



# Fact sheet - Small Islands

## Climate Change Impacts and Risks

### Observed impacts and projected risks

Small islands are increasingly affected by increases in temperature, a larger proportion of the most intense tropical cyclones (TCs), storm surges, droughts, changing precipitation patterns, sea-level rise (SLR), coral bleaching, and invasive species, all of which are already detectable across both natural and human systems (*very high confidence*). {ES-Ch15}

Projected changes in the wave climate superimposed on SLR will rapidly increase flooding in small islands, despite highly contrasting exposure profiles between ocean sub-regions (*high confidence*). The projected estimates in SLR for 2050, compared to 1994–2014 varies from 18–24 cm and in a worst case could be 15–40 cm, which will double flooding frequency in much of the Indian Ocean and Tropical Pacific, while TCs will remain the main driver of (rarer) flooding in the Caribbean Sea and Southern Tropical Pacific. {ES-Ch15}

### Ecosystems

The continued degradation of terrestrial and marine ecosystems of small islands due to negative human impacts will amplify the vulnerability of island peoples to climate change impacts (*high confidence*). New studies highlight large population reductions with an extinction risk of 100% for endemic species within insular biodiversity hotspots including within the Caribbean, Pacific and Sundaland regions by 2100 for  $> 3^{\circ}\text{C}$  warming. Ecosystem degradation is likely to decrease the provision of resources to the millions of people inhabiting small islands, resulting in impacts upon settlements and infrastructure, food and water security, health, economies, culture, and migration (*high confidence*). {ES-Ch15}

### Coral Reefs

Severe coral bleaching, together with declines in coral abundance have been observed in many small islands, especially those in the Pacific and Indian Oceans (*high confidence*). {ES-Ch15}

Under future climate scenarios (RCP 4.5 and RCP 8.5) some small islands will experience severe coral bleaching on an annual basis before 2040 (*medium confidence*). Above  $1.5^{\circ}\text{C}$ , globally inclusive of small islands, it is projected there will be further loss of 70–90% of reef-building corals, with 99% of corals being lost under warming of  $2^{\circ}\text{C}$  or more above the pre-industrial period. {ES-Ch15}

### Cities and Settlements

Coastal cities and rural communities on small islands have been already impacted by sea-level rise, heavy precipitation events, tropical cyclones and storm surges. Climate change is also affecting settlements and infrastructure, health and wellbeing, water and food security, and economies and culture, especially through compound events (*high confidence*). These changes are a major concern for small islands given that a high percentage of their population, infrastructure and economic assets are located in the low elevation coastal zone of below 10 metres elevation. {ES-Ch15} The problems of increasing exposure and vulnerability are most clearly seen in atoll islands. {15.3.2}

### Water

Projected changes in aridity are expected to impose freshwater stress on many small islands, especially Small Island Development States (SIDS) (*high confidence*). It is estimated that with a warming of  $1.5^{\circ}\text{C}$  or less, freshwater stress on small islands would be 25% less as compared to  $2.0^{\circ}\text{C}$ . Drought risk projections for Caribbean SIDS aligned with observations from the Shared Socio-Economic Pathway (SSP) 2 scenario, indicate that a  $1^{\circ}\text{C}$  increase in temperature (from  $1.7^{\circ}\text{C}$  to  $2.7^{\circ}\text{C}$ ) could result in a 60% increase in the number of people projected to experience severe water resources stress from 2043–2071. {ES-Ch15}

### Food

On small islands, coastal land loss attributable to higher sea level, increased extreme precipitation and wave impacts, and increased aridity have contributed to food and water insecurities that are likely to become more acute in many places (*high confidence*). Most Pacific Island Countries could experience  $\geq 50\%$  declines in maximum fish catch potential by 2100 relative to 1980–2000 under both an RCP 2.6 and RCP 8.5 scenario. {ES-Ch15}

