

Handbook on Green Infrastructure Planning

A practical tool to plan, finance, and implement
Green Infrastructure (GI) in cities

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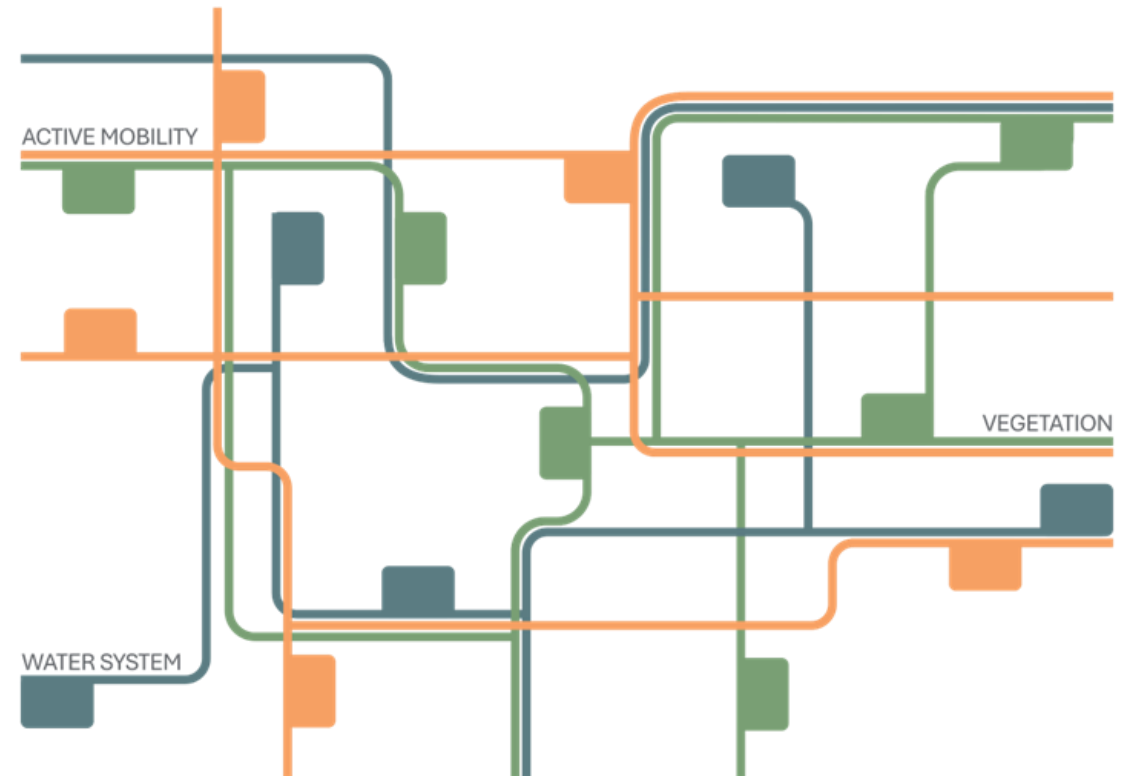


