub

CASE STUDY

Central and Eastern Europe: Natural small water retention measures for flood and drought management

Summary

Natural small water retention measures (NSWRM), a form of nature-based-solutions, can greatly contribute to flood and drought management through improving water retention in the landscape. They present in addition multiple benefits including filtration of pollutants and biodiversity. Noting that awareness of these measures, methods and tools, and uptake, remained yet limited in the CEE region, GWP CEE started collaborating with partners in the early 2010s to advance these solutions. GWP has since supported a broad range of measures, including demonstration projects, knowledge products, stakeholder engagement, policy level work, and partnership development to support uptake of NSWRM.

Background

Central and Eastern Europe is increasingly vulnerable to the impacts of flood and droughts. Climate changes have resulted in an increase in the frequency and impacts of extreme climate events, including floods and droughts. At the same time, the intensification of agriculture, the unification of natural habitats, the construction of drainage systems, and urbanisation, have caused changes in the soil cover and water cycle, with more limited retention in catchments and a quicker water circulation. The population’s exposure has also risen as ever more people live in flood-prone areas. Climate change models further point to a decrease of precipitation during summers, and an increase of precipitation during winters in Europe, further aggravating the cycle. Some monitoring systems and management measures are in place, but they are insufficient to protect people, infrastructure and nature.

NSWRM are taken with the aim to restore the natural water retention capacity of catchments.

Technical Measures. Most hydro-technical and drainage works, aiming at the retardation of surface water runoff can be included in this group like construction of small water reservoirs, damming of lakes and water courses, construction of ditches and channels etc.

Non-Technical measures (planning methods). Proper spatial planning of the catchment can play an important role in water management. This measure focuses on the creation of spatial planning that can limit the accelerated runoff of rain and snow melting waters.

Non-Technical measures (agro-technical). These are the measures that depended on the

way of land use, including the use of proper methods of arable field's cultivation in the river catchment.

All the NSWRM have positive social, economic and environmental effects. The most important benefits are:

- Changes in water outflow structure in the river, decrease of the flood wave and, in some cases, improvement of low flow conditions;
- satisfying the needs of water dependent forest and swamp ecosystems, as well as the improvement of the state of environment as a result of elevation of groundwater tables;
- increase of groundwater aquifers alimentation, which causes the increase of groundwater resources;
- fulfilling some of economic demands, for example, water reservoirs can be used as water intakes for firefighters, bathing resorts, fish ponds, water intakes for irrigation or watering holes for wild animals;
- improvement of natural values of environment, improvement of biodiversity of agricultural landscape by the restoration of wetlands, small ponds, creation of natural aquatic fauna and flora enclaves, creation of human friendly micro climate;
- protection of surface water quality, retention of suspended matter, cleaning of rainwater from nutrients (nitrogen and phosphorous).

Despite their benefits, NSWRM still have a limited uptake, with important challenges related in particular to awareness, knowledge, methods and tools, and expertise.

Actions taken

GWP CEE took a pro-active approach to support the uptake of NSWRM, supporting demonstration projects, knowledge products, stakeholder engagement, policy level work, and partnership development.

As GWP CEE launched the regional Integrated Drought Management Programme (IDMP) in 2013, it identified NSWRM among the measures to be supported for drought management in the Region. Within the IDMP, a specific project on Natural Small Water Retention Measures (NSWRM) was implemented by a group of experts from four CEE countries: Poland, Slovakia, Hungary, and Slovenia. The activities carried out included a compilation of case studies as well as the preparation of first Guidelines on Natural Small Water Retention Measures, published in 2015. During the course of the project, the experts identified the need to create a modern and effective tool for delivering knowledge on NSWRM. Consequently, GWP CEE collaborated with partners to develop a video lecture series on NSWRM.

An important milestone for advancing NSWRM came with the FramWat project, implemented over 2017 – 2020 with the support of INTERREG's Central Europe Programme. The project coordinated by Warsaw University of Life Sciences aimed at strengthening the regional common framework for floods, droughts, and pollution mitigation by increasing the buffer capacity of the landscape through NSWRM.

