

Leveraging GIS for Implementing Green Infrastructure in Jaipur: Transforming Defunct Urban Spaces into Sustainable Landscapes

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Abstract: This paper explores how Geographic Information System (GIS) technology can facilitate the implementation and analysis of green infrastructure in Jaipur, specifically focusing on transforming defunct urban spaces such as flyover vertical surfaces, defunct thoroughfares, and empty spaces along roads. By harnessing the power of GIS, Jaipur can optimize urban planning, enhance climate resilience, and achieve Sustainable Development Goals (SDGs). This article highlights the benefits, challenges, and strategies for integrating green infrastructure into these overlooked urban areas, fostering a sustainable and vibrant cityscape.

Key Words: Green Space, GIS, SDGs

Introduction:

As urban areas in Jaipur struggle with the challenges of rapid urbanization and environmental degradation, revitalizing defunct spaces presents an opportunity to integrate green infrastructure and promote sustainable development. Green infrastructure involves incorporating natural elements, such as vegetation, green spaces, and sustainable drainage systems, into the built environment. The focus should now be on the utilization of GIS technology to identify, plan, and implement green infrastructure in defunct urban spaces, including flyover vertical surfaces, defunct thoroughfares, and empty spaces along roads (Mell, Ian. 2015).

Role of GIS in Implementing Green

Infrastructure:

GIS plays a pivotal role in the successful implementation of green infrastructure projects. By utilizing its untapped potential, urban planners and infrastructure planners can effectively analyse and map defunct urban spaces suitable for green infrastructure interventions. The decisions and implementations based on such in-depth analysis will be less likely to fail in the long run. GIS enables the identification of potential areas based on various factors, including proximity to communities, sunlight exposure, wind patterns, and structural compatibility (Benedict MA, et al., 2006). This data-driven approach helps optimize the allocation of

resources and ensures the selection of appropriate locations for green infrastructure implementation (Vidyarthi S, et al., 2013).

Transforming Flyover Vertical Surfaces:

Flyover vertical surfaces offer vast untapped potential for implementing vertical green architecture. GIS can assist in identifying suitable flyovers based on parameters such as structural stability, visibility, and accessibility. By transforming these concrete structures into vertical gardens, Jaipur can enhance the aesthetic appeal of the cityscape, mitigate the urban heat island effect, improve air quality, and create habitats for urban biodiversity. GIS enables planners to assess the feasibility of vertical green interventions, select appropriate plant species, and plan the distribution of vegetation based on sunlight exposure and microclimate conditions.

Revitalizing Defunct Thoroughfares and Empty Spaces:

Defunct thoroughfares and empty spaces along roads are often overlooked areas for green infrastructure implementation. Utilizing GIS, we can identify these spaces and repurpose them as linear parks, urban trails, or green corridors (Cai, G., et al., 2023). GIS analysis helps determine the connectivity of these spaces with existing green areas, assess pedestrian and vehicular accessibility, and design walkable pathways. Through the integration of green infrastructure, these once

neglected spaces can be transformed into vibrant and functional areas that promote physical activity, social interaction, and ecological connectivity (Roy A 2009).

Benefits of Green Infrastructure in Defunct Urban Spaces:

Implementing green infrastructure in defunct urban spaces offers numerous benefits. Firstly, it enhances the liveability and attractiveness of the city by introducing green elements into neglected areas, creating a sense of place, and fostering community pride. These revitalized spaces provide opportunities for recreation, relaxation, and cultural activities (Jennings, V., et al 2012). Secondly, green infrastructure contributes to climate resilience by mitigating the urban heat island effect. Vegetation on flyover vertical surfaces and in defunct spaces helps regulate temperature, reduce heat absorption, and improve air quality. This leads to energy savings, as well as improved health and well-being for residents (Cortinovis, C. et, al., 2019).

Challenges and Strategies:

Implementing green infrastructure in defunct urban spaces comes with challenges such as limited space availability, structural considerations, and maintenance requirements. To overcome these hurdles, innovative design solutions, modular green infrastructure systems, and low-maintenance plant species can be employed. Engaging local

communities, government agencies, and stakeholders is crucial for garnering support, securing resources, and ensuring the long-term maintenance of green infrastructure projects (Hou, H. et. al., 2021).

Future Directions and Conclusion:

As Jaipur continues to grow, the integration of green infrastructure in defunct urban spaces is paramount. GIS technology will play an increasingly significant role in identifying and implementing green infrastructure interventions. Ongoing monitoring and evaluation using GIS will provide valuable insights into the effectiveness of these interventions, enabling adaptive planning and continuous improvement (Caprari, G. et al., 2022).

By harnessing the power of GIS, Jaipur can transform defunct urban spaces into sustainable landscapes that enhance liveability, mitigate climate change impacts, and contribute to the achievement of SDGs. The integration of green infrastructure in flyover vertical surfaces, defunct thoroughfares, and empty spaces along roads will create a greener, more resilient cityscape, fostering a healthier and more vibrant environment for Jaipur's residents and visitors alike.

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