Chapter 1
Adaptive Strategies for Success: Monitoring and Evaluating Blue–Green Infrastructure in Urban Development

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ABSTRACT

This chapter delves into the critical processes necessary for ensuring the long-term success and sustainability of Blue-Green Infrastructure (BGI) projects. As urban areas grapple with the challenges of climate change, biodiversity loss, and public health issues, the integration of BGI presents a multifaceted solution that enhances urban resilience, improves water quality, reduces urban heat islands, and fosters biodiversity. This chapter highlights the importance of continuous monitoring and evaluation to track the performance of BGI systems and identify areas for improvement. It explores various adaptive management strategies that allow for the iterative refinement of BGI practices based on real-time data and changing environmental conditions. Through detailed case studies and best practices from around the world, the chapter provides insights into effective monitoring frameworks, evaluation methodologies, and adaptive management techniques. It offers valuable guidance for stakeholders dedicated to developing sustainable urban environments via the implementation of BGI.

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INTRODUCTION

Overview of Blue-green Infrastructure

It is an alerting time for urban authorities for green development for a sustainable future. With the rise in population and factories all around, there is a rise in pollution, and cities are heating at an alarming rate, and thus the concept of Blue-green infrastructure becomes important, and a priority. It is hard to go back to the old era and have greenery all around, the combination of natural resources and artificial solutions can be very helpful for urgent urban needs. In the present study, the focus is been on the importance of blue-green infrastructure management and its importance in meeting urban issues and its modern solutions. Blue Green infrastructure (BGI) is the modern solutions that combine natural resources with manmade artefacts and architectures to resolve modern issues for water management, disaster management and more (Ismail, 2024; Ismail & Aldous, 2024).

BGI is not just limited to water-related management, which is a normal misconception. BGI deals with mitigating climate change by creating green spaces, it uses modern infrastructure to save biodiversity and flourish it. It improves overall public and health management and leads to more social interactions with more social spots. Blue-green infrastructure (BGI) solutions will be used by urban authorities and planners to make remarkable changes for urban development in various means (Alqodsi et. al., 2024).

Importance of BGI in Urban Development

Since the concept of BGI resolves various issues, it has advantages to offer for urban issues and needs. Plantation of trees, gardens and other greeneries supports to filter air and reduce surrounding temperature. Gardens even play as social spots for citizens and improve their mental well-being. Incorporating blue elements such as ponds, water bodies, and rivers allows for the management of floods, restores the water table, and improves city attractiveness (Veerkamp et al. 2021). BGI leads to reduce energy requirements for air conditioners, by reducing overall temperatures. Further unique BGI ideas lead to attractive tourism and financial sound. Further cost of maintenance for natural bodies is lower than for grey infrastructures used in traditional times. It leads to community building and brings people together. It leads to a sense of ownership and thus more care and maintenance (Aldous & Ismail, 2024).