After-LIFE plan of the LIFE LOGOS 4 WATERS project „In cooperation for a climate-conscious river basin management”

Contents

Project Title:

„Integrated application of innovative water management methods at river basin by coordination of local governments”

Project short title:

In cooperation for climate-conscious river basin management

Administration number:

LIFE20 CCA/HU/001604

Acronym:

LIFE LOGOS 4 WATERS

Duration of implementation:

1 October 2021 – 30 September 2025

Total budget:

3 764 915 € (approx. 1.318 billion Ft)

EU contribution:

2 070 703 €

(which is 55% of the total budget, approx. 725 million HUF)

Internal resources:

1 694 212 € (approx. 593 million HUF),

Co-financed by the Hungarian State

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https://lifelogos4waters.bm.hu/

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1 Introduction to the Partnership

1.1 Ministry of Public Administration and Regional Development - MoPARD

The LIFE LOGOS 4 WATERS project was initially coordinated by the Ministry of Interior, including the department of Local Government. On 1 January 2024, the Ministry of Public Administration and Regional Development (hereinafter: MoPARD) was newly established, which the field of Hungarian local government became a part of. MoPARD aims to contribute, through the implementation of this project, to strengthening the role of local governments, given that well-organized, well-prepared, and cooperative local governments are key factors in the effective implementation of national and EU policies, and also play a key role in engaging and reaching out to local stakeholders. Within the project, MoPARD, as the Coordinating Beneficiary, brings together the entire partnership and plays a significant role in implementing the project's communication activities and disseminating the project results. Furthermore, it promotes the wider uptake of nature-based water retention solutions both at the local catchment level and at the governmental level.

1.2 Municipality of Bátya

The Municipality of Bátya is located on the Great Hungarian Plain, in the Kalocsa sub-region of Bács-Kiskun County. The settlement has approximately 2,000 permanent residents. Within the project, the municipality represents one of the two locations where water retention solutions were implemented at the catchment level. The municipality assumed an active coordinating role in the establishment and operation of the Catchment Stakeholder Forum, participating in both its preparation and implementation. The objective of this forum is the integrated management of rainfall and water scarcity, through the creation of wetland areas. Bátya also contributed to the active communication of project results and the sharing of know-how. The municipality is responsible for engaging and coordinating additional local stakeholders within the catchment area affected by the project. Furthermore, it is tasked with establishing catchment-level partnerships aimed at supporting adaptation to climate change.

1.3 Association of Climate Friendly Municipalities - AoCFM

The Association of Climate Friendly Municipalities was founded in 2009. It aims to reach out to all responsible mayors, municipal representatives and community leaders to equip them with the necessary tools, knowledge and assistance to implement successful climate change adaptation and mitigation measures, both at local and at regional level. The Association currently has 99 municipal members, ranging from small villages to the largest districts of the capital. In the LIFE LOGOS 4 WATERS project, the Association's main role is to facilitate the development of municipal networks at both national and international levels. In addition, monitoring the project's impacts on society, the economy and ecosystem services, as well as managing the municipal and catchment-level grant programmes, also fall within the organisation's responsibilities.

1.4 Hungarian Chamber of Engineers - HCE

The Hungarian Chamber of Engineers is a professional association whose members consist of design engineers and expert engineers. The unity of the Chamber is formed by 18 regional organisations and 21 professional divisions. Within this organisational framework, it has more than 22,000 active engineering members across all fields of engineering activity. Within the Chamber, the Water Management and Hydraulic Engineering Division is responsible for coordinating and professionally guiding water management-related professional activities at the national level. The division actively participates in the national professional discourse on water management and contributes to the introduction of innovative approaches in engineering practice and in everyday professional work. The Water Management and Hydraulic Engineering Division of the Hungarian Chamber of Engineers participates in the LIFE LOGOS 4 WATERS project as an engineering organisation. Through its involvement, it aims to contribute to the joint professional dialogue necessary for developing future water management solutions that provide the greatest overall benefits for water management, nature conservation, environmental protection, landscape use and landscape planning, while also responding to social expectations.

1.5 I University of Public Service - UPS

The Faculty of Water Sciences of the University of Public Service contributes to training development and training organization, e-learning curriculum development, international summer university, as well as the organization of an international closing conference. Through the implementation of the LIFE LOGOS 4 WATERS project, the national and international network of the University of Public Service is strengthened, while the professional knowledge base of the Faculty of Water Sciences is expanded by preparing training materials for experts of the municipalities and the water sector, participating in their delivery, and contributing to the development of a multidisciplinary curriculum. The Faculty of Water Sciences aims to promote the project results and share best practices with future engineering professionals through the implementation of task-oriented individual and group exercises that most effectively develop problem-solving skills and prepare the next generation of engineers foe climate change adaptation.

1.6 General Directorate of Water Management - GDWM

The professional activities of the General Directorate of Water Management (GDWM) are carried out through the cooperation of experts from various disciplines and technical fields, including engineers, hydrologists, economists and IT specialists, all contributing to its diverse pool of expertise. Within the LIFE LOGOS 4 WATERS project, one of our main tasks is to provide professional guidance for the successful implementation of territorial interventions, as well as to monitor these activities and support the development of training materials. The latter is of particular importance, as a new generation of well-trained experts with practical experience will play a key role in achieving long-term water management objectives. Another key responsibility within the project is the development of guidance for the preparation of Integrated Municipal Water Management Plans (IMWMPs), as well as the creation of a model plan at the catchment level based on an IMWMP, together with the methodological framework required for its development.

1.7 Municipality of Püspökszilágy

The Municipality of Püspökszilágy is located in the Central Hungary region, in Pest County. The village has approximately 738 permanent residents. The municipality participates in the active communication of results and the sharing of know-how generated through the implementation of the pilot project. The aim is to support the application of the tested NWRM prototype at additional locations, while the LIFE LOGOS 4 WATERS project also ensures the preservation and transfer of these results. The municipality is responsible for engaging and coordinating additional local stakeholders across eight further settlements within the catchment area. Furthermore, it is tasked with establishing catchment-level partnerships to support adaptation to climate change.

1.8 WWF Hungary - WWF

WWF is one of the world's largest and most respected independent environmental organisations. Through the LIFE LOGOS 4 WATERS project, its objective is to promote a water management approach in Hungary based on water retention, which applies nature-based solutions to simultaneously help halt the country's drying trends, manage water-related risks, and preserve biodiversity. Its main tasks within the project include organising international field trips, supporting pilot cooperation projects at small catchment levels for the joint implementation of water retention solutions, and carrying out the ecological monitoring of these results. In addition, a key responsibility is the wide dissemination of experiences gained from these collaborations, as well as environmental education and the implementation of a nationwide awareness-raising campaign.

2 Overview

Based on the assessments of the 6-year progress report (2013–2018) under the Habitats Directive, **19.41%** of habitats **across all EU Member States** were reported as being affected by climate change as a **pressure**, while **27.73%** were identified as being affected as a **threat**. In Hungary, these values are **significantly higher**: **68.89%** as a pressure and **71.11%** as a threat. These high proportions place climate change as the

leading pressure factor affecting habitats in Hungary, making it the most significant pressure and threat.

According to Hungary's **Second River Basin Management Plan (RBMP2)**, out of the 525 Natura 2000 sites, **363 (69%)** have been damaged or severely damaged due to **insufficient amounts of water**. The RBMP lists protected areas designated for the protection of surface waters or groundwater, and the species and habitats associated with them. This includes areas protected under national legislation, Ramsar sites, and elements of the Natura 2000 network. **Of the 46 habitat types of Community importance occurring in Hungary, 20 are classified** in the RBMP **as highly dependent on water**, either on surface waters or groundwater bodies. This includes areas protected under national legislation, Ramsar sites, and elements of the Natura 2000 network. Of the 46 habitat types of community importance occurring in Hungary, 20 are classified in the RBMP as highly dependent on water, either on surface waters or groundwater bodies.

The most significant issue affecting protected natural areas preserved for their ecological value is almost universally water scarcity. The proportion of water-dependent Natura 2000 sites that have been degraded deteriorated by approximately 30% during the RBMP2 period. The most severely affected are groundwater-dependent habitats in the Homokhátság region. Drying trends are also evident along major rivers, as riverbed incision and the infilling of floodplains result in habitats becoming increasingly disconnected from water for most of the year. Consequently, habitat degradation has intensified, and ensuring water supply to side branches and oxbow lakes has become a chronic problem.

The third River Basin Management Plan (RBMP3) identifies a total of 23 habitat types that are highly dependent on water. Within water-dependent Natura sites, groundwater-dependent habitats are assessed separately. A detailed description of the assessment methodology and results can be found in the document titled *6_7_background material_assessment_of_the_status_of_Natura_areas*. Based on this assessment, in Hungary there are:

- 266 significantly degraded,
- 117 degraded,

- 39 moderately degraded,
- 15 not or only slightly degraded

water-dependent Natura 2000 sites.

