

Assessing Industrial Land's Suitability for Sustainable Urban Planning in Dhaka Region Using Geospatial Techniques

Sk. Tanjim Jaman Supto ¹, Dewan Reza Hamid Karzai ², Ettahad Islam Adib ²

¹ Department of Environmental Research, Nano Research Centre; Sylhet; 3114; Bangladesh

² Department of Industrial and Production Engineering, Shahjalal University of Science and Technology, Sylhet-3114, Bangladesh

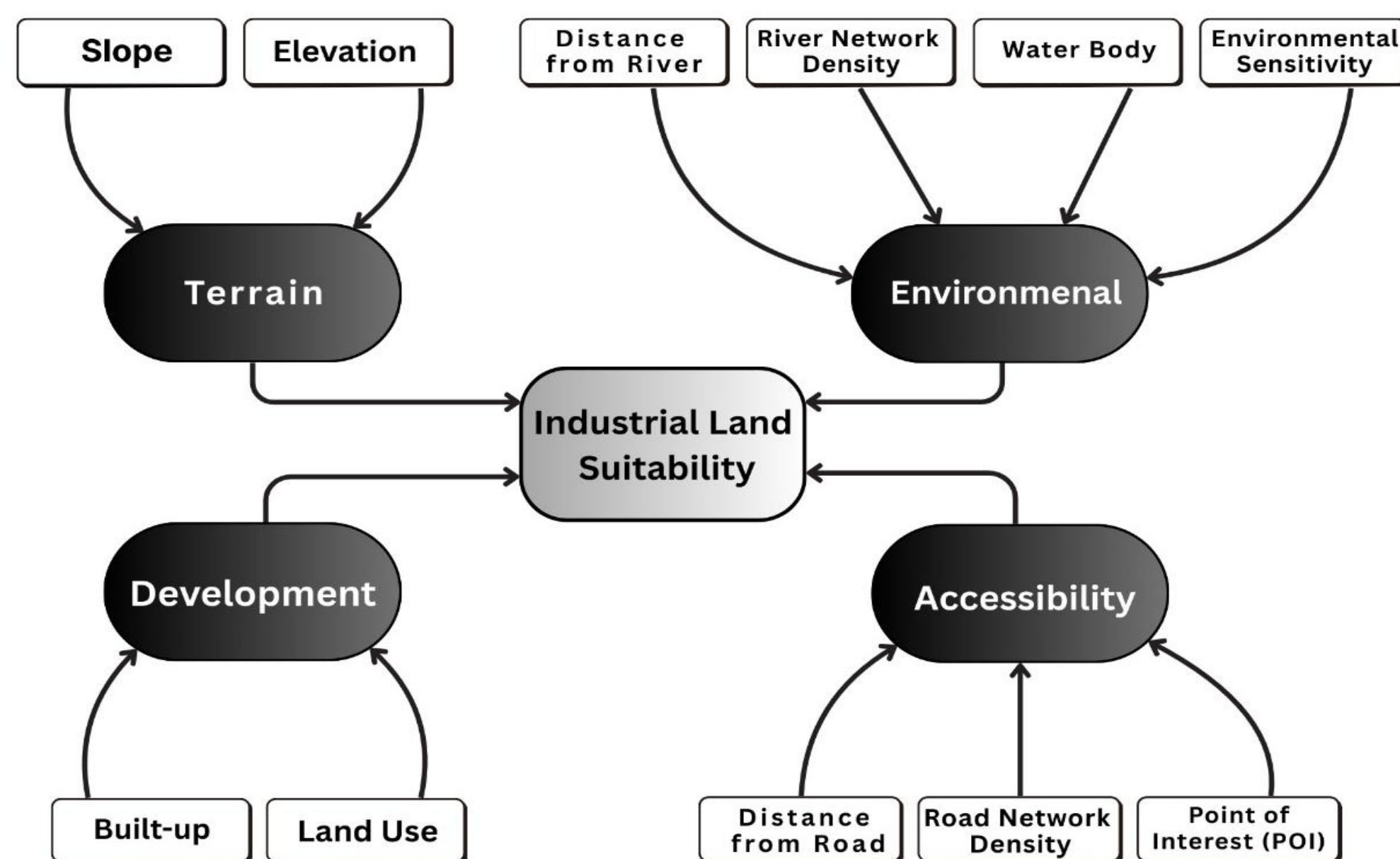
Corresponding author email: sksupto7@gmail.com

