# Contextualising Green Infrastructure for India

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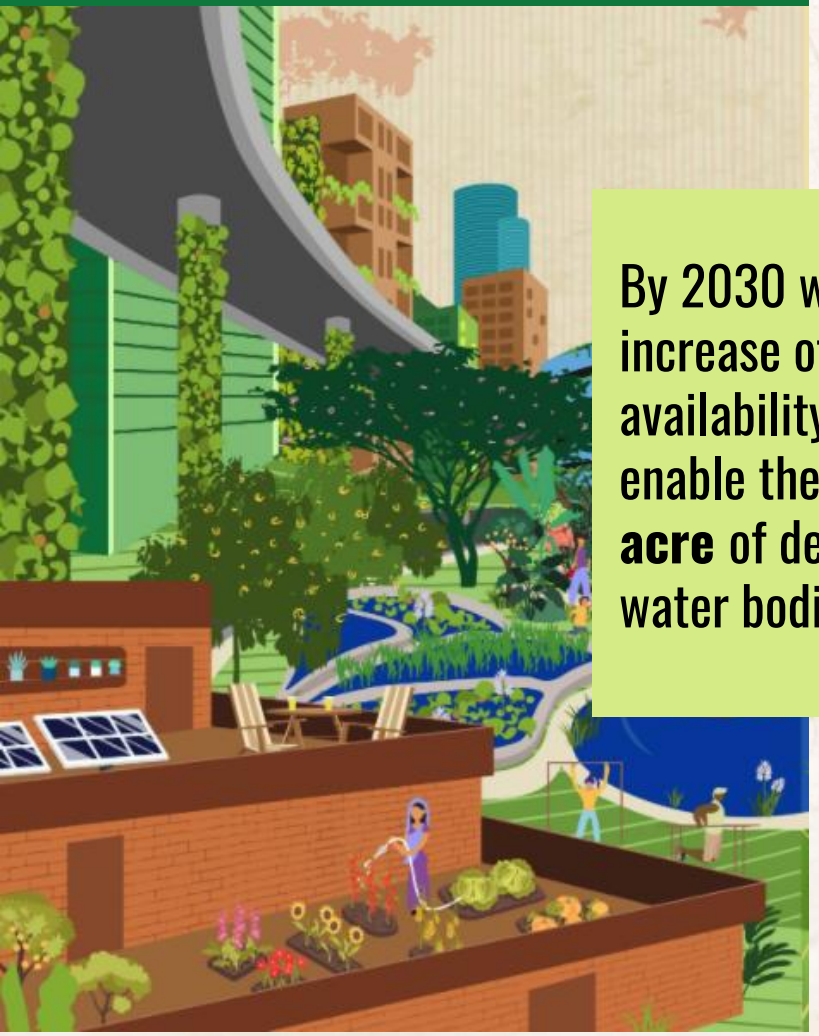
CENTRE FOR
SOCIAL & ENVIRONMENTAL
INNOVATION

# ABOUT CSEI

## Cities & Towns



By 2030 we will enable the increase of freshwater availability for **6M people** and enable the restoration of **6500 acre** of degraded land and water bodies.

