

Descriptions for the Congress Paths of the Economy of a Water City 2021

M1 - Ecosystem services in cities

Ecosystem services include benefits that people derive from the natural environment. The term is connected to the concept of the natural capital and environmental economy. The concept of ecosystem services, developed by scientists in the 1990s, particularly advocated by the American scientist Robert Costanza and his international collaborators, gained significant popularity after the spread of the so-called Millennium Ecosystem Assessment. Ecosystem services can be divided into four categories: (i) productive, (ii) regulatory, (iii) sustaining and (iv) cultural services. Ecosystem services in cities form a coherent and structured concept. They include, for example, (i) food and water production; (ii) regulation of climate, air and water quality, as well as mitigation of extreme hydro-meteorological events; (iii) sustaining biodiversity and habitats; (iv) aesthetic values related to spiritual development as well as recreation and tourism. The ecosystem services that contribute to human well-being and wellness can be measured not only by the economic values but also by the environmental, social and health benefits. It is worth trying to estimate the value of ecosystem services and the loss of services caused by the loss or deterioration of the condition of ecosystems, in practical terms. Urban greenery, i.e., parks, gardens, forests, wetlands, and water systems (rivers, streams, lakes and ponds), and even green walls and roofs provide valuable ecosystem services. On the other hand, though, the elimination of urban wetlands or leading a surface watercourse through underground channels (the so-called "buried rivers") can lead to the loss of many valuable benefits derived from ecosystems. Categories of ecosystem services in cities also include prevention of the urban heat island effect, which is to be discussed at Session M2 of this congress.

M2 - Urban heat island effect and the consequences of heat waves

Apart from the evident impact of the climate on the city, the opposite relation is also important, namely the impact of the city on the climate. Intensification of the urban fabric exerts impact on the climate conditions. Along with the global warming, the frequency, length and intensity of heat waves increases. Urbanisation proceeds in parallel, leading to a situation when the percentage of urban inhabitants increases as compared to the total population. Urban space is thermally more exposed than the surrounding undeveloped areas. The house roofs and walls, street surfaces, pavements or parking lots heat up much more during the day than open greenery areas. At night, they release the accumulated heat. As a result of the so-called urban heat island effect, the air temperature in the city is higher than in rural areas. In many countries all over the world, the number of births decreases, whereas the life expectancy increases, thus the society is gradually getting older. As the elderly people do not tolerate extremely high temperatures well, often due to concomitant diseases, the negative consequences of this phenomenon for public health (e.g., higher incidence and, further, mortality) are becoming an increasingly serious threat. The number of additional deaths caused by heat waves in Europe significantly exceeded 50 thousand in the summers of 2003 and 2010. The adaptation to heat waves in cities, intensified by the urban heat island effect, is one of the most important tasks in the area of adaptation to climate change. Thanks to evaporation and transpiration processes, water and greenery effectively reduce the temperature rise. One can state that among the categories of ecosystem services in cities, as discussed at Session M1 of this congress, includes prevention of the urban heat island effect. Therefore, the selection of appropriate urban systems and building materials can strengthen or weaken the urban heat island effect. The mitigation of this effect is also possible by changing the principles of spatial and architectural planning, including adequate legal provisions.



25–26 October 2021
Stadium Wrocław

Foundation of Economy
and Public Administration

ks. I. J. Skorupki St. 22
31-519 Krakow, Poland

tel. +48 12 423 76 05, int. 24
biuro@oees.pl
www.oees.pl

W1 - Heavy rainfall and urban flash floods

Climate change is a reason for occurrence of extreme precipitation of the increasing intensity. They get into historical rainwater drainage systems in cities, which, however, were designed and dedicated to much lower extreme precipitation values in the past. An additional factor accelerating the discharge of rainwater is the progressing sealing of surfaces in urbanised areas. As a result, there are flash floods in cities that should be counteracted by local municipalities. In the cities located on rivers, additional risk is associated with the accumulation of high flows in the river with simultaneous large discharges from the rainwater sewage system. In such cases, it is necessary to integrate the issues at the level of forecasting and modelling as well as joint control of flood risk by municipal services and water management authorities. An important element of mitigating the risk of urban floods may be focusing on increasing local water storage also by means of over-ground system solutions for rainwater management (including green roofs). An alternative solution is the application of intelligent control systems for the existing storage and discharge of rainwater, especially in densely built-up areas with limited possibilities to develop additional retention.

W2 - Do not pour water unnecessarily! Controlling the demand and supply of water in the city.

