

# Climate change and health: a Pacific perspective

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Climate change is among the most serious challenges facing Pacific Island countries and territories, threatening every aspect of their environment, social and economic development, and political and human security. The nature of these small countries – often sparsely populated atolls in a vast ocean – makes them highly vulnerable to the projected effects of climate change. For some of the 22 member countries and territories of the Pacific Community, it is a question of survival, and for all of them, a time for action. Ensuring that communities in the region are equipped with the skills and tools needed to adapt to the effects of climate change is essential to minimising its likely impacts on the lives – including health, culture and economies – of Pacific Island people.

Across the region, there is strong political will to act. In 2005, Pacific Islands Forum Leaders called for national level implementation of the Pacific Islands Framework for Action on Climate Change (PIFACC) 2006–2015. In 2008, the 39th meeting of Pacific Islands Forum Leaders in Niue ‘reaffirmed the continuing urgency of addressing the challenges posed by, and the impacts of, climate change as a regional priority and called on all appropriate regional bodies to support national efforts and take a leadership role in implementing regional actions to address climate change’ (Alofi Communiqué 2008).

This paper gives an overview of the threats posed by climate change to the health of Pacific Island people, based on currently available knowledge, and draws on the existing, somewhat scarce literature and data relevant to the Pacific, notably from the Intergovernmental Panel on Climate Change (IPCC).

## Impacts of climate change on health – direct and indirect

Health is defined as ‘a state of complete physical, mental and social well being and not merely the absence of diseases or infirmity’ (World Health Organization). An individual’s health is thus determined by many factors including social factors commonly known as ‘determinants of health’. Climate change affects people’s health directly through changes in weather and environment (higher temperatures, rising sea levels, more severe flooding, cyclones or drought), and indirectly through its impact on basic determinants of health including water, food security, housing and economies (Confalonieri et al. 2007).

## Unique vulnerability of Pacific Islands

A grasp of the unique characteristics of Pacific islands brings home the potential for climate change to devastate many of the region’s island communities. The 22 island countries and territories of the Pacific are scattered across the largest body of water on the planet – a total area about four times the size of China. The total population of the region is around 9.5 million, but individual country populations range from around only 66 people in Pitcairn Islands to almost 6.5 million (SPC 2008) in Papua New Guinea (PNG). Pitcairn Islands has 5 square

kilometres of land while PNG has 462,840 square kilometres. At least four of the countries are atolls (Kiribati, Republic of the Marshall Islands, Tokelau and Tuvalu) with their highest points barely 4 metres above sea level. In many Pacific archipelago countries, large proportions of the population live in atoll and lowland coastal areas susceptible to king tides, storm surges, coastal erosion and flooding. With the exception of PNG, and to a lesser extent, Solomon Islands and Fiji, the majority of Pacific people live in coastal zones.

## Current situation

For many small island states, the harmful consequences of climate change and variability are already a reality (Barnett 2007; Mimura et al. 2007). There is growing evidence that the region will experience fewer but stronger, cyclones and that higher rainfall will occur in tropical areas, with drought more common in subtropical areas, especially during winter (Table 1). For low-lying islands, the combined impact of more powerful waves from stronger cyclones and sea-level rise are of grave concern, with projections indicating an uncertain future, even the disappearance of some islands by the end of the 21st century (IACC 2008).

The number of tropical cyclones reaching category 5 globally has increased since 1970 (Mimura et al. 2007). A similar trend has been observed in the Pacific. For example, before 2005, Cook Islands was considered to lie outside the cyclone belt and likely to be hit by a severe cyclone only once every 20 years. Between February and March 2005, the country was affected by five tropical cyclones (three at category 5 level). The cyclones caused damage equal to 10% of the government’s annual budget and destroyed 75% of homes on Pukapuka Island. In 2004, Niue was hit by Cyclone Heta, a category 5 cyclone that saw waves break over the island’s 30-metre-high cliffs, causing two deaths, flattening 20% of buildings, destroying almost all of the country’s agriculture, ruining 90% of the country’s museum artefacts and causing economic damage equivalent to 200 years of Niue’s exports (IACC 2008). In other words, every aspect of life on Niue was affected.