1. Urban GI: A three-layer network

Green layer: Vegetation

Blue layer: Water systems

Orange layer: Active-mobility spaces



1. Urban GI: A three-layer network

Green layer: Vegetation



Blue layer: Water systems

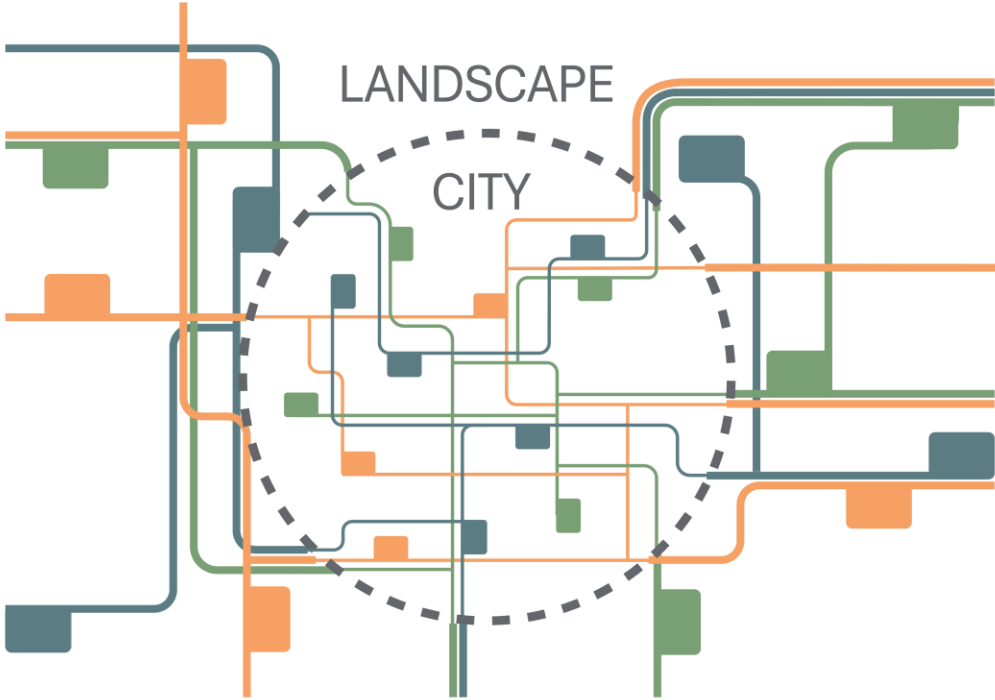


Orange layer: Active-mobility spaces

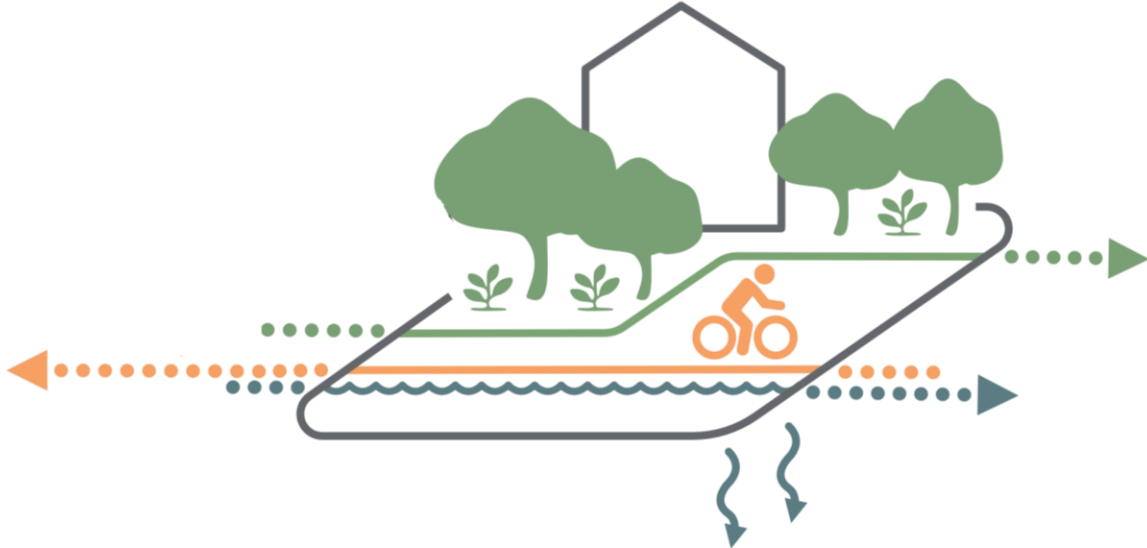


