

Uttar Pradesh HLC Urban Conclave

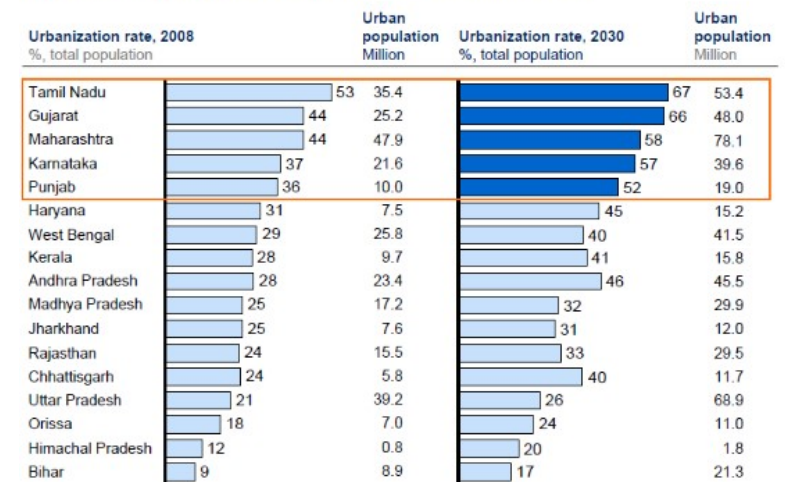
Localising Nature Based Solutions in Indian Cities

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CEPT University, Ahmedabad, India

INDIA'S URBANISATION TRAJECTORY

- India is on the forefront of urbanization. By 2050, India's Urban Population is expected to grow around 880 million
- Share of Urban GDP is expected to be around 80%
- More and more people are living in towns, cities and hinterland villages with closer proximities
- On an average, large Indian cities are physically expanding by 20-25 sq.km/Year

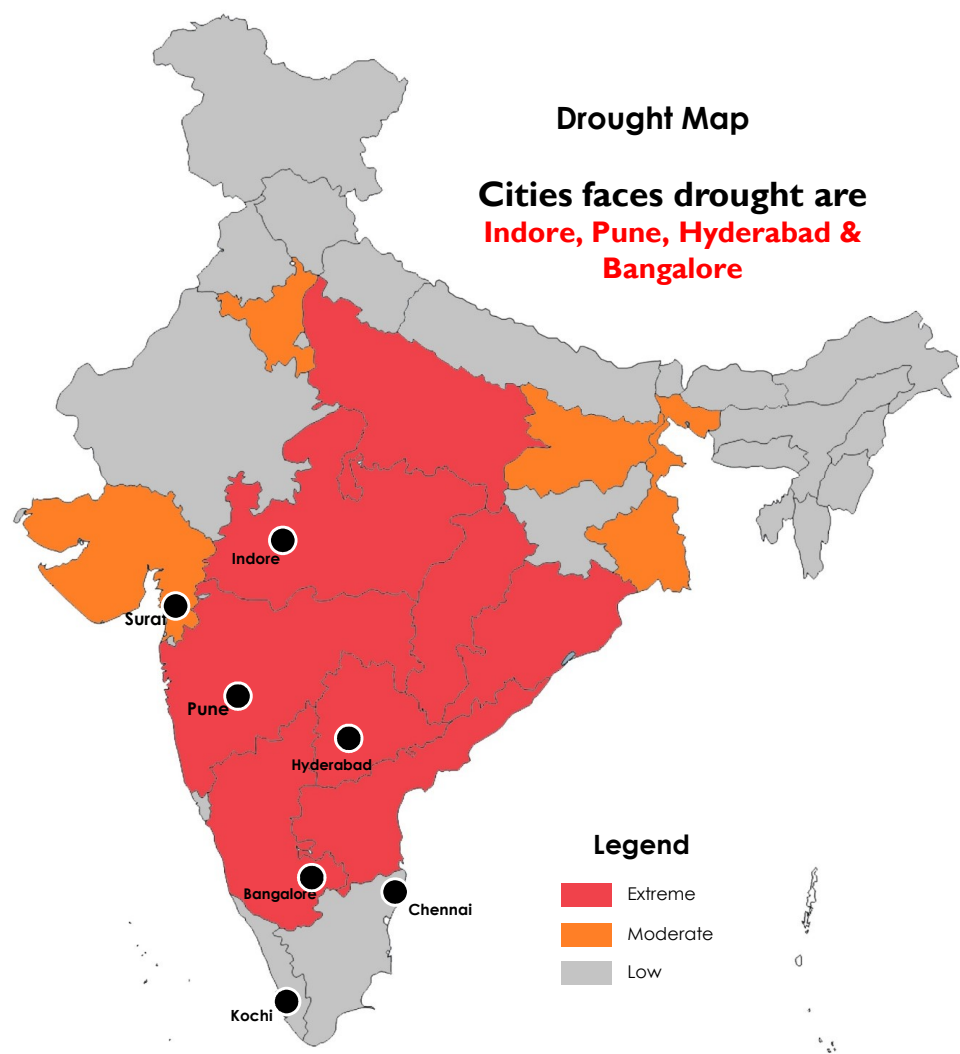
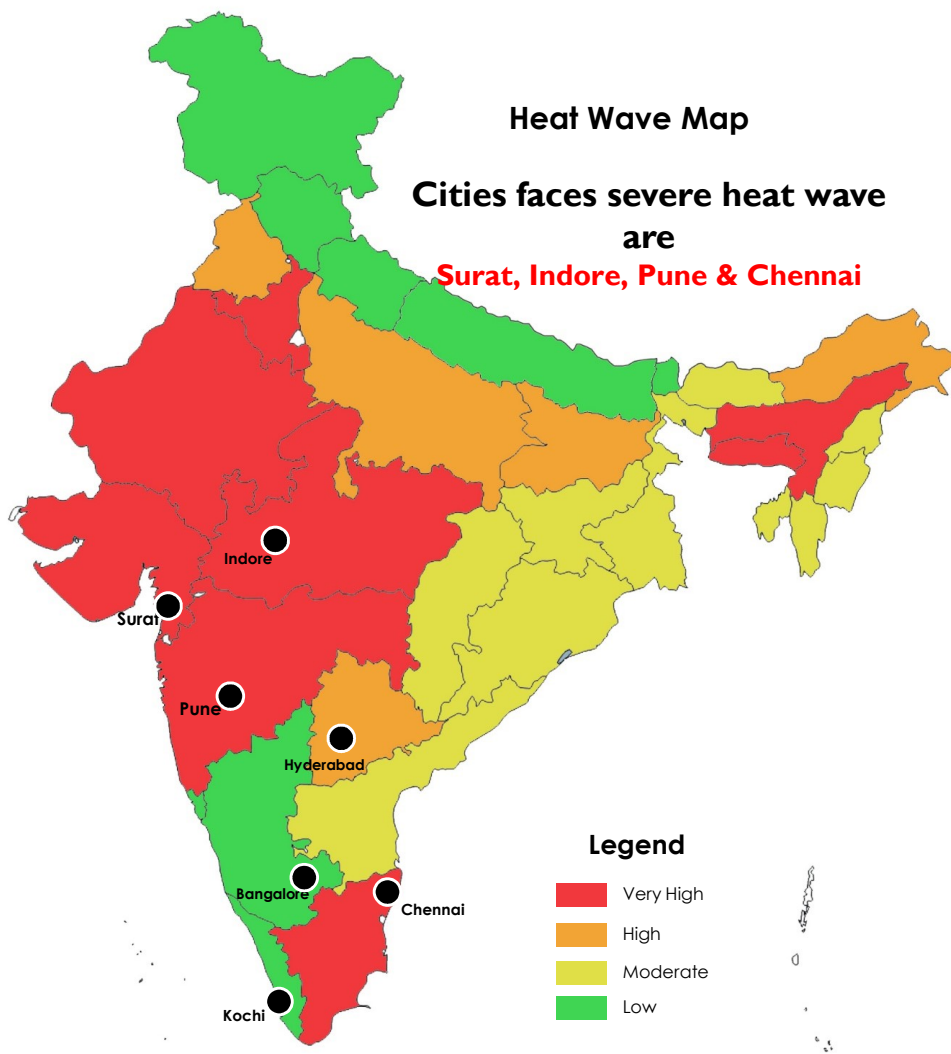
Five states are likely to be more than 50 percent urbanized



