Water and Sanitation

Key findings for the Pacific from the United Nations **Intergovernmental Panel on Climate Change's** (IPCC) Sixth Assessment Report (AR6) on Impacts, Adaptation and Vulnerability

Pacific nations **rely heavily on aquifers and rainwater**.

CHANGES

Climate change can

- increase risk of waterborne diseases
- increase saltwater intrusion
- increase water shortages

Water stress will increase with

- population growth
- rainfall changes
- agricultural demands

Freshwater systems in Pacific nations

are exposed to diverse climate impacts

and among the most threatened on the planet

Access to appropriate and reliable

WASH infrastructure

- **W**ater
- **S**anitation **&** **H**ygiene

is a low-cost and high-benefit climate adaptation measure

Possible adaptations

- water sharing
- rainwater harvesting
- desalination
- accessing deeper groundwater

ADAPTATION

Some small-island communities may need to consider

MANAGED RETREAT

in the face of inundation and water-related changes.

Ecosystem based adaptation

could have benefits for

WASH outcomes

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Key findings for the Pacific from the United Nations **Intergovernmental Panel on Climate Change's** (IPCC) Sixth Assessment Report (AR6) on Impacts, Adaptation and Vulnerability

Freshwater systems in Pacific nations are exposed to many diverse climate impacts and are among the most threatened on the planet.[1]

WHAT IS HAPPENING

In small island states, infrastructure that supports water, sanitation, and hygiene (WASH) is particularly vulnerable to climate change and extreme events. As WASH infrastructure (e.g. running water, toilets, and handwashing stations) helps prevent the spread of disease, damage caused by climate change can increase the burden of diseases for small island states.[2]

Heavy reliance on aquifers and rainwater harvesting on small islands, particularly atolls, together with high demand, population growth and contamination interact with climate impacts and increase the risk of waterborne disease. For example, high seasonal rainfall in Kiribati is associated with diarrhoea, cholera, and typhoid fever[3] and extreme drought has in some instances led people to rely on small amounts of contaminated water left at the bottom of household tanks.[4]

Small islands are already regularly experiencing droughts and freshwater shortages.** In the Republic of the Marshall Islands, for example, more than half of all interviewed households have already had to move due to a water shortage.[5]

Small islands mostly depend on rain-fed agriculture, which is likely to be affected in various ways by climate change. This includes loss of agricultural land through floods and droughts, and contamination of freshwater and soil through salt-water intrusion (caused by rising sea levels). Warming temperatures also likely leads to water-stressed crops. On the other hand, heavy rainfall during planting seasons can damage seedlings, reduce growth, and provide conditions that promote plant pests and diseases and increase erosion.[6] In some islands, there are traditional crops that can no longer be cultivated due to such changes.

WHAT COULD HAPPEN FURTHER

Risks related to the lack or failure of WASH services under climate change include increased incidence and outbreaks of water-related diseases, physical injuries, stress, exacerbation of the underlying disease, and risk of violence, which is often gendered.[7] For example, the increased rainfall intensity expected with climate change will likely increase waterborne disease outbreaks. Furthermore, lack of access to toilets and running water pose additional risks to limited groundwater resources.[8]

Population growth, changes in rainfall patterns and agricultural demand are projected to increase water stress in small islands with implications for WASH. Atoll islands may be unable to provide adequate domestic drinking water due to the lack of potable groundwater by 2040 in a very high-emission scenario; 2030 in a very high-emission scenario with ice sheet collapse; or by the 2060s in a moderate-emission scenario.[9]

While some islands are projected to experience an increase in average rainfall, this does not necessarily lower their risk of water insecurity. Projected increases in rainfall variability and intensity may increase extreme rainfall events, thereby increasing the risk of flooding during the wet season, while not decreasing the risk of droughts during dry periods. In addition, projected shifts in the timing of the rainfall season might pose an additional risk for water supply.[10]

* = medium confidence
** = high confidence
*** = very high confidence

1 Chapter 15, Executive Summary
2 4.5.3; 15.6.2
3 15.3.4.2
4 Chapter 15, Executive Summary
5 Chapter 4, Box 4.2
6 FAQ 15.3
7 4.6.1
8 Chapter 4, Box 4.2; 4.5.3
9 Chapter 4, Box 4.2
10 Chapter 4, Box 4.2; 15.3.4.2

When events such as cyclones, sea level rise and El Niño Southern Oscillation-related high-water levels occur together and interact with local human disturbances they can amplify the impact of flooding events and impact freshwater availability.** On Roi-Namur, Marshall Islands, one study found that the availability of freshwater is impacted by the effect of sea level rise plus coastal flooding. In other Pacific atolls, freshwater resources could be significantly affected by a 0.40 m sea level rise.[11] Therefore, managing the risk of salinisation of freshwater resources will become increasingly important.

