EXPLORING HOW EUROPEAN CITIES CAN ADAPT TO THE IMPACTS OF CLIMATE CHANGE AND THE CHALLENGES AHEAD

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Insights from the IPCC 6th Assessment Report – Adaptation

- Urban impacts of climate change are observed
- Risk and impacts extend from point source to cascading and systemic
- Existing adaptation is inadequate and unequal
- Systemic resilience??? Climate Resilient Development
- The urban opportunity
- Conclusions

https://report.ipcc.ch/ar6/wg2/IPCC_AR6_WGII_FullReport.pdf

Urban risk: emerging expansion from point source to systemic risks

Ch6: '*Urban impacts are widespread and pervasive*'

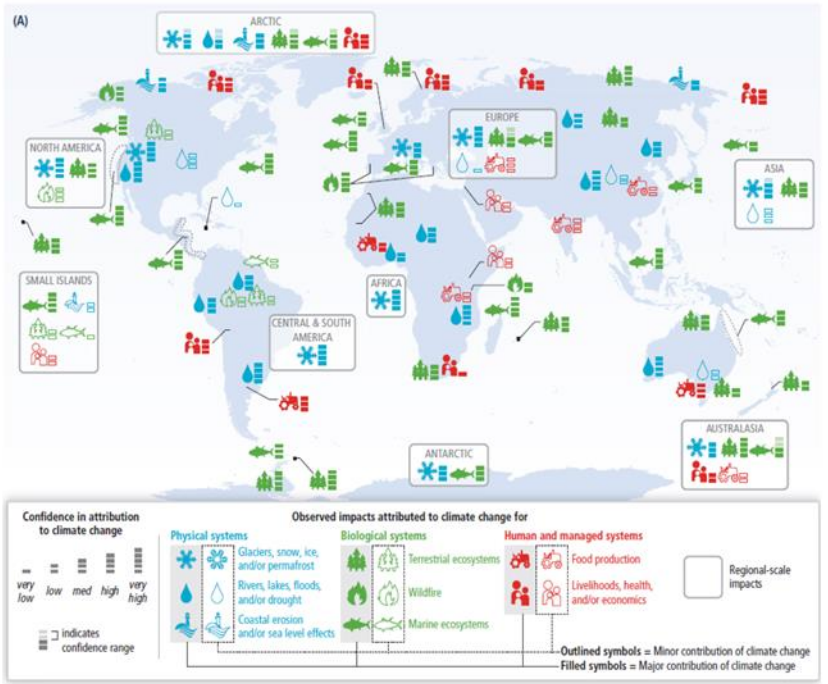
- indirect impacts (supply chains and food/water security);
- compounding impacts (critical infrastructure)
- urban dynamics (smaller, declining, new demographies

AR6, 2022

AR5, 2014

(b) Observed impacts of climate change on human systems

Human systems	Impacts on water scarcity and food production: Water scarcity	Agriculture/ crop production	Animal and livestock health and productivity	Fisheries yields and aquaculture production	Impacts on health and wellbeing: Infectious diseases	Heat, malnutrition and other	Mental health	Displacement	Impacts on cities, settlements and infrastructure: Inland flooding and associated damages	Flood/storm induced damages in coastal areas	Damages to infrastructure	Damages to key economic sectors
Global	±	−	○	−	−	−	−	−	−	−	−	−
Africa	−	−	−	−	−	−	○	−	−	−	−	−
Asia	±	±	−	−	−	−	−	−	−	−	−	−
Australasia	±	−	±	−	−	−	−	not assessed	−	−	−	−
Central and South America	±	−	±	−	−	−	not assessed	−	−	−	−	−
Europe	±	±	−	±	−	−	−	○	−	○	−	−
North America	±	±	○	±	−	−	−	−	−	−	−	−
Small Islands	−	−	−	−	○	−	○	−	−	−	−	−
Arctic	±	±	−	−	−	−	−	○	−	−	−	±
Cities by the sea	○	○	○	−	○	−	not assessed	−	○	−	−	−
Mediterranean region	−	−	−	−	○	−	not assessed	○	±	○	○	−
Mountain regions	±	±	−	○	−	−	○	−	−	na	−	−