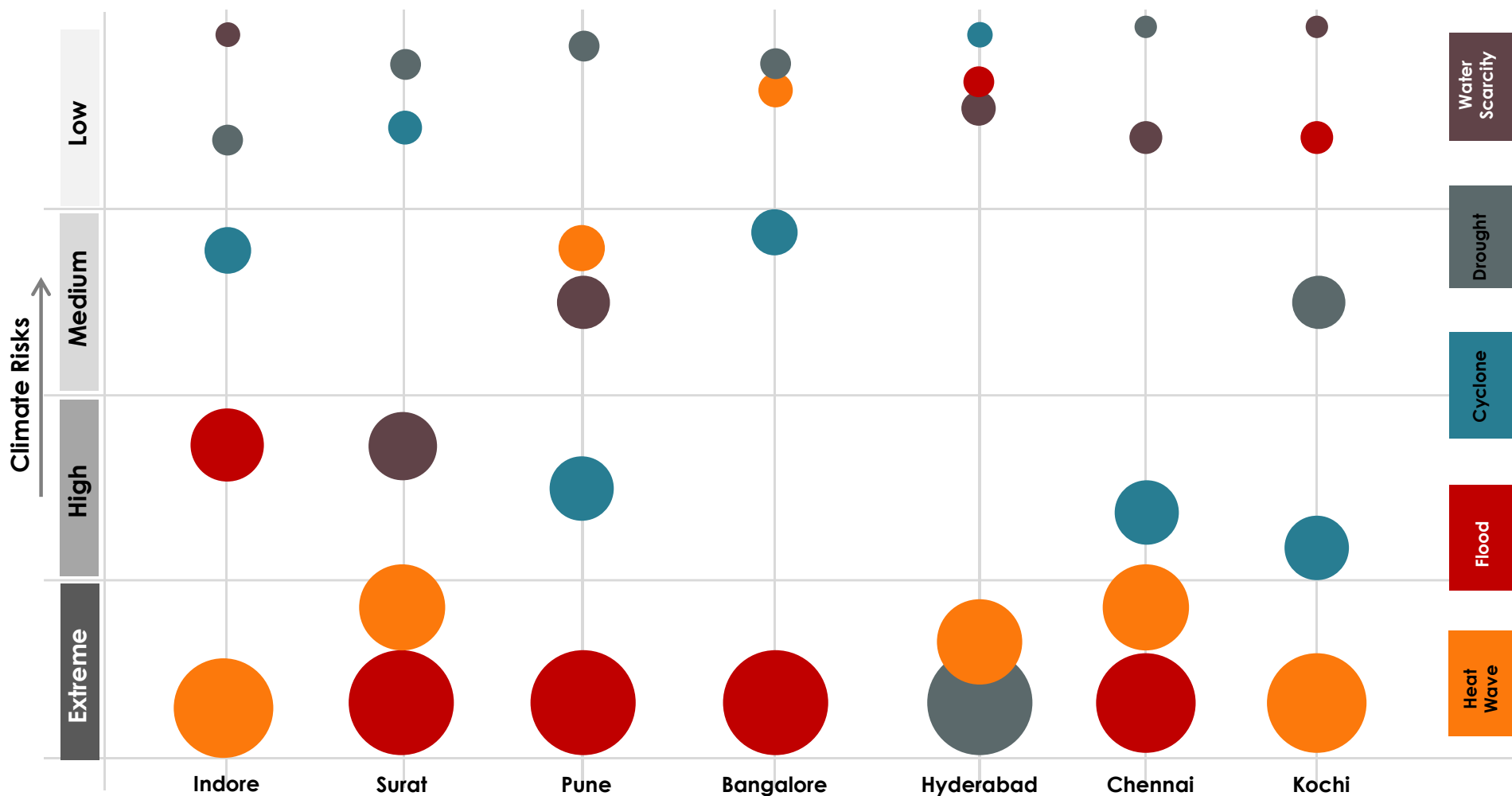
SOURCE: India Urbanization Econometric Model; McKinsey Global Institute analysis

