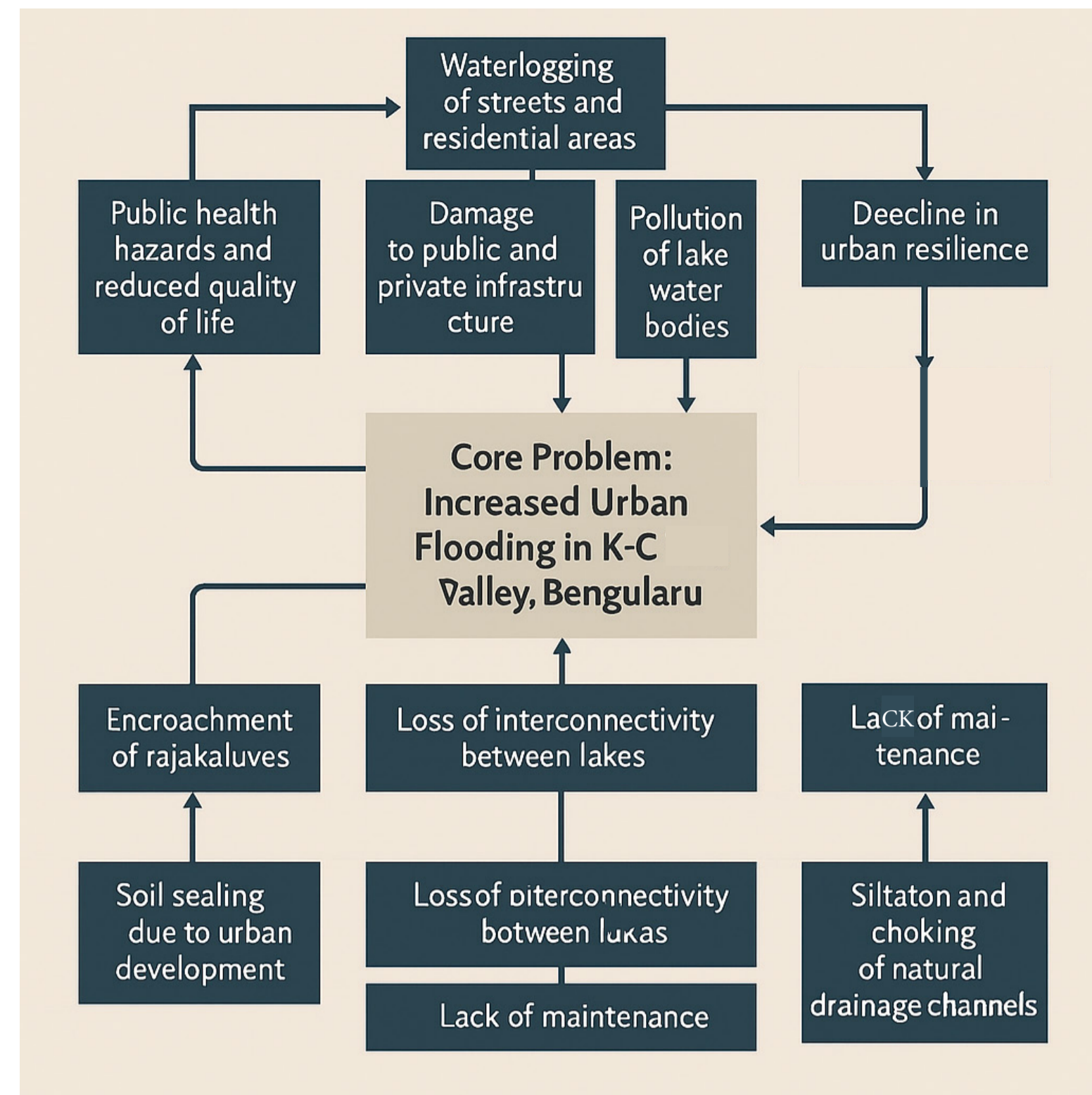
