



WRI INDIA
— ROSS CENTER

LOCALISED ACTIONS FOR URBAN RESILIENCE

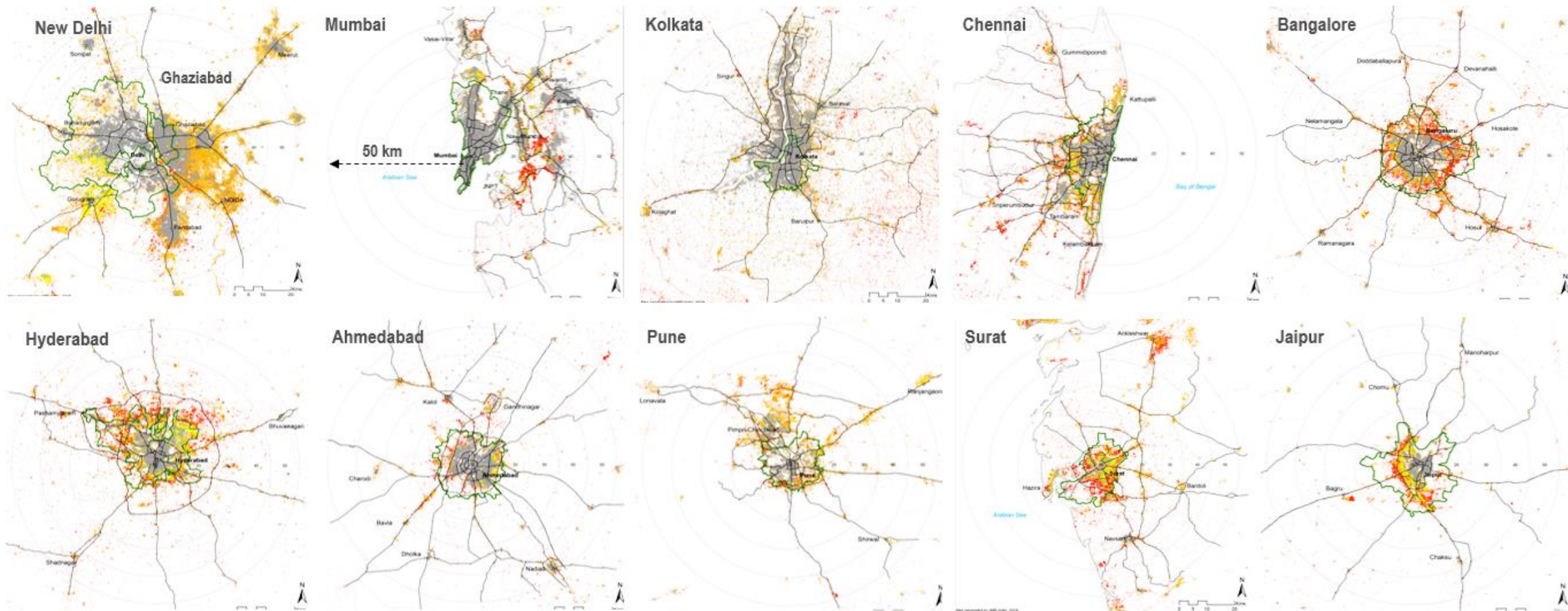
NATIONAL URBAN CONFERENCE ON THE COMMUNITIES OF PRACTICE – SUDSC II

16 NOV | 2023

JAYA DHINDAW, EXECUTIVE DIRECTOR- SUSTAINABLE CITIES, WRI INDIA

Photo credit: Stockpicturesforeveryone.com

URBANIZATION - MESSY AND HIDDEN



Source: Generated by WRI India, Data from European Commission JRC 2011, Landsat (USGS / NASA)



WHERE ARE WE BUILDING OUR CITIES?



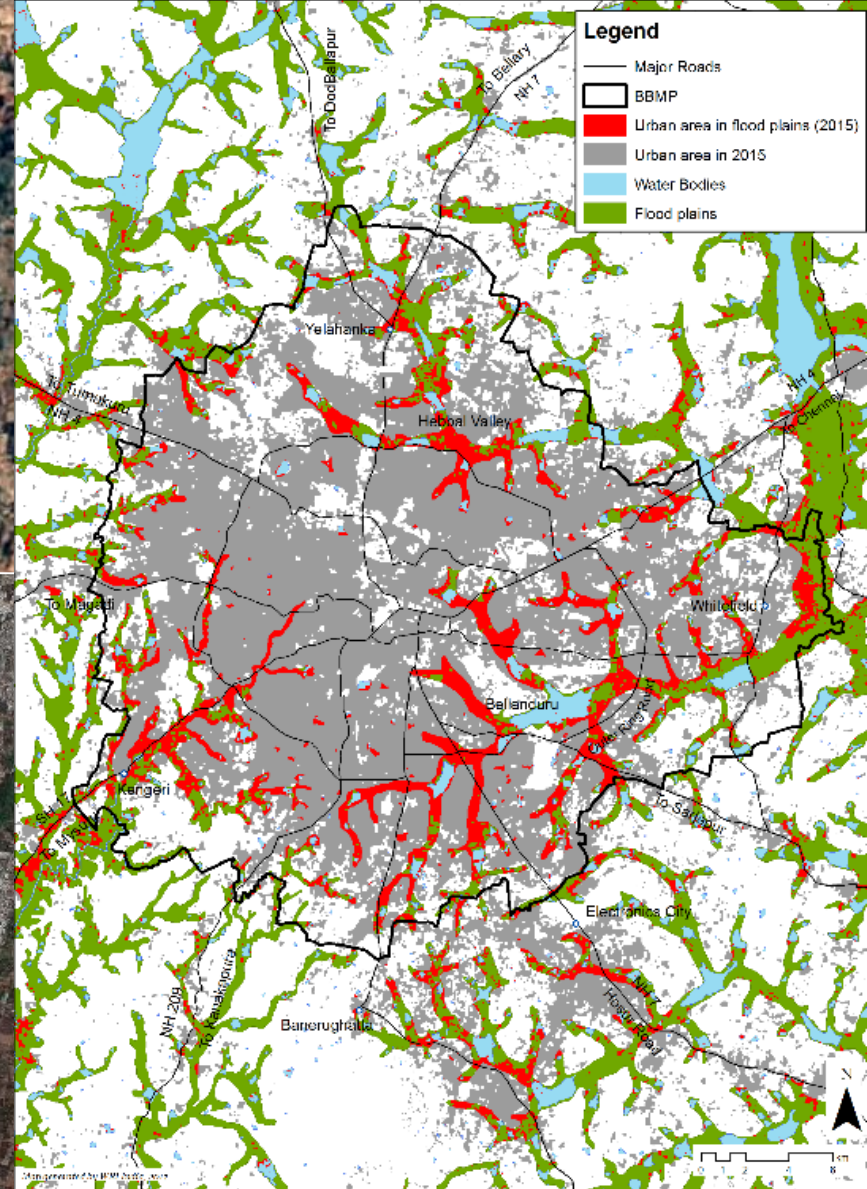
85% of floodplains in Bangalore are encroached upon/built-up



1984



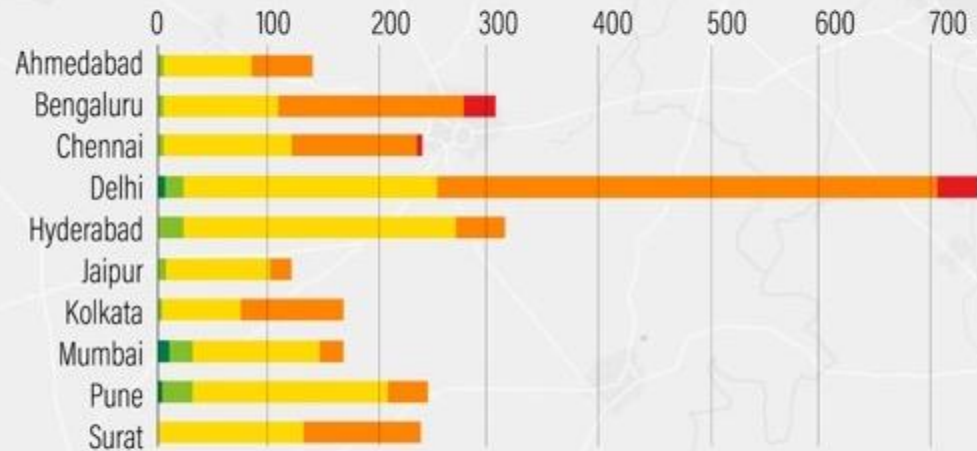
2016



- Legend**
- Major Roads
 - BBMP
 - Urban area in flood plains (2015)
 - Urban area in 2015
 - Water Bodies
 - Flood plains

