
(De)engineering cities

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River interlinking viable, say IIM-A students inspired by Kalam

Chitra Unnithan, TNN, Nov 26, 2010, 04.06am IST

River linking can prevent floods as well as drought, says Kalam

Staff Correspondent

President dedicates Upper Krishna Project to the nation

- *The delay has cost the nation Rs. 33,000 crore: President*
- *Kumaraswamy urges Centre to announce a water policy*
- *Yediyurappa appeals to President to get permission for raising the height of the dam*

Kalam calls for T.N.- ISRO collaboration in linking rivers

SPECIAL CORRESPONDENT

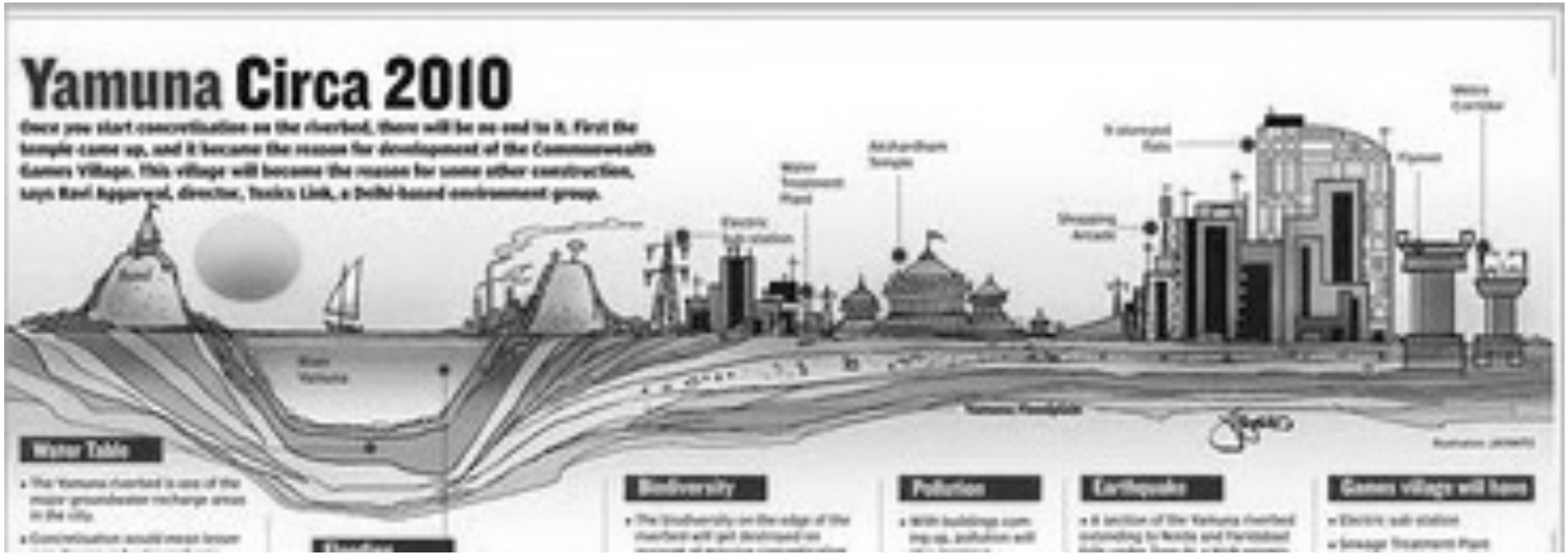
PM selects panel for river-linking plan

SONU JAIN

Posted: Mar 03, 2003 at 0000 hrs IST

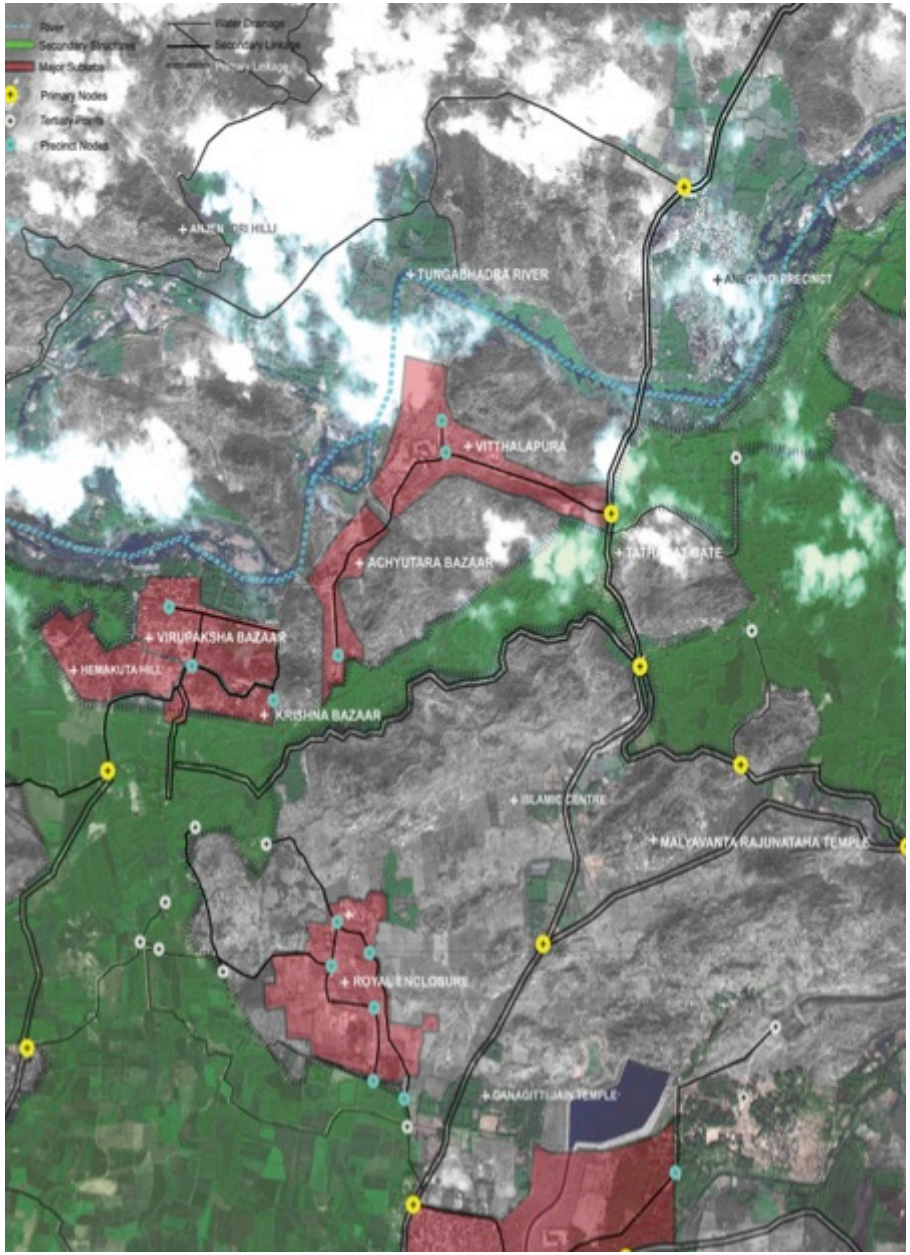
NEW DELHI, MARCH 2: For all the skeptics out there, here's another indication of how serious the Central Government is about the national river-linking project. Last week, Prime Minister A B Vajpayee hand-picked five experts to expand the task force chaired by former Union minister Suresh Prabhu.

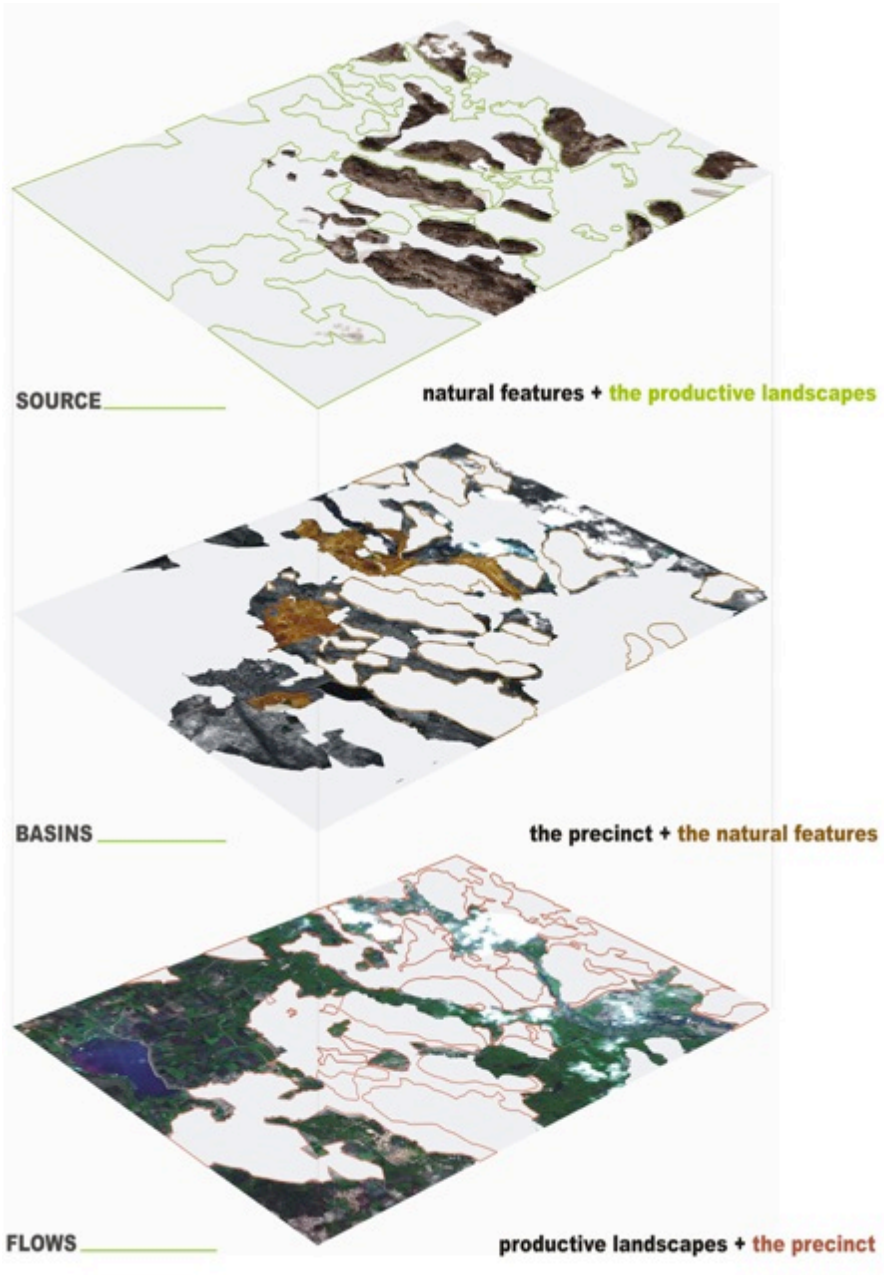
So, who are these who are expected to tell the country whether these 30 links on 37 rivers worth Rs 5,60,000 crore are actually viable? The eight-member team will now have R K Pachauri, Director, Tata Energy Research Institute (TERI), K. Kasturirangan, Chairman, Indian Space Research Organisation (ISRO), K V Kamath, CEO, ICICI Bank, Deepak Dasgupta, former chairman of National Highway Authority and G C Sahu, former chief engineer, Orissa government.



