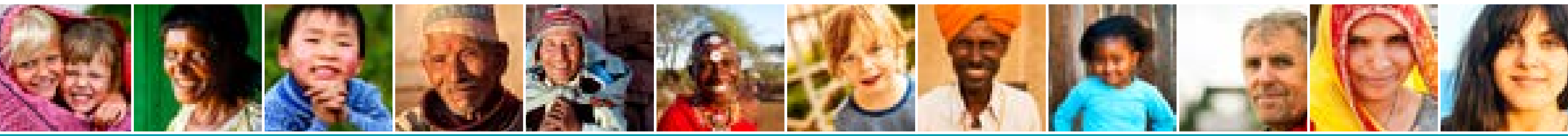
CLIMATE AND HEALTH COUNTRY PROFILE – 2017

VANUATU



OVERVIEW

Vanuatu is an archipelago of approximately 80 islands located south of the equator in the Western Pacific ocean. Vanuatu's climate is tropical, with two distinct seasons – a warm, wet season and a cooler, dry season. The climate varies considerably from year to year, mainly due to the effects of the El Niño-Southern Oscillation (ENSO) system. The wet season often brings tropical cyclones (Pacific Climate Change Science Program, PCCSP, 2011).[a] Although one of the lowest greenhouse gas emittters in the world, Vanuatu is amongst one of the most vulnerable nations to the impact of climate change. Vanuatu's economy is based primarily on agriculture, fishing and tourism. These sectors are already experiencing stresses from climate variability and climate change. These effects are expected to intensify, resulting in continued increases in mean annual and seasonal temperatures, changes in rainfall patterns, increases in extreme weather events such as cyclones, and continued sea-level rise and ocean acidification.[b] Climate change in Vanuatu is expected to impact human health in numerous ways, including an increased burden of vector-borne and water-borne diseases, increased mortality and morbidity associated with climate-related disasters and a deterioration in food-safety and security. Adaptation to the health impacts of climate change in Vanuatu are hindered by environmental and socio-economic stresses already facing the nation.

SUMMARY OF KEY FINDINGS

- In Vanuatu, under a high emissions scenario, mean annual temperature is projected to rise by about 3.3°C on average from 1990 to 2100. If global emissions decrease rapidly, the temperature rise is limited to about 0.9°C. This may be accompanied by a high number of heat wave days and increased variability of precipitation patterns [page 2].
- Vanuatu faces increased risk of vector-borne and water-borne diseases such as dengue fever [page 4].
- Loss of productive land and variable precipitation patterns could damage agricultural production leading to food insecurity and nutritional deficiencies, particularly for those dependent on subsistence livelihoods.

OPPORTUNITIES FOR ACTION

1) Adaptation

- Implement actions to build institutional and technical capacities to work on climate change and health
- Strengthen integrated disease surveillance systems and ensure the use of accurate climate information.
- Promote inter-sectoral collaboration
- Raise public awareness about the health impacts of climate change

2) Mitigation

- Estimate the health co-benefits of mitigation action and sustainable development

DEMOGRAPHIC ESTIMATES	
Population (2017)[c]	276,000
Population growth rate (2017)[c]	2.1%
Population living in urban areas (2017)[d]	26.8%
Population under five (2017)[c]	12.5%
Population age 65 or over (2017)[c]	4.4%
ECONOMIC AND DEVELOPMENT INDICATORS	
GDP per capita (current US$, 2016)[e]	2861 USD
Total expenditure on health as % of GDP (2014)[f]	5.0%
Percentage share of income for lowest 20% of population (2010)[e]	NA
Average annual HDI growth % (2010-2015)[g]	0.20%
HEALTH ESTIMATES	
Life expectancy at birth (2015)[h]	72 years
Under-5 mortality per 1000 live births (2015)[i]	28