Cascades recognised – for first time! – high confidence

IPCC AR6 WGII Summary for Policymakers:

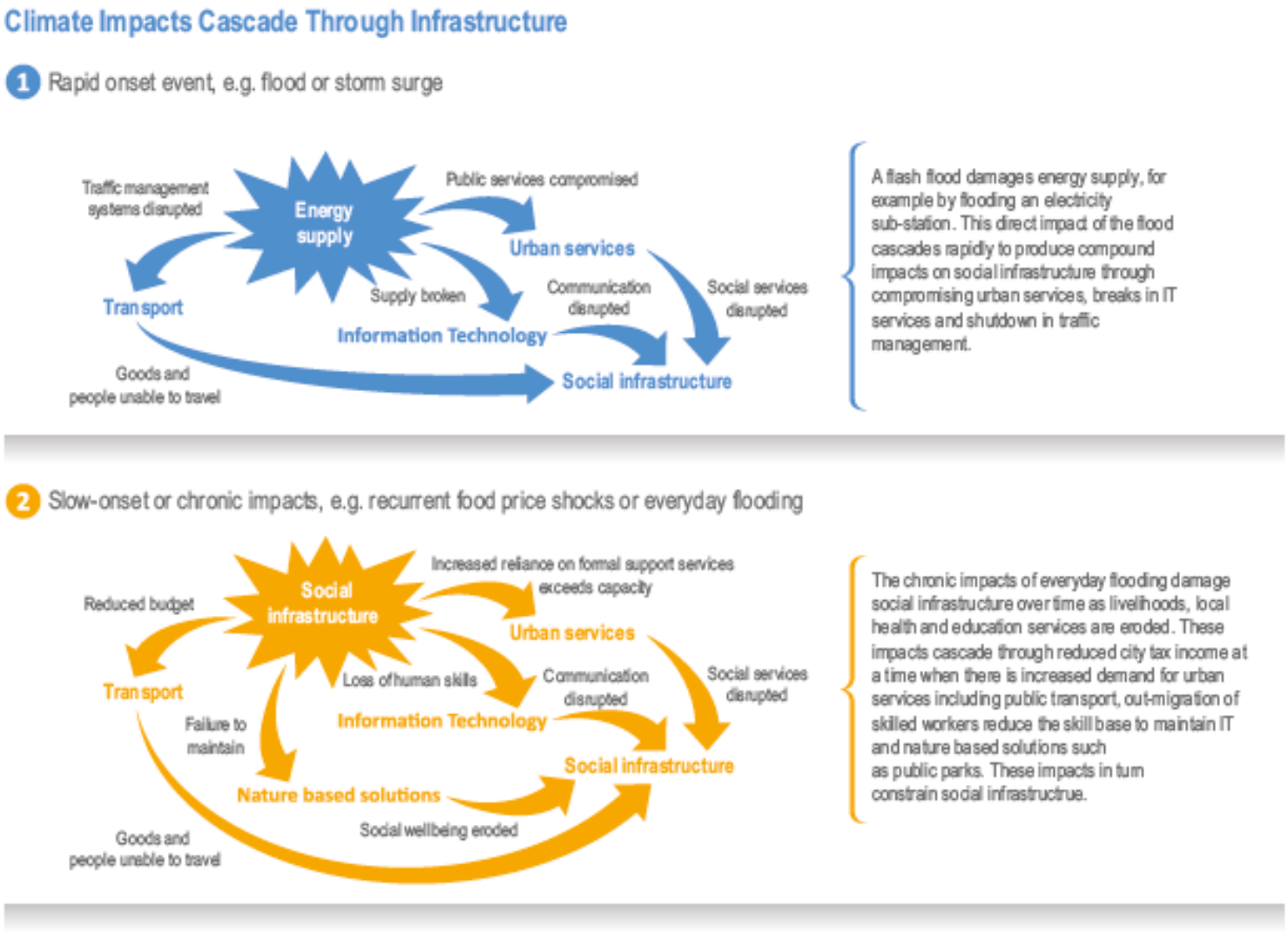
B5: Climate change impacts and risks are becoming increasingly complex and more difficult to manage. Multiple climate hazards will occur simultaneously, and **multiple climatic and non-climatic risks will interact, resulting in compounding overall risk and risks cascading across sectors and regions**. Some responses to climate change result in new impacts and risks. **(high confidence)**