2.1 Climate Change and Water in Hungary

By 2050, a **temperature increase of at least 1°C** is expected in all regions of Hungary, and by the end of the century, the rise in average summer temperatures **may exceed 4°C** (according to the ALADIN and REGCM models). Beyond rising temperatures, the **most significant impact** of climate change **affects the hydrological cycle**. Substantial changes are expected (National Adaptation Strategy of Hungary, 2018):

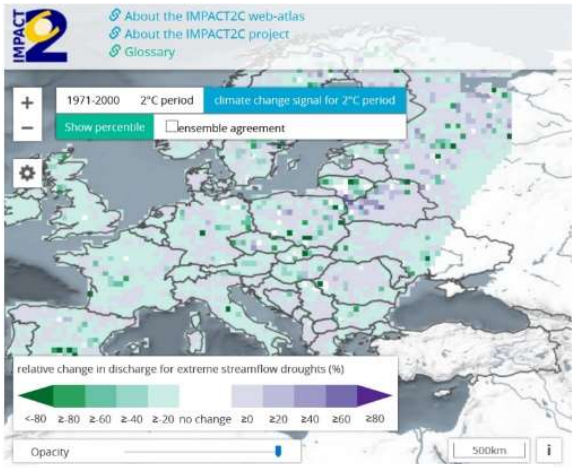


Figure 1: Forecast of extreme floods and droughts caused by climate change

Figure 2: Projections of climate change-induced changes in heavy rainfall

- prolonged periods of extremely low water levels in rivers
  - in small watercourses, both extremely low and extremely high water levels are becoming more frequent;
  - the frequency of flash floods is increasing (based on EU projections on the impacts of intense rainfall);
  - infiltration of water into the soil is decreasing;
  - groundwater levels are declining;
  - the extent of droughts is increasing;
  - inland water flooding is becoming more unpredictable and more extreme.

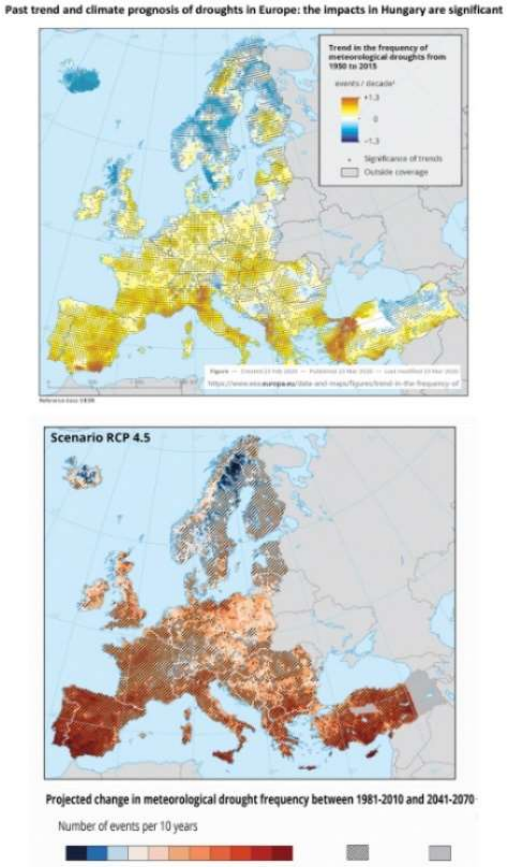


Figure 3: Past and Future Trends in Droughts

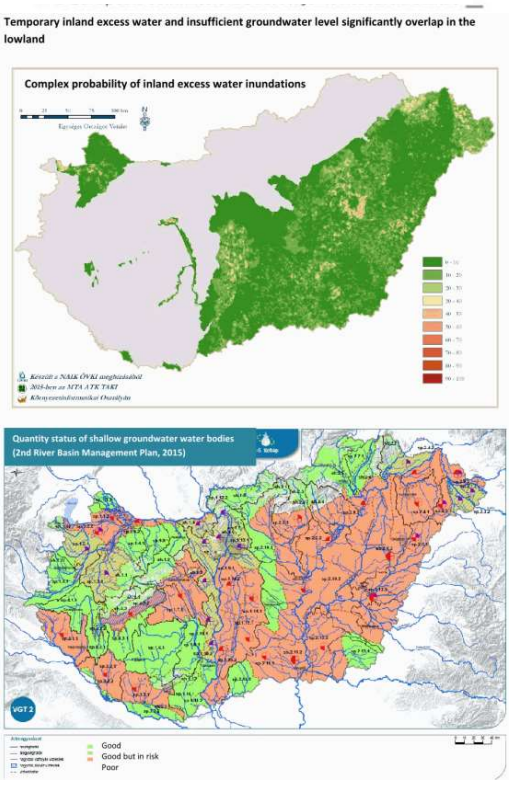


Figure 4: Map of flood risk and groundwater quality

In addition, climate change is increasing water demand, particularly during water-scarce summer periods.

Why is adaptation important?

Climate change cannot be stopped; however, its negative impacts can be mitigated. One of the most effective ways to achieve this is through adaptation by preparing, changing our behaviour, and adjusting to altered conditions. Climate change brings numerous challenges, including rising average temperatures, increasingly frequent and unpredictable extreme

weather events, uneven distribution of precipitation, and even the potential disappearance of species. However, through conscious and targeted **adaptation, we can significantly reduce our exposure to climate risks and mitigate their adverse impacts.**

3 Project Description

The **overall objective** of the LIFE LOGOS 4 WATERS project is to **strengthen the climate adaptation capacity of Hungarian municipalities**, with a particular focus on addressing **water management challenges**. A central element of the project is **the promotion of nature-based solutions** (NbS), which utilise the natural processes of ecosystems to mitigate the adverse impacts of climate change.

The key issue from a climate adaptation perspective that lies at the core of the project **requires a cross-sectoral approach**: the **application of natural water retention solutions** and the **promotion of sustainable water management**. Within the framework of the programme, the positive impacts of ecosystem-based adaptation methods are demonstrated from both water management and sustainable land-use perspectives, **at both municipal and catchment scales**.

The LIFE project was implemented with **nationwide coverage**. Practical interventions were implemented in **two pilot catchments** - one hilly and one flat - however, the project's impact extends far beyond these areas. Through additional professional outputs, awareness-raising trainings, online knowledge-sharing materials, target group-specific training resources, short films, international study visits, as well as publications, guidelines and other activities developed within the project, the programme has reached a wide range of municipalities and other stakeholders, thereby contributing to the broad dissemination of the principles of natural water retention and sustainable water management.

3.1 Objectives

The aim of the LIFE LOGOS 4 WATERS project is to **integrate the concepts of water retention and climate change adaptation into the everyday operation of municipalities**. The programme supports municipalities in recognising water not as a problem, but as a value, and in finding solutions to water scarcity, droughts or flash floods by relying on natural processes.

Specific objectives:

1. **Promoting cooperation between municipalities and stakeholder groups** in addressing water management challenges.

2. **Systematically enhancing the knowledge** of sectors involved in the planning and implementation of green-blue infrastructure solutions at municipal and territorial levels—including designers, authorities, water directorates and future professionals—regarding the application of integrated water management measures at both municipal and catchment levels.

3. Establishing and disseminating **the concepts** of **"water as a value"** and **"water as a key to climate adaptation"** to ensure broad awareness and support for water retention-based adaptation.

4. Mapping and making easily accessible **decision-support systems, good practices and other tools** that support local climate adaptation, thereby facilitating effective and professionally grounded adaptation at territorial and municipal levels.

5. **Strengthening international cooperation and enhancing the capacity of municipalities** to access and utilise EU and national funding for ecosystem-based water retention solutions, by **improving their absorption capacity**.

6. Integrating the approach of retention-based, integrated water management and nature-based climate **adaptation into complex planning and regulatory mechanisms**.

Municipalities as key local actors of climate adaptation

Although climate change is a global phenomenon, both international and national experiences show that many of the most effective responses to its negative impacts are developed at the local level. **The effectiveness of adaptation measures is significantly enhanced at the municipal level**, where knowledge of local conditions, technical characteristics and social contexts is the most comprehensive. Municipalities **are present throughout the entire country** and, due to their administrative role, **maintain direct and continuous contact with residents, economic actors and civil society**. This enables public engagement, awareness-raising and knowledge dissemination.

Addressing climate change-related challenges requires **coordinated cooperation** among all relevant stakeholders—authorities, water management organisations, experts, farmers, businesses and the public. **In this process, municipalities play a particularly important coordinating role; therefore, strengthening their capacities and cooperation skills can be a key condition for successful climate adaptation.** Broad social dialogue, multi-level awareness-raising and increased awareness of water-related risks are essential to ensure that the impacts of climate change can be effectively managed at the level of local communities.

