Green infrastructures performance evaluation towards management of water quality: a case study

Qian Yu, Na Li

China Institute of Water Resources and Hydropower Research (IWHR)

Beijing, China

Under the dual impacts of climate change and rapid urbanization, urban pluvial flooding and water quality deterioration problems become increasingly serious. Green infrastructure (GI), a kind of resilient practices, is able to effectively improve water quality of rainfall runoffs. Modelling the effects of GIs on controlling stormwater runoff pollutants under different rainfall characteristics plays an important role in planning and designing GIs that are adapted to both the local conditions and the future climate change. In this paper, we set three rainfall scenarios with varying rainfall return periods and then evaluate the GIs’ performances on water quality in Jinan Daminghu Sponge City Construction pilot area. The results indicate that GIs have good effects on controlling rainfall runoff pollutants. The improvement effects decease with increasing rainfall return periods. The reduction rates of suspended solid (SS) loads are 68.552%, 67.942% and 67.314% under the 24h design storm with 5-year, 10-year and 20-year return period. The main reason is the decrease in runoff coefficient reduction rates. The corresponding values are 10.148%, 8.406% and 6.611% under three rainfall return periods, respectively. In addition, we vary the SS removal efficiency of each GIs and the results show that the control effects on SS loads are very sensitive to the SS removal efficiency.