

# Sustainable Healthy Cities Network for Integrated Urban Infrastructure Solutions

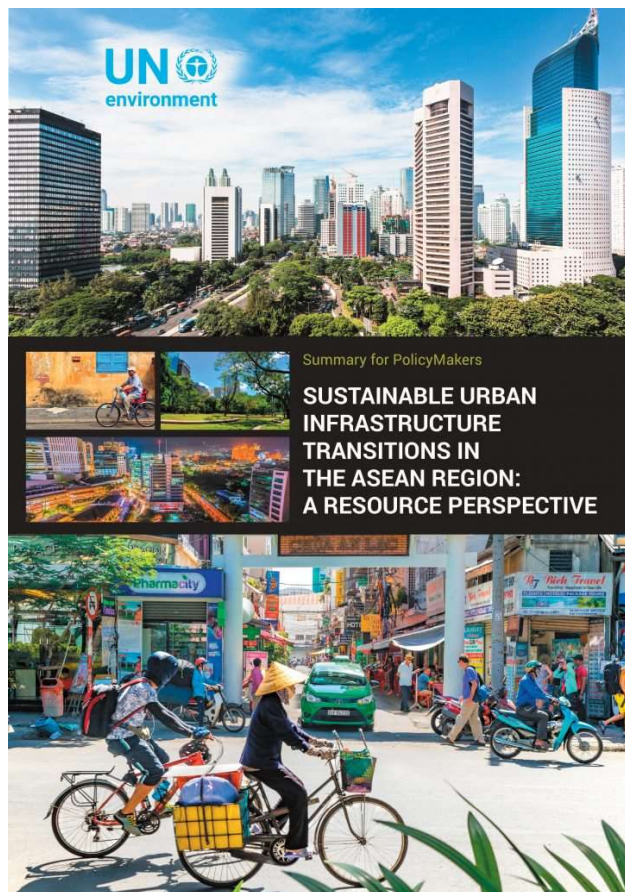
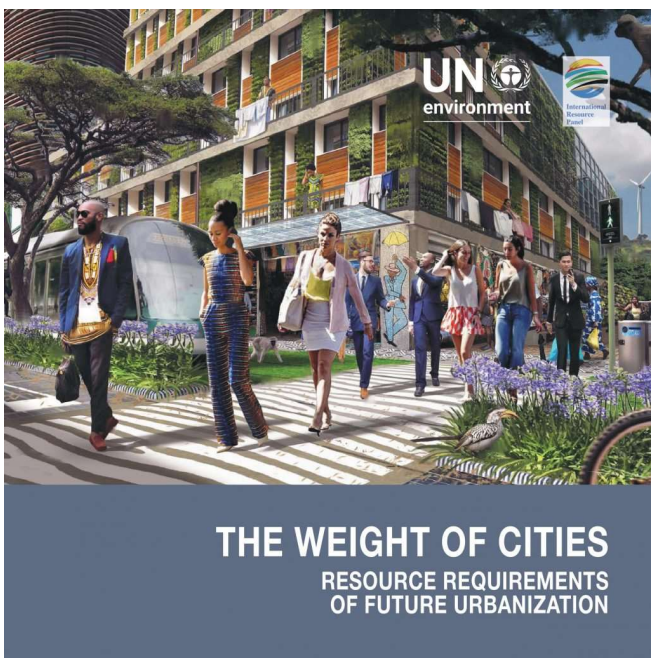
