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THE ZOFNASS PROGRAM FOR SUSTAINABLE INFRASTRUCTURE

HARVARD UNIVERSITY

CHALLENGES AND OPPORTUNITIES TOWARDS UPGRADING INFORMAL SETTLEMENTS



The UN 2030 Agenda

Sustainable Development Goals



Working Definitions

Sustainability

“Improves the quality of human life while living within the carrying capacity of supporting eco-systems.”

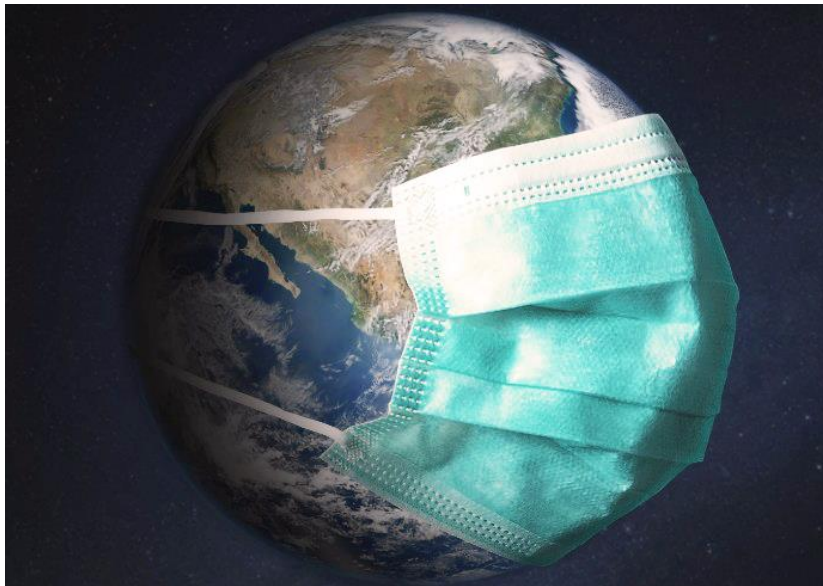
IUCN/UNEP/WWF. Caring for the Earth: A Strategy for Sustainable Living (Gland, Switzerland, 1991).

Resilience

The capacity to recover quickly from shocks and stresses.

COVID-19: A Time to Rethink

the COVID-19 shows the limited resilience of cities



A time to rethink how we plan, design, develop and manage cities



Planning
for
Resilience

An integrated and holistic approach working with all stakeholders to enhance urban centers' long-term societal, economic and environmental resilience

Impact of the Pandemic

Covid-19 is a shock for human settlements globally, with **immense consequences**

- loss of human life
- unemployment
- underemployment
- business closures
- community quarantines
- social isolation
- mental health issues
- unforeseen public expenditures
- reduction in gross domestic product
- supply-chain interruption



Areas of Higher Risk

1. densely populated urban centers

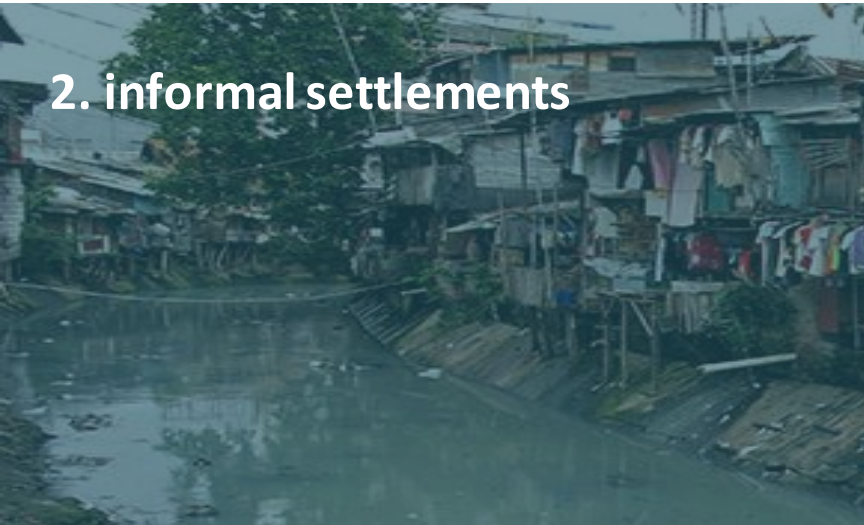


High risks due to:

- population density
- national and international connectivity
- public health response