4 Brief Description of Actions

A1, A2: To test and demonstrate a community-based decision-making method, Catchment Stakeholder Forums (CSFs) are established with the participation of local actors representing different sectors: municipalities (urban), hydro morphology, agriculture, forestry, nature conservation, rural development, tourism, etc. The Rules of Procedure of the CSFs will serve as a model document for future forums in other catchments. A summary report will be prepared on the lessons learned, which—if successfully applied—will support the wider uptake of the method.

A3: The assessment of the general and specific needs and expectations of different stakeholder groups serves as a basis for the replication activities under C5, C8 and C9. It also functions as a communication activity: the initial engagement with stakeholders lays the foundation for subsequent replication and knowledge transfer measures.

C1, C2: The development of NWRM (Natural Water Retention Measures) infrastructure serves demonstration purposes and will be presented and promoted as a good practice during subsequent activities and beyond the project's lifetime. The Multi-Stakeholder Catchment Forums (MCFs) ensure the continuity of cooperation among local action groups and the alignment of interests regarding catchment-level water management. Both hilly and lowland catchments are involved as demonstration areas to provide examples for other small catchments with similar geographical characteristics.

C3: The Integrated Support Board (ISB), composed of key experts from project partners and external cooperating organisations, ensures the technical and professional supervision of project activities and facilitates cross-sectoral exchange of information and ideas throughout the project duration. The project's Sustainability and Replication Strategy is approved by the IBS.

C5: To support the municipal sector, an online decision-support platform is developed to facilitate the use of modern water management and climate adaptation planning tools and information sources. The platform is communicated to all 3,188 municipalities in Hungary through the Municipal Newsletter (the official electronic publication of the Ministry of Public Administration and Regional Development for municipal officials).

A4, C6: Through the newly introduced financial support for third parties, replication activities are planned at at least 15 additional locations outside the partnership. The call for municipalities provides co-financing for the implementation of innovative NWRM solutions to support climate change adaptation. Through this activity, municipal cooperation within catchments will also be replicated in an additional five regions, as this will be an eligibility criterion under sub-action C6.2.

C7: The General Directorate of Water Management (GDWM) develops the content and methodological guidelines required for the preparation of Integrated Municipal Water Management Plans (IMWMPs). Based on this guideline, a master plan is prepared for the Püspökszilágy demonstration catchment. Both the methodological guide and the master plan will serve as reference documents for future IMWMPs.

C8: The development and implementation of training materials for professional target groups (municipal decision-makers, public sector water management professionals, water engineers) promotes the application of integrated water management methods in climate adaptation. The newly developed university course and training programme in integrated water management ensure that NWRMs become part of the toolkit of future generations of water engineers.

C9: Methodological guidelines and handbooks are prepared for municipalities based on experiences gained at demonstration sites, covering integrated land-use management, NWRMs, and additional municipal needs identified under A3. To support transnational replication and knowledge transfer, English versions are also produced, shared online, and presented at conferences, summer schools and international visits.

C10: The preparation of a governmental report facilitates interactions between different policies and sectors, as the document is disseminated to all Hungarian ministries.

D2: The establishment of a hydrological and meteorological monitoring system provides reliable technical data on the impacts of the interventions. This will serve as a reference for engineers when designing future NWRM systems across different catchments.

E2: The awareness-raising campaign (including environmental education elements) supports replication and knowledge transfer by fostering a positive and supportive attitude among the public, thereby encouraging changes in local policies and strategies through civic engagement. The campaign also aims to build a positive attitude towards NWRMs among municipal leaders, supported by video reports.

E3: The international summer school will host approximately 60 future water engineers from various EU universities. The international closing conference is planned with around 200 participants. These events target a professional audience that can act as key stakeholders and ambassadors of the project.

E4: The local NWRM and climate adaptation showrooms established in the two pilot catchments host a wide range of target groups, including water engineers, water science professionals, engineering students, nature conservation experts and NGOs, mayors, local decision-makers, staff of water directorates, civil servants, as well as experts from ministries dealing with climate adaptation, water management and rural development (Ministry of Interior, Ministry of Agriculture, Ministry for Innovation and Technology), and professionals from water permitting authorities. International projects and expert groups may also participate in guided visits.

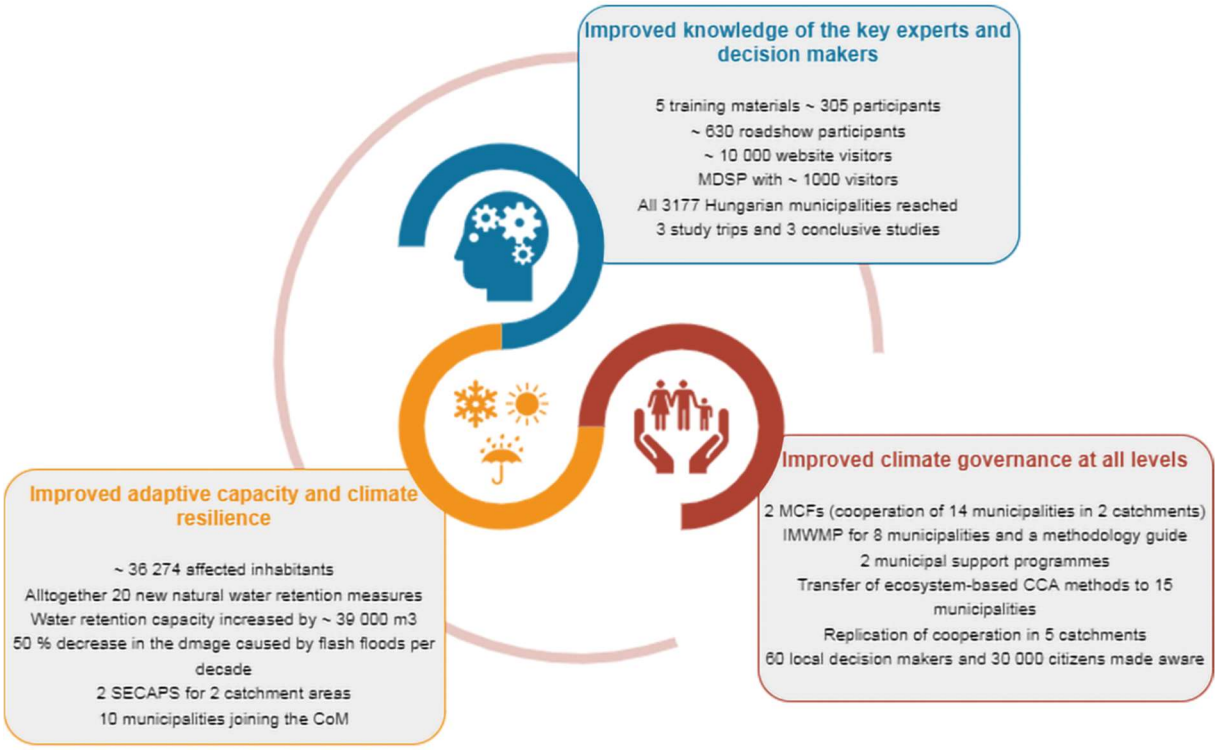
E5: Climate workshops are organised for municipal leaders and decision-makers, promoting community-based cooperation, networking and awareness-raising. The workshops present funding opportunities available to municipalities for implementing the solutions demonstrated in the project and support the enhancement of absorption capacity.

E6: Exchange of information, good practices and experiences, as well as the exploration of mutual replication and knowledge transfer opportunities with other national initiatives and international projects.

F3: The After-LIFE plan not only addresses the continuation of certain activities but also includes steps to ensure the further replicability and transferability of results (e.g. hosting different stakeholder groups, promoting good practices, etc.).

5 Expected Impacts and Results

Enhancing the knowledge and capacity of municipalities and key stakeholders in the fields of ecosystem-based adaptation, climate change-related water risks, and integrated water management contributes to strengthening overall climate adaptation



capacity. The experiences gained from catchment-level cooperation and the tools developed will support local municipalities in shifting towards retention-based local water management, thereby contributing to improving Hungary's negative water balance.

The measures implemented in the two pilot catchment areas make a meaningful contribution to strengthening the climate adaptation capacity of municipalities, shaping awareness, restoring the relationship between people and water, and promoting sustainable water management practices. The testing and monitoring of the interventions are currently ongoing.

