

# Fact sheet - Cities and Settlements by the Sea

## Climate Change Impacts and Risks



### On the climate change frontline

Much of the world's population, economic activities and critical infrastructure are concentrated near the sea (*high confidence*), with nearly 11% of the global population, or 896 million people, already living on low-lying coasts directly exposed to interacting climatic and non-climatic coastal hazards (*very high confidence*). {CCP2-ES}

The population potentially exposed to a 100-year coastal flood is projected to increase by about 20% if global mean sea level rises by 0.15 m relative to 2020 levels; this exposed population doubles at a 0.75 m rise in mean sea level and triples at 1.4 m without population change and additional adaptation (*medium confidence*). By 2100 the value of global assets within the future 1-in-100 year coastal floodplains is projected to be between US\$7.9 and US\$12.7 trillion (2011 value) under RCP4.5\*, rising to between US\$8.8 and US\$14.2 trillion under RCP8.5 (*medium confidence*). {SPM.B.4.5}

Under all climate and socioeconomic scenarios, low-lying cities and settlements, small islands, Arctic communities, remote Indigenous communities and deltaic communities will face severe disruption by 2100, and as early as 2050 in many cases (*very high confidence*). {TS.C.5.3} Cities and settlements by the sea are thus on the frontline of action to adapt to climate change, mitigate greenhouse gas emissions and chart climate resilient development pathways. {CCP2.1.1}

## Adaptation Options and Barriers



### Adaptation limits

Some coastal settlements face soft adaptation limits due to technical and financial difficulties of implementing coastal protection (*high confidence*). {SPM.B.5.4}



### Take an adaptation pathways approach

A mix of interventions is necessary to manage coastal risks and build resilience over time. An adaptation-pathways approach sets out near-term 'low-regret' actions that align with societal goals, facilitates implementation of a locally appropriate sequence of interventions in the face of uncertain climate and development futures, and enables necessary transformation (*high confidence*). {CCP2-ES}

A mix of infrastructural, nature-based, institutional and sociocultural interventions are needed to reduce the multifaceted risk facing cities and settlements, including vulnerability-reducing measures, avoidance (i.e., disincentivising developments in high-risk areas), hard and soft protection, accommodation, advance (i.e., building up and out to sea) and retreat (i.e., landward movement of people and development) (*very high confidence*). {CCP2-ES}



### Successful adaptation

Due to long implementation lead times and the need to avoid maladaptive lock-in, particularly in localities facing rapid sea level rise and climate-compounded risk, adaptation will be more successful if timely action is taken accounting for long-term (committed) sea level rise, and if this is underpinned by sustained and ambitious mitigation to slow greenhouse gas emission rates (*high confidence*). {CCP2-ES}.



### Build adaptive capacity

Locally appropriate institutional capabilities, including regulatory provisions and finances dedicated to maintaining healthy coastal socioecological systems, build adaptive capacity in cities and settlements by the sea (*high confidence*). Implementing integrated multi-level coastal zone governance, pre-emptive planning, enabling behavioural change and alignment of financial resources with a wide set of values will provide cities and settlements with greater flexibility to open up the solution space to adapt to climate change (*high confidence*). Insufficient financial resources are a key constraint for coastal adaptation, particularly in the Global South (*high confidence*). Engaging the private sector in coastal adaptation action with a range of financial tools is crucial to address the coastal adaptation funding gap (*high confidence*). Considering the full range of economic and non-economic values will improve adaptation effectiveness and equity across cities and settlements archetypes (*high confidence*). Aligning adaptation in cities and settlements with socioeconomic development, infrastructure maintenance and COVID-19 recovery investments will provide additional co-benefits. Urgency is also driven by the need to avoid lock-in to new and additional risk, for example to avoid cities and settlements sprawl into fragile ecosystems and the most exposed coastal localities. {CCP2-ES}.