a Spickett, J.T., Katscherian, D., McIver, L. (2013). Health Impacts of Climate Change in Vanuatu: An Assessment and Adaptation Action Plan. Global Journal of Health Sciences. May; 5(3): 42–53.
b Current and Future Climate of Vanuatu, Country Brochure, Pacific Climate Change Science. http://www.pacificclimatechangescience.org/wp-content/uploads/2013/06/15_PACCSAP-Vanuatu-11pp_WEB.pdf.
c World Population Prospects: The 2017 Revision, UNDESA (2017)
d World Urbanization Prospects: The 2014 Revision, UNDESA (2014
e World Development Indicators, World Bank (2017)
f Global Health Expenditure Database, WHO (2016)
g United Nations Development Programme, Human Development Reports (2016)
h Global Health Observatory, WHO; 2016
i Levels & Trends in Child Mortality Report 2015, The UN Inter-agency Group for Child Mortality Estimation (2015)

1 CURRENT AND FUTURE CLIMATE HAZARDS

Due to climate change, many climate hazards and extreme weather events, such as heat waves, heavy rainfall and droughts, could become more frequent and more intense in many parts of the world.

Outlined here are country–specific projections up to the year 2100 for climate hazards under a 'business as usual' high emissions scenario compared to projections under a 'two-degree' scenario with rapidly decreasing global emissions. Most hazards caused by climate change will persist for many centuries.

COUNTRY-SPECIFIC CLIMATE HAZARD PROJECTIONS

The model projections below present climate hazards under a high emissions scenario, Representative Concentration Pathway 8.5 [RCP8.5] (in orange) and a low emissions scenario, [RCP2.6] (in green).[a] The text boxes describe the projected changes averaged across about 20 models (thick line). The figures also show each model individually as well as the 90% model range (shaded) as a measure of uncertainty and, where available, the annual and smoothed observed record (in blue).[b,c] Modelling uncertainties associated with the relatively coarse spatial scale of the models compared with that of small islands are not explicitly represented.

MEAN ANNUAL TEMPERATURE

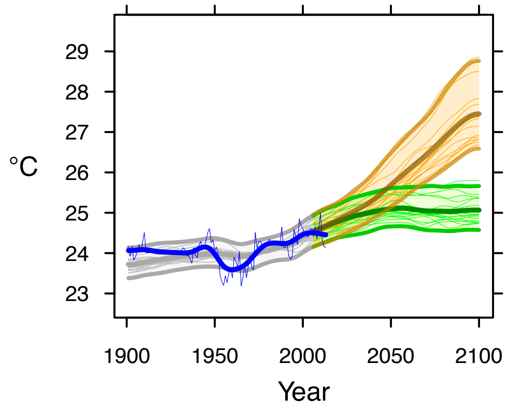


Fig. 1.1. Under a high emissions scenario, mean annual temperature is projected to rise by about 3.3°C on average from 1990 to 2100. If global emissions decrease rapidly, the temperature rise is limited to about 0.9°C.

DAYS OF WARM SPELL ('HEAT WAVES')

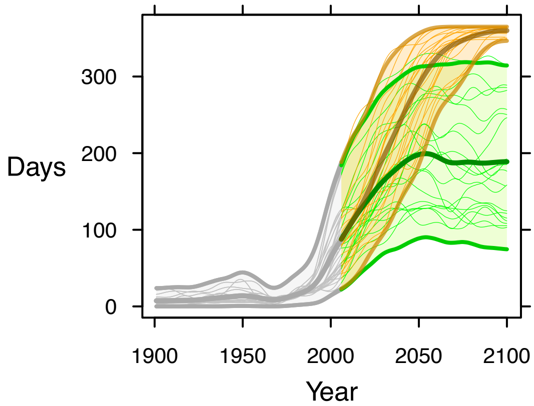


Fig. 1.2. Under a high emissions scenario, the number of days of warm spell[d] is projected to increase from about 30 days in 1990 to about 360 days on average in 2100. If global emissions decrease rapidly, the days of warm spell are limited to about 190 on average.