## Farms & Forests

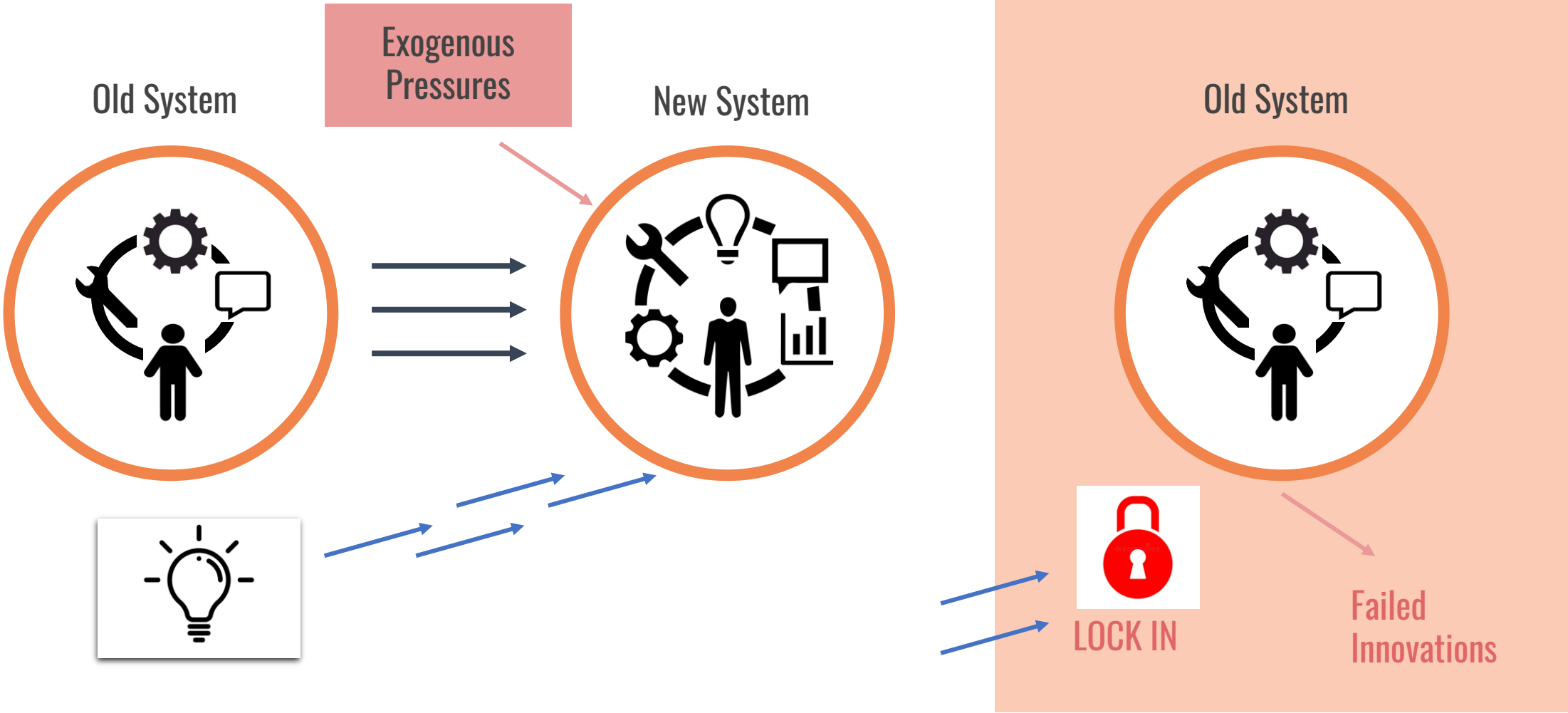
By 2030 we will enable the improvement of **150,000 people**, while enabling the restoration of **2M acre** of degraded land.

