

Enhancing Blue/Green Infrastructure for Resilient Urban Environments: Smart Solutions and Nature-Based Strategies

Zahid Hassan^{1✉}, Babar Shahbaz¹, Felipe Gallardo Lopez²

¹University of Agriculture Faisalabad, Faculty of Social Sciences, Punjab/PAKISTAN

²Postgraduate College, Veracruz Campus, Veracruz/MEXICO

✉Correspondence: zahidhassan2142@gmail.com

Abstract: The rapid increase in urban population density has put tremendous pressure on urban ecosystems and infrastructure, resulting in an array of environmental issues. Blue/green infrastructure has emerged as a viable solution for addressing these issues by creating resilient urban settings. This abstract revisits the concept of blue/green infrastructure and emphasizes the importance of nature-based, smart solutions and methods. The blue/green structure refers to a network of designed and natural landscapes such as green spaces, parks, wetlands, sustainable drainage systems, and rivers that all work together to improve air quality, manage stormwater, offer recreational places, and increase biodiversity in metropolitan settings. Smart solutions like advanced sensor technologies, data analytics, and Internet of Things (IoT) integration can improve the efficiency and efficacy of blue and green infrastructures. They provide real-time monitoring, informed decision-making, and adaptive management for long-term urban development. Nature-based strategies that include the restoration and maintenance of natural bionetworks in urban environments. These measures not only provide numerous conservation advantages, but they also help in the adaptation and mitigation of climate change. Our cities can lower flood risk, lessen urban heat island effect, sequester carbon, and increase overall urban resilience by utilizing natural power. The global data show the importance of improving the blue/green structure. According to a United Nations estimate, around 55% of the world's population lives in cities, with that proportion expected to rise to 68% by 2050. Furthermore, metropolitan areas account for more than 70% of global greenhouse gas emissions, emphasizing the importance of sustainable urban growth. The World Health Organization estimates that urban air pollution causes 4.2 million premature deaths per year. This research emphasizes the significance of incorporating smart solutions and nature-based techniques into urban planning and design in order to improve blue and green infrastructure. Cities may establish resilient and sustainable environments that will increase citizens' well-being, encourage natural biodiversity, and reduce the impacts of the changing climate.

Keywords: Blue/green infrastructure, Nature-based strategies, Smart solutions, Urban resilience, Climate change mitigation.