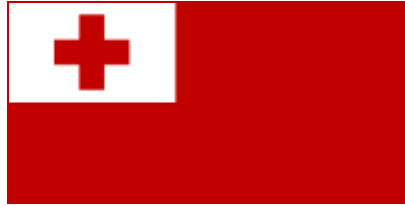


CLIMATE CHANGE PROFILE



KINGDOM OF TONGA

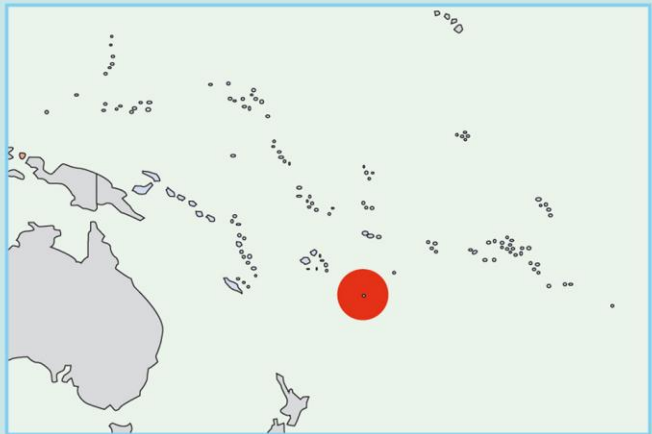
GLOBAL CLIMATE CHANGE ALLIANCE: PACIFIC SMALL ISLAND STATES PROJECT





Tonga

- o Niuu Fooo
- NIUA GROUP
GROUPE NIUA
- Niuu Toputapu



- VAVAU GROUP
GROUPE VAVAU
- Nelatu
- Vavau
- Late
- Kapa
- Kapa
- Maninita

- Kao
- Tofua
- Haano
- Lifuka
- Uiha
- HAAPAI GROUP
GROUPE HAAPAI
- Limu Barrier Reef
Récif-barrière Limu
- Fonuafoou
- Nomuka
- Lolona
- Hunga Tonga
- NOMUKA GROUP
GROUPE NOMUKA
- NUKUALOFA
- TONGATAPU GROUP
GROUPE TONGATAPU
- Ohonua
- Eua

- o Ata

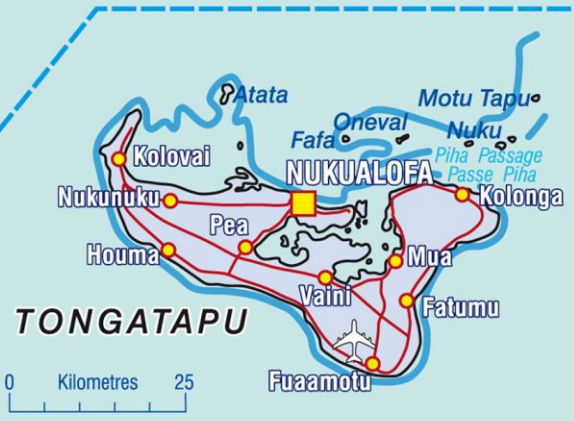


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Abbreviations

ADB	Asian Development Bank
CCA	Climate Change Adaptation
CCCPIR	Coping with Climate Change in the Pacific Island Region
DCCEE	Department of Climate Change and Energy Efficiency of Australia
DRM	Disaster Risk Management
EEZ	Exclusive Economic Zone
ENSO	El Nino-Southern Oscillation
EU	European Union
GCCA: PSIS	Global Climate Change Alliance: Pacific Small Island States
GDP	Gross Domestic Product
GEF	Global Environment Facility
GIZ	Gesellschaft fur Internationale Zusammenarbeit, German Technical Cooperation
GNI	Gross National Income
HDI	Human Development Index
ICCAI	International Climate Change Adaptation Initiative
IUCN	International Union for conservation of Nature
JNAP	Joint National Action Plan for Climate Change Adaptation and Disaster Risk Management
MLECC&NR	Ministry of Lands, Environment, Climate Change and Natural Resources
NSPF	National Strategic Planning Framework
PACCSAP	Pacific Australia Climate Change Science and Adaptation Planning
PEFA	Public Expenditure and Financial Accountability Assessment
PFM	Public Financial Management system
PPCR	Pilot Programme on Climate Resilience
PUMA	Planning and Urban Management Agency
SDP8	Strategic Development Plan 8
SPC	Secretariat of the Pacific Community
SPCR	Strategic Programme on Climate Resilience
SPREP	Secretariat of the Pacific Regional Environment Programme
TOP	Tongan Pa'anga
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change

