Fact sheet - Australasia

Climate Change Impacts and Risks

Impacts from extreme events

Extreme events such as heatwaves, droughts, floods, storms and fires have caused deaths and injuries, and affected many households, communities and businesses via impacts on ecosystems, critical infrastructure, essential services, food production, the national economy, valued places and employment. {11.5.1}

Ecosystems

Climate trends and extreme events have combined with exposure and vulnerabilities to cause major impacts for many natural systems, with some experiencing or at risk of irreversible change in Australia (*very high confidence*) and in New Zealand *(high confidence).*The Bramble Cay melomys, an endemic mammal species, became extinct due to loss of habitat associated with sea-level rise and storm surges in the Torres Strait. Extensive coral bleaching events and loss of temperate kelp forests have occurred, due to ocean warming and marine heatwaves. {ES-Ch11}

Human systems

Climate trends and extreme events have combined with exposure and vulnerabilities to cause major impacts for some human systems (*high confidence*). Socio-economic costs arising from climate variability and change have increased. Extreme heat has led to excess deaths and increased rates of many illnesses. Droughts have caused financial and emotional stress in farm households and rural communities. Nuisance and extreme coastal flooding have increased due to sea-level rise superimposed upon high tides and storm surges. Tourism has been affected by coral bleaching, fires, poor ski seasons and receding glaciers. {ES-Ch11}

Complex risks

Ongoing warming is projected, with more hot days and fewer cold days, snow and glacier retreat, sea-level rise, and ocean acidification *(very high confidence).* More extreme fire weather is projected in southern and eastern Australia (high confidence) and over northern and eastern New Zealand *(medium confidence*). Heavy rainfall intensity is projected to increase, with more droughts over southern and eastern Australia and northern New Zealand *(medium confidence)*. {ES-Ch11}

Climate impacts are cascading and compounding across sectors and socio-economic and natural systems (*high confidence*). Complex connections are generating new types of risks, exacerbating existing stressors and constraining adaptation options. These include impacts that cascade between interdependent systems and infrastructure in cities and settlements, e.g. the 2019-2020 south eastern Australia wildfires. {ES-Ch11}

Key risks

Climate risks are projected to increase for a wide range of systems, sectors and communities, which are exacerbated by underlying vulnerabilities and exposures (*high confidence*). Nine key risks were identified {ES-Ch11}

1. Loss and degradation of coral reefs and associated biodiversity and ecosystem service values in Australia due to ocean warming and marine heatwaves (*very high confidence*)
2. Loss of alpine biodiversity in Australia due to less snow (*high confidence)*
3. Transition or collapse of alpine ash, snowgum woodland, pencil pine and northern jarrah forests in southern Australia due to hotter and drier conditions with more fires (*high confidence*)
4. Loss of kelp forests in southern Australia and southeast New Zealand due to ocean warming, marine heatwaves and overgrazing by climate-driven range extensions of herbivore fish and urchins (*high confidence*)
5. Loss of natural and human systems in low-lying coastal areas due to sea-level rise (*high confidence*)
6. Disruption and decline in agricultural production and increased stress in rural communities in south-western, southern and eastern mainland Australia due to hotter and drier conditions (*high confidence*)
7. Increase in heat-related mortality and morbidity for people and wildlife in Australia due to heatwaves (*high confidence*)
8. Cascading, compounding and aggregate impacts on cities, settlements, infrastructure, supply-chains and services due to wildfires, floods, droughts, heatwaves, storms and sea-level rise (*high confidence*)
9. Inability of institutions and governance systems to manage climate risks (*high confidence*).

Adaptation Options and Barriers

Illustrative adaptation pathway for risk to natural and human systems in low-lying coastal areas due to sea-level rise