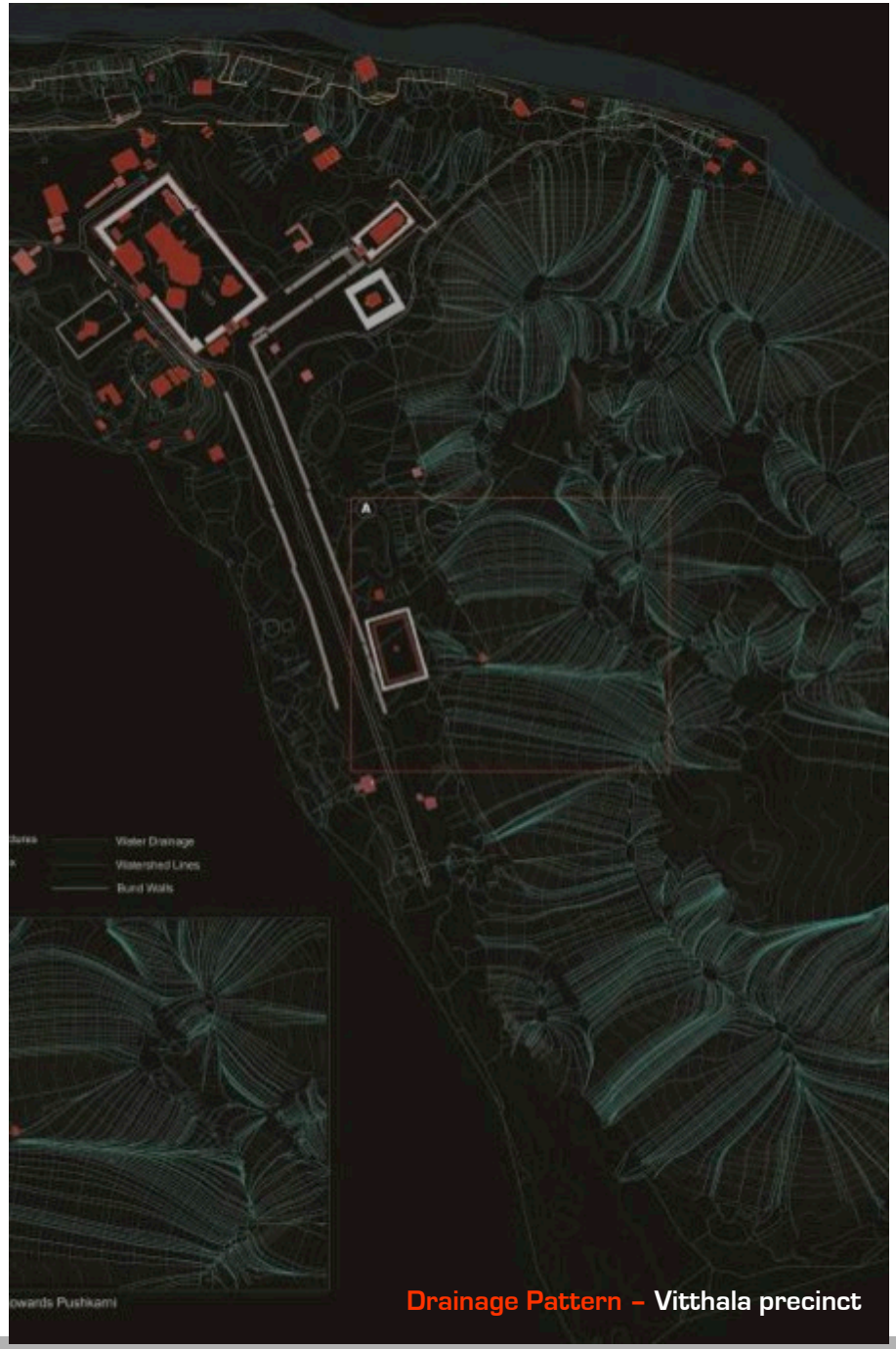
NON CONTEXTUAL DESIGN PRACTICES - limiting ecosystem oppportunities and creating opposing systems

Contextual variations determining water management practices – Harappa vs Vijayanagara

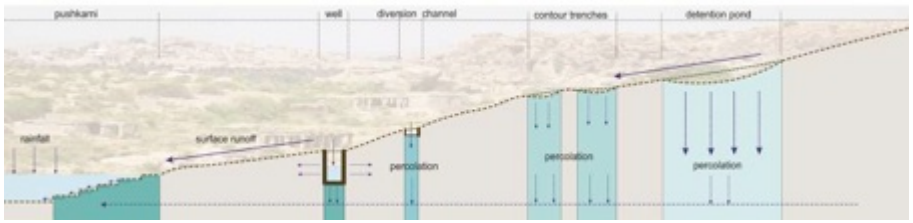




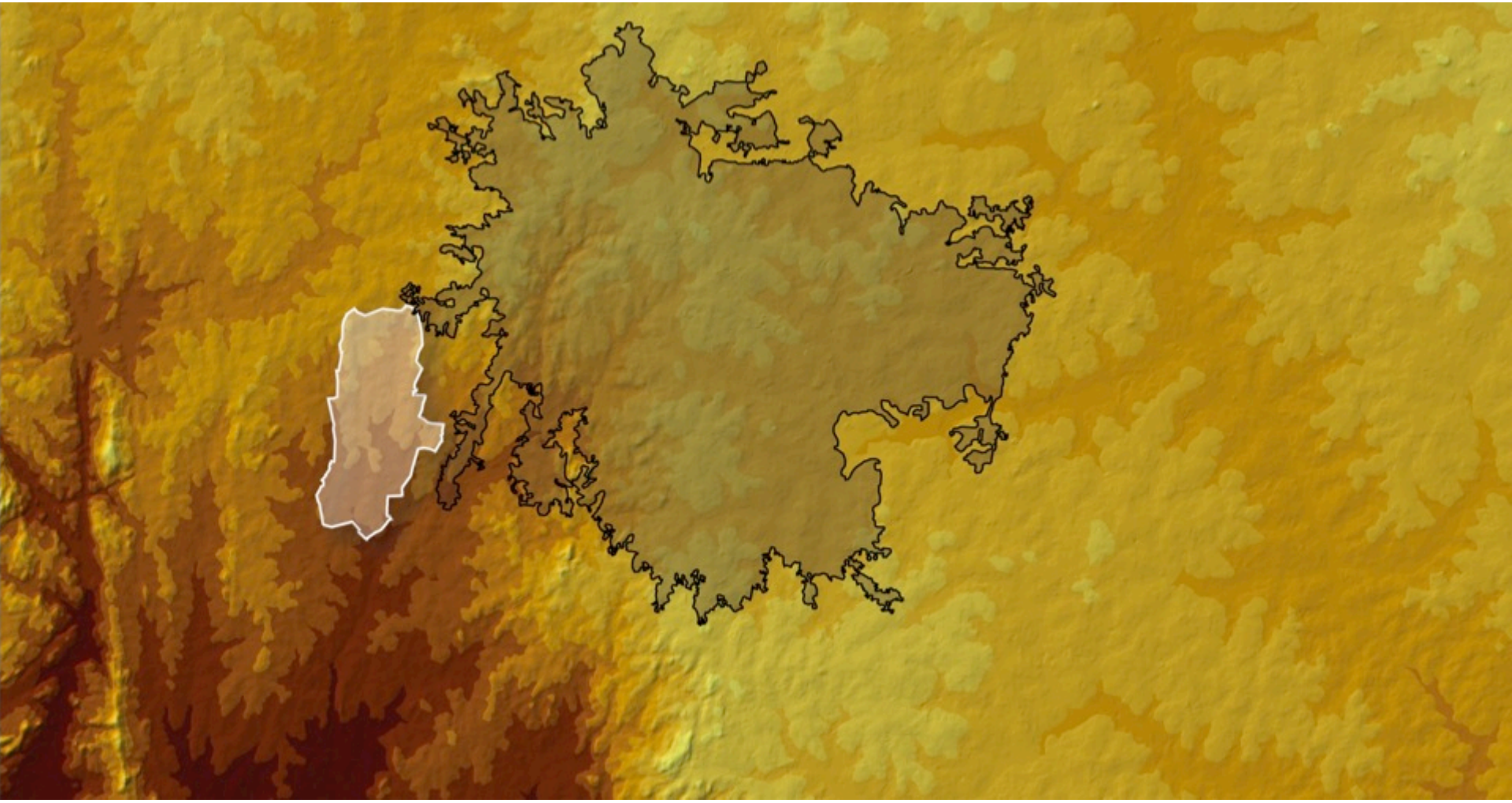
Traditional settlements and their interdependency on Landscape systems - an integrated morphology derived through local contextual associations with livelihood patterns, natural systems, urban orders, and agricultural techniques