OBJECTIVE OF THE CLIMATE CHANGE PROFILE

This second version of the climate change profile for Tonga has been prepared as part of the Secretariat of the Pacific Community's (SPC) Global Climate Change Alliance: Pacific Small Islands States (GCCA: PSIS) project. The goal of GCCA: PSIS is to support the governments of nine small Pacific Island states, namely Cook Islands, Federated States of Micronesia, Kiribati, Marshall Islands, Nauru, Niue, Palau, Tonga and Tuvalu, in their efforts to tackle the adverse effects of climate change. The purpose of the project is to promote long-term strategies and approaches to adaptation planning, and pave the way for more effective and coordinated aid delivery on climate change, including the delivery of streamlined adaptation finance, at the national and regional level.

This climate change profile is specific in nature and seeks to inform the GCCA: PSIS project as well as the larger SPC Climate Change Support Team. It commences with a section on the country's background, including geography, economy, financial management and aid delivery. This is followed by a section focusing on the country's response to climate change, including climate change projections, institutional arrangements, ongoing adaptation activities and climate change priorities. The profile is work in progress and will be revised and enhanced as the project develops.

COUNTRY BACKGROUNDⁱ

Geographic coordinates	Lat. 15 ⁰ - 23 ⁰ S, Long. 173 ⁰ -177 ⁰ E
Total land area	747 km ²
Tongatapu Coastline	40km
Exclusive economic zone (EEZ)	700,000 km ²
Population mid-year 2010	103,365
Population growth rate (July 2007 est.)	1.847%
Infant mortality rate (July 2011 est.)	13.21 deaths per 1000 live births
Average annual growth rate (2010)	0.3%
Population density	159 per km ²
Access to improved water supply (1996 est.)	84.6% of population ^{ia}
Access to improved sanitation facilities (2010 est.)	96% ^{1b}
Human development index	0.786 ¹

Introduction

The Kingdom of Tonga is located in the central South Pacific and it lies between 15° and 23°S and 173° and 177°W. Tonga is an archipelago of 172 coral and volcanic islands of which 36 of these islands are inhabited over a land area of 649 km². Tonga consists of four main island groups: (1) Tongatapu (260 km²) and 'Eua (87 km²) in the south, (2) Ha'apai (109 km²) in the middle, (3) Vava'u (121 km²) in the north and (4) Niuafo'ou and Niua Toputapu (72 km²) in the far north. The islands of Tonga are formed on the top of two parallel submarine ridges, stretching from southwest to northeast and enclosing a 50 km wide trough. Several volcanoes, some of which are still active exist along the western ridge, while many coral islands have formed along the eastern ridge; among them are the Vava'u and Ha'apai island groups. Coral islands are in two categories. Low coral islands, as exemplified by the Ha'apai group of flat islands of sand which rise to 15m above sea level. These islands were formed on the coral reef platforms. Raised coral islands, including Tongatapu, 'Eua and the Vava'u islands groups have been tilted by earth pressures and show

¹ The human development index (HDI) is a comparative measure of life expectancy, literacy, education, and standards of living for countries worldwide. It is a standard means of measuring well-being, especially child welfare. It is used to distinguish whether the country is a developed, a developing or an under-developed country, and also to measure the impact of economic policies on quality of life. The HDI score indicates that Tonga is in the medium human development category.

a marked topography. The Niuas are high volcanic islands surrounded by fringing and barrier reefs.

