Facilitating inter-municipal cooperation at the small-catchment level for NWRM implementation

Opportunities for applying natural water retention solutions - Guide for local governments

February 2026

What are natural water retention solutions?

Main definition & concepts

Nature-based solutions, NBS
Nature-based solutions provide environmental, social and economic benefits in a cost-effective way and support resilience. Through locally adapted, resource-efficient and systemic interventions, such solutions bring more and more diverse natural features and processes into cities, landscapes and marine environments.

Natural water retention measures (NWRM)
Natural water retention measures are multifunctional, sustainable interventions that aim to protect water resources and address water-related challenges by restoring or maintaining the natural characteristics and features of ecosystems and water bodies using natural means and processes. These solutions help retain water in the landscape, reduce the effects of floods and droughts, and improve water quality and biodiversity.

Green infrastructure

Green infrastructure networks, as defined by the European Union's Technical Committee, consist of strategically planned natural and artificially created green structures designed to provide a wide range of ecosystem services.

Blue infrastructure
Blue infrastructure is part of green infrastructure, but specifically refers to water bodies such as lakes, canals, rivers, floodplains and other wetlands.

Ecosystem service:
All the goods and services that humanity receives from the natural world. These include pollination, protection against biological pests, food, medicinal substances, air and water purification, climate regulation, improvement of our mental health, etc.

Types:

- provisioning services, such as food, water, wood, fibre and genetic resources;
- regulation services such as climate regulation, floods, diseases and water quality;
- cultural services, such as recreation and ecotourism;
- supporting services such as soil formation, pollination and nutrient cycling.

Source: https://environment.ec.europa.eu/topics/nature-and-biodiversity/

Advantages of natural water retention solutions

- "Many small steps add up to a lot": Typically, these are small-scale, interrelated interventions that can function well as a complex system.
- A greener environment: Creates green spaces in the community that are suitable for relaxation and active recreation. It also has the power to bring the community together.
- Protection for the settlement: In many cases, it contributes to reducing water risks in the given settlement (e.g. log dam system to slow down runoff).
- Close to nature: It helps to preserve biodiversity and native flora and fauna. It improves the microclimate, nourishes vegetation and provides a lush green environment.
- Cost-effective: The investment costs are lower than for traditional grey infrastructure solutions.
- More attractive townscape: It can give new meaning and useful function to parts of a town that were previously unused and neglected areas.

Water management challenges and possible interventions in hilly and flat areas

Hilly	Flat
Challenges: • Erosion • flash floods • forest drying, degradation • landslides • soil entering from agricultural areas on the outskirts of settlements **Interventions:** • wave barriers • grass-covered drainage ditch • small ponds, side reservoirs • grass infiltration basin • water erosion control with dams • brushwood and log dams • restoration of stream beds • re-meandering • removal of artificial riverbanks • floodplain restoration and management • restoration of natural infiltration	**Challenges:** • drought, increased deflation of large-scale arable land, dust pollution • frequent successive floods, inland flooding and drought • rising groundwater and damage to buildings, elsewhere, continuously falling groundwater levels and water shortages • soil shrinkage and building cracks **Interventions:** • grass infiltration basins • creation of small lakes, reservoirs and basins • restoration of seasonal watercourses and abandoned drainage channels, reconnection to water management • restoration of natural infiltration into the soil, removal of coastal landfills near small watercourses • restoration and management of wetlands • restoration and management of floodplains • re-meandering, reconnection of oxbow lakes • restoration of watercourses to their natural state • removal of artificial riverbanks • removal of riverbank protection • recycling of emergency reservoirs (polder areas) along rivers retention of grey water, returning it to the landscape • Rehabilitation of oxbow lakes

Why should local authorities cooperate at the small catchment level?

The role of local authorities in adapting to climate change

Local authorities play a key role in climate change adaptation and, consequently, in water management at the municipal and small catchment area level. Local authorities are locally embedded actors who are familiar with the characteristics of their settlements, including climatic challenges, and who also know the local population groups and other stakeholders in the settlement and region.