Drainage Pattern – Vitthala precinct

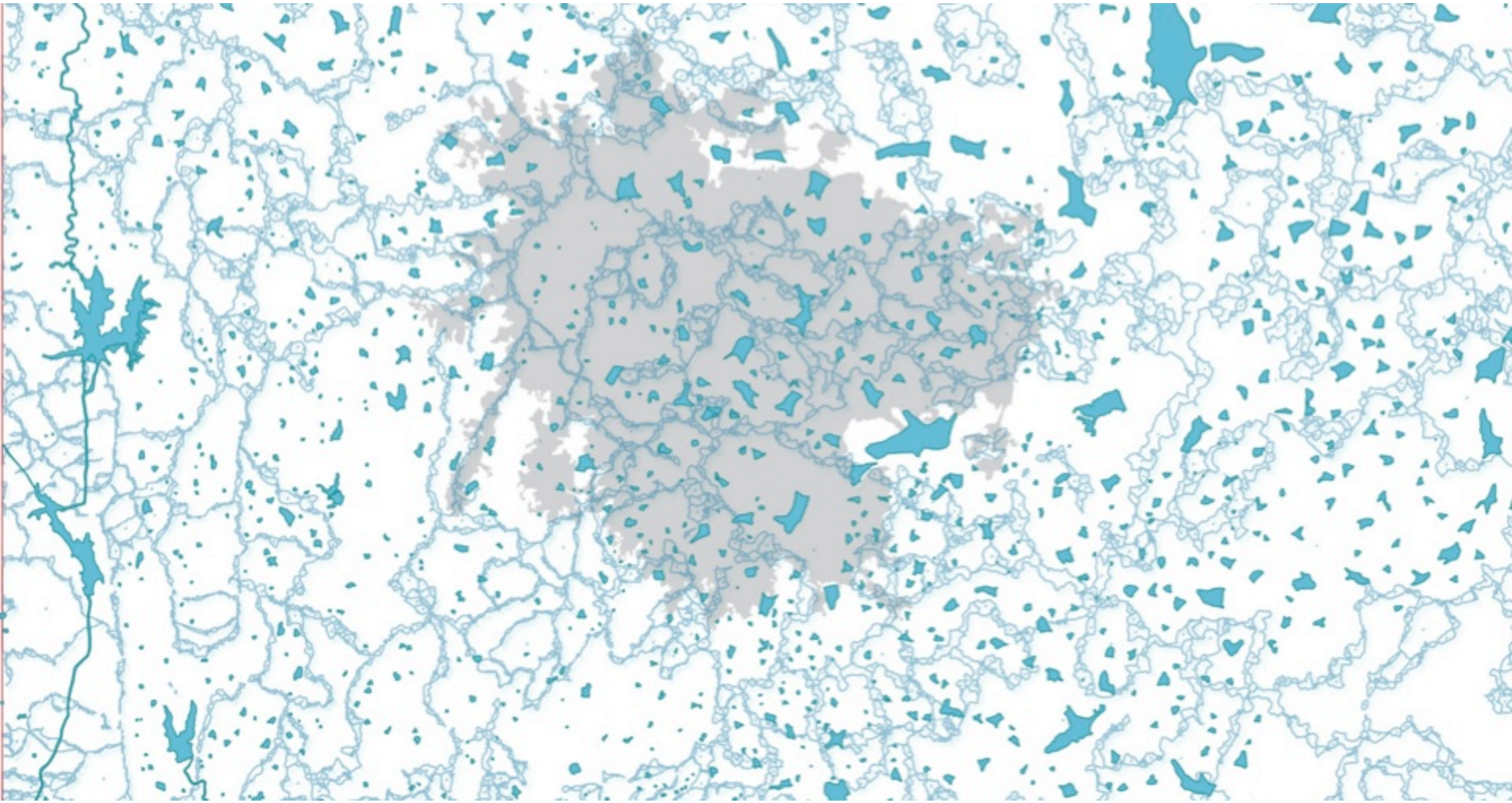


1. Bangalore region and its context: elevation patterns



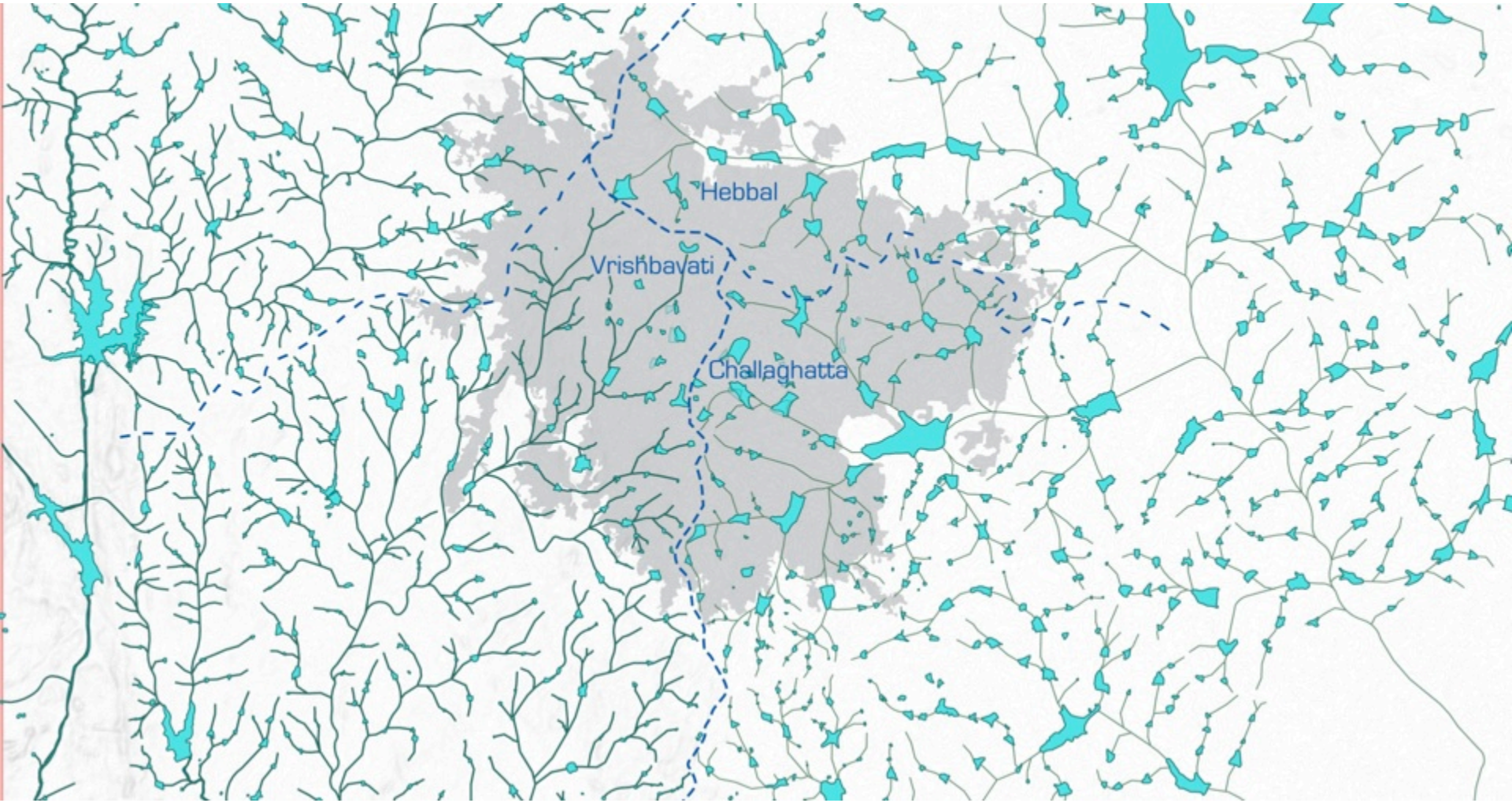
Bangalore, being a part of the Deccan Plateau represents plains, hills, valleys and undulating terrain.The main ridge running along NNW – SSE divides the area into **two distinct topographical regions.** This topography exhibits a **radial pattern of drainage,** distributing from the apex and ramifying to the lower plains with **dentric and reticulate drainage pattern**

1. Bangalore region and its context: watershed and water bodies



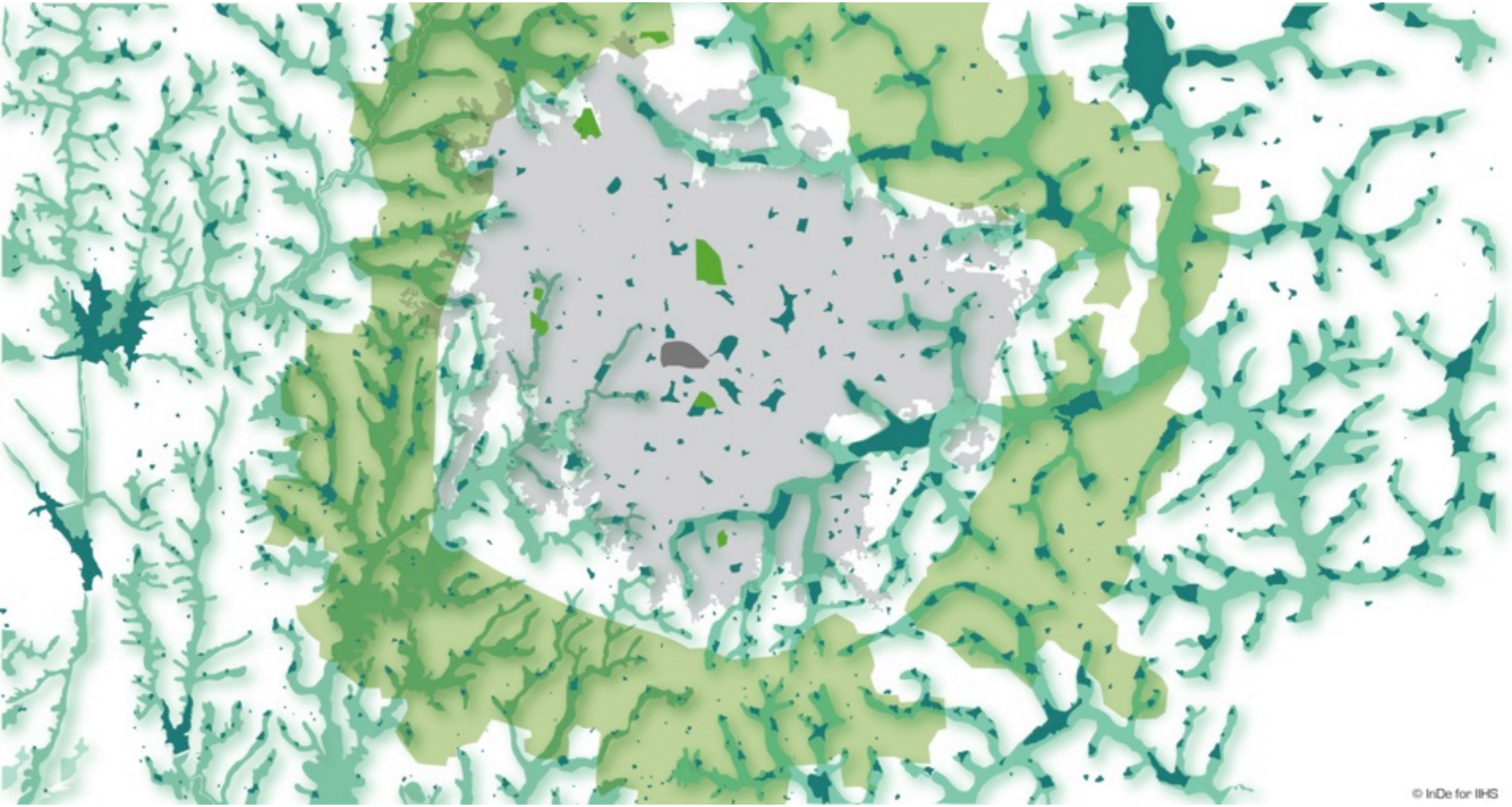
The naturally undulating terrain lends itself perfectly to the development of lakes designed to capture and store rainwater. By intercepting natural streams at appropriate locations, an extensive network of lakes has been designed since the earliest settlement and function as reservoirs.