Government

The Kingdom of Tonga is a constitutional monarchy. The governing structure comprises the monarch in the Privy Council of Tonga, the cabinet, the legislative assembly and the judiciary. The monarch is head of state and the prime minister is head of government. The monarch presides over the Privy Council, which comprises cabinet members (ministers, including the prime minister plus the governors of Ha'apai and Vava'u). The Privy Council is the highest executive authority in the kingdom. The monarch appoints the ministers and governors; in effect, this means appointment for life or until they receive his permission to retire or are asked to resign. The constitution provides for a legislative assembly, comprising the 16 cabinet members, nine elected representatives of the nobles (there are 33 noble titles in Tonga) and nine elected representatives of the people. Elections for the legislative assembly have been held every three years, with nobles' and peoples' representatives being elected on different days.

The November 2010 elections were held under new arrangements, following a process of political reform, which has dominated politics in Tonga in recent years. The 2010 elections saw an increase in the number of parliamentarians directly elected by the Tongan people (people's representatives). The new model considerably reduced the powers of the monarch, which have devolved to the cabinet and the cabinet is now answerable to the legislative assembly. The legislative assembly comprises 17 people's representatives, nine noble representatives elected by Tonga's nobles and up to four other members appointed by the monarch on the advice of the prime minister of the day. Members of the legislative assembly elect a prime minister, who is then formally appointed by the monarch. For the first time the elected prime minister has a constitutional mandate to govern.ⁱⁱ

Tonga has a centralised governance structure and does not operate local government. All financial accountabilities reside with the Ministry of Finance and National Planning. Tonga is administratively divided into three main island groups: Ha'apai, Tongatapu, and Vava'u. The two governors who are members of the Privy Council have delegated responsibilities in the overall administration and reporting of outer islands affairs. Districts and town officers or representatives chosen by the community and stationed in these islands report to the Office of the Prime Minister. The National Strategic Planning Framework envisions a significant change in the governance structures for the outer islands through the establishment of village districts and councils, with the objective of giving communities a greater say in local and regional development.

The public service is currently administered through 13 government ministries with and a Prime Minister's office. Together they make up approximately 18% of the employed formal labour force. There are 14 ministries including the Prime Minister's Office.ⁱⁱⁱ

Table 1: Ministries of government

Ministry of Agriculture, Food, Forests and Fisheries
Ministry of Education and Training
Ministry of Finance and National Planning
Ministry of Foreign Affairs and Trade
Ministry of Health
Ministry of Public Enterprises
Ministry of Commerce, Tourism and Labour
Ministry of Lands, Environment, Climate Change and Natural Resources
Ministry of Police, Fire Services and Prisons
Ministry of Justice

Ministry of Infrastructure
Ministry of Revenue Services
Prime Minister's Office
Ministry of Internal Affairs

National and sector policies and strategies

At the conclusion of *Strategic Development Plan Eight 2006–2009: Looking to the Future Building on the Past* (SDP8), Tonga made a shift from a strategic development planning process to a *National Strategic Planning Framework* (NSPF), an overarching planning framework, covering the period 2010–2015. The vision for the NSPF is: 'To create a society in which all Tongans enjoy higher living standards and a better quality of life through good governance, equitable and environmentally sustainable private sector-led economic growth, improved education and health standards, and cultural development'. The primary objectives are to:

- 1) facilitate community development by involving district/village communities in meeting their service needs;
- 2) support private sector growth through better engagement with government, appropriate incentives and streamlining of rules and regulations;
- 3) facilitate continuation of constitutional reform;
- 4) maintain and develop infrastructure to improve the everyday lives of the people;
- 5) increase performance of technical and vocational education and training to meet the challenges of maintaining and developing services and infrastructure;
- 6) improve the health of the people by minimising the impact of non-communicable diseases;
- 7) integrate environmental sustainability and climate change into all planning and executing of programmes.

Outcome 7 is significant, given that climate change adaptation has been recognised as a key enabling activity. The government also recognises within the context of the NSPF the potential negative effects of climate change and inter-annual variability, including extreme events, which pose a serious threat to the development of Tonga's fisheries, agriculture, tourism, public health, and coastal and water resources.

