

Fact sheet - Human Settlements

Climate Change Impacts and Risks



Concentrated risk and concentrated opportunity for action

Cities and settlements are crucial for delivering urgent climate action. The concentration and interconnection of people, infrastructure and assets within and across cities and into rural areas creates both risks and solutions at global scale (*high confidence*). {TS.D.6}

Globally, urban populations have grown by more than 397 million people between 2015-2020, more than 90 percent of this growth occurring in Less Developed Regions. The most rapid growth in urban vulnerability has been in unplanned and informal settlements, and in smaller to medium urban centres in low- and middle-income nations where adaptive capacity is limited. {TS.B.8.1}



Key impacts

Exposure to climate-driven impacts, such as heatwaves, urban heat islands, extreme precipitation and storms, in combination with rapid urbanization and lack of climate sensitive planning, is affecting marginalised urban populations and key infrastructure to climate change (*high confidence*). {TS.B.8.1}

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}

Urban areas and their infrastructure are susceptible to both compounding and cascading risks arising from interactions between extreme events and increasing urbanization. Losses become systemic when affecting entire systems and can jump from one system to another (e.g. drought impacting on rural food production contributing to urban food insecurity) (*medium confidence*). {TS.C.11.5}



Coastal cities

Coastal cities are disproportionately affected, in part because of the exposure of multiple assets, economic activities and large populations are concentrated in narrow coastal zones (*high confidence*). Early impacts of accelerating sea-level rise have been detected at sheltered or subsiding coasts, flooding at high tides, water-table salinisation, ecosystem and agricultural transitions, increased erosion and coastal flood damage (*medium confidence*). Coastal settlements with high inequality e.g., a high proportion of informal settlements, as well as deltaic cities prone to land subsidence and Small Island States are highly vulnerable (*high confidence*). {TS.B.8.2}

Risks to coastal cities and settlements are projected to increase by at least one order of magnitude by 2100 without significant adaptation and mitigation action (*high confidence*). Population at risk in coastal cities and settlements to a 100-year coastal flood increases by ~20% if global mean sea level rises by 0.15 m relative to current levels, doubles at 0.75 m, and triples at 1.4 m, assuming present-day population and protection height (*high confidence*). {TS.C.5.4}

Climate resilient development depends on the extent to which coastal cities and settlements institutionalise key enabling conditions and chart place-based adaptation pathways to close the coastal adaptation gap and take urgent action to mitigate greenhouse gas emissions (*medium confidence*). {ES-CCP2}

Adaptation Options and Barriers

✓ + ✗ Adaptation plans, opportunities and gaps

Many cities and settlements have developed adaptation plans, but few have been implemented, so that urban adaptation gaps exist in all world regions and for all hazard types (*high confidence*). Current adaptation is unable to resolve risks to current climate change associated hazards. {TS.D.1.4}

Continuing rapid growth in urban populations and unmet needs for healthy, decent, affordable and sustainable housing and infrastructure are a global opportunity to integrate inclusive adaptation strategies into development (*high confidence*). Retrofitting, upgrading and redesigning existing infrastructure, combined with planning and designing new urban places, can utilise existing knowledge on social policy, nature-based solutions with safeguards and grey/physical infrastructure to build inclusive processes of adaptation into everyday urban planning and development. {TS.D.6.1}

(c) Projected number of people at risk of a 100-year coastal flood.

Calculated for sea level rise under SSP2-4.5, based on current protection levels.