In addition, local authorities are key players in local planning and strategy-making, so they also have a key role to play in preparing for climate change. The challenges and damage caused by climate change and extreme weather events can only be prevented and properly managed in accordance with the principle of subsidiarity, i.e. by local stakeholders through local interventions.

Local authorities also have a key role to play because they enjoy the highest level of public trust among public sector actors. It may be worthwhile for local governments to respond to regional water management challenges as early as possible, in a kind of integrating, facilitating role, as this can create a win-win situation for several interest groups.

Advantages of cooperation

As water does not stop at the administrative boundaries of settlements, effective management of water management challenges requires cooperation between the local governments of settlements located in a small catchment area.

1. **Joint planning of investments:** In the field of water management, investments made by one municipality often have an impact on other municipalities in the catchment area: for example, the development of a drainage system in one municipality may result in too much water being discharged into the downstream municipality. It is worth coordinating development plans so that each intervention benefits not only the investing settlement but also the other settlements in the catchment area, rather than creating new problems to be solved.

2. **Prevention and mitigation of water and drought damage:** The primary goal of cooperation may be to prevent and mitigate water and drought damage. Small catchment-level planning and an integrated, 'spatially aware' approach can help to ensure that the available financial resources are used most effectively to support climate change adaptation at the regional level.

3. **Resource sharing:** Cooperation at the small catchment level can also be very valuable in emergencies, when rapid mobilisation and mutual support are needed. Sharing available human capacity, equipment, and financial resources is another way in which local authorities can respond more effectively to extreme events related to climate change. It is worthwhile for several local authorities to join forces and jointly employ water management, technical or environmental and nature conservation experts.

4. **Advocacy**: Local governments that cooperate informally or formally on water management issues can act more effectively in terms of advocacy, not only on water management but also on other issues.

5. **Call for proposals**: In recent years, it has been evident in both operational programmes and direct Brussels funding that local governments that participate in calls for proposals in broad partnerships or consortia achieve a higher success rate. In the 2021-2027 funding cycle, significantly more calls for proposals than in the previous cycle are open only to participants who form a consortium. In addition to the above-mentioned aspects, well-functioning partnerships and regional cooperation in the field of water management can also have further positive effects on the performance of other municipal tasks.

The following chapter presents the steps involved in establishing municipal cooperation at the small catchment level, from planning to the implementation of specific interventions.

Steps for establishing cooperation at the small catchment level

Area designation and kick-off meeting

The first step in establishing cooperation at the local government level for small water catchment areas is for the mayor and council of the local government concerned to undertake to organise the cooperation and appoint a responsible person to coordinate the forum. Experience from previous associations and collaborations shows that there is a need for a leading local government to organise meetings based on a pre-defined vision and to bring together the local governments and other interest groups involved in the area.

At the beginning of the process, the leading local authority designates the area (typically overlapping with a small catchment area) in which it wishes to establish cooperation. After visiting the local authorities concerned, it is recommended to start with a comprehensive one-day event ("kick-off"), where, with the help of either the staff of the leading local authority or a commissioned moderator, the problem map of the small catchment area is identified, the common goal and vision are defined, and the stakeholders of the partnership are identified. Ideally, the outcome of the meeting at the end of the day would be a work plan setting out the main tasks for the municipalities affected by the small water catchment area.

Before exploring the problems, the meeting should identify the hydrographic, topographical, social and economic characteristics of the affected area, for example according to the following criteria:

- inventory of flowing and standing waters
- inventory of shared water resources
- nature and extent of interdependence (upstream-downstream)
- similarities in municipal water management challenges
- treatment and maintenance challenges