1. Bangalore region and its context: interconnectivity of water bodies



As water bodies are part of an intricate interconnected system of lakes, valleys and canals, any disturbance at one point in the system is highly likely to impact the entire systems, specially downstream.

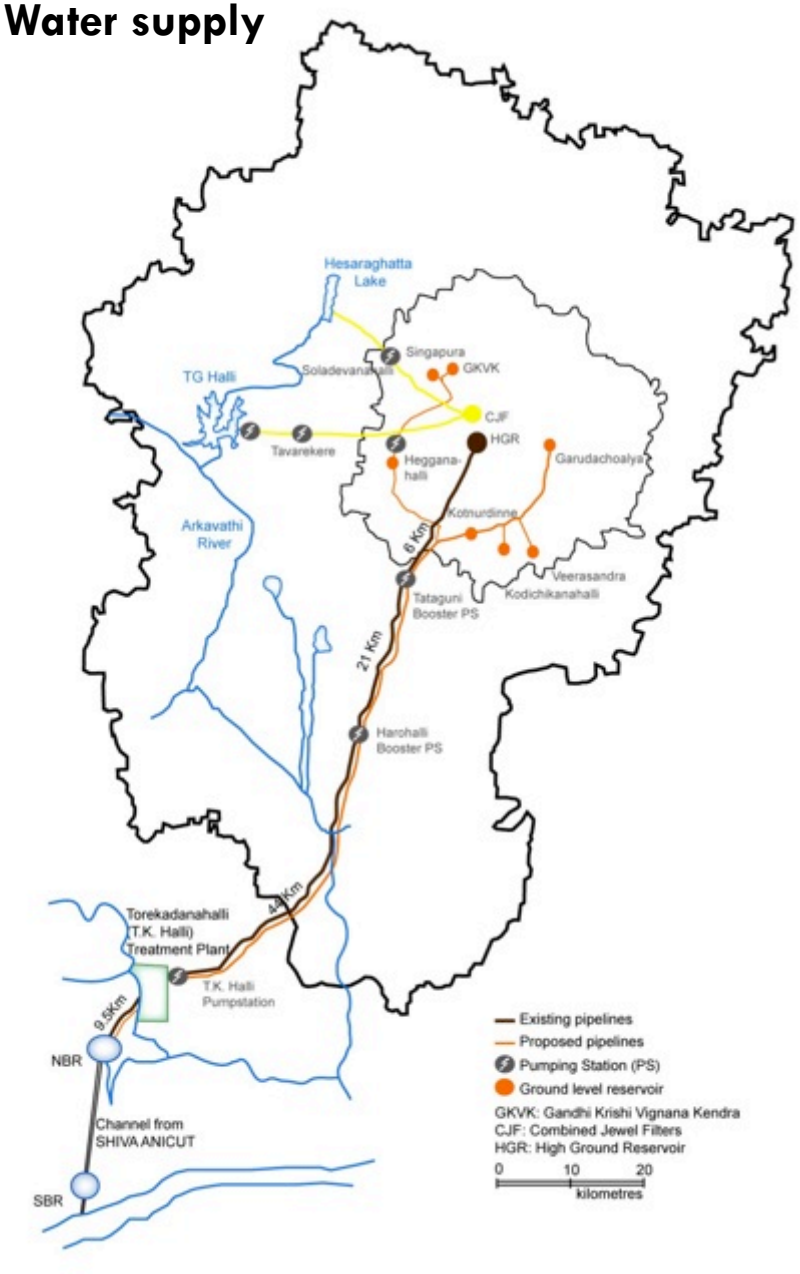
1. Bangalore region: defined green belt vs natural systems



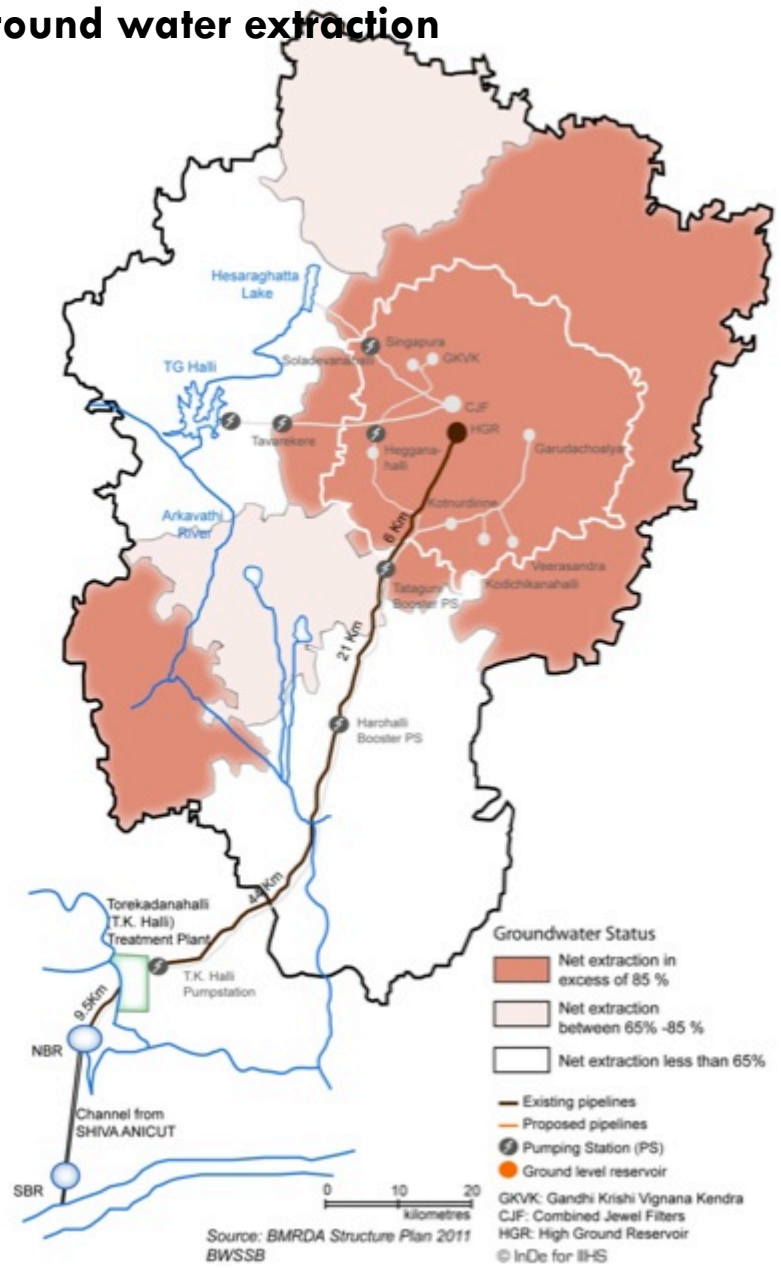
The current planning approach confine ecological systems and their services to a concept of "*green belt*" meant to play merely a limiting role to contain urban sprawl. As a virtual definition of the physical boundary of the city, the "*green belt*" follows the radial urbanisation of the city completely overlooking and at times conflicting with the natural profile of ecological infrastructure.