2. Scoping: Two planning pathways

System-level planning



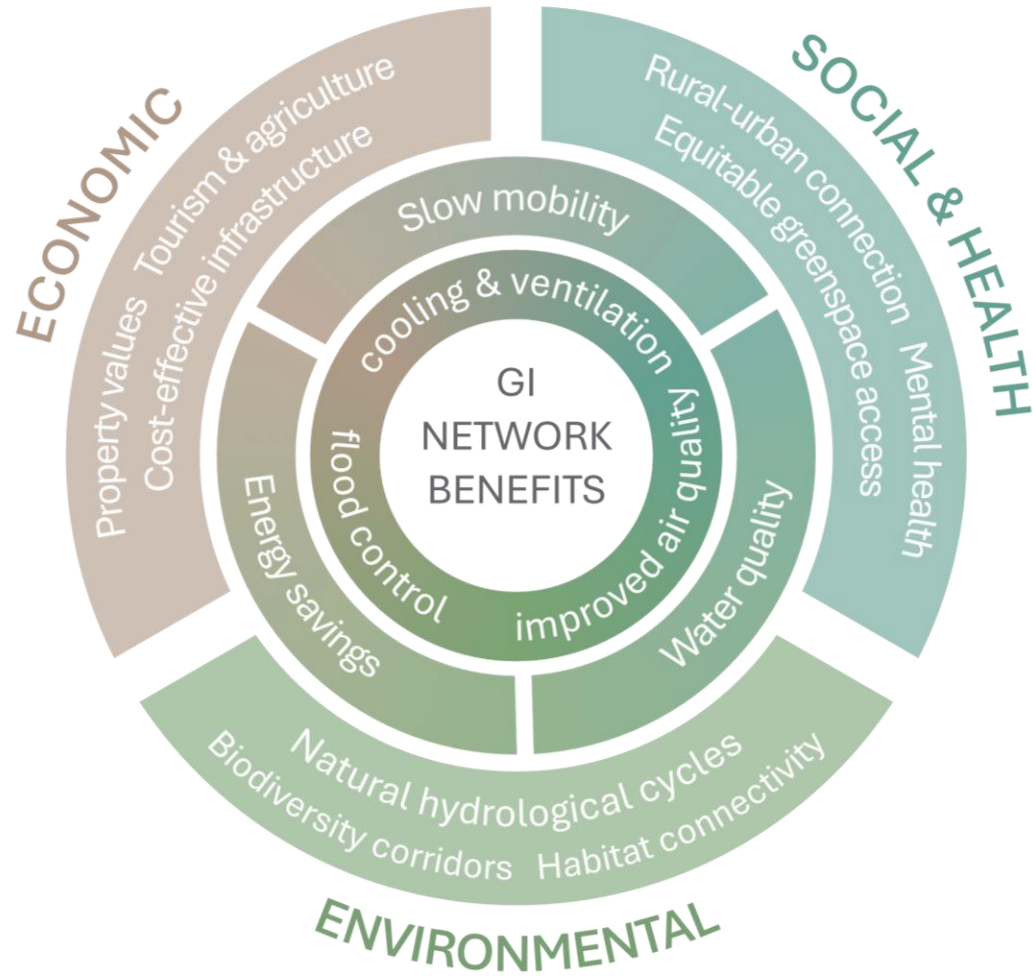
Project-level planning



2. Scoping: Target functions and synergies

Kibera, Nairobi

(Source: KDI)



Medellín

(Source: C40)

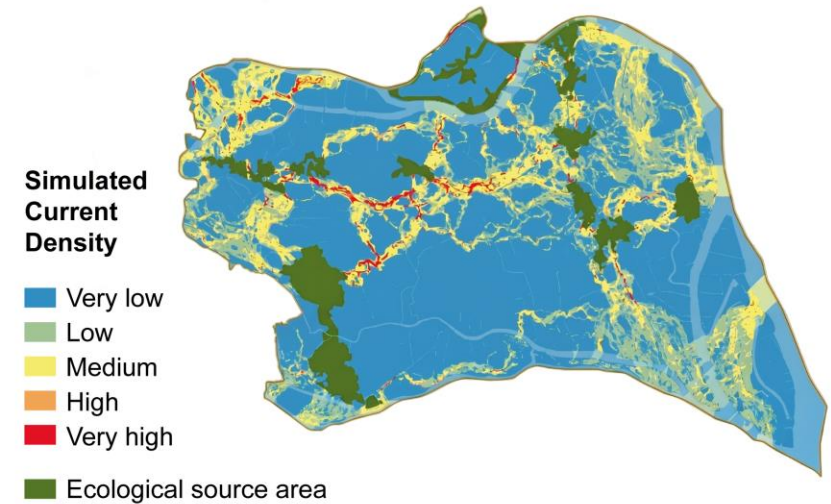
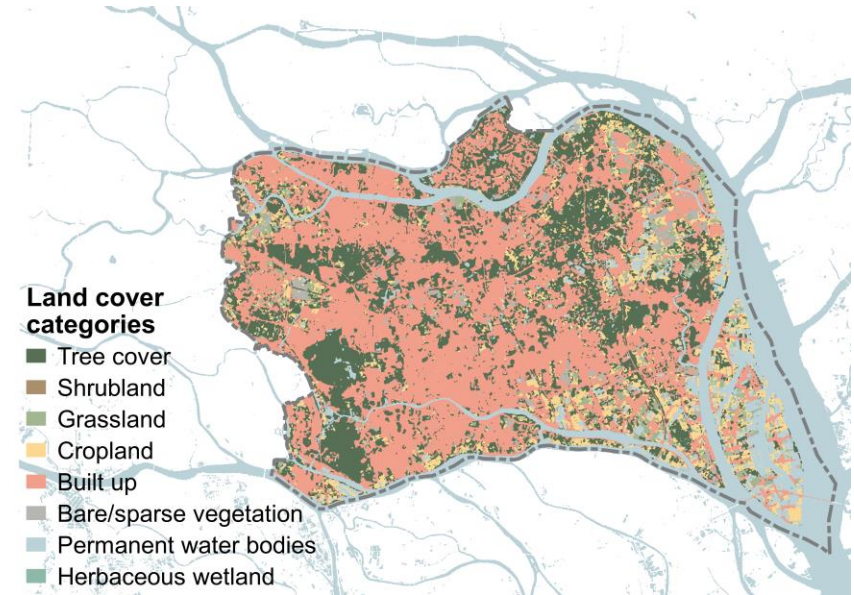


