Disaster Risk Management

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

CHANGES

Compound impacts of

EXTREME EVENTS

amplify impacts of flooding and fresh water availability

Tropical cyclone intensity

has increased in the past 40 years

Increased

frequency intensity duration

of extreme weather events is causing widespread and severe impacts on

people **infrastructure** **ecosystems**

COMMUNITY-BASED ADAPTATION

involve local people and organisations in

disaster planning

During diasaster recovery, rebuild by

preparing for increased future extremes

Investing in

climate-adapted infrastructure

helps reduce future risks

Early warning systems which integrate

Indigenous Knowledge and Local Knowledge

+

scientific-based forecasts

ADAPTATION

SOCIAL CAPITAL

links affected people to external support and resources, helping small-island communities to have

SELF-BELIEF & BUILD RESILIENCE

to recover and rebuild following disaster events

Disaster Risk Management

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

Increased frequency, intensity and duration of climate-change induced extreme weather events are causing widespread and severe impacts on individuals, communities and infrastructure as well as ecosystems and their services.[1]**

WHAT IS HAPPENING

Tropical cyclones are having severe impacts on Pacific islands.** The intensity of cyclones at a global scale have increased in the past 40 years. Destruction from tropical cyclone Winston (the most intense cyclone ever recorded in the Southern Hemisphere) in 2016 exceeded 20% of Fiji's current GDP. In 2015, tropical cyclone Pam caused damage to the agricultural sector valued at 64.1% of Vanuatu's GDP and widespread flooding in distant Kiribati and Tuvalu. This is already having major impacts on coast-focused tourism in the Pacific.[3]

Events such as sea level rise, El Niño-Southern Oscillation related high-water levels, cyclones and local human disturbances compound and amplify the impact of flooding events, impacting fresh water availability.** For example, in the Tuamotu atolls, French Polynesia, floods in 1996 and 2011 occurred due to rising sea-levels interacting with high swells causing lagoon filling and the obstruction of inter-islet channels by human-built structures. In 2011, the flooding of the lagoon-facing coast of Majuro Atoll, Marshall Islands, resulted from the combination of high sea levels occurring during La Niña conditions and seasonally high tides.[4]

* = medium confidence (about 5 out of 10 chance)
** = high confidence (about 8 out of 10 chance)
*** = very high confidence (at least 9 out of 10 chance)

Increases in extremes are surpassing the resilience of some ecological and human systems, and challenging their adaptive capacities, leading to irreversible impacts.[2]**

Significant progress has been made in early warning systems, particularly in the area of detection, monitoring, analysis and forecasting of severe weather systems. Improvement is still needed for effective response strategies and will need to consider the implementation capacity of local government and address social, cultural, and economic barriers.[5]

Improvements in cross sectoral and cross agency coordination are also creating opportunities for improved disaster preparedness and adaptation measures in the Pacific. Further integration between development priorities and risk management in national budgetary and development processes is necessary, as is continued investment in coordination mechanisms.[6]

WHAT COULD HAPPEN FURTHER

Sea level rise in the Pacific islands combined with extreme flooding events could threaten the future livelihoods of coastal communities.[7]** A 5-10 cm addition in sea level rise (expected for ~2030–2050) will double (or more) flooding frequency in much of the Tropical Pacific.[8] Small reef islands and narrow coastal systems affected by human disturbances will increasingly be at risk of disappearance as a result of sea level rise and enhanced sediment loss caused by extreme events and/or human activities,** as has already been reported in Takuu, Papua New Guinea.[9] Sea level rise is expected to cause significant negative impacts to small islands.

Small island states will continue to be affected by increases in temperature, tropical cyclones, storm surges, drought and changing precipitation patterns.*** Extreme weather and climate events will continue to affect settlements and infrastructure, health and wellbeing, water and food security and economies and culture,** with different impacts depending on island type and rural versus urban settings.[10]

1 SPM.B.1
2 SPM.B.1
3 Chapter 15, Executive Summary
4 15.3.1.1
5 15.5.7
6 15.7
7 8.4.5.4
8 Chapter 15, Executive Summary
9 15.3.3.1.2
10 Chapter 15, Executive Summary

Tropical cyclone intensification in the future is likely to cause significant damage to human settlements and infrastructure and challenge the capacity to manage disaster-risk.[11] Informal settlements are particularly vulnerable to extreme events due to unsustainable land use practices and difficulties enforcing land use zoning and building guidelines.