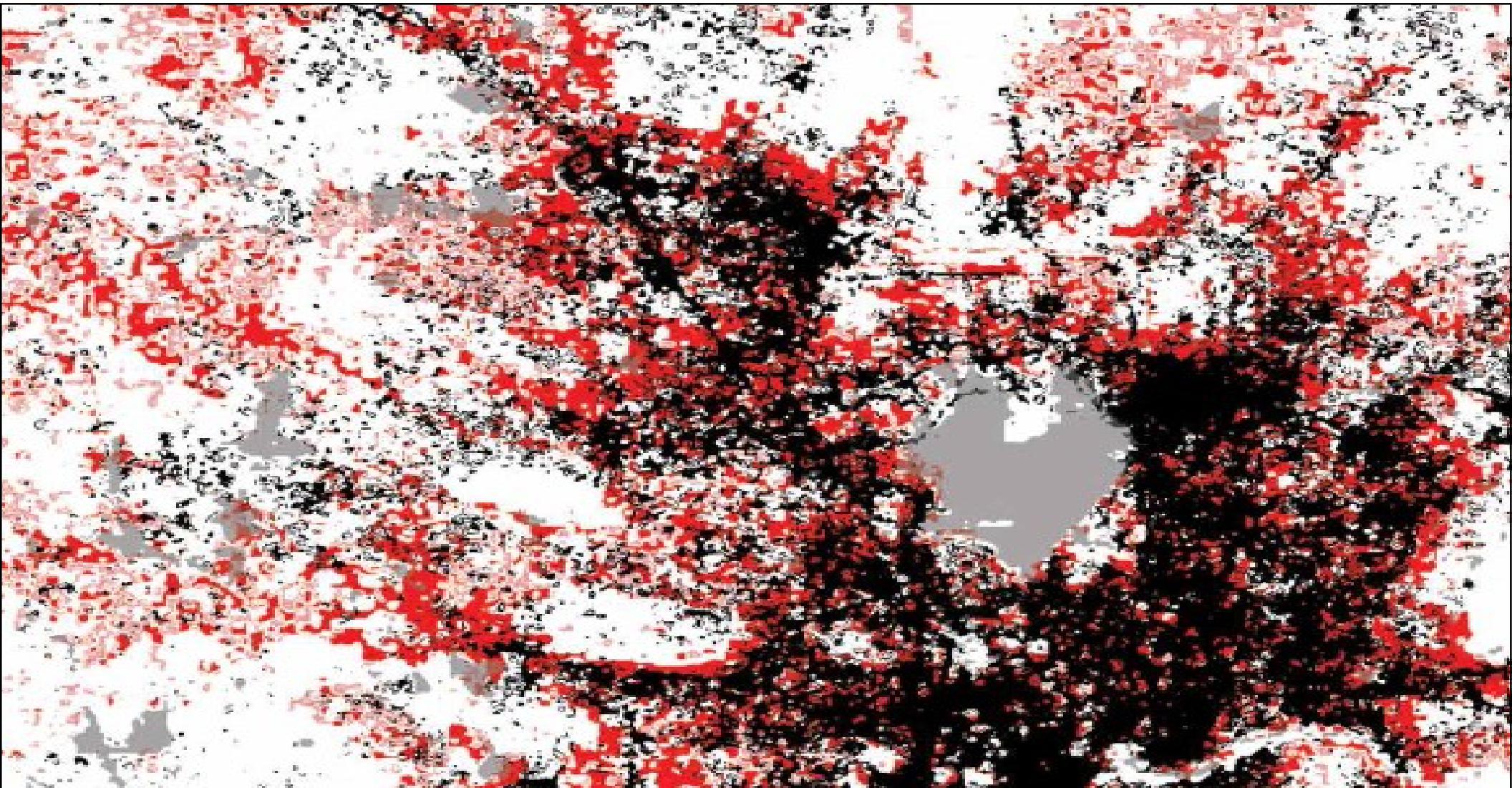
- Indian Cities are at the forefront of Climatic Vulnerability
- Cities are the key contributor of GHGs and at the same time, are at the forefront of Vulnerabilities

Heat Stress



Comparative Climate Risk of the Cities





Hyderabad Urban Complex

Impact of Urbanization over Environment

Impact on biosphere

- Modification of Habitats
- Destruction of Habitats
- Creation of New Habitats

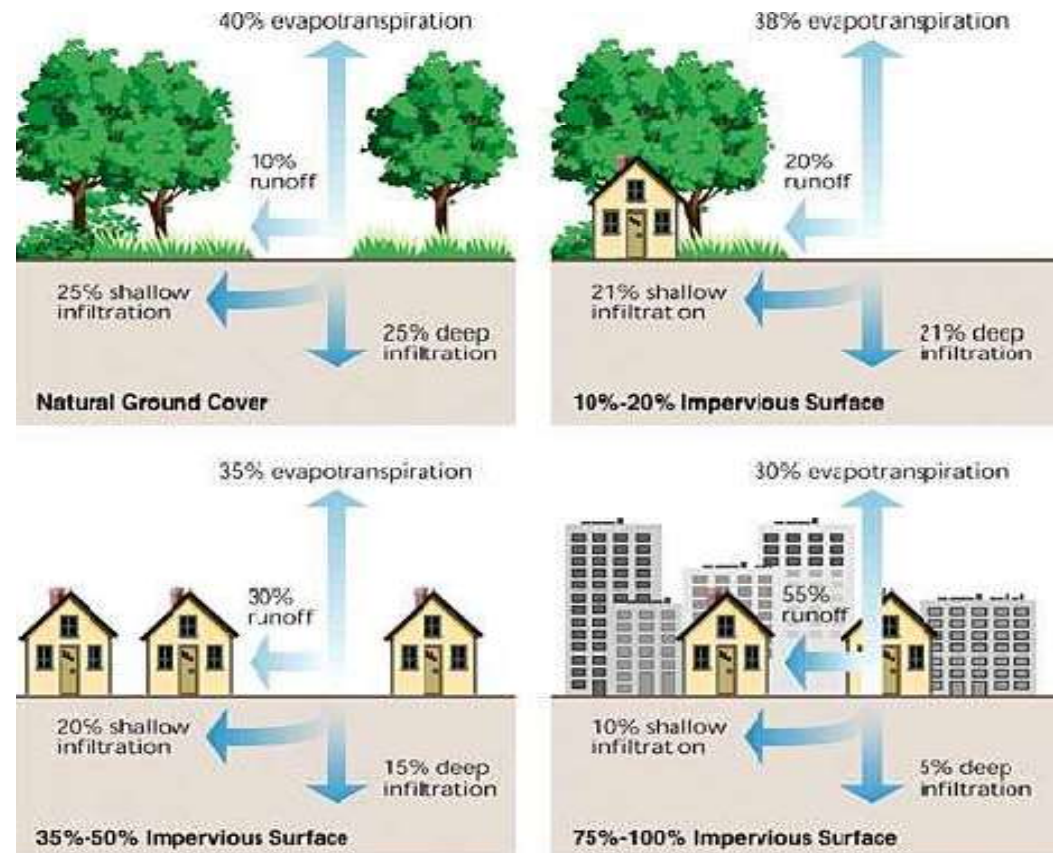


Fig. 3.21 — Relationship between impervious cover and surface runoff. Impervious cover in a watershed results in increased surface runoff. As little as 10 percent impervious cover in a watershed can result in stream degradation. In Stream Corridor Restoration: Principles, Processes, and Practices (10/98). By the Federal Interagency Stream Restoration Working Group (HSRWG) (15 Federal agencies of the U.S.)



