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Experiences of a nature-based urban development on the example of a Hungarian city

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Kaposvár is a developing middle-size city in the middle of South-western Hungary surrounded by mountains and forested areas. Due to its location and natural surroundings, the city strives to achieve close-to-nature urban development. Sustainable urban management, increasing green space, promoting carbon neutrality, adaptation to the challenges of climate change, reducing emissions are the main aims of the development. For support, city-wide investigations began last year to make further suggestions for future direction based on measurements and experience. A foundational survey was conducted to characterize the conditions of urban soils and urban plantations; thus, it would have a proper space in the city's climate strategy and settlement development concept in the future. Soil properties (artefacts, pH, texture, CaCO_3) and trace metal concentrations (Pb, Cu, Zn, Ni, Cr, Sn, Cd, Co) were measured as well. Compared to the actual condition of the natural environment, the soil-changing effect of the city became visible. For changed soil conditions, trees should be chosen that are well adapted to this changing environment. The city is currently afforesting its area; however, it wants to increase the number of trees planted in the future. This is especially justified in areas where there are many overgrown, old, diseased trees in its hundred-year-old parks and tree lines. Choosing the right tree species is not only an aesthetic consideration, but it can also affect the condition of the soils in the environment. We also considered the effects of heavy metals pollution on vegetation important, so we took samples from the trees leaves in many parts of the city and measured the total metal content they absorbed. To comparison, the nearby soil test points showed a correlation between leaves pollution levels in several cases. Based on the results, the heavy metal uptake capacity of the different tree species became comparable. It can be used effectively in the selection of tree species for future afforestation, so that afforestation can also play a role in soil protection and city climate maintenance in the future.