Number of Interventions	Cost of Interventions	Water retention capacity	Newly created water surface area	Affected population	Groundwater recharge
34	~ 225 million HUF	46881 m^3	31356 m^2	33521 people	20951 m^3/year

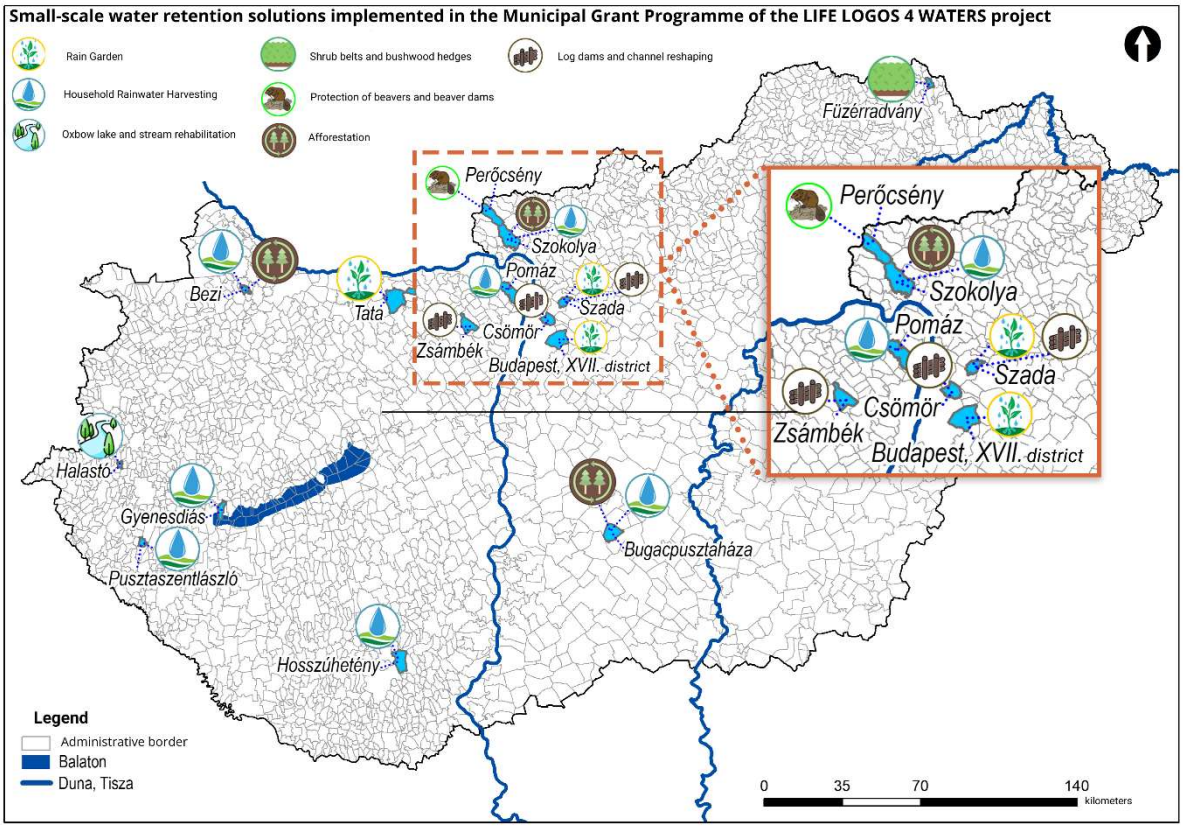
The project promoted the dissemination of water retention and nature-based solutions not only through pilot area interventions, but also **through nationwide support and knowledge-sharing instruments**. Key elements included **grant programmes**, **municipal decision-support** tools, and target group-specific **training and dissemination activities**, which together contributed to strengthening the climate adaptation capacities of municipalities and regions.

5.1 Support programmes for municipalities (two grant schemes)

The project promoted the integration of water retention approaches into municipal practice through two complementary grant schemes. **Nearly 300 applications** were submitted from across the country, involving the smallest settlements, cities with county rights, districts of the capital, and county-level authorities.

5.1.1 Municipal Grant Programme:

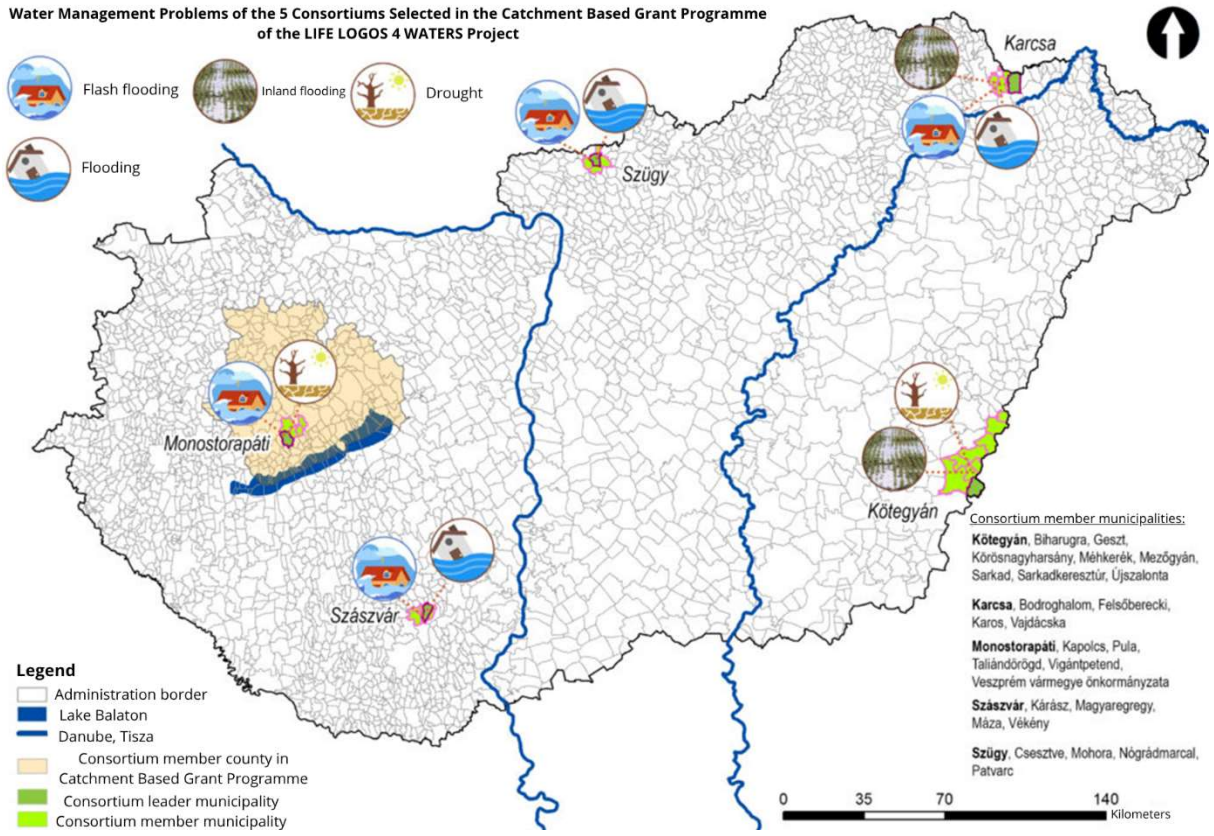
A The Programme supported the implementation of local, small-scale developments.



From **a budget of €100,000, 15 municipalities** received non-repayable funding and implemented tailored water retention solutions through “mini projects” adapted to local conditions. Supported interventions included, among others, **household rainwater harvesting, rehabilitation of oxbow lakes and streams, log dams and channel reshaping, shrub belts and brushwood hedges, afforestation,** and the **protection of beavers and their dams.** These small-scale developments demonstrated that effective and sustainable interventions can be initiated even with limited financial resources, and in several cases laid the foundation for larger-scale developments.

5.1.2 Catchment-Based Grant Programme:

The novelty of this Programme lay in the fact that municipalities applied **not individually but at catchment level, as a consortium,** with a joint planning and strategic focus. A total of **39 municipal consortiums** applied to the two-stage call, involving **more than 200 municipalities** (195 municipalities and 5 county offices), from nearly **50 districts**, ensuring nationwide coverage. Ultimately, **five catchment consortiums** received support, along with expert assistance, to develop integrated, nature-based solutions. The key lesson of the Programme is that the catchment-based approach and joint planning in themselves created significant added value; the resulting "know-how" became a model at national level and has also been reflected in domestic funding schemes (e.g. KEHOP ZKI: support for joint, small-scale green-blue infrastructure developments across multiple municipalities).



5.1.3 Municipal decision-support and multi-level climate governance

A key objective of the project was to enable municipalities to make well-founded decisions on water retention and climate adaptation **based on data and methodologies**. The main tool for this was the **Integrated Municipal Decision Support Platform (IMDSP)**[1], an online platform providing access to national and international knowledge resources, databases, planning tools, guidelines, and best practices, all in one place. The content is structured around six thematic areas: **climate protection, regional development, nature-based solutions, ecosystems, water management, and green infrastructure**. The platform contributes to the long-term foundation of municipal planning and supports alignment between local documents (e.g. SECAPs – Sustainable Energy and Climate Action Plans) and regional and national policy frameworks.

In addition, the project established a **knowledge network** (field visits, Catchment Stakeholder Forums, Integrated Support Board, international and national networking events, workshops, and pilot trainings) to ensure that planning is based on practical challenges and local experience.