OIS Creation

LEELA MEDICINES
Chemists & Druggists
1A, Southend Park, Kolkata - 700 029



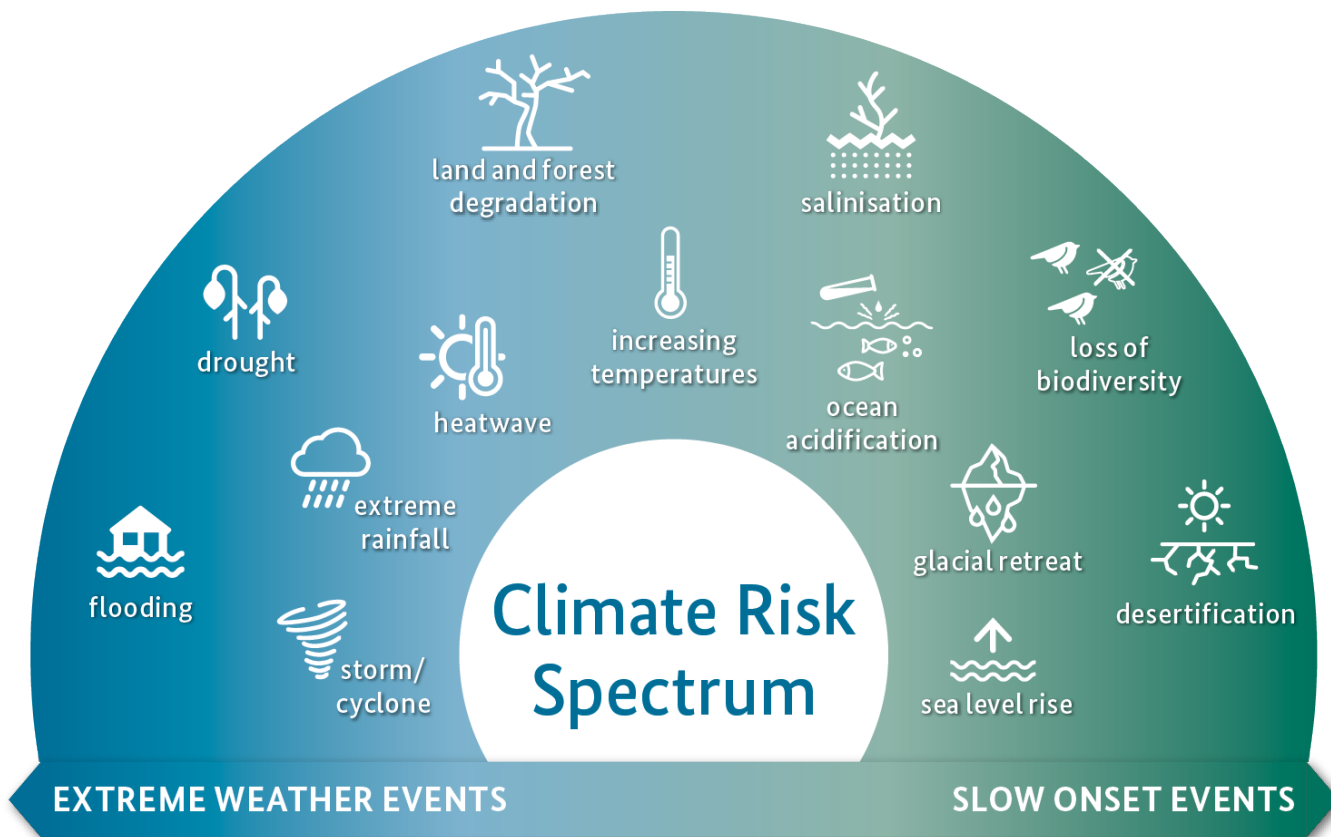


United Nations
Climate Change

**The
different**

**futures
that**







Increasing Shocks And Stresses In Urban Areas



Mitigation of Climate Change

Demand and Services

There are options available now in every sector that can at least halve emissions by 2030



Energy



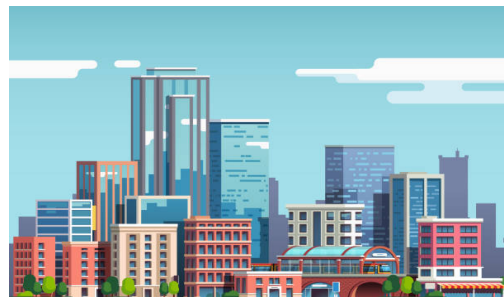
Land Use



Industry



Urban



Building



Transportation

Mitigation of Climate Change

Buildings

- Building: Possible to reach net zero emissions in 2050
- Action in this decade is critical to fully capture this potential
- Involves retrofitting existing buildings and effective mitigation techniques in new building
- Requires ambitious policy packages
- Zero energy and **Zero Carbon** buildings exist in new builds and retrofits

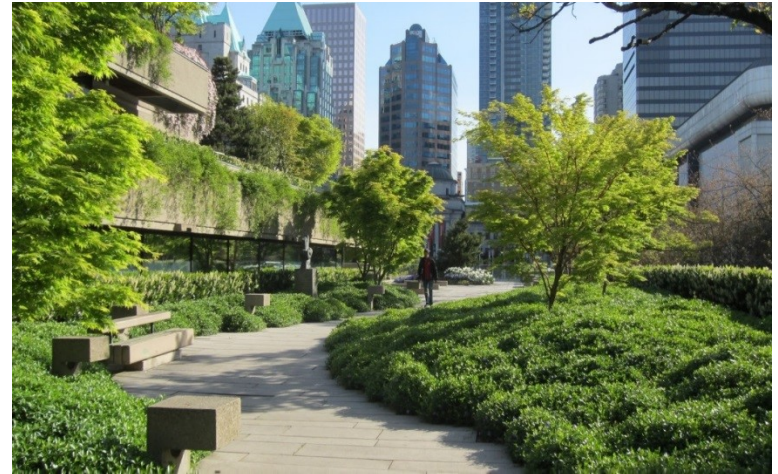


Mitigation of Climate Change

Cities and Urban Areas

- Better Urban Planning
- Sustainable Production and consumption of goods and services
- **Electrification** (low emission energy)
- Enhance **carbon uptake and storage** (green spaces, ponds, trees)

There are options for existing, rapidly growing and new cities



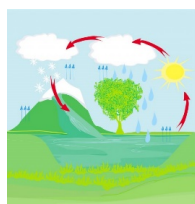
Localizing Nature Based Solutions

Defining Nature based Solutions

IUCN



Actions to **protect, sustainably manage and restore natural or modified ecosystems** that address **societal challenges** effectively and adaptively, simultaneously providing human well-being and biodiversity **benefits**.