INTRODUCTION

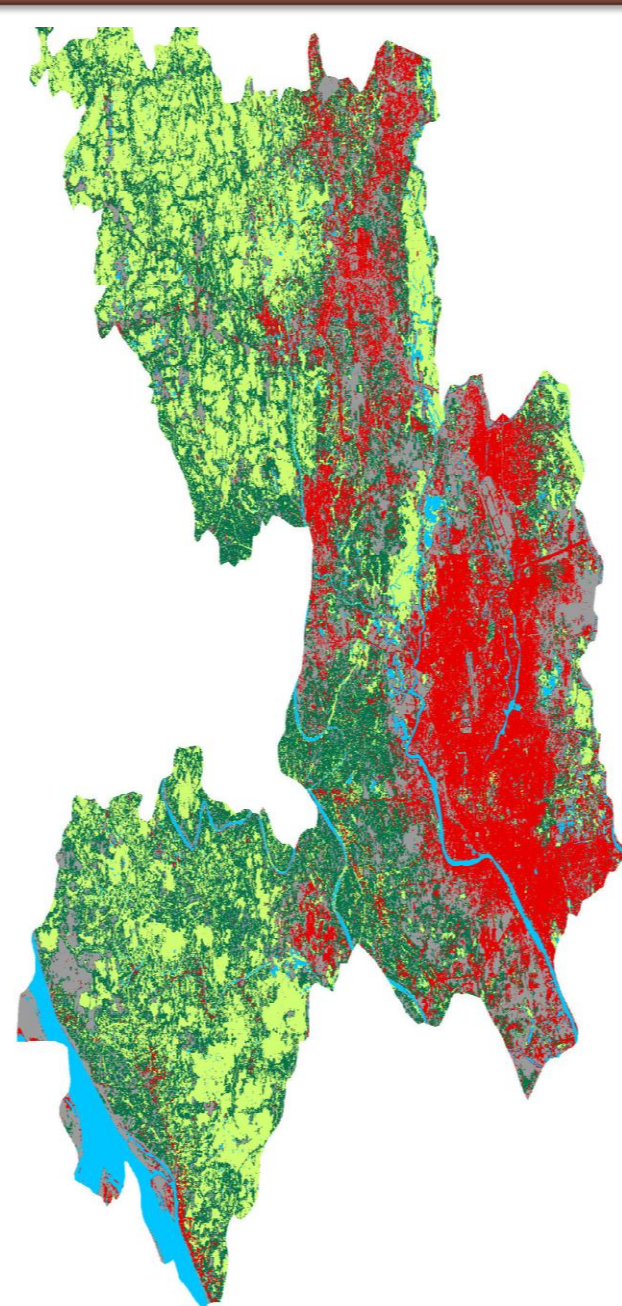
Bangladesh's capital, Dhaka, is a fast-growing metropolis that is confronted with serious problems as a result of unchecked industrial growth and urban sprawl. The city's land-use disputes and environmental constraints are getting worse due to its dense population of about 8 million people. Using a GIS-based multi-criteria evaluation, this study aims to evaluate the suitability of industrial land by incorporating important elements such as infrastructure capacity, environmental sensitivity, and accessibility. The study highlights the necessity of sustainable industrial development in the metropolitan area of Dhaka, encompassing regions with diverse topography and accessibility. In order to ensure the city's long-term viability in the face of rising urbanization, geospatial techniques are used to inform land-use decisions that strike a balance between industrial growth and environmental conservation.