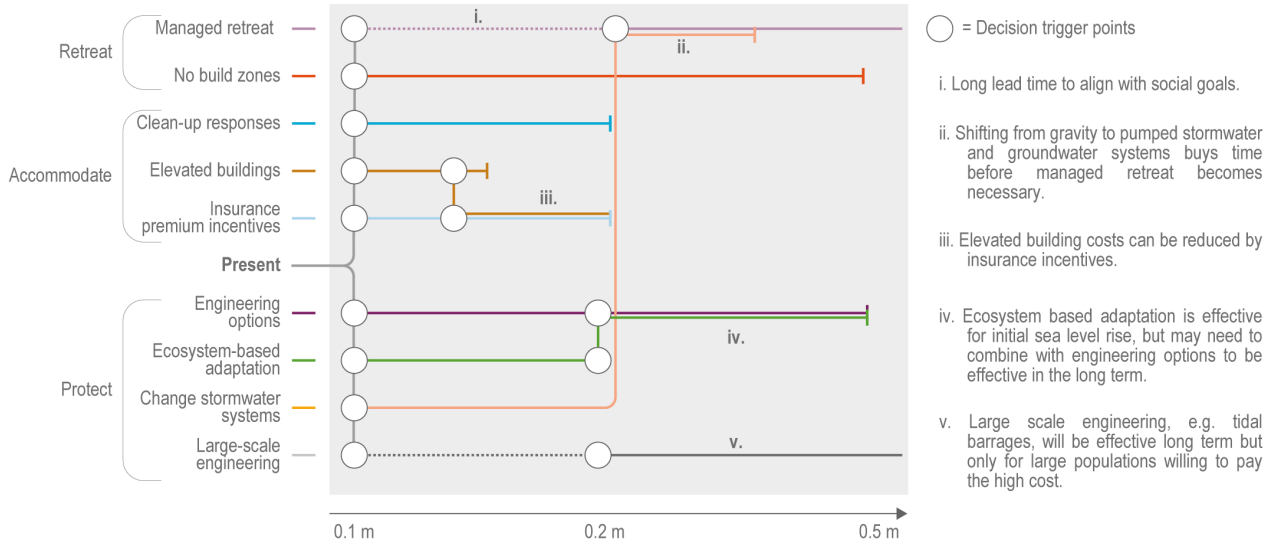

Figure 1: Illustrative adaptation pathway for risk to natural and human systems in low-lying coastal areas in Australia and New Zealand due to sea-level rise. {Figure 11.7}

Adaptation barriers

The ambition, scope and progress of the adaptation process has increased across governments, non-government organisations, businesses and communities (*high confidence*).

However, adaptation progress is uneven, due to gaps, barriers and limits to adaptation, and adaptive capacity deficits (*very high confidence*). Barriers include lack of consistent policy direction, competing objectives, divergent risk perceptions and values, knowledge constraints, inconsistent information, fear of litigation, up-front costs, and lack of engagement, trust and resources. {ES-Ch11}

For ecosystems at critical thresholds (key risks 1 and 2) further climate change may cause irreversible damage, with limited scope for adaptation. Limits to adaptation in human systems include thermal thresholds and safe freshwater and the inability of some low-lying coastal communities to adapt in-place *(very high confidence)*. (Table 11.14, Box 11.6)

Adaptation options

A range of incremental and transformative adaptation options and pathways (Figure 1) is available as long as enablers are in place to implement them (*high confidence*). Responses that lock in risk by discounting ongoing and changing climate risk can create maladaptation (*high confidence*) and undermine society's capacity to adapt to future impacts (*very high confidence*). {11.7.3} Available tools can help shift from static to dynamic adaptation by highlighting path dependencies and potential lock in of decisions, system dependencies and the potential for cascading impacts (*high confidence*). {Table 11.17, 11.7.3; 11.5; Box 11.6}

Key enablers for effective adaptation include shifting from reactive to anticipatory planning, integration and coordination across levels of government and sectors, inclusive and collaborative institutional arrangements, government leadership, policy alignment, nationally consistent and accessible information, decision-support tools, adaptation funding and finance, and robust consistent and strategic policy commitment. Focus on the role societal inequalities and environmental degradation play in generating climate change vulnerability can enable fairer adaptation outcomes.

Aboriginal and Torres Strait Islander Peoples and Tangata Whenua Māori can enhance effective adaptation through the passing down of knowledge about climate change planning that promotes collective action and mutual support across the region (*high confidence*). {ES-Ch11}

Climate Resilient Development

The projected global warming under current global emissions reduction policies would leave many of the region's human and natural systems at very high risk and beyond adaptation limits (*very high confidence*). Delay in implementing adaptation and emission reductions will impede climate resilient development, resulting in more costly climate impacts and greater scale of adjustments. Reducing the risks would require significant and rapid emission reductions to keep global warming to 1.5-2.0°C, as well as robust and timely adaptation. {ES-Ch11}