DAYS WITH EXTREME RAINFALL ('FLOOD RISK')

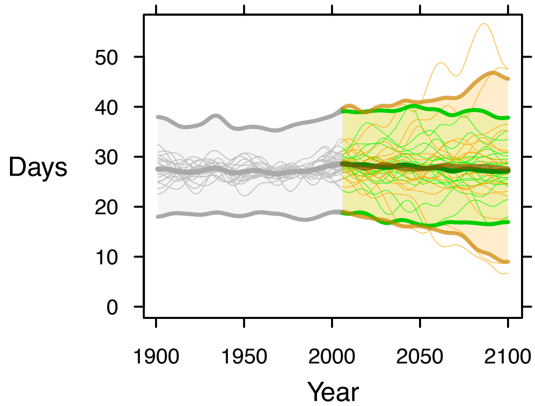


Fig. 1.3. Under both high and low emissions scenarios, the number of days with very heavy precipitation (20 mm or more) is not, on average, expected to change from an average of just under 30 days. Year-to-year variability remains high, and under a high global emissions scenario, some models indicate a slight decrease, others a slight increase in risk.

CONSECUTIVE DRY DAYS ('DROUGHT')

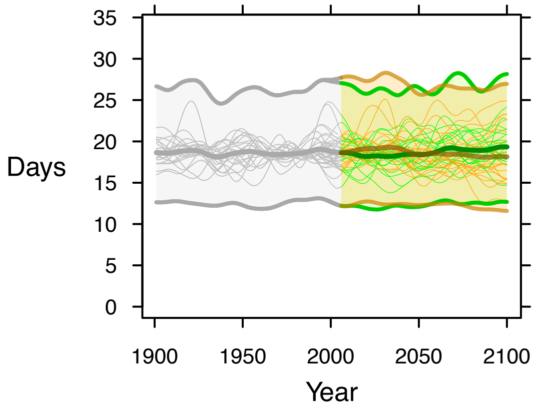


Fig. 1.4. Under both high and low emissions scenarios, the longest dry spell is not indicated to change much from an average of just under 20 days, with continuing large year-to-year variability.

a Model projections are from CMIP5 for RCP8.5 (high emissions) and RCP2.6 (low emissions). Model anomalies are added to the historical mean and smoothed.
b Observed historical record of mean temperature is from CRU-TSv.3.22.
c Analysis by the Climatic Research Unit and Tyndall Centre for Climate Change Research, University of East Anglia, 2015.
d A 'warm spell' day is a day when maximum temperature, together with that of at least the 6 consecutive previous days, exceeds the 90th percentile threshold for that time of the year.

2 CURRENT AND FUTURE HEALTH RISKS DUE TO CLIMATE CHANGE

Human health is profoundly affected by weather and climate. Climate change threatens to exacerbate today's health problems – deaths from extreme weather events, cardiovascular and respiratory diseases, infectious diseases and malnutrition – whilst undermining water and food supplies, infrastructure, health systems and social protection systems.

SEA LEVEL RISE

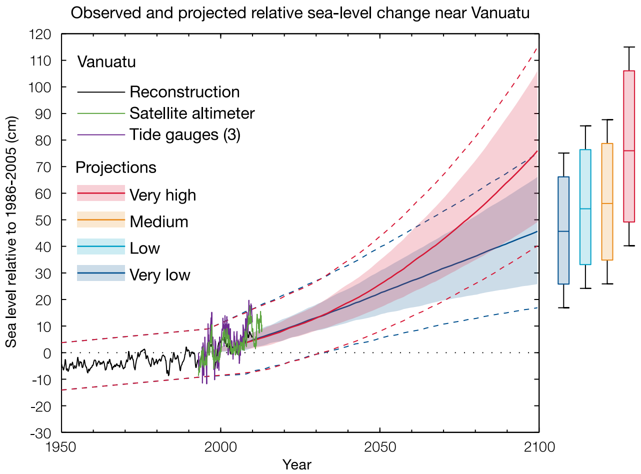


Fig. 2.1. Tide-gauge records (purple) of relative sea level and the satellite record (green) since 1993. The reconstructed sea level data at Vanuatu (since 1950) is shown in black. Multi-model mean projections from 1995–2100 are given for the very high (red solid line) and very low emissions scenarios (blue solid line), with the 5–95% uncertainty range shown by the red and blue shaded regions. The ranges of projections for the four emissions scenarios by 2100 are also shown by the bars on the right. The dashed lines are an estimate of year-to-year variability in sea level (5–95% uncertainty range about the projections) and indicate that individual monthly averages of sea level can be above or below longer-term averages.