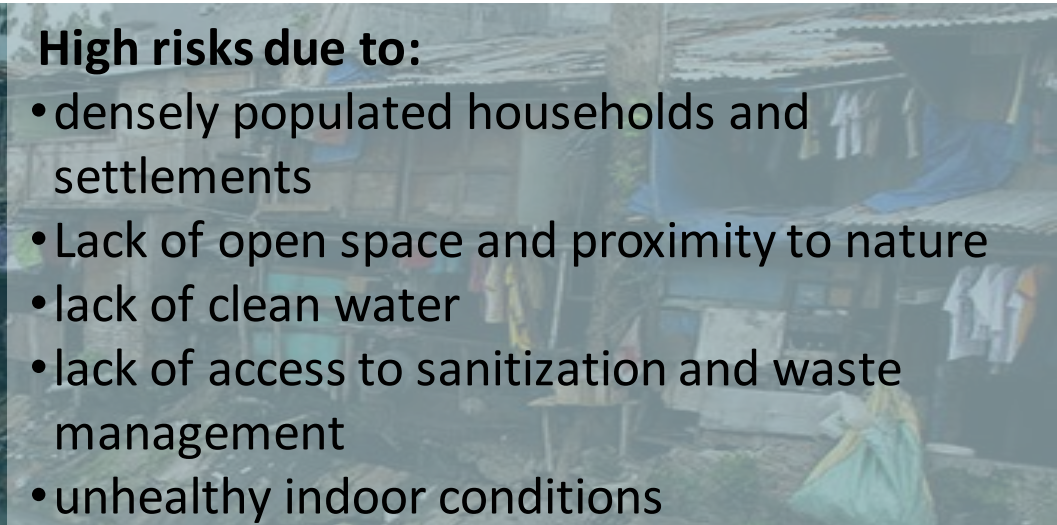


2. informal settlements

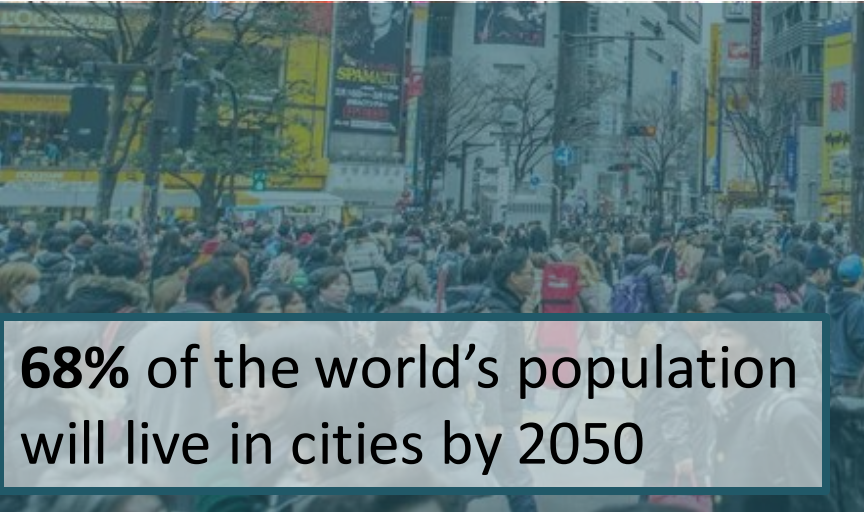


High risks due to:

- densely populated households and settlements
- Lack of open space and proximity to nature
- lack of clean water
- lack of access to sanitization and waste management
- unhealthy indoor conditions