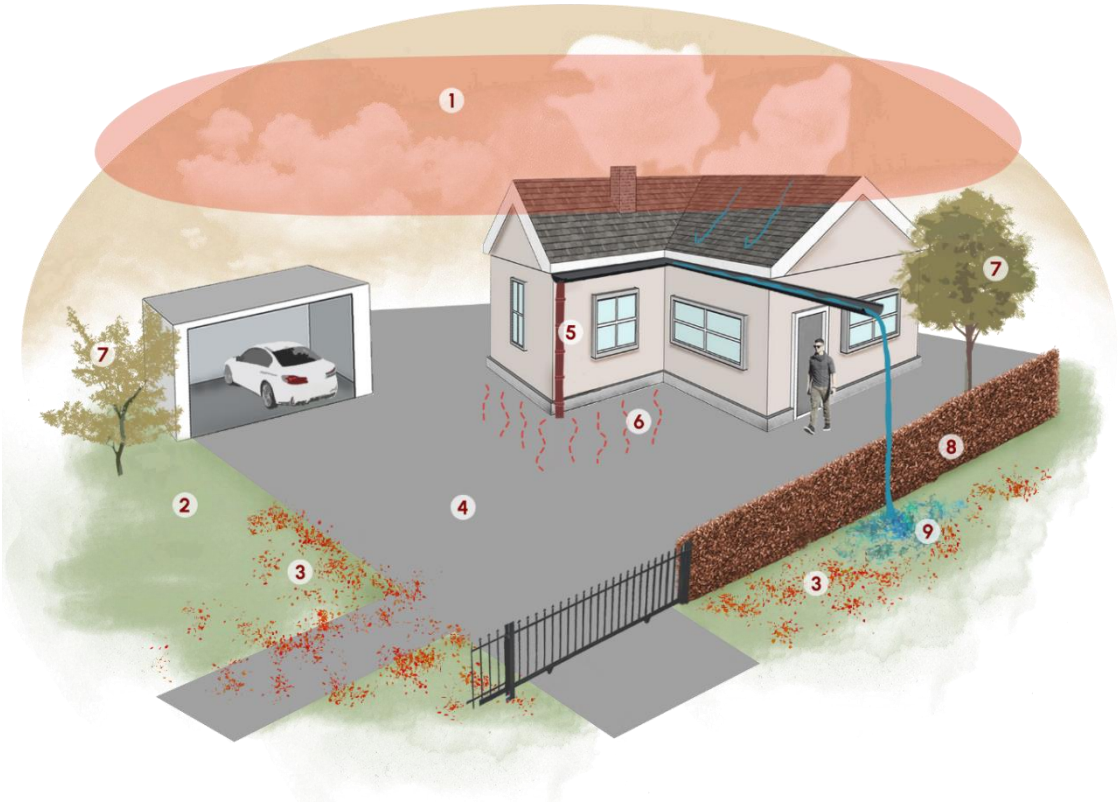
Problem mapping

The first priority task of the meeting may be problem mapping, during which participants identify the most important challenges for each water management challenge (e.g. drought, flooding, inland flooding, flash flooding), which can be placed on a physical or virtual map.

During problem mapping, it is advantageous to channel not only the experiences of local government decision-makers and experts, but also complaints from the public and data on previous damage events (e.g. information on force majeure support). The professionalism of problem mapping can be enhanced by the presence of a water management expert who can place the issues raised in a professional context.

When identifying water management problems, it is worth placing particular emphasis on issues where cooperation between municipalities could play an important role in finding a solution. Once the problems have been collected, it is recommended to prioritise them jointly and select those that pose the most significant challenge for the majority of participating municipalities.