URBANIZATION AND WATER STRESS

New Development (in km²) Over Various Recharge Potential Areas



Recharge Potential Area Overlapping Urban Extent (2000-2015):

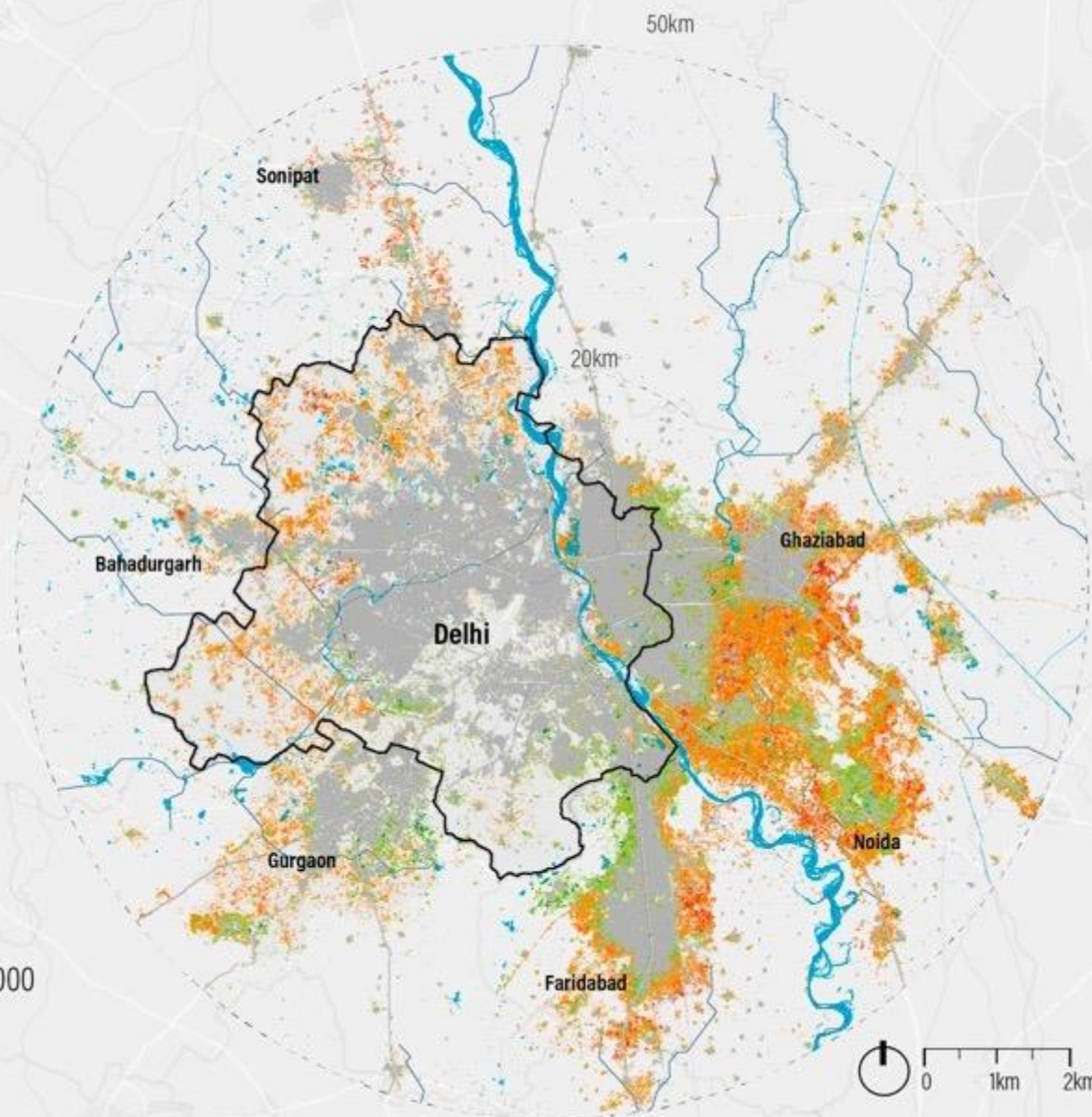
Very Low Low Medium High Very High

□ New Delhi Municipal Boundary

— River Network

■ Max. surface water observed between 1984- 2018

■ Urban Extent till year 2000



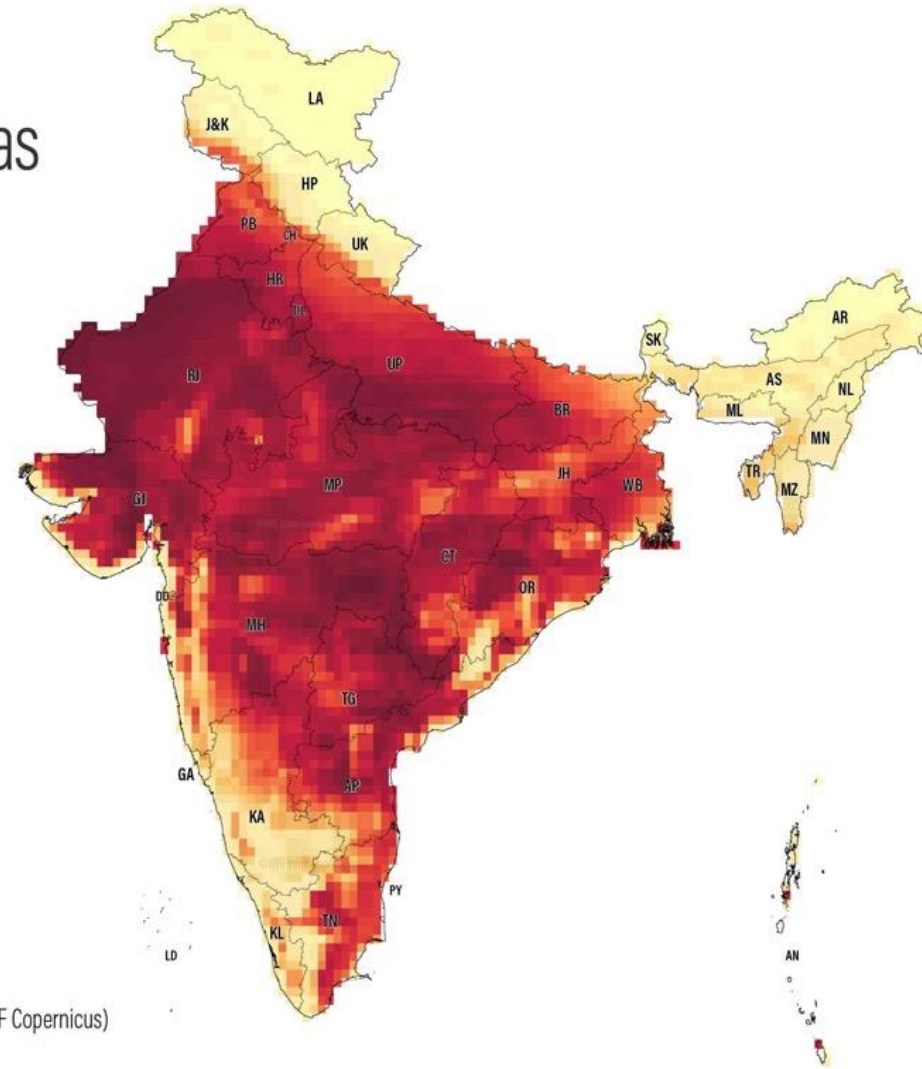
INDIA'S CLIMATE VULNERABILITY



HEAT RISK

Over **35 crore** people in urban areas were exposed to Very Strong Heat Stress over the last few months

Duration of Exposure to very Strong Heat Stress:



Source: WRI India, GeoAnalytics; ERA5-Heat [Thermal Comfort Indices from ERA5 ReAnalysis] (ECMWF Copernicus)

Source:

1. BBC News, Oct 2022 [India heatwave: High temperatures killing more Indians now, Lancet study finds - BBC News](#)
2. BBC News, Oct 2022 [India heatwave: High temperatures killing more Indians now, Lancet study finds - BBC News](#)
3. [Climate change: How can India's concretised, dangerously hot cities be cooled down sustainably? \(scroll.in\)](#)
4. Centre for Policy, March 2023 [Heat Report Revised 24March 23 03 \(cprindia.org\)](#)

DETERMINANTS OF RISK

Vulnerabilities are *differential* across social, political, economic, physical, environmental domains