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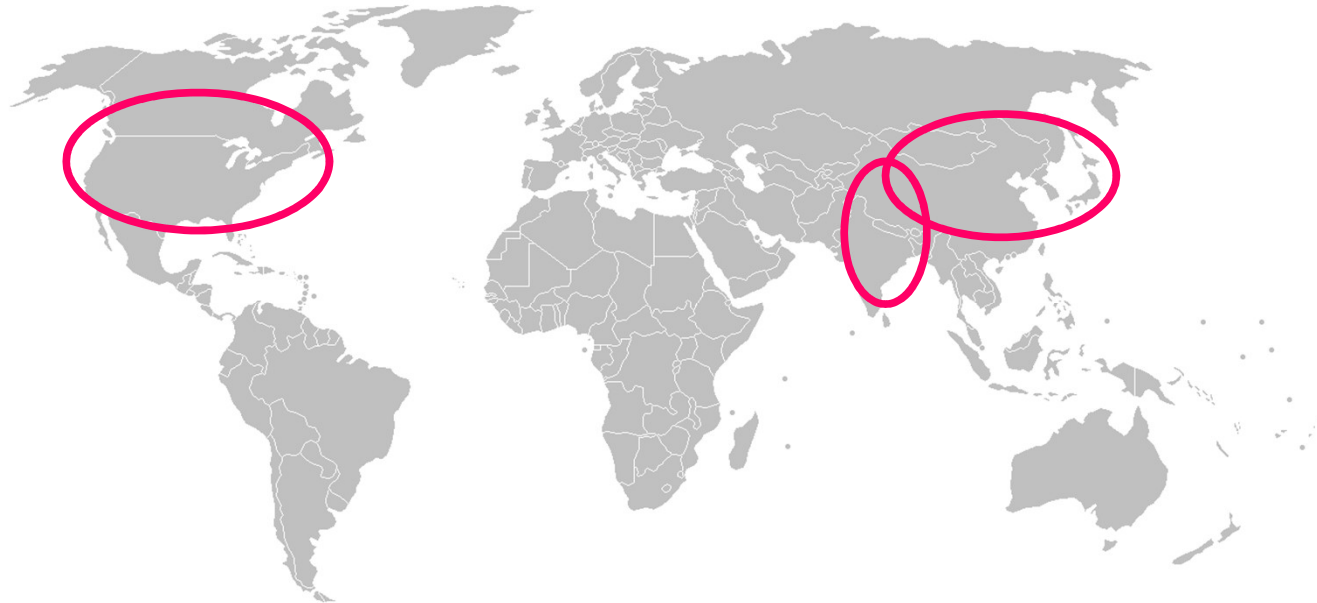
**Sustainable  
Healthy Cities**  
A National Science Foundation-supported  
Sustainability Research Network (SRN)