Natural Processes



Societal challenges

Key Elements



Adaptability

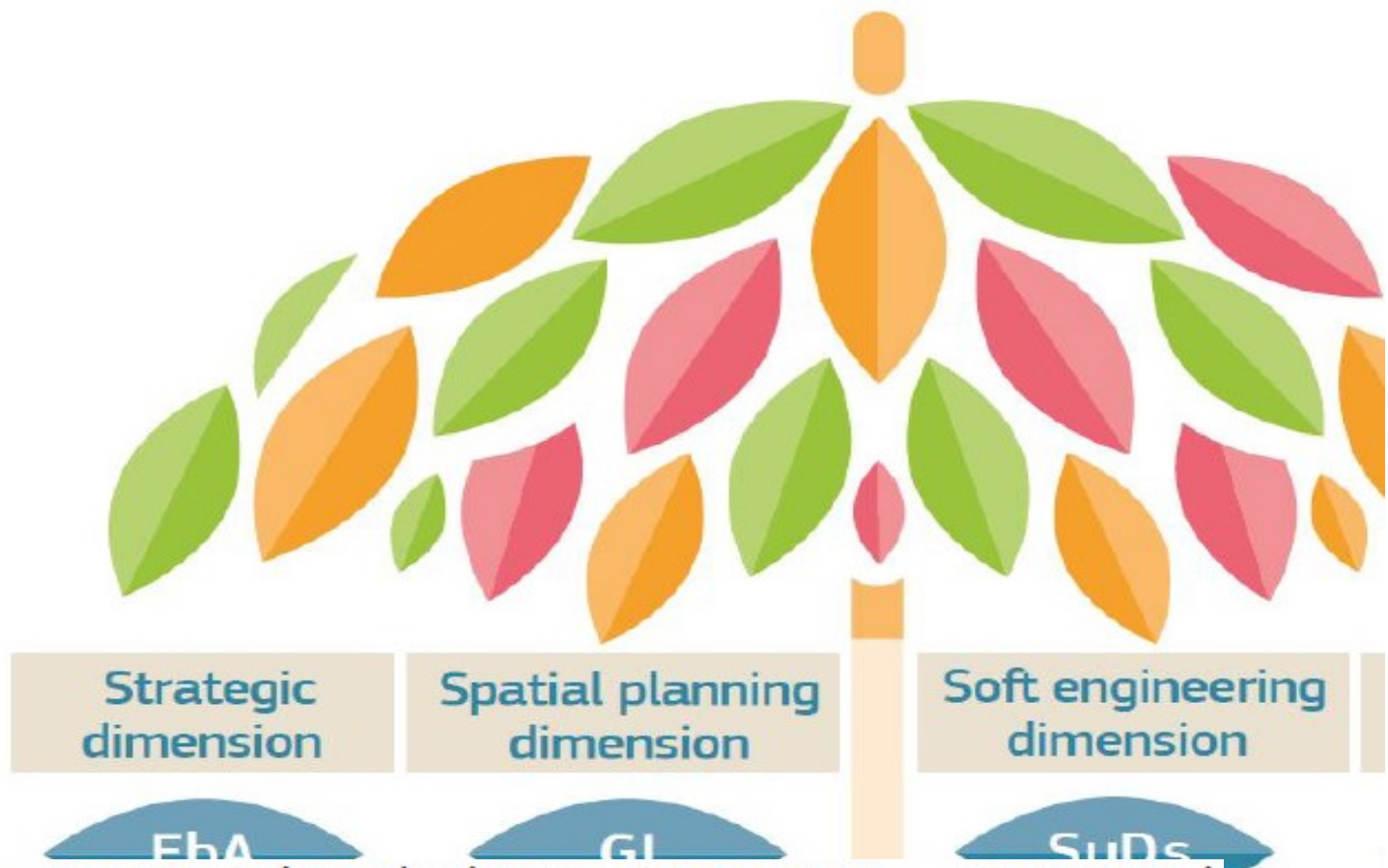


Environmental Benefits

EU Commission



Living solutions inspired by, continuously supported by and using Nature designed to address various **societal challenges** in a resource efficient and adaptable manner and to provide simultaneously economic, social and environmental **benefits**.



concepts. EbA = ecosystem based adaptation; Eco-DRR = ecosystem-based green infrastructure; BI = blue infrastructure; GBI = green-blue infrastructure; SUDS = sustainable urban drainage systems; EE = ecological engineering; BM

Differences in canal water levels under the traditional storm and the ABC Waters Management Strategy:



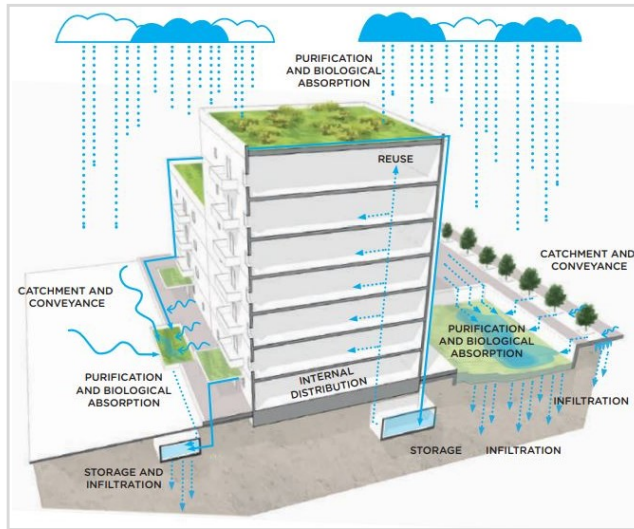
Water levels in the canals under the traditional stormwater manager