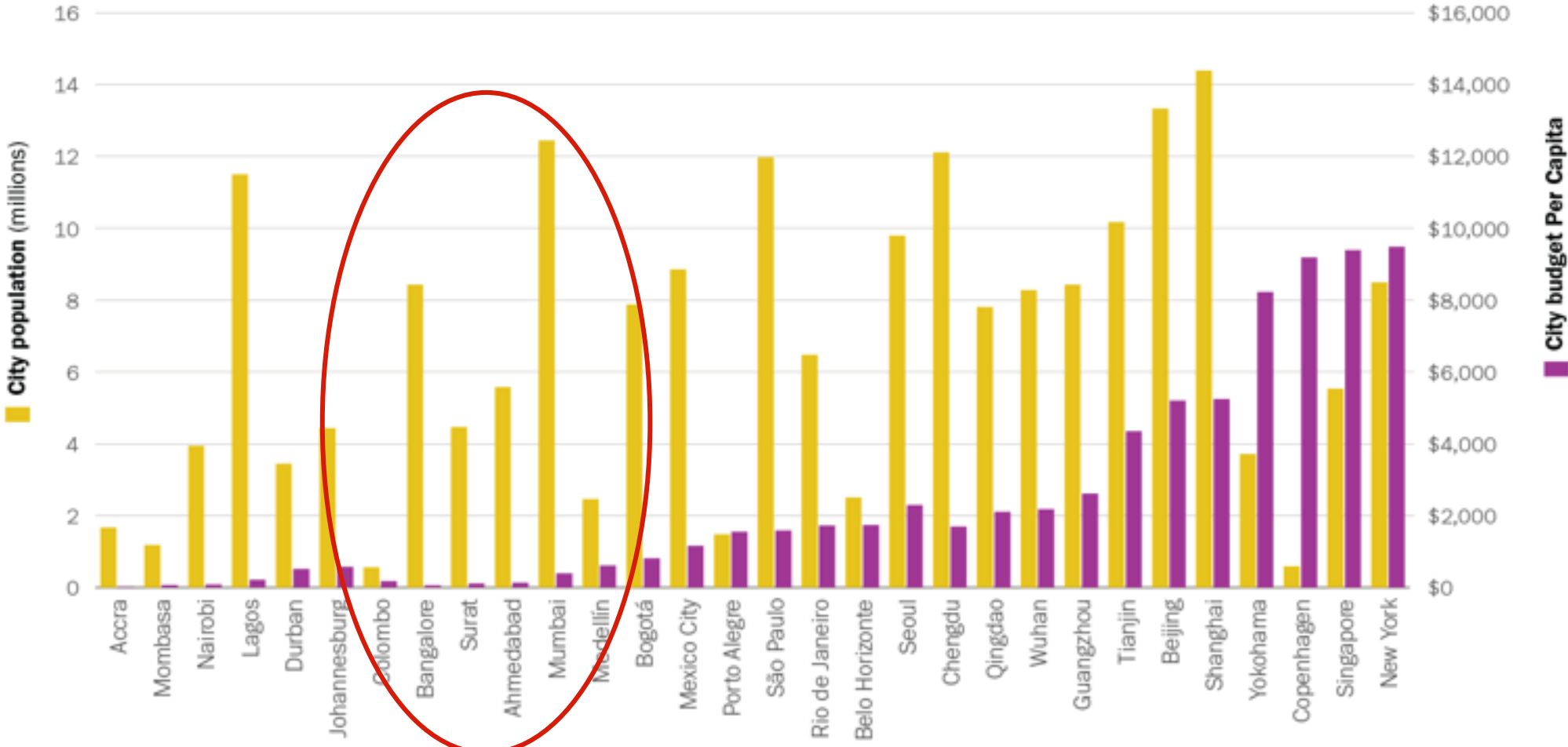
Understanding *differential needs* to define response mechanisms to cater to the most vulnerable communities/ groups/ people is critical to urban adaptation strategies

b) AR6 and future of the IPCC Risk Framework



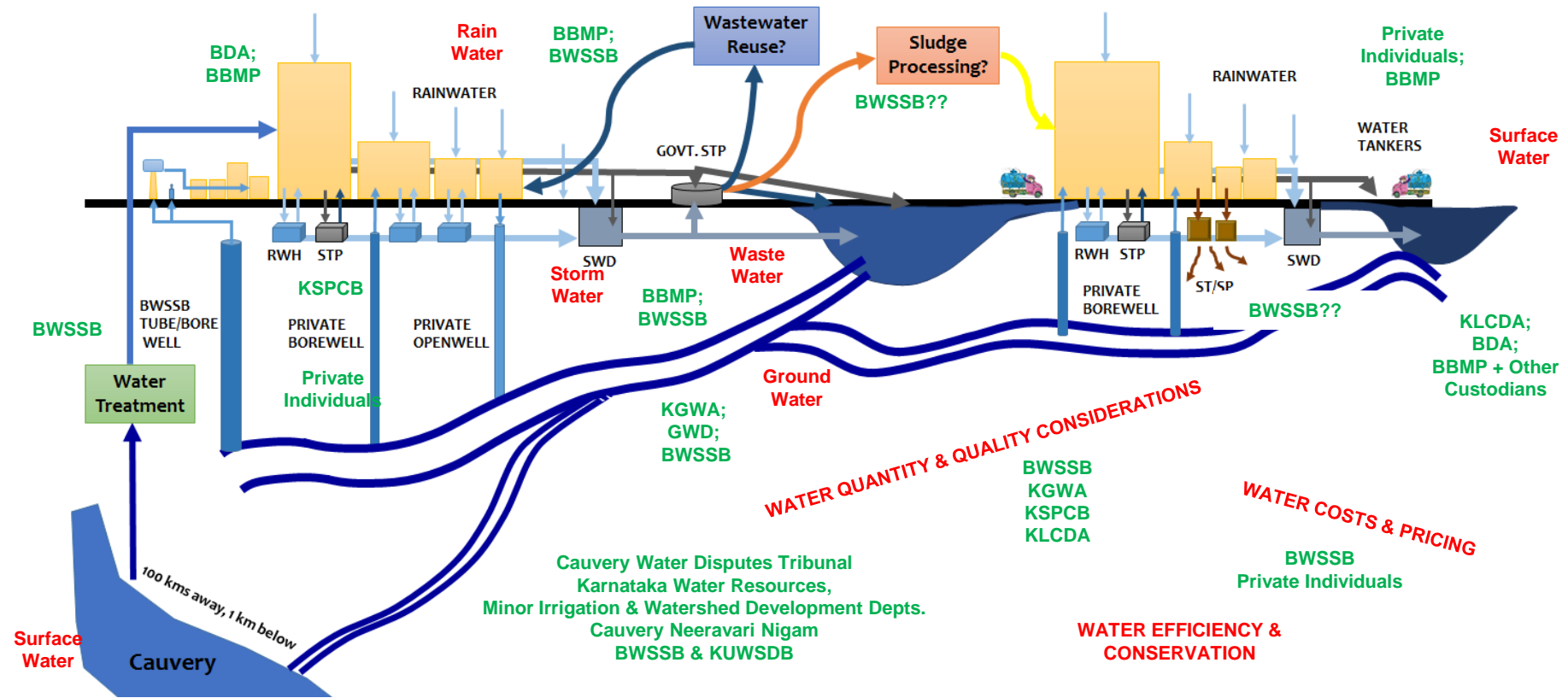
* Source: Simpson et.al, "White Paper II: Impacts, vulnerability, and understanding risks of climate change for culture and heritage (ICOMOS)"

FASTEST-GROWING CITIES - LEAST PUBLIC RESOURCES



Source: Authors' compilation from various sources. Note: Budget data represent years 2010 to 2016.

REGULATORY AND GOVERNANCE STRUCTURES



The urban hydrological cycle has various components and processes which are regulated by a host of different agencies with overlapping functions

THE OPPORTUNITY

The background of the slide is a photograph of a construction site at sunset. Two large cranes are visible, their silhouettes against the bright orange and yellow sky. In the distance, a city skyline is visible, with the sun setting behind one of the buildings. The overall mood is one of industrial activity and potential.

75% of India's
2050 infrastructure
has yet to be built

NATURE BASED SOLUTIONS

Ecosystem Benefits and Ecological Integrity

Community Resilience and Social Benefits

Livelihoods and Economic Benefits

Solutions that offer benefits to the urban ecosystem and maintain or restore key ecological processes that are characteristic to or reflect the natural condition expected in a region

Solutions that mitigate climate risks and enhance human well-being by promoting social, cultural, recreational, and health co-benefits

Solutions that help transition towards a nature-positive economy while maintaining resource efficiency and promoting circularity.