# UN Environment International Resources Panel



# Focus on Developing Science that Informs Integrated Infrastructure Actions in Diverse Cities & Nations Globally



## **Developed Economies**

Small fast-growing cities

Stable aging cities

Shrinking cities

## **Developing Economies**

Small fast-growing cities

Mega-cities with infrastructure deficits

# Research Logic: Seven Key Infrastructure & Food Provisioning Sectors & Their Interactions



Buildings & Energy



Food Systems



Green Infrastructure



Transportation



Water & Waste

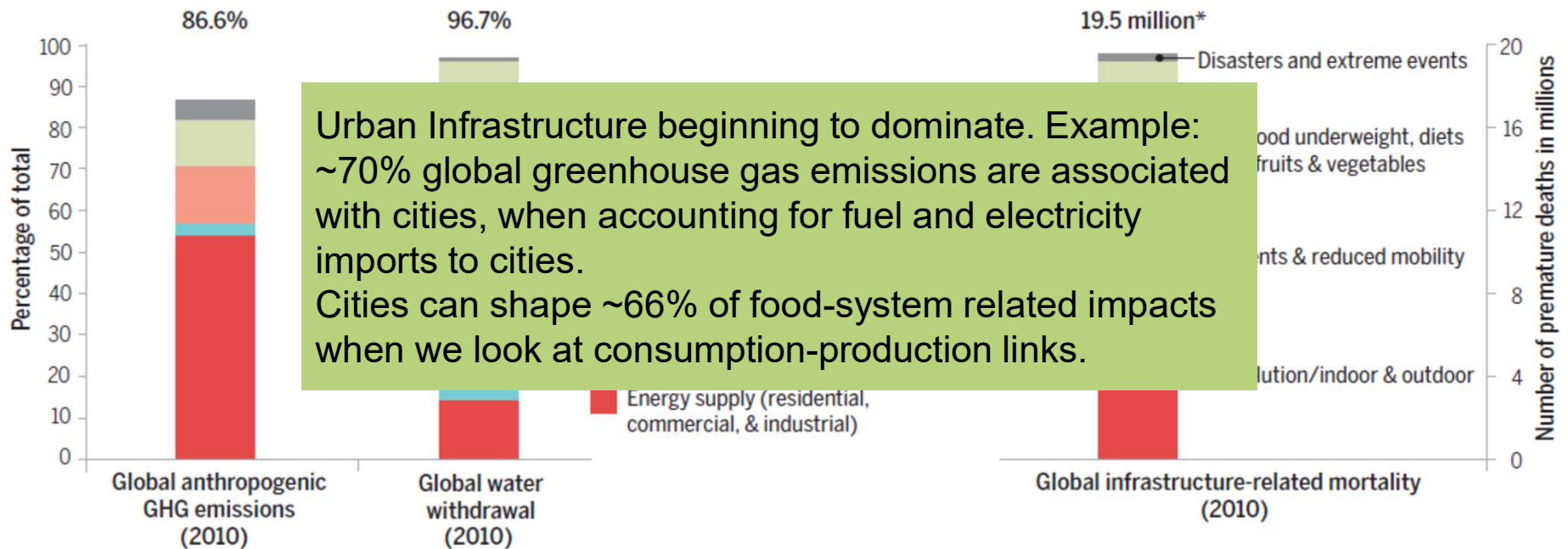


Cross-sector Interactions

[sustainablehealthycities.org](https://sustainablehealthycities.org)



# A Broad Definition of Infrastructure: Seven Key Sectors Affect Global Resource Use & Environment-Related Human Health



**Fig. 1. Impacts of key infrastructure sectors.** Shown are the impacts of urban infrastructure sectors on global anthropogenic GHG emissions (20), global water withdrawals (21, 22), and global disease burden (6). GHG and water impacts associated with buildings and shelter materials include those of

Ramaswami et al., *Science*, 2016



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# Meta Principles for Developing Smart Sustainable and Healthy Cities



## PERSPECTIVE

### Meta-principles for developing smart, sustainable, and healthy cities

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Policy directives in several nations are focusing on the development of smart cities, linking innovations in the data sciences with the goal of advancing human well-being and sustainability on a highly urbanized planet. To achieve this goal, smart initiatives must move beyond city-level data to a higher-order understanding of cities as transboundary, multisectoral, multiscalar, social-ecological-infrastructure systems with diverse actors, priorities, and solutions. We identify five key dimensions of cities and present eight principles to focus attention on the systems-level decisions that society faces to transition toward a smart, sustainable, and healthy urban future.

Ramaswami et al., Science, 2016



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# A Multi-Infrastructure, Multi-Scaled Social-Ecological-Infrastructural System (SEIS)

