Student Thesis Competition (STC) Season 5 on

"Re-imagining Urban Rivers"

" Reinvigorating Urban River with Sustainable Approach to Revitalize the Eutrophic Segments to strengthen River-Centric planning."

Shraddha Shrivastava
Masters in Urban Plannin , SVNIT , Surat

Introduction

- Urbanization contributes to nutrient runoff, leading to excess algal growth and oxygen depletion.
- Eutrophication negatively impacts aquatic life, water quality, and recreational opportunities.
- The damage caused by eutrophication costs communities in terms of water treatment and lost tourism.

Research Question

Determining the Factors Affecting the river degradation of river health, To integrating Sponge City approaches for achieving circular water economy principles river-city integration.
:

Method

Research Design

Mixed-method approach combining quantitative and qualitative data.

Participants

Stakeholders , Government officials and Research Scholars

Data Collection

- Surveys for User perspectives.
- Interviews with Government Officials.
- Spatial analysis from GEE and GIS Maps.

Data Analysis

Analyzing data and Create a severity matrix to pinpoint and identify the hotspots

Research Objectives

- To identify hotspot zones vulnerable to flooding and ecological degradation.
- To assess the missing components in the existing Urban River Management Plans (URMPs).
- To propose a Sponge City–based circular framework that reuses stormwater, restores riparian buffers, and empowers communities.

Result & Discussion

Nature Based Solution

Permeable Surfaces

The Permeable surfaces will allow water to seep down into the road and pavements to reduce the water runoff.

Ghat rejuvenation

The Transition to suspension bridges for better flow of river with much less obstruction,

Infrastructure Solution

Suspension Bridges

A source of employment for Street hawkers and also a social as well as recreational space for people Also With IoT boards at ghat for creating sensitivity for river .

Riparian Regeneration

The Slum rehabilitation encroached in the riparian zone for rejuvenating the riparian buffer and uplifting of the Slum dwellers.

Regeneration Solution

The RE-Networking of Drainage network broken due to the encroachments and splitting the drains in two with surface runoff of storm water and sewage waste.

The Regeneration of Wetlands as Detention ponds, habitat for crocodiles and birds and also helps absorbing water as sub channels for the flood water to absorb the runoff. And sunken parks

Challenges Identified

- Land acquisition, institutional fragmentation, and resistance to slum relocation hinder large-scale implementation.
- Limited coordination between departments delays nature-based and decentralized interventions.

Recommendations

- Strengthen inter-agency coordination with clear mandates under PRAVAAH for integrated river basin governance.
- Promote community co-design, capacity building, and financial incentives for decentralized green infrastructure adoption.

Conclusion

- The Vishwamitri River project demonstrates how integrated blue-green infrastructure and Sponge City principles can transform degraded urban rivers into resilient ecological assets.
- Circular economy, flood modeling, and inclusive planning offer a replicable model for sustainable, river-centric urban development in India.

References

- M. Yang, T. Z. (2025). *"Reimagining urban resilience: Circular water systems in Sponge City models,"* (Vols. , vol. 151,). *J. Urban Plann. Dev.*.
- Y. Li, W. L. (2021.). "Sponge City implementation in China: Benefits, challenges, and future directions, (p. 112307 ed., Vols. vol. 287,). J. Environ. Manage.