CLIMATE RISK COUNTRY PROFILE

SOLOMON ISLANDS

WORLD BANK GROUP

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ACKNOWLEDGEMENTS

This profile is part of a series of Climate Risk Country Profiles that are developed by the World Bank Group (WBG). These profiles synthesize the most relevant data and information on climate change, disaster risk reduction, and adaptation actions and policies at the country level. The profile is designed as a quick reference source for development practitioners to better integrate climate resilience in development planning and policy making. This effort is co-led by Veronique Morin (Senior Climate Change Specialist, WBG) and Ana E. Bucher (Senior Climate Change Specialist, WBG).

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Climate and climate-related information is largely drawn from the Climate Change Knowledge Portal (CCKP), a WBG online platform with available global climate data and analysis based on the current Intergovernmental Panel on Climate Change (IPCC) reports and datasets. The team is grateful for all comments and suggestions received from the sector, regional, and country development specialists, as well as climate research scientists and institutions for their advice and guidance on use of climate related datasets.

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FOREWORD

Climate change is a major risk to good development outcomes, and the World Bank Group is committed to playing an important role in helping countries integrate climate action into their core development agendas. The World Bank Group is committed to supporting client countries to invest in and build a low-carbon, climate-resilient future, helping them to be better prepared to adapt to current and future climate impacts.

The World Bank Group is investing in incorporating and systematically managing climate risks in development operations through its individual corporate commitments.

A key aspect of the World Bank Group's Action Plan on Adaptation and Resilience (2019) is to help countries shift from addressing adaptation as an incremental cost and isolated investment to systematically incorporating climate risks and opportunities at every phase of policy planning, investment design, implementation and evaluation of development outcomes. For all IDA and IBRD operations, climate and disaster risk screening is one of the mandatory corporate climate commitments. This is supported by the World Bank Group's Climate and Disaster Risk Screening Tool which enables all Bank staff to assess short- and long-term climate and disaster risks in operations and national or sectoral planning processes. This screening tool draws up-to-date and relevant information from the World Bank Group's Climate Change Knowledge Portal, a comprehensive online 'one-stop shop' for global, regional, and country data related to climate change and development.

Recognizing the value of consistent, easy-to-use technical resources for client countries as well as to support respective internal climate risk assessment and adaptation planning processes, the World Bank Group's Climate Change Group has developed this content. Standardizing and pooling expertise facilitates the World Bank Group in conducting initial assessments of climate risks and opportunities across sectors within a country, within institutional portfolios across regions, and acts as a global resource for development practitioners.

For developing countries, the climate risk profiles are intended to serve as public goods to facilitate upstream country diagnostics, policy dialogue, and strategic planning by providing comprehensive overviews of trends and projected changes in key climate parameters, sector-specific implications, relevant policies and programs, adaptation priorities and opportunities for further actions.

It is my hope that these efforts will spur deepening of long-term risk management in developing countries and our engagement in supporting climate change adaptation planning at operational levels.

Bernice Van Bronkhorst
Global Director
Climate Change Group (CCG)
The World Bank Group (WBG)

KEY MESSAGES

- The Solomon Islands are warming and are expected to continue to experience warming trends throughout the 21st century. Future rates of warming are clouded by current models' inability to simulate very localized changes but are likely to be in the range of 0.7°C–2.8°C depending on the 21st century rate of global emissions.
- Natural variability between years means short and medium-term rainfall changes are difficult to detect and project into the future. Further research is urgently required to develop models better suited to modelling the future climate of Pacific islands.
- The Solomon Islands has significant vulnerability to extreme rainfall events and in the context of uncertainty, disaster risk reduction is of critical importance.
- Sea-levels are rising faster than the global average. Submergence of the lowest-lying islands has already begun and threatens coastal communities. In some cases, nature-based adaptation such as coral reef and mangrove restoration may protect communities, in others hard defences or managed relocation may need to be considered.
- A very negative outlook is projected for the fisheries sector in the Solomon Islands, with potential reductions in the maximum catch potential of over 50%. These impacts represent a major threat to dietary health in poorer communities, national food security, and national income.
- The future of the cash and subsistence agriculture sector is uncertain and requires further study given its importance to the majority of rural households.
- The Solomon Islands face a large range of hazards which intersect with climate changes. In most cases fundamental social issues of poverty, inequality, and poorly planned development remain the biggest drivers of disaster risk.
- However, as one of the most vulnerable countries in the world, the Solomon Islands have a priority need for support to prevent significant damage and loss over the 21st century.

COUNTRY OVERVIEW

The Solomon Islands is an archipelago located in the Melanesian region of the Pacific, south-east of Papua New Guinea. Located in the Coral Triangle, which is considered the "Amazon of the Seas", the country's expansive area covers a unique range of atolls, mountains, and salt-water lagoons, and has some of the world's richest marine diversity. In 2020, Solomon Islands had a population of approximately 686,878 people, with a gross domestic product (GDP) per capita of around USD$2,258, putting it among the world's poorest countries. Agriculture, forestry, and fishing are the mainstay of the economy, with agriculture contributing an estimated 34% of gross domestic product in 2013, compared to 58% from the services sector. Land degradation and deforestation are serious concerns in the Solomon Islands, as logging is a key source of revenue for the country but also a significant driver of biodiversity loss. The country is one of the most vulnerable to climate change, due in large part to the fact that the majority of the population lives within 1.5 kilometre (km) of the coastline and the islands are regularly exposed to extreme rainfall events.[1] In addition, high poverty rates, excessive dependence on foreign aid, and remoteness make the Solomon Islands particularly vulnerable to climate variability and change.

The Ministry of Environment, Climate Change, Disaster Management and Meteorology (MECDM) is the coordinator and central point for climate change engagement with all development partners including the United Nations Framework Convention on Climate Change. The Solomon Islands National Climate Change Policy (2012–2017) laid out an initial pathway to integrate climate change policy into the National Development Strategy, and strengthen capacity to mitigate and adapt to the negative impacts of climate change. The Solomon Islands ratified the Paris Agreement on September 21, 2016, submitted its Second Nationally Determined Contribution in 2016 and its Second National Communication to the UNFCCC in 2017.[2]

Green, Inclusive and Resilient Recovery

The coronavirus disease (COVID-19) pandemic has led to unprecedented adverse social and economic impacts. Further, the pandemic has demonstrated the compounding impacts of adding yet another shock on top of the multiple challenges that vulnerable populations already face in day-to-day life, with the potential to create devastating health, social, economic and environmental crises that can leave a deep, long-lasting mark. However, as governments take urgent action and lay the foundations for their financial, economic, and social recovery, they have a unique opportunity to create economies that are more sustainable, inclusive and resilient. Short and long-term recovery efforts should prioritize investments that boost jobs and economic activity; have positive impacts on human, social and natural capital; protect biodiversity and ecosystems services; boost resilience; and advance the decarbonization of economies.

[1] DIFD (2018). Enabling safe and sustainable marine economies across Commonwealth Small Island Developing States. Commonwealth Marine Economies Programme. URL: https://projects.noc.ac.uk/cme-programme/about

[2] Ministry of Environment, Climate change, Disaster Management, and Meteorology. (2017) Second National Communication of the Solomon Islands to the UNFCCC. URL: https://unfccc.int/sites/default/files/resource/SI%20SNC%20FINAL_1-1.pdf [accessed 15/11/2019]

This document aims to succinctly summarize the climate risks faced by the Solomon Islands. This includes rapid onset and long-term changes in key climate parameters, as well as impacts of these changes on communities, livelihoods and economies, many of which are already underway. This is a high-level synthesis of existing research and analyses, focusing on the geographic domain of the Solomon Islands, therefore potentially excluding some international influences and localized impacts. The core climate projections presented are sourced from the Pacific-Australia Climate Change Science and Adaptation Planning Program,[3,4] as well as the World Bank Group's Climate Change Knowledge Portal (CCKP), incorporating climate projections from the Coupled Model Inter-comparison Project Phase 5 (CMIP5). This document is primarily meant for WBG staff to inform their climate actions. The document also aims to direct the reader to many useful sources of secondary data and research.

TABLE 1. Key indicators

Indicator	Value	Source
Population Undernourished[5]	13.2% (2017–19)	FAO, 2020
National Poverty Rate[6]	12.7% (2013)	ADB, 2020a
Share of Wealth Held by Bottom 20%[7]	7% (2012)	World Bank, 2021
Net Annual Migration Rate[8]	–0.3% (2015–20)	UNDESA, 2019
Infant Mortality Rate (Between Age 0 and 1)[9]	1.5% (2015–20)	UNDESA, 2019
Average Annual Change in Urban Population[10]	3.9% (2015–20)	UNDESA, 2019
Dependents per 100 Independent Adults[11]	78 (2020)	UNDESA, 2019
Urban Population as % of Total Population[12]	24.7% (2020)	CIA, 2020
External Debt Ratio to GNI[13]	29.1% (2018)	ADB, 2020b
Government Expenditure Ratio to GDP[14]	29.3% (2019)	ADB, 2020b

3 Australian Bureau of Meteorology and CSIRO (2014). Climate Variability, Extremes and Change in the Western Tropical Pacific: New Science and Updated Country Reports. Pacific-Australia Climate Change Science and Adaptation Planning Program Technical Report, Australian Bureau of Meteorology and CSIRO, Melbourne, Australia. URL: https://www.pacificclimatechangescience.org/wp-content/uploads/2014/07/PACCSAP_CountryReports2014_WEB_140710.pdf

4 The NextGen projections for the Pacific region under CMIP5 are expected to be available from late 2021. These will provide an update on the PACCSAP 2014 projections referenced in this profile. The process for providing the new NextGen CMIP6 projections for the Pacific is still in the planning phase.

