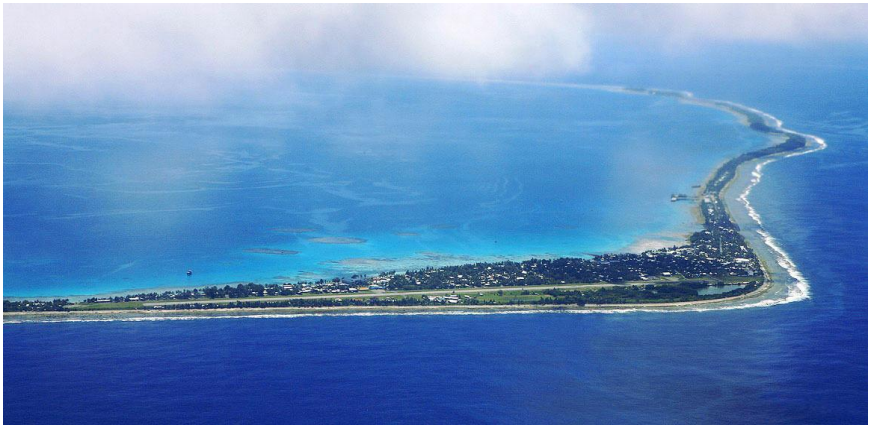
Pacific Calling Partnership information sheet

Sorting fact from fiction:
The habitability of Tuvalu and other low-lying islands



Habitability is about more than land area

The habitability of low lying islands such as Tuvalu, Kiribati and the Marshall Islands is influenced by a number of climatic, social and economic pressures.[1] The vulnerability of these nations is acknowledged in the United Nations Intergovernmental Panel on Climate Change (IPCC) report, noting that their "very existence is threatened by rising sea levels associated with global warming".[2] Despite this, certain media commentators have promoted the myth, based on studies of physical processes such as Kench's 2018 study on sediment movement, that Tuvalu will remain habitable and that Pacific and climate activists are "deniers of the evidence".[3]

Kench's study suggests that the total land area of Tuvalu over the past 4 decades has increased by 2.9%. This increase in land area is due to a combination of coastal erosion, sediment transport and accretion processes, with smaller islands showing the greatest change in land area (some islands are growing and others shrinking).

The assumption that growing land area negates both the presence of climate change and claims that the islands will become uninhabitable is untrue. Kench himself recognises in his study that "habitability rests on an additional set of factors" and that "loss of land is unlikely to be a factor in forcing depopulation off islands".[4]

Climate change-related changes in physical conditions such as temperature, rainfall, sea level, erosion rates and extreme weather events are already being seen on Tuvalu.[1] Each of these factors affects the island's ecosystems and the people who depend on them. The strong connection between natural processes and livelihoods means that climate change disrupts all parts of life including resource availability and economic strength.[5] Furthermore, the small size, location and fragmented land area of low lying islands limits adaptation efforts to respond to these changes.[6]

It is a combination of pre-existing social and economic stressors and the impacts of climate change that determines island habitability and how the effects of climate change are felt.[1]

Influences on Island Habitability and Climate Change impacts

Sediment Transport:

Sediment transport involves the movement of sand from one area to another by waves, tides and currents. Islands can grow in size if the sand is transported from a different island, or is accreted over a larger area with a lower elevation.[7] Climate adaptation and development projects such as sea walls and causeways can also alter transport patterns, causing increased or unusual levels of erosion or accretion in localised areas.[10]

Despite growing island size resulting from these processes, a number of islanders have noted that the natural and physical resources that were present on eroded land, such as coconut trees and infrastructure, are not replaced on the new sand deposits.[1]

Erosion:

Coastal erosion, especially in populated areas, impacts on resource availability due to a reduction in usable land area. Levels of erosion will increase with climate change due to the more severe and frequent storms. Erosion can affect crop and fishery habitats either through the direct destruction of resources and habitats or the damage of boundaries between fragile ecosystems such as

lagoon/ocean boundaries.[5] Localised erosion can also disrupt settlement patterns in economic centres, forcing relocation to more remote areas with less work, education and healthcare opportunities.[1]

Overcrowding:

Migration from outer islands towards the main island and economic centre, Funafuti, is driven by a desire for increased jobs and opportunities, climate change and sediment movement on the smaller islands.[1],[4] This migration has resulted in overcrowding of Funafuti, with 56.6% of the population residing within this small area.[8] As a result, previously uninhabited areas that are most vulnerable to changing climate conditions (i.e. strips of narrow land and land of low elevation) have become populated, increasing people's exposure to the impacts of climate change.[1]

Over-wash:

"When we had the king tide the island was… really flooded so the government had to evacuate some people from their homes. The airstrip was covered with sea, and people were swimming and paddling canoes on the road." [1]

Oceanic over-wash causes flooding of the islands, usually occurring with high tides or with severe weather events such as storms.[1] These events will become more frequent and severe with climate change. Current greenhouse gas emission rates will result in sea level rise that will cause annual over-wash events on most atoll nations, including Tuvalu, by the mid-21st century.[6] Since much of Tuvalu's infrastructure is located close to the current sea level, frequent flooding will result in the islands becoming uninhabitable due to repetitive infrastructure damage.[6] In addition, flooding can spread rubbish and disease, causing serious health consequences.[1]

Water Security:

The main atoll of Tuvalu, Funafuti, depends on rainfall for freshwater due to the absence of non-saline ground water and surface water.[1] This reliance, combined with limited water storage capacity and the relatively large size of households, means that consistent rainfall is essential for water security in Tuvalu.[1] Climate change is expected to result in periods of heavy rainfall that exceed water storage capacity, followed by extended dry spells that can cause domestic water shortages.[1] Increasing the current water storage capacity is difficult due to limited financial resources.

Food Security:

Food security on Tuvalu will be impacted by climate change due to physical processes such as coastal erosion, over-wash, rainfall patterns and sea level rise. [6] Dry spells, strong winds, and increased soil salinity have all caused a reduction in the yield of fruit and vegetables such as the traditional pulaka (taro) crop.[1]

Mangrove areas that are essential for fish breeding and nursing grounds are damaged by climate change related storms and erosion, reducing fish availability.[5] Ocean acidification caused by carbon dioxide emissions causes reef environments to become stressed, resulting in increased toxin levels. These toxins can be transferred to the fish which, if caught and consumed, can lead to human health impacts.[1]

Looking beyond land area

Beyond physical changes to land area, the habitability of low lying island nations such as Tuvalu, Kiribati and the Marshall Islands depends on processes such as sediment transport, erosion, over-wash, changing weather patterns and the threats that salination and drought pose to water and food security. These all significantly impact on life on low-lying islands. The effects of climate change are expected to become more severe with the current predicted levels of global warming. Without immediate climate action land accretion alone will be insufficient to ensure habitability of the islands.

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