Climate-driven hydrological changes are affecting culturally significant terrestrial and freshwater species and ecosystems, particularly for communities in small islands.** These impacts on cultural water uses are influencing travel, hunting, fishing, and gathering practices, which have negative implications for livelihoods, cultural traditions, economies, and self-determination.[12]

RESPONSE OPTIONS

Access to appropriate and reliable WASH has been identified as a low-cost, large benefit, adaptation measure. For example, building new WASH infrastructure in areas less exposed to flooding and extreme weather events.[14] Other WASH interventions include promoting water safety and sanitation plans in communities. Investments in water and sanitation also have co-benefits for pandemic resilience. Ensuring access to climate change adapted WASH infrastructure and practices can protect communities against water-related diseases, particularly after climate hazards such as heavy rainfalls and floods.**[13] Furthermore, access to reliable and safe drinking water can reduce negative physical and mental impacts of climate-related water stress and extreme events. Expansion and replacement of WASH infrastructure can provide opportunities to climate-proof WASH, meaning benefits can still be delivered under future climate scenarios.

Actions which have been observed during drought events and which may be used increasingly for climate adaptation include community water-sharing, purchasing water from private companies, and using desalination units or accessing deeper or new groundwater resources.[15] While desalination is an important adaptation option for small island states, it needs to be supported with adequate financing and governance to reduce unwanted consequences such as highly saline water plumes.[16]

WASH outomes can be improved via ecosystem based adaptation approaches that enhance water security, flood management and ecosystem health. Watershed management through mangrove planting, reforestation, restoration of riparian zones, urban forests/trees could establish downstream water security and quality and erosion control. These measures could improve the health and resilience of coral reef ecosystems by reducing the impact from human disturbances.[17]

Warming beyond 1.5°C may pose hard limits to adaptation for small islands.*[18] In these instances, in-situ adaptation may not be adequate and relocation (managed retreat) can be an adaptation response for communities in areas impacted by, or at risk of, inundation and other water-related changes.[19]** However, relocation can be culturally, socially, financially, politically and geographically constrained due to the importance of cultural relationships with traditional, customary or ancestral lands.** Among Pacific islands, for example, the prospect of migration raises concerns about the loss of cultural identity and local knowledge and practices, which can impact emotional well-being.[20]

It is estimated that with a warming of 1.5°C or less, freshwater stress on small islands would be 25% less as compared to 2.0°C

Water-adaptation response categories[21]

Livelihood diversification and migration

Remittances/ employment opportunities
Managed retreat/planned relocation

Agricultural water management related

Soil and water conservation
Water harvesting/reviving water sources

Crop related

On farm livelihoods diversification
Planting drought and salt tolerant species

Building and adapting WASH infrastructure in line with future climate projections

Building WaSH infrastructure outside of coastal risk zones
Raising of WaSH infrastructure

Incentives, policies, institutions, collective action and capacity building

Collective action and cooperation
Water dispute resolution
Behavioural changes
Insurance (including crop insurance)
Micro-finance
Social safety nets

Indigenous Knowledge and Local Knowledge based

Indigenous Knowledge and Local Knowledge based adaptations. For example, in Fiji IK&LK was used to identify native species which reduce flooding impacts.

Urban, WASH and energy related

Hand washing and hygiene
Safe drinking water and sanitation
Desalinisation
Recovery and reuse of waste water

11 15.3.3.2
12 4.3.8; Chapter 4, Table 4.5
13 4.6.4
14 7.4.2.3
15 Chapter 4, Box 4.2
16 15.6.1; Chapter 4, Box 4.5
17 15.5.4, FAQ 15.2
18 SPM.C.3.3 ;4.7.4
19 15.3.4.7; 15.5.3
20 4.6.9
21 4.22
22 Chapter 15 Executive Summary

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