5 FAO, IFAD, UNICEF, WFP, WHO (2020). The state of food security and nutrition in the world. Building Resilience for peace and food security. FAO. Rome. URL: http://www.fao.org/documents/card/en/c/ca9692en/

6 ADB (2020a). Basic Statistics 2020. URL: https://www.adb.org/publications/basic-statistics-2020

7 World Bank (2021). Income share held by lowest 20%. URL: https://data.worldbank.org/indicator/SI.DST.FRST.20 [accessed 21/10/2021]

8 UNDESA (2019). World Population Prospects 2019. URL: https://population.un.org/wpp/Download/Standard/Population/ [accessed 15/02/2021]

9 UNDESA (2019). World Population Prospects 2019. URL: https://population.un.org/wpp/Download/Standard/Population/ [accessed 15/02/2021]

10 UNDESA (2019). World Urbanization Prospects 2019. URL: https://population.un.org/wup/Download/ [accessed 15/02/2021]

11 UNDESA (2019). World Population Prospects 2019. URL: https://population.un.org/wpp/Download/Standard/Population/ [accessed 15/02/2021]

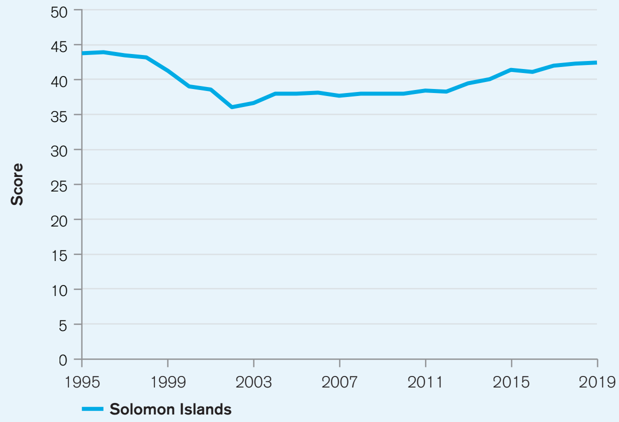
12 CIA (2020). *The World Factbook*. Central Intelligence Agency. Washington DC. URL: https://www.cia.gov/the-world-factbook/

13 ADB (2020b). Key Indicators for Asia and the Pacific 2020, 51st Edition. Asian Development Bank. Manila. URL: https://www.adb.org/sites/default/files/publication/632971/ki2020.pdf

14 ADB (2020b). Key Indicators for Asia and the Pacific 2020, 51st Edition. Asian Development Bank. Manila. URL: https://www.adb.org/sites/default/files/publication/632971/ki2020.pdf

Due to a combination of political, geographic, and social factors, the Solomon Islands is recognized as highly vulnerable to climate change impacts, ranked 127th out of 182 countries in the 2020 ND-GAIN Index.[15] The ND-GAIN Index ranks 182 countries using a score which calculates a country's vulnerability to climate change and other global challenges as well as their readiness to improve resilience. The more vulnerable a country is the lower their score, while the more ready a country is to improve its resilience the higher it will be. Norway has the highest score and is ranked 1st. **Figure 1** is a time-series plot of the ND-GAIN Index showing the Solomon Islands' progress.

FIGURE 1. The ND-GAIN Index score (out of 100) summarizes a country's vulnerability to climate change and other global challenges in combination with its readiness to improve resilience. It aims to help businesses and the public sector better prioritize investments for a more efficient response to the immediate global challenges ahead.



CLIMATOLOGY

Climate Baseline

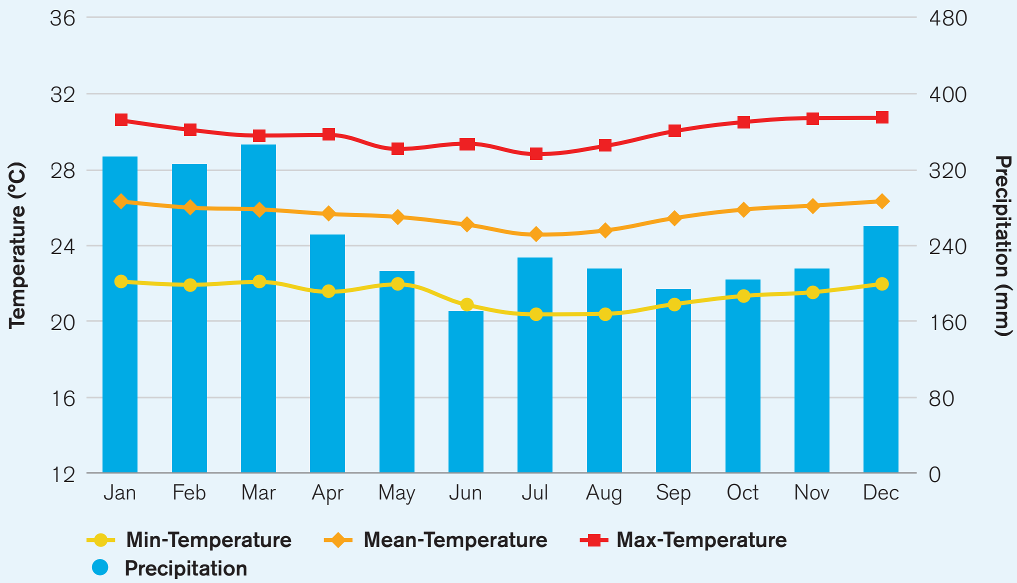
Overview

Typical of its Pacific location, the Solomon Islands experiences a highly stable climate with average temperatures fluctuating between 24.5°C and 26.5°C year-round. Average monthly rainfall is also relatively consistent, ranging from 150–350 millimetres (mm), and usually peaking between January and March (**Figure 2**). Solomon Islands are known to experience intensive periods of short-term rainfall, with the record precipitation over a 12-hour period seen in 2009, totalling 281 mm.[2] Humidity is also high, averaging around 80%. Climate in the Solomon Islands is influenced by a complex set of interconnected large-scale climate phenomenon. Its location places it in what is termed the 'warm pool' between the South Pacific Convergence Zone (SPCZ) and the Intertropical convergence zone (ITCZ). These features are not static, and their relative location to the Solomon Islands can control wind direction and rainfall patterns. El Niño–Southern Oscillation (ENSO) also influences inter-annual rainfall patterns and wave direction.

[15] University of Notre Dame (2019). Notre Dame Global Adaptation Initiative. URL: https://gain.nd.edu/our-work/country-index/

Annual Cycle

FIGURE 2. Average monthly mean, max, and min temperatures and rainfall in Solomon Islands, 1991–2020[16]



Key Trends

Temperature

Monitoring stations across the Solomon Islands point to increases in average temperature between 1962–2012 at a rate of around 0.14–0.17°C per decade. Rates of warming appear to have accelerated since about 1990, and the Berkeley Earth Dataset suggests temperatures in 2015–2017 reached around 0.8°C above the long-term average.[17]

Precipitation

The Solomon Islands precipitation records suffer from significant data gaps and no historical trends can be linked to climate change at this time. It has been suggested that El Niño years are associated with below average rainfall totals, but this trend is also poorly understood.[2]

A Precautionary Approach

Studies published since the last iteration of the IPCC's report (AR5), such as Gasser et al. (2018), have presented evidence which suggests a greater probability that earth will experience medium and high-end warming scenarios than previously estimated.[18] Climate change projections associated with the highest emissions pathway (RCP8.5) are presented here to facilitate decision making which is robust to these risks.

[16] WBG Climate Change Knowledge Portal (CCKP, 2021). Climate Data: Historical. URL: https://climateknowledgeportalworldbank.org/country/solomon-islands/climate-data-historical

[17] Carbon Brief (2018). Mapped: How every part of the world has warmed – and could continue to warm. [26 September 2018]. URL: https://www.carbonbrief.org/mapped-how-every-part-of-the-world-has-warmed-and-could-continue-to-warm [accessed 25/10/2019]

[18] Gasser, T., Kechiar, M., Ciais, P., Burke, E. J., Kleinen, T., Zhu, D., . . . Obersteiner, M. (2018). Path-dependent reductions in CO2 emission budgets caused by permafrost carbon release. Nature Geoscience, 11, 830–835. URL: https://www.nature.com/articles/s41561-018-0227-0?WT.feed_name=subjects_climate-sciences

Climate Future

Overview

The Representative Concentration Pathways (RCPs) represent four plausible futures, based on the rate of emissions reduction achieved at the global level. Four RCPs (i.e. RCP2.6, RCP4.5, RCP6.0, and RCP8.5) were selected and defined by their total radiative forcing (cumulative measure of GHG emissions from all sources) pathway and level by 2100. In this analysis, RCP2.6 and RCP8.5, the low and high emissions pathways, are the primary focus; RCP2.6 represents a very strong mitigation scenario, whereas RCP8.5 assumes a high-emissions scenario. For reference, **Table 2** provides information on all four RCPs over two-time horizons. In subsequent analysis RCPs 2.6 and 8.5, the low and high emissions pathways, are the primary focus. RCP2.6 would require rapid and systemic global action, achieving significant emissions reduction throughout the 21st century. RCP8.5 assumes annual global emissions will continue to increase throughout the 21st century. Climate changes under each emissions pathway are presented against a reference period of 1986–2005 for all indicators. For more information, please refer to the RCP Database.

TABLE 2. An overview of temperature change projections (°C) in the Solomon Islands under four emissions pathways. Projected changes over the 1986–2005 baseline are given for 20-year periods centred on 2050 and 2090 with the 5th and 95th percentiles provided in brackets.[3]

	Mean Surface Air Temp (Annual)		Max Temp (1-in-20 Year Event)		Min Temp (1-in-20 Year Event)	
Scenario	**2050**	**2090**	**2050**	**2090**	**2050**	**2090**
RCP2.6	0.8 (0.6, 1.2)	0.7 (0.4, 1.2)	0.7 (0.4, 1)	0.8 (0.4, 1.1)	0.7 (0.4, 1)	0.7 (0.1, 0.9)
RCP4.5	1 (0.7, 1.4)	1.4 (1, 2.1)	0.9 (0.4, 1.3)	1.3 (0.9, 2)	0.9 (0.5, 1.3)	1.3 (0.8, 1.9)
RCP6.0	0.9 (0.7, 1.4)	1.7 (1.3, 2.6)	NA	NA	NA	NA
RCP8.5	1.3 (1, 1.9)	2.8 (2, 4)	1.4 (0.9, 2.1)	2.9 (2, 4.1)	1.5 (1, 2.1)	3 (2.2, 4.4)

Model Ensemble

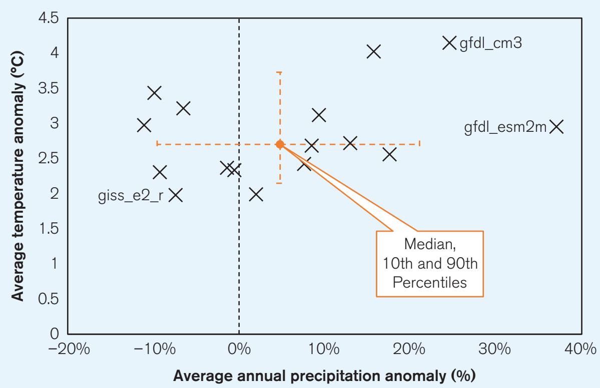
Due to differences in the way global circulation models (GCMs) represent the key physical processes and interactions within the climate system, projections of future climate conditions can vary widely between different GCMs. This is particularly the case for rainfall related variables and at sub-national scales. Exploring the spread of climate model outputs can assist in understanding uncertainties associated with climate models. The range of projections from 16 GCMs on the indicators of average temperature anomaly and annual precipitation anomaly for the Solomon Islands under RCP8.5 is shown in **Figure 3**.

The majority of the models from which outputs are presented in this report are from the CMIP5 round of standardization and quality assurance. Unfortunately, models of this generation operate at large spatial scales and are not well equipped to simulate the future climate of small islands. Typically, the changes projected will relate more to the expected changes over nearby ocean than the island itself. Caution should therefore be applied in interpreting results. This highlights a major area for future development, a research opportunity, and an urgent need from the perspective of policy makers planning for climate change.

