



Ecohydrology and ecosystem biotechnologies in adaptation to climate change

Name and surname: Tomasz Jurczak¹, Iwona Wagner, Paweł Szałański, Elżbieta Stanke, Michał Zdybiewski, Katarzyna Jankowska

Institution: UNESCO Chair on Ecohydrology and Applied Ecology, Department of Biology and Environmental Protection, University of Lodz, 90-237 Lodz, 12/16 Banacha str. Poland

e-mail: tomasz.jurczak@biol.uni.lodz.pl

Abstract

The climate on earth is changing, and the cause of these changes is human and his pressure on the environment. Taking effective adaptation measures, which would at least partially protect humanity from global consequences, is very short. On the one hand, effective actions should use the potential of the environment (ecosystems) and the processes taking place in them, and on the other hand, they must be related to actions to stop the biodiversity crisis and reduce human pressure on the environment.

Today, more than half of people live in cities, and these ecosystems are particularly affected by the effects of climate change. The problem of periodic floods, heat island, too fast outflow of water and significantly limited natural resources weaken the natural ability to adapt. This negatively affects the functioning of the city and the health of its inhabitants.

Radom was one of the first cities to take up the challenge of counteracting these unfavorable changes on a city-wide scale. The aim of the LIFERADOMKLIMA-PL project was to create an urban space with increased resistance to climate change. By using the blue-green infrastructure in the city space, it has been planned to enhance green areas in the city, restoration and adaptation of watercourses and reservoirs, as well as local rainwater retention in the city landscape. These are examples of actions based on an ecosystem approach.

The starting point for the project activities was the concept of ecohydrology, integrating hydrotechnical and biological solutions for effective protection of water resources and the possibility of their management at the catchment scale. Ecohydrology is a one of the important key activity in the IXth phase of IHP UNESCO programme (IHP-IX, 2022-2029), which puts science to action for a Water Secure World, in a Changing Environment. Its assumptions were formulated by prof. Maciej Zalewski and now are implemented by the scientific team of the UNESCO Chair on Ecohydrology and Applied Ecology at the University of Lodz in Poland. The concept of ecohydrology points to the importance of interrelationships between ecological processes and the water cycle in the landscape, including the landscape of the city. These dependencies can be used to improve the quality of the environment - e.g. in self-purification process of rivers, increasing local rainwater retention or improving the microclimate by evapotranspiration process. In the Anthropocene, this concept was extended to include social aspects, leading to the creation of the WBRSC model (water, biodiversity, resilience to climate change adaptation, ecosystem services and cultural heritage and education). It indicates, on the one hand, areas of cross-sectoral cooperation - important from the point of view for improving the quality of the urban environment, and on the other hand, areas affected by nature-based solutions. These concepts were creatively used in the LIFERADOMKLIMA-PL project as an adaptation to climate change in the Radom city through sustainable management of water.

Keywords: adaptation to climate change, ecohydrology, ecosystem biotechnologies, landscape retention.