# We need systemic change

Landscape

System

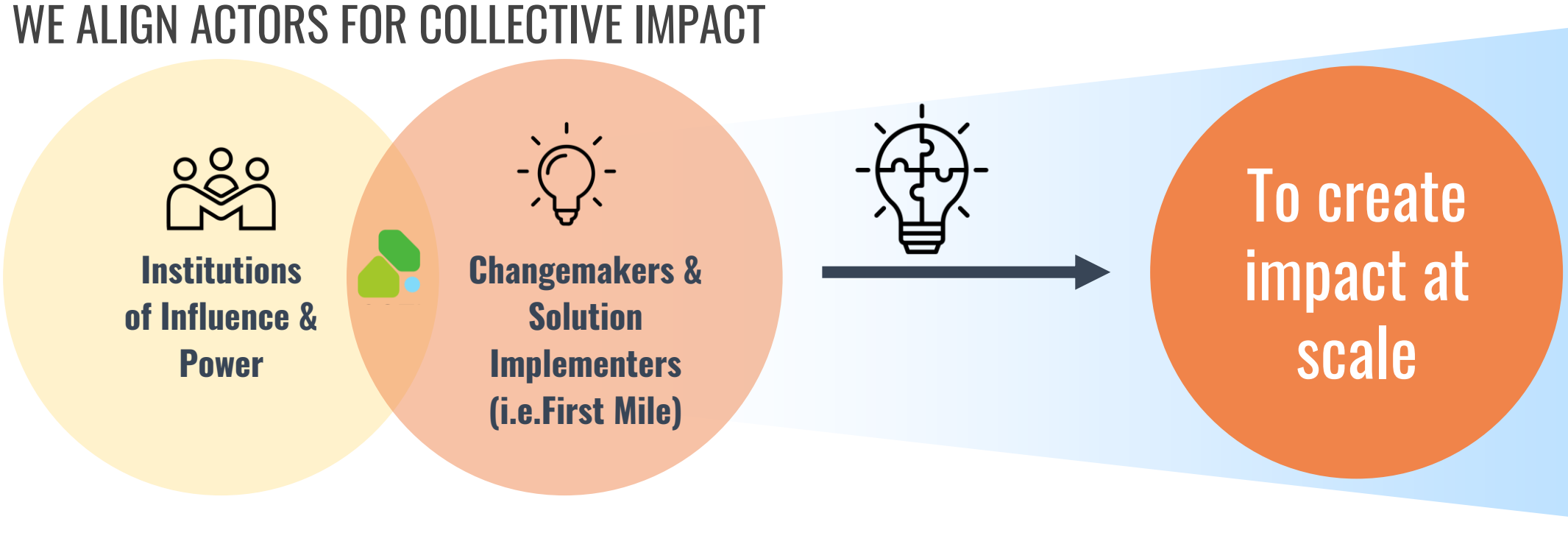
Innovations




**‘Pilots never fail, Pilots never scale’**

# As an Ecosystem builder, we can make this happen

## WE ALIGN ACTORS FOR COLLECTIVE IMPACT



# Why Green Infrastructure?

Should everyone harvest rainwater?

Should our focus be on green infrastructure in slums?

Is focusing on “green gated communities” elitist?

Is it appropriate to direct philanthropic funds towards GI instead of sanitation in slums?

What should be the end goal of Green Infrastructure projects?

# Green Infrastructure: The Normative Case

The gets the job done (efficient and cost-effective) and yields co-benefits in terms of carbon and biodiversity

GI is neither inherently pro or anti-poor.

- The case for preserving the commons – whether groundwater or air or the ocean -- is to sustain life in planet earth.
- This does not guarantee the commons are accessible to all. Equity needs to be designed for separately.

Normative principle – differential burdens: The wealthy pay for preserve the urban commons, while ensuring the commons are accessible to all.