{1.3, 2.4, Box 2.2, Box 9.5, 11.5, 13.5, 14.6, Box 15.1, CCP1.2, CCP2.2, CCB COVID, CCB DISASTER, CCB INTEREG, CCB SRM}

https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_SummaryForPolicymakers.pdf

Urban Cascades – shaped by infrastructure

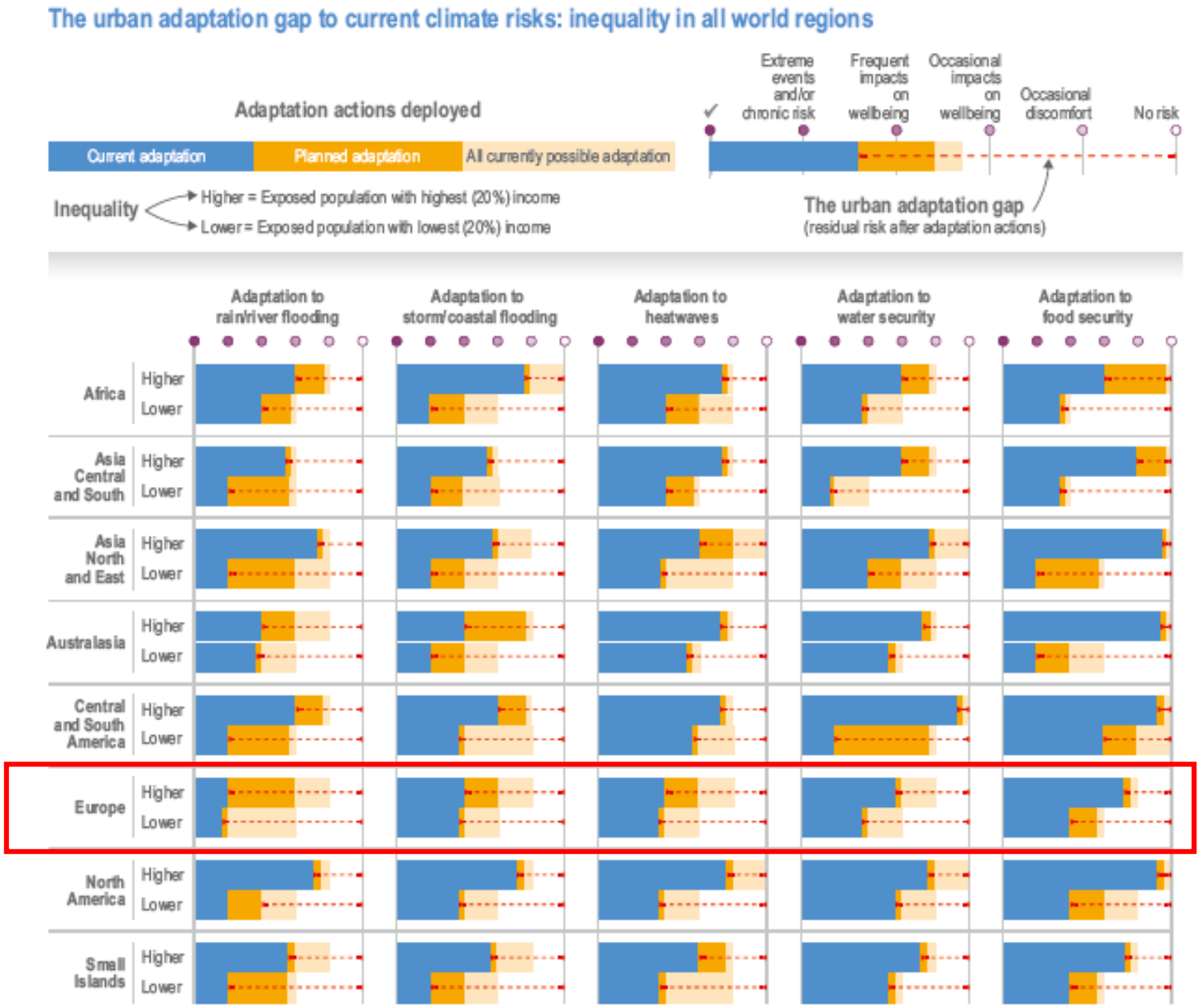
Urban impacts are cascading and compounding