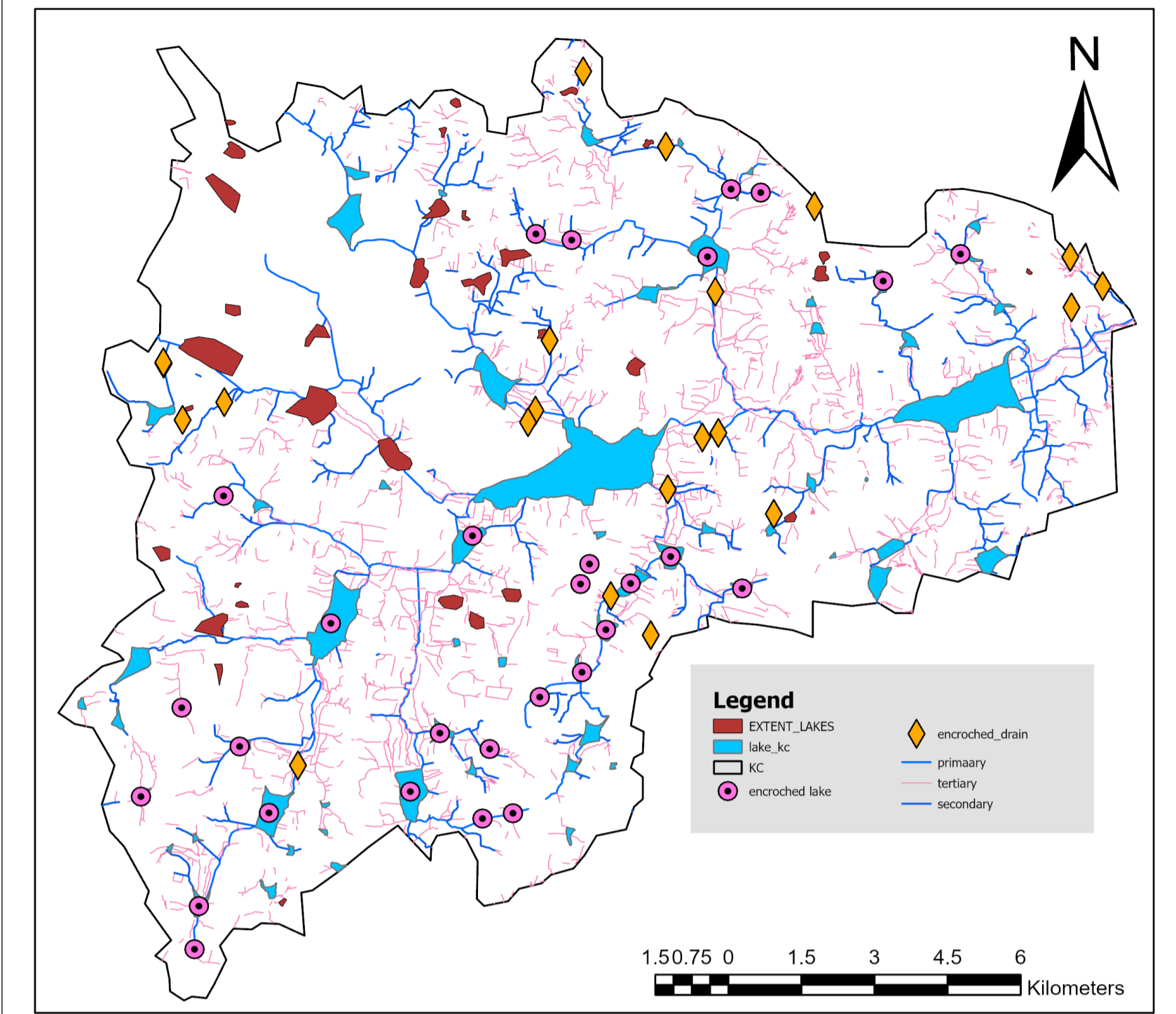