KEY CHALLENGES WITH URBAN NBS IN INDIA

Limited no. of **solution providers** exist in this space, as urban NbS is still at a nascent stage in India

Unavailability of adequate **land** parcel for implementation

Lack of **ownership** and maintenance models

Limited **awareness** and **capacity** to implement and maintain urban NbS

Involvement of multiple agencies requiring larger **coordination** efforts

Lack of standard **specifications** and impact measurement frameworks for NbS

High **gestation** period for return on investments

Investment remains scarce as immediate results draw more interest

TRANSITIONING TO RESILIENT CITY-REGIONS

PLANS AND PROTOTYPES

- Mainstream evidence-based plans and pilots for climate resilient urban development



PRIORITISING VULNERABLE COMMUNITIES

- Protect vulnerable communities and promote equitable access to services and amenities



GOVERNANCE, FINANCE AND INSTITUTIONAL INNOVATION

- Strengthen institutions and build partnerships and pipeline of investments for operationalising NBS



ANALYTIC TOOLS

- Use analytic tools to develop insights and aid better decision-making and investments for climate action



1. BUILDING A RESILIENT KOCHI

Cities4Forests

Movement to catalyzes political, social, and economic support for city governments

*Globally 80 + cities
Kochi (founding member)
Hyderabad; Mumbai*



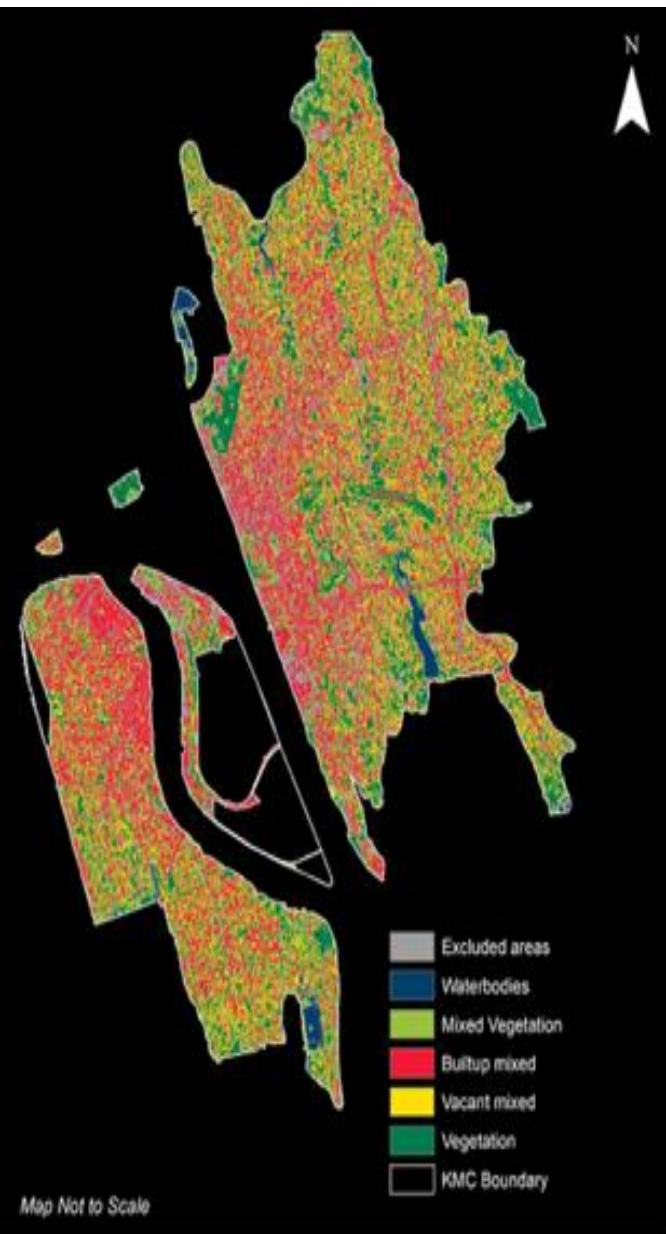
Call to Action: Mitigation strategy | Resilience planning | Capacity building | Nature-based Solutions

KOCHI: MAPATHON



NICFI
Norway's
International Climate
and Forest Initiative

Department
for Environment
Food & Rural Affairs



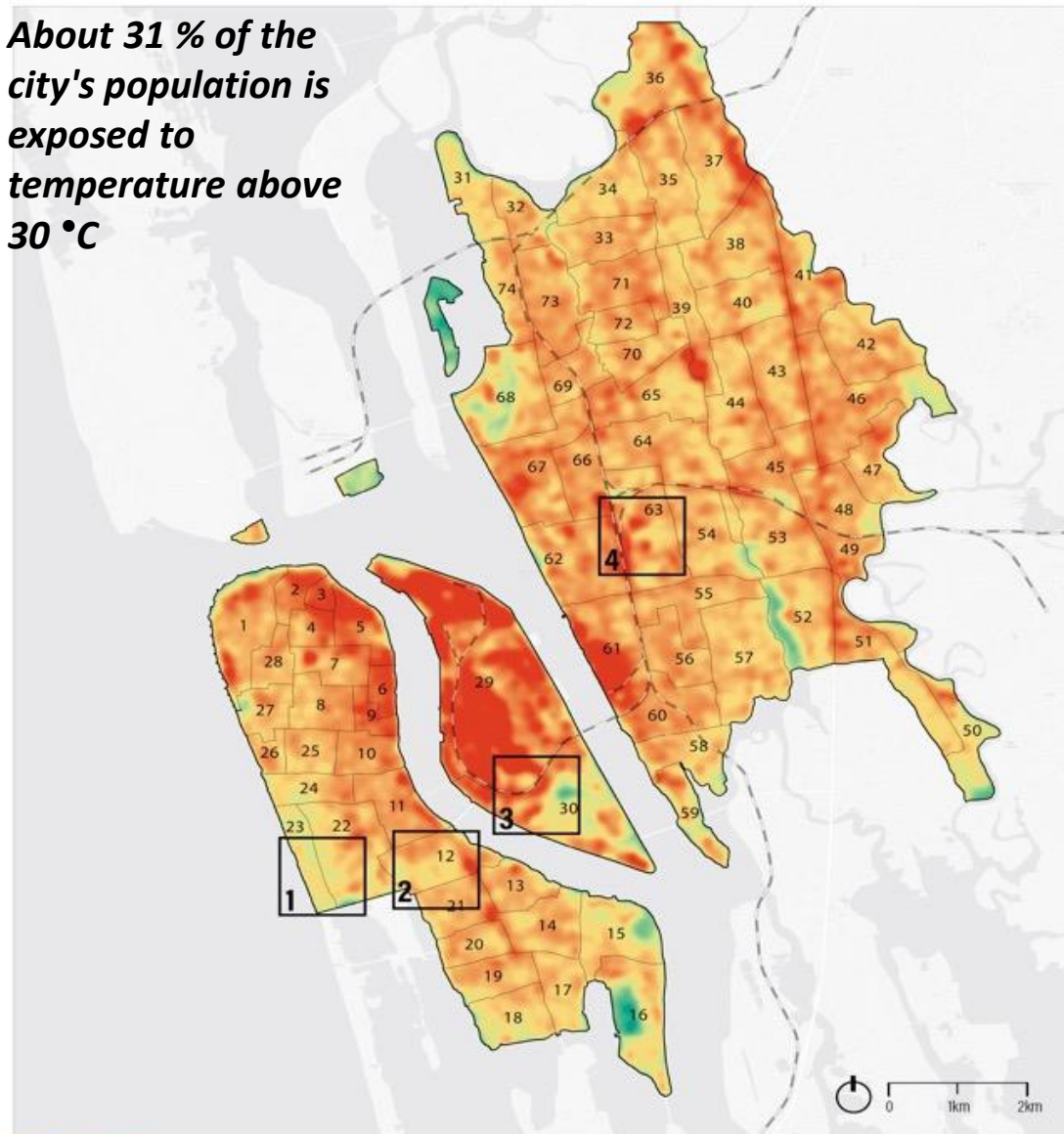
Capacitating KMC and city stakeholders to collaboratively develop and update tree baselines and identify potential restoration areas in a scientific manner and plan planting activities accordingly
80 city stakeholders capacitated