### Migration

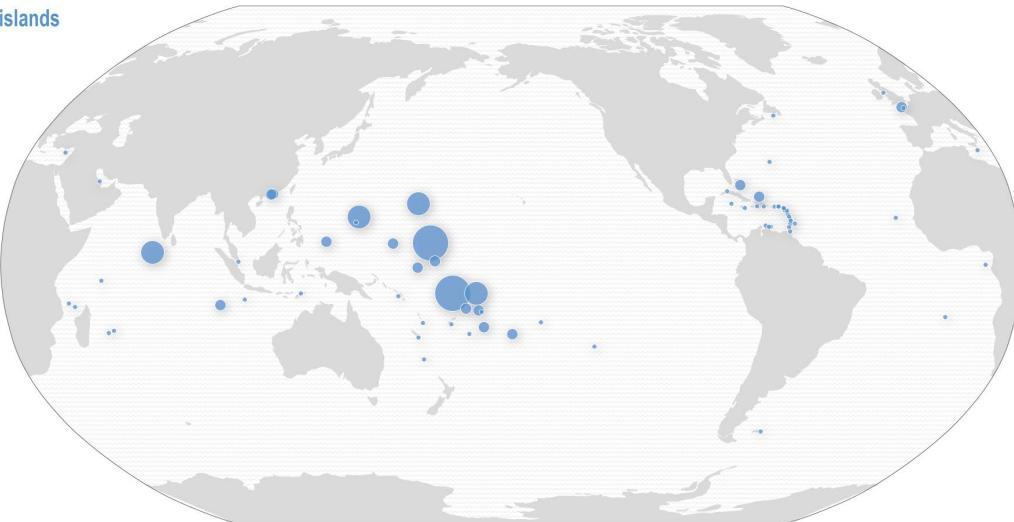
The vulnerability of communities in small islands, especially those relying on coral reef systems for livelihoods, may exceed adaptation limits well before 2100 even for a low greenhouse gas emission pathway (*high confidence*). The impacts of climate change on vulnerable low-lying and coastal areas, present serious threats to the ability of land to support human life and livelihoods (*high confidence*). Climate-related migration is expected to increase, although the drivers and outcomes are highly context specific and insufficient evidence exists to estimate numbers of climate-related migrants now and in the future (*medium evidence, high agreement*). {ES-Ch15}



### Population living in small islands that may be exposed to coastal inundation by 2100 under RCP4.5

For selected islands, each dot represents the corresponding percentage of the population occupying vulnerable land, that may be exposed to coastal inundation—either by permanently falling below mean higher high water (MHHW), or temporarily falling below the local annual flood height.

Percentage of island's population exposed to coastal inundation



**Figure 1:** Percentage of current population in selected small islands occupying vulnerable land (the number of people on land that may be exposed to coastal inundation—either by permanently falling below MHHW, or temporarily falling below the local annual flood height) in 2100 under an RCP4.5 scenario. Positions on the map are based on the capital city or largest town. {Figure 15.3}



## Losses and damages

Small islands are already reporting losses and damages particularly from tropical cyclones and increases in sea-level rise (*high confidence*). Despite the loss of human life and economic damage the methods and mechanisms to assess climate-induced losses and damages remain largely undeveloped for small islands. Further, there are no robust methodologies to infer attribution and such assessments are limited. {ES-Ch15}

## Adaptation Options and Barriers



### Barriers to adaptation

Small islands present the most urgent need for investment in capacity building and adaptation strategies (*high confidence*) but face barriers and constraints which hinder the implementation of adaptation responses. Barriers and constraints arise from governance arrangements, financial resources and human resource capacity. Additionally, institutional and legal systems are often inadequately prepared for managing adaptation strategies such as large-scale settlement relocation and other planned and/or autonomous responses to climate risks (*high confidence*). {ES-Ch15}

The unavailability of up-to-date baseline data and contrasting scenarios/ temperature levels continue to impair the generation of local-to-regional observed and projected impacts for small islands, especially those that are developing nations (*high agreement*). Climate model data based on the most recent suite of scenarios (RCPs and especially SSPs) are still not widely available to primary modelling communities in most small island developing nations (*high agreement*). {ES-Ch15}



## Adaptation options and responses

In small islands, despite the existence of adaptation barriers several enablers can be used to improve adaptation outcomes and to build resilience (*high confidence*). These enablers include better governance and legal reforms; improving justice, equity and gender considerations; building human resource capacity; increased finance and risk transfer mechanisms; education and awareness programmes; increased access to climate information; adequately downscaled climate data and embedding Indigenous Knowledge and Local Knowledge (IKLK) as well as integrating cultural resources into decision-making (*high confidence*). {ES-Ch15}

## Climate Resilient Development

Some island communities are resilient with strong social safety nets and social capital that support responses and actions already occurring, but there is limited information on the effectiveness of the adaptation practices and the scale of needed action (*high confidence*). A better understanding of the limits to adaptation is needed and of what constitutes current resilience and/or successful adaptation in small island contexts. Greater insights into which drivers weaken local and indigenous resilience, together with recognition of the socio-political contexts within which communities operate, and the processes by which decisions are made, can assist in identifying opportunities at all scales to enhance climate adaptation and enable action towards climate resilient development pathways (*medium evidence, high agreement*). {ES-Ch15}