Climate change observed today causes more and more frequent drought periods. The above, however, determines the need to rationalise the consumption and distribution of water. The evolution of climatic conditions also adversely affects water sources supplying urban water supply systems. As a result, water is becoming more and more expensive and difficult to get. It can be expected that in the future there will be a need to introduce restrictions in its consumption. For this reason, technical and non-technical measures leading to decreasing the water demand are necessary. In addition, in view of the limitation of water resources and the simultaneous increase in urban population, it is necessary to develop the possibilities of water acquisition and treatment, for example, by means of the implementation of innovative technologies of sewage treatment and purification. The development of purification systems and the recycling of water is also an alternative. Supplying clean water to households and for the needs of business services and activities is the primary task of municipal water and sewage companies responsible for controlling the supply of this medium. It should be also underlined that the further development of residential construction in cities is and will be subject to the supply capacity of the above enterprises. At the same time, the price of water for the consumption purposes has to be affordable also for the poorest city inhabitants. On the one hand, its cost is a function of the society's wealth and, on the other hand, depends on the costs of sewage water preparation and treatment as well as the efficiency of its distribution management. An important element is also paying attention to the intangible value of water and the fact that, in our latitudes, more and more frequently we will be dealing with competition for the access to water resources between municipal needs, agriculture and industry. In this context, controlling the demand for and supply of water in cities has additional significance.



25–26 October 2021
Stadium Wrocław

Foundation of Economy
and Public Administration

ks. I. J. Skorupki St. 22
31-519 Krakow, Poland

tel. +48 12 423 76 05, int. 24
biuro@oees.pl
www.oees.pl

JŻ1 - Waterways in Europe: the Danube River

The Danube River is not only Europe's second longest river flowing through as many as ten countries. It is also a monumental carrier of historical, collective, and cultural memory. Its waters reflect the history of Europe from the ancient times, when it was the northern border of the Roman Empire, through the dramatic events of World War II and the post-war period, until today, when it is increasingly difficult for us to build a common narrative not only about the Danube (which is more often dividing rather than connecting) but also about the entire continent. The President of Austria, Theodor Körner accurately noted that *"No river in Europe has played an equally important role in the history of the old world economy as the Danube River has. All the waterways in this part of the globe attempt to reach the shortest route to the sea to the north or to the south. Only the Danube River crosses the continent on the longest distance from the west to the east, connecting many nations. It is an artery of vital importance for many countries, rightly called the Danubian states. If there are waters that deserve the name of the European river, then, it is definitely the Danube River."* A strongly marked presence of this extraordinary river is also characteristic in the national mythologies of the countries it flows through. It is enough to say that the Danube River is present in the texts of the national anthems of Austria, Hungary, Croatia, Bulgaria, and Romania. Following the World War I, the Danube River was recognised as an international river, open and available to ships of all the flags with the assumption of total equality. Today, it is worth asking whether the Danube River is still a common European good or whether the individual Danube states have their own visions of the river, not only in their anthems? Is it still true that what happens at the springs of the river affects the course of events at its mouth? When we talk about the Danube River, do we still think about Europe or only some parts of it?

JŻ2 - Blue Health

The majority of Europe's population lives in cities which have either developed along major rivers, been founded on the banks of inland lakes, or grown on the continent's extensive coastline. These 'blue' environments have played a major role in both the historical and modern evolution of our urban areas. They have been used for supplying drinking water, transportation, industry, fisheries, energy generation and sewage treatment. A growing body of evidence suggests that this utilitarian network of urban 'blue infrastructure' might also be able to provide a number of health and wellbeing benefits. Research has shown these environments might allow us to tackle major public health challenges such as obesity, physical inactivity, and mental health disorders. The Horizon 2020-funded BlueHealth project has brought together experts from across Europe to systematically explore the impact urban waterways can have on health and wellbeing. Through a number of surveys, reviews, experiments, and interventions, it is investigating whether the careful design and implementation of urban blue infrastructures can deliver benefits to public health and prevent disease. Genuine two-way communication lies at the very heart of BlueHealth, which is working with representatives from public and patient groups, health care providers, planners, engineers, policy makers and the commercial sectors to ensure its methods are driven by real-world challenges. With much of Europe's vast network of waterways spanning national boundaries, a key part of the programme's focus is also ensuring its findings will be used to inform government policies, particularly as both climates and environments change across the EU. The research conducted over the last four years has put the BlueHealth team in a position to make direct recommendations on how both existing and new blue infrastructures can be designed to promote good health and wellbeing across Europe's cities.