2. Data and methods for GI analysis

Useful data sources

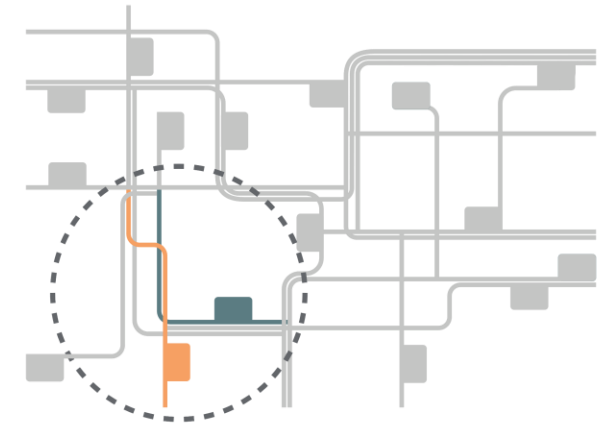
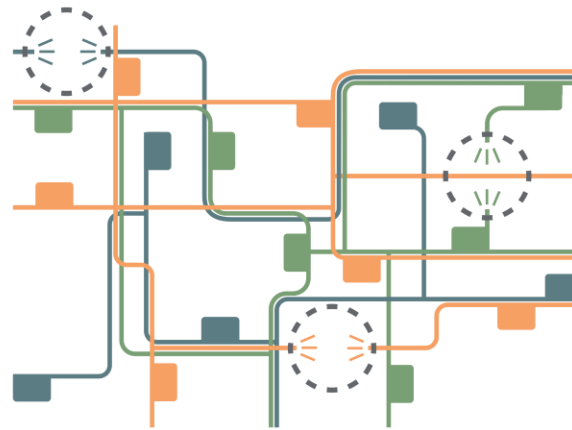
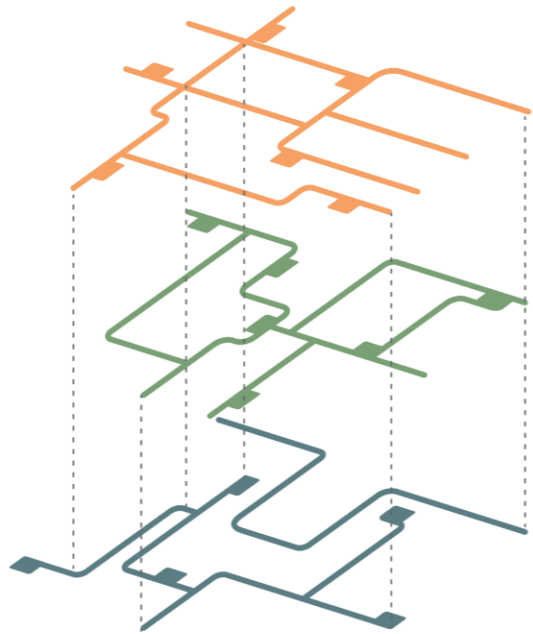
- Geology
- Hydrology
- Climate
- Land cover and land use
- Ecology
- Socio-economic development
- Mobility and recreation