For the first time ever recorded in the region, in 2009 king tides struck many countries at the same time, including the Federated States of

Micronesia, Republic of the Marshall Islands, Kiribati, PNG, Solomon Islands and Tuvalu. In PNG, the government had to relocate 2000 people to the nearby Bougainville mainland from low-lying Carteret Island when it was almost submerged by king tides. In January 2009, Fiji was struck by the worst flooding in more than 50 years, resulting in at least 10 deaths. Flash floods also affected Solomon Islands with more than 13 lives lost in just one location. All these events have, of course, had serious consequences for the health of people in the affected communities.

The impact of changing weather conditions has hit the economies of Pacific Island countries hard. Many of them, particularly atoll countries, already face huge challenges in producing enough food for their populations. The combination of sea-level rise and saltwater intrusion, persistent heavy rainfall, floods, and in some countries droughts, has seriously undermined food production and food and nutritional security. In almost all Pacific countries, critical infrastructure, such as housing, energy provision, schools, hospitals and clinics, banks, airports, freight and transport, business districts, and in some countries, all government facilities, is located in coastal areas and thus exposed to climatic events.

The floods, droughts, storm surges and saltwater intrusion associated with changing patterns of rainfall, more intense cyclones and sea level rise (Table 1) are projected to continue to affect water resources, agriculture and food security in many countries, particularly atolls. The United Nations Framework Convention on Climate Change predicts that the economic impacts of agricultural decline associated with climate change will differ between high-island countries such as Fiji, where up to 4% decline in GDP may be expected by 2050, and low-lying countries such as Kiribati, which may face impacts equivalent to 18%

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of its GDP.

Preliminary analysis (Bell et al. 2009; SPC 2006) of the likely impact of climate change on the region's fisheries (10% of GDP for many island countries) and marine ecosystems indicates that changes to the distribution of tuna, and reduced productivity of coastal fisheries due to degradation of coral reefs, caused by higher water temperatures and acidification of the ocean, could have profound effects on local economies and food security (Bell et al. 2009).

Climate change and climate variability are therefore not just theoretical concerns for Pacific Island countries. They are development issues that strike at the heart of their existence. The economic and social impacts, in particular, pose serious political and financial challenges (Mimura et al. 2007) that will adversely affect gross domestic product,

Table 1: Projected changes to features of the climate of the Pacific and Pacific Ocean, relative to 1980–1999 levels, together with projections of total concentration of atmospheric CO<sub>2</sub>, for two of the IPCC emissions scenarios in 2035 and 2100

Climate feature	Low emissions (B1) scenario 2035	High emissions (A2) scenario 2035	Low emissions (B1) scenario 2100	High emissions (A2) scenario 2100
Surface atmospheric temperature (0C)	0.5–0.8	0.5–0.8	1.0–1.5	2.5–3.0
Sea surface temperature (0C)	SST changes are similar to those for surface temperatures though slightly lower in magnitude			
Sea level rise (cm)*	8	8	18–38	23–51
Rainfall	5–15% increase in tropics, decreases in subtropics	5–15% increase in tropics, decreases in subtropics	10–20% increase in tropics, decreases in subtropics	10–20% increase in tropics, decreases in subtropics
Cyclone frequency and intensity	Cyclones less frequent but more intense. Projected to increase in intensity by 6–12% by 2100, equivalent to 0.5 of a cyclone warning category			
ENSO**	ENSO events will continue as a source of inter-annual climate variability, but it is uncertain whether they will increase in frequency or intensity			
CO <sub>2</sub> (ppm)	~400	~400?	450–500	750–800

Source: Information on rainfall, temperature, tropical cyclones and ENSO prepared for SPC by Dr G.A. Meehl, National Center for Atmospheric Research, USA( following Meehl et al. 2007; sea level, Bindoff et al. 2007; CO<sub>2</sub> concentrations, Forster et al. 2007).

\*Could be underestimates, depending on rate at which land ice and glaciers melt.

\*\* El Niño-Southern Oscillation.

living standards and health, agricultural systems, employment and tourist infrastructure. Pacific governments and communities need to fully recognise these projected impacts and be empowered with the capacity to plan responses and adaptation (IACC 2008).

### Specific health impacts

Climate change, climate variability and sea-level rise are projected to have varying levels of health impacts in all island countries as outlined below.

**Direct exposure to changing climatic conditions** – While the region has been spared extremes in temperatures (heat waves or very cold snaps), the increased frequency of stronger cyclones, heavy persistent rainfall and flooding, king tides and storm surges has had severe effects on human health and livelihoods in many island communities in the region, including death, increased incidence of disease and loss of homes and property. This was the case in the Fiji floods in January 2009.