Level of households

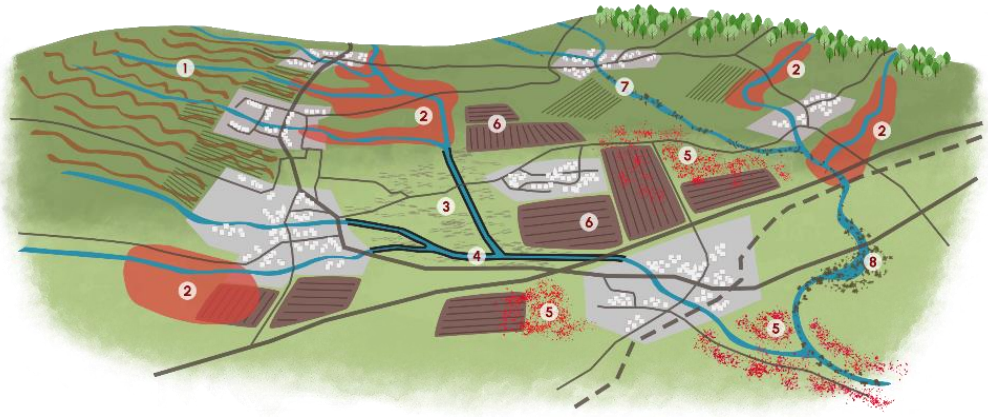


1. Heat island, 2. Short-cut lawn, 3. Garden flooding, 4. Gardens with a high, proportion of paving, 5. Rainwater drainage into sewers, 6. Flooding of cellars, 7. Dried-out vegetation, 8. Use of species-poor plants, 9. Water drainage into public areas

Level of settlements

1. Sediment deposition, 2. Wastewater drainage in closed sewers, 3. Drought, 4. Dams, 5. Flooding, 6. Seasonal water flow, 7. Inland water, 8. Underground drainage, 9. Covered open channel, 10. Thermal insulation, 11. Flooding

Level of small catchment areas



1. Erosion, 2. Flooding, 3. Drought, 4. Artificial stream bed, 5. Inland water, 6. Monoculture agriculture, 7. Sediment, 8. Sediment deposition

Baseline assessment

If financial and human resources allow, it is advisable to conduct a preliminary baseline assessment at the very beginning of the planning process. If this is not

possible, expert studies can be commissioned for more focused tasks after the problems and objectives have been identified. The baseline assessment may include field surveys, remote sensing, and quantitative and qualitative studies synthesising the knowledge of local stakeholders. Subsequently, the commissioned experts prepare analyses such as micro-regional climate modelling, runoff modelling or erosion studies.

Data collection

- Quantitative data
- Interviews
- questionnaire for stakeholders

Fieldwork and analysis

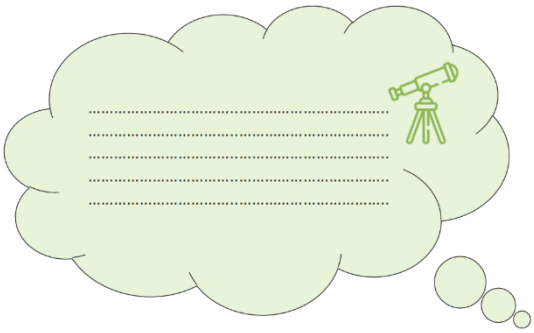
- field trips
- remote sensing surveys
- analyses
    - runoff modelling
    - erosion studies
    - climate modelling

Setting goals and vision

Problem mapping is followed by setting the water management vision and goals of the local actors involved at the small catchment level.

When creating a vision, it is particularly beneficial for participants to let their imaginations run wild and envision an ideal situation. The following guiding questions can help: "In 2050... a region where water..." or "In 2030... a region where water...". When creating a vision, it is recommended to first imagine a sufficiently distant point in time (e.g. 2050) and then gradually work backwards to the present situation (the "backcasting" method). After jointly formulating a concise vision, it is worth setting goals that are sufficiently comprehensive yet specific.

Well-defined goals are measurable and trackable, as well as realistic and achievable. It is worth prioritising the jointly defined goals and setting intermediate deadlines and deadlines for their implementation. It is important that the vision developed is acceptable to all local authorities participating in the cooperation. The goals should be clear and easily communicable to all regional stakeholders.