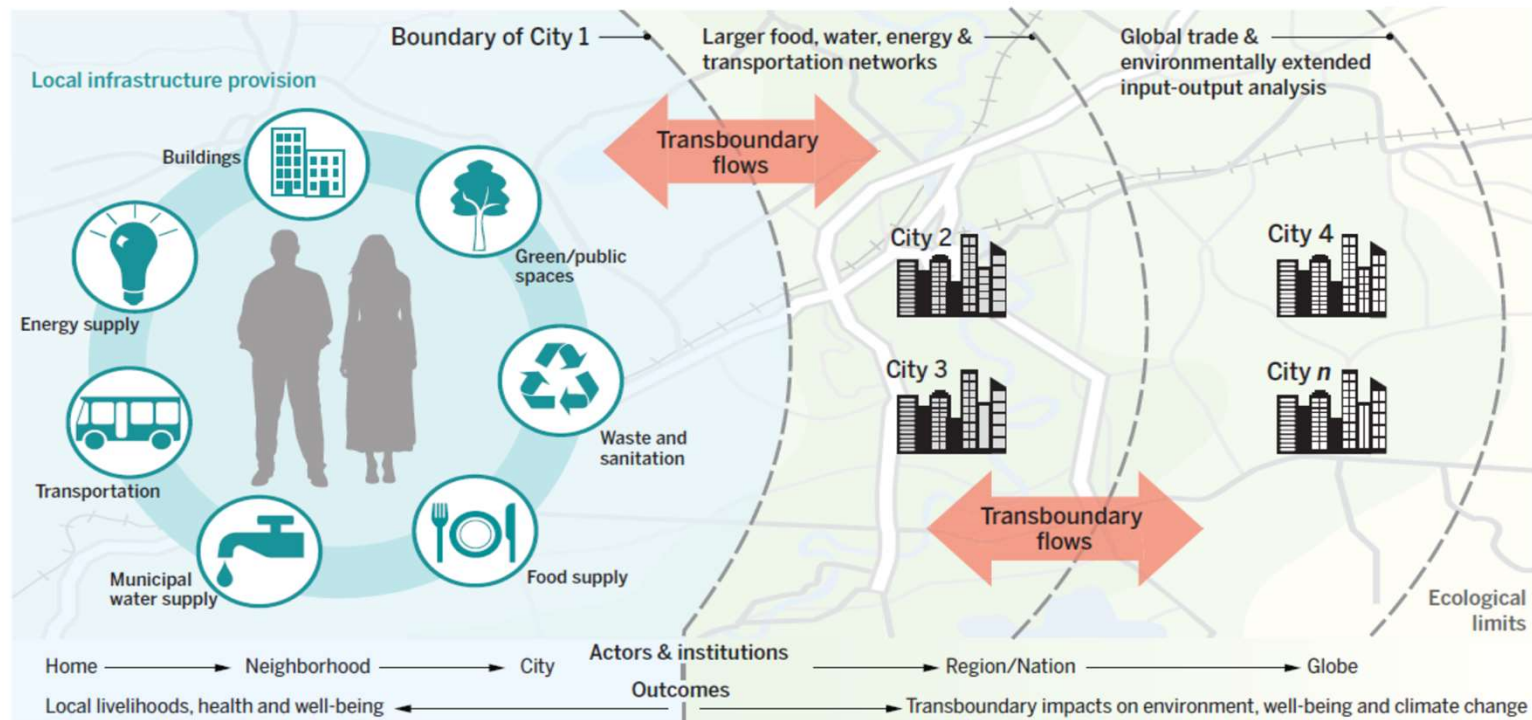


Fig. 2. Intersection of human activities and seven infrastructure sectors within a city, linked to natural ecosystems through transboundary infrastructures across scales. Actors and outcomes (health and sustainability) are also intertwined across scales.

## Five Features:

1. Economic Opportunity
2. Urban Form
3. Inequities in Infrastructure & Multiple/Multi-Scale Health in the city
4. Transboundary Supply of Seven Sectors
5. Multi-Level & Multi-Sector Governance of Nexus outcomes

Ramaswami et al., *Science*, 2016



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# Eight Principles for Developing Smart Sustainable and Healthy Cities

- 1) Focus on providing and innovating basic infrastructure for all, all 7 sectors
- 2) Pursue dynamic multisector and multi-scalar urban health improvements, with attention to inequities.
- 3) Focus on urban form and multisector synergies for resource efficiency
- 4) Recognize diverse strategies for resource efficiency in different city types
- 5) Integrate high- and vernacular technologies
- 6) Apply transboundary systems analysis to inform decisions about localized versus larger-scale infrastructure, recognizing trade-offs
- 7) Recognize coevolution of infrastructures and institutions
- 8) Create capacity and transparent infrastructure governance across sectors and scales





# Contact Us

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