1. Bangalore region and its context

Water supply

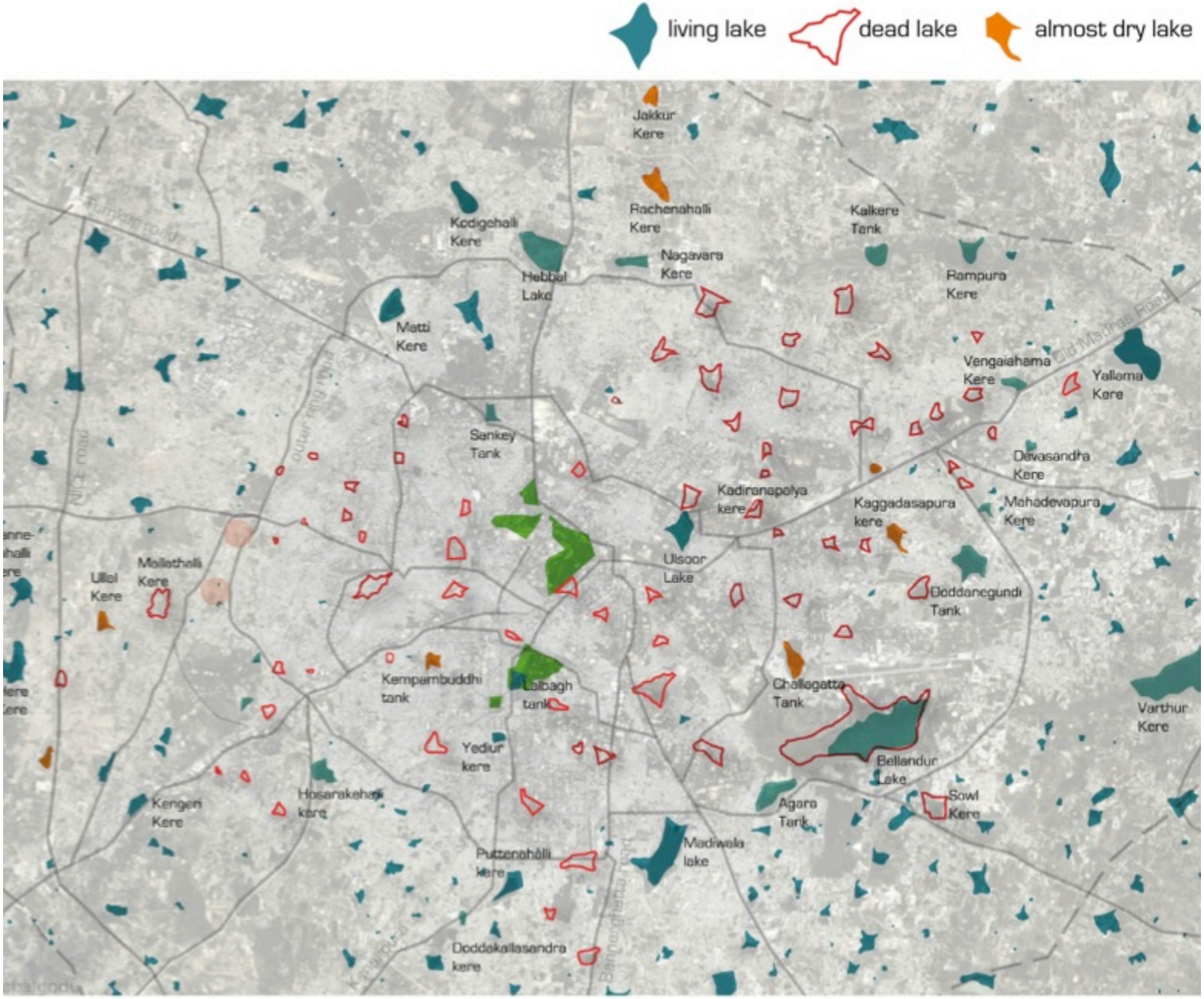


Ground water extraction

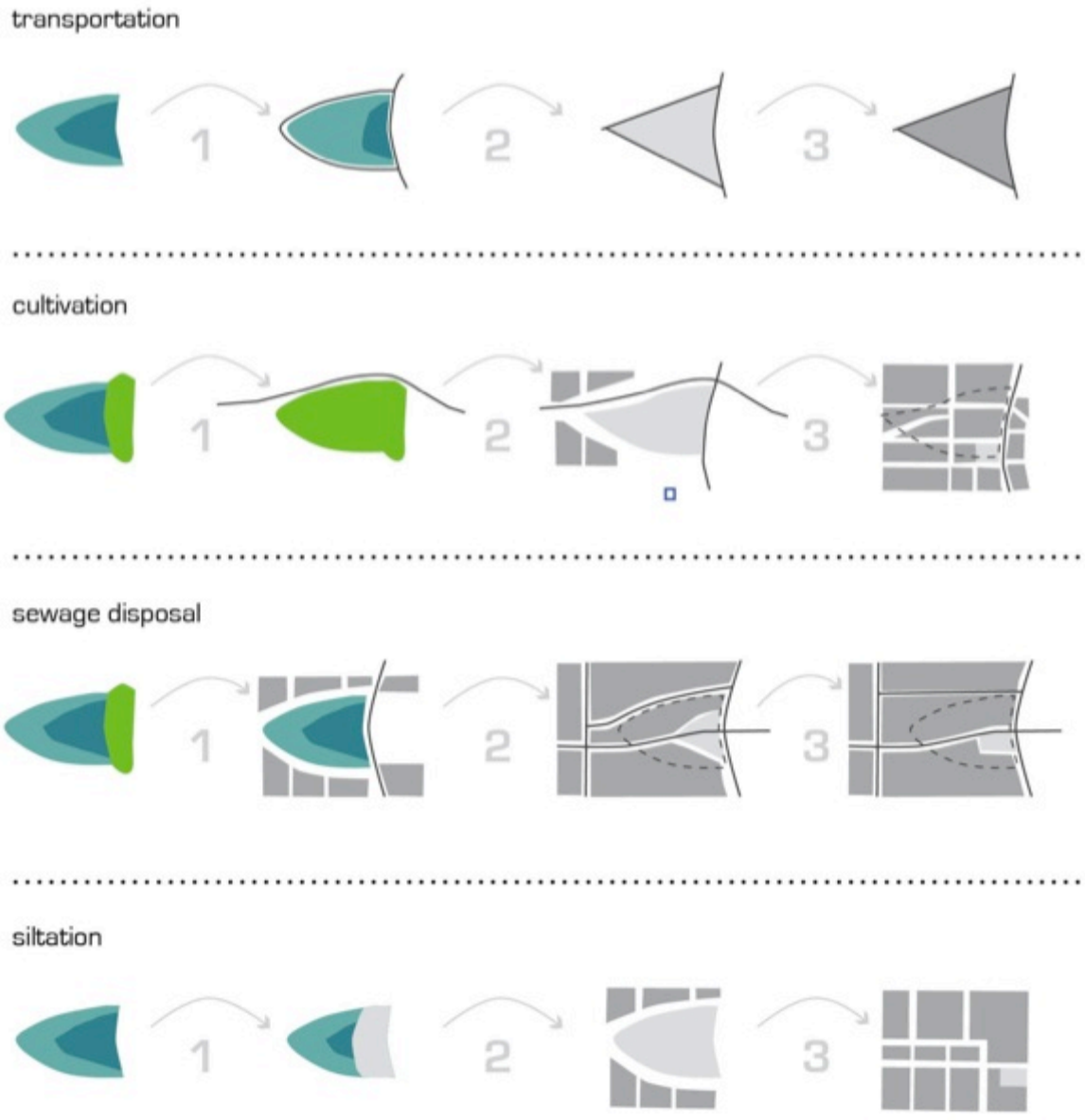


1. Bangalore: current status of lakes

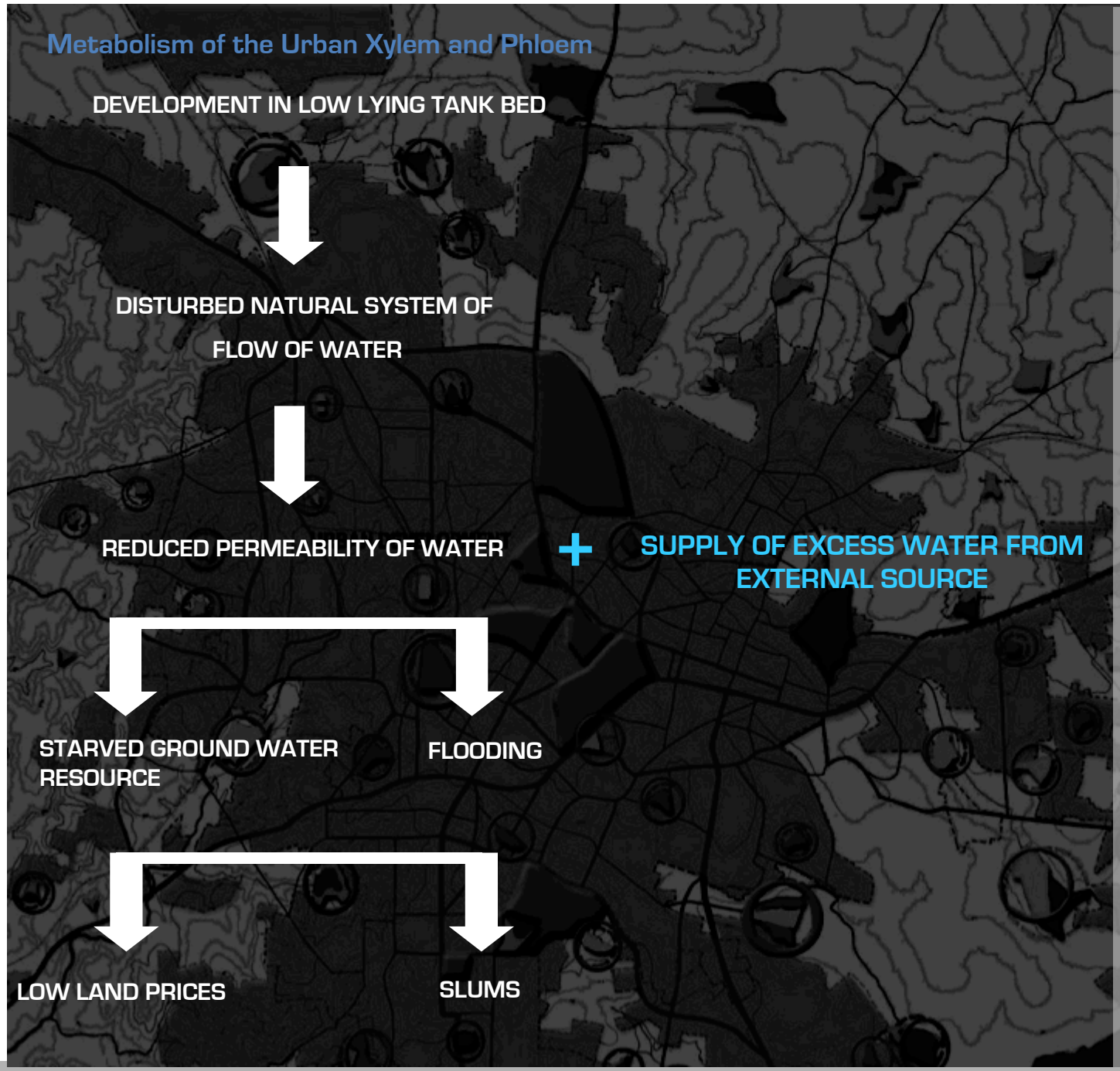
"While till **1960,** there were **262 water bodies** in Bangalore, today they have **declined to about 81 of which only 34 are recognized as live lakes.** The reduction of water bodies is as high as 35% while in terms of water spread area, it shows a decrease of 8.66%"
Envis Centre



1. Bangalore: process of lake alteration



Metabolism of the Urban Xylem and Phloem



Most tanks within the city are utilized for urban development.

Increase in nutrient content of tank water due to sewage disposal.

Many tanks become marsh land due to excessive siltation.

Tanks on the urban fringe are encroached by residential developments.