COVID-19 has had a substantial urban impact and generated **new climate-vulnerable populations** (high confidence). {TS.B.8.1}

Impacts on health, livelihoods and well-being are **felt disproportionately by economically and socially marginalized people** (high confidence). {TS.B.8.3}

Adaptation to date: Limited and unequal



Global

- An unequal adaptation gap exists in all regions.
- Implemented is often far behind planned and possible

Europe

- lots of scope for improvement in risk and equity
- moving from current to planned inequality persists.

Climate Resilient Development: adaptation win-wins?

Table 6.6 Urban Climate Resilient Development

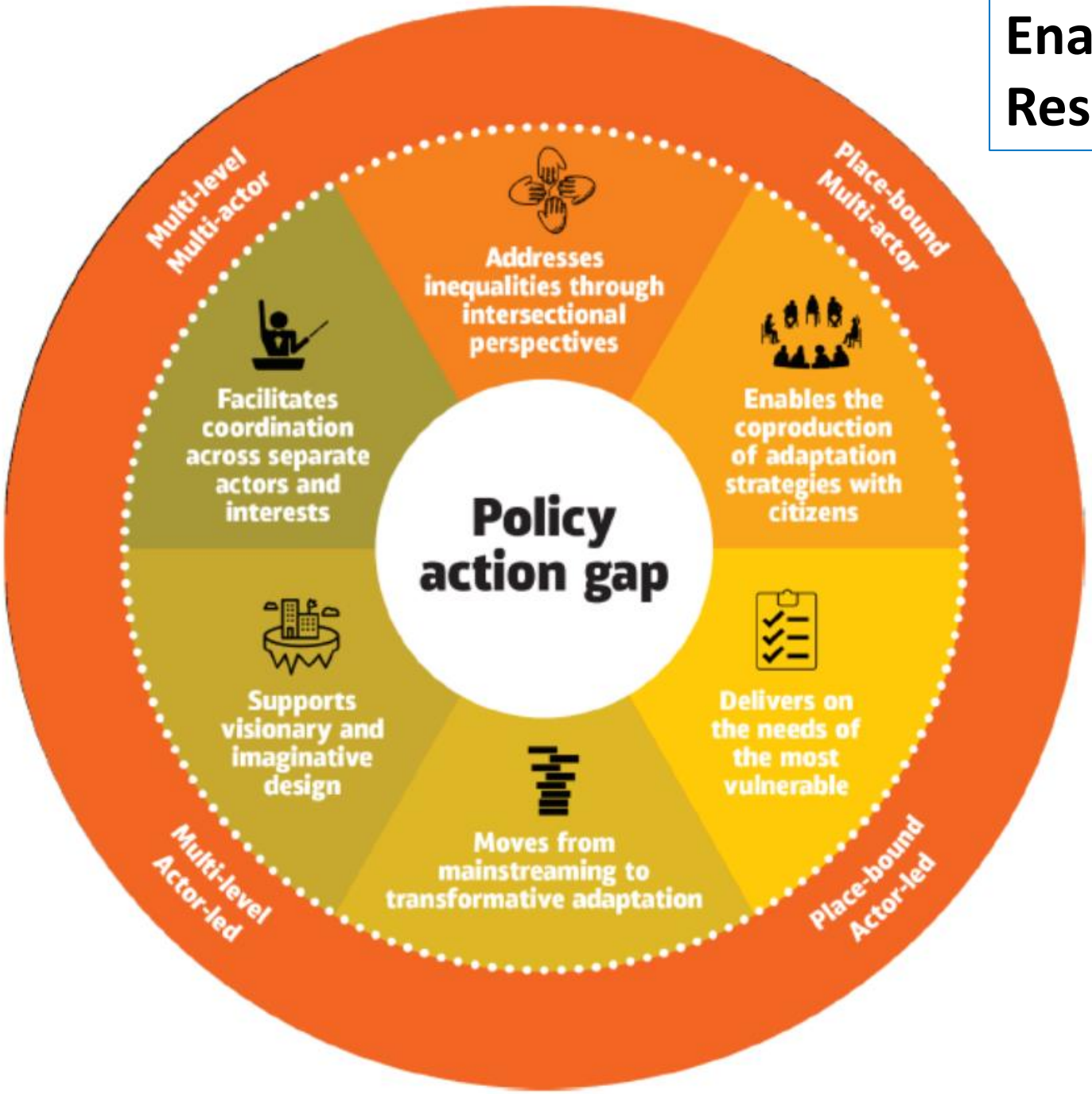
Inf. Systems	Adaptation Measure	Risk coverage				Benefits to Human			Benefits to ecosystem services	Potential effectiveness				Contribution to GHG emission reduction	Equity benefits		Transformation towards sustainable development (human systems fundamental change + impact on wider system)	
		Multi-climate Hazard	Systemic vulnerability reduction	Reduces new hazard exposure	Transfer risk or impact to other people	Social capital	Livelihood	Health	Ecological	Flexibility post deployment	Deployment scale	Benefit to other inf. systems	Economic feasibility	Mitigation cobenefit	Targets poverty and marginality	Inclusive and locally accountable	Social transformation	Ecological transformation