Temperature

Projections of future temperature change are presented in three primary formats. Shown in **Table 2** are the changes (anomalies) in maximum and minimum temperatures over the given time period, as well as changes in the average temperature. **Figures 3** and **4** display only the average temperature projections. While similar, these three indicators can provide slightly different information. Monthly and annual average temperatures are most commonly used for general estimation of climate change, but the daily maximum and minimum can explain more about how daily life might change in a region, affecting key variables such as the viability of ecosystems, health impacts, productivity of labor, and the yield of crops, which are often disproportionately influenced by temperature extremes.

FIGURE 3. 'Projected average temperature change' and 'projected annual rainfall change' in the Solomon Islands. Outputs of 16 models within the ensemble simulating RCP8.5 over the period 2080–2099. Models shown represent the subset of models within the ensemble which provide projections across all RCPs and therefore are most robust for comparison.[19] Three models are labelled.



Across the Pacific, temperatures are projected to increase between 1.4°C and 3.1°C. As shown in **Figure 4**, local temperature increases are expected across Solomon Islands, with warming differences varying widely across RCPs, especially after 2030. For instance, as indicated in **Table 2**, relative to the 1986–2005 baseline, current levels of warming of around 0.7°C are expected to sustain to the end of the century under the lowest (RCP2.6) emissions pathway. The model ensemble's estimate of warming under the highest emission pathway (RCP8.5) is an average temperature increase of 1.3°C by the 2050s and 2.8°C by the 2090s.

Future temperature rises in the Solomon Islands are likely to be below the global average – the mean annual surface air temperature under the highest emissions pathway is projected to reach around 2.8°C by the 2090s, compared to around 3.7°C globally. This difference may reflect the moderating effect of large amounts of nearby ocean cover, but considering that ocean cover can also distort model simulations, and the current iteration of global models does not have the spatial accuracy to reliably capture climate processes over small island states, these projections should be approached with caution.

Precipitation

When the median estimate of the full model ensemble there is some evidence that annual precipitation may increase slightly in the Solomon Islands (**Figure 5**). However, there is much uncertainty around future changes in average annual precipitation since there is disagreement among models (see **Figure 3**), and a very wide range in the ensemble estimate (**Figure 5**). Challenges to the certainty of the model average rainfall change are affected by the usual complexity in simulating tropical rainfall, as well as uncertainty in ENSO changes, which especially influences year-to-year rainfall variability within the region.

[19] WBG Climate Change Knowledge Portal (CCKP, 2021). Climate Data: Projections. URL: https://climateknowledgeportalworldbank.org/country/solomon-islands/climate-data-projections

Regarding extreme rainfall events, a warmer atmosphere is likely to lead to an increase in their frequency and intensity. However, the magnitude of such changes in extreme rainfall is not certain due to difficulty capturing key atmospheric interactions, as well as the general coarse spatial resolution of GCMs.

FIGURE 4. Historical and simulated surface air temperature time series for the region surrounding the Solomon Islands. The graph shows the anomaly (from the base period 1986–2005) in surface air temperature from observations (the GISS dataset, in purple), and for the CMIP5 models under the very high (RCP8.5, in red) and very low (RCP2.6, in blue) emissions scenarios. The solid red and blue lines show the smoothed (20-year running average) multi-model mean anomaly in surface air temperature, while shading represents the spread of model values (5–95th percentile). The dashed lines show the 5–95th percentile of the observed interannual variability for the observed period (in black) and added to the projections as a visual guide (in red and blue). This indicates that future surface air temperature could be above or below the projected long-term averages due to interannual variability. The ranges of projections for a 20-year period centred on 2090 are shown by the bars on the right for RCP8.5, 6.0, 4.5 and 2.6.[3]

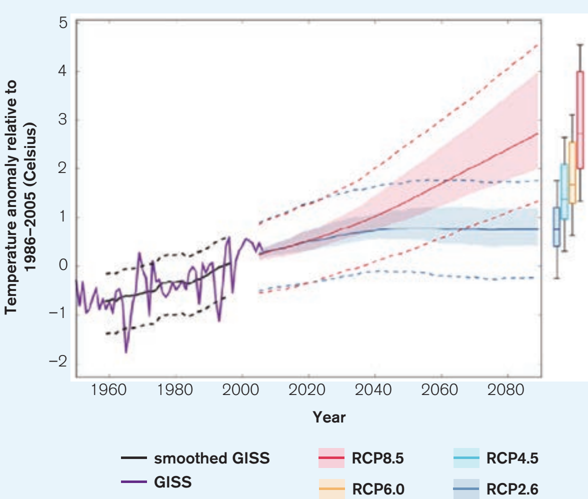
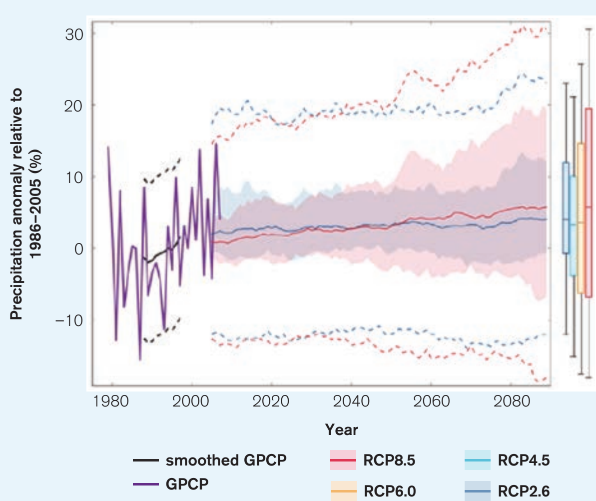


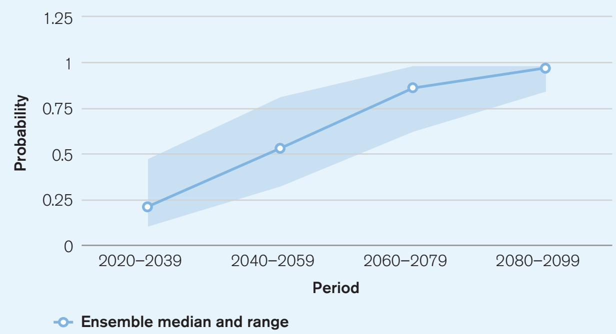
FIGURE 5. Historical and simulated annual average rainfall time series for the region surrounding the Solomon Islands. The graph shows the anomaly (from the base period 1986–2005) in rainfall from observations (the GPCP dataset, in purple), and for the CMIP5 models under the very high (RCP8.5, in red) and very low (RCP2.6, in blue) emissions scenarios. The solid red and blue lines show the smoothed (20-year running average) multi-model mean anomaly in rainfall, while shading represents the spread of model values (5–95th percentile). The dashed lines show the 5–95th percentile of the observed interannual variability for the observed period (in black) and added to the projections as a visual guide (in red and blue). This indicates that future rainfall could be above or below the projected long-term averages due to interannual variability. The ranges of projections for a 20-year period centred on 2090 are shown by the bars on the right for RCP8.5, 6.0, 4.5 and 2.6.[3]



Heat Waves

Heat waves are defined as a period of 3 or more days when the daily temperature remains above the 95th percentile. **Figure 6** shows the projected change in heat wave probability under RCP8.5 (compared to 1986–2005), highlighting the daily probability of a sudden heat wave in subsequent time periods. For the Solomon Islands, this probability steadily increases in the long term. This is held within the global context in which probabilities are expected to increase due to long-term warming. However, it is notable that the tropics are particularly where systematic warming might lead to the largest increases in heat wave probability, as a result of historically low day-to-day and month-to-month variability.

FIGURE 6. Projected change in probability of Heat Waves in Solomon Islands under RCP8.5 (compared to 1986–2005)[19]



The Solomon Islands regularly experience high temperatures, with a mean maximum temperature of around 30°C. Ensemble-based maximum temperatures are projected to rise up to 2.9°C by the 2090s (**Table 2**). However, the risk to humans of extreme heat is better measured by also considering humidity, as captured in the Heat Index measure. Modelling Heat Index highlights a significant increase in the number of days in which uncomfortable temperature conditions are reached. From a baseline situation in which the key threshold of Heat Index 35°C is rarely breached, the Solomon Islands can expect multiple breaches per year under all climate change scenarios.[19] This projected change likely signals the potential for extremely uncomfortable conditions, with local impacts and health repercussions. However, it is noted that further research is required to better understand the implications of climate change, and its interaction with the ENSO phenomenon, on future temperature regimes and potential heat waves.

An additional factor for consideration is the potential for marine heat waves. Research has shown that "from 1925 to 2016, global average marine heat wave frequency and duration increased by 34% and 17%, respectively, resulting in a 54% increase in annual marine heat wave days globally".[20] While such research has not specifically identified Solomon Islands under threat, the consequences of these trends may be serious for marine ecosystems in the region, which are adapted to survive under very stable temperature regimes, as well as the livelihoods dependent on them.

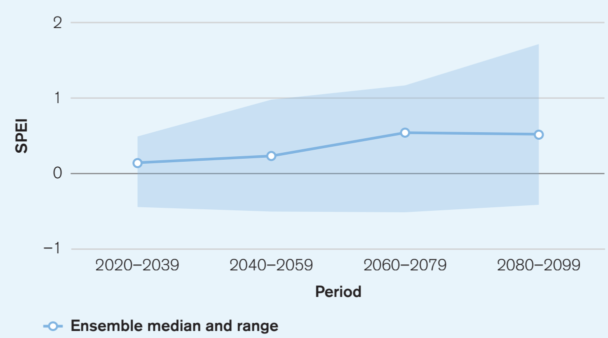
[20] Oliver, E. C., Donat, M. G., Burrows, M. T., Moore, P. J., Smale, D. A., Alexander, L. V., . . . & Holbrook, N. J. (2018). Longer and more frequent marine heat waves over the past century. Nature communications, 9(1), 1324. URL: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5893591/

Drought

Drought can be expressed in many ways, from looking at simple precipitation deficits to complex estimates of remaining soil moisture. Research done for the report on "Climate Variability, Extremes and Change in the Western Tropical Pacific 2014" defines projected changes in the frequency and duration of mild, moderate, severe and extreme meteorological droughts using the Standardised Precipitation Index (SPI).[3] This index is based solely on rainfall (i.e. periods of low rainfall are classified as drought), and does not take into account factors such as evapotranspiration or soil moisture content. It is noted that the SPI is commonly used in many regions including the Pacific due to the relative simplicity with which it is calculated, as well as its relevance across temporal and spatial scales.[3] For the Solomon Islands, it is likely that the percentage of time spent in drought may decrease, and this is generally shown across emissions scenarios.[3] The most extreme droughts are projected to maintain their length and frequency, while lower intensity events are expected to reduce in frequency. However, it should be noted that complex processes relating to rainfall projections, including the limited consensus of future ENSO influence for the region, hinder the confidence of these projections of drought frequency and duration, as well as magnitude of change.[3]

Another lens through which to view drought risk is the standardised precipitation evapotranspiration index (SPEI), which is computed over 12-month periods and captures the cumulative balance between gain and loss of water across the interannual time scale by incorporating both precipitation input variations as well as changes in the loss of water through evapotranspiration. It is widely used today as a global measure for drought monitoring over various cumulative time intervals. **Figure 7** looks at the projected changes in the annual mean drought index for Solomon Islands in subsequent time periods, under RCP 8.5, compared to 1986–2005. Since positive values indicate positive water balance (or wet) conditions and negative values indicate negative water balance (or dry) conditions, the ensemble's best estimate is of more wet future conditions. However, again, overall confidence is very low and further research is required.

