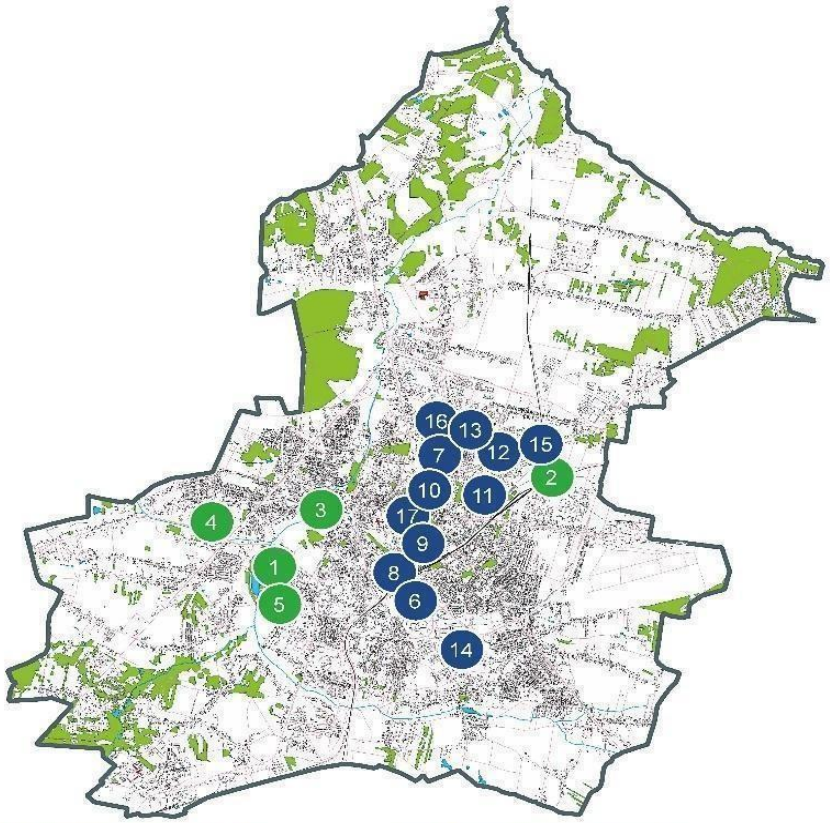
The key results of the project



Map No 1. Large – scale and small-scale Blue and Green Infrastructure implemented in the project

Project LIFE-RADOMKLIMA-PL aimed in increasing climate resilience of the city of Radom by:

1) building demonstrative blue-green infrastructure (BGI) for managing extreme rainwater flows and control flood risks (outside and within the city);

2) enhancing biodiversity by restoration and creation terrestrial and water microhabitats;

3) mainstreaming climate adaptation into city planning and supporting informed decision- making;

4) rising of awareness and building capacity on climate adaptation;

5) support exchange of knowledge and know-how.

BGI implemented in the project were classified into two groups:

1) Small - scale BGI – (action C6) adaptation actions which support onsite stormwater retention in those parts of the city, where the risk of overloading the stormwater drainage system and flooding resulting from urban run-off and flash floods is the greatest. Thanks to

their construction, not only stormwater is collected, but also attractive places are created for residents as well as biodiversity enclaves.

2) Large – scale BGI – (actions C1 – C6) adaptation measures which increase the retention capacity of rivers and their valleys, strengthen flood safety, improve biodiversity in river ecosystems and their valleys, and create new, natural recreational space for city residents.

The key outputs of the project included:

1) activating local stakeholders to work together in integrated climate actions;

2) climate change vulnerability assessment for Radom;

3) demonstrative large-scale BGI:

• increased retention and purification capacity of 2 existing water ecosystems (Borki reservoir and sedimentation ponds);

• 3 new large-scale areas to mitigate the hydrometeorological risks (SSBS above the Borki reservoir, the Potok Północny and the Cerekwianka polders);

• rehabilitation of urban river section (the Mleczna River);

• 34 small-scale BGIs in the densely-developed city area (climaponds, climaboxes, green roofs on bus stops and bike shelters, swales, tree-trenches, permeable surface);

4) education and information materials and improved awareness and dissemination of the climate change effects around the local communities;

5) improved biodiversity.

The project increased climate resilience of the City of Radom by implementing adaptation actions aiming at managing water resources at the source, thus decreasing local floods and mitigating microclimate. Below the results of the project.