Social Inf.	Land-use	HA-RE	HA-RE	HA-RE	HA-RE	HA-RE	HA-RE	HA-RE	HA-RE	HA-RE	HA-ME	MA-ME	HA-RE	HA-RE	MA-LE	HA-ME	HA-ME	HA-ME
	Livelihoods and social protection 6.3.2.2	HA-ME	HA-RE	HA-ME	HA-LE	HA-LE	HA-ME	HA-LE	LA-LE	MA-ME	HA-ME	HA-LE	MA-ME	LA-LE	HA-ME	MA-RE	MA-ME	LA-LE
	Emergency management and security 6.3.2.3	HA-ME	MA-ME	MA-ME	HA-ME	HA-ME	HA-ME	MA-ME	HA-ME	MA-ME	MA-ME	HA-ME	HA-ME	HA-ME	MA-ME	MA-ME	MA-ME	MA-ME
	Health 6.3.2.4	HA-RE	HA-RE	HA-ME	HA-ME	HA-ME	HA-ME	HA-RE	MA-ME	MA-ME	HA-RE	MA-ME	MA-ME	MA-ME	HA-RE	MA-ME	LA-LE	LA-LE
	Education & Comms. 6.3.2.5	HA-ME	MA-ME	MA-ME	MA-ME	HA-RE	HA-ME	HA-ME	HA-LE	HA-ME	MA-LE	LA-LE	LA-LE	HA-ME	MA-ME	MA-ME	HA-ME	MA-RE
	Cultural heritage & institutions 6.3.2.6	HA-ME	MA-ME	MA-LE	HA-ME	MA-ME	MA-RE	HA-ME	MA-LE	MA-ME	LA-LE	MA-LE	HA-ME	MA-LE	MA-LE	HA-ME	HA-RE	HA-RE
Nature based Solutions	Temp. regulation 6.3.3.1	HA-RE	LA-ME	LA-LE	LA-LE	HA-ME	HA-ME	HA-ME	HA-ME	MA-LE	HA-ME	MA-ME	HA-ME	HA-RE	MA-LE	MA-LE	LA-LE	HA-ME
	Air quality regulation 6.3.3.2	HA-ME	MA-LE	MA-LE	LA-LE	HA-ME	MA-ME	HA-ME	MA-ME	HA-ME	MA-ME	MA-LE	MA-ME	HA-ME	LA-LE	MA-LE	LA-LE	MA-LE
	Stormwater and sanitation 6.3.3.3	HA-ME	MA-ME	MA-LE	HA-ME	MA-ME	MA-LE	HA-LE	HA-ME	MA-ME	MA-LE	HA-ME	HA-ME	HA-ME	MA-LE	MA-LE	LA-LE	MA-ME
	Coastal flood protection 6.3.3.4	HA-ME	MA-ME	HA-LE	LA-LE	MA-LE	HA-RE	HA-LE	HA-ME	HA-LE	MA-LE	HA-ME	HA-ME	MA-ME	MA-LE	LA-LE	MA-LE	MA-ME
