Implementation of ecohydrological adaptative systems in the river valleys in Radom

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Abstract

The consequences of anthropogenic climate change, such as intense rainfall, which increasingly affects urban areas, are now becoming a serious problem for many cities. As a result of these events, there is uncontrolled flooding, damage and the need to take corrective measures to allow the cities and its inhabitants to return to normal functioning. As part of the LIFERADOMKLIMA-PL project, measures were taken in Radom to adapt the city to climate change through sustainable water management in the urban space. In this case, one of the project activitiy was the preparation and implementation of demonstration solutions on the city's river systems and within their valleys in order to limit the negative effects related, on the one hand, to the inflow of large amounts of water into the city center as a result of intense rainfall, and on the other hand, to limiting its runoff and their use to improve the quality of the city's natural environment and its microclimate. On the Mleczna River, which is the main watercourse in Radom, the existing Borki reservoir with colmatage ponds were adapted to retain and purify rainwater flowing into the city as a result of intense rainfall in the region. On its left tributary - the Cerekwianka River, a flood polder with an area of 1.7 ha was constructed, allowing to retention almost 17,000 cubic meters of water transported by the river as a result of intensive rainfall. In turn, on the Potok Polnocny River, which is the right tributary of the Mleczna River, WBRSC multifunctional system (water, biodiversity, resilience, ecosystem services, culture and education) were applied. On the one hand, this system reduces the problem of flooding, and on the other hand, it brings benefits for the environment and society. These systems reduce the flood wave flowing into the city center as a result of intensive rainfall, minimizing the problem of uncontrolled flooding.

In order to increase the retention capacity of the Mleczna River valley, as an example of adaptation to climate change, its regulated, straight section of river was rebuilt into a meandering system with variable hydromorphology, which significantly slowed down the outflow of water. The meandering of the river causes its periodic flooding, and the raising of the bottom of the river bed contributes to the retention of water in the catchment area. The system reconstructed in this way creates wetlands, thus improving the humidity and microclimate. They create habitats for many organisms and reduce the problem of drought. In addition, in order to increase the river's ability to self-purification of water, 10 different systems were made to act as riflles and pools in the river bed. Besiades, the outlet of the rainwater underground collector was rebuilt into sequential system for water purification. Tree trunks and stones used in the riverbed are to create an additional structure that slows down the outflow of water. Additionally, they create habitats for aquatic organisms and improve water quality.

Ecohydrological implementations on the rivers in Radom are an element supporting the city in adapting to climate change, they improve the microclimate through water retention, increase biodiversity by creating new habitats for many organisms, and are socially open and friendly spaces.

Keywords: adaptation to climate change, rainwater, river valley, ecohydrology.

Projekt LIFE14CCA/PL/000101 Adaptacja do zmian klimatu poprzez zrównoważoną gospodarkę wodą w przestrzeni miejskiej Radomia LIFERADOMKLIMA-PL jest współfinansowany przez Unię Europejską w ramach Instrumentu Finansowego LIFE oraz Narodowy Fundusz Ochrony Środowiska i Gospodarki Wodnej w Warszawie