FIGURE 7. Projected change in Annual Mean Drought Index for Solomon Islands, under RCP8.5[19]



Flood and Cyclones

The Solomon Islands experiences significant risk driven by extreme rainfall, with notable events in 2008 and 2010 involving loss of life and damage to infrastructure and livelihoods.[2] Rare precipitation events are often referred to as events of a certain return level, and the 5-day cumulative rainfall indicator focuses on the maximum rainfall amount over any 5-day period that can be expected once in an average 25-year period. Changes in this indicator may have potentially significant impacts on infrastructure and endanger life and property through direct physical effects and perhaps through water quality issues. As such, any significant changes in their magnitudes would need to be understood.

The boxplot in **Figure 8** shows recorded 5-Day Cumulative Rainfall for 1986–2005 and projected 5-Day Cumulative Rainfall 25-yr Return Level by 2050 under all RCPs of CIMP5 ensemble modelling for the Solomon Islands. From this, it is noted that compared to the historical value, median ensemble projections seem to generally be similar.

Looking at further future projections, **Figure 9** highlights the projected change in annual maximum 5-day rainfall of a 25-year return level (under RCP8.5), projected ensemble median changes seem to be close to 0 initially then slightly increase closer to 2100, but the range of values is quite broad and needs to be further contextualised and understood.

Tropical cyclones have historically affected the Solomon Islands, mainly between November and April.[3] Tropical cyclones typically pass through the Solomon Islands' exclusive economic zone at a rate of around 21 cyclones per decade. Around 27% are typically considered severe events (i.e. Category 3 or higher). ENSO influences cyclone frequency – there is a higher frequency of cyclones during El Niño years (39 per decade), but a lower frequency of extreme rainfall events.[2] Exposure to cyclones is greatest in the South eastern Solomon Islands of Makira, Ulawa, Rennell, and Bellona.

FIGURE 8. 5-day precipitation – historical and projected scenarios of 25-year return level in Solomon Islands for period 2040–2059[19]

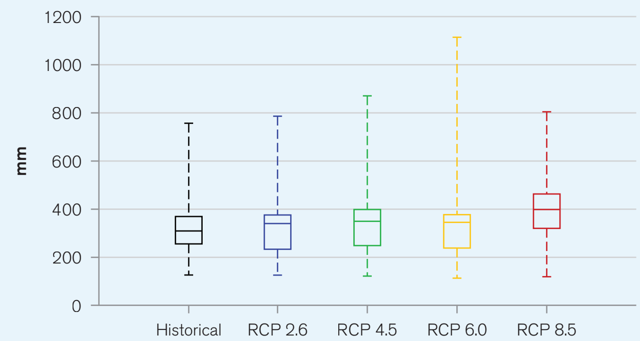
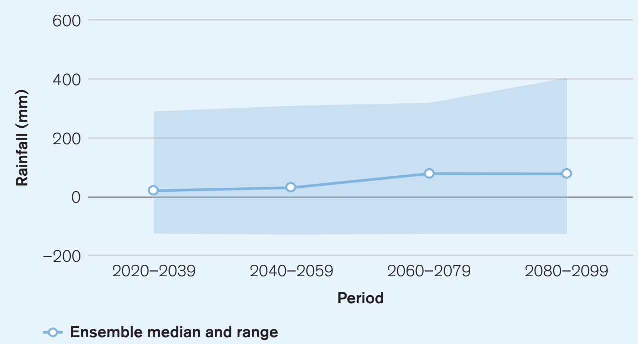


FIGURE 9. Projected change in annual maximum 5-day rainfall (25-year return level) for Solomon Islands, under RCP8.5[19]



For the Solomon Islands, the general projection is for a decrease in cyclone genesis (formation) frequency, with *medium confidence*, consistent with a general global projection for decreased cyclone frequency by 2100.[3] This decrease in frequency is expected in the range of 6%–35%. However, there is also evidence that the maximum wind speed of cyclones may increase – and all changes projected should be seen in the context of uncertainty around future ENSO, which is not well understood for the region.[3]

According to available information compiled by the Global Facility for Disaster Reduction and Recovery (GFDRR) ThinkHazard! web-based tool, the risk of cyclone (hurricane/typhoon) hazard is classified as *high* in the Solomon Islands.[21] This means that there is more than a 20% chance of potentially-damaging wind speeds for the country in the next 10 years. While climate change is expected to interact with cyclone hazard in complex ways which are

[21] GFDRR (2016). ThinkHazard! Profile for Solomon Islands. URL: http://thinkhazard.org/ [accessed 31/10/2019]

currently poorly understood, known additional risks include the action of sea-level rise to enhance the damage caused by cyclone-induced storm surges, and the possibility of increased wind speed and precipitation intensity. Further research is required to better understand potential changes in cyclone seasonality and routes, and the potential for cyclone hazards to be experienced in unprecedented locations.

CLIMATE CHANGE IMPACTS

Natural Resources

Water

The Solomon Islands have faced major challenges extending access to at least a basic water supply to its population. As of 2015 access had only reached 64% of the population.[22] Significant institutional challenges have hindered progress in this area.[23] The Solomon Islands is also exposed to diverse water-related hazards, such as extreme rainfall, coastal flooding (including tsunami and storm surge), fluvial and flash flooding. Again, levels of risk have historically been elevated by institutional challenges in disaster management.[24] Projections suggest the Solomon Islands faces particularly significant fresh water stress by 2030. This stress derives primarily from expected rates of population growth.[25]

The uncertainty in future climate change-driven impacts on the hydrological regime of the Solomon Islands represents a major block to effective planning and disaster risk reduction. The challenge is also compounded by the diversity of the different water-related threats faced across different islands. Extreme rainfall is an almost universal pressure, but at the same time the Solomon Islands is home to low-lying river delta regions vulnerable to inundation and saline intrusions, low-lying atolls with groundwater supplies vulnerable to saltwater contamination, and rivers which threaten fluvial flooding. Food security concerns have also been raised by recent incidences of drought which impacted on crop productivity.[26] Considering also remoteness, poverty and limited government resource, the adaptation challenge is significant, and studies have shown that there is a risk of 'maladaptation' if a systems approach is not taken to planning a response.[27]

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[22] WaterAid (2018). The Water Gap – The State of the World's Water 2018. URL: https://washmatters.wateraid.org/sites/g/files/jkxoof256/files/The%20Water%20Gap%20State%20of%20Water%20report%20lr%20pages.pdf

[23] Hadwen, W. L., Powell, B., MacDonald, M. C., Elliott, M., Chan, T., Gernjak, W., & Aalbersberg, W. G. L. (2015). Putting WASH in the water cycle: climate change, water resources and the future of water, sanitation and hygiene challenges in Pacific Island Countries. Journal of Water, Sanitation and Hygiene for Development, 5(2), 183–191. URL: https://waterinstitute.unc.edu/publication/putting-wash-in-the-water-cycle/

[24] Weir, T., & Virani, Z. (2011). Three linked risks for development in the Pacific Islands: Climate change, disasters and conflict. Climate and Development, 3(3), 193–208. DOI: https://doi.org/10.1080/17565529.2011.603193

[25] Karnauskas, K. B., Schleussner, C.-F., Donnelly, J. P., & Anchukaitis, K. J. (2018). Freshwater stress on small island developing states: population projections and aridity changes at 1.5 and 2°C. Regional Environmental Change. URL: https://link.springer.com/article/10.1007%2Fs10113-018-1331-9

[26] ReliefWeb (2017). Pacific: Drought - 2015–2017. URL: https://reliefweb.int/disaster/dr-2015-000127-fji [accessed: 28/11/2019]

[27] Fazey, I., Pettorelli, N., Kenter, J., Wagatora, D., & Schuett, D. (2011). Maladaptive trajectories of change in Makira, Solomon Islands. Global Environmental Change, 21(4), 1275–1289. DOI: https://doi.org/10.1016/j.gloenvcha.2011.07.006

The Coastal Zone

According to its Second National Communication to the UNFCCC, the Solomon Islands are in an area that has experienced above average rates of sea-level rise in recent decades. Estimates show rises of an average of 8–10 mm/year for the tropical western Pacific between 1993 and 2010. This compares to a global average rate of around 3.4 mm/yr. This has reportedly impacted on communities inhabiting some remote islands (Ontong Java atoll and the outer Reef Islands). Localized sea-level rise can in fact be an extremely complex phenomenon to measure and model, notably due to the influence of large scale climate phenomena such as ENSO. Some studies have suggested that the western Pacific has been experiencing above average rates of sea-level rise, but the extent to which this is attributable to human-driven climate change and/or likely to continue requires further research.[28]

Sea-level rise threatens significant physical changes to coastal zones around the world. Global mean sea-level rise was estimated in the range of 0.44–0.74 meters (m) by the end of the 21st century by the IPCC's Fifth Assessment Report,[29] but some studies published more recently have highlighted the potential for greater rises (**Table 3**). Studies have shown that rises even at the lower end of these projections threaten the homes and livelihoods of communities in the Solomon Islands' coastal areas.[30]

TABLE 3. Estimates of global mean sea-level rise by rate and total rise compared to 1986–2005 including likely range shown in brackets, data from Chapter 13 of the IPCC's Fifth Assessment Report with upper-end estimates based on higher levels of Antarctic ice-sheet loss from Le Bars et al. (2017).[31]

Scenario	Rate of Global Mean Sea-Level Rise in 2100	Global Mean Sea-Level Rise in 2100 Compared to 1986–2005
RCP2.6	4.4 mm/yr (2.0–6.8)	0.44 m (0.28–0.61)
RCP4.5	6.1 mm/yr (3.5–8.8)	0.53 m (0.36–0.71)
RCP6.0	7.4 mm/yr (4.7–10.3)	0.55 m (0.38–0.73)
RCP8.5	11.2 mm/yr (7.5–15.7)	0.74 m (0.52–0.98)
Estimate inclusive of high-end Antarctic ice-sheet loss		1.84 m (0.98–2.47)

28 Peyser, C. E., Yin, J., Landerer, F. W., & Cole, J. E. (2016). Pacific sea level rise patterns and global surface temperature variability. Geophysical Research Letters, 43(16), 8662–8669. DOI: https://doi.org/10.1002/2016GL069401