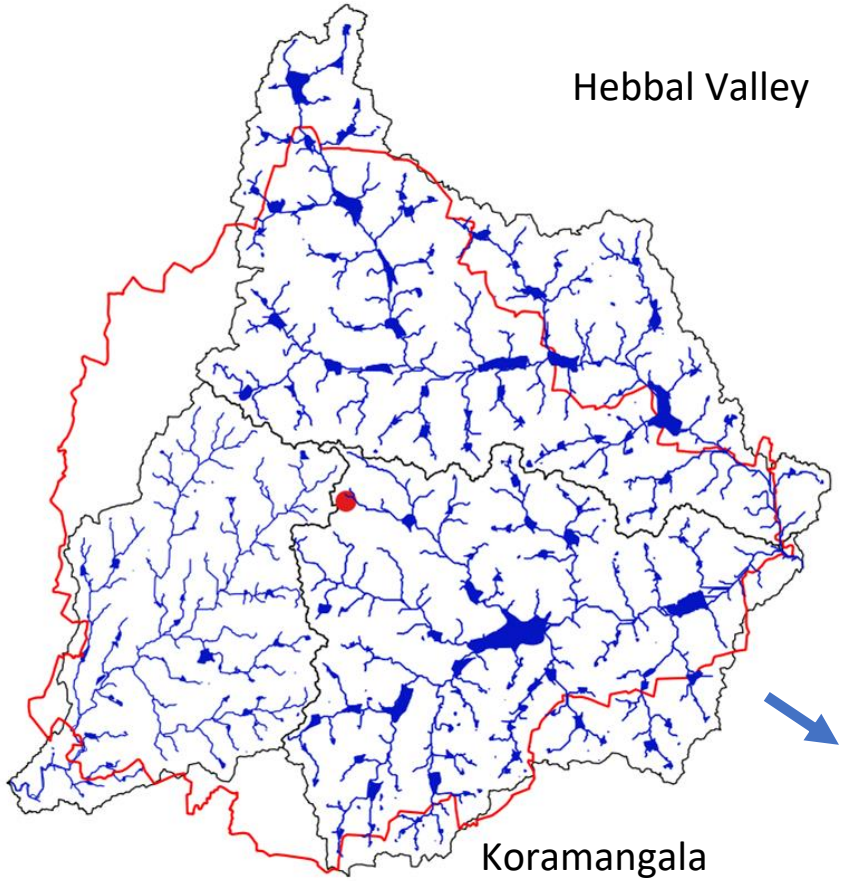
# India contextualization: What people want varies.

# Biogeographic context varies

Photo credit: Biome Environmental Solutions

# Bangalore context

# Bangalore’s Cascading Lake System



Hebbal Valley

Vrishabhavathy Valley

To Dakshin Pinakini

Koramangala Challagatta Valley

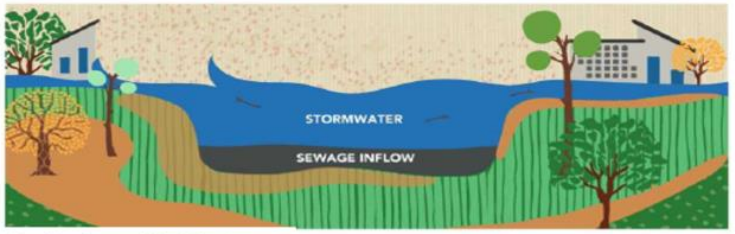
To Cauvery River

# Problems with lakes.

LAKES ARE POLLUTED

LAKES ARE DRYING UP

LAKES HAVE REDUCED ABILITY TO BUFFER FROM FLOODING




*Credits: Sarayu Neelakantan*

Pollution

Drying

Flooding

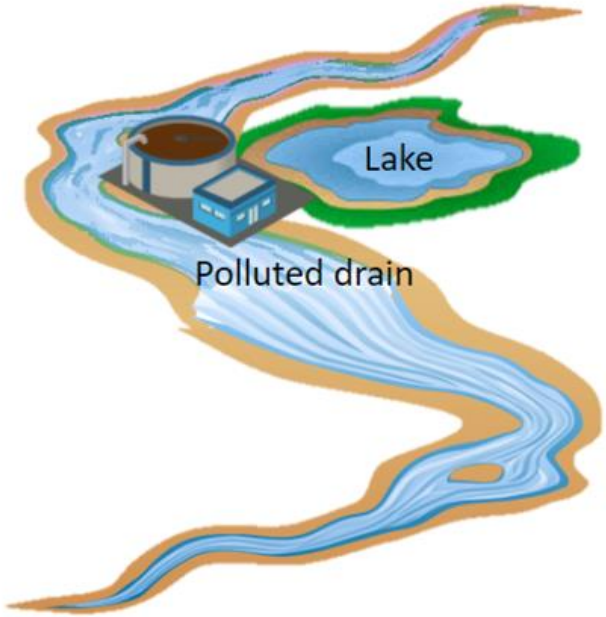
# Pollution


| | |
|---|---|
| Treated sewage | 35% |
| Untreated sewage | 64% |
| Reuse | <1% |