### Make wise choices

Individual and collective choices founded on public-centred values and norms, as well as pro-social behaviour, help to foster climate resilient coastal development in cities and settlements (*high confidence*). The effectiveness of different approaches (e.g., awareness and education, market-based and legal strategies) is mediated by how well they address contextual and psychosocial factors influencing adaptation choices in coastal cities and settlements (*medium confidence*). Adaptation options accounting for risk perceptions and aligning with public values tend to be more socioculturally acceptable, and consequently facilitate pro-social behavioural change. {CCP2-ES}



## Climate Resilient Development



### Role of coastal cities and settlements in advancing climate resilient development

Realising global aspirations for 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*). Extensive adaptation planning has been undertaken since the IPCC Fifth Assessment Report (AR5), but there has not been widespread effective implementation, thus giving rise to a ‘coastal adaptation gap’ (*high confidence*). To date, most interventions have been reactive and often rely on protective works alone (*high confidence*). {CCP2-ES}

The effectiveness of alternative interventions differs among cities and settlements archetypes, while their feasibility is influenced by geomorphology and socioeconomic conditions as well cultural, political and institutional considerations (*very high confidence*). Mismatches between adaptation needs and patterns of physical development are commonplace in many coastal cities and settlements, with particularly adverse impacts on poor and marginalised communities in the Global North and Global South (*high confidence*). Overcoming this gap is key to transitioning towards climate resilient development (*medium confidence*). Under higher warming levels and higher sea level rise, increasingly dichotomous coastal futures will become more entrenched (*medium confidence*), with stark differences between more urbanised, resource-rich coastal cities and settlements dependent on hard protection, and more rural, resource-poor cities and settlements facing displacement and migration. {CCP2-ES; Table CCP2.1}



### Key enablers for charting climate resilient development pathways

Coastal adaptation innovators adopt more flexible, anticipatory and integrative strategies, combining technical and non-technical interventions that account for uncertainties and facilitate effective resolution of conflicting interests and worldviews (*limited evidence, high agreement*). Moreover, a core set of critical enablers is foundational for cities and settlements to chart climate resilient development pathways. {CCP2-ES; Table CCP2.1}

Cities and settlements play a pivotal role in global aspirations to implement the Paris Agreement, advance the Sustainable Development Goals, and foster climate resilient development. Progress towards these ends depends on the extent to which cities and settlements mobilise urgent and transformational changes to institutionalise enabling conditions, close the coastal adaptation gap by addressing the drivers and root causes of exposure and vulnerability to climate-compounded coastal hazard risks, and drastically reduce greenhouse gas emissions (*medium confidence*). {CCP2-ES}

Table 1: Governance challenges and critical enablers for addressing coastal hazard risks in cities and settlements (C&S). {Table CCP2.1}

Key governance challenges	Critical enablers for C&S to address coastal hazard risk
<b>Complexity:</b> climate change compounds non-climatic hazard risks facing coastal C&S in interconnected, dynamic and emergent ways for which there are no simple solutions.	Draw on <b>multiple knowledge systems</b> to co-design and co-produce more acceptable, effective and enduring responses.
	Build <b>governance capacity</b> to tackle complex problems.
<b>Time horizon and uncertainty:</b> The future is uncertain, but climate change will continue for generations and cannot be addressed by short-term (e.g., 1–10 years) responses alone.	Adopt a <b>long-term view</b> but take action now. <b>Keep options open</b> to adjust responses as climate risk escalates and circumstances change.
	<b>Avoid</b> new development commitments in exposed locations. Enable managed retreat in most at-risk locations by <b>anticipatory actions</b> , e.g., secure funds, legal provisions for buy-outs, resettlement, etc.
<b>Cross-scale and cross-domain coordination:</b> Decisions bound by jurisdictional and sectoral boundaries fail to address linkages within and between coastal ecosystems and C&S facing interconnected climate change-compounded impacts and risk.	Develop networks and linkages within and between different governance scales and levels and across policy domains and sectors, to improve <b>coordination</b> , build trust and legitimise decisions.
	Build <b>shared understanding</b> and enable locally appropriate responses through experimentation, innovation and social learning.
<b>Equity and social vulnerability:</b> Climate change compounds everyday inequity and vulnerability in coastal C&S, making it difficult to disentangle and address social drivers and root causes of risk.	Recognise political realities and <b>prioritise vulnerability</b> , justice and equity concerns to enable just, impactful and enduring outcomes.
	Strengthen <b>community capabilities</b> to respond to coastal hazard risk, using external assistance and government support if necessary.
<b>Social conflict:</b> Coastal C&S will be the focal point of contending views about appropriate climate responses, and face the challenge of avoiding destructive conflict and realising its productive potential.	Design and facilitate <b>tailor-made participation processes</b> , involving stakeholders early and consistently from negotiating responses to implementation.
	Create <b>safe arenas of engagement</b> for inclusive, informed and meaningful deliberation and collaborative problem-solving.