- Increased purification capacity of sedimentation ponds by 20% (C1)
- Increased retention capacity of sedimentation ponds roughly by 60 % (C1)
- Borki reservoir retention capacity increased by 10% (C2)
- Mitigating extreme flows in the Mleczna River (C2)
- Creating a water retention capacity in a multi-use retention area at the Potok Północny (C3)
- Restoration of 630 m of the Mleczna River (C4)
- Storm water channel A0 sealed on a distance of 679 m, iron pollution in water reduced and water redirected upstream of Borki reservoir (C5)
- Improvement of inflowing water quality by 60% by sequential sedimentation-bio filtration system (C5)
- Green-blue infrastructure developed and installed (C6) including, 5 Climaponds, 8 Climabox, 14 swales, raingardens and tree trench systems, green 5 roofs, 65 m2 of permeable surface
- Integration of biodiversity in rainwater management system in Radom and creation of habitats for biological diversity within the city (5 locations in ponds, green roofs, swales) (C6)
- 12 locations (11 concerning small BGI, where biodiversity was monitored and 1 on the Cerekwianka polders),
- A comprehensive best practice guide on adaptation through rainwater management in cities elaborated
- Information materials and education actions (Actions E) providing numerous opportunities for demonstrating project achievements and proposed solutions for rain water management – 12 913 items of information materials used and/or distributed, 3 880 promotional gadgets distributed, 12 packets of main education actions involving local society
- 4 other cities in Poland took up project know-how and transfered it to their plans and projects (E actions) - Wrocław, Opoczno, Białystok, Zgierz
- RadomKlima Portal has been operating as an internet tool on climate adaptation in cities (E1)

Specific, worth highlighting achievement of the project was a following distinction. At the end of the project, Scientific Advisory Committee of the Ecohydrology Program of the UNESCO's IHP (International Hydrological Program), composed of internationally well- known scientists from all over the world invited LIFE-RADOMKLIMA-PL project and the City of Radom to become a member of the Global Network of Ecohydrology Demonstration Sites of UNESCO's Intergovernmental Hydrological Program

Photo 1 (source: S. Szklarek UL) Borki reservoir, colmatation ponds and A0 Channel.

Photo 2. Climapond at the Public Kindergarten No 16

Photo 3. Rain garden at the Public Kindergarten No 11

Photo 4. Green bike shelter at The Radom Sport Center. Own source

The project applied the following solutions aimed at reaching its goals:

1) **Demonstrating BGI approaches to manage stormwater** on rivers, reservoirs and inner city which is becoming more and more popular lately in Poland and the low-costs, ecosystem-based solutions applied in this project are considered as "trend-setting". Its implementation required developing new technological approaches and institutional methodologies, which created unique know-how available to be replicated both in the future Radom planning practices and in other cities` realms.
2) **Climapond.** This innovative BGI measure had not been tested/installed in Poland before the project implementation and had innovative character. The uniqueness of these modular reservoirs depends on their design and adaptation to harsh rainfall conditions, while preserving habitats for many species.

3) **SSBS - Sequential sedimentation-biofiltration system.** The project used SSBS after LIFE project LIFE08 ENV/PL/000517 in Łódź. In Radom, SSBS was implemented in 3 places (the Cerekwianka polders, colmatation ponds and the Potok Północny reservoir) as a demonstration methodology aimed to increase water retention capacity and quality and prevent flooding of Radom by the rivers flowing into its centre from the suburbs. The SSBS consists of three zones: sedimentation zone with structures added to improve sedimentation, a geochemical barrier made of limestone deposit and biofiltration zone – all aimed to purify urban rivers supplied by stormwater.
4) **Co-operating within Working Groups, BGI co-designing and multi-level territorial approach to managing extreme flows in urban areas.** Two working groups (WG1 on integrating climate adaptation in local decision making and strategies; WG2 on blue-green infrastructure and biodiversity) were established and operationalized. The groups consisted of the representatives of decision-makers, managers, NGOs, practitioners, designers, urban planners and actively took part in the development of the project technical solutions. The aim of the project to increase infrastructure, land development planning and governance focus on the adaptation measures was achieved by the demonstrative character of the measures and by WGs meetings, hoping that it will make the city adaptation more successful, cost-efficient and institutionalized.
5) **Conducting climate vulnerability assessment (VA).** Radom undertook VA as the first city in Poland. We developed and used our own methodology, based on the best available practices, e.g. from Copenhagen and Aarhus (Denmark) to elaborate the document which was an integrated part of the Radom Adaptation Plan adopted by the City Council in 10/2019. VA alongside demonstration solutions in small BGIs and in protecting and developing biodiversity have been applied in the city's planning document - the City Land Use Study. The document replaces land use plans in decision-making processes, which determine the urban design permits for different stakeholders.
6) **Exchange of knowledge, know-how, dissemination and awareness rising.** The project actions contributed to promote understanding of the impacts of climate change on economic, social, and environmental conditions and to communicate the importance of cost-effective adaptation options. The project representatives were very involved in exchanging knowledge and know-how, as well as in informing on various occasions about climate change, its risks and applied adaptation measures. RadomKlima GIS Platform, an internet based tool, allowed, still does and will allow the public and the professionals to obtain information on climate change, vulnerability and adaptation and to help various stakeholders to take advantage from the Platform in the process of designing infrastructure and city development.