5.1.4 Education, Knowledge-sharing and Dissemination

The project placed strong emphasis on raising awareness and training the next generation of professionals. Within the **environmental education programme**[2], the "Water Mirror" educational booklet and a related educational package (lesson plans, methodological materials, videos, field guides) were developed for the 10–12 age

[1] https://lifelogos4waters.bm.hu/dontestamogato-platform/
[2] https://lifelogos4waters.bm.hu/kornyezeti-nevelesi-csomag/

group. **Approximately 40 teachers** participated in **a two-day accredited training**; based on follow-up data, they held seven Water Mirror sessions on average, reaching **more than 1,300 children.**

Showrooms and educational trails were established in the pilot areas: in Püspökszilágy, an indoor education centre and nature trail with interactive "water theme park"-type elements; in Kalocsa, an outdoor trail and covered education pavilion; and in Dusnok, a nature trail presenting local best practices.

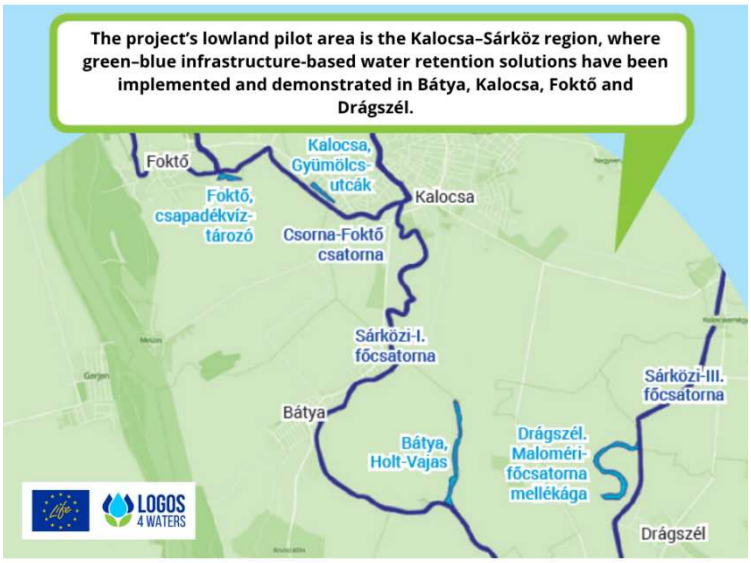
In higher education, the **Faculty of Water Sciences of the University of Public Service** organised three **international summer schools**, with a strong focus on practical components (measurement technologies, field exercises, demonstration of NbS solutions).

Dissemination activities included **4 climate workshops, 1 national conference, 14 professional field visits**, and **3 nationwide roadshows** (21 events in total). The project's closing event was the **ClimAct2Adapt – Acting Together for Climate Resilience** international conference (Esztergom, 8–9 October 2025), focusing on the links between climate adaptation, water management challenges, and nature-based solutions. In addition, three **European study trips** and three smaller **international networking meetings** were organised to support international knowledge exchange.

Overall, the grant programmes, the decision-support platform, and the education and dissemination components together created a comprehensive **toolkit with nationwide impact** that supports the practical application of natural water retention, strengthens cooperation among municipalities, and facilitates the long-term integration of climate adaptation and water retention approaches into everyday practice.

6 Interventions in the lowland pilot area

6.1 „Water is value" and „Water is the key to climate adaption!"



Nature-based, green-blue water retention solutions provide multiple additional benefits beyond their primary water management function. Even a single wetland created through water retention can improve the local microclimate (cooling, evaporation, reducing near-surface frost), enhance aesthetic and recreational value, and positively impact biodiversity. However, when multiple interventions are implemented and function together at landscape scale, further benefits emerge. One such effect is the mesoclimatic, precipitation-forming impact: in Hungary, 16–41% of precipitation originates from water that evaporates within the Carpathian Basin. Therefore, increasing the area of water bodies subject to evaporation could, in the long term, help strengthen the regional water cycle and mitigating drought. In the Kalocsa–Sárköz region, the LIFE LOGOS 4 WATERS project lays the foundations for this landscape-scale water retention approach.

6.2 Rehabilitation of Oxbow lakes in Bátya and Drágszél

The Kalocsa–Sárköz area was once a complex water system of side branches, oxbow lakes, marshes, and ponds closely connected to the main branch of the Danube. Today, the only reminders that the area was once a deep floodplain are the agricultural lands threatened by inland flooding, as well as the dozens of riverbed remnants clearly visible in aerial photographs and on maps. One of these disappearing former riverbeds, the 2 km long Holt-Vajas, branches off from the Sárköz Main Canal I at the border of Bátya and Kalocsa, while another 3 km long channel lies near Drágszél. Within the project, these side branches were restored to receive and retain surplus water appearing in the water system. The rehabilitated and reconnected channels are capable of both relieving drainage canals from excess water and retaining this water for water-scarce, drought periods.

6.3 Municipal Green-blue Infrastructure in Kalocsa and Foktő

Many present-day wetlands are not of natural origin but have been artificially created, such as the marshy reed beds that have formed in borrow pits and clay extraction sites. In Kalocsa, five different interventions have enhanced the aesthetic, recreational, and educational value of five

depressions located between residential areas and the canal. In addition, infrastructure was established to allow water inflow from the Csorna–Foktő Canal, and, if necessary, water pumping is also possible. As a result of the interventions, the area now includes diverse habitats resembling floodplain forests, recreational spaces, and a resting and exhibition area suitable for school activities. These interventions demonstrate that green-blue infrastructure elements can also be successfully implemented in urban environments.

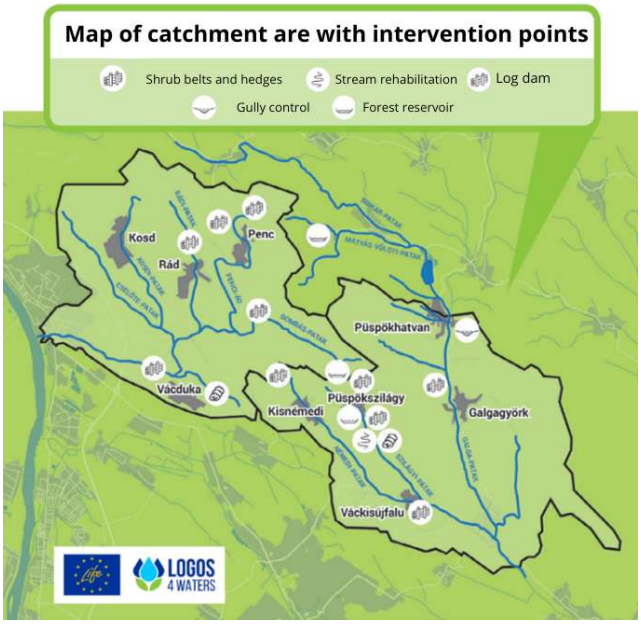
6.4 Presentation of multifunctional green-blue community spaces in Dusnok

Even before the project, Dusnok had several water bodies that not only enhanced the local landscape but also helped balance hydrological and precipitation extremes, thereby protecting the locality. One such example is the Bara Lake and leisure park, located in a low-lying central area. During heavy rainfall, the lake overflows into the surrounding leisure park area situated higher than the lake but still below residential levels thus simultaneously retaining water and protecting inner areas from flooding. In Dusnok, such water retention good practices (including those implemented within the project) are presented through an inner educational trail.

7 Interventions in the hilly pilot area

7.1 Towards Water-retentive Catchment Management

In hilly and mountainous areas, climate change is leading to increasingly frequent flash floods and mudflows caused by soil erosion from intense runoff, while heatwaves and droughts are also recurring challenges. Flood protection on small watercourses places a significant burden on municipalities, and 1,414 localities across Hungary are affected by flash flood risk. Effective prevention requires interventions not only within the town limits but also across the upstream catchment. Nature-based solutions such as slowing runoff and local water retention can simultaneously reduce damage, improve habitat conditions, and create new recreational opportunities. These measures often require cooperation among multiple localities and stakeholders, as the most effective intervention points are not always located within the areas most affected by damage. A good example is the joint, small-scale water retention and runoff reduction measures implemented by nine municipalities cooperating in the catchments of the Szilágyi and Gombás streams, demonstrating a shift towards water-retentive catchment management.



7.2 Installation of Live and Deadwood Hedgerows

On the outskirts of Vácduka, on the hillside above the new “container school”, a 120-metre-long “Benjes hedge” with live shrub reinforcement was established on a newly parcelled but undeveloped area. The structure consists of woven deadwood and branches placed between rows of posts perpendicular to the slope, complemented by living shrubs. Its purpose is to slow runoff, reduce erosion, prevent soil loss and mudflows. Similar deadwood and live hedgerows are also being installed in Püspökszilágy on an agricultural hillside.