Data Source: Jamwal, 2017

# Pollution

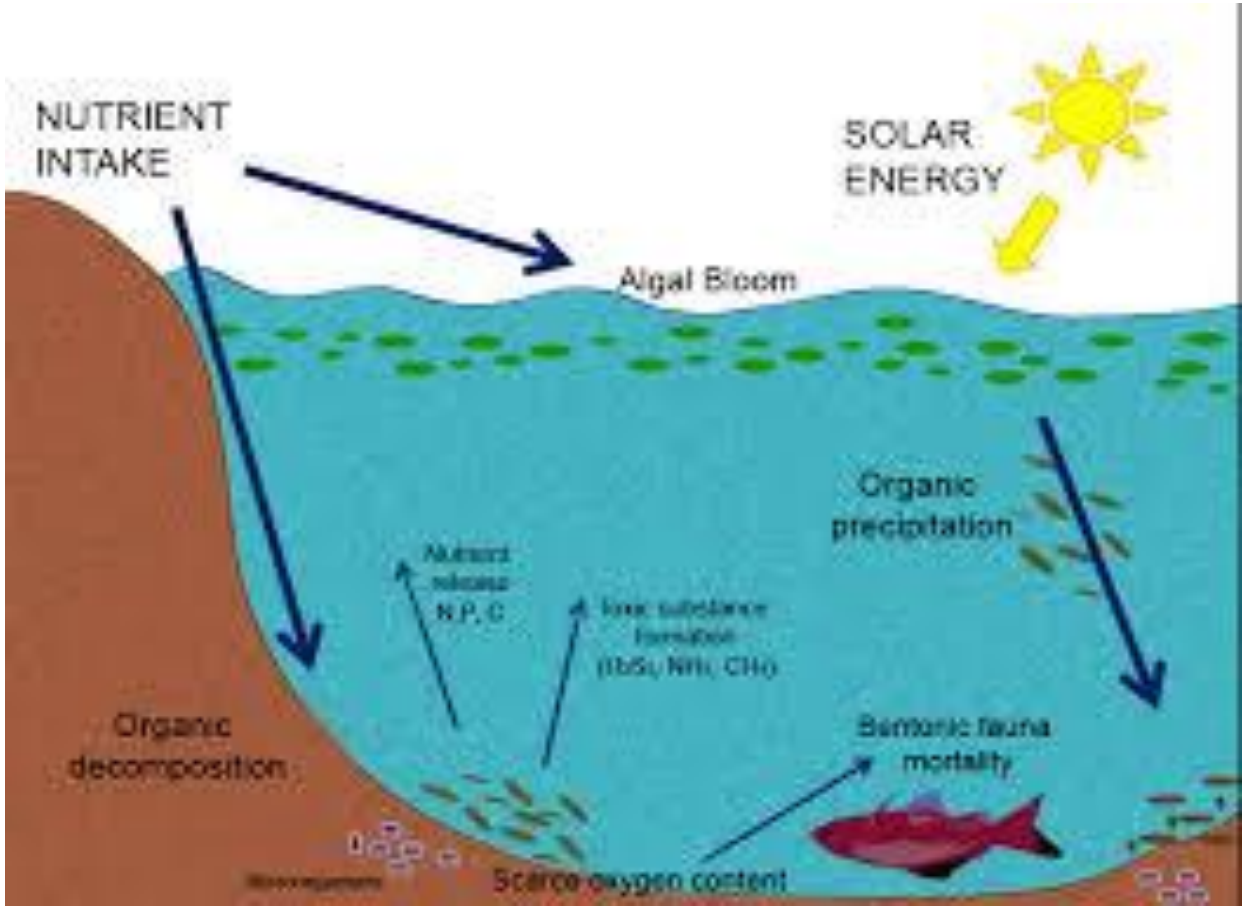
## Even with STPs lakes still have high nutrient content.