Photo 5. Colmatation ponds before and after the project. Own source

Photo 6. Main weir and fish pass on the Borki reservoir before and after the project. Own source

Photos 7, 8. The Borki reservoir after the project. Own source

Photos 9, 10. Potok Północny reservoir before and after the project. Own source

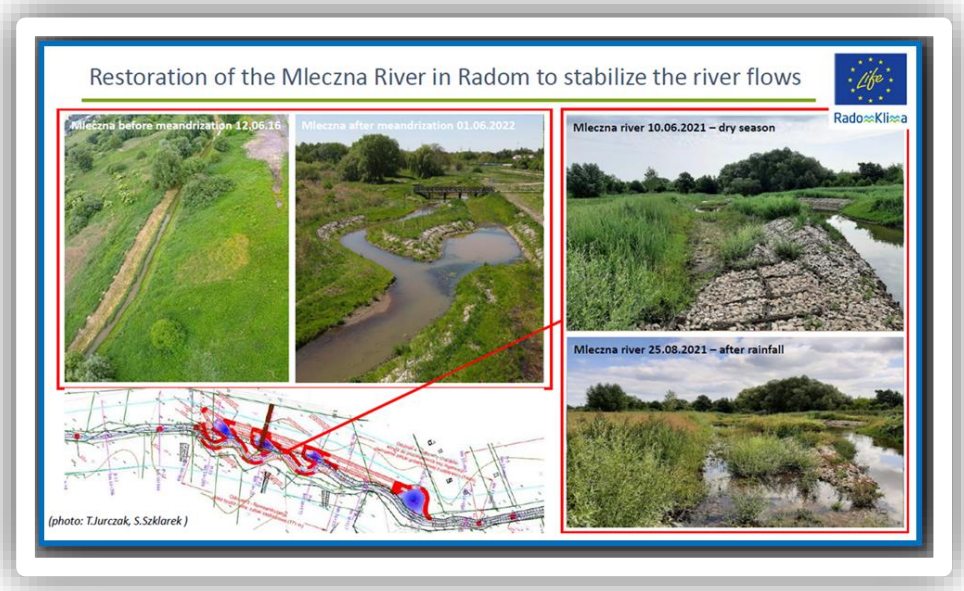


Photo 11. Mleczna river restoration before and after the project. Own source

Photo 12. Waterbox on Public Kindergarten No 4. Own source

Photo 13. Waterbox on Nad Potokiem Nursing Home. Own source

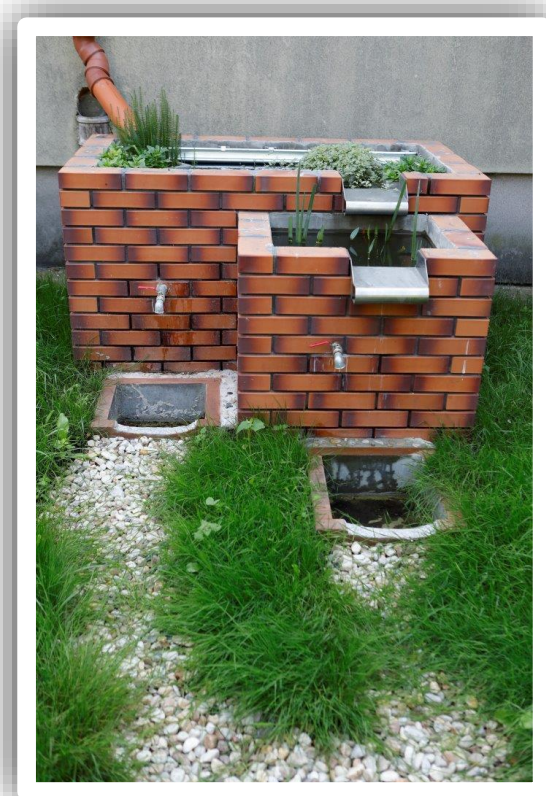


Photo 14. Waterbox on Nursing Home at Wyścigowa Street. Own source