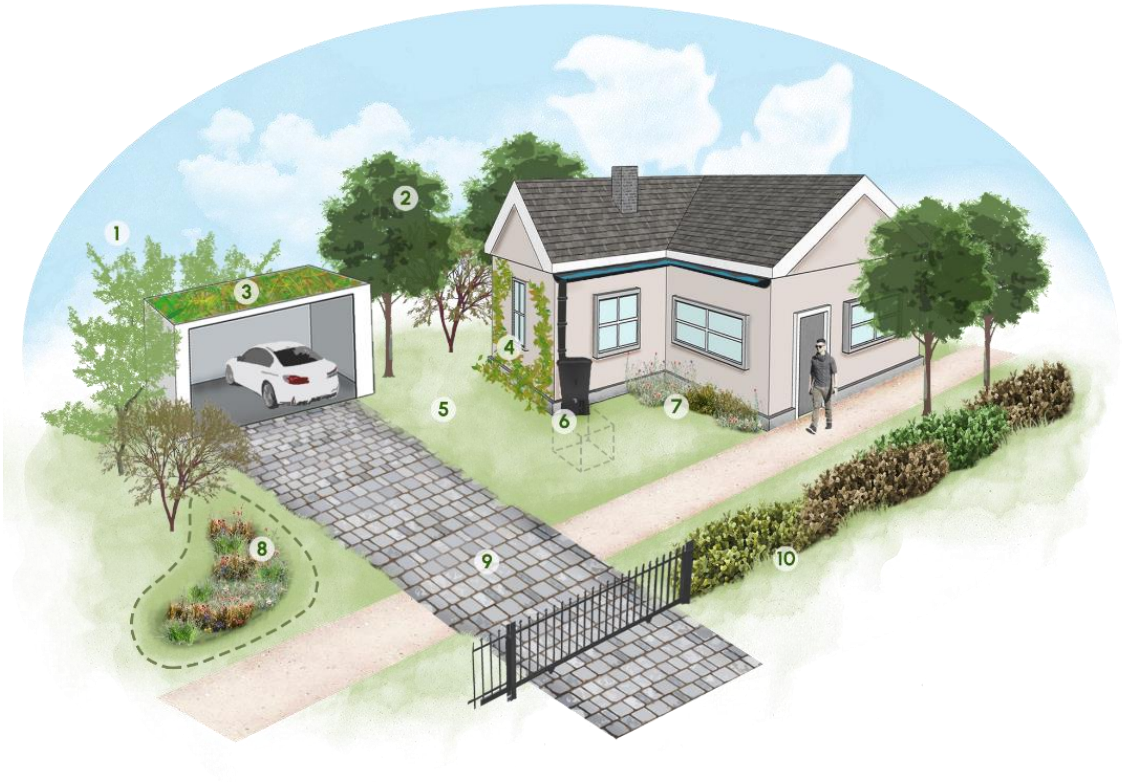
What is the vision?

In 2030 ... a settlement where water ...

In 2050... a settlement where water...

Goals	Solutions & tasks			Problems
	2050	2040	2030	

Level of households

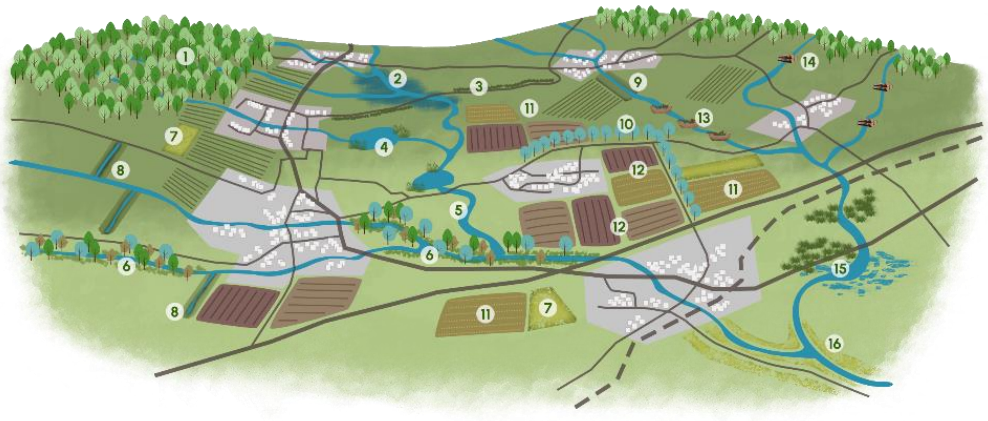


1. Nature-friendly, species-rich plant use, 2. Afforestation, 3. Green roof, 4. Green façade, 5. Longer lawns, varied, species composition,6. Rainwater collection tank or cistern, 7. Natural ground cover, 8. Rain garden, 9. Water-permeable paving