METHODOLOGY

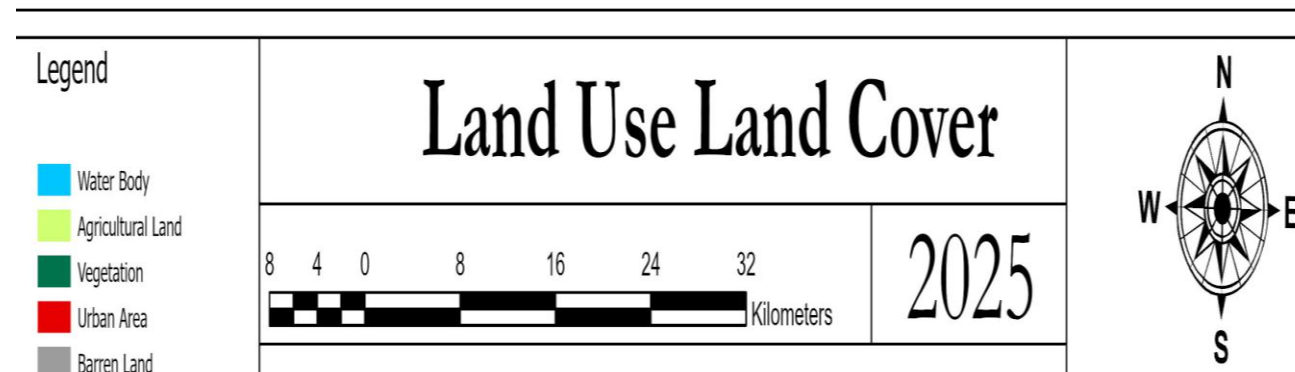
The land suitability analysis methodology combined multi-criteria decision-making (MCDM) techniques such as the Analytical Hierarchy Process (AHP). Relevance and influence of various criteria based on their impact on land suitability. Topographical factors like slope and elevation were prioritized due to their effect on environmental sustainability and development feasibility.