Methods for mapping and assessment



4. Planning a city-wide GI network

Spatial conception of a **GI network**



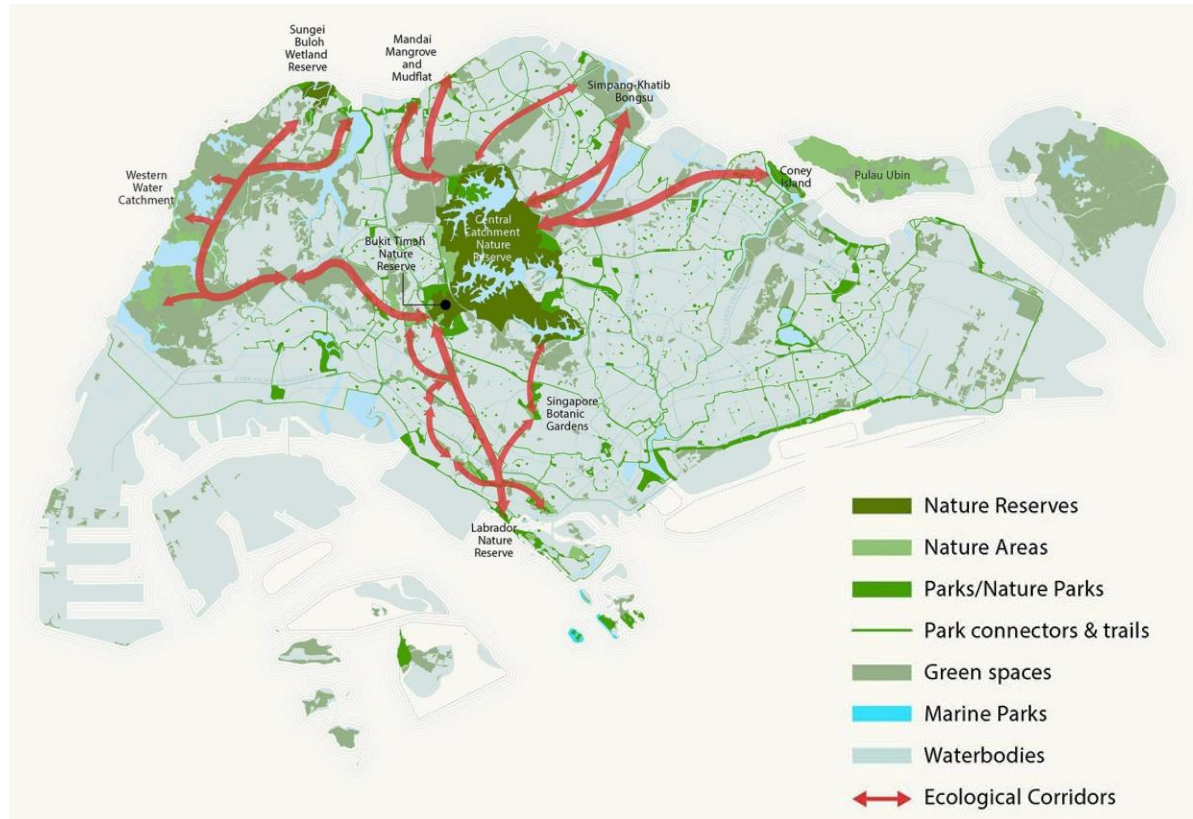
Overlaying green, blue,
and orange networks