**Altered profile and distribution of certain diseases** – Climate plays an important role in the seasonal pattern and distribution of diseases such as malaria, dengue and diarrhoeal diseases (Confalonieri et al. 2007). Prolonged spells of hot and wet weather would further favour development of mosquito vector populations and spread of diseases such as malaria, which occurs in PNG, Solomon Islands and Vanuatu, and dengue, which particularly affects New Caledonia and Fiji. The projected impacts of climate change on disease incidence could further erode economic stability as noted by a World Bank study in 2000, which calculated that the 1998 dengue fever epidemic in Fiji cost between USD 3–6 million and that the economic costs of a dengue epidemic in Kiribati would be beyond the capacity of the country to cope (Mimura et al. 2007).

**Potential damage to health infrastructure** – Except in PNG, the majority of the region's health facilities are in low-lying coastal areas. In at least six countries, the main national hospital is located within 30 to 300 metres of the sea. For example, in Solomon Islands, the second largest country in the region after PNG, the main national referral hospital is 30 metres from the sea (it was 60 metres from the sea 28 years ago) and only about 2–3 meters above sea-level. The major concern is that hospitals and other health facilities are centres of refuge for the sick and injured in times of disaster. If extreme climatic events render them unusable, where will people go to find help?

**Inadequate capacity of health systems** – Practically all health systems in the Pacific are already severely stretched in attempting to provide basic services to their populations. In some areas, population pressures due to increasing density and unplanned settlement present new health problems that will be compounded by climate change effects. Above all, health systems lack sufficient skilled staff, equipment and funding and the surveillance systems needed to detect changes in disease incidence. There is limited or no spare capacity to cater for the increased impact of natural disasters caused by climate change.

**Impacts arising from climatic effects on determinants of health** – The major determinants of good health are food and nutritional security, a safe water supply, sanitation and hygiene, suitable housing, access to education and a clean and safe environment. All these determinants are subject to the effects of climate change and their status holds the key to sustained human health. Food and nutritional security is of course critical. Many countries, in particular the smaller island states, are already net importers of food. Not only will climate change further reduce the productive capacity of agriculture and fisheries, it will also

force higher consumption of imported low-value processed foods, leading to a rise in nutrition-related diseases.

**Failure to acknowledge the intricate link between changing weather patterns in the Pacific and climate change** – Acknowledging the increasing frequency of extreme weather events as an effect of climate change is the key to putting in place a more proactive and strategic response in Pacific Island countries, especially in relation to protecting human settlements and public infrastructure.

### Where to from here?

At the national level, adaptation planning is essential. Governments need to take a long-term view and put in place planning processes based on hard questions such as, 'When we apply projected rises in sea level, how much of the existing town, village and public infrastructure will remain in 50 or 100 years?' National health systems also need to undertake their own long-term analysis of likely scenarios over the next century in planning the future of health facilities and services.

At the regional level, organisations such as the Secretariat of the Pacific Community (SPC), Secretariat of the Pacific Regional Environment Programme (SPREP) and Pacific Islands Forum Secretariat (PIFS) need to join forces and coordinate their efforts to assist member countries and territories in adaptation planning, policy development and effective implementation of strategies. These organisations must also work together with development partners to support Pacific nations in their efforts to influence global processes aimed at mitigating climate change.

SPC has programmes in agriculture, culture, education, health, fisheries, forestry, statistics and demography, media, transport, gender issues, youth issues and human rights. The Secretariat is working with all its member countries and territories across these sectors – from the political policy making level to the grassroots level – to help them put effective adaptation strategies in place to cope with climate change effects. Just one example is SPC's work to develop 'salt tolerant' varieties of Pacific staple crops for areas affected by salt water intrusion, and similarly 'flood tolerant' varieties for use in flood-prone coastal lowlands, along with advice on building integrated production systems suited to specific locations.

### Conclusion

Pacific Island countries and territories are not producers of the greenhouse gas emissions that contribute to changes in climatic conditions. They are a victim of circumstances and of other nations' uncontrolled appetite for development without due regard for the long-term consequences for the environment. As such, these small nations have an undeniably strong case for international support. They rely on the global community to decide on climate change mitigation strategies, and on individual nations to implement them despite their inconvenience, to ensure that current and future generations of Pacific people can continue to live on their islands and maintain their cultures. ♦

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