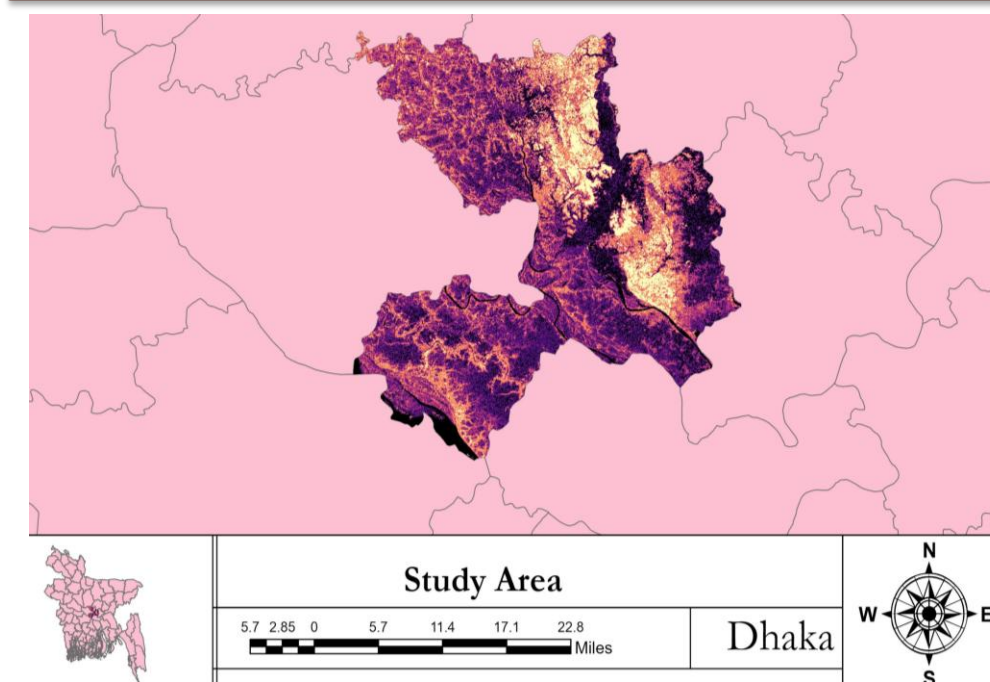
LAND USE LAND COVER ANALYSIS



Dhaka's land use and land cover are characterized by rapid urbanization, with significant expansion of residential, commercial, and industrial areas. Agricultural land has been increasingly converted for development, particularly in the outskirts. The city features dense built-up areas, especially in the central and northern regions, while green spaces and water bodies are limited. Floodplains and wetlands, particularly along the rivers, are vital for the city's ecosystem but are under pressure from urban sprawl. This rapid growth has led to challenges in land management, infrastructure, and environmental management. Its population increasing by over 4 million people in the past two decades, contributing to severe pressure on infrastructure, housing, and environmental resources.

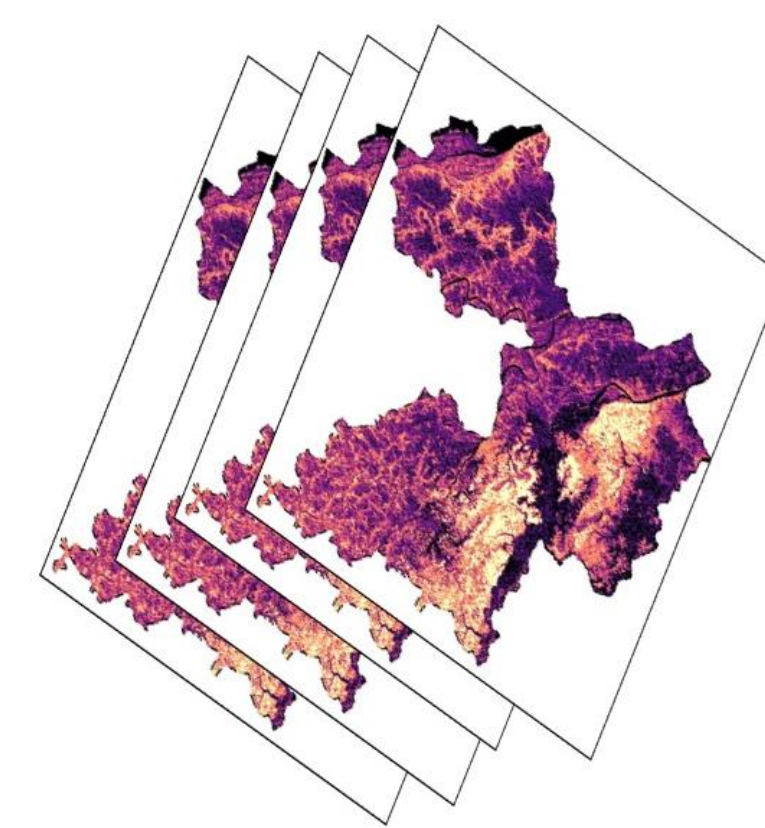


STUDY AREA



Dhaka, the capital of Bangladesh, is the country's most densely populated city with around 8.5 million people. Located at 23°42'N, 90°24'E, it spans 270 km² in the Ganges Delta. Facing challenges of rapid urbanization, inadequate infrastructure, and seasonal flooding, this study focuses on assessing industrial land suitability within the Greater Dhaka Detailed Urban Planning Area (1,528 km²) using geospatial techniques for sustainable urban planning.