The government has developed a framework for multi-hazards risk management to address the risks posed by climate change and variability, including extreme events. Tonga was the first country in the Pacific region to develop its Joint National Action Plan on climate change adaptation and disaster risk management (JNAP) where it highlighted national and community priority goals and activities to be implemented. This plan was an important component of Tonga's Second National Communication Programme and an entry point to a coordinated approach in assisting the island kingdom to timely adaptation and disaster risks mitigation, thus achieving its sustainable development goals and aspiration.

Economy

Tonga has a small economy that is heavily reliant on foreign aid and remittances from Tongans living and working overseas and foreign aid to fund a large current account deficit. Over recent years, Tonga has averaged approximately 200 million pa'anga (TOP) per year in remittances (AUD 133 million) although these have fallen by approximately 20% from 2010 to 2011. This is probably due to the impact of the global economic crisis, which, together with the civil unrest in Nuku'alofa in 2006 and weakness in the administration, have contributed to the relatively poor performance of the economy in recent years. Revenue

across all sectors declined in recent years — especially 2008–2009 — when earnings from tourism dropped by 6%, despite a 4% increase in visitor arrivals.

Economic Information	
Gross national income (GNI) per person 2007	USD 2,480
Gross domestic product (GDP) (2008)	USD 276.5 million
GDP per capita (2008)	USD 2,690
Real GDP growth rate (2011 est.) ^{ix}	0.8%
Annual Inflation rate (March 2013 est.) ^{ix}	0.8%
Unemployment rate (2003 est.) ^x	13%
Number of wage and salary earners	15,597

Declines in electricity consumption, new car registrations, and imports (which fell by 10% in the first half of 2009) indicated an overall weakness in the economy. Non-performing loans led to a deterioration of the banking and lending environment in 2008, with credit restrictions reducing business activities. Agriculture is the leading productive sector, while the manufacturing sector is very small with limited export production in recent years. Tourism is modest but has potential for expansion. Tonga's main trading partners are New Zealand, Australia, Fiji, the United States and Japan. Most Tongan exports are agricultural produce, while imports cover the full range of consumer and industrial goods. In 2009, Tonga's GDP was USD 259 million and the economy was estimated to have contracted by 0.4%, owing primarily to a slump in tourism activity and falling remittances. The International Monetary Fund has forecast public infrastructure spending will provide a temporary boost to economic activity in 2010/2011, but cautions that once those projects wind down it will be challenging to achieve growth in the 1%– 2% range.

Public debt in FY2012 was estimated to be about 45.1% of the GDP which exceeds the 40% threshold recommended by the IMF and the World Bank^{iv}. Majority of the total debt is from external creditors. Thus the main fiscal challenge of the government in FY2013 will be to bring the debt levels down with debt-servicing commitments especially for repaying loans from the EXIM Bank of China. Approximately 18% of the total expenditure in FY2013 is committed to debt-servicing.

Financial management

The public expenditure and financial management system (PFM) in Tonga is based on a solid legal and regulatory framework, which sets out budgeting, spending and accountability structures. These include responsibility and accountability for public funds delegated to individuals and some oversight by the Legislative Assembly. The PFM system also includes clear statements of the powers and respective duties of the Ministry of Finance and National Planning, the Revenue Services Department, the Customs Department, the Public Services Commission and the Audit Office. The legal framework that underpins the PFM system includes expenditure control procedures covering wages and salaries, non-salary items, and procurements. Thus, there are clear rules and procedures in place and these tend to be followed by the various agencies of government.

The *2010 Public Expenditure and Financial Accountability (PEFA) Public Financial Management Performance Report* found Tonga's PFM system to be mostly operating at average or above average levels when compared to international best practice. Significant improvements in recent years have included a shift towards multi-year budgeting, revenue collection and enforcement, which has resulted in the level of tax arrears being identified and

actively pursued, using a risk management approach. There is still room for further improvements in the PFM system, especially in improving budget credibility at the ministry/department/agency level by strengthening the links between the national strategic planning framework and individual corporate plans. There is also scope for strengthening the transparency around the financial operations of public enterprises, procurement contracts entered into by the state and audits performed by the Audit Office. Procurement is managed by Treasury instructions and the procedures generally ensure open competition for tendering above what are deemed to be sensible thresholds. However, the policy is not yet firmly established in regulations or legislation, and procurement decisions are not publicly available.