# THEMATIC ANALYSIS OF PROBLEMS

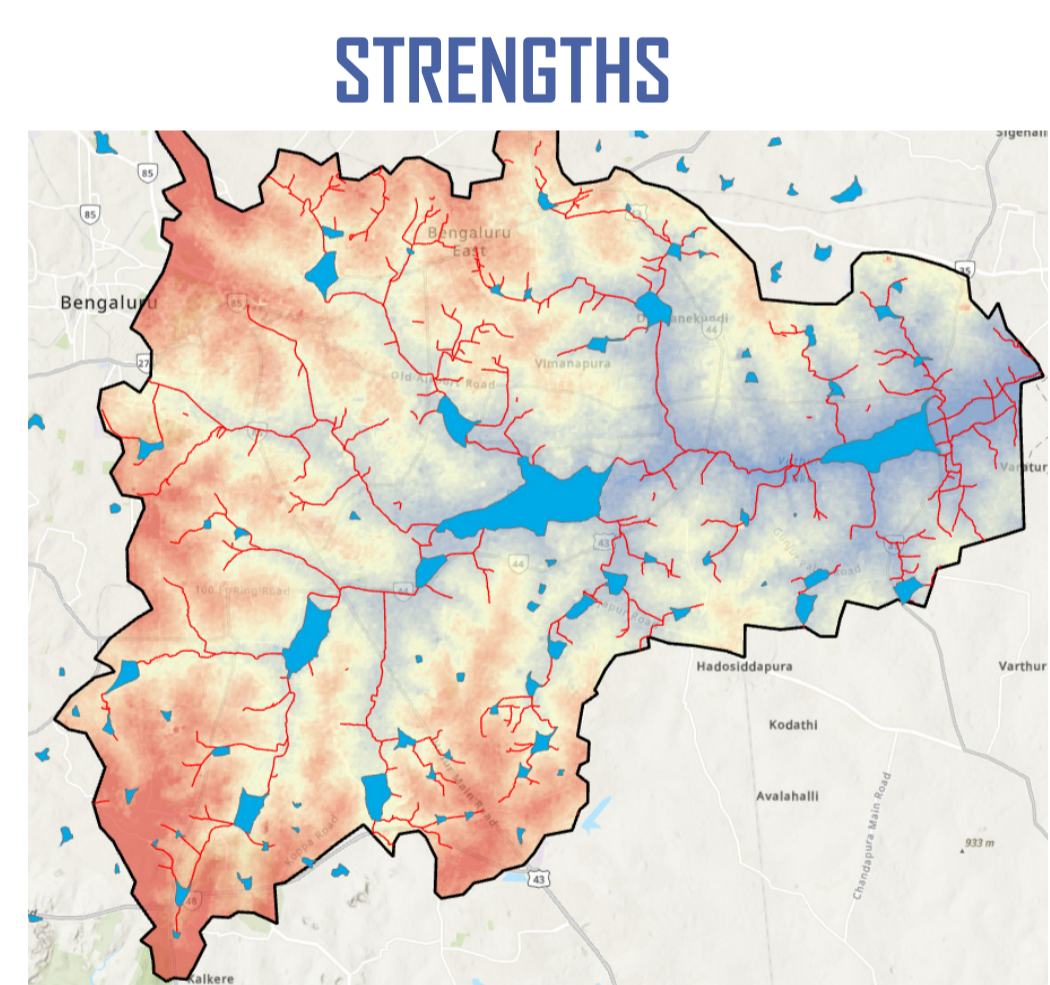


Theme	Issues Identified	Description	Supporting Evidence/Data
Urban Growth & Land Use Change	Unplanned Urbanization	Rapid increase in built-up areas encroaching natural water channels and lakes.	Satellite imagery, BDA Master Plan, LULC analysis (1990-2023)
	Conversion of Permeable Land	Loss of wetlands, open spaces, and agricultural land to urban infrastructure.	LULC maps, remote sensing data
Hydrology & Drainage Network	Disconnection of Rajakaluves	Natural drainage channels blocked by roads, buildings, and debris.	BBMP stormwater drain maps, site surveys
	Insufficient Drain Capacity	Stormwater drains are narrow, clogged, or poorly maintained.	BBMP flood incident records, field assessment
Blue-Green Infrastructure	Fragmented Water Systems	Lakes, parks, and drains are not interconnected to manage runoff and recharge.	Open space inventory, lake connectivity analysis
	Absence of Recharge Zones	Built-up land prevents percolation and aquifer recharge.	Groundwater level data, infiltration capacity maps
Flood Risk & Vulnerability	Urban Flooding	Recurrent waterlogging in low-lying zones like Koramangala, Ejjipura, and ST Bed Layout.	IMD rainfall data, flood maps, field photos
	Informal Settlements at Risk	Vulnerable communities residing along rajakaluves and lake beds.	Slum data (BBMP), socio-economic surveys
Water Scarcity	Groundwater Depletion	Over-extraction and lack of recharge leading to falling water tables.	BWSSB reports, CGWB groundwater data
	Seasonal Water Shortage	Water tankers common in summer; lack of sustainable supply.	Newspaper reports, citizen complaints, ward-level surveys
	Loss of Surface Water Bodies	Encroachment and siltation reducing storage and recharge functions.	Lake inventory, KLKDA records
Governance & Institutional Gaps	Multi-Agency Overlap	Poor coordination among BBMP, BWSSB, BDA, KLKDA, and Revenue Dept.	Institutional analysis
	Weak Implementation of Policies	Buffer zone violations, construction on stormwater paths.	Legal case reviews, field validation
Climate Change	Extreme Rainfall Events	Increasing rainfall intensity causes flash floods in short durations.	IPCC, IMD trend analysis
	Erratic Rainfall Patterns	Long dry periods followed by intense rain — increasing both flood and drought risks.	IMD data, climate vulnerability assessments