RESPONSE OPTIONS

Community-based adaptation, a community led process based on meaningful engagement and proactive involvement of local individuals and organisations, can reduce risk of disasters. In the Pacific, high performing community-based adaptation initiatives included climate awareness raising and equipping people with knowledge to understand environmental changes and how to respond. In Fiji a study found that the intention for adaptive behaviour increased with the supply of climate information.[12]

Investing in infrastructure adapted for climate change reduces the future risks. For example, ground-based solar power systems can ensure energy security during extreme events. In Tonga, well secured ground-based solar power systems withstood cyclone Gita, ensuring supply of power for the recovery process.[13]

Community members often use a combination of Indigenous Knowledge and Local Knowledge (IKLK) as well as modern scientific-based weather forecasts to take actions to prepare for extreme weather events. In Samoa, people keep particular places reserved for disaster times such as cyclone seasons, while in Vanuatu IKLK indicators for tropical cyclones include mango trees flowering early and turtles going further inland to lay their eggs. There is also evidence of blended local and modern scientific knowledge being used in Niue, Tonga, Vanuatu and the Solomon Islands.[14]

During disasters, social capital plays an important role in linking those who are affected to external supports and resources.** On small islands, social networks can support adaptation with traditional knowledge and societal cohesion. This helps communities to have self-belief and build the capacity to recover even in the absence of external interventions.[15]

Investing in disaster risk management has the potential to reduce climate change-driven risk and contribute to sustainable development.[16] Examples of this includes strengthening capacity of National Meteorological and Hydrological Services and developing effective end-to-end early warning systems. Early warning systems should be designed with the people who are vulnerable to extreme events and be action-orientated.

Insurance schemes are an opportunity for at-risk people to transfer their risk from extreme events. For example, in Vanuatu, discussions about increasing insurance availability for tropical cyclones and droughts are ongoing. However, standardisation of housing designs to get insurance can make it prohibitive for people to take this option. Furthermore, lack of trust in insurance companies is also a challenge. Lack of trust could be addressed by seeking out domestic banks or credit unions with whom people are already engaging, while also using social marketing campaigns to raise awareness of weather-related insurance to address knowledge gaps and lack of awareness of these tools.[17]

Examples of risks and adaptation options for the management of key risks. Each of the early warning systems needs to be linked to a clear plan of action.

Risk to coastal socio-ecological systems

- Storm surge early warnings and action plans
- Early warnings of water-borne disease

Risk to terrestrial and ocean ecosystems

- Fishery marine heatwave warnings and mobile fishing equipment
- Forecast of shifts and regime changes in ecosystems and integration into planning

Risks associated with critical physical infrastructure, networks and services

- Build for future climate change

Risk to living standards and equity

- Adaptive social protection systems

Risk to human health

- Heat health early warning systems and action plans
- Health and disease monitoring and outbreak prediction

Risk to food security

- Forecasting rainfall and droughts for seed selection and action plans
- Food price early warnings and action plans

Risk to water security

- Early warnings for flood and drought and linked with action plans

Risk to peace and migration

- Build employment skills and options of affected people to allow for orderly and planned change

* = medium confidence (about 5 out of 10 chance)
** = high confidence (about 8 out of 10 chance)
*** = very high confidence (at least 9 out of 10 chance)

11 15.3.4.1; 15.3.3.3
12 15.6.4
13 Chapter 18, Box 18.3
14 15.6.5
15 8.5.2.4.1
16 15.5.7
17 15.6.3

Prepared by the Australian National University Institute for Climate, Energy & Disaster Solutions

SPREP Secretariat of the Pacific Regional Environment Programme