HEAT RISK IN KOCHI

Mean Land Surface Temperature observed for 2017 - 2020

About 31 % of the city's population is exposed to temperature above 30 °C



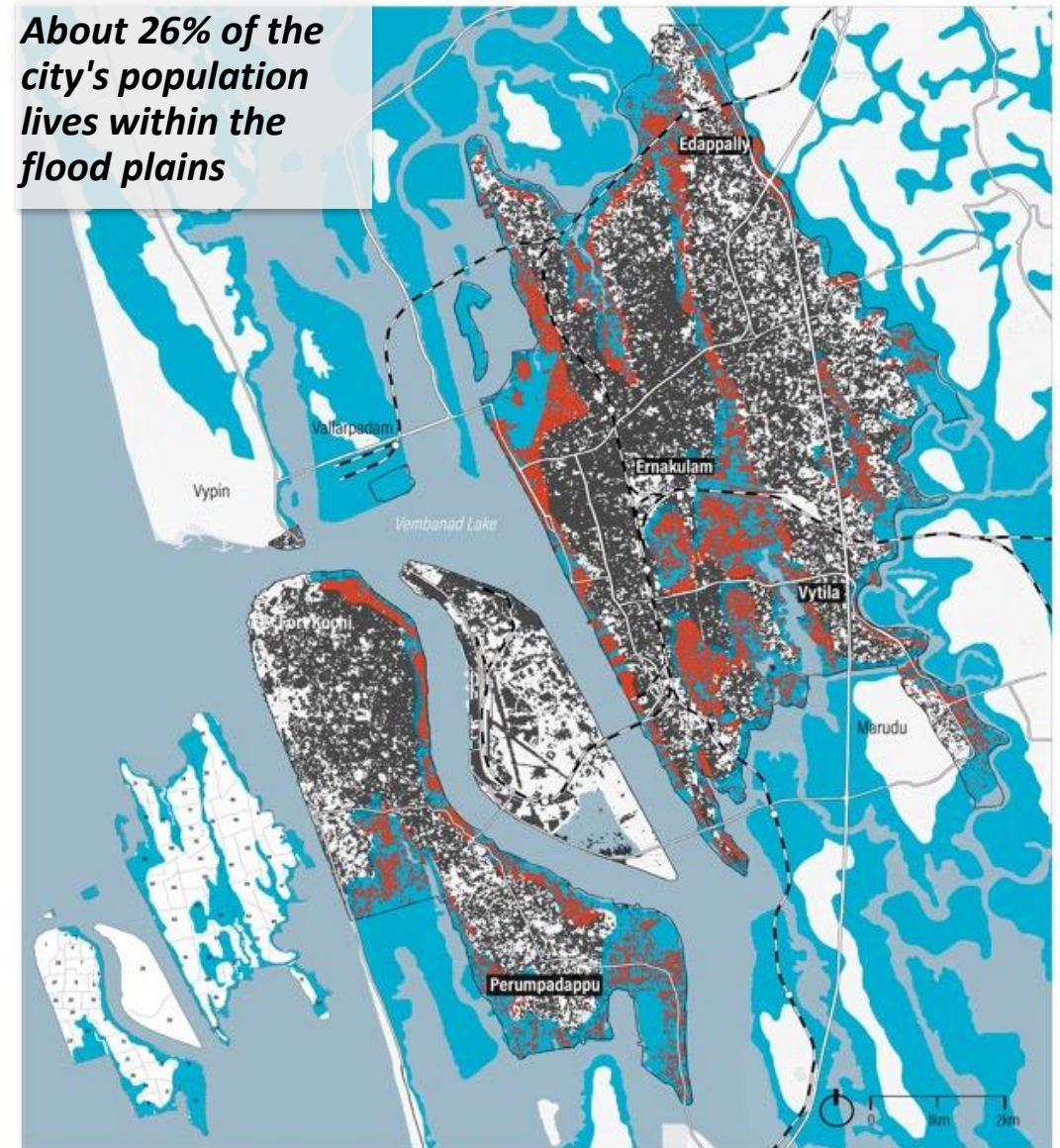
25°C 27.5°C 32°C

Source: WRI India 2021; Landsat USGS/NASA, ESRI gray base map.
Note: Each pixel in the map represents the overall average LST computed using Landsat 8 imagery for the following dates: Feb 3, 2017; Feb, 6 2018; Feb 8, 2019; Feb 12, 2020.

FLOOD RISK IN KOCHI

Potential Flooding Risk Areas in Kochi Municipal Corporation

About 26% of the city's population lives within the flood plains



Flood Susceptibility Zones ■ Flood Plains ■ Settlements ■ Settlements in Flood Risk Areas

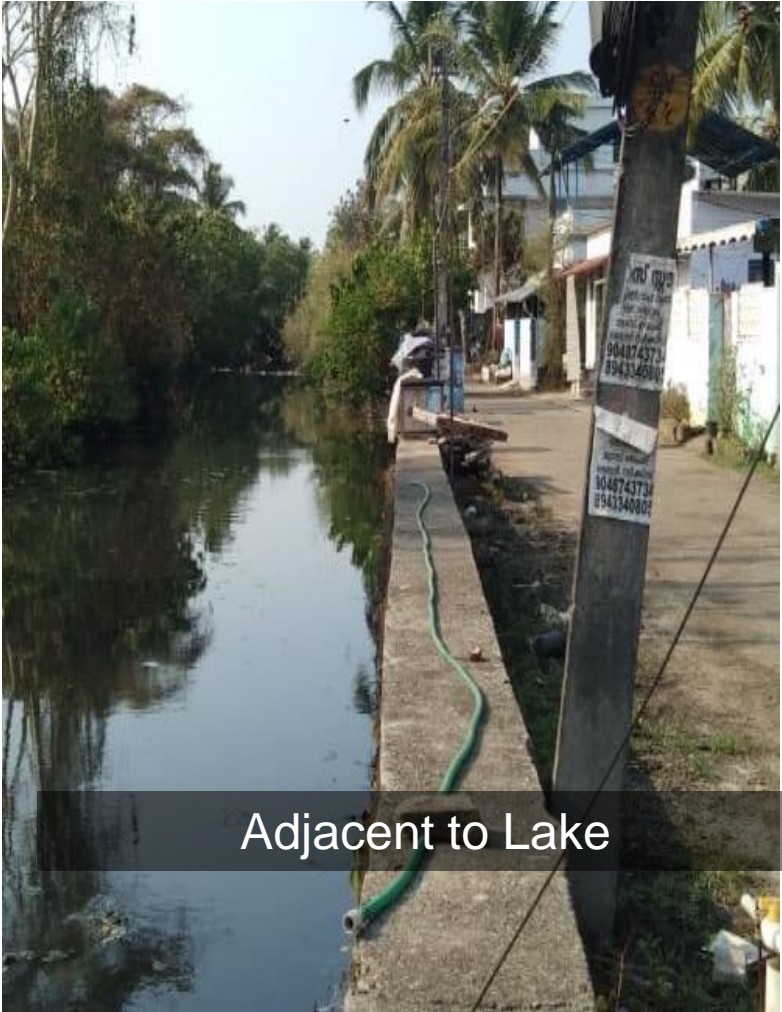
Source: WRI India 2021; NCESS 2010; Sentinel ESA.