Direct budget support

Tonga faces a number of key macro-economic challenges: large dependency on direct budget support to support its recurrent expenditure, a large wage bill and other non-discretionary expenditure, a high debt level, a high trade deficit from the high inflow of aid and remittances, a decline in cash remittances, high liquidity but declining credit, and general weaknesses in the key economic sectors.^v Given the macroeconomic situation, it appears that Tonga depends on direct budget support from bilateral donors and its development partners. The macro-economic situation was worsened by the effects of the 2008 global economic crisis and the civil riots that occurred in 2006.

A number of development partners have provided direct budget support to Tonga between 2009 and 2011.

- 1) The Government of New Zealand provided NZD 3 million in direct budget support to cover the budget deficit and to pay the salaries of police personnel and teachers in 2011/2012 financial year.
- 2) The European Union, as part of its support to developing countries in coping with the global economic crisis, provided € 5.5 million in direct budget support to Tonga in 2010. The funds were used to mitigate the impact of the global economic crisis on the country.
- 3) The World Bank provided USD 9 million in direct budget support to Tonga, as part of its Country Assistance Strategy for Tonga 2011–2014, to strengthen public financial management, fiscal policy and structural reform, and to improve social protection.

Trust Fund

The Tonga Climate Change Trust Fund was established in Tonga in 2011 to fund climate change adaptation and mitigation activities. The fund aims to assist the government in planning, financing and delivering on climate policies, projects/programmes. It will centralise funding through the mandated Ministry of Lands, Environment, Climate Change and Natural Resources, which allows for enhanced coordination of all climate change-related activities. The fund will also provide grants to line ministries to support climate change-related projects within the government. Initial capitalization of the fund will be provided by US\$5 million from Tonga's Strategic Programme on Climate Resilience supported through the ADB.

Donor support

Current donors to Tonga are Australia, New Zealand, Japan, China, the Asian Development Bank, the World Bank and the European Commission. The government recently established an Aid Coordination and Monitoring Division to harmonise donor activities in the country. Australian assistance to Tonga in 2010–2011 was primarily focused on the four priority outcome areas of the Tonga–Australia Partnership for Development:

- 1) a more efficient and effective public sector – the Partnership will build on existing assistance for strengthening the public sector in policy formulation and implementation, and public financial and economic management;
- 2) improved health – wide-ranging support for the implementation of the Tonga Ministry of Health's corporate plans, such as reduced prevalence of non-communicable disease and primary health care to a common national standard available to all communities;
- 3) improved technical and vocational skills – develop opportunities to expand skills in areas of industry, both domestically and abroad, through strengthening the management and teaching capabilities of technical and vocational education and training institutions in Tonga, and promote access to training and employment opportunities in the region;
- 4) Develop and improve infrastructure – plan and put in place transport and other infrastructure to reduce business costs and facilitate access to markets and services.

There is also the Joint Commitment for Development between the Governments of Tonga and New Zealand² establishing a shared vision for achieving long-term development outcomes for the people of Tonga, including the achievement of the Millennium Development Goals. Both Parties have agreed to work towards supporting the following priority sectors and outcomes:

- 1) energy – improve energy supply with increasing use of renewable energy;
- 2) private sector development – promote and support private sector-led development;
- 3) tourism – increase the contribution of tourism to economic growth;
- 4) police – sustainable and effective police force;
- 5) education – improve literacy and numeracy skills;
- 6) targeted sector budget support – improve economic policy-making and public financial management;
- 7) partnerships – New Zealand partnerships that leverage New Zealand expertise and resources for the benefit of the people of Tonga.