Source: Current and Future Climate of Vanuatu, Country Brochure, Pacific Climate Change Science. http://www.pacificclimatechangescience.org/wp-content/uploads/2013/06/15_PACCSAP-Vanuatu-11pp_WEB.pdf

KEY IMPLICATIONS FOR HEALTH

Under a high emissions scenario (RCP8.5) sea-level rise in Vanuatu is expected to reach between 42–89 cm (90% model range) towards the end of the century. Ambitious global action to mitigate climate change and achieve a low emissions scenario (RCP2.6) could limit sea-level rise to between 25-59 cm (90% model range).[a]

Coastal erosion, storm surges, saltwater inundation and flooding associated with sea level rise can cause extensive health impacts, including impacts on food production, water provision, ecosystem disruption, infectious disease outbreak and vector distribution. Longer term effects may include mental health stresses and population displacement.

OCEAN ACIDIFICATION AND SEA SURFACE TEMPERATURE

About one quarter of the carbon dioxide emitted from human activities each year is absorbed by the oceans. As the extra carbon dioxide reacts with sea water it causes the ocean to become slightly more acidic. This impacts the growth of corals and organisms that construct their skeletons from carbonate minerals. These species are critical to the balance of tropical reef ecosystems.[a] Projections under several emissions scenarios indicate that the acidity level of sea waters in the Vanuatu region will continue to increase past the 21st century.[a]

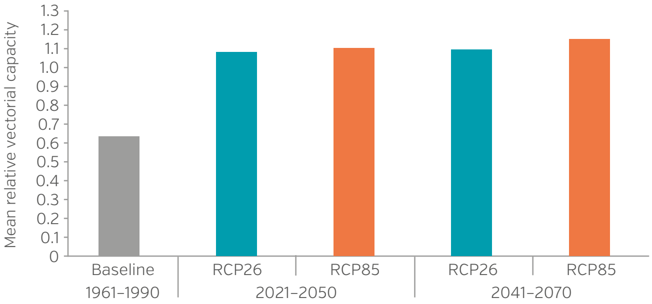
At the same time, sea surface temperatures are increasing in the Vanuatu region, often leading to coral bleaching and loss of marine biodiversity. Although it is not yet certain, increasing sea surface temperatures are also believed to be associated with an increased risk of ciguatera fish poisoning.

Ocean acidity, along with coral bleaching, risks of ciguatera infection and fishing pressures could lead to food insecurity and nutritional deficiencies in the population of Vanuatu.

a Text taken from Current and Future Climate of Vanuatu, Country Brochure, Pacific Climate Change Science. http://www.pacificclimatechangescience.org/wp-content/uploads/2013/06/15_PACCSAP-Vanuatu-11pp_WEB.pdf.

INFECTIOUS AND VECTOR-BORNE DISEASES

Fig. 2.2. Mean relative vectorial capacity for dengue fever transmission in Vanuatu



The mean relative vectorial capacity for dengue fever transmission is projected to increase towards 2070 under both a high and low emissions scenario.

Source: Rocklöv, J., Quam, M. et al., 2015.[a]

KEY IMPLICATIONS FOR HEALTH

Some of the worlds most virulent infections are also highly sensitive to climate: temperature, precipitation and humidity have a strong influence on the life-cycles of the vectors and the infectious agents they carry and influence the transmission of water and food-borne diseases.[b]

In Vanuatu, climate change is expected to increase the risk of several vector-borne diseases including malaria, dengue fever and lymphatic filariasis.[c]

Globally, socioeconomic development and health interventions are driving down burdens of several infectious diseases. The projections presented here for vectorial capacity for dengue fever transmission assume that this will continue. However, climate conditions are projected to become significantly more favourable for transmission, slowing progress in reducing burdens, and increasing the populations at risk if control measures are not maintained or strengthened.[d]