KOCHI: URBAN COMMUNITY RESILIENCE ASSESSMENT

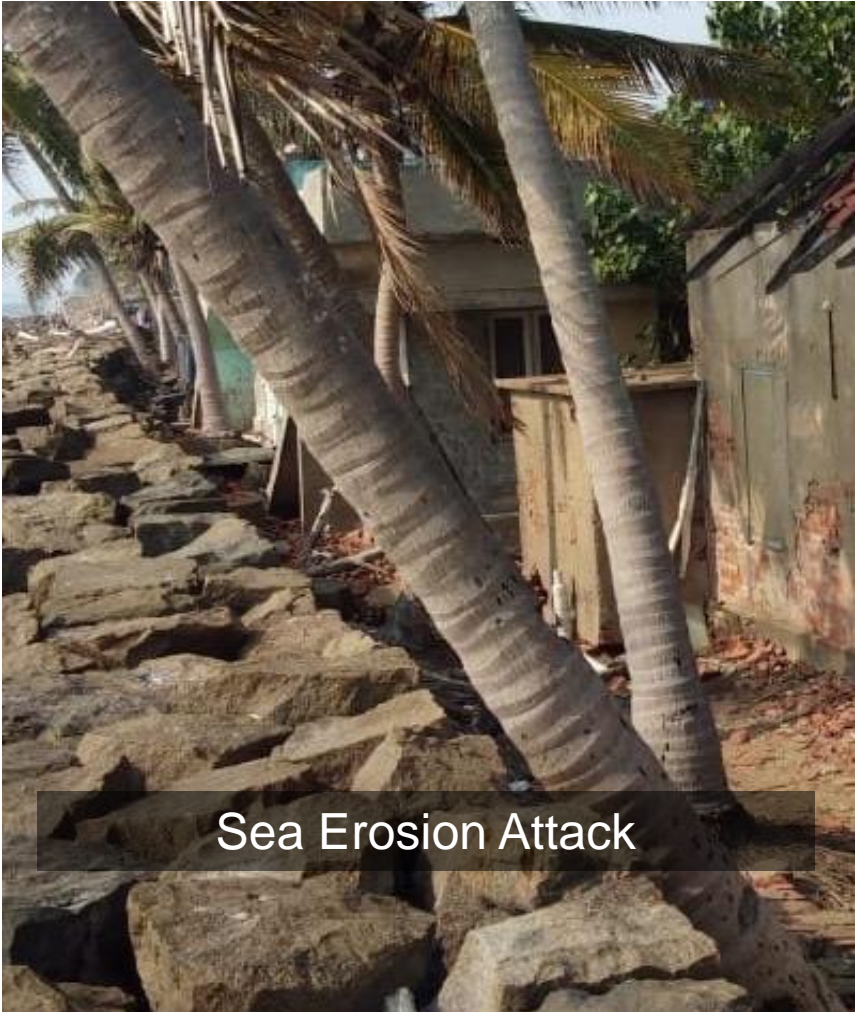


Participatory approach is adopted for identifying differential community needs and integrated into the CDMP; vulnerable communities are empowered to implement NBS to address climate risks and bolster adaptive capacities
600 households (surveyed); impacts 26,000 citizens

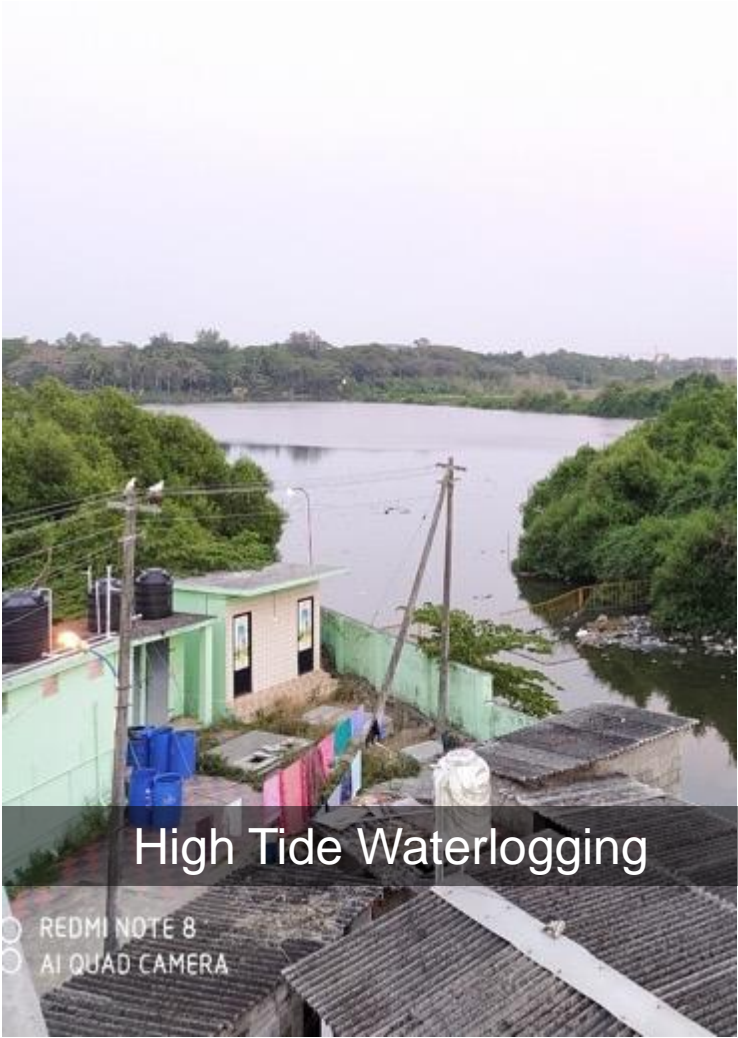
IDENTIFYING COMMUNITIES AT RISK



Adjacent to Lake



Sea Erosion Attack



High Tide Waterlogging

PILOT INTERVENTIONS



GUIDANCE DOCUMENT FOR RESILIENCE PLANNING IN CITIES

***This document will support the preparation of a comprehensive city disaster management plan for Kochi**

(Coverpage)



Credits: Indian Express

**INSTITUTIONALIZING APPROACH THROUGH
THE CITY DISASTER MANAGEMENT PLAN**

Date:
21.01.2023

TO WHOMSOEVER IT MAY CONCERN

Subject: Regarding nurturing of Kawaki sites

Under the Cities4Forests initiative (KMC File No: ISO/MOE8/508/21), Kochi Municipal Corporation has developed urban groves named as Kawaki at multiple locations in Kochi city. The tree saplings planted in public places under the initiative will be nurtured by Kochi Municipal Corporation under the Ayyankali mission for the next three years by watering them, removing weeds around the saplings and protecting the site from debris or waste dumping.

The Kawaki sites taken up for nurturing are listed below:

- SRV Government School, Ernakulam South (100 trees)
- Palluruthy Public crematorium (130 trees)
- Chirakkal road, Palluruthy (100 trees)
- Edward Memorial Government School, Fort Kochi (100 trees)