RESPONSE TO CLIMATE CHANGE

Activities in response to climate change began in Tonga after the ratification of the UNFCCC on July 20 1998. Awareness on climate change and sea-level rise issues began with the implementation of the preparation of its initial national communication under the UNFCCC between 1999 and 2005. The preparation provided the avenue for discussing climate change issues and also undertaking some capacity building and awareness on climate change in Tonga.

Current and future climate

Current climate

There is a marked diurnal, seasonal and spatial variation in temperature. Mean annual temperatures vary according to latitude from 27°C at Niuafu'ou and Keppel (northernmost island) to 24°C at Tongatapu (in the south). Diurnal and seasonal variations can reach as high as 6°C throughout the island group. There is also a marked seasonality in the rainfall of Tonga between hot wet (November–April) and cool dry (May–October) seasons. The annual mean (1971–2007) rainfall for the five meteorological stations in Tonga show Tongatapu received on average of 1,721 mm, Vava'u 2,150 mm, Ha'apai 1,619 mm, Niuafu'ou 2,453 and Niua Toputapu 2,374 mm.

² Signed on 13 July 2011 by the Prime Minister of Tonga and the Minister for Foreign Affairs and Trade, New Zealand.

Niuafu'ou is both the wettest and the northernmost island of the Tongan archipelago located closer to the wet tropics and influenced by both the Intertropical Convergence Zone and the South Pacific Convergence Zone (SPCZ). The Ha'apai group receives the lowest rainfall due to its positioning between influence of SPCZ over northern Tonga and regions to the south, which come under the influence of the upper air jet stream and other extra tropical features.

Expected future climate^{vi,vii}

Projections for all emissions scenarios indicate that the annual average surface air temperature and sea-surface temperature will increase in the future in Tonga (Table 2). There will be more very hot days and warm nights. The projections for future trends in rainfall are not clear but indicate a general decrease in dry season rainfall and an increase in wet season rainfall with an increase in extreme rainfall days. Tropical cyclones will be more intense but less frequent, while sea-level rise and ocean acidification will continue.

Table 2: Climate change projections for Tonga for 2030 and 2055 under the high emissions scenario (A2).

Climate Variable	Expected Change	Projected Change by 2030 (A2)	Projected Change 2055 (A2)	Confidence Level
Annual surface temperature	Average air temperature will increase	+0.3 to +1.1°C	+1.0 to +1.8°C	Moderate
Maximum temperature (1 in 20 year event)	More very hot days	NA	+0.8 to +2.0°C	Low
Minimum temperature (1 in 20 year event)	Fewer cool nights	NA	-0.3 to +3.1°C	Low
Annual total rainfall (%)	Annual rainfall will increase	-10 to +16%	-7 to +17%	Low
Wet season rainfall (%)	Wet season rainfall will increase	-10 to +20%	-6 to +24%	Moderate
Dry season rainfall (%)	Dry season rainfall will increase	-12 to +14%	-15 to +17%	Low
Sea surface temperature (°C)	Sea-surface temperature will increase	+0.3 to +1.1°C	+0.9 to +1.7°C	Moderate
Annual maximum acidification (aragonite saturation)	Ocean acidification will continue to increase	+3.3 to +3.5 Ωar	+2.9 to +3.1 Ωar	Moderate
Mean sea level (cm)	Sea level will continue to rise	+7 to +27 cm	+11 to +51 cm	Moderate

Institutional arrangements for climate change

Tonga has made significant efforts to create an institutional set-up for addressing climate change issues and concerns and to integrate climate change issues into the national planning processes. Of particular note is the development and adoption of Tonga's National Climate Change Policy, which was endorsed by government in 2006 and was followed by the establishment of the Ministry for Environment and Climate Change, which coordinates and implements all climate change activities in the country. The climate change policy identified key issues that affect the ability of Tonga to address climate change issues and concerns. These key issues include a lack of knowledge, a lack of physical and financial resources, a lack of comprehensive environmental legislation, inherent difficulties in discerning overlapping and unclear management powers, a lack of appropriate policy support, and a lack of public participation coupled with a basic lack of political will and commitment for sustainable development.