Many lakes develop severe algal blooms.

# Pollution


## Even with STPs lakes still have high nutrient content.



Drying


# Diverting drains causes lake drying.

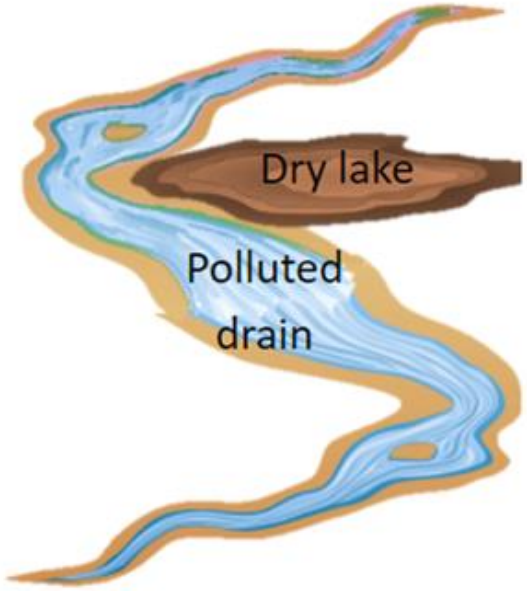
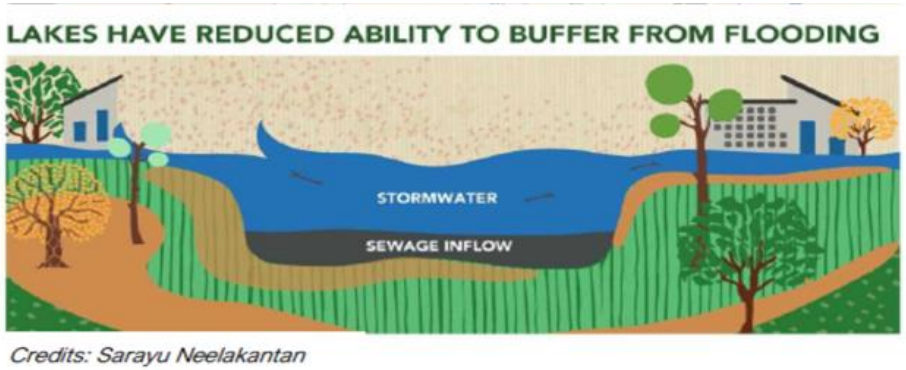



Photo: Daniel Phillip

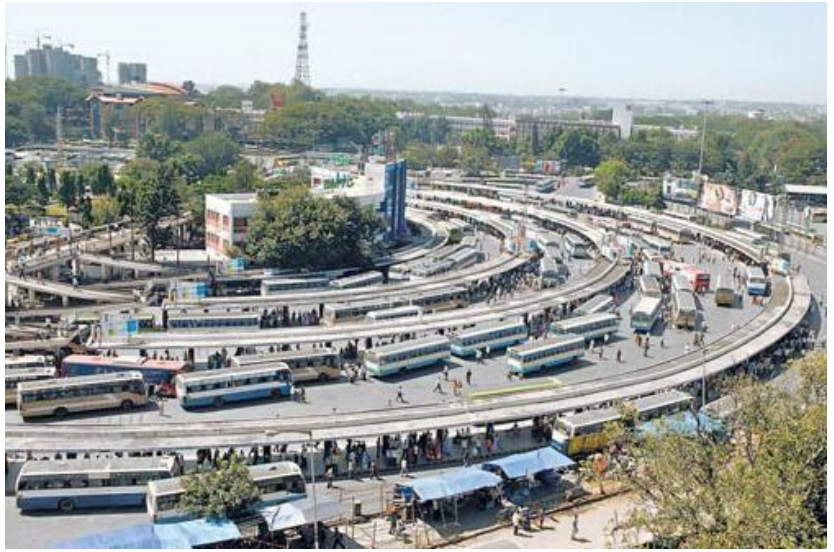
Throwing the (rainwater) out
with the bath (sewage) water.