	Riverine flood impact reduction 6.3.3.5	HA-RE	MA-ME	MA-ME	HA-ME	HA-ME	LA-ME	HA-ME	HA-RE	MA-LE	MA-ME	MA-ME	LA-ME	HA-RE	LA-ME	MA-LE	LA-LE	MA-ME
	Water provisioning and management 6.3.3.6	HA-RE	MA-LE	MA-LE	MA-LE	MA-LE	MA-ME	HA-ME	HA-RE	MA-ME	HA-ME	MA-ME	HA-RE	HA-ME	LA-LE	MA-LE	MA-LE	HA-ME
	Food production and security 6.3.3.7	HA-ME	HA-ME	MA-LE	LA-LE	MA-ME	MA-ME	MA-ME	HA-ME	MA-ME	HA-ME	MA-ME	HA-ME	MA-ME	MA-ME	MA-LE	HA-ME	MA-ME
Grey/ Physical Inf.	Built form 6.3.4.1	HA-RE	HA-RE	HA-RE	MA-LE	LA-LE	MA-ME	HA-RE	MA-ME	HA-RE	HA-RE	LA-LE	LA-LE	MA-ME	LA-LE	LA-LE	LA-LE	MA-ME
	Housing and building design 6.3.4.2	HA-RE	HA-RE	HA-RE	MA-ME	LA-LE	MA-ME	HA-RE	LA-LE	HA-RE	HA-RE	MA-LE	MA-ME	MA-ME	MA-ME	MA-ME	MA-ME	MA-ME
	ICT 6.3.4.3	HA-RE	HA-ME	LA-LE	LA-LE	HA-RE	HA-ME	LA-LE	LA-LE	HA-RE	HA-ME	HA-RE	HA-ME	MA-ME	LA-ME	LA-ME	MA-ME	LA-LE
	Energy Inf. 6.3.4.4	HA-RE	HA-ME	LA-LE	LA-LE	HA-LE	HA-RE	LA-LE	LA-LE	HA-ME	MA-ME	HA-RE	MA-ME	HA-RE	MA-ME	MA-ME	LA-LE	LA-LE
	Transport 6.3.4.5	HA-RE	HA-ME	LA-LE	LA-LE	HA-LE	HA-RE	LA-LE	LA-LE	HA-ME	MA-ME	MA-ME	MA-ME	MA-LE	MA-ME	MA-ME	LA-LE	LA-LE
	Water and Sanitation 6.3.4.6	HA-RE	HA-LE	MA-ME	LA-ME	HA-LE	HA-RE	HA-RE	HA-RE	HA-ME	MA-ME	HA-RE	MA-ME	HA-ME	MA-RE	MA-ME	LA-LE	HA-RE
	Flood management 6.3.4.7	HA-RE	HA-ME	HA-ME	HA-RE	MA-ME	HA-RE	HA-RE	MA-ME	HA-ME	HA-RE	HA-RE	HA-RE	HA-LE	MA-ME	LA-ME	LA-LE	MA-LE
	Coastal management 6.3.4.8	HA-RE	HA-ME	HA-ME	HA-RE	MA-ME	HA-RE	HA-RE	MA-ME	HA-ME	HA-RE	HA-RE	HA-RE	HA-LE	MA-ME	LA-ME	LA-LE	MA-LE

