

Climate Change in the Pacific Islands



Synopsis of the issue

There exists a growing body of scientific evidence supporting the theory on global climate change. Since the beginning of the industrial revolution, atmospheric concentrations of carbon dioxide (CO₂) have increased nearly 30%, methane concentrations have more than doubled, and nitrous oxide concentrations have risen by about 15%. The increase greenhouse gas and aerosol emissions from human activity have enhanced the heat-trapping capability of the earth's atmosphere.

Climate change has serious implications for the Pacific Islands. Revenue loss across sectors such as agriculture, water resources, fisheries, tourism, energy, forestry, and other industry-related sectors is possible with increased disruption to coral reef habitat. Although "healthy" coral communities almost inevitably recover, those that are already degraded by human impacts often cannot.

Some of the projected impacts of climate change that specifically apply to the Pacific Islands are listed below. Each listed item will be described in the following paragraphs.

- Sea-level rise leading to
 - infrastructure damage,
 - accelerated coastal erosion,
 - crop damage;
- Oceanic chemistry change to a more acidic marine environment;
- Increased water temperature causing increased episodes of coral bleaching;
- Increased severity and frequency of extreme weather and climate events such as tropical cyclones, droughts, and flooding associated with El Nino and La Nina

Sea-level Rise

Globally, sea level has risen 9 - 25 centimeters (4-10 inches) over the past century. With a doubling of greenhouse gases expected by the end of the 21st Century, scientists expect that the average global surface temperature will rise 1.5 – 4.5°C (1.6 - 6.3°F). Sea levels will probably continue to rise for several centuries, even if global temperatures were to stop rising a few decades hence.

Many Pacific Islands have low landmasses that will experience damage to buildings, infrastructure, and crops if sea levels rise as predicted. The reality of the situation caused New Zealand to accept refugees from Tuvalu that have been driven from their homes by rising sea levels. Tuvalu, a country whose highest point is just 4.5m above sea level, is extremely vulnerable to climate change. The country has brought a case to the International Court of Justice against developed countries considered most liable for the greenhouse gases that are blamed for global warming.

Ocean Chemistry

The ocean offsets some CO₂ emissions by absorbing as much as 20-25 million tons of CO₂ each day. Unfortunately, the increased CO₂ absorption has caused the ocean's chemistry to change after hundreds of thousands of years of relative stability. The higher levels of CO₂ have created a more acidic environment that can disrupt the growth and reproduction of calcifying organisms like corals, shellfish and phytoplankton.

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Warmer Waters

Water temperature is also on the rise. Increased temperatures lead to an increased number of coral bleaching events. Bleaching occurs when the coral's symbiotic algae, or zooxanthellae, die. The zooxanthellae provide energy for the hard coral animal, and the coral animal provides a home for the algae. When the water gets too warm, the algae dies and the coral loses its energy source and color. In time, the coral may die as well. In the 1997/98 El Niño, some parts of the Pacific lost 70-90 percent of the corals due to bleaching. Losing corals, the basic components of coral reef ecosystems, is detrimental to the productivity of the system.

More Severe Weather Events

Since 1977, El Nino events have become more frequent which may also be attributed to climate change. Each El Nino event has resulted in water shortages and drought the Pacific Islands. For Tuvalu, Tonga, Samoa, Cook Islands and French Polynesia, there is an increased risk of tropical cyclones associated with El Nino events.

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Climate Change Experts

Name	Organization	Country
Richard Aronson	Dauphin Island Sea Laboratory	USA
William Burns	American Society of International Law's Wildlife Interest Group	USA
Terry Done	Australian Institute of Marine Science	Australia
Solomone Fifita	Secretariat for the Pacific Community	Tonga
Mike Hamnett	University of Hawaii at Manoa	USA
John Hay	University of Waikato	New Zealand
Ove Hoegh-Guldberg	University of Queensland	Australia
Wayne King	International Global Change Institute	New Zealand
Penehuro Lefale	National Institute of Water and Atmospheric Research (NIWA)	New Zealand
Nancy Lewis	East West Center	USA
Janice Lough	University of Sydney	Australia
Diane McFadzien	World Wide Fund for Nature (WWF)	Fiji
Cedric Schuster	World Wide Fund for Nature (WWF)	Fiji
Graham Sem	SPREP	Samoa
Al Strong	National Oceanic and Atmospheric Administration (NOAA)	USA
Clive Wilkinson	Australian Institute of Marine Science	Australia

Selected Links and Publications

Climate Change Prediction Center

http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/enso_advisory/index.html

Climate Change and the Pacific Islands

<http://www.unescap.org/mced2000/pacific/background/climate.htm>

Greenpeace <http://www.greenpeace.org/~climate/arctic99/reports/index.html>

Island Climate Update (ICU) <http://www.niwa.cri.nz/NCC/ICU/archive>

National Oceanic and Atmospheric Administration (NOAA).

<http://www.pmel.noaa.gov/tao/elnino/forecasts.html>

Current El Niño and La Niña related climate predictions and forecasts

Pacific Institute <http://www.pacinst.org>

Pew Center on Global Climate Change http://www.pewclimate.org/press_room

South Pacific Sea Level and Climate Monitoring Project

<http://www.ntf.flinders.edu.au/TEXT/PRIS/PACIFIC/pacific.html>

USA Today El Niño site. <http://www.usatoday.com/weather/nino/wnino0.htm>

WWF Climate Change Campaign South Pacific Coral Bleaching

<http://www.wwfapacific.org.fj/coralbleaching.htm>