29 Church, J. a., Clark, P. U., Cazenave, A., Gregory, J. M., Jevrejeva, S., Levermann, A., . . . Unnikrishnan, A. S. (2013). Sea level change. In Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (pp. 1137–1216). Cambridge, United Kingdom and New York, NY, USA: Cambridge University Press. URL: https://www.ipcc.ch/site/assets/uploads/2018/02/WG1AR5_Chapter13_FINAL.pdf

30 Albert, S., Abernethy, K., Gibbes, B., Grinham, A., Tooler, N., & Aswani, S. (2013). Cost-Effective Methods for Accurate Determination of Sea Level Rise Vulnerability: A Solomon Islands Example. Weather, Climate, and Society, 5(4), 285–292. DOI: https://doi.org/10.1175/WCAS-D-13-00010.1

31 Le Bars, D., Drijhout, S., de Vries, H. (2017). A high-end sea level rise probabilistic projection including rapid Antarctic ice sheet mass loss. Environmental Research Letters: 12:4. URL: https://iopscience.iop.org/article/10.1088/1748-9326/aa6512

Sea-level rise is not just a threat due to long-term encroachment on coastal areas, but also due to the projected increase in the frequency of extreme sea-level events.[32] The return period of exceptionally high sea-levels, driven by climate circulations, is expected to reduce and low-lying Pacific island nations are particularly at risk.[33] Studies have shown that the extent of wave-driven flooding is impacted by coral reef height and health, highlighting the importance of coral conservation.[34]

The sea-level rise (**Figure 10**) threat represents both a slow-onset and rapid-onset hazard. In addition to natural fluctuations in wave height which can result in inundation, GFDRR's ThinkHazard! tool highlights a *high* risk of tsunamis in the Solomon Islands. This indicates there is more than 20% chance of the occurrence of a potentially-damaging tsunami in the next 50 years[17] and highlighting the critical need for adaptation action. The Solomon Islands are located near to the Pacific "ring of fire" where regular earthquake increase the frequency of such hazards. Studies focused on learning from past tsunami events in the Solomon Islands have emphasised the importance of reducing social vulnerability, improving disaster risk reduction and readiness for such events, and having adequate formal disaster response protocols in place.[35] Processes such as the loss of naturally occurring mangroves have been identified as amplifying disaster risk in regions of the Solomon Islands.[36]

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32 Widlansky, M. J., Timmermann, A., & Cai, W. (2015). Future extreme sea level seesaws in the tropical Pacific. Science Advances, 1(8). DOI: https://doi.org/10.1126/sciadv.1500560

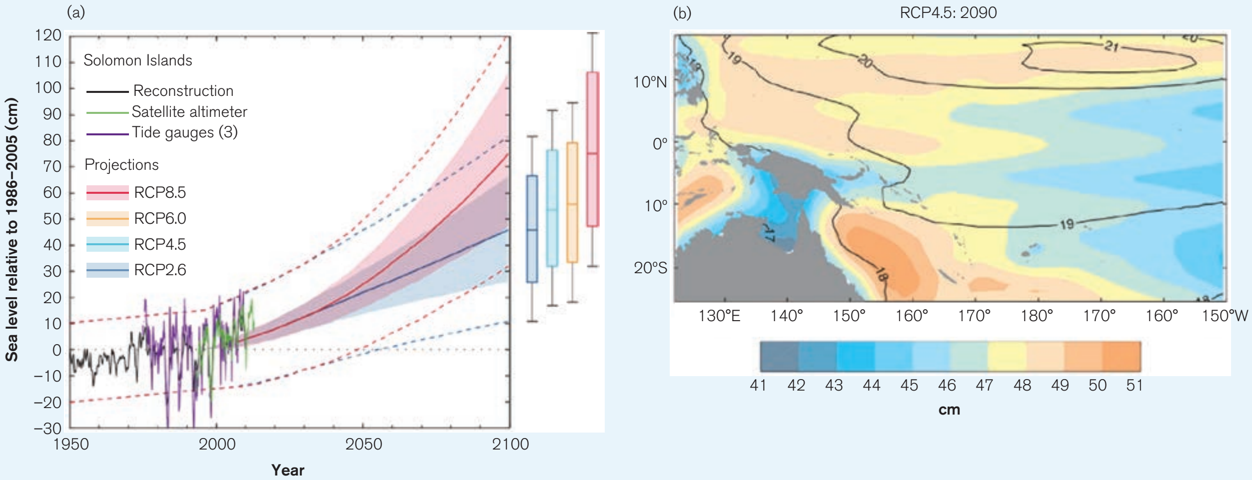
33 Vitousek, S., Barnard, P. L., Fletcher, C. H., Frazer, N., Erikson, L., & Storlazzi, C. D. (2017). Doubling of coastal flooding frequency within decades due to sea-level rise. Scientific Reports, 7(1), 1399. https://doi.org/10.1038/s41598-017-01362-7

34 Beetham, E., Kench, P. S., & Popinet, S. (2017). Future Reef Growth Can Mitigate Physical Impacts of Sea-Level Rise on Atoll Islands. Earth's Future, 5(10), 1002–1014. DOI: https://doi.org/10.1002/2017EF000589

35 Weber, E. (2014). Of tsunamis and climate change: The need to resettle. In L. Andrianos, J.-W. Sneep, G. Kerber, & R. Attfield (Eds.), Sustainable Alternatives for Poverty Reduction and Eco-Justice (pp. 192–208). Cambridge Scholars Publishing. URL: http://repository.usp.ac.fj/7830/

36 PASAP (2012). Building social and ecological resilience to climate change in Roviana, Solomon Islands. Pacific Adaptation Strategy Assistance Program. URL: http://pubs.iclarm.net/resource_centre/WF_3561.pdf

FIGURE 10. (a) The observed tide-gauge records of relative sea-level (since the late 1970s) are indicated in purple, and the satellite record (since 1993) in green. The gridded (reconstructed) sea level data at the Solomon Islands (since 1950) is shown in black. Multi-model mean projections from 1995–2100 are given for the RCP8.5 (red solid line) and RCP2.6 emissions scenarios (blue solid line), with the 5–95% uncertainty range shown by the red and blue shaded regions. The ranges of projections for four emission scenarios (RCPs 2.6, 4.5, 6.0, 8.5) by 2100 are also shown by the bars on the right. The dashed lines are an estimate of interannual 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. (b) The regional distribution of projected sea level rise under the RCP4.5 emissions scenario for 2081–2100 relative to 1986–2005. Mean projected changes are indicated by the shading, and the estimated uncertainty in the projections is indicated by the contours (in cm).[3]



Studies have highlighted the vulnerability of livelihoods in coastal areas of the Solomon Islands. For example, the Lungga Delta near Honiara is an important space for agricultural production, but already experiences impacts linked with sea-level rise and associated saline intrusion.[37] There is also concern for livelihoods on low-lying atoll islets, which are not only more vulnerable to sea level rise than the higher volcanic islands. In these areas sea level rise and related effects not only threaten physical resources and infrastructure, but also cultural norms, traditions and language, as well as ancestral lands.

Coral Reefs and Fisheries

The Solomon Islands has some of the world's richest marine diversity, including more than 75% all known coral species, 30% of the world's coral reefs, and 40% of coral reef fish species.[38] These reefs face a very serious

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[37] Nunn, P. D. (2013). The end of the Pacific? Effects of sea level rise on Pacific Island livelihoods. Singapore Journal of Tropical Geography, 34(2), 143–171. DOI: https://doi.org/10.1111/sjtg.12021

[38] Permanent Mission of Solomon Islands to the United Nation (2009). Solomon Islands National Submission on Climate Change and Possible Security Implications. Submission to the 64th Session of the UN General Assembly. URL: https://sustainabledevelopment.un.org/content/dsd/resources/res_pdfs/ga-64/cc-inputs/Solomon_Island_CCIS.pdf

climate change threat. Calcium carbonite is used for the external skeletons of multiple marine organisms – for instance, plankton, coral reefs, and shell-fish. Increases in atmospheric carbon dioxide are understood to lead to reduced levels of calcium carbonite saturation on the ocean's service via an increase in ocean acidification and by decreasing carbonite ion concentrations. As a result, there are serious concerns that if carbonite minerals, such as aragonite, become under saturated, it could undermine current ocean ecosystems.[39]

FIGURE 11. Projected changes in aragonite saturation state in the Solomon Islands from CMIP5 models under RCP2.6, 4.5 and 8.5. Shown are the median values (solid lines), the interquartile range (dashed lines), and 5% and 95% percentiles (light shading). The horizontal line represents the threshold at which transition to marginal conditions for coral reef health typically occurs.[3]

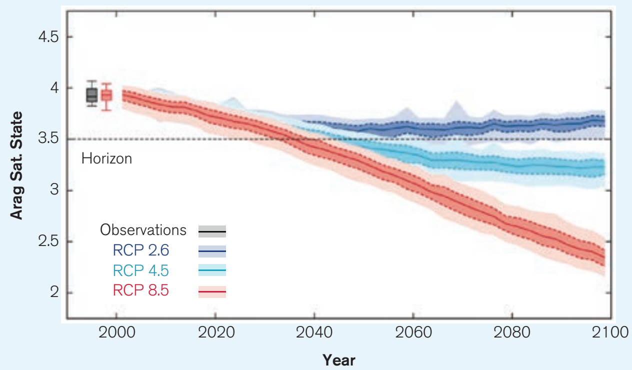

Figure 11 shows that the projected aragonite saturation state under three emission scenarios for the Solomon Islands. Under RCP4.5 and RCP8.5, the saturation state is expected to decrease below the threshold needed to sustain healthy coral reefs as early as 2030. While there is a high degree of confidence of the increased risk of coral bleaching due to a warmer ocean, there is only medium confidence in the ranges of estimates of projected changes in severe coral bleaching risk for the Solomon Islands. This is due to limited confidence in the sea surface temperature change projections as well as complexities of understanding reef-scale changes.[3] As well, such potential changes may not include other reef stressors, such as local environmental concerns, and impacts of ocean acidification, which are all also likely to affect the entire marine ecosystem impact the key ecosystem services provided by reefs.