Closing gaps

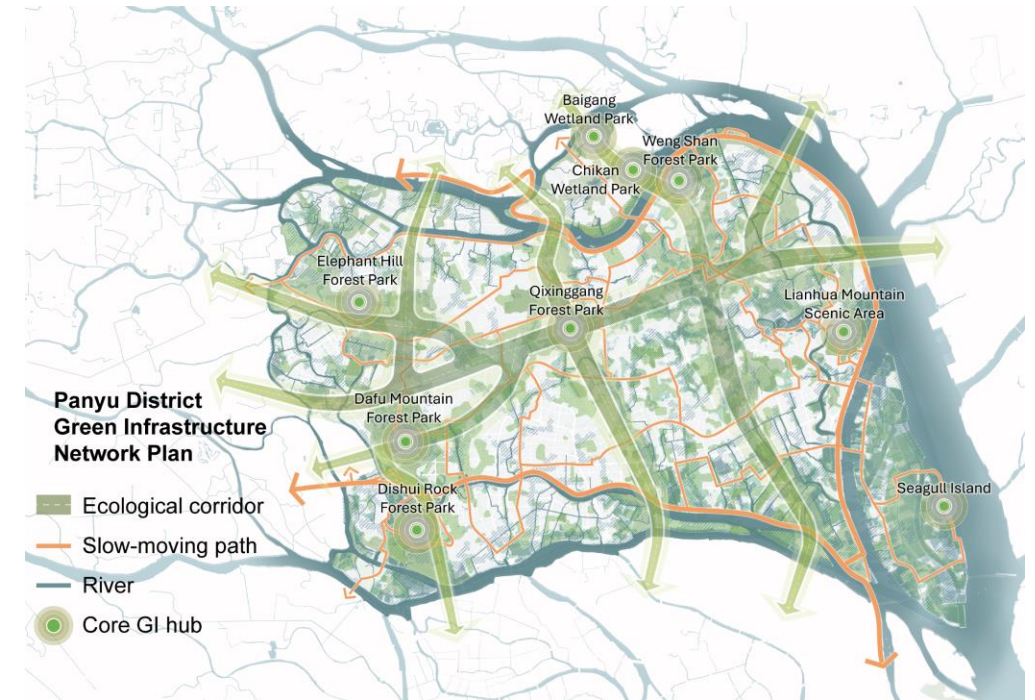
Identifying
focus areas and axes

4. Planning a city-wide GI network

Spatial conception of a GI network



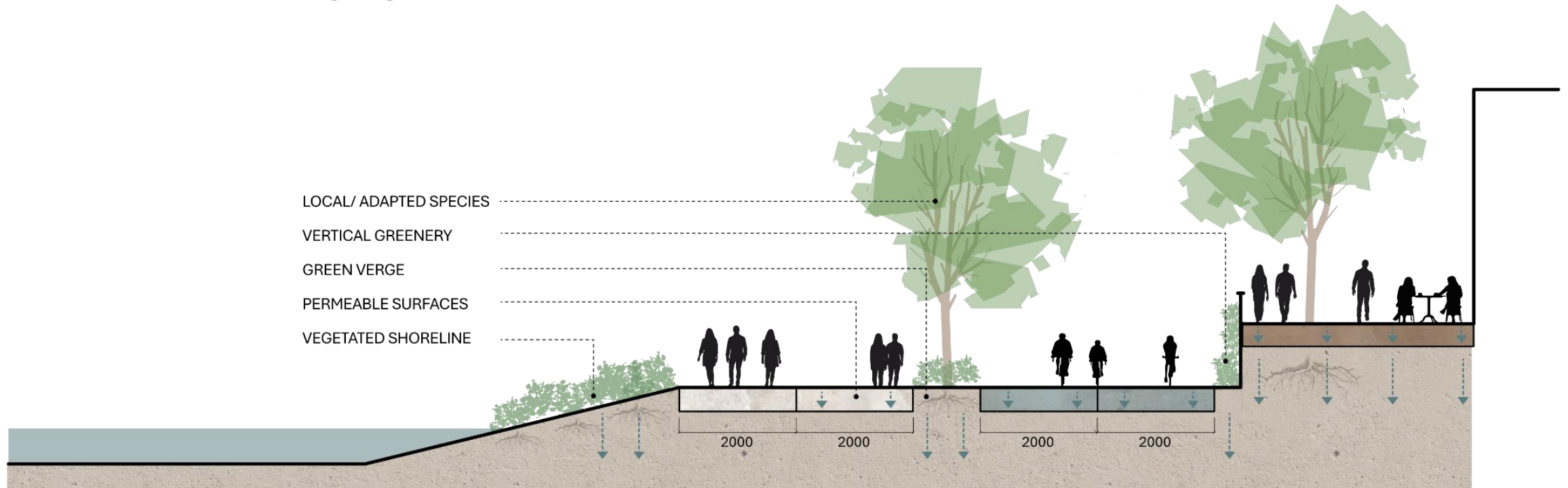
Singapore
(Source: NParks)