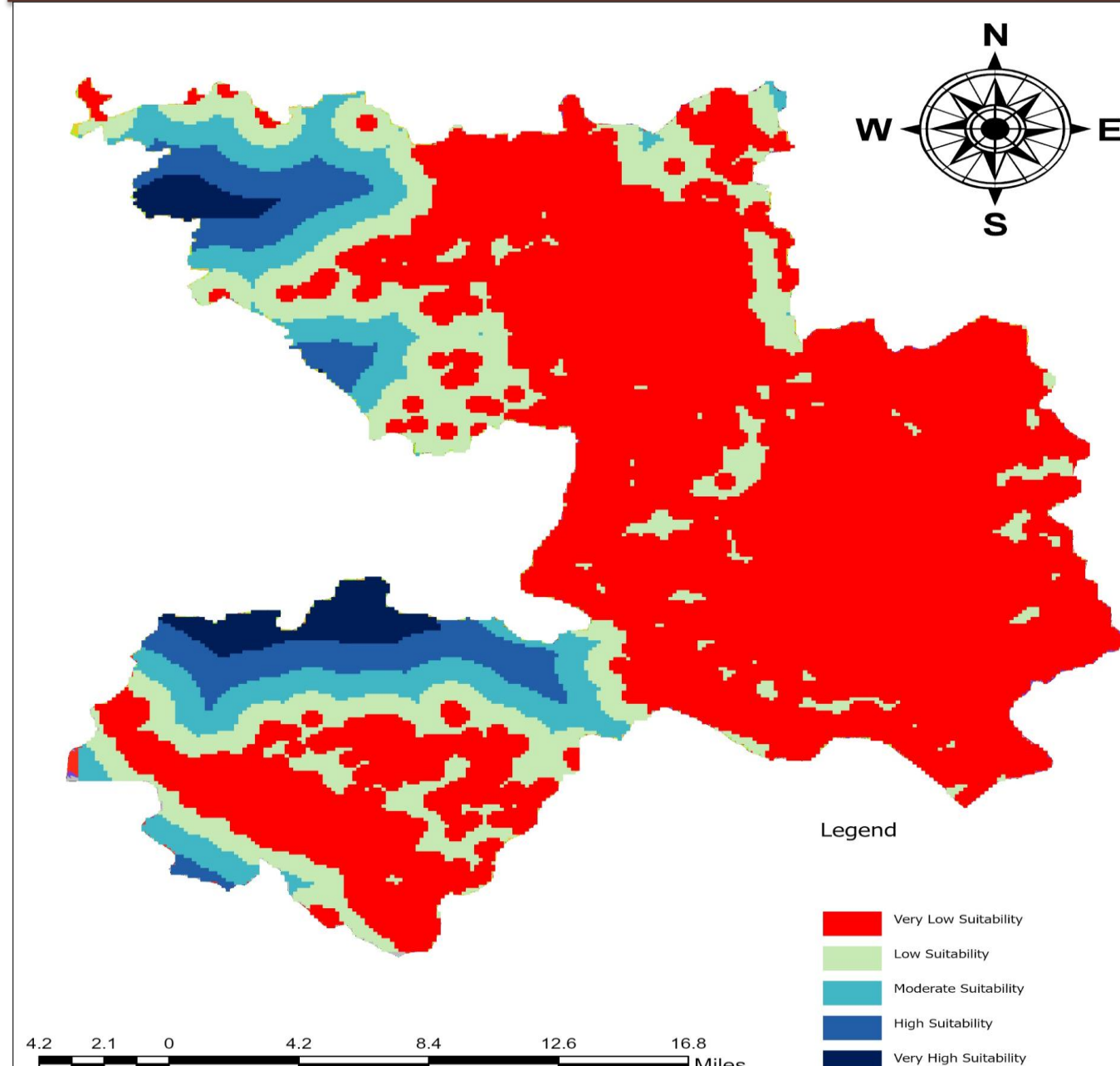
ANALYTICAL HIERARCHY PROCESS (AHP)



Weight Overlay

Industrial
Land's
Suitability

INDUSTRIAL LAND'S SUITABILITY



In Dhaka, 46% of the land is classified as "Very Low Suitability," 24% as "Low Suitability," 14% as "Moderate Suitability," 11% as "High Suitability," and 5% as "Very High Suitability." With limited land area of 270 square kilometers and rapid urbanization, much of Dhaka faces challenges like flooding and inadequate infrastructure, making sustainable urban planning difficult. As Dhaka continues to grow, the demand for suitable land for development intensifies, placing significant pressure on the available resources.

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