The fishing sector is a key component of the economy. Estimates of its contribution to GDP range from 3%–5%, but these estimates understate its importance as a source of subsistence to communities.[40] Consumption is estimated at around 40 kg per capita per year, and higher in land-poor areas, highlighting its critical importance providing dietary protein.[41] Tuna catches by the domestic fleet alone were valued at 5% of GDP in 2014. Tuna worth approximately 5–6 times this value is caught in the Solomon Islands' national waters by foreign fishing fleets. These generally pay licence fees and these constituted around 7% of government income in 2014.[42]

[39] Orr, J. C., Fabry, V. J., Aumont, O., Bopp, L., Doney, S. C., Feely, R. A., . . . & Key, R. M. (2005). Anthropogenic ocean acidification over the twenty-first century and its impact on calcifying organisms. Nature, 437(7059), 681. DOI: 10.1038/nature04095

[40] FAO (2018). Fishery and Aquaculture profiles: Solomon Islands. Food and Agriculture Organization of the United Nations. URL: http://www.fao.org/fishery/facp/SLB/en [accessed: 27/11/2019]

[41] FAO (2018). Role of fish in food security in selected Pacific Island Countries. Food and Agriculture Organization of the United Nations, policy brief No. 2 May 2018. URL: http://www.fao.org/publications/card/en/c/I9956EN/

[42] Gillett, R. (2016). Fisheries in the economies of Pacific Island countries and territories. Chapter 32: Government Revenues from Fisheries. Pacific Community/FFA/Australian Aid. URL: https://www.adb.org/sites/default/files/publication/27511/pacific-fisheries.pdf

Climate change and human resource exploitation represent a dual threat to fisheries. Species living in and around coral reefs, either permanently or in their juvenile period, and particularly larger species, face an extinction threat.[43] As a result of changes in temperature, dissolved oxygen, and acidity, the maximum catch potential of currently resident species has been forecast to decline significantly in the Solomon Islands, potentially by over 50%.[44] Additionally, there is a significant threat to deep sea fisheries within Solomon Islands' exclusive economic zone. The migration range of tuna, for example, is expected to shift eastward.[45] Studies have suggested that without adaptation the Solomon Islands faces a fish catch deficit which could impact on the dietary health of the population, but also that adaptation strategies sufficient to mitigate this deficit are feasible.[46] As a result there have been strong calls for support to communities to identify suitable responses and financing mechanisms, and to adapt to the changing marine environment.[47]

Forests and Island Ecology

The Solomon Islands hold unique and biodiverse terrestrial and marine habitats.[48] However, while the majority of the land surface remains covered by tropical rainforest, increasing human pressure, particularly from logging, threatens ecosystem integrity.[49] Indeed, island biodiversity faces a variety of human pressures.[50] Forestry is a particularly critical industry in the Solomon Islands contributing around one sixth of government income. Output has been estimated to be as much as seven times the sustainable yield and is understood to contribute significantly to income inequality.[51]

Climate change and variability may compound these pressures. Sea-level rise, for instance, not only threatens humans residing on Pacific islands, but also their unique ecosystem functions and ecology. Past seismic activity provides insights into the potential long-term impacts of sea-level rise. An earthquake in 2007 which induced rapid subsidence and hence 'relative' sea-level rise, highlighted the vulnerability of the Solomon Islands' mangrove

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43 Mellin, C., Mouillot, D., Kulbicki, M., McClanahan, T. R., Vigliola, L., Bradshaw, C. J. A., . . . Caley, M. J. (2016). Humans and seasonal climate variability threaten large-bodied coral reef fish with small ranges. Nature Communications, 7(1), 10491. DOI: https://doi.org/10.1038/ncomms10491

44 Asch, R. G., Cheung, W. W. L., & Reygondeau, G. (2018). Future marine ecosystem drivers, biodiversity, and fisheries maximum catch potential in Pacific Island countries and territories under climate change. Marine Policy, 88, 285–294. URL: https://www.sciencedirect.com/science/article/abs/pii/S0308597X17301409?via%3Dihub

45 Bell, J., Taylor, M., Amos, M., and Andrew, N. (2016). Climate change and Pacific Island food systems. CCAFS and CTA. Copenhagen, Denmark and Wageningen, the Netherlands. URL: https://ccafs.cgiar.org/resources/publications/climate-change-and-pacific-island-food-systems

46 Dey, M. M., Gosh, K., Valmonte-Santos, R., Rosegrant, M. W., & Chen, O. L. (2016). Economic impact of climate change and climate change adaptation strategies for fisheries sector in Solomon Islands: Implication for food security. Marine Policy, 67, 171–178. DOI: https://doi.org/10.1016/j.marpol.2016.01.004

47 Hanich, Q., Wabnitz, C. C. C., Ota, Y., Amos, M., Donato-Hunt, C., & Hunt, A. (2018). Small-scale fisheries under climate change in the Pacific Islands region. Marine Policy, 88, 279–284. DOI: http://dx.doi.org/10.1016/j.marpol.2017.11.011

48 Weeks, B. C., Diamond, J., Sweet, P. R., Smith, C., Scoville, G., Zinghite, T., & Filardi, C. E. (2017). New Behavioral, Ecological, and Biogeographic Data On the Montane Avifauna of Kolombangara, Solomon Islands. The Wilson Journal of Ornithology, 129(4), 676–700. URL: https://agris.fao.org/agris-search/search.do?recordID=US201800251493

49 Bosma, W., Suti, S., & Deeks, P. (2017). Beekeeping as Pro-forest Income Diversification in Solomon Islands. In W. Leal Filho (Ed.), Climate Change Adaptation in Pacific Countries: Fostering Resilience and Improving the Quality of Life. CH. 23. (pp. 371–387). Springer International Publishing. URL: https://www.springerprofessional.de/en/beekeeping-as-pro-forest-income-diversification-in-solomon-islan/12050258

50 Jupiter, S., Mangubhai, S., & Kingsford, R. T. (2014). Conservation of Biodiversity in the Pacific Islands of Oceania: Challenges and Opportunities. Pacific Conservation Biology, 20(2), 206–220. DOI: https://doi.org/10.1071/PC140206

51 Gibson, J. (2018). Forest Loss and Economic Inequality in the Solomon Islands: Using Small-Area Estimation to Link Environmental Change to Welfare Outcomes. Ecological Economics, 148, 66–76. DOI: https://doi.org/10.1016/j.ecolecon.2018.02.012

forests (and hence coastal economies) to climate change, with a 35% decline in mangrove forest cover resulting from relative sea-level rise in the range of 30cm–70 cm in the affected area.[52] Research has also shown that inundation of low-lying islands has the potential to remove important refuges for migrating sea birds.[53]

As climate changes so the suitable range for species to inhabit shifts, typically either upslope or away from the equator. In the Island environment the capacity for species to shift is extremely limited and as such loss and extinction are becoming increasingly likely. Major concerns have been raised for the terrestrial ecology of low lying Pacific islands, for example endemic lizards, which may become trapped in a shrinking habitat.[54] Research has also highlighted the risks to biodiversity in the Pacific through study of tree richness in New Caledonia, where the range sizes of 87–96% of species was projected to decline, typically by 52%–84%.[55] Compounding the direct impacts of climate change on species' viable ranges, concerns have also been raised by research highlighting the potential for climate change to drive introduction of new weeds, pests, and diseases in Pacific habitats which threaten the productivity of forests and other ecosystems.[56] Further research is needed to better constrain the potential impacts of climate change on island ecology, and the potential knock-on effects on ecosystem service provision. From a least-regrets perspective, the risks of climate change only increase the importance of reducing human development impacts which currently undermine the resilience of island ecosystems.

Economic Sectors

Agriculture and Food

The Solomon Islands has a very significant agricultural sector, accounting for an estimated 34% of GDP in 2017, and a larger proportion of employment. Reportedly, agriculture sustains 85% of the country's rural economy[57] and 96% of rural households grow at least some of their own food.[58] Women play a significant role in household production and selling of produce. Notably crops include root crops, tubers, and vegetables.

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52 Albert, S., Saunders, M. I., Roelfsema, C. M., Leon, J. X., Johnstone, E., Mackenzie, J. R., . . . Woodroffe, C. D. (2017). Winners and losers as mangrove, coral and seagrass ecosystems respond to sea-level rise in Solomon Islands. Environmental Research Letters, 12(9), 94009. URL: https://iopscience.iop.org/article/10.1088/1748-9326/aa7e68/pdf

53 Reynolds, M. H., Courtot, K. N., Berkowitz, P., Storlazzi, C. D., Moore, J., & Flint, E. (2015). Will the Effects of Sea-Level Rise Create Ecological Traps for Pacific Island Seabirds? PLOS ONE, 10(9), 1–23. DOI: https://doi.org/10.1371/journal.pone.0136773

54 Taylor, S., & Kumar, L. (2016). Global Climate Change Impacts on Pacific Islands Terrestrial Biodiversity: A Review. Tropical Conservation Science, 9(1), 203–223.

55 Pouteau, R., & Birnbaum, P. (2016). Island biodiversity hotspots are getting hotter: vulnerability of tree species to climate change in New Caledonia. Biological Conservation, 201, 111–119. DOI: https://doi.org/10.1177/194008291600900111

56 Taylor, S., & Kumar, L. (2016). Will climate change impact the potential distribution of a native vine (Merremia peltata) which is behaving invasively in the Pacific region? Ecology and Evolution, 6(3), 742–754. DOI: 10.1002/ece3.1915

57 Western Sydney University (2018). Food Security in Solomon Islands: A Survey of Honiara Central Market. Preliminary report, April 2018. HADRI/Western Sydney University. URL: https://www.westernsydney.edu.au/__data/assets/pdf_file/0010/1465453/Food_Security_in_Solomon_Islands.pdf

58 FAO (2019). Country Gender Assessment of Agriculture and the rural sector in the Solomon Islands. The Food and Agriculture Organization of the United Nations and the Pacific Community. URL: http://www.fao.org/3/ca6858en/CA6858EN.pdf

Climate change could influence food production via direct and indirect effects on crop growth processes. Direct effects include alterations to carbon dioxide availability, precipitation and temperatures. Indirect effects include through impacts on water resource availability and seasonality, soil organic matter transformation, soil erosion, changes in pest and disease profiles, the arrival of invasive species, and decline in arable areas due to the submergence of coastal lands. On an international level, these impacts are expected to damage key staple crop yields, even on lower emissions pathways. Tebaldi and Lobell (2018) estimate 5% and 6% declines in global wheat and maize yields respectively even if the Paris Climate Agreement is met and warming is limited to 1.5°C.[59] Shifts in the optimal and viable spatial ranges of certain crops are also inevitable, though the extent and speed of those shifts remains dependent on the emissions pathway. Climate change has been identified as a major threat to food supply and security in the South Pacific. Issues such as low incomes, poor routes of connectivity and access, and dependence on imports are highlighted as key vulnerabilities.[60]

Research into the future productivity of specific crops in the Solomon Islands is relatively limited but it is likely that optimal crop ranges will shift, and productivity levels change. The climate change impacts on cocoa production have been explored and are broadly negative, particularly under higher emissions pathways and later in the century. Cocoa production typically declines when maximum daily temperature surpasses 32°C, a phenomenon which could occur regularly under the most extreme projections.[61] Issues related to extreme rainfall have been qualitatively reported in other crops, including root crops, fruit trees, and vegetables.[62] Further research is urgently required first to constrain climate projections, and second to model future crop productivity rates.