Panyu District, Guangzhou

4. Planning a city-wide GI network

Functional **design guidelines** for consistency between projects



TRAIL



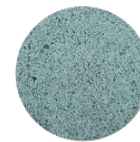
light grey stone

TRACK



grey permeable
concrete

BIKE PATH



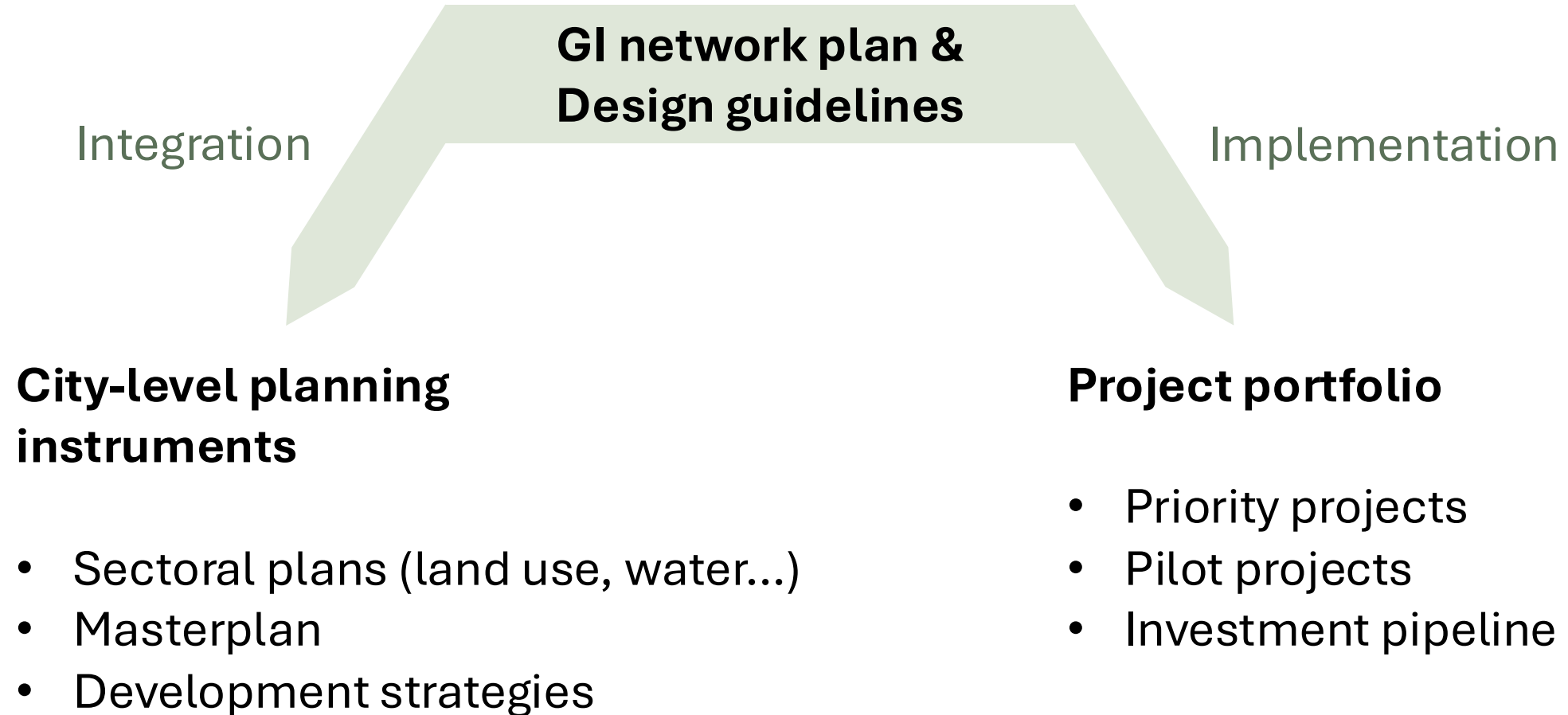
blue permeable
concrete

PUBLIC SPACE



grey-brown wood

4. Planning a city-wide GI network



5. Designing a local GI solution

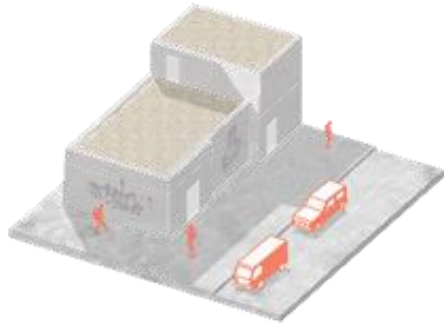
Achieving **systemic impact** by:

- Integrating **core GI functions** into project design
- Strengthening **local connectivity**
- Considering **integrated planning** options