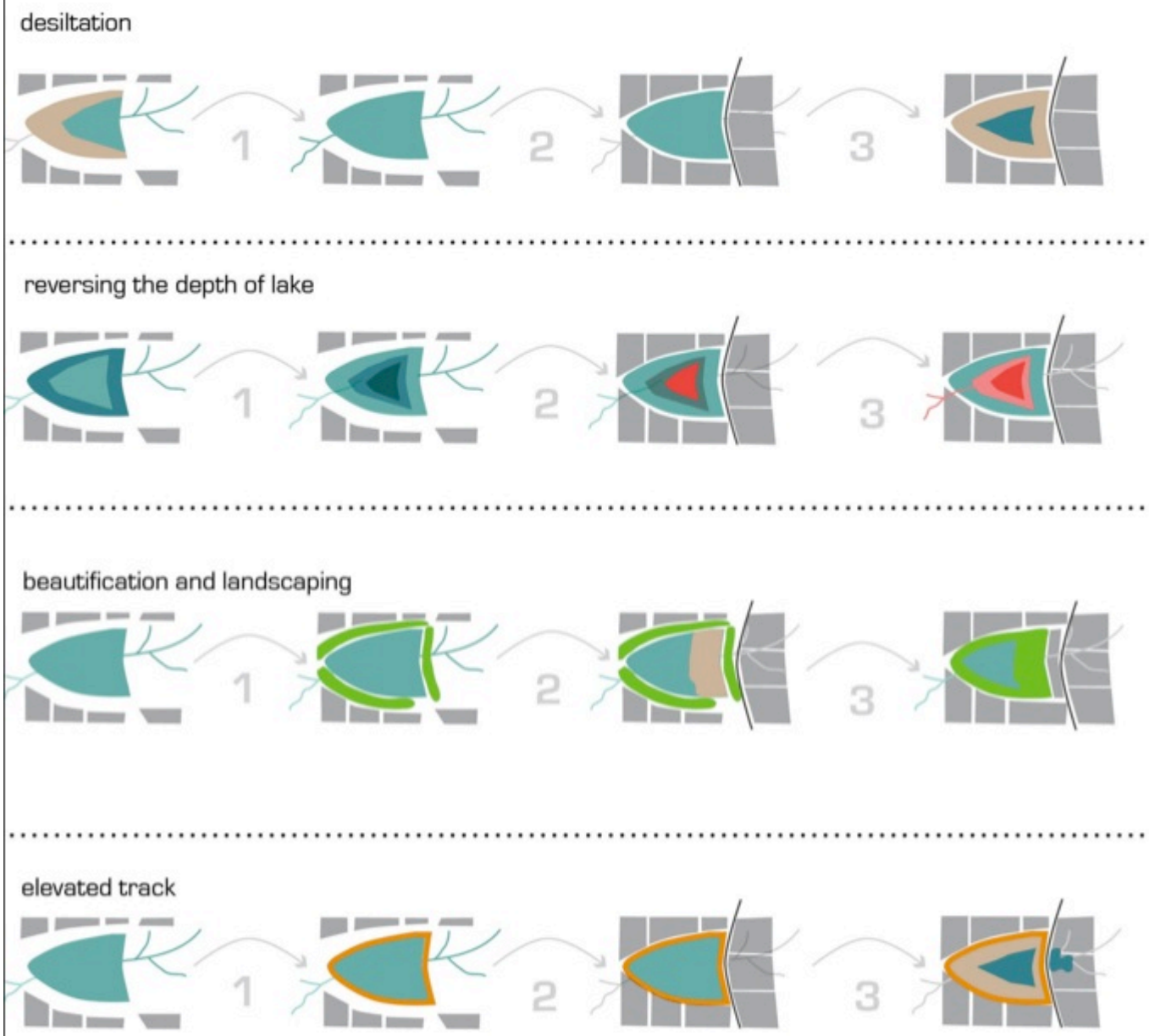
1. Bangalore: current status of lakes

Evolution of Mallatahalli Lake over 10 years

1. Bangalore: current status of lakes

Evolution of Mallatahalli Lake over 10 years

1. Bangalore: existing efforts focusing on beautification



With little understanding of the ecological services rendered by watersheds, valley systems and lakes, treating the environment as an extended engineering exercise is guaranteed to result in failure.

2. Land Capability Analysis

Background

Previous Plans + Land Capability Analysis + Sectoral Analysis + On Ground Observation

Issues / Opportunities / Constraints

Guiding principles

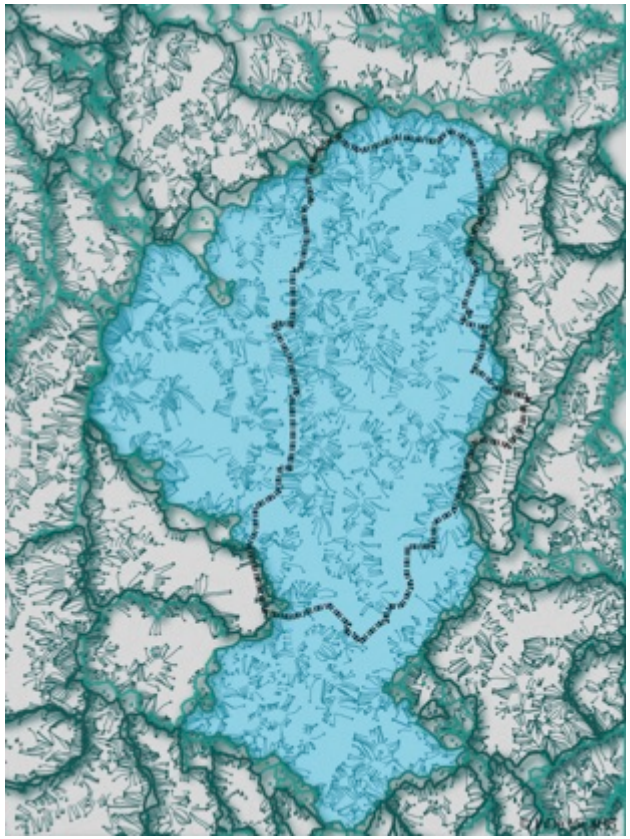
Regional Growth Dynamics + Environment /Ecology (focus on water resource) + Economy & Equity + Governance

Development Strategy

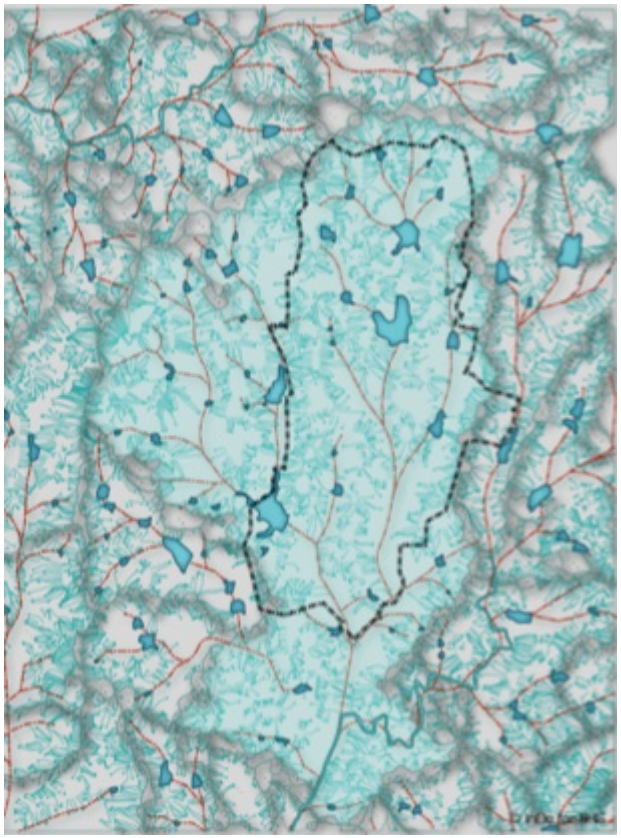
Demarcation of zones for potential growth as per Land Capability Analysis + Clustered and nodal development Vs Conventional Satellite Town + In tandem with institutional reforms to empower local and metropolitan bodies

3. Future development of the Kempegowda Layout: context

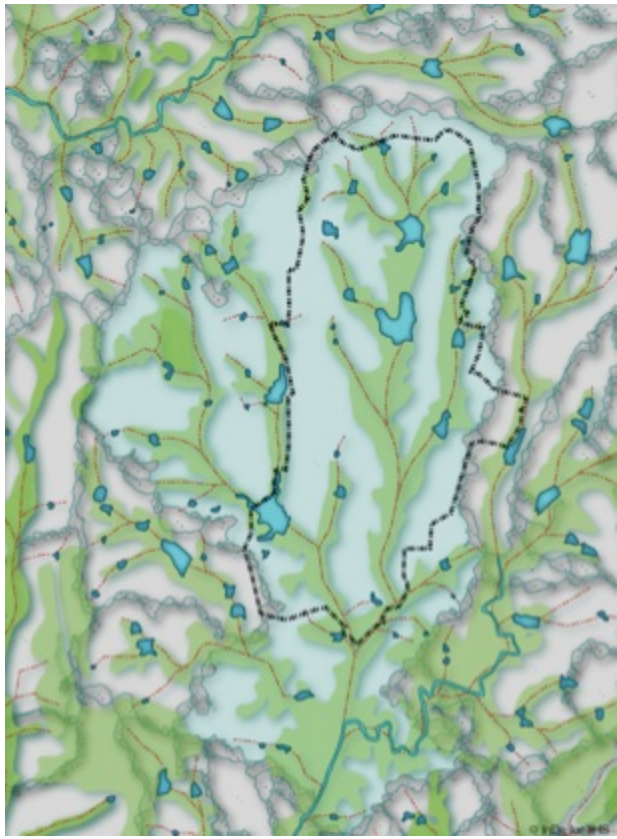
Watershed & Drainage



Drainage and water bodies



Water bodies and valleys

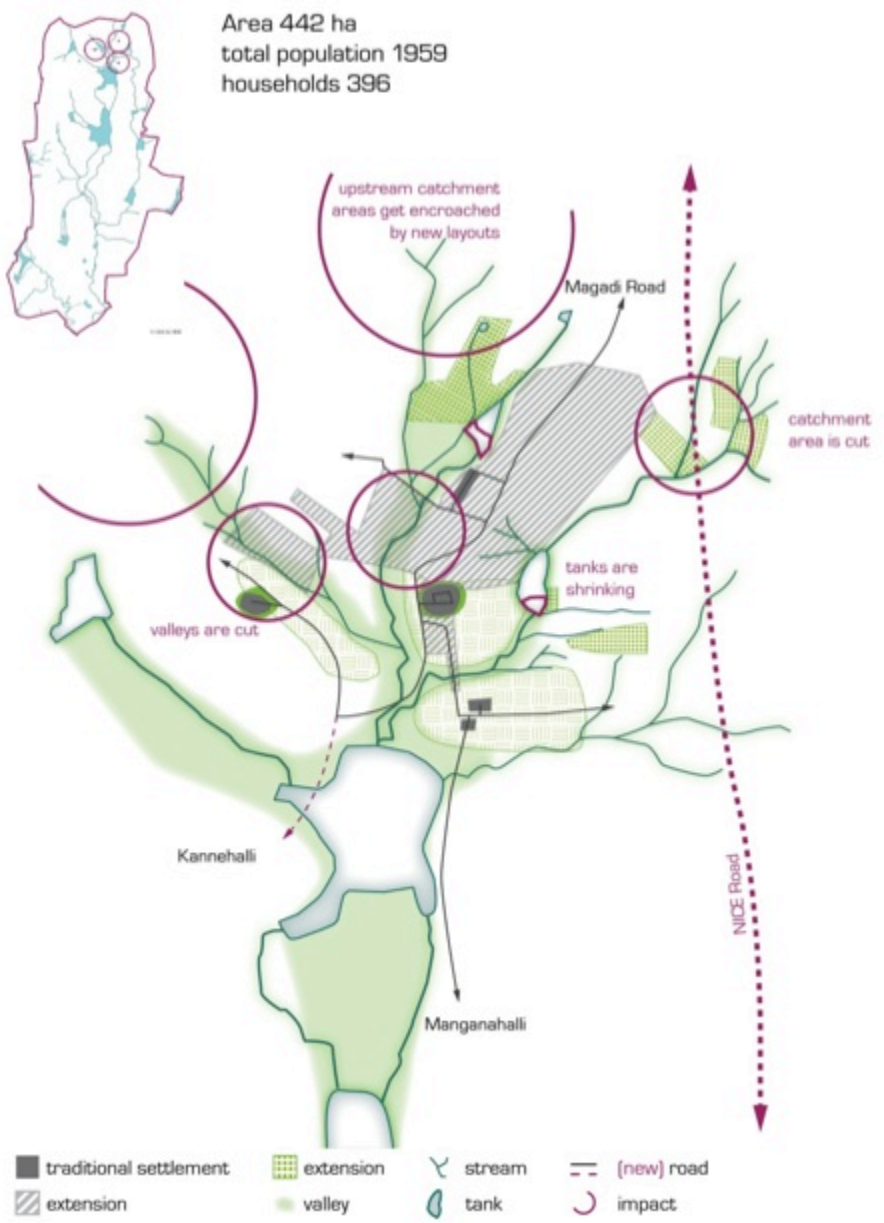


Located on the upstream of important catchment areas, any development or interventions in the Kempegowda Layout spreading over 2,000 hectares will have critical impacts downstream. By recognizing the structure of the ecological infrastructure, the existing valleys systems can become the framework to inform the urban development in the layout and through which shared infrastructural services could be linked.