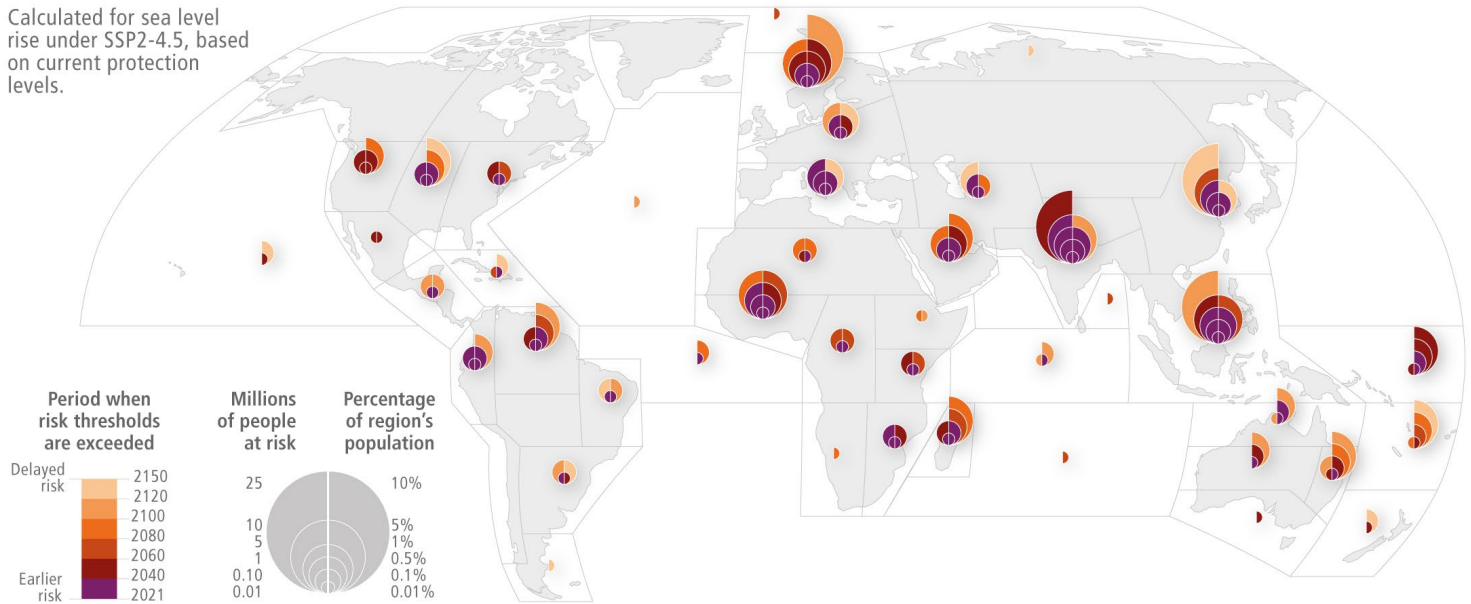


Figure 1: The size of the circle represents the number of people at risk per IPCC region and the colours show the timing of risk based on projected sea-level rise under SSP2-4.5. Darker colours indicate earlier in setting risks. The left side of the circles shows absolute population at risk and the right side the share of the population in percentage. {Figure CCP2.4; Figure 13.6; Figure 15.3; Annex 1: Global to Regional Atlas; TS.9c}.

Key adaptation options

A mix of infrastructure, nature-based, institutional and socio-cultural interventions include: vulnerability-reducing measures, avoidance (e.g. disincentivising developments in high-risk areas and addressing existing social vulnerabilities), hard- and soft-protection (e.g. sea walls, coastal wetlands), accommodation (e.g. elevating houses), advance (e.g. building up and out to sea) and staged, managed retreat (e.g. landward movement of people and development) (*very high confidence*). {TS.D.7.3}

Disaster risk management, climate services and risk sharing expand the solution space by increasing the feasibility and effectiveness of other options (*high confidence*). {TS.D.11.1}

There is high confidence in the economic and ecological feasibility of green infrastructure and ecosystem services as well as sustainable urban water management, once institutional barriers in the form of limited social and political acceptability are overcome. {TS.E.1.4}

Inertia, maladaptation and limits to adaptation

Maladaptation has been observed for instance, because of inadequate knowledge, short-term, fragmented, single-sectoral and/or non-inclusive governance planning and implementation (*high confidence*). It includes inflexible infrastructure that cannot be adjusted easily or affordably, or stranded assets or stranded vulnerable communities which cannot afford to move or adapt. {TS.D.3.1}

Long-term planning will help avoid maladaptive lock-in, to build capacity to act in a timely and pre-emptive manner, and to reduce risks to ecosystems and people. {TS.D.7.1} A staged approach involving manageable steps over time, and pathways analyses to determine 'low regret' actions for near-term and long-term options, are useful (*medium confidence*). {TS.D.10.5}

Limits to adaptation will be reached in more systems, including, for example, coastal communities, water security, agricultural production, and human health, as global warming increases (*medium confidence*). {TS.D.2.3}

Co-benefits and synergies of adaptation

Urban adaptation measures can enhance social capital, livelihoods, human and ecological health as well as contributing to low carbon futures. Urban planning, social policy and nature-based solutions with safeguards bring great flexibility with co-benefits for climate mitigation and sustainable development. Participatory planning for infrastructure provision and risk management in informal, precarious and under-served neighbourhoods, the inclusion of Indigenous knowledge and local knowledge, communication and efforts to build local leadership especially amongst women and youth are examples of inclusive approaches with co-benefits for equity. {TS.D.6.6}

Climate Resilient Development

Global urbanization as a window of opportunity

Global urbanization offers a time-limited opportunity to work towards widespread and transformational adaptation and Climate Resilient Development (*high confidence*). An additional 2.5 billion people are projected to be living in urban areas by 2050. How settlements and key infrastructure are planned, designed and maintained determines patterns of exposure, social and physical vulnerability and capacity for resilience. {ES-Ch6}

Finance and governance

Key innovations in adaptation in social policy and nature-based solutions with safeguards have not been matched by innovation in adaptation finance. {TS.D.6.5} Governance capacity, financial support and the legacy of past urban infrastructure investment constrain how cities and settlements can adapt to key climate risk (*medium confidence*). Limits to adaptation are often most pronounced in rapidly growing urban areas, and smaller settlements including those without dedicated local government. {ES-Ch6}

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}

Climate governance will be most effective when it has meaningful and ongoing involvement of all societal actors from the local to global levels (*very high confidence*). Actors, including individuals and households, communities, governments at all levels, private sector businesses, non-governmental organisations, Indigenous Peoples, religious groups and social movements, at many scales and in many sectors, are adapting already and can take stronger adaptation and mitigation actions. {TS.E.5.3}

(d) Contributions of urban adaptation options to Climate Resilient Development.