In recognition of the need for integration of climate change into development planning, Tonga developed the *Joint National Action Plan on Climate Change Adaptation and Disaster Risk Management (JNAP) 2010–2015*.^{viii} The plan comprises six priority goals:

- 1) improved governance for climate change adaptation and disaster risk management (mainstreaming, decision making, and organisational and institutional policy frameworks);
- 2) enhanced technical knowledge base, information, education and understanding of climate change adaptation and effective disaster risk management;
- 3) analyses and assessments of vulnerability to climate change impacts and disaster risks;
- 4) enhanced community preparedness and resilience to all impacts of disasters;
- 5) technically reliable, economically affordable and environmentally sound energy to support the sustainable development of the kingdom;
- 6) strong partnerships, cooperation and collaboration within government agencies and with civil societies, non-government organisations and the private sector.

Each of these priority goals has a number of actions or activities that will be implemented over the term of the plan. In order to implement it, the government (with financial support from the Australian Government) established a JNAP Taskforce secretariat to oversee and coordinate implementation, including the development of a three-year implementation plan. The secretariat has three full-time staff that carry out tasks/activities relating to climate change adaptation and disaster risk management in the country.

Ongoing climate change adaptation activities

Tonga has in recent times implemented a number of climate change adaptation and climate change-related programmes, projects and activities. The list below includes the most recent and ongoing projects.

Title and Timeframe	Description, country focus and agencies responsible
South Pacific and Sea-Level and Climate Monitoring Project <i>Ongoing</i>	This project commenced in 1991 with the objective of installing eleven sea-level monitoring stations across the Pacific Basin. All stations were operational by October 1994 with Tonga's station installed in January 1993. Ongoing training and capacity building provided to Tongan experts.
International	Delivered and implemented jointly by AusAID and DCCEE. Initiative

Title and Timeframe	Description, country focus and agencies responsible
Climate Change Adaptation Initiative (CCAI)	<p>focuses on: improved scientific information and understanding; strategic planning and vulnerability assessments; implementing, financing and coordinating adaptation measures; and multilateral support for climate change adaptation. As part of ICCAI, Australia has provided AUD 40 million to the <i>Pilot Programme on Climate Resilience</i> in which Tonga also participates and will have access to funding support of USD 15 million to implement its <i>Strategic Programme on Climate Resilience</i>.</p> <ul style="list-style-type: none"> • <i>Pacific Australia Climate Change Science and Adaptation Planning Programme</i>. • Tonga also has access to funding and support through a number of regional programmes including the Community-based Adaptation Activities, and the Pacific Future Climate Leaders Program.
UNDP-GEF funded climate change adaptation and other climate change-related projects.	<ul style="list-style-type: none"> • Second national communication under the UNFCCC (USD 405,000), 2008–2012 • Pacific Adaptation on Climate Change 2008–2013 • Pacific Islands Greenhouse Gas Abatement and Renewable Energy Project 2009-2014 • Various projects funded through the Small Grants Programme on adaptation and mitigation • Integrated Water Resource Management Project to be completed 2008–2013 • Third national communication on climate change (USD 480,000). Awaiting initial disbursement of funds from UNDP–GEF
Coping with Climate Change in the Pacific Island Region – Programme <i>Ongoing, 2009-2015</i>	Funded by the Government of Germany through GIZ with focus on climate change mainstreaming, implementing pilot activities, education and energy.
ADB-supported activities in Tonga	Development of climate risk profile for Tonga as basis for climate change adaptation initiatives for various development sectors; mainstreaming of climate change adaptation and mitigation to ensure that climate change implications are incorporated in the economic development policies and planning processes; Incorporation of climate change adaptation in Tonga’s Urban; Integrated Development Project (Phase II).
Mangrove Ecosystems for Climate change Adaptation and Livelihoods (MESCAL) project	Funded by governments of Italy and Austria and supported by International Union for Conservation of Nature (IUCN). Overall goal for Tonga MESCAL is to improve community livelihoods through targeted sustainable management and harvest of mangrove resources, increase resilience to climate change.
University of the South Pacific-EU	Project addresses the challenges of climate change impacts in the 15 Pacific ACP countries, including Tonga, through capacity building,

Title and Timeframe	Description, country focus and agencies responsible
Global Climate Change Alliance project	community engagement, and applied research. The objective of this project is to develop and strengthen the Pacific ACP countries' capacity to adapt to the impacts of climate change. Overall available funding is € 8 m.

