



Cities: IPCC Special Report on Global Warming of 1.5°C

A call to action

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Four system transitions

“....require rapid and far-reaching transitions in energy, land, **urban** and infrastructure (including transport and buildings), and industrial systems.”

Rapid. Far-reaching. Unprecedented

A global scale opportunity

“.... urban systems can harness the megatrends of urbanisation, digitalisation, financialisation and growing sub-national commitment to smart cities, green cities, resilient cities, sustainable cities and adaptive cities, for the type of transformative change required by 1.5°C-consistent pathways”.



Urbanisation megatrend

- World population is rising especially in **medium-sized cities** in low- and moderate-income countries. **Most affected people** live in low and middle income countries.
- Urban population projected to increase by **~2 billion by 2050**
 - 70 million additional urban residents per year until mid-century
- ~360 million people live in **urban coastal areas**
- ~3 billion people will live in **slums and informal settlements** by 2050

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Urbanisation megatrend

Transformational potential because of the concentration:

- economic activity
- social networks
- human resources
- infrastructural investment
- nimble local governments
- connection to rural and natural environments
- Innovation

This transformation will involve both ambitious **mitigation and adaptation**

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Cities at risk



Cities – Increased risks

- **Climate change risks concentrate** in cities
 - heat stress, flooding, vector-borne diseases, air pollution, water scarcity, landslides, fire
- These risks could **expose and amplify pre-existing stresses**
 - Poverty, exclusion, governance
 - Especially in **African and Asian** countries where urbanisation rates are highest
- Urbanisation leads to **increased consumption, environmental degradation and vulnerability**

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Cities - Heat

- **Urban heat island (UHI) effect** increases heat related health impacts in cities
 - Up to **30% increase of heat island effect** for a doubling of CO₂
 - Heat island effect amplified by **greater population and city size**
- **Twice as many megacities** become heat-stressed at 1.5°C than today
- **>350 million more people** exposed to deadly heat by 2050 (midrange population growth)
- Even holding temperature to well below 2°C + UHI could result in a substantial increase in **deadly heatwaves in cities**

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Cities – Flooding and drought

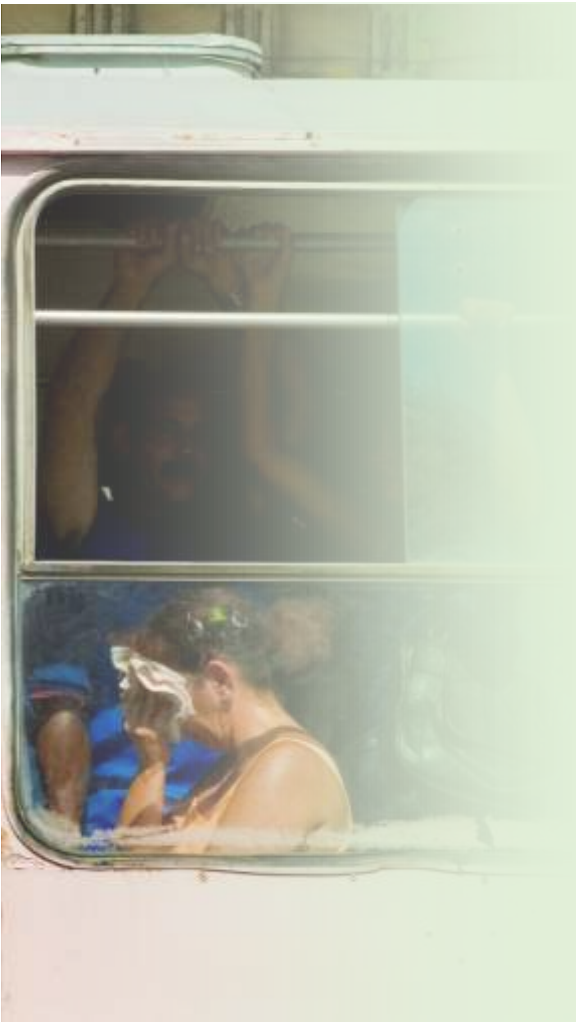
- Increased **flooding and damage** of infrastructure from extreme events
- **Compound flooding** (from multiple drivers) in coastal cities
 - likely to increase with further development and sea level rise at 1.5°C and 2°C
 - 31-69 million people exposed to coastal flooding at 1.5°C; 32-79 million at 2°C
- Urban populations **exposed to drought**
 - 350.2 (± 158.8) million at 1.5°C, 410.7 (± 213.5) million at 2°C

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Cities - Sea level rise

- **136+ megacities** (> 1 million in 2005) at risk of sea level rise
- **Salinization** of groundwater
- **Localized subsidence** causing greater relative sea level rise
- **Effect of storms** amplified by sea level rise
- Dike height under no-mitigation scenario is **2m higher in 2300** compared to scenarios with mitigation, at 1.5°C or 2°C
- **‘Coastal squeeze’**: ocean and human activity encroach on coastal ecosystems



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Cities – Poverty

- Poverty and climate change
 - Climate change is a **poverty-multiplier** that makes poor people poorer
 - **>100 million people** could be forced into extreme poverty
 - Reduces incomes, **widens inequality**, reshapes global economy
 - **Most severe impacts** projected for urban areas and some rural regions in sub-Saharan Africa and Southeast Asia affected