Nature-based solutions and social policy as innovative domains of adaptation show how some of the limitations of grey infrastructure can be mediated. A mixture of the three categories has considerable future scope in adaptation strategies and building climate resilience in cities and settlements.

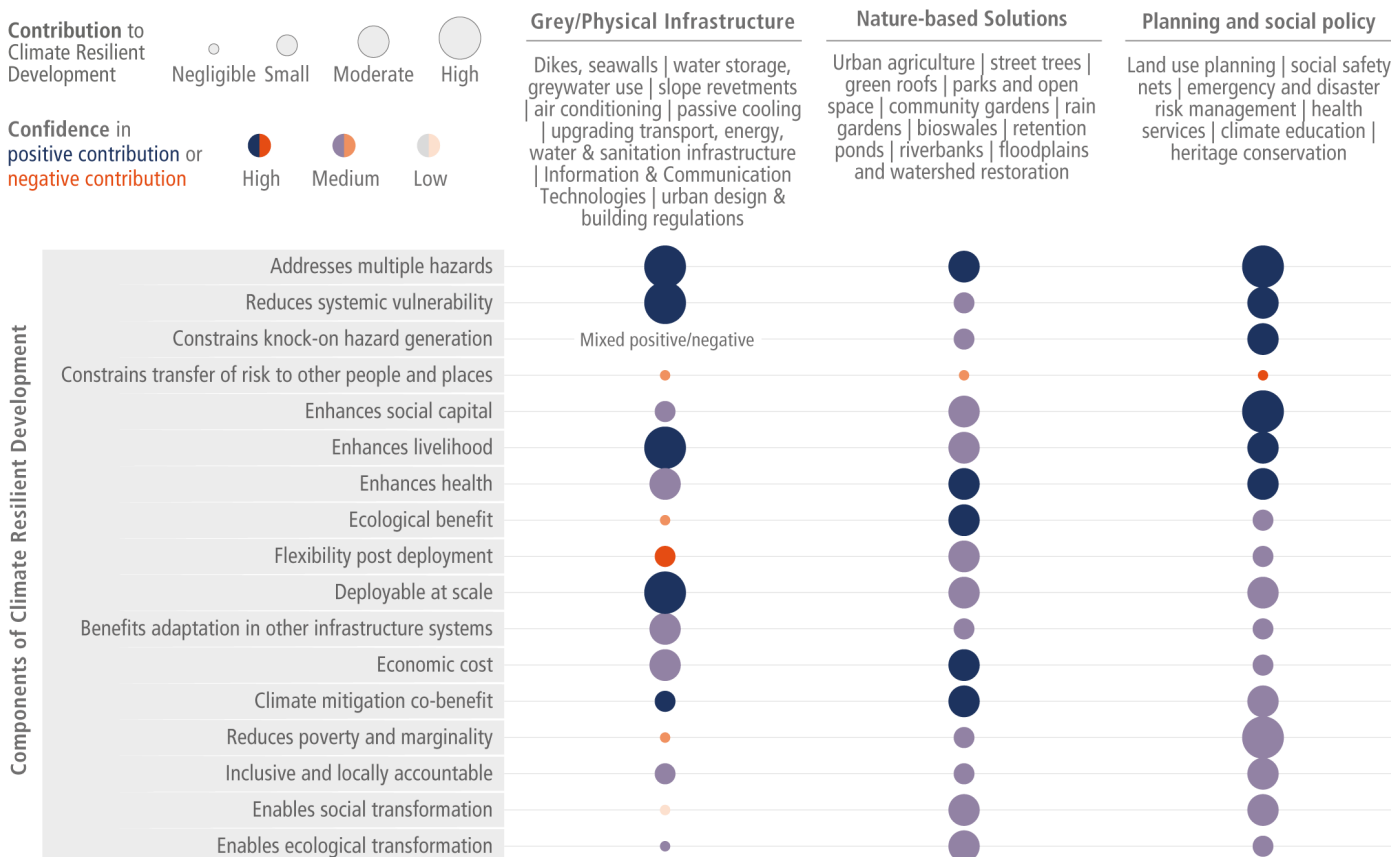


Figure 2: The figure is based on Table 6.6 which is an assessment of 21 urban adaptation mechanisms. Supplementary Material 6.3 provides a detailed analysis including definitions for each component of Climate Resilient Development and the evidences. {Table 6.6; 6.3.1; 6.3.2; 6.3.3; TS9.d}