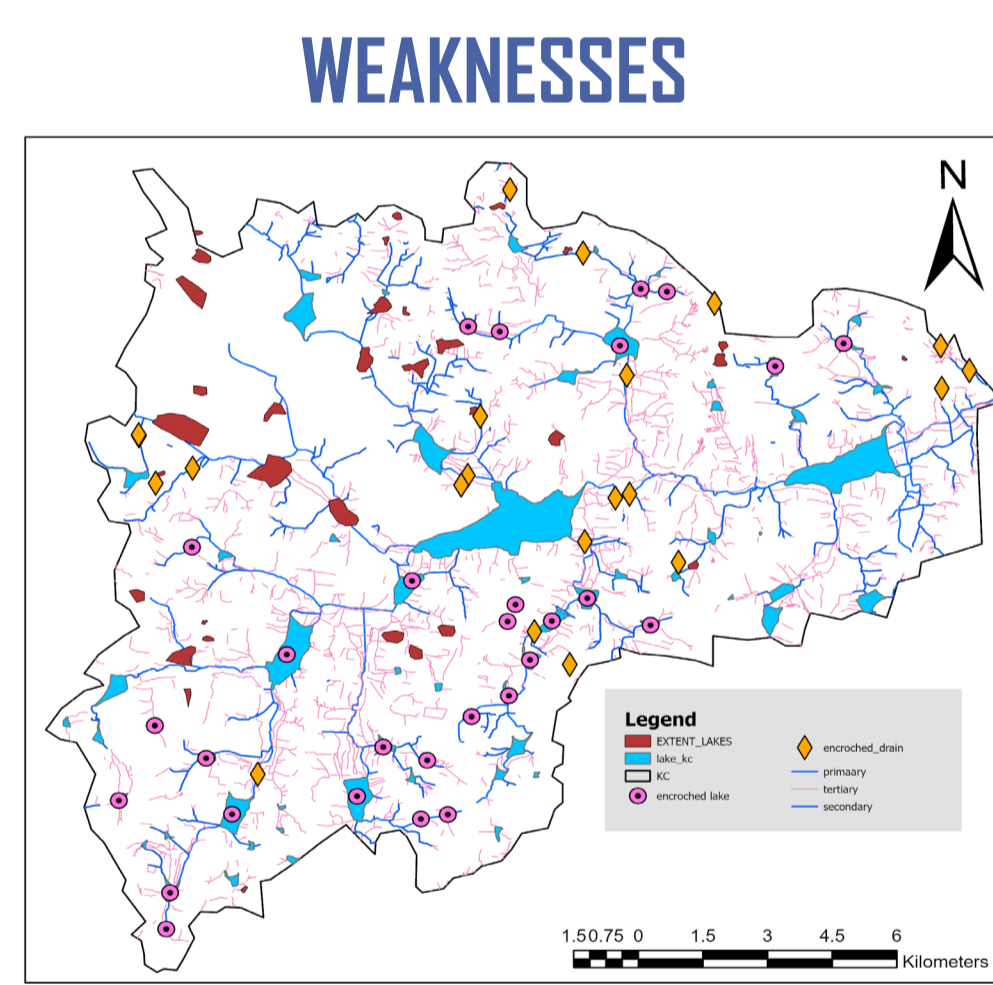
# PROBLEM IDENTIFICATION MAP



# S.W.D.C ANALYSIS



Key Element	Description
Existing Natural Drainage System	Presence of an extensive network of rajakaluves and interconnected lake chains.
Defined Topography	Natural terrain facilitates flow of water from higher to lower regions, aiding runoff if managed well.
Pockets of Blue-Green Infrastructure	Some areas still retain functional lakes, wetlands, tree cover, and stormwater drains.
Established Planning Institutions	BBMP, BDA, BWSSB provide an administrative framework for urban management and coordination.
Availability of Geospatial Data	Access to satellite imagery, flood vulnerability maps, LULC data for analysis and interventions.



Key Element	Description
Unregulated Urban Expansion	Haphazard development over water bodies and buffer zones without hydrological consideration.
Disconnected Lake Systems	Loss of upstream-downstream connectivity due to built-up and encroachments.
Poor Drain Maintenance	Choking, siltation, and garbage dumping in stormwater drains reduce flow efficiency.
Ineffective Enforcement	Weak legal enforcement against illegal construction in sensitive flood-prone areas.
Lack of Integrated Planning	Blue and green networks not well-integrated into zoning, infrastructure, and transport plans.



Key Element	Description
Blue-Green Infrastructure Planning	Integration of ecological design in stormwater management (e.g., bioswales, urban wetlands).
Urban Renewal Projects	Redevelopment of encroached drains/lakes into multifunctional public spaces.
Use of Smart Technologies	IoT-based flood monitoring, GIS-based mapping of blue-green infrastructure.
Increased Public Awareness	Rising citizen movements for lake revival and environmental conservation.
Government & NGO Support	AMRUT, NMCG, Jal Shakti Abhiyan, ESG, and other programs can fund initiatives.



Key Element	Description
Encroachment Pressure	Politically and economically driven illegal construction over drains and lake beds.
Resistance to Evictions	Slum dwellers and landowners oppose demolitions and regularizations.