The starting point for the project was that the majority of water management and flood protection measures lack innovation and follow more traditional approaches, including large scale grey infrastructure investment programs or capital projects.

Within the scope of the project, GWP CEE supported stakeholder engagement, policy dialogues, development of the synthesis guidelines of the project as well as the preparation of 6 action plans for NSWRM in each of the project pilot catchments. A series of national and regional policy dialogues was conducted in 6 countries – Austria, Croatia, Hungary, Poland, Slovakia and Slovenia.

The project integrated the stakeholders most affected by droughts and floods (municipalities, forest districts, representatives of agriculture, nature protection agencies) with each other and experts, and facilitated creating ideas for in mitigating their effects. Problems and possible solutions were identified (Action plan), and tools (DSS planner) were provided to support stakeholders in the process of implementing activities (i.e. legal and technical guidelines).

In addition, national trainings were organized by project partners in 6 pilot river basins to familiarise stakeholders, particular target groups and associated partners with developed methods and to train them how to apply methodologies in river basins. Their purpose was to discuss and test the methodologies and train participants on how to use the developed GIS based assessment tool/s. National trainings were organized during the preparation of the concept plan and testing models. After creating the prototype of GIS Tool (FroGIS), training of its use was conducted for all partners. Additionally, the materials from the training course of GIS tool was developed into an e-learning system. In 2018 the training was organized for several WULS students and several function demonstrations at meetings with stakeholders in various countries.

The work currently continues in particular through the implementation of the project Optimal strategies to retain water and nutrients (OPTAIN) funded by Horizon 2020 over 2020 – 2025 and coordinated by Helmholtz Centre for Environmental Research (UFZ, Germany). OPTAIN proposes a social and scientific journey towards the increasing and better understanding of the multiple benefits of NSWRM. In this project GWP co-leads the work package on Communication and Dissemination, aiming to be a bridge between researchers and end users/farmers.

Outcomes

FramWat developed a new set of tools for choosing the best location to improve water quality and better balance its quantity. It provided GIS-based tools and guidelines for the water authorities and decision-makers to critically approach and assess the effectiveness of nature-based small water retention measures in the river basin management context. FramWat increased the skills and capacities of water authorities and related stakeholders for sustainable use of landscape, and for better and climate-proof water resources management.

Partners developed innovative methods:

1. Identifying locations in a river basin where N(S)WRM would be needed as a consequence of topological, hydrological, meteorological conditions.
2. Supporting the evaluation of cumulative effectiveness of N(S)WRM at river basin scales.
3. Providing guidelines for implementation of N(S)WRM with policy options and cost analysis to mitigate negative effects of floods and droughts and prevent water pollution to preserve natural heritage in Central Europe.

Moreover, the methodology provided decision makers with appropriate tools to incorporate N(S)WRM into the next cycle of River Basin Management Plans and gave guidance and raise awareness about the importance of horizontal integration of different planning frameworks. All of the activities were carried out with a strong stakeholder engagement process, policy-level dialogues, and trainings, ensuring co-development and appropriation of the tools for uptake.

Lessons Learned

An intervention combining development of new tools and methods directly applicable by decision makers and river basin management planners can greatly facilitate their uptake. When supported by national water management authorities, the measures can be included in river basin management planning and possibly replicated in other basins.

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Organisation
Global Water Partnership Central and Eastern Europe - GWP CEE

Year
2022

Country
Croatia, Hungary, Poland, Slovakia, Slovenia

Region
Europe

Thematic Tagging
Climate , Ecosystems/Nature-based solutions , Gender , Private Sector , Transboundary , Urban , Water services , Youth
Language English

Related IWRM Tools
Climate Change Policies, Groundwater Management Plans, Integrated Drought Management Plans, Geographic Information System, Nature Based Solutions

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