3. Future development of the Kempegowda Layout

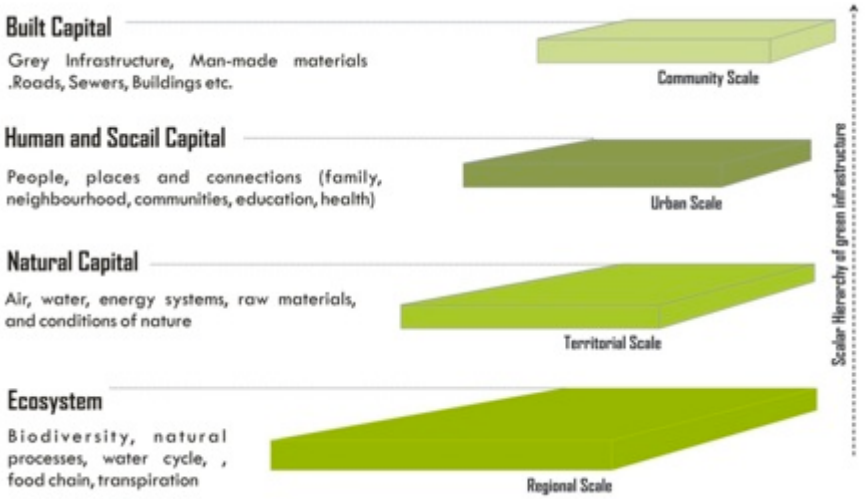
Existing settlements and their relations to natural systems

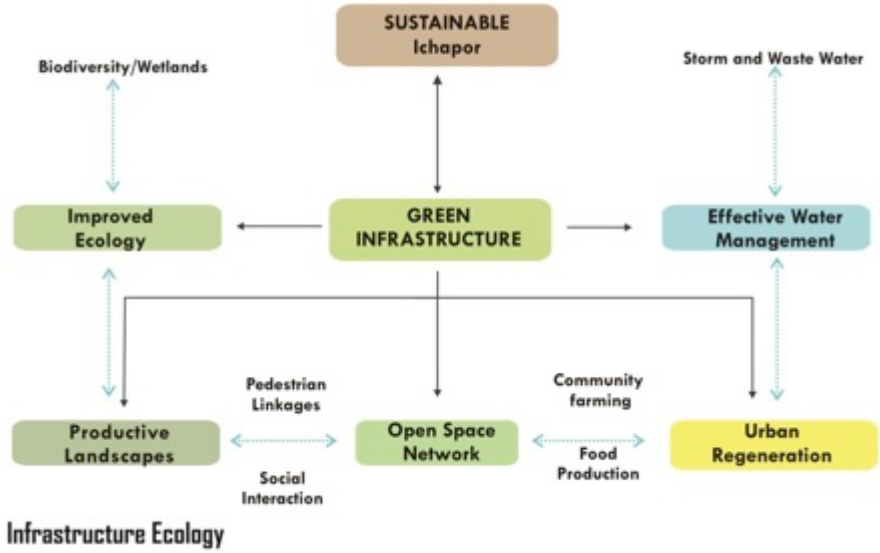
Kodigehalli

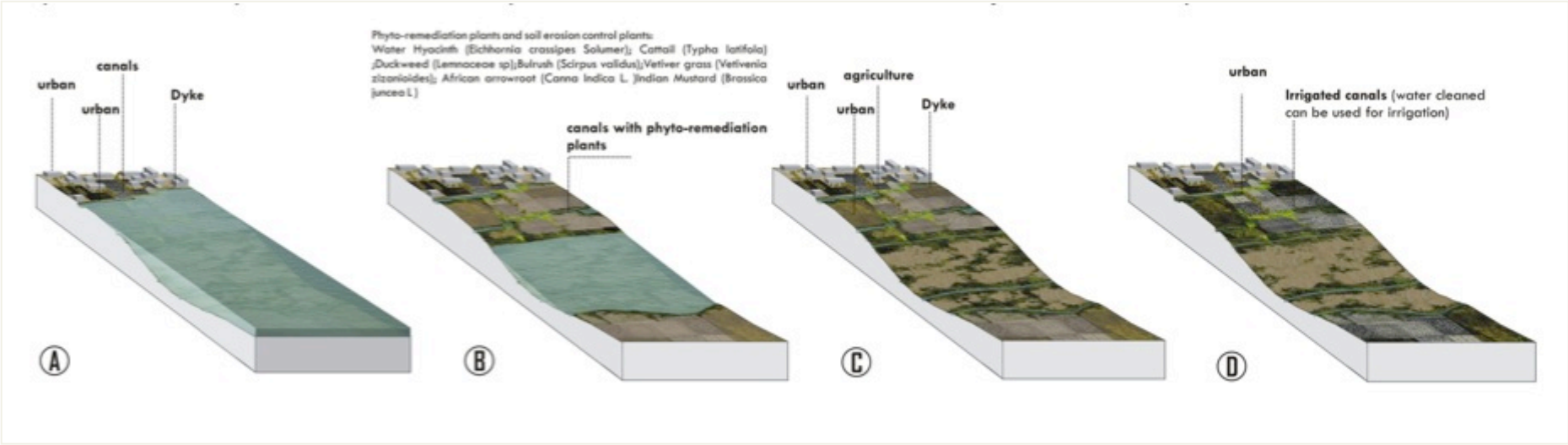


2000

2009







Green Infrastructure – strategies for innovating planning and resilient design methodologies

	Rainwater Management		River Edge		Open-Space		Mobility		Water Management		Waste Management	
	Soft rainwater management	**Drained rainwater management**	**Soft River Edge**	**Hard River Edge**	**Productive**	**"Un-Productive"**	**Soft**	**Motorized**	**Decentralized**	**Centralized**	**Recycled**	**Non-recycled**
Design												
Principles	-Bio-swale, - Permeable parking surface, - Infiltration System	- Storm-water drainage system	- Flood plain with streamside wetland, - Gabion placement, Joint Planting	- Embankment of the river edge, - Built canal	- Urban Farming - Community sharing open-space	- Park and Playground (natural or impervious ground)	- Dedicated and secured pedestrian and cycle paths - Proximity with public Transport	- Road widening	- Phytoremediation and treatment plant, - Artificial wetland	-Piped water supply and drainage	- Compost of organic waste	- Centralised Waste Disposal at City Level
Objectives	- Promote natural infiltration of rainwater, - Limit impervious surface	- Collect rainwater in drains	- Leave natural space to allow water spread	- Raise an artificial bank to contain / redirect water	- Plant open spaces, grow food + animal husbandry - Create non-built space	- Create non-built space for social and collective usage	- Dedicate space for pedestrian and cyclist	- Increase performance of motorized transport	- Treat and recycle water closest to its usage	- Collect and drain waste water away from source	- Recycle organic waste as a nutrient for urban farming	- Collect Solid Waste for distant disposal
Time of implementation *(1=long, 2 = medium, 3=short)*	2	3	3	1	2	1	1	1	2	2	2	2
Cost of implementation *(1=high, 2 = medium, 3=low)*	3	1	3	1	2	3	2	1	3	1	3	2
Skills Required *(1=high, 2 = medium, 3=low)*	2	1	2	1	3	1	2	2	1	1	3	2
Implementation Index (100)	**78**	**56**	**89**	**33**	**78**	**56**	**56**	**44**	**67**	**44**	**89**	**67**
Frequency of maintenance *(1=high, 2 = medium, 3=low)*	3	1	2	3	1	2	2	2	2	1	2	2
Cost of maintenance *(1=high, 2 = medium, 3=low)*	2	1	1	2	2	1	2	2	2	1	2	1
Skills/Materials *(1=high, 2 = medium, 3=low)*	2	3	3	2	2	2	3	3	2	1	2	2
Maintenance Index (100)	**78**	**56**	**67**	**78**	**56**	**56**	**78**	**78**	**67**	**33**	**67**	**56**
Run-Off Volume *(1=High, 2=medium, 3=low)*	3	1	3	1	3	1	2	1	3	1	-	-
Resilience *(1=High, 2=medium, 3=low)*	3	1	3	1	3	1	3	1	2	1	3	1
Velocity *(1=High, 2=medium, 3=low)*	3	1	3	1	3	1	2	1	3	1	-	-
Flexibility of the system *(1=low, 2=medium, 3=high)*	3	1	3	1	3	1	3	1	3	1	3	1
Downstream Impacts *(1=High, 2=medium, 3=low)*	2	1	2	1	2	1	2	1	3	1	-	-
Flood Mitigation Index (100)	**93**	**33**	**93**	**33**	**93**	**33**	**80**	**33**	**93**	**33**	**100**	**33**
Increased biodiversity *(1=low, 2=medium, 3=high)*	3	1	3	1	3	1	3	1	3	1	-	-
Erosion Prevention *(1=low, 2=medium, 3=high)*	3	1	3	1	3	1	-	-	3	1	-	-
Water Recycling *(1=low, 2=medium, 3=high)*	2	1	2	1	3	2	-	-	3	1	-	-
Waste Recycling *(1=low, 2=medium, 3=high)*	2	1	2	1	3	1	-	-	2	1	3	1
Absorption/Reduction of Pollution *(1=low, 2=medium, 3=high)*	3	1	3	1	3	1	3	1	3	1	3	1
Environmental Index (100)	**87**	**33**	**87**	**33**	**100**	**40**	**100**	**33**	**93**	**33**	**100**	**33**
Community Involvement *(1=low, 2=medium, 3=high)*	2	1	3	1	3	2	3	1	3	1	3	1
Educational Values *(1=low, 2=medium, 3=high)*	3	1	3	1	3	1	3	1	3	1	3	1
Aesthetic Values *(1=low, 2=medium, 3=high)*	3	1	3	2	3	2	3	2	3	1	-	-
Recreational Values *(1=low, 2=medium, 3=high)*	3	1	3	2	3	3	3	1	3	1	-	-
Health Benefit												