National and sector climate change priorities

The stocktaking of climate change information and stakeholder consultations³ have revealed a number of key success factors in facilitating adequate adaptation to climate change in Tonga. These factors will need to be included in the design and process for adaptation and sustainable development: (i) availability of land; (ii) policies, plans and legal/regulatory frameworks; (iii) stakeholder understanding of the impacts of climate change and the needs for adaptation; (iv) public awareness and dissemination of relevant information; (v) availability of and access to financial, human and technological resources.

The Ministry of Lands, Survey, Natural Resources, Environment and Climate Change has a strong desire to improve land information by incorporating risk or potential risk factors relating to land development in Tonga but is constrained by inadequate financial, human and technological resources. Despite this shortcoming the ministry currently provides GIS information, including high risk areas, e.g. maps showing low-lying areas prone to effects of sea-level rise. All land in Tonga is the property of the Crown and therefore the way in which land is developed or used is determined by the provisions of the Land Act under the Minister for Lands.

There is a real need for integration and mainstreaming of climate change issues/concerns into sectoral planning, management and budgetary processes but this is hampered seriously by the limited availability of financial and human resources. The majority of funding available for climate change programmes, projects and activities through the Ministry of Finance and Planning (Aid Management Division) is provided from bilateral and multilateral donors (external sources).

The following adaptation needs and priorities were identified through the stocktaking and consultation process for the development of the JNAP,^{4ix} and also from the vulnerability and adaptation assessment conducted as part of the preparation of Tonga's second national communication under the UNFCCC. Some of the activities which require funding and implementation have been highlighted in the JNAP activity matrix:

Awareness and education:

- Climate change public awareness is required at all levels — national, regional, islands and local/community.
- There is a need for a communication strategy for climate change in Tonga.
- Include climate change in the primary and secondary school curriculum.
- Strengthen networking and information sharing/exchange amongst all stakeholders to develop appropriate measures to address climate change, climate variability and sea-level rise.

³ Conducted for the Pacific Adaptation Strategies Assistance Programme in 2011

⁴ Six priority goals in the JNAP include priority actions for climate change adaptation and disaster risk management.

Research and data management:

- There is a need to better understand the impacts of climate change on tourism in Tonga.
- Conduct studies on the impacts of ENSO on the fisheries and tourism sectors.
- Develop a climate change and climate variability database and collect data on sectors and relevant indicators to monitor and evaluate their impacts.
- Improve climate monitoring, research and systematic observation; develop and manage databases necessary for vulnerability and adaptation assessment; and enhance the capabilities and capacities of experts and institutions in the use and applications of analytical, integrated and process-based methods and tools for assessment work.
- Develop high-resolution modelling of inundation of the coastlines characterised by high population density and the degree of exposure to effects of climate change and sea-level rise.

Financing:

- There is a need for government to seek innovative and sustainable financial resources to support the programmes, projects and activities that address climate change issues/concerns, including adaptation to climate change over the long term.

Planning and mainstreaming:

- Opportunities exist for integration of climate change issues/adaptation into planning processes and documents (e.g. Building Code, National Infrastructure Investment Plan, PUMA legislation). However, capacity building and training are required to enable and facilitate the integration.
- There is a need for community-based adaptation planning.
- Integrate climate change adaptation into sectoral development planning and budgeting processes.
- Promote integrated coastal zone management and planning for the protection of coastal resources.

Implementation of adaptation measures:

- Implement urgent adaptation measures to enable the communities to cope with the current and future climate and sea-level changes.
- Conserve and protect