Policy Gaps	Overlapping jurisdictions and unclear mandates between BBMP, BWSSB, KSPCB, etc.
Climate Uncertainty	Unpredictable rainfall intensities and durations due to climate change.
Infrastructural Inflexibility	Existing hard infrastructure (roads, culverts) is not easily modifiable to accommodate ecological designs.

# INFERENCE

The Koramangala-Challaghatta (K-C) Valley in Bengaluru, once a naturally resilient watershed system, is increasingly vulnerable to urban flooding due to severe disruptions in its blue-green network. Rapid urbanization, unchecked encroachments, loss of inter-lake connectivity, and poor stormwater management have led to a dramatic shift from a sponge city to a runoff-heavy concrete basin.

- Key Problems Identified:**
1. Encroachment and narrowing of rajakaluves and lake buffers
  2. Disconnected lake chains and disrupted hydrological flow
  3. Shrinking green cover and impervious surface expansion
  4. Lack of integrated, watershed-based planning and governance

**Insights from SWOC Analysis:**  
While the region still possesses ecological assets and planning potential (Strengths), internal planning weaknesses and external development pressures hinder systemic reform. However, growing awareness, policy momentum, and technology adoption offer a unique opportunity to restore and reimagine the K-C Valley as a resilient blue-green urban ecosystem.

**Strategic Imperative:**  
To mitigate urban flooding and enhance climate resilience, it is crucial to integrate nature-based solutions, restore hydrological continuity, and mainstream blue-green infrastructure into urban planning, zoning, and governance in the K-C Valley.

The path forward lies not in controlling water, but in making space for it — through ecological restoration, integrated planning, and people-centric design.

# MITIGATING URBAN FLOODS : A PLANNING STUDY ON CONNECTING BLUE-GREEN NETWORK IN KORAMANGALLA - CHALLAGHATTA VALLEY IN BENGALURU CITY

SCHOOL OF PLANNING AND ARCHITECTURE

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