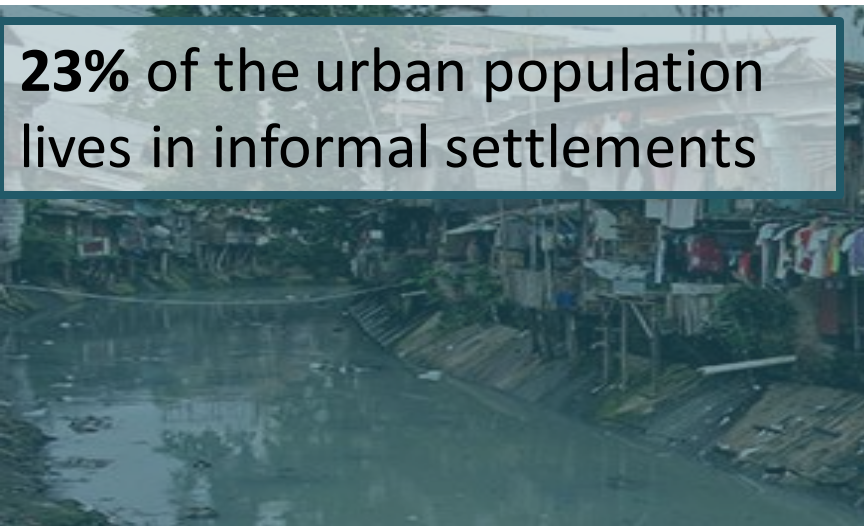


Covid-19: An Opportunity for Resilience



68% of the world's population will live in cities by 2050

It is imperative to upgrade cities and design **resilient human settlements**

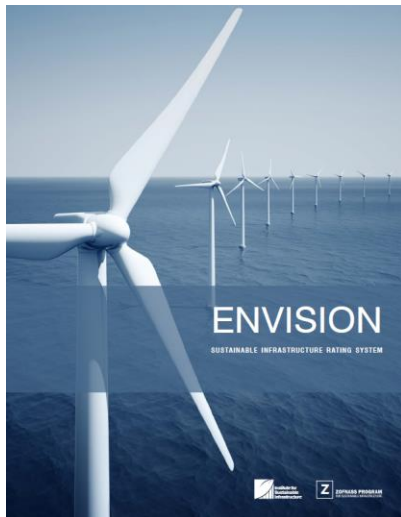


23% of the urban population lives in informal settlements

It is even more imperative to seriously **upgrade informal settlements** and design **resilient cities for all**

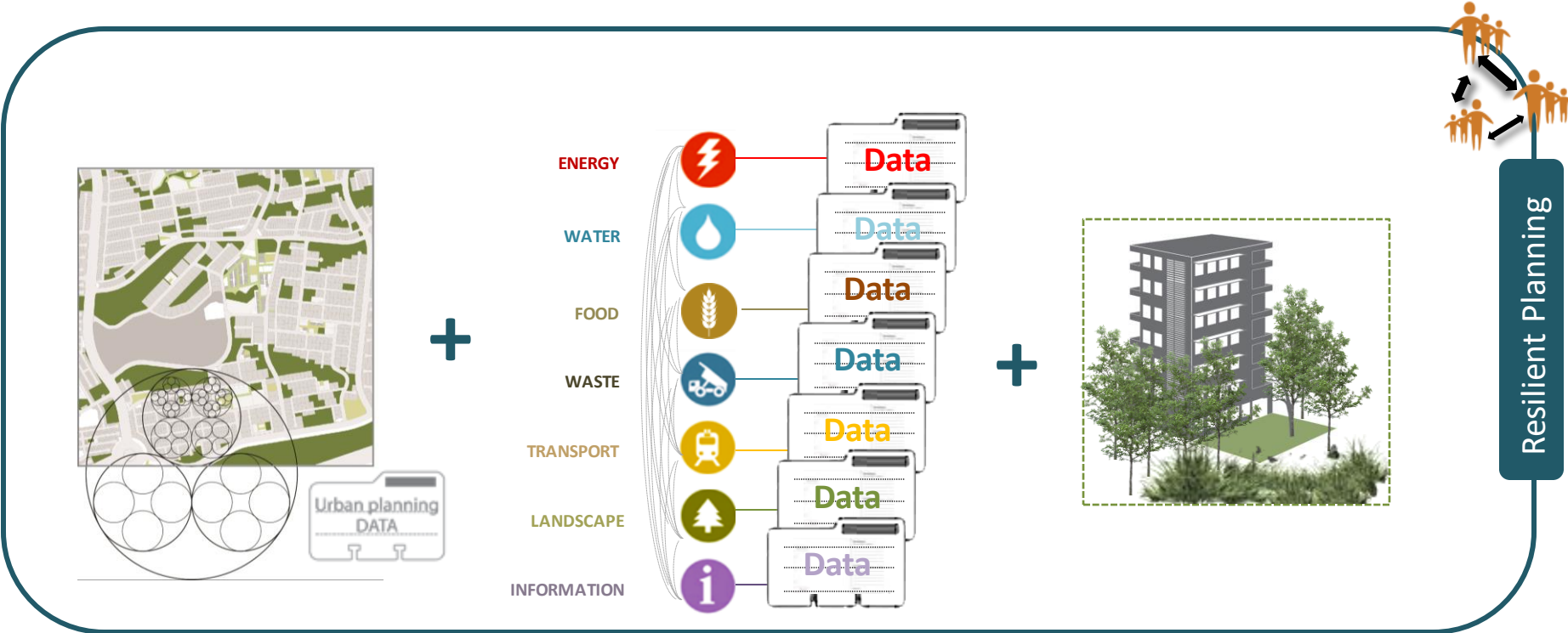
The Zofnass Framework

- The **Envision**[®] rating system for sustainable infrastructure, Institute for Sustainable Infrastructure.
- The “**Planning Sustainable Cities – An infrastructure-based approach,**” Routledge 2016.