The Solomon Islands Second National Communication details key climate vulnerabilities by region. A common issue is the degradation of soils. Soil health intersects with both land management practices and climate through the impact of extreme rainfall events. Extended periods of drought, followed by extreme rainfall, can contribute to significant soil erosion and represents a climate threat. However, impacts can be significantly mitigated through ecological restoration and land stewardship. Studies have thus far emphasised that pressures such as intensification, migration, and logging represent the greatest threat to traditional farming systems in the Solomon Islands, but monitoring will be important as climate changes intensify.[63] An issue identified where adaptive capacity is concerned is the common lack of diversified income sources for smallholders, increasing disaster risk when climate hazards strike.[2]

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[59] Tebaldi, C., & Lobell, D. (2018). Differences, or lack thereof, in wheat and maize yields under three low-warming scenarios. Environmental Research Letters: 13: 065001. URL: https://iopscience.iop.org/article/10.1088/1748-9326/aaba48

[60] Barnett, J. (2011). Dangerous climate change in the Pacific Islands: food production and food security. Regional Environmental Change, 11(1), 229–237. URL: https://link.springer.com/article/10.1007/s10113-010-0160-2

[61] SIMS, SPREP and CSIRO (2018). A preliminary case study assessment of climate change impacts and risks for cocoa farming in Guadalcanal Plain, Solomon Islands. CSIRO, Melbourne, Australia. URL: https://www.pacificclimatechangescience.org/wp-content/uploads/2018/04/Dev-CC-info-SI-case-study-report-16pp-WEB.pdf

[62] Viliamu, I., Maeke, J., Holland, E., Wairiu, M., and Naidu, S. (2015). Farming Adaptations to the Impacts of Climate Change and Extreme Events in Pacific Island Countries: Case Study of Bellona Atoll, Solomon Islands. In Impacts of Climate Change on Food Security in Small Island Developing States, ed. Wayne G. Ganpat and Wendy-Ann P. Isaac, 166–194. URL: https://www.igi-global.com/gateway/chapter/118024

[63] Mertz, O. L. E., Birch-Thomsen, T., Elberling, B. O., Rothausen, S., Bruun, T. B., Reenberg, A., . . . Breuning-Madsen, H. (2012). Changes in shifting cultivation systems on small Pacific islands. The Geographical Journal, 178(2), 175–187. URL: https://www.jstor.org/stable/23263251?seq=1

Another, and perhaps lesser appreciated, influence of climate change on agricultural production is through its impact on the health and productivity of the labor force. Dunne et al. (2013) suggest that global labor productivity during peak months has already dropped by 10% as a result of warming, and that a decline of up to 20% might be expected by the 2050s under the highest emissions pathway (RCP8.5).[64] The Solomon Islands currently operates an agricultural system highly dependent on physical labor inputs and hence is potentially vulnerable to higher temperatures without adaptation.[65] In combination, it is highly likely that the above processes will have a considerable impact on national food consumption patterns both through direct impacts on internal agricultural operations, and through impacts on the global supply chain.

Tourism

Compared with other Pacific nations tourism makes a modest contribution to the economy of the Solomon Islands, estimated at around 4.3% of GDP in 2017. However, the Government has ambitions to significantly increase its relative contribution to the economy, as set out in its 2015–2019 National Tourism Development Strategy.[66] In one critical review of the literature examining the dynamics between climate change and tourism, there appeared to be multiple indications that the tourism sectors of small island states, such as the Solomon Islands, are particularly vulnerable to climate change.[67] In the long-term, the dual threats of rising sea levels and coastal erosion could reduce the quantity and quality of available beach space without significant adaptation measures and could therefore reduce the attractiveness of the country as a tourist destination. Another area of vulnerability is the valuable recreational diving sector, which is threatened by environmental degradation, loss of reeds, and coastal erosion.[68]

In addition to direct physical impacts, climate change may affect the tourism sector in the Solomon Islands through global efforts to mitigate climate change. One possible manifestation is in the increased cost of international flights. One study estimated that while the cost of achieving an emissions-target compatible tourism sector may be proportionately low (3.6%). Nonetheless the necessary increase in trip costs (estimated at $11 when averaging across every global trip but potentially higher on a long-haul destination such as the Solomon Islands) may reduce the Solomon Islands' attractiveness as a tourist destination.[69] Further research is required to better constrain the suite of potential climate change impacts on the sector.

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64 Dunne, J. P., Stouffer, R. J., & John, J. G. (2013). Reductions in labor capacity from heat stress under climate warming. Nature Climate Change, 3(6), 563–566. URL: http://www.precaution.org/lib/noaa_reductions_in_labour_capacity_2013.pdf

65 Lebot, V., & Siméoni, P. (2015). Community Food Security: Resilience and Vulnerability in Vanuatu. Human Ecology, 43(6), 827–842. URL: https://link.springer.com/article/10.1007/s10745-015-9796-3

66 Solomon Islands (2015). The Solomon Islands National Tourism Development Strategy. URL: http://macbio-pacific.info/wp-content/uploads/2017/08/National-Tourism-Strategy-2015.pdf

67 Scott, D., Gössling, S., & Hall, C. M. (2012). International tourism and climate change. Wiley Interdisciplinary Reviews: Climate Change, 3(3), 213–232. DOI: https://doi.org/10.1002/wcc.165

68 Klint, L. M., Jiang, M., Law, A., Delacy, T., Filep, S., Calgaro, E., . . . Harrison, D. (2012). Dive tourism in Luganville, Vanuatu: Shocks, stressors, and vulnerability to climate change. Tourism in Marine Environments, 8(1–2), 91–109. URL: https://researchers.mq.edu.au/en/publications/dive-tourism-in-luganville-vanuatu-shocks-stressors-and-vulnerabi

69 Scott, D., Gössling, S., Hall, C. M., & Peeters, P. (2016). Can tourism be part of the decarbonized global economy? The costs and risks of alternate carbon reduction policy pathways. Journal of Sustainable Tourism, 24(1), 52–72. DOI: https://doi.org/10.1080/09669582.2015.1107080

As with other small islands, tourism sector development should be reconciled with concerns for environmental sustainability, especially in the face of climate change impacts.[70] The dual threats of rising sea levels and coastal erosion could reduce the quantity and quality of available beach space and, without significant adaptation measures, could therefore reduce the attractiveness of the country as a tourist destination. As well, potential losses to land area due to sea level rise would need to be considered for the building of desirable beachfront properly locations. However, rates of coastal erosion are not currently measured and there is limited understanding of how to confront beach loss. Challenges to already-limited freshwater could become a problem in times of drought conditions, and storm threats could hinder the sun, sea, sand experience and require sufficient disaster preparedness actions.

Communities

Poverty, Inequality and Vulnerability to Climate-Related Disaster

Solomon Islands experiences acute economic challenges. This relates to a combination of issues including weak infrastructure, income inequality,[71] heavy reliance on agriculture for income revenue as well as the country's remote location, which makes it costly to access established markets such as in Europe, Asia or the USA.[72] The Solomon Islands has very low levels of urbanisation compared to most other nations, with only an estimated 23.7% of the population living in cities as of 2018 (**Table 1**). In 2018, seven out of 10 Solomon Islanders were under 30 years old,[73] making it the second youngest population in the Oceania region. There is severe unemployment rate amongst the youth; in 2018, around 35% of the youth were unemployed.[69]

Study into the vulnerability of Solomon Islanders is very limited. One comprehensive study by UNDP assessing the region around Honiara highlights that many areas face a nexus of hazard exposure and social vulnerability, particularly in the vicinity of water courses and lower-lying areas of coast.[74] Extreme rainfall is the most commonly reported driver of disaster events, sometimes intersecting with high sea-levels to amplify impacts at the coast. A wide variety of adaptation needs, ranging from infrastructural solutions to disaster preparedness and strengthening of land-use planning protocols.[70]

Many of the climate changes projected are likely to disproportionately affect the poorest groups in society. For instance, heavy manual labor jobs are commonly among the lowest paid whilst also being most at risk of productivity losses due to heat stress.[75] Poorer businesses are least able to afford air conditioning, an increasing need given projected increase in the need for air conditioning with temperature increases. Poorer farmers and communities are least able to afford local water storage, irrigation infrastructure, and technologies for adaptation.

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70 Diedrich, A., & Aswani, S. (2016). Exploring the potential impacts of tourism development on social and ecological change in the Solomon Islands. Ambio, 45(7), 808–818. DOI: 10.1007/s13280-016-0781-x

71 United Nations in the Pacific (2017). United Nations Pacific Strategy 2018–2022: A Multi-country sustainable development framework in the Pacific region. URL: https://www.unicef.org/about/execboard/files/Final_UNPS_2018-2022_Pacific.pdf

72 The Borgen Project (2017). Four Cases of Poverty in Solomon Islands. URL: https://borgenproject.org/causes-of-poverty-in-the-solomon-islands/

73 UNDP (2018). Solomon Islands Youth Status Report 2018. URL: https://www.undp.org/content/dam/fiji/docs/UNDP-SOI-Youth-Status-Report-2018.pdf.

74 UNDP (2014). Cities and Climate Change Initiative: Honiara Solomon Islands Climate Change Vulnerability Assessment. United Nations Human Settlement Programme. URL: https://unhabitat.org/honiara-solomon-islands-climate-change-vulnerability-assessment

75 Kjellstrom, T., Briggs, D., Freyberg, C., Lemke, B., Otto, M., Hyatt, O. (2016). Heat, human performance, and occupational health: A key issue for the assessment of global climate change impacts. Annual Review of Public Health: 37: 97–112. URL: https://www.annualreviews.org/doi/abs/10.1146/annurev-publhealth-032315-021740

Gender

An increasing body of research has shown that climate-related disasters have impacted human populations in many areas including agricultural production, food security, water management and public health. The level of impacts and coping strategies of populations depends heavily on their socio-economic status, socio-cultural norms, access to resources, poverty as well as gender. Research has also provided more evidence that the effects are not gender neutral, as women and children are among the highest risk groups. Key factors that account for the differences between women's and men's vulnerability to climate change risks include: gender-based differences in time use; access to assets and credit, treatment by formal institutions, which can constrain women's opportunities, limited access to policy discussions and decision making, and a lack of sex-disaggregated data for policy change.[76]

Climate-Driven Migration

There is consensus in the literature that climate change has significant implications for Pacific island populations, many of whom reside in coastal areas and rely on natural resources for livelihoods and well-being. Climate change can cause "a reduction in land, livelihood or habitat security for some Pacific communities".[77] Temporary and permanent involuntary displacement and migration is a known risk.