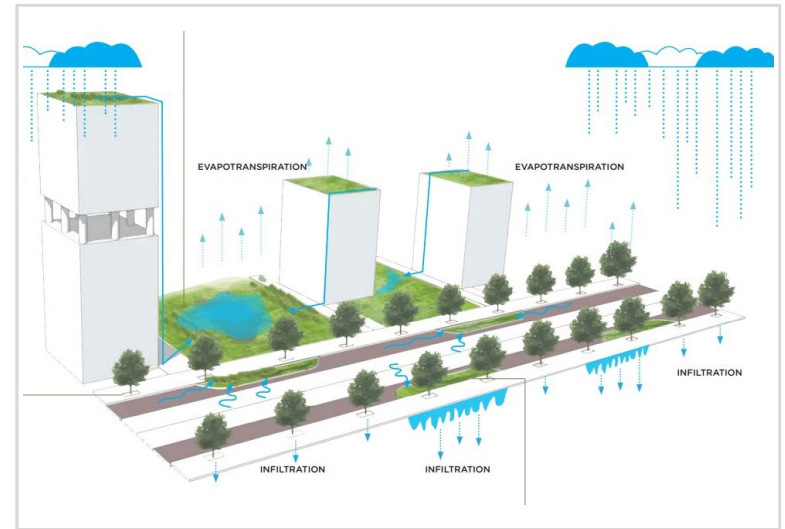
NbS for SUWM - Scales of Interventions



Building Scale

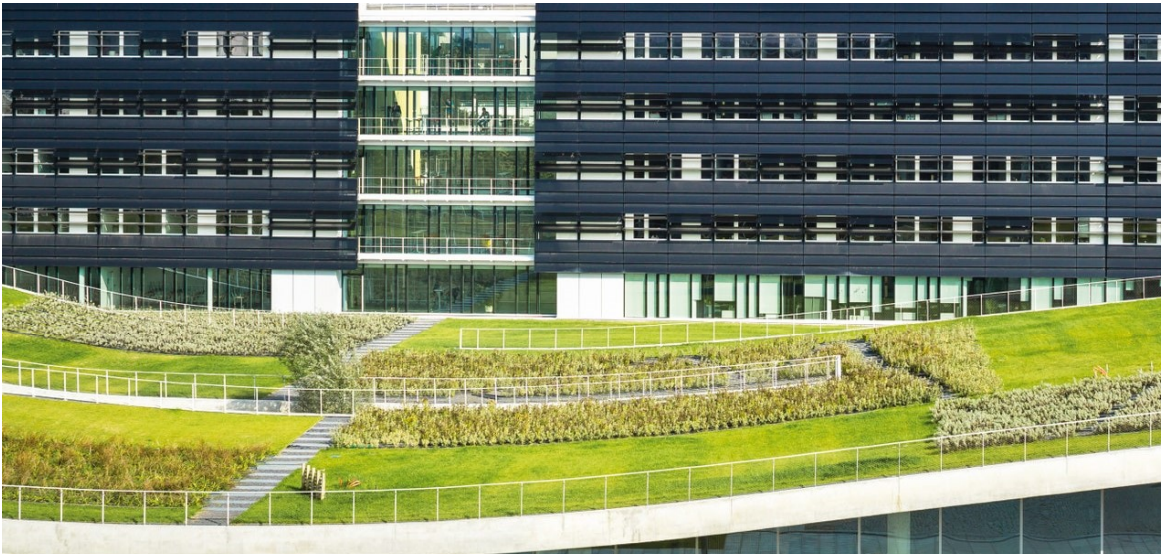


Institutional/ Neighborhood Scale

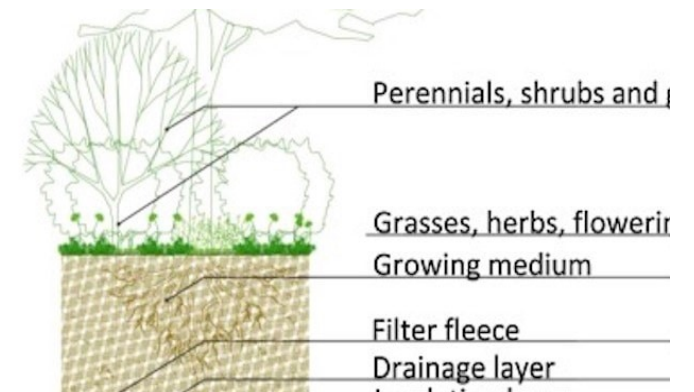


Urban Catchment Scale

NbS Strategies - Green Roofs



Espace Bienvenue, Marne-la-Vallée, France



Green Roofs absorb, store, and later evapo-transpire initial precipitation, thereby acting as a stormwater management system and reducing overall peak flow discharge to a storm sewer system

Elements include waterproofing layer, a soil or substrate layer, and a plant layer.

NbS Strategies - Permeable Pavements



Permeable Pavers



Permeable Concrete



Grass Pavers

Effective at stabilizing the hydrologic condition of a site.

Permeable surfaces can be used in **conjunction with subsurface infiltration galleries (subsurface retention facilities)**

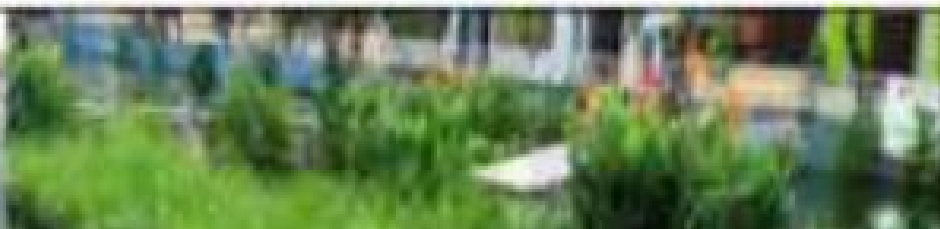
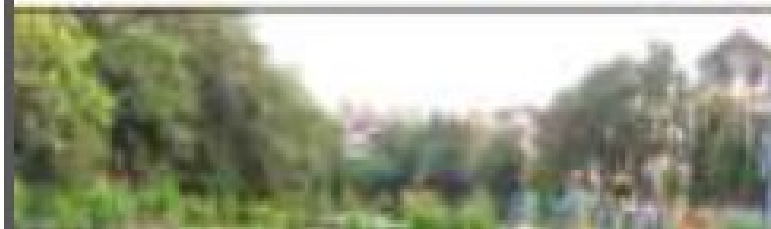
Types of permeable pavement include **grid block pavers, plastic grids, vegetated grids, Belgium block, turf block, gravel, cobbles, brick, natural stone, etc.**