7.3 Gully Stabilisation Against Erosion

In Püspökhatvan, runoff from deeply incised gullies descending from Takács Hill

regularly causes flooding at houses located at the edge of the village. To mitigate this problem, five different types of energy-dissipating, runoff-reducing log and stone check dams are being installed in the upper sections of the gullies, where runoff from agricultural land currently gains significant kinetic energy. These structures slow water flow, delay concentration, trap sediment and debris, reduce damage, and promote infiltration.

7.4 Forest Water Retention Basin

In Püspökszilágy, a temporary forest water retention basin has been created on the Kisköves tributary of the Szilágyi Stream. Following its implementation, runoff from heavy rainfall and cloudbursts remain longer in the landscape, helping ensure water availability for ecosystems during dry periods.

7.5 Runoff Slowing Using Permeable Log Dams

Permeable log dams retain part of the runoff and sediment during heavy rainfall, thereby slowing flood waves. When applied extensively across the upper catchment, they can flatten peak flows and reduce the frequency of water-related damage. At the same time, low flows and aquatic organisms can pass through the structures, meaning they do not create impassable ecological barriers in either temporary or permanent watercourses.

7.6 Supporting Stream Rehabilitation and Showrooms

The straightened channel of the Szilágyi Stream below Püspökszilágy runs across a wide valley floor that was once naturally inundated. Log dams installed in the channel aim to improve both hydrological conditions and ecological status. These interventions slow runoff, enhance water supply to floodplain habitats, and can contribute to raising groundwater levels. At the same location, an educational trail and showroom have been established to present the principles and traditions of water retention in an interactive way for visitors.

8 Catchment Stakeholder Forum (CSF)

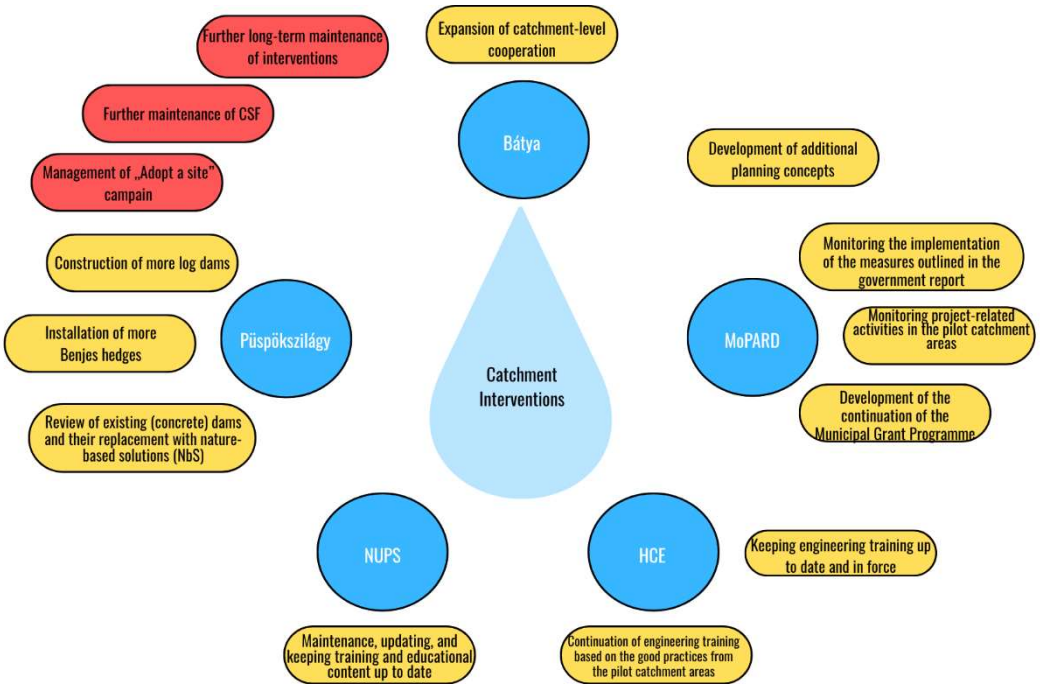
The establishment of the Catchment Stakeholder Forum (CSF) was based on the recognition that water does not stop at administrative boundaries; therefore, climate-related risks occurring within the same sub-catchment or along the same watercourse such as flash floods, inland excess water, or drought can only be effectively managed through coordinated, catchment-level interventions. The aim of the Forum was to jointly identify and prioritise water-related challenges and adaptation opportunities, and to support integrated implementation by incorporating the perspectives of all relevant stakeholders. The partnership considered it a major success that, despite initial challenges, the CSFs were successfully established and operated effectively, leading to the selection of a sufficient number of high-quality projects. In both pilot areas, the CSFs brought together, in addition to the leaders of the catchment municipalities, local farmers, civil society representatives, and water management experts. The designation of intervention sites was always preceded by thorough professional preparation and consultation. In the lowland pilot area, in Bátya, Kalocsa, and Foktő, interventions were jointly defined by municipal leaders and project experts, while in Dusnok and Drágszél the CSF comprising municipal leaders, farmers, civil actors, and water professionals, selected the most appropriate water retention and

awareness-raising measures. In the hilly pilot catchment, through the cooperation of Püspökszilágy, Kosd, Kisnémedi, Penc, Galgagyörk and additional localities, decisions were made partly during the proposal development phase and partly within the framework of the CSF. Several interventions affected privately owned land, requiring extensive coordination. Across the approximately 200 km² catchment, covering nine towns, more than twenty small-scale, nature-based water retention solutions were implemented, laying down the foundation for the practical application of water-retentive catchment management.

9 After-LIFE Activities

The objective of the After-LIFE activities, i.e. actions implemented after the completion of the project, is to ensure the long-term sustainability of project outputs and milestones, even beyond the five-year maintenance period. This commitment was already evident during the proposal phase, as all partners planned to continue working with small-scale, nature-based water retention solutions in their respective areas. These commitments are closely aligned with the partners' core activities and long-term objectives; therefore, in most cases, project results can be sustained without significant additional burden or resource allocation. In line with the project proposal, the continuation activities are structured into four main categories: catchment interventions, monitoring, replication, and communication and dissemination.

9.1 Catchment Interventions



The responsibilities of stakeholders and the planned follow-up actions are defined in a long-term perspective, building on one another. In Bátya, Püspökszilágy, and through cooperation among catchment-level municipalities, the long-term operation and maintenance of implemented interventions will continue in accordance with the approved operational regulations. This includes the continuation of the actively managed “Adopt a site” campaign targeting local schools and civil organisations, as well as the ongoing operation of the Catchment Stakeholder Forum.

- In the **Püspökszilágy** catchment area, additional nature-based solutions will be implemented, including new Benjes-hedges using household green waste, other than that, various types of log dams, as well as solutions such as valley-closing and earthen dam structures. Furthermore, previously constructed concrete structures that are no longer appropriately located will be reviewed and, where justified, replaced with modern nature-based solutions.

- In **Bátya**, the objective is to further expand catchment-level cooperation by involving new settlements and developing joint concepts to support this. The

town also aims to actively participate in conferences and dissemination events, presenting implemented interventions and experiences, and further refining them based on lessons learned.

- The **Ministry of Public Administration and Regional Development (MoPARD)** will monitor and coordinate the evaluation of project-related activities of municipalities in the pilot catchments. It will also track the implementation of recommendations included in the governmental report and assess the possibility of continuing the Municipal Grant Programme, including launching new calls if feasible.

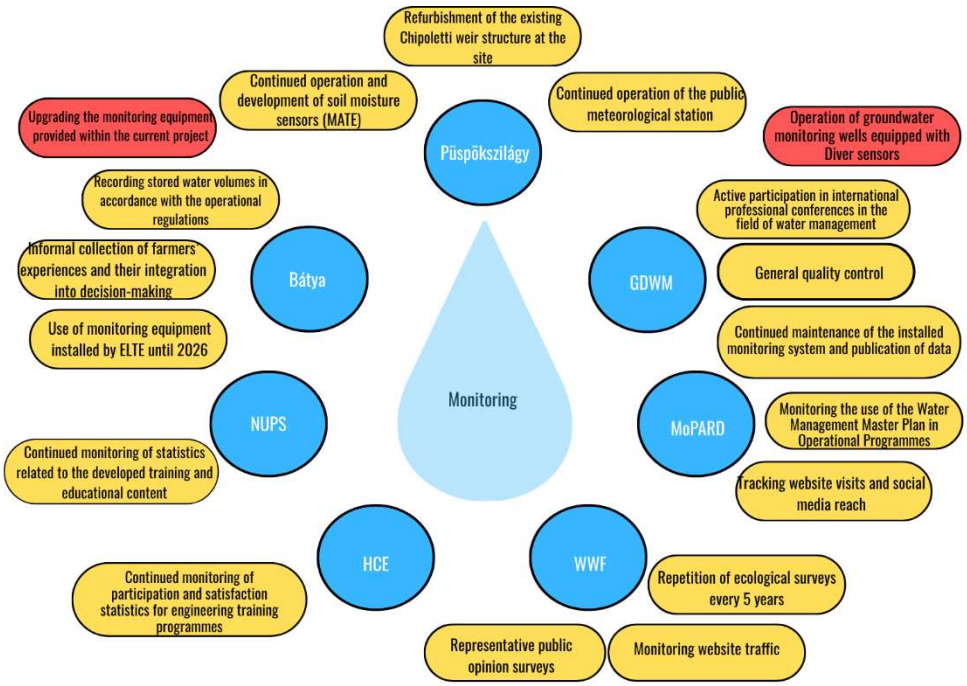
- The **Hungarian Chamber of Engineers (HCE)** will continue strengthening engineers' competencies related to nature-based solutions through ongoing training programmes based on best practices from the pilot areas, ensuring continuous updates of training materials.