A Resilient City

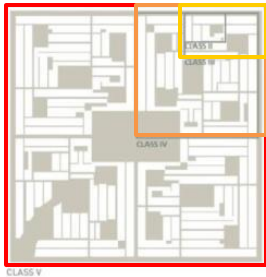
(a) Spatial Planning | (b) Infrastructure Planning | (c) Design of Buildings



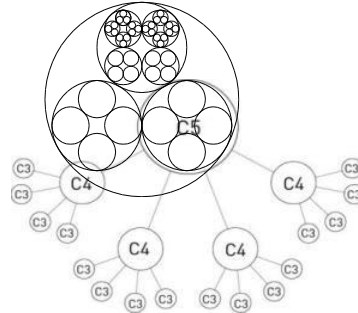
Planning with EKISTICS

“Cities within the City” concept

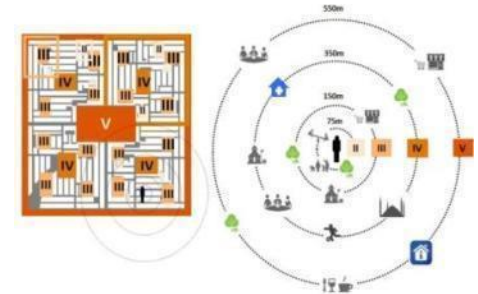
Self-Sufficient Cities



Hierarchy of Cities & Networks



Human Scale Cities









**Self-sufficiency
for resilience**

- **Mixed use:** education, healthcare, commerce, food, parks, religious spaces, administration, leisure
- **Proximities:** “Cities within the City” no bigger than 2x2 km provide walkable distance to amenities.

“Cities within the City” enable control of access-egress

Infrastructure Systems are **sub-systems** that must reach everyone and function **in synergy at times of shocks and stresses.**

	Landscape	<ul style="list-style-type: none"> • Access to city green space for mental/physical health • More public space for healthy living • Protection of natural systems
	Transportation	<ul style="list-style-type: none"> • Plan for alternate means of transport • Plan for pedestrian proximities by minimizing distances and trips. • Provide wide sidewalks. • Offer more paths and small roads to avoid congestion.
	Water	<ul style="list-style-type: none"> • Secure access for all to clean water, sewage and wastewater management.
	Energy	<ul style="list-style-type: none"> • Secure continuous energy supply for all when energy during shocks (e.g. remote working, heating, telecommunications). • Reduce energy use and promote renewables to minimize environmental and health risks.
	Solid Waste	<ul style="list-style-type: none"> • Sustainable waste management for all.
	Information	<ul style="list-style-type: none"> • Secure internet access. • Provide constant communication pathways and real-time data available to citizens and city managers across all sectors and infrastructure systems. • Provide and manage electronic services (e-government, e-learning, etc).
	Food	<ul style="list-style-type: none"> • Ensure continuous access to food for all. • Promote local food production.

Resilience for All

Urban resilience demands a holistic approach:

- meaningful engagement of the most vulnerable members of the community
- integration of informal settlements through planning



Definition of Informal Settlements

Informal Settlements (OECD):

1. areas where groups of housing units have been constructed on land that the occupants have no legal claim to, or occupy illegally,
2. **unplanned settlements and areas where housing is not in compliance with current planning and building regulations (unauthorized housing),**
3. **the neighbourhoods usually lack, or are cut off from, formal basic services and city infrastructure.**

Informal Housing are also:

1. housing built with partial or no permit (unauthorized housing),
2. unplanned settlements and areas with unauthorized housing, which are not in compliance with planning regulations and lack proper infrastructure.



Management of Change

- **Collect Data**
- **Introduce Realistic Planning Regulations and Building Bylaws**
- **Create Open Green Space (requires demolitions)**
- **Improve and Establish Services (infrastructure)**
- **Build Healthy Housing**
- **Engage the Private Sector; reduce Bureaucracy, enable Transparency**



Funding is Required

- Often, residents do not pay.
- Multiple layers of bureaucracy with overlapping responsibilities.
- The private sector needs incentives and guarantees.
- Difficulty of Multilateral Organizations to identify real needs.
- Often, there is a restart at “square one.”
- Effectiveness of interventions are not evaluated.





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