Before



After



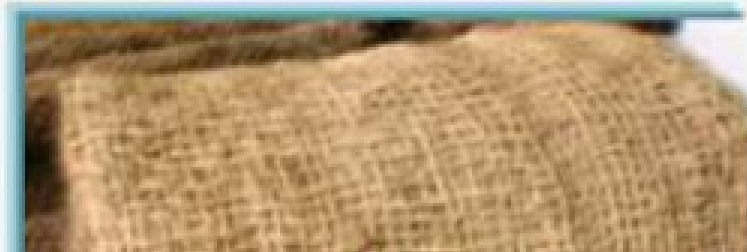




Canal Restoration, Kolkata

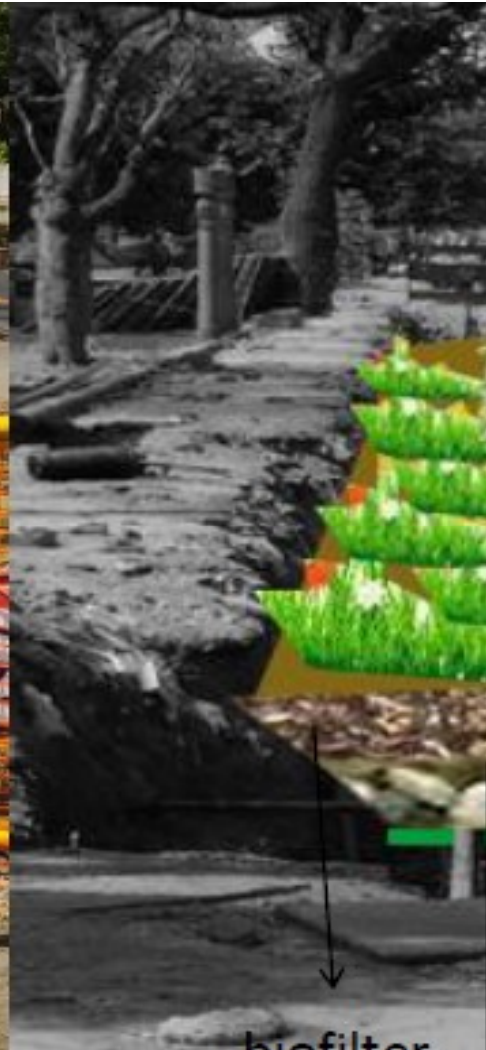


MATERIALS USED FOR ENVIRONMENTAL RE





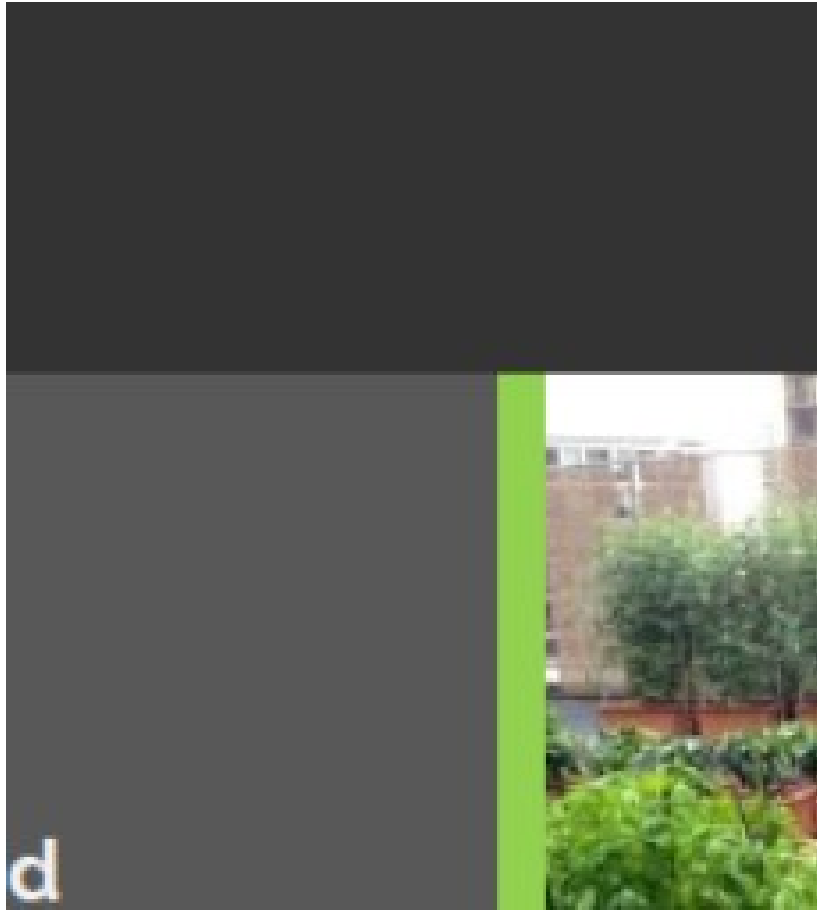
Stormwater drainage network



biofilter

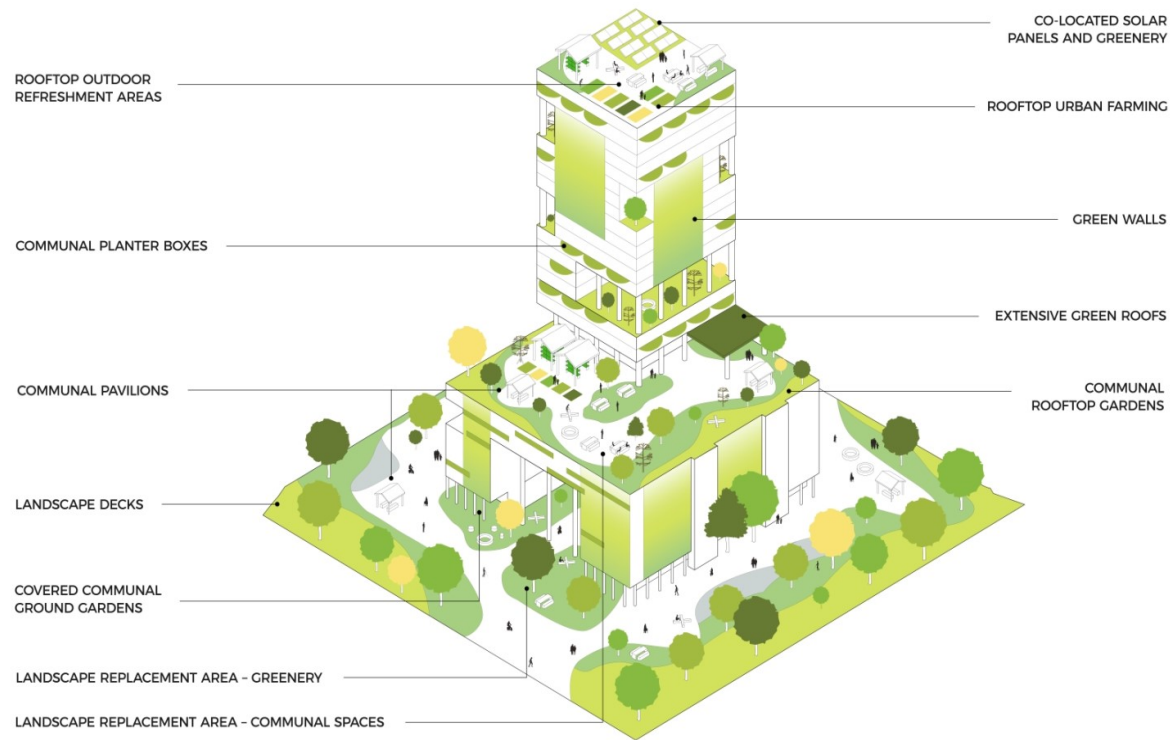


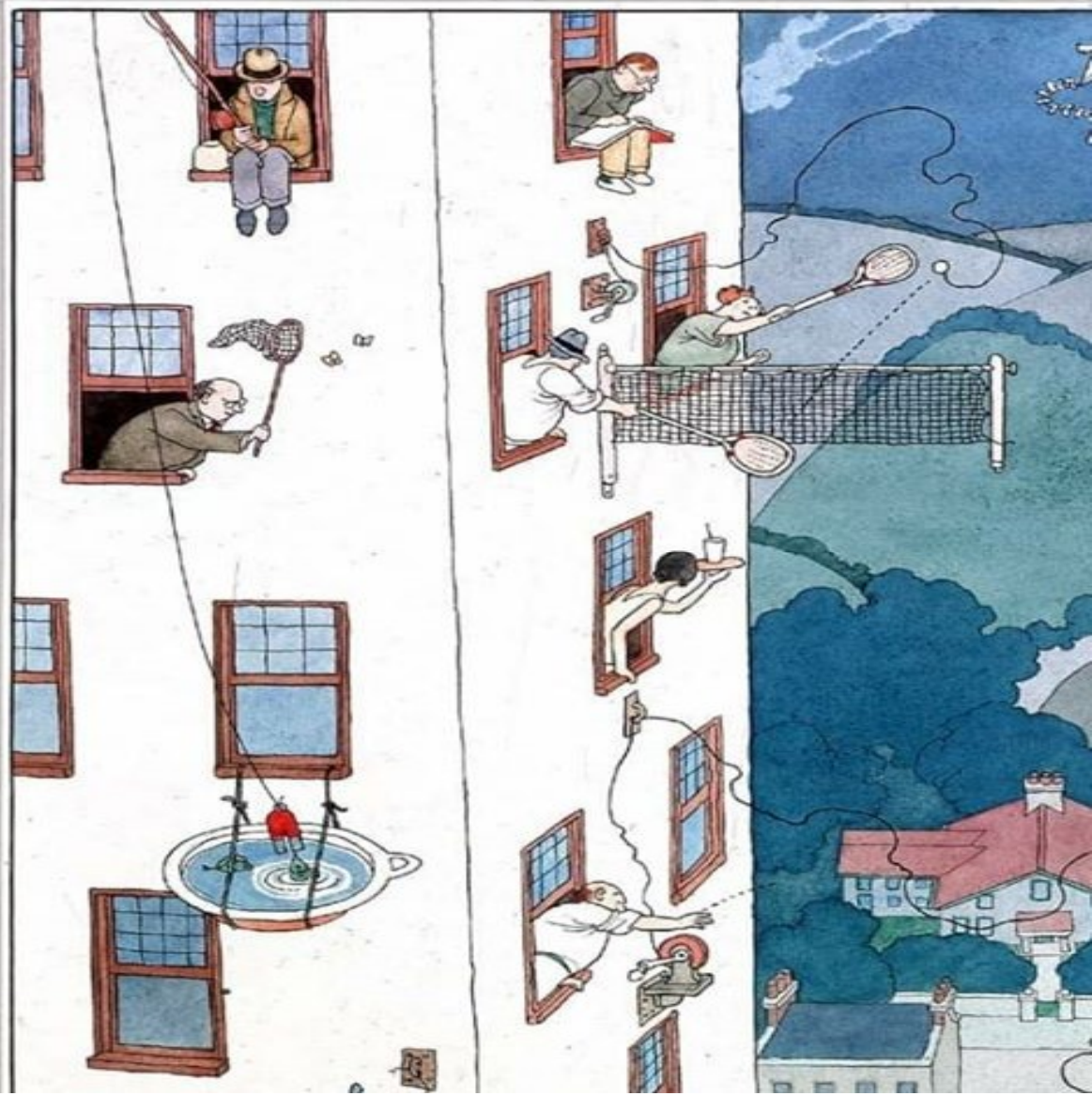
Urban Horticulture and Roof Gardening Initiatives



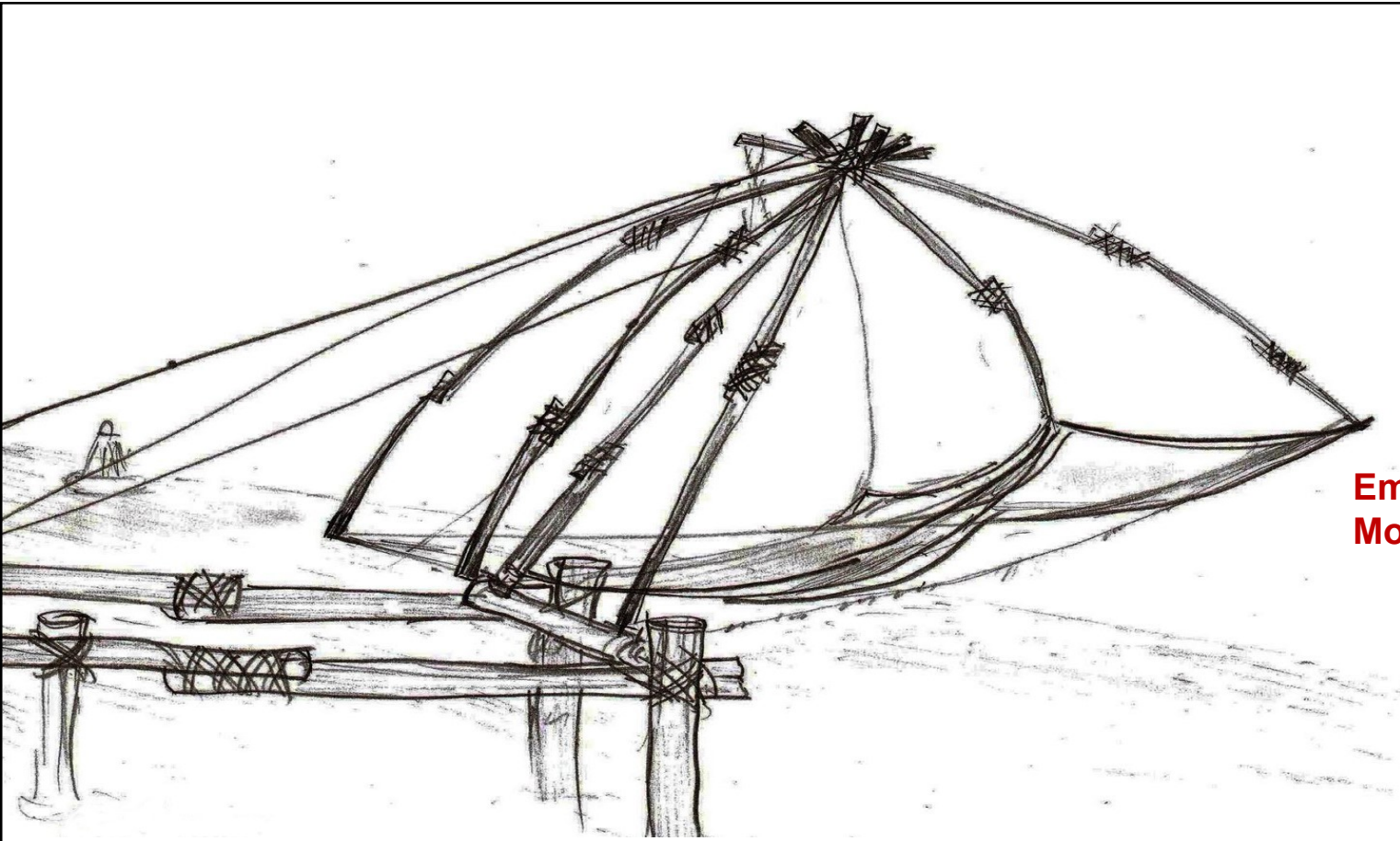
- Encourage students of Corporation Schools to take up vegetable gardening and rooftop farming in order to promote a value-based education and supplement the Govt. of Tamil Nadu's Nutritious Meal program
- Support livelihood generation, skills development and social cohesion of vulnerable groups, the empowerment of women
- Conduct training and awareness programs to educate citizens on the benefits of urban horticulture

Singapore LUSH (Landscape for Urban Spaces and High Rises)





Build Back Better?
AND
Living Back Safer!



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