# Flooding

## Encroachment and Sewage reduce space to capture stormwater.




*Credits: Sarayu Neelakantan*



Majestic Bus Terminus

# How do we solve the problem?

Lake Visioning

Intervention Design

Blue green infrastructure

Monitoring




Credits: Sarayu Neelakantan

# Lake Visioning

01

List of STAKEHOLDERS of the lake whom were included in coming up with this lake vision.

02

The imagined PHYSICAL vision of the lake in the form of a sketch that includes the PHYSICAL ELEMENTS deemed necessary and beneficial.

03

The FUNCTIONS that this lake will serve and to what extent. For example, idol immersion, wastewater treatment, livelihood, etc.

04

RULES that are expected to be applicable at the lake.

# Intervention Design


*Credits: Sarayu Neelakantan*

01

Sewage Treatment Plans

02

Constructed wetlands and Diversion Drains

03

Amenities

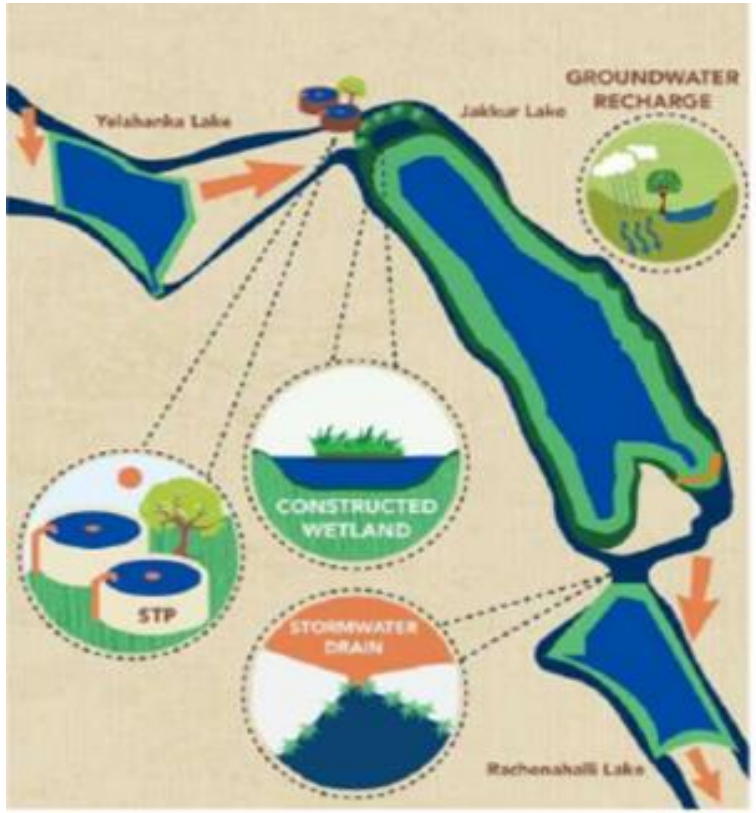
04

Vegetation and habitat

05

Lake Bathymetry

# Blue Green Grey Infrastructure Plan




01

Simulate scenarios of blue-green-grey infrastructure

02

Regulatory Structure

03

Operational Rules

04

Capacity building of agencies

05

Financing

# Lake Health Monitoring


01

Physical Assets

- Civil structures
- Civic amenities

02

Biological Assets

- Tree census
- Fish and Amphibian Census
- Waterbird census (e-bird)
- Microfauna - Bioindicators

03

Water Quality

- Phosphates
- Turbidity
- Chlorophyll A
- => Trophic Status


# Thank you!