OVERVIEW OF CLIMATE-SENSITIVE HEALTH RISKS IN VANUATU AND ADAPTATION PRIORITIES

Vanuatu recently conducted a climate change and health vulnerability and adaptation assessment to determine the key climate sensitive health risks and ranked these risks based on the likelihood and potential consequences for the population (Fig. 2.3).[e] Adaptation priorities to address these health risks were then identified in each of the following areas; regulatory interventions, public education, surveillance & monitoring, ecosystem intervention, infrastructure development, technological advancements, health interventions and research & evidence.[e,f]

A number of common adaptation measures were recommended for all areas. These included:[e]

- increased capacity both in human resources and equipment and other support;
- further information on the health impacts of climate change, including incorporation of these considerations into the training curricula of health professionals in Vanuatu;
- community education from primary school onwards on the potential health impacts of climate change and the need for adaptation strategies;
- improved collection, collation, storage and analysis of data on health status in the community;
- inter-sectoral collaboration; and
- improved standards and better enforcement of current regulations.

Fig 2.3. Climate-sensitive health risks in Vanuatu

Risk category	Health issue
Extreme	Waterborne diseases Foodborne diseases
High	Vector-borne diseases Malnutrition NCDs Temperature-related illnesses Occupation-related illnesses
Medium	Respiratory infections Skin conditions Eye diseases Mental health disorders Traumatic injuries and deaths

Source: Spickett, J.T., Katscherian, D., McIver, L. (2013). Health Impacts of Climate Change in Vanuatu: An Assessment and Adaptation Action Plan.[e]

a Country-level analysis, completed in 2015, was based on health models outlined in the Quantitative risk assessment of the effects of climate change on selected causes of death, 2030s and 2050s. Geneva: World Health Organization, 2014. The mean of impact estimates for three global climate models are presented. Models assume continued socioeconomic trends (SSP2 or comparable).
b Atlas of Health and Climate, World Health Organization and World Meteorological Organization, 2012
c Spickett,J.T., Katscherian, D., McIver, L. (2013). Health Impacts of Climate Change in Vanuatu: An Assessment and Adaptation Action Plan. Global Journal of Health Sciences. May; 5(3): 42–53.
d Quantitative risk assessment of the effects of climate change on selected causes of death, 2030s and 2050s. Geneva: World Health Organization, 2014.
e Spickett, J.T., Katscherian, D., McIver, L. (2013). Health Impacts of Climate Change in Vanuatu: An Assessment and Adaptation Action Plan. Global Journal of Health Sciences. May; 5(3): 42–53.
f Further details about specific adaptation strategies for each of these areas can be found in Spickett, J.T., Katscherian, D., McIver, L. (2013). Health Impacts of Climate Change in Vanuatu: An Assessment and Adaptation Action Plan. Global Journal of Health Sciences. May; 5(3): 42–53.

3 CO-BENEFITS TO HEALTH FROM CLIMATE CHANGE MITIGATION: A GLOBAL PERSPECTIVE

Health co-benefits are local, national and international measures with the potential to simultaneously yield large, immediate public health benefits and reduce the upward trajectory of greenhouse gas emissions. Lower carbon strategies can also be cost-effective investments for individuals and societies.

Presented here are examples, from a global perspective, of opportunities for health co-benefits that could be realised by action in important greenhouse gas emitting sectors.[a]

Transport

Transport injuries lead to 1.2 million deaths every year, and land use and transport planning contribute to the 2–3 million deaths from physical inactivity. The transport sector is also responsible for some 14% (7.0 GtCO_2e) of global carbon emissions. The IPCC has noted significant opportunities to reduce energy demand in the sector, potentially resulting in a 15%–40% reduction in CO_2 emissions, and bringing substantial opportunities for health: A modal shift towards walking and cycling could see reductions in illnesses related to physical inactivity and reduced outdoor air pollution and noise exposure; increased use of public transport is likely to result in reduced GHG emissions; compact urban planning fosters walkable residential neighborhoods, improves accessibility to jobs, schools and services and can encourage physical activity and improve health equity by making urban services more accessible to the elderly and poor.