Level of settlements

1. Sediment trap dam, 2. Log dam, 3. Stormwater retention basin, 4. Green roof and water-permeable pavement, 5. Natural, species-rich plant use, 6. Water retention through wastewater recycling, 7. Afforestation, 8. Rain garden, 9. Drainage ditch, 10. Restoration of the original stream bed, 11. Shrubbery, 12. Lake bed expansion, 13. Reed beds, 14. Infiltration green area, 15. Recreational functions, 16. Nature trail

Level of small catchment areas



1. Afforestation, 2. Coastal buffer zone, 3. Field protection shrubbery, 4. Creation of ponds, wetland habitat, 5. Restoration of stream beds to their natural, state, 6. Natural riverbank, 7. Grassy infiltration basin, 8. Drainage ditch, 9. Low earth embankment, 10. Field protection forest strip, 11. New types of agricultural cultivation, 12. Ecological corridors, 13. Water erosion control with dams, 14. Log dams / brushwood dams, 15. Grassy basins and marshes, 16. Grassy drainage ditches

Identifying stakeholders and mapping resources

Once the small catchment area problem map has been completed, the next step is to identify and characterise stakeholders at the small catchment area level – or even at the wider district, county, regional and national levels.

The following overview table can help identify the most important stakeholders in solving small catchment area challenges.

National level	Regional, county, district and small catchment area level	Municipal level
• Ministry of Public Administration and Regional Development • Ministry of Agriculture • Ministry of Energy • Ministry of Construction and Transport Ministry of the Interior Disaster Management • Ministry of Energy National Water Authority • Hungarian Chamber of Engineers • National Chamber of Agriculture	• Regional Water Management Directorate • Water utility provider • County Local Government • County Chamber of Engineers • district government office • national park administration • state and private forestry • hunting association • local government associations, micro-regional cooperation • universities, research institutes • water management associations • professional and advocacy organisations • county and district offices	• local governments (mayors, representatives, specialist offices, municipal companies) • farmers (agriculture, forestry, game management) • civil organisations (e.g. fishing associations) • local institutions (educational, health, social, etc.) • external experts, consulting and grant writing companies • population • village agronomists • field guard • local businesses

Stakeholders are parties who may have a positive or negative impact on the progress, outcome and results of our project or strategy. When conducting a stakeholder analysis, it may be useful to ask the following questions:

- Who are the stakeholders in small-scale water management?
- Which of them has the greatest influence on the implementation of the strategy?
- And who has the greatest interest in this?
- Place them on the stakeholder matrix!
- Who are the ones in the upper right quadrant? Analyse these stakeholders with particular attention!

Level of households

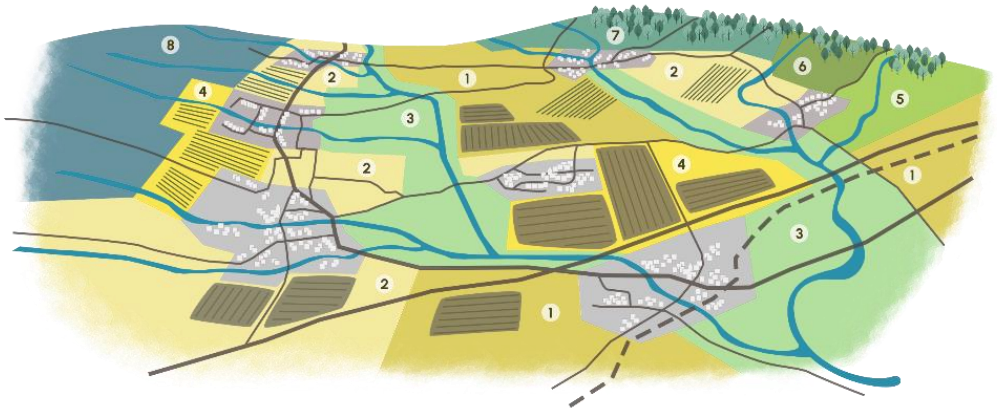
Segmentation of population groups:

- by type of housing:
  - garden owners
  - apartment building residents
  - prefabricated housing residents
- by means of transport:
  - car owners
  - pedestrians
  - cyclists
- by activity:
  - dog walkers
  - anglers
  - etc.
- by local communities:
  - environmental and nature conservation associations
  - cultural and heritage associations
  - sports associations
- vulnerable groups
  - elderly people
  - children
  - low-income individuals
  - people with reduced mobility

Level of settlements

1. Municipal property, 2. Owned/managed by municipal company, 3. Condominium property, 4. Local business property, 5. Owned by a public utility company, 6. Owned by neighbouring local government

Level of small catchment areas



1. State, 2. Local government, 3. Water management authority, 4. Private farms, 5. Private forestry, 6. State forestry, 7. National park administration, 8. Hunting association

Involvement of experts

Once the scope of action has been defined and the vision, goals and problems have been identified, the necessary external expertise can be determined. Of course, if financial resources allow, it may be justified to involve external experts from the first phase of planning, but costs can be reduced if this is done in a more focused manner, for smaller parts of the work.

In order to find appropriate responses to regional water management challenges, the involvement of the following expertise should be considered:

- water engineer
- nature conservation engineer
- urban planning engineer
- public utility planner
- architectural engineer
- landscape architect
- participation facilitator

Identifying and planning actions

Following expert consultations and the baseline assessment, it is advisable to update the preliminary work plan and then identify the tasks with the highest priority. For these tasks, it is advisable to develop a detailed action plan, which may include the following elements:

Action name	District rainwater management concept, water management strategy and complex water management plan
Type	mitigation / adaptation / awareness raising
Responsible stakeholder	
Other key stakeholders	
Communication channels	
Description	
Specific action areas	
Budget	Small / Medium / Large
Potential funding	District municipality own resources / Grant resources
Time frame	Short / Medium / Long
Indicators	

Cost estimation and resource creation

After developing the action plan, it is worth devoting separate capacity to accurately estimating costs and exploring funding opportunities, grant opportunities and partnerships. Accurate forecasting of the costs, timing and maintenance of interventions is key to the subsequent success of the project.

In terms of planning costs, tasks such as the following should be taken into account:

- geodetic survey
- complete planning
- water rights licensing
- environmental permits
- use of public procurement experts
- operating licence (if necessary, after completion)

Imprint

LIFE LOGOS 4 WATERS project partners

- Ministry of Public Administration and Regional Development life@ktm.gov.hu
- Climate-Friendly Municipalities Association info@klimabarat.hu
- Municipality of Bátya
- Municipality of Püspökszilágy
- Hungarian Chamber of Engineers
- National Water Authority
- National University of Public Service
- WWF Hungary

Professional editing and visualisation

- Dr. Ildikó Réka Báthoryné Nagy, Department of Urban Design and Green Infrastructure, MATE
- Andrea Wallner, Department of Urban Design and Green Infrastructure, MATE

Graphics and maps

- Tamás Kuslits, Tommy Design

Author of the text

- Dr. Dorottya Teveli-Horváth, Urbavis, dorottya.teveli@urbavis.hu
- Anita Szőllőssy, Urbavis, anita.szollossy@urbavis.hu

The project entitled "Integrated practical application of innovative water management methods at the catchment level with municipal coordination" (LIFE20 CCA/HU/001604) is implemented with the support of the European Union's LIFE programme and co-financed by the Hungarian State.

We hope that this publication will inspire many local authorities in Hungary to introduce and apply natural water retention solutions. If you have any questions, please contact the project partnership using one of the contact details provided in the Imprint.