ECOLOGICAL MATRIX – evaluating sustainable construction techniques as opposed to engineering solutions

	Rainwater Management		River Edge		Open-Space	
	Soft rainwater management	**Drained rainwater management**	**Soft River Edge**	**Hard River Edge**	**Productive**	**"Un-Productive"**
Design						
Principles	-Bio-swale, - Permeable parking surface, - Infiltration System	- Storm-water drainage system	- Flood plain with streamside wetland, - Gabion placement, Joint Planting	- Embankment of the river edge, - Built canal	- Urban Farming - Community sharing open-space	- Park and Playground (natural or impervious ground)
Objectives	- Promote natural infiltration of rainwater, - Limit impervious surface	- Collect rainwater in drains	- Leave natural space to allow water spread	- Raise an artificial bank to contain / redirect water	- Plant open spaces, grow food + animal husbandry - Create non-built space	- Create non-built space for social and collective usage
Time of implementation *(1=long, 2 = medium, 3=short)*	2	3	3	1	2	1
Cost of implementation *(1=high, 2 = medium, 3=low)*	3	1	3	1	2	3
Skills Required *(1=high, 2 = medium, 3=low)*	2	1	2	1	3	1
Implementation Index (100)	**78**	**56**	**89**	**33**	**78**	**56**
Frequency of maintenance *(1=high, 2 = medium, 3=low)*	3	1	2	3	1	2
Cost of maintenance *(1=high, 2 = medium, 3=low)*	2	1	1	2	2	1
Skills/Materials *(1=high, 2 = medium, 3=low)*	2	3	3	2	2	2
Maintenance Index (100)	**78**	**56**	**67**	**78**	**56**	**56**
Run-Off Volume *(1=High, 2=medium, 3=low)*	3	1	3	1	3	1
Resilience *(1=High, 2=medium, 3=low)*	3	1	3	1	3	1
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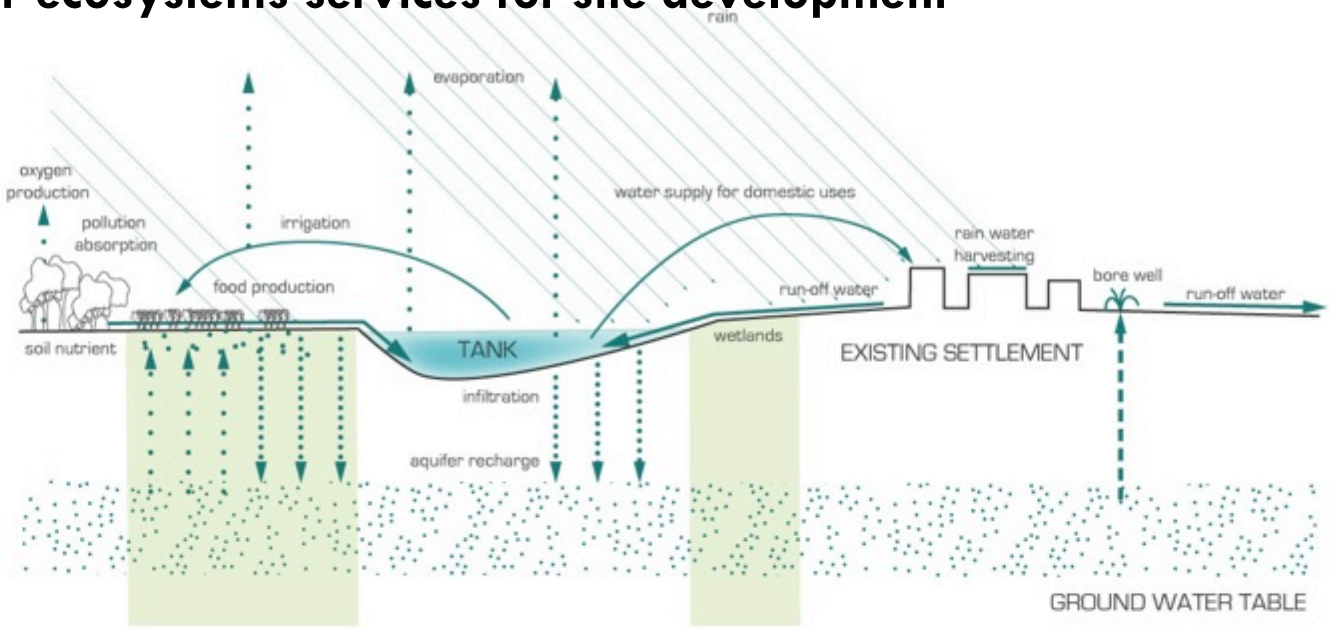
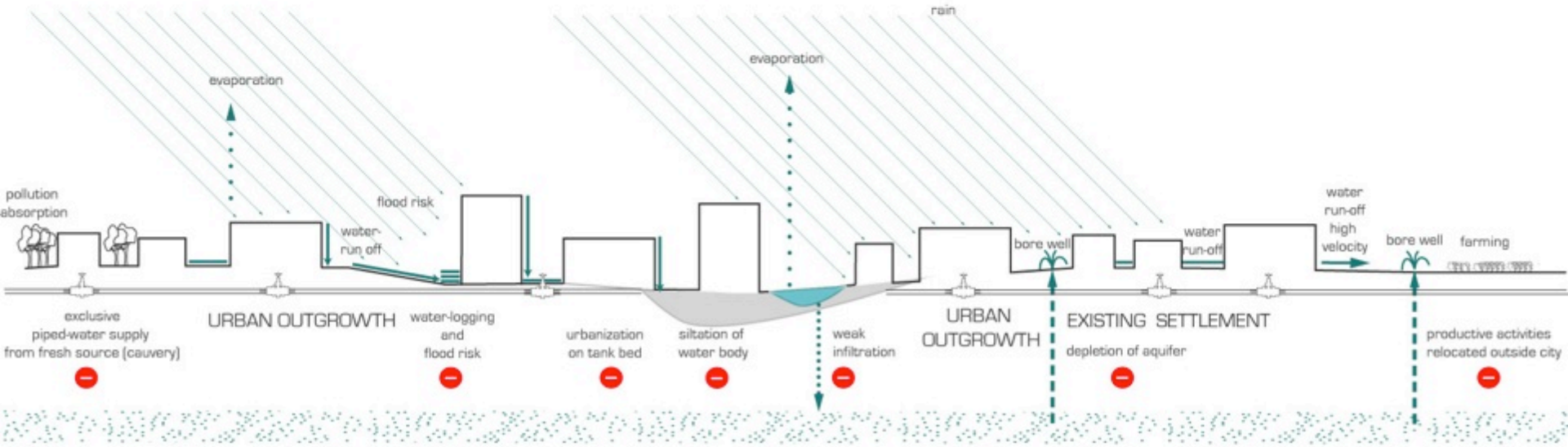
Downstream Impacts *(1=High, 2=medium, 3=low)*	2	1	2	1	2	1
Flood Mitigation Index (100)	**93**	**33**	**93**	**33**	**93**	**33**
Increased biodiversity						

4. Opportunities of ecosystems services for site development

Land performance

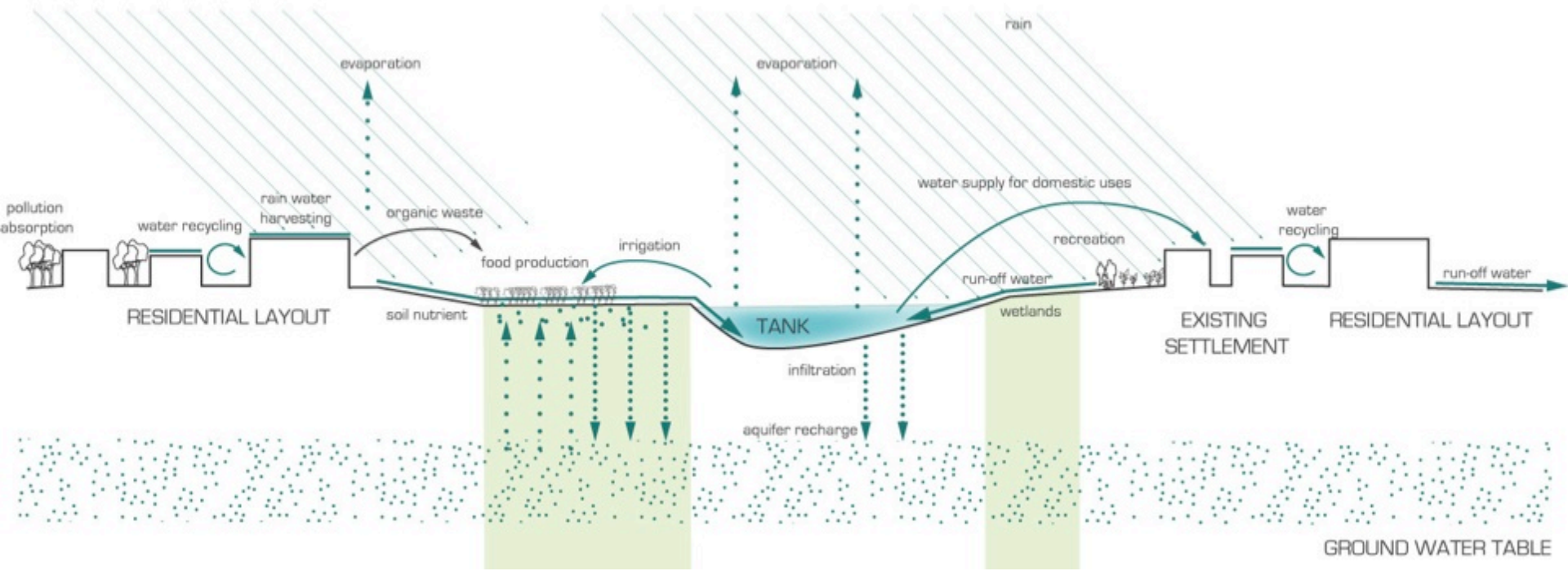


1. Initial relations: natural systems and villages



2. Urban development without integrating urban ecosystems

4. Opportunities of ecosystems services for site developmet



Urban development with integration of urban ecosystems

4. Opportunities of ecosystems services for site development

Water ecology