Electricity Generation

Reliable electricity generation is essential for economic growth, with 1.4 billion people living without access to electricity. However, current patterns of electricity generation in many parts of the world, particularly the reliance on coal combustion in highly polluting power plants contributes heavily to poor local air quality, causing cancer, cardiovascular and respiratory disease. Outdoor air pollution is responsible for 3.7 million premature deaths annually, 88% of these deaths occur in low and middle income countries. The health benefits of transitioning from fuels such as coal to lower carbon sources, including ultimately to renewable energy, are clear: Reduced rates of cardiovascular and respiratory disease such as stroke, lung cancer, coronary artery disease, and COPD; cost-savings for health systems; improved economic productivity from a healthier and more productive workforce.

Household Heating, Cooking and Lighting

Household air pollution causes over 4.3 million premature deaths annually, predominantly due to stroke, ischaemic heart disease, chronic respiratory disease, and childhood pneumonia. A range of interventions can both improve public health and reduce household emissions: a transition from the inefficient use of solid fuels like wood and charcoal, towards cleaner energy sources like liquefied petroleum gas (LPG), biogas, and electricity could save lives by reducing indoor levels of black carbon and other fine particulate matter; where intermediate steps are necessary, lower emission transition fuels and technologies should be prioritized to obtain respiratory and heart health benefits; women and children are disproportionately affected by household air pollution, meaning that actions to address household air pollution will yield important gains in health equity; replacing kerosene lamps with cleaner energy sources (e.g. electricity, solar) will reduce black carbon emissions and the risk of burns and poisoning.

Healthcare Systems

Health care activities are an important source of greenhouse gas emissions. In the US and in EU countries, for example, health care activities account for between 3–8% of greenhouse gas (CO_2-eq) emissions. Major sources include procurement and inefficient energy consumption. Modern, on-site, low-carbon energy solutions (e.g. solar, wind, or hybrid solutions) and the development of combined heat and power generation capacity in larger facilities offer significant potential to lower the health sector's carbon footprint, particularly when coupled with building and equipment energy efficiency measures. Where electricity access is limited and heavily reliant upon diesel generators, or in the case of emergencies when local energy grids are damaged or not operational, such solutions can also improve the quality and reliability of energy services. In this way, low carbon energy for health care could not only mitigate climate change, it could enhance access to essential health services and ensure resilience.

a For a complete list of references used in the health co-benefits text please see the Climate and Health Country Profile Reference Document, http://www.who.int/globalchange/en/

4 EMISSIONS AND COMMITMENTS

Global carbon emissions increased by 80% from 1970 to 2010, and continue to rise.[a,b] Collective action is necessary, but the need and opportunity to reduce greenhouse gas emissions varies between countries. Information on the contribution of different sectors, such as energy, manufacturing, transport and agriculture, can help decision-makers to identify the largest opportunities to work across sectors to protect health, and address climate change.

VANUATU GREENHOUSE GAS EMISSIONS

A 2°C upper limit of temperature increase relative to pre-industrial levels has been internationally agreed in order to prevent severe and potentially catastrophic impacts from climate change. Reductions are necessary across countries and sectors. In order to stay below the 2°C upper limit it is estimated that global annual CO_2-energy emissions, currently at 5.2 tons per capita, need to be reduced to 1.6 tons per capita.[c]

Vanuatu's CO_2 emissions are amongts the lowest of all nations, and yet it is one that will suffer the most devastating impacts of climate change.

The Vanuatu National Energy Roadmap proposes a long-term development plan for the energy sector to reduce its reliance on imported petroleum fuels and focuses on five energy sector priorities:[d]

- Access to secure, reliable and affordable electricity for all citizens by 2030
- Reliable, secure and affordable petroleum supply throughout Vanuatu
- A more affordable and low cost of energy services in Vanuatu
- An energy secure Vanuatu at all times
- Mitigating climate change through renewable energy and energy efficiency

NATIONAL STRATEGIES AND INITIATIVES[e]

2011	NATIONAL CLIMATE CHANGE ADAPTATION STRATEGY FOR LAND-BASED RESOURCES, 2012–2022