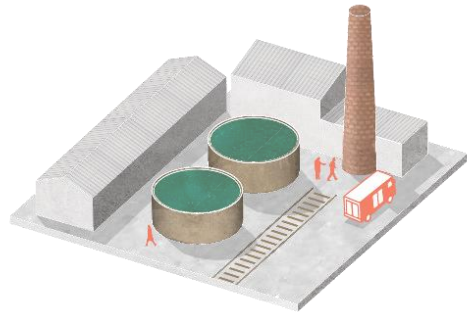


5. Designing a local GI solution

Gray-to-green conversion



Retrofit



Repurposing



Rehabilitation



6. Financing

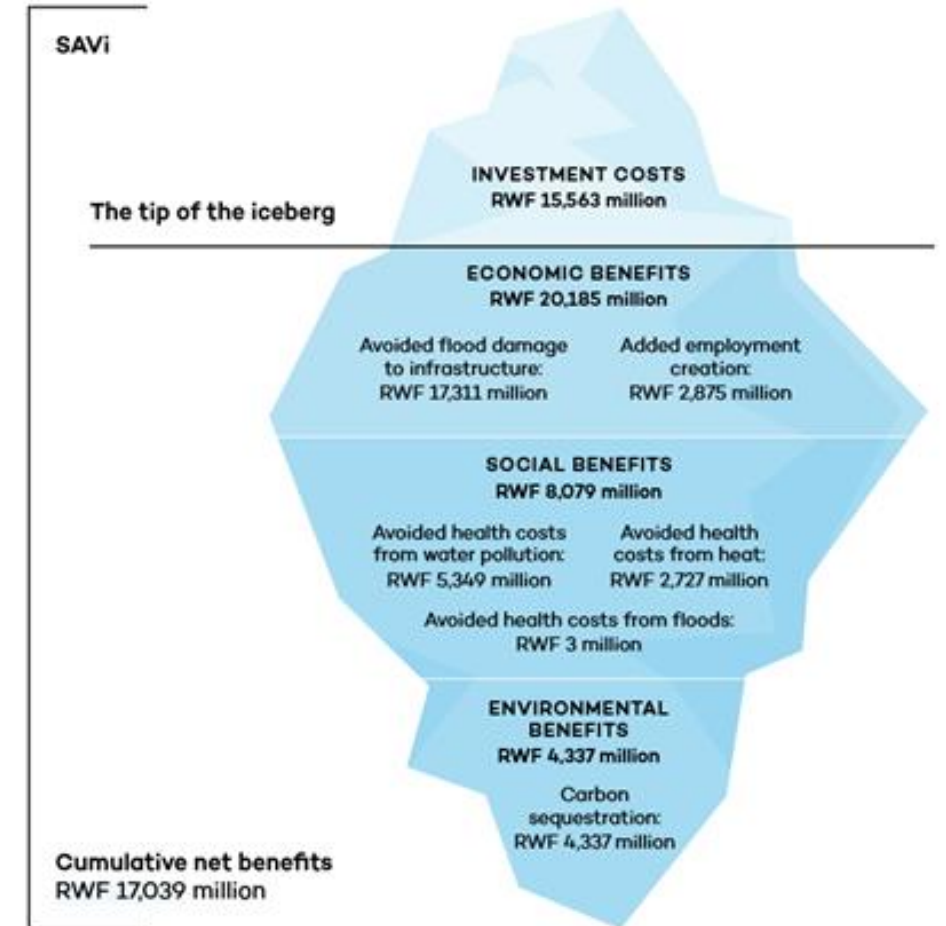
- **Costs**

Funding capital and operational expenditure through municipal investment budgets

- **Benefits**

Leveraging GI's long-term value proposition (through land value capture, stormwater fees, PPPs, green bonds)

→ Valuation tools and frameworks



SAVi Calculation for NbS in Kigali
(Source: IISD)

7. Indicators

Indicator	Measure or unit
Connectivity	
Green space accessibility	% of population within 300m or 5-minute walk of ≥0.5-hectares green space
Habitat connectivity	Index based on probability of connectivity (PC) or effective mesh size (EMS)
Ecological corridors	Number or km
Length of dedicated bicycle lanes, greenways, or blueways	km
Dedicated bicycle lane coverage	% of population within 300m of cycling network
Ecosystem extent and quality	
Natural areas	
Protected areas	
Key habitats, e.g., forests, wetlands, rivers	km ² or % of total area
Tree canopy cover	
Native plant or animal species	Number
Species diversity	Shannon index or Simpson index
Water quality	% of water bodies matching a specified ecological status or quality-index threshold

Indicator	Measure or unit
Ecosystem services	
Stormwater absorption	Infiltrated volume per hour or % of total rainfall
Temperature reduction	°C difference
Air quality improvement	Change in concentration of PM2.5/PM10/NO ₂
Carbon sequestration	Tons per year
Urban services	
Overall green space coverage	
Green space coverage in built-up areas	m ² per resident or % of urban area
Park usage	Visitation numbers
Satisfaction or cleanliness surveys	Point rating
Reduction in heat-related illnesses	Cases per year
Economic performance	
Estimated savings through avoided flood damage, health care costs, and energy costs	Value
Jobs created in GI construction or maintenance	Number
Land value uplift near new GI investments	%

8. Operations and maintenance (O&M)

- **Low-maintenance design** (native species, simple solutions, low-input maintenance)
- **Institutional commitment and community stewardship**
- **Lifecycle budgeting**



Buffelsdraai Landfill, Durban
(Source: Errol Douwes)

Handbook Overview

1. Urban Green Infrastructure: A Three-Layer Network
2. Scoping
3. Data and Methods for GI Analysis
4. Planning a City-Wide GI Network
5. Designing a Local GI Solution
6. Financing
7. Indicators
8. Operations and Maintenance