There is historical precedent for displacement in the Solomon Islands resulting from storm surge and tsunami. In 2007 around 4.6% of the population (24,000 people) was displaced as a result of a tsunami, leading to significant damage to the country's economy as well as loss of life.[78] Data and evidence on displacement driven by climate change in the Solomon Islands is limited, but some coastal communities are believed to have already begun preparing to re-settle inland.[79] Indeed, in 2016, 5 uninhabited islands in Solomon Islands, were reportedly completely submerged. Others, inhabited by very small communities, were significantly eroded leading to permanent displacement.[80]

The vast majority of Solomon Islanders live in rural areas and rely on subsistence agriculture for food production and land is usually held by kinship groups making it inextricably linked with a group's identity and history. With a potential of land reduction and internal migration of vulnerable communities into other areas of the country, changes to the demographic make-up of certain areas, climate change might create conditions for increased forms of conflict amongst the population. Solomon Islands has suffered conflict over land disputes and unequal access to resources and there is fear the adverse impact of climate change might further exacerbate the drivers of conflict across the country; these conflict drivers include "the management of land and relations, resource management, changes in population and demographic make-up, state-community relations and conflict legacies and intergenerational trauma".[81]

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[76] World Bank Group (2016). Gender Equality, Poverty Reduction, and Inclusive Growth. URL: http://documents1.worldbank.org/curated/en/820851467992505410/pdf/102114-REVISED-PUBLIC-WBG-Gender-Strategy.pdf

[77] Climate Change and Migration Issues in the Pacific (2014). United Nations Economic and Social Commission for Asia and the Pacific. URL: https://www.ilo.org/dyn/migpractice/docs/261/Pacific.pdf

[78] OHCHR (2011). Protecting the Human Rights of Internally Displaced Persons in Natural Disasters. - Regional Office for the Pacific. URL: http://pacific.ohchr.org/docs/IDP_report.pdf

[79] UN Women (2013). Asia and the Pacific - Solomon Islands. URL: https://asiapacific.unwomen.org/en/countries/fiji/co/solomon-islands

[80] Albert, S., Leon, J. X., Grinham, A. R., Church, J. A., Gibbes, B. R., & Woodroffe, C. D. (2016). Interactions between sea-level rise and wave exposure on reef island dynamics in the Solomon Islands. Environmental Research Letters, 11(5), 54011. URL: https://www.sprep.org/attachments/VirLib/Solomon/interactions-between-sea-level-rise-wave-exposure-reef-island-dynamics.pdf

[81] Higgins, K., and Maesua, J. (2019). Climate change, Conflict and Peacebuilding in Solomon Islands, Toda Peace Institute, Policy Brief no.36. URL: https://toda.org/assets/files/resources/policy-briefs/t-pb-36_higgins-maesua_climate-change-conflict-and-peace-in-solomon-islands.pdf

Some countries in the Pacific region are using external migration as an adaptive strategy to the impacts of climate change. However, Solomon Islands unlike other countries (such as Cooks Islands, Samoa or Tonga) in the region does not enjoy an outward migratory legislation or agreement (such as granting temporary work visas) with countries such as New Zealand and Australia; as such Solomon Islanders have limited possibilities to externally migrate. This has meant that while rate of population growth in Solomon Islands has grown exponentially due to limited outward migratory patterns[82] and is experiencing rapid rates of urbanisation (from internal migration).[76] In fact, the rate of rural to urban migration in Solomon Islands was estimated at 4% in 2012.[83] However, climate change may end up increasingly becoming an additional driver of migration.

Most Pacific islands countries have national development plans to enable countries to plan and respond to climate risks effectively. Solomon Islands' development plans for the period of 2016–2035 aims to "increase labor mobility and employment opportunities outside the country, manage labor migration and establish a National Strategic Direction for labor migration".[84] There is a recognition that there is a demand for labor outside Solomon Islands, particularly in "horticulture, construction, health, domestic services and hospitality sectors", and improving migration to secure employment opportunities would improve the income of Solomon Islanders.[79] Studies have highlighted the need to better understand the health and wellbeing risks of climate-driven migration.[85]

Human Health

The broad human health risks of climate change in Pacific island countries were assessed in a 2016 study. A large suite of issues were identified. Specifically flagged in the Solomon Islands were the health impacts of extreme weather events, heat-related illness, water security and safety, food security and malnutrition, vector-borne diseases, respiratory illnesses, non-communicable diseases, and a variety of other disorders.[86]

Heat-Related Mortality

Research has placed a threshold of 35°C (wet bulb ambient air temperature) on the human body's ability to regulate temperature, beyond which even a very short period of exposure can present risk of serious ill-health and death.[87] Temperatures significantly lower than the 35°C threshold of 'survivability' can still represent a major threat to human

[82] Ferris E. et al. (2011). On the Front Line of Climate Change and Displacement: Learning from and with Pacific Island Countries, The Brookings Institution- London School of Economics Project on Internal Displacement. DOI: https://brook.gs/2pqkMzG

[83] Solomon Islands Government (2012). Solomon Islands National Climate Change Policy 2012 – 2017, Ministry of Environment, Climate Change, Disaster Management and Meteorology. URL: https://www.adaptation-undp.org/sites/default/files/downloads/solomon_islands-national_climate_change_policy.pdf

[84] Solomon Islands Government (2016). National Development Strategy 2016 to 2035 Improving the Social and Economic Livelihoods of all Solomon Islanders, Ministry of Development Planning and Aid Coordination. URL: https://solomons.gov.sb/wp-content/uploads/2020/02/National-Development-Strategy-2016.pdf

[85] Dannenberg, A.L., Frumkin, H., Hess, J.J. and Ebi, K.L. (2019). Managed retreat as a strategy for climate change adaptation in small communities: public health implications. Climatic Change, pp. 1–14. URL: https://ideas.repec.org/a/spr/climat/v153y2019i1d10.1007_s10584-019-02382-0.html

[86] Lachlan, M., Rokho, K., Alistair, W., Simon, H., Jeffery, S., Dianne, K., . . . L., E. K. (2016). Health Impacts of Climate Change in Pacific Island Countries: A Regional Assessment of Vulnerabilities and Adaptation Priorities. Environmental Health Perspectives, 124(11), 1707–1714. URL: https://pubmed.ncbi.nlm.nih.gov/26645102/

[87] Im, E. S., Pal, J. S., & Eltahir, E. A. B. (2017). Deadly heat waves projected in the densely populated agricultural regions of South Asia. Science Advances, 3(8), 1–8. URL: https://advances.sciencemag.org/content/3/8/e1603322

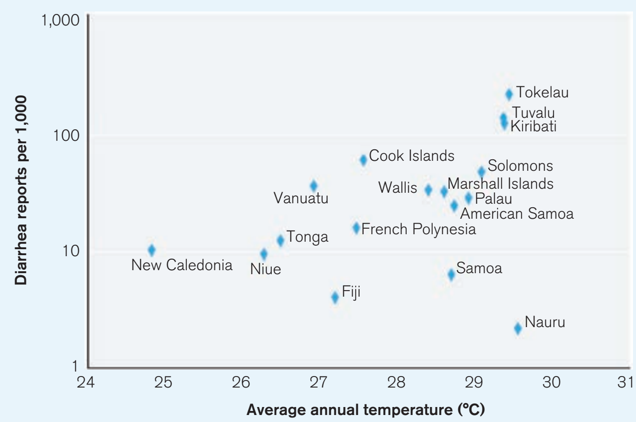
health. Climate change will push global temperatures closer to this temperature 'danger zone' both through slow-onset warming via an increase mean annual temperature and the intensity and frequency of heat waves. Although there are challenges of limited downscaled climate information to specify projections, it is likely that climate change will result in an increased number of people at risk of heat-related medical conditions, perhaps specifically related to the elderly, children, the chronically ill, the socially isolated and at-risk occupational groups. It should be noted that the potential reduction in heat-related deaths achievable by pursuing lower emissions pathways is significant, as demonstrated by Mitchell et al. (2018).[88]

Disease and General Health

According to the WHO "some of the world's 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 foodborne diseases".[89] Climate change threatens to slow progress in tackling the spread of disease.

As in other countries, loss of a clean water supply can result in water contamination, which will have significant medical concerns. Generally, an increase in atmosphere and sea temperatures could also intensify risks in water and vector-borne diseases, such as diarrhoea, disaster-related fatalities, injuries and illnesses, heat stress and conjunctivitis (pink-eye). It is noted that while the interaction between temperature and diarrheal disease is still unclear, one explanation of the association is that rotavirus and other bacteria that cause diarrhoea are able to proliferate in warm marine water. Another possible explanation is that higher temperatures can cause food to spoil more rapidly, and thus cause food poisoning.[90] **Figure 12** shows research by Singh et al. (2001), which demonstrated the link between annual average temperature and average reporting rates of diarrheal disease specifically amongst Pacific island states.[91]

FIGURE 12. Annual average temperature and average reporting rates for diarrheal disease, Pacific islands (1986–1994). $r^2 = 0.49$; $p < 0.05$[86]



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[88] Mitchell, D., Heaviside, C., Schaller, N., Allen, M., Ebi, K. L., Fischer, E. M., . . . Vardoulakis, S. (2018). Extreme heat-related mortality avoided under Paris Agreement goals. Nature Climate Change, 8(7), 551–553. URL: https://pubmed.ncbi.nlm.nih.gov/30319715/

[89] World Health Organisation (2021). South-East Asia. URL: http://www.searo.who.int/entity/water_sanitation/mav_c_h_profile.pdf?ua=1. [accessed 30/06/2019].

[90] Bentham, G., & Langford, I. H. (2001). Environmental temperatures and the incidence of food poisoning in England and Wales. *International journal of biometeorology, 45*(1), 22–26. DOI: 10.1007/s004840000083

[91] Singh, R. B., Hales, S., De Wet, N., Raj, R., Hearnden, M., & Weinstein, P. (2001). The influence of climate variation and change on diarrheal disease in the Pacific Islands. Environmental health perspectives, 109(2), 155–159. URL: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1240636/

POLICIES AND PROGRAMS

National Adaptation Policies and Strategies

- Nationally Determined Contribution (2021)
- Second National Communication (2017)
- Intended Nationally Determined Contribution (INDC) (2016)
- Initial National Communication (2004)

Climate Change Priorities of the WBG

WBG — Country Partnership Framework

The WBG and Solomon Islands are in the middle of the Country Partnership Framework FY18-FY23 (CPF). The CPF supports the Solomon Islands to meet their development goals and long-term vision, identified through five key objectives:

i. Sustained and inclusive economic growth;
ii. Poverty alleviated across the whole of the Solomon Islands, basic needs addressed, and food security improved, with the benefits of development more equitably distributed;
iii. Access for all Solomon Islanders to good-quality social services, including education and health;
iv. Resilient and environmentally sustainable development with effective disaster risk management; and
v. A unified nation with stable and effective governance and public order.

Within these key objectives, the CPF is focused on supporting the Solomon Islands to increase its climate resilience, increase preparedness to natural disasters and increase adaptation efforts to climate change impacts. Specifically, the CPF program will support farming households to adapt to climate variability and change, increase the resiliency of transportation and infrastructure, and support projects aimed at the protection of livelihoods at risk, such as the agricultural and fisheries sectors.

CLIMATE RISK COUNTRY PROFILE

SOLOMON ISLANDS

WORLD BANK GROUP