- The **University of Public Service (UPS)** is responsible for maintaining, regularly updating, and keeping current the training and educational content developed for water management professionals, municipal experts, and students in higher education.

- The **Association of Climate Friendly Municipalities (AoCFM)** contributes to the wider uptake of nature-based solutions by maintaining and regularly updating its database of good practices, thereby supporting and encouraging the application of various types of interventions. The database provides practical guidance for Hungarian municipalities during both the planning and implementation phases by summarising, in an accessible format, the necessary

steps for implementation, typical cost and permitting considerations, as well as maintenance experiences. Through its membership network, AoCFM also supports the expansion of catchment-level cooperation by involving new municipalities. It presents the adaptability of coordination practices applied in the pilot areas (e.g. forum-based approaches similar to the Catchment Stakeholder Forums) to its members. In addition, AoCFM facilitates the use of templates and ready-to-use materials by member municipalities for local maintenance and operational tasks (such as communication, public engagement, and volunteer programmes). The Climate-Friendly Municipalities Association plans to continue organising networking events and workshops at least annually, further strengthening awareness among municipalities regarding water retention and promoting the wider adoption of nature-based solutions.

9.2 Monitoring



The purpose of monitoring is to track whether the implemented interventions and achieved results are maintained after the completion of the project, and to assess their long-term impacts on the target area. This process provides an opportunity to evaluate the sustainability,

functionality and actual effectiveness of the interventions, as well as to identify any further development or intervention needs. Monitoring also contributes to the systematisation of lessons learned, the reinforcement of good practices, and the foundation of future programmes.

- With the active involvement of the **General Directorate of Water Management (GDWM)**, water management paradigms related to natural water retention solutions are continuously explored at national and international professional conferences across Europe. In addition, data from the installed monitoring equipment will continue to be collected, analysed and shared with the relevant municipalities and project partners; if necessary, their public disclosure will also be considered. GDWM monitors the use of the Catchment-Based Water Management Plan (Master Plan) in operational programmes, analyses how many applications have built upon this material, and carries out general quality control and experience assessments.

- In **Püspökszilágy**, the operation of the existing public meteorological station will continue, along with the maintenance of groundwater monitoring wells equipped with data loggers. Monitoring activities in the catchment area are now also supported by drone surveys, which significantly helps both the maintenance of interventions and the identification and development of further NWRM opportunities. Data from the upgraded precipitation station in Galgagyörk and the newly installed station in Galgamácsa are integrated by GDWM into the national water management data system. The camera-based discharge measurement system installed on the Szilágyi Stream is operated and processed by the Budapest University of Technology and Economics (BME), with results accessible on a dedicated interface. Soil moisture sensors provided by the Hungarian University of Agriculture and Life Sciences (MATE) enable continuous long-term impact assessment of the interventions, complemented by sedimentation measurements. The modernisation of

monitoring equipment procured within the project, as well as the renovation of the existing Chipoletti structure at the site, will also be carried out.

- In **Bátya**, the volume of stored water is recorded in accordance with the operational regulations, while informal collection of farmers' experiences and their integration into decision-making are also emphasised. Through installed monitoring equipment (temporary surface and groundwater observation points) and manual data collection, GDWM conducted continuous data collection at the Bátya site until 15 December 2025, enabling further evidence-based conclusions to be drawn.

- The **Hungarian Chamber of Engineers** will continue to monitor participation rates and satisfaction indicators of engineering training programmes to ensure their effectiveness and continuous improvement.

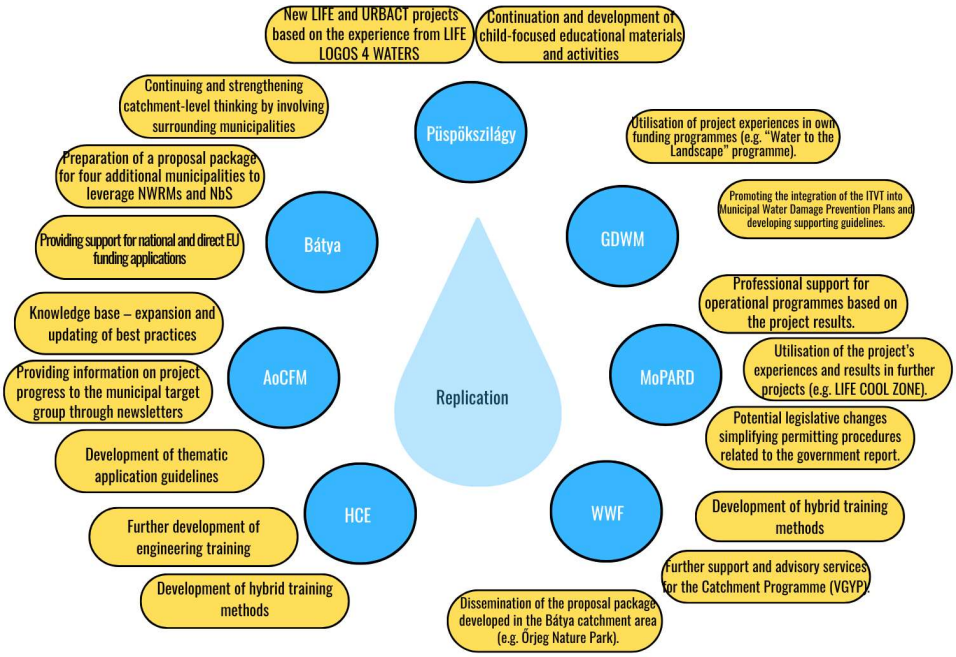
- The **University of Public Service** will likewise continue to measure participation and satisfaction indicators related to its training and educational content, ensuring their relevance and practical applicability.

- The **Ministry of Public Administration and Regional Development** is responsible for monitoring the communication impacts of the project, including the regular measurement and analysis of website traffic data and social media reach.

- **WWF** monitors changes in public attitudes through surveys, tracks the visitor statistics of the "Viztükör" (WaterSurface) website, and provided the necessary

funding is available, plans to repeat ecological assessments in five-year cycles to evaluate long-term environmental impacts.

9.3 Replication



As part of replication activities, the partnership remains committed to promoting the application of natural water retention solutions, supporting stakeholders within their respective sectors in implementing similar projects and investments.

- **AoCFM** plays a key role in expanding and regularly updating the knowledge base and the collection of good practices, further developing the Municipal Grant Programme model, and preparing thematic guidance materials to support municipalities in practice. As part of this effort, AoCFM is compiling a list of needs related to natural water retention solutions based on local requirements, and, drawing on numerous domestic and international best practices, aims to support the work of its network members through a publication in Hungarian. The aim of these guidance materials is to reduce administrative burdens during project preparation, improve the professional quality of submitted proposals, and support the wider replication of nature-based solutions. AoCFM also incorporates feedback from member municipalities and lessons learned from the project, thereby enhancing the effectiveness and relevnce of support instruments. In addition, building on the municipal cooperations established

during the project, AoCFM provides mentoring and experience-sharing mechanisms on demand, and regularly disseminates relevant national and EU funding opportunities to facilitate replication.

- The **Municipality of Püspökszilágy** plans to initiate new LIFE and URBACT projects based on the experiences gained from the LIFE-MICACC and LIFE LOGOS 4 WATERS projects. Replication is approached primarily through environmental education, including the continuation and expansion of awareness-raising tools and programmes targeting children, such as an NBS-themed storybook, the "water theme park", and the showroom with related educational activities. In addition, further project proposals are planned in cooperation with neighbouring settlements, building on the catchment-based approach and cooperation mechanisms developed within the project.

- In the case of **Bátya**, maintaining and strengthening catchment-level thinking remains a key objective, with the involvement of neighbouring settlements. A **proposal package** will be prepared under the leadership of the municipality **for four additional municipalities** to support the implementation of small-scale natural water retention solutions, along with professional support for the preparation and submission of national and direct EU funding applications.

