Abstract

This study examines green infrastructure (GI) potential in Lahore to address the climate change impacts and enhance urban resilience. As, rapid urbanization in Lahore has triggered significant environmental issues such as air pollution, increased flooding risks, loss of biodiversity, and urban heat island effects. The study adopts a mixed-method framework, initiating a quantitative survey of 384 respondents employing descriptive analysis and one-way analysis of variance to evaluate residents' understanding, awareness, and acceptance of green infrastructure and its relationship with educational background. Qualitative interviews were conducted to gain insights from stakeholders regarding their perceptions and knowledge of GI. Geographic Information Systems (GIS) were applied to design a map highlighting the potential sites for GI implementation in Lahore. The finding in the study highlighted that (21.4% ($F=1.356$, $p=0.249$)) of the respondents supported green infrastructure as a climate mitigation technique over other conventional methods. While the knowledge of GI among the respondents was limited, its potential benefits were recognized with 25.5%, (mean=0.255) for climate mitigation, 25.0%, (mean=0.250) for air quality improvement, and 15.7%, (mean=0.157) for public health enhancement. The study demonstrated the variation in the analysis that educational background significantly influences the perception and concern of respondents on the impact of climate change while indicating minimal impact on knowledge of nature-based solutions or support for educational programs. The results demonstrated that although stakeholders recognize the various advantages of GI including biodiversity preservation, improved air quality, and mitigated urban island heat effect, public participation is relatively low. The proposal outlines the implementation of various GI components including green walls, roofs, and belts, along with an estimated budget, to deliver a practical approach to promoting urban climate resilience. This study highlights significant communication gaps in GI awareness among residents and stakeholders and emphasizes the need for collaborative initiatives between government and non-government organizations to enhance community engagement. The study also recommended the need for education and awareness campaigns and the government providing incentives for the sustainable implementation of GI in Lahore city.

Keywords: Green Infrastructure (GI), Urban Resilience, Mixed-method framework, community engagement, Stakeholder interviews, Geographic Information Systems (GIS), and Urban sustainability.