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Responding through adaptation



Cities - Adaptation

- 1.5°C pathways require **action in all cities** and urban contexts
- Cities are at the **frontline of adaptation**
 - Disaster risk reduction and management
 - Flood and drought early warning systems
 - Improving water storage and use
- **Regional differences** in adaptation spending
 - Developing cities spend more on health and agriculture-related
 - Developed cities spend more on energy and water

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Cities - Adaptation

- Adaptation activities **lagging in emerging economies**
 - **Major centres** of population growth
 - Face **complex interrelated investment pressures** in health, housing and education
 - In rapidly growing African and Asian cities, **poverty undermines adaptive capacity**



Cities – Urban planning

- Can address **adaptation and mitigation** needs
- Effective urban planning can **reduce GHG emissions from transport by 20 - 50%**
- **Benefits** of reduced air pollution, congestion, fatalities and promote **social cohesion**
- Consider implications of **extreme events** in urban design
- Building **codes and standards**
- Improved **enforcement of codes**
- **Maladaptation**: Potential for industry interests to undermine transformation of codes and prevent evolution of buildings or land use

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Cities – Urban land use

- Influences **risk exposure, adaptive capacity**
- Investing in **infrastructure and buildings** reduces risk
- **Adaptation plans:** reduce exposure to flood, heat stress, fire and sea-level rise
- Consider **justice, equity, and broad participation** to avoid negative impacts on poor

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Cities – Sustainable Water

- **Sustainable water resource management** through waste-water recycling and storm water diversion
- **Urban design** to mediate run off, encourage groundwater recharge and enhance water quality.
- **Water-energy-food nexus** can support policy coherence



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Cities – Green Urban Infrastructure and Ecosystem Services

Green infrastructure	Adaptation benefits	Mitigation benefits
Urban trees planting, urban parks	Reduced heat island effect, psychological benefits	Less cement, reduced air-conditioning
Permeable surfaces	Water recharge	Less cement in city, some bio-sequestration, less water pumping
Forest retention, urban agricultural land	Flood mediation, healthy lifestyles	Air pollution reduction
Wetland restoration, riparian buffer zones	Reduced urban flooding, Low skilled local work, Sense of place	Some bio-sequestration, Less energy spent on water treatment
Biodiverse urban habitat	Psychological benefits, inner-city recreation	Carbon sequestration

Governance for action



Cities - Governance

- Urban governance is critical to ensuring that the necessary urban transitions deliver economic growth and equity
- Local governments can be powerful agents of climate action
- Urban governance is enhanced when it involves:
 - multiple actors
 - supportive national governments
 - sub-national climate networks
- Climate resilient development pathways

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INTERGOVERNMENTAL PANEL ON climate change

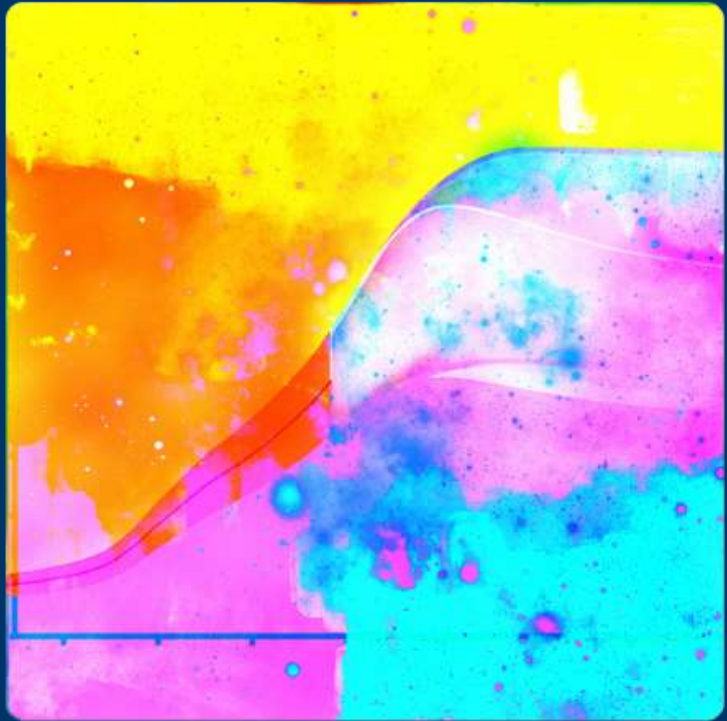


AR6 Chapter 6 – Cities, settlements and key infrastructure

- Changes in the **international policy architecture** for settlements since AR5 (including SDGs)
- Interactions of climate risks with urban and rural change processes including **food-energy-water-health nexus** (e.g., air quality)
- Risk-reducing **infrastructure and services** (including **ecological** and social), their deficits, and implications for vulnerability, exposure and adaptation, particularly in the context of extreme events

AR6 Chapter 6 – Cities, ...

- **Detection and attribution** of observed impacts and responses and **projected risks** from climate change under alternative scenarios for cities and settlements, and related infrastructure
- **Adaptation options**, adaptive capacity, responses and outcomes, including equity considerations, and links to mitigation
- **Institutional, financial, and governance** structures that enhance resilience of and enable adaptation in settlements, cities and key infrastructure
- **Lessons from case studies**



Thank you