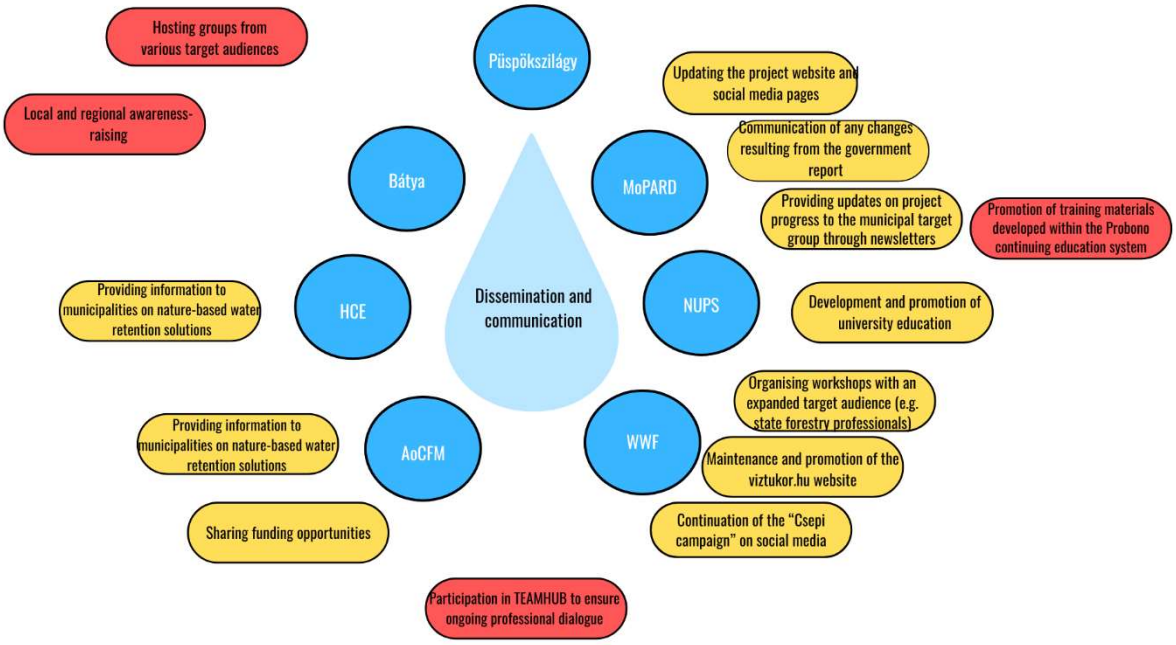
- **WWF** will promote the wider dissemination of the proposal package developed for the Bátya catchment (e.g. in the Őrjeg Natúrpark area), and will continue to provide professional support and advisory services within the Catchment Grant Programme. In addition, WWF plans to publish a comprehensive professional publication on nature-based solutions.

- **GDWM** will utilise the experience gained during the project within its own funding programmes, for example under the "Water to the Landscape" programme. It will also promote the integration of project results into Integrated Municipal Water Management Plans (IMWMPs), Municipal Flood Protection Plans, and municipal water management development projects.

- **MOPARD** will examine legislative amendments related to the recommendations set forth in the government report that could potentially simplify licensing procedures. The project's experiences and results will also be utilised in further developments, such as the LIFE COOL ZONE project, and will provide a professional basis for support activities related to the KEHOP ZKI call.

- **HCE** plans to further develop engineering training programmes, with a particular focus on improving accessibility through hybrid training methods. As part of this, a unified national technical guideline will be prepared and proposed, providing practical guidance for professional engineers on the design and implementation of nature-based water retention solutions.

9.4 Dissemination and Communication



For successful replication, it is essential that the project and its underlying approach are widely known and understood. Dissemination and communication therefore play a key role in the project's after-life phase, with all partners actively contributing.

- The communication of the project and the wide dissemination of its results are implemented through a coordinated, multi-channel approach. The **MoPARD** manages the project website, as well as its Facebook and LinkedIn platforms, through which target groups are continuously informed. Any changes resulting from the governmental report are communicated in a targeted manner, with particular attention to relevant professional and municipal stakeholders. For municipalities, regular newsletters provide updates on project progress and current developments. MOPARD will continue to represent and showcase the project at professional and informational events.

- **MoPARD** and the **UPS** jointly promote the training materials developed within the Probono training system, while UPS places particular emphasis on the

further development and promotion of university-level education. At the same time, the **Hungarian Chamber of Engineers** is committed to promote the final version of the engineering degree programs and strengthening their professional recognition.

- **WWF** continues awareness-raising activities on social media, building on elements of the already established "Csepi campaign", and ensures the maintenance and active promotion of the viztukor.hu website. On its YouTube channel, the short film "Our Wasted Waters" and other educational videos produced within the project remain continuously accessible. WWF also participates in professional events, extending the reach of the original target groups, for example towards the forestry sector, thereby supporting a broader understanding and application of nature-based water retention solutions.

- **All project partners** commit to disseminating results through their own communication channels, publishing news and articles, and promoting project documents, publications and infographics at various professional and public events.

- **AoCFM** supports municipalities with targeted information on nature-based water retention solutions and shares relevant funding opportunities. MOPARD, WWF and AoCFM all participate in the TEAMHUB professional forum to ensure continuous professional dialogue and knowledge exchange. AoCFM will continue to regularly publish results related to natural water retention solutions in Hungary through its communication channels (newsletters, social media) and organise thematic online and in-person knowledge-sharing events for municipal decision-makers and professionals. As part of the dissemination, AoCFM distributes accessible, municipality-focused summaries and case studies, with a particular emphasis on the practical implementation and maintenance of nature-based solutions, as well as potential funding opportunities.

- **Püspökszilágy** and **Bátya** will continue to welcome visitors from various target groups through local exhibition centres (indoor exhibition spaces and

educational trails) and on-site programmes, thereby strengthening awareness at local and regional levels and directly showcasing the practical results of the project.

10 After-LIFE Actions

Action	Partner Responsible	Description of Action	Cost of Action	Funding
C1, C2	Bátya, Püspökszilágy	The integrated NWRM systems (infrastructure and equipment) developed under the project will be operated, used, and maintained by the participating municipalities.	€€€	Own funds, future grant funds
C4	WWF	Sharing the insights gained from the solutions observed during international study tours with local governments, designers, and experts in the future	€	No funding required
C5	MoPARD	The Integrated Municipal Decision Support Platform will remain available on the project website.	€	Own funds
C5	AoCFM	The AOCFM updates and revises these best practices regularly.	€	No funding required

Action	Partner Responsible	Description of Action	Cost of Action	Funding
C6.1	AoCFM	The 15 municipalities receiving funding are maintaining the small-scale solutions they implemented using third-party funding.	€€	Own funds Grant funds
C6.2	AoCFM	The supported municipal cooperation communities will implement the concepts developed during the project.	€€	Own funds, Future grant funds
C7	GDWM	A methodological guide summarizing the findings from the pilot implementation will be shared with the relevant professionals.	€	No funding required
C8	AoCFM	The training framework developed as part of the project will be integrated into official knowledge-sharing programs and will remain available.	€	No funding required
C8	UPS	UPS will continue to offer the multidisciplinary course within its undergraduate programmes on an annual basis, as well as the specialised postgraduate training. The e-learning materials will remain available within the public service training system and will continue to be accessible and predictable for	€	Own funds

Action	Partner Responsible	Description of Action	Cost of Action	Funding
		those required to participate in training in the coming years.		
C9	MoPARD	The methodological guidelines support more effective municipal work and will be available on the platform.	€	No funding required
C10	MoPARD	At the end of the project, a Government Report is prepared, and its follow-up will continue after the project.	€	No funding required
D1	WWF	Identifying funding sources to repeat ecological assessments in five years	€€	Own funding, future grant funds
D2	GDWM	Hydrological and meteorological monitoring will continue to the necessary extent.	€€	Own funding, future grant funds
E1	MoPARD	The project website will remain available, and the Layman's report will be downloadable.	€	Own funding

Action	Partner Responsible	Description of Action	Cost of Action	Funding
E2	WWF	The films produced within the campaign will remain available and will continue to be promoted.	€	No funding required
E2	WWF	The materials developed for teachers will remain available on the WWF and project websites.	€	No funding required
E3	UPS	The summer schools organised by the University of Public Service (UPS) will continue after the project.	€€€	Own funding, future grant funds
E4	WWF	The local exhibition centres will continue to be used, and virtual tours will be available.	€€	Own funding
E5	AoCFM	ACFM plans to continue organising dissemination events and workshops in the future in order to promote the wider uptake of nature-based solutions.	€	Own funding, future grant funds
E6	MoPARD	The established international partnerships will serve to identify future project opportunities.	€	Own funding, future grant funds

Legend:

€	**0-5000 €**
€€	**5000-10000 €**
€€€	**+10 000 €**