Key:
Climate Resilient Development Contribution: High Negative; Negative Moderate; Negative Small; Negligible negative; Nil; Positive Negligible; Positive Small; Positive Moderate; Positive High; No data

Confidence: HA-LE High agreement – limited evidence; HA-ME High agreement – medium evidence; HA-RE High agreement – robust evidence; MA-LE Medium agreement – limited evidence; MA-ME Medium agreement – medium evidence; MA-RE Medium agreement – robust evidence; LA-LE Low agreement – limited evidence; LA-ME Low agreement – medium evidence; LA-RE Low agreement – robust evidence

- 750 papers reviewed
- Multiple, diverse urban options
- Urban planning cross-cuts
- Physical inf – caution
- Risk burden shifting biggest failing

Enabling Factors for Urban Climate Resilient Development



Finance has tended to favour the wealthiest rather than the poorest {TS.D.6.3}, **large-scale engineering projects rather than maintenance or social innovations, grey/physical rather than blue/green infrastructure, reproducing risk of stranded assets** {TS.D.6.5}.

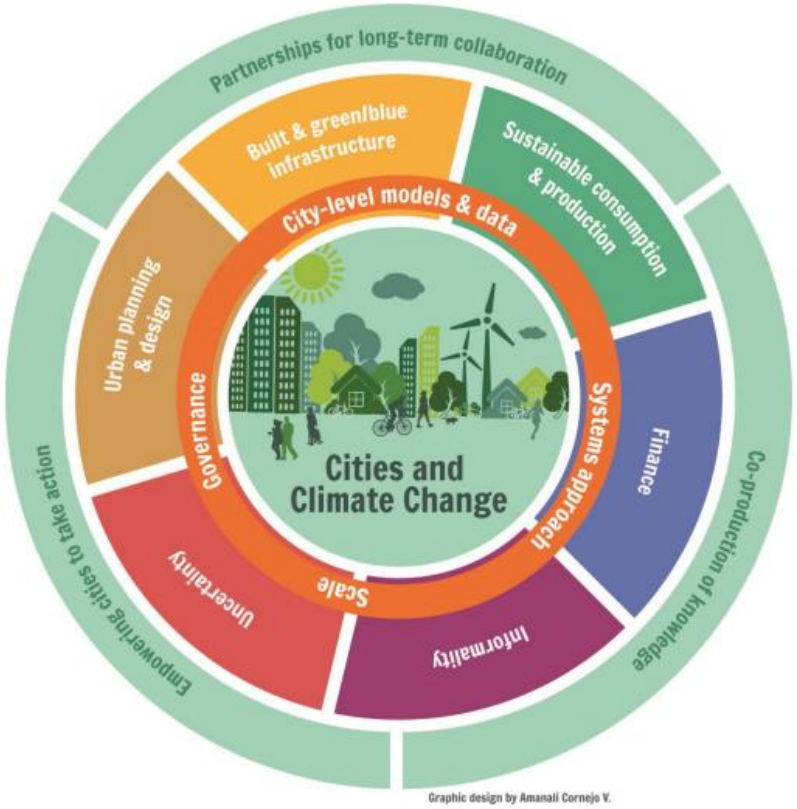
Access to finance is most difficult for city, local and non-state actors and in conditions where governance is fragile. {ES-Ch6}

Overarching Message for Cities

Urbanisation processes generate global climate risk…
In all cities and urban areas the risk faced by people and assets from hazards associated with climate change has increased (*high confidence*)

Evidence from urban and rural settlements is unequivocal; climate impacts are felt disproportionately in urban communities, with the most economically and socially marginalised being most affected (*high confidence*)

…and can be a global solution for climate resilient development
Global urbanisation offers a time-limited opportunity to work toward widespread and transformational adaptation and climate-resilient development (*high confidence*).



Conclusions

1. From point source to cascading/compounding risk and impacts
2. What might systemic resilience look like?
3. We start with an adaptation gap
4. We know little about connections between policy options
5. We know what the enabling environment for CRD might look like but it is difficult to achieve.