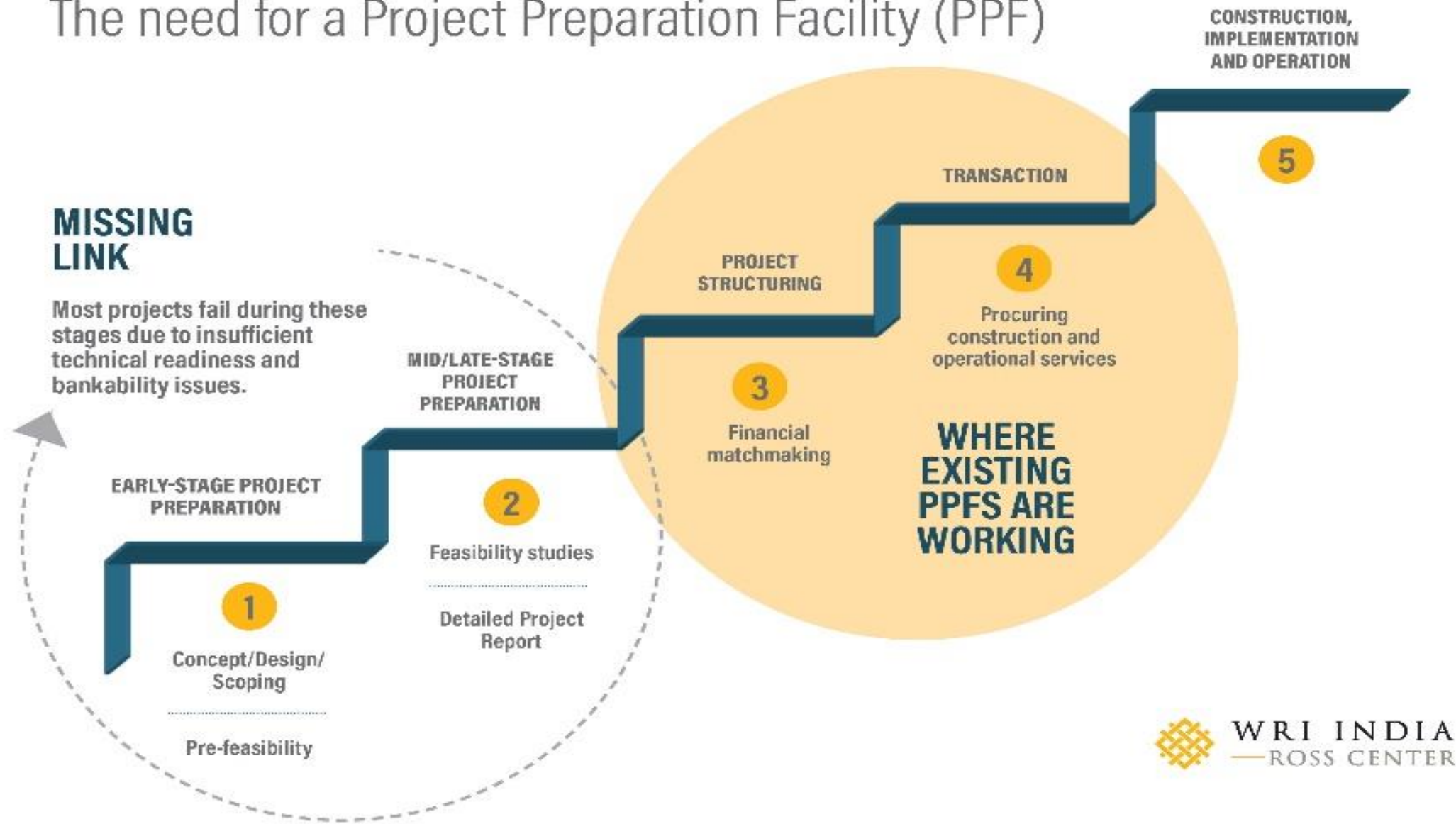
M. BABU ABDUL KHADEER IRPS
SECRETARY
KOCHI MUNICIPAL CORPORATION

INCENTIVISE NBS

- Kochi city has effectively strategized partnership with the Local Self Government Department (LSGD) of Kerala State - Ayyankali Mission – employing non-skilled women laborers
- Mainstreaming greening as a viable and productive livelihood option, empowering community resources and ensuring that skill building provides a way to other sustainability and climate adaptation projects
- Potential to exploring other viable missions and policies for convergence and institutionalizing climate action.

PROJECT CYCLE

The need for a Project Preparation Facility (PPF)



WRI INDIA
— ROSS CENTER

2. MUMBAI CLIMATE ACTION PLAN

MUMBAI CLIMATE ACTION PLAN (MCAP)

ACTION AREAS

URBAN PLANNING, GREEN COVER & BIO-DIVERSITY:

1. INCREASE GREEN COVER & PERMEABLE SURFACES TO 30-40% OF CITY SURFACE AREA BY 2030

Tackle heat and flood risk
Reduce heating effect and increase permeable surface to 100% by 2050, along city streetscape

2. ENSURE EQUITABLE ACCESS TO GREEN OPEN SPACES

Equitable distribution of open spaces
Increase per capita open space to 6 sq.m by 2040
Identify & provide new open spaces in priority areas

3. RESTORE & ENHANCE BIODIVERSITY

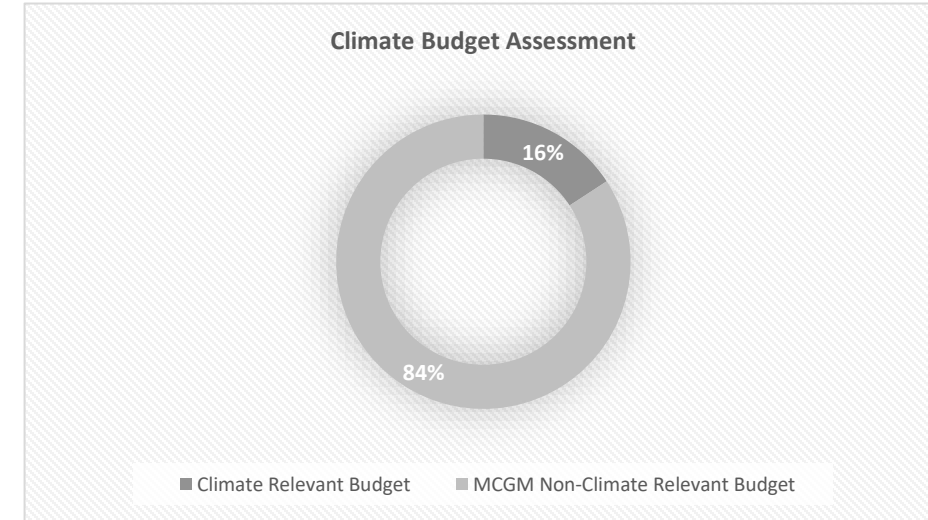
Develop landscape framework to identify habitat degradation & biodiversity hotspots
Local biodiversity strategy & action plan



The Mumbai Climate Action Plan aims to identify vulnerable communities, to increase resilience by introducing sector-specific strategies for mitigation & adaptation.



STRATEGIC IMPLEMENTATION OF THE MCAP



Urban Greening

- NbS Accelerator
- Green Yodha Campaign
- Greening in vulnerable neighborhoods to improve heat resilience

Urban Flooding

- Catchment-wide planning and flood risk management through
- Geospatial data
- Framework for analysis
- Pilot projects

Institutions & Budget

- Working towards developing a climate budget for Mumbai's upcoming budget cycle FY2023-24
- Institutionalizing the Climate Action Cell

COMMUNITY MOBILISATION (TISS, YUVA, SCHOOLS, INSTITUTIONS)



THE CITYFIX LABS: ACCELERATING NATURE-BASED SOLUTIONS

TheCityFix[™]
Labs

ACCELERATING
Nature BASED
SOLUTIONS

Steering India towards
a resilient future

AIR



WATER



GREEN
SPACES



Surfacing and supporting urban NBS solutions and developing pilots, in partnership with educational institutions.

Establishing a national level multi-stakeholder forum on NBS to enable investments and scaling of NBS solutions in cities

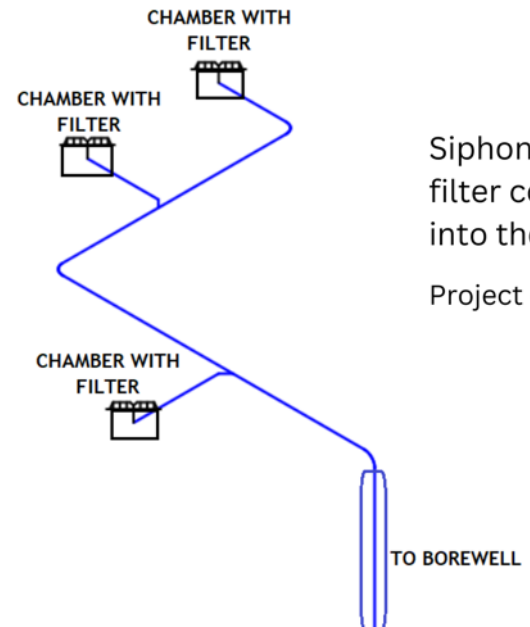
5 institutions/ 5 solution providers/ 250,000 people impacted



URBAN VEGETATION FARMING AND GROUND WATER RECHARGE PROJECTS



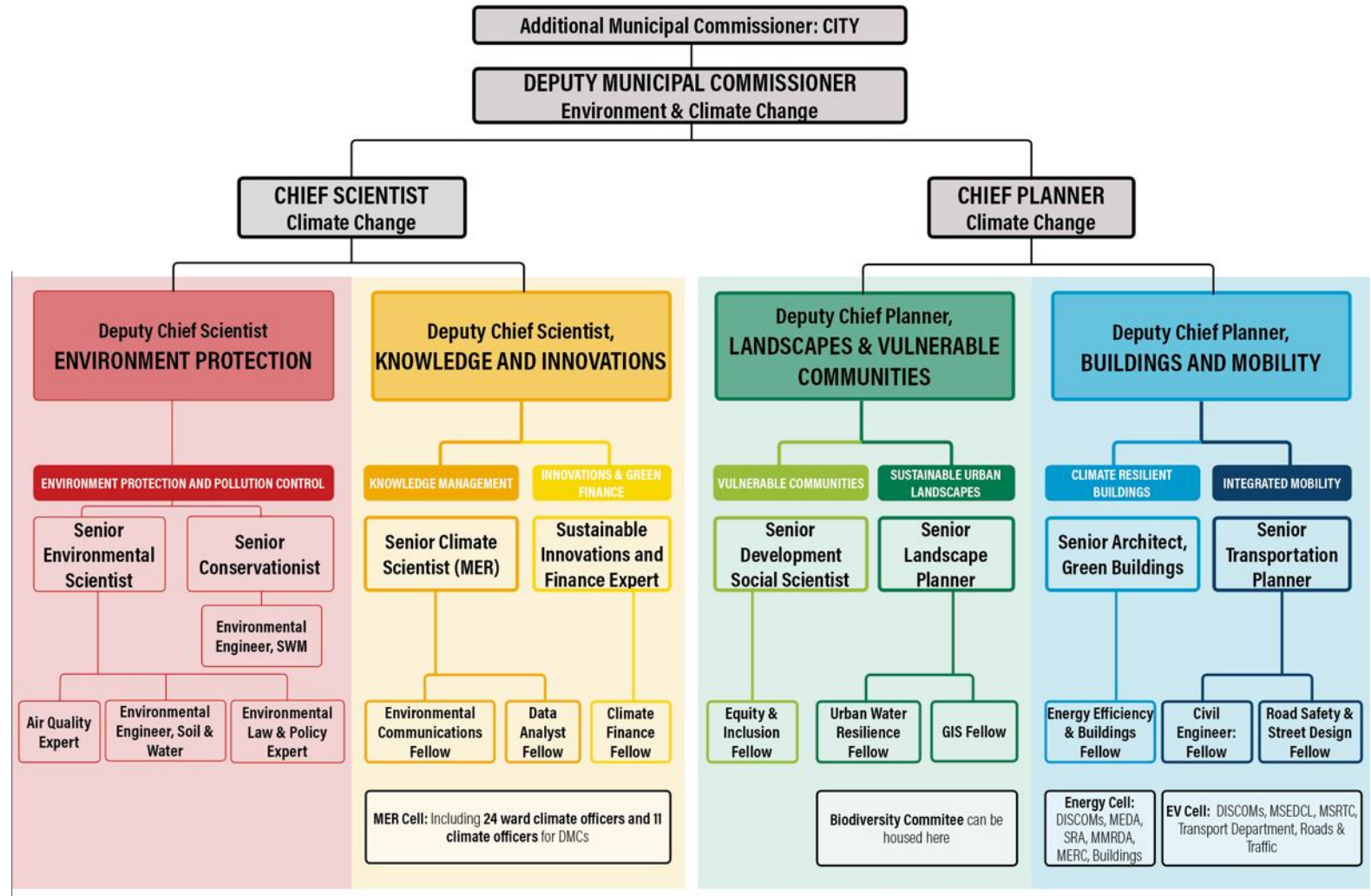
Enhancing greenery in the school campus to engage and build awareness of young students on the 'what', 'why' and 'how' of urban farming and resilience.



Siphon
filter co
into the
Project c

Reducing waterlogging and recharging ground water through siphonic action. Chambers on the ground collect and filter rainwater which is then used to recharge the aquifer through a borewell.

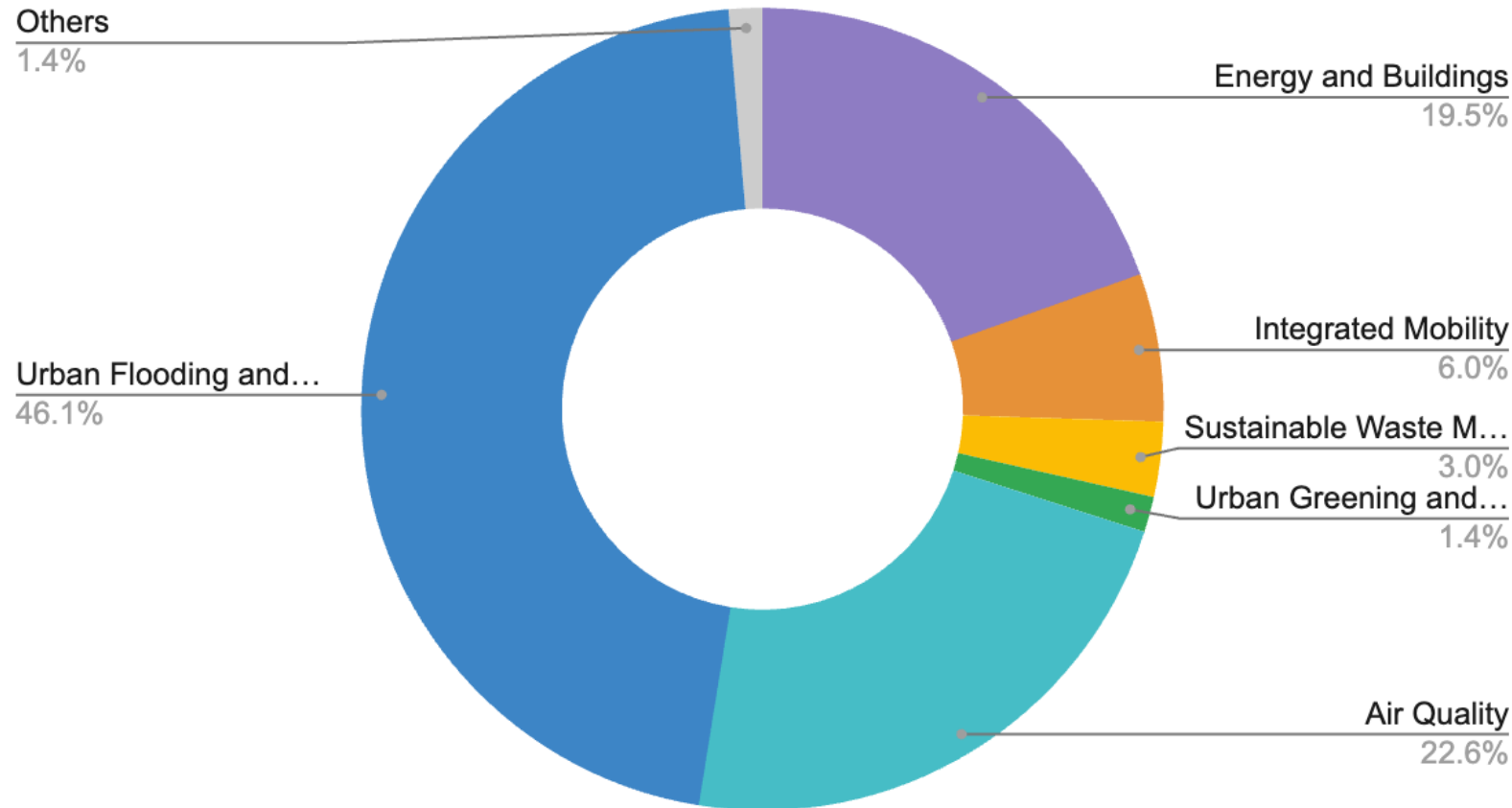
CITY-LEVEL CLIMATE ACTION CELL



CLIMATE BUDGET ASSESSMENT

- Highest % budgetary allocation for **high relevance + high negative sensitivity** –Urban Flooding and Water Resource Management (46%)
- Highest % budgetary allocation for **high relevance + high positive sensitivity** –Sustainable Waste Management (3%), Urban Greening and Biodiversity (1.4%)

Budget Estimates - Sectoral Split



3. FINANCING BLUE-GREEN INFRASTRUCTURE



PHOTO: SOCIAL INCOME

ACWA
FUND

The African Cities Water Adaptation Fund
Supporting innovation at scale across
the full lifecycle of urban water resilience projects in Africa

JOINT BENEFITS AUTHORITY (JBA) IN SAN FRANCISCO

- Integrated and equitable resilient public infrastructure with multiple community benefits
- Creative mechanism to allow joint funding and attract/leverage new investors
- Department collaboration: good governance & accountability



Joint planning | Funding | Project delivery | Long-term stewardship

INDIA FORUM FOR NATURE-BASED SOLUTIONS

Scale through
Partnerships &
Coalitions

Scale through
Agenda Setting



INDIA FORUM FOR NATURE-BASED SOLUTION



Climate Proofing 100 million residents and infrastructure worth \$100 billion in Indian cities by 2030

Mission: to harness the power of the collective to mainstream ecosystem services and nature-based solutions for climate resilience in Indian cities

Objectives:

Defining a shared language and communicating benefits to inform actions at the local level including scaling up existing interventions for urban nature-based solutions.

Driving investment and strengthening delivery mechanisms through multi-stakeholder coordination.

Mainstreaming urban ecosystem-based services and nature-based solutions in India through policy, plans and project interventions

- Building increased awareness, capacities and coordination amongst stakeholders including policymakers, government agencies, investors, solution providers and academia by creating a community of practice
- Facilitate informed decision making through promotion of appropriate tools and technology
- Creating pilot opportunities to innovate and identify scalable solutions for implementation
- Creating a platform for collective knowledge sharing to showcase the benefits and avoid maladaptation

LEARNINGS

NATURE BASED SOLUTIONS AT SCALE

Permeable pavers



Home gardens



Street trees



Constructed wetlands



Rainwater harvesting



Rooftop gardens



Community gardens



Urban forests



Plot level

Neighbourhood level

City scale

REFLECTIONS

- NBS : evaluate risks and rewards
- Mobilizing catalytic funds for first practice
- De-risking solutions for uptake by government
- Up-stream project preparation for bankability
- Solving for governance
- Aggregation for scale and pipeline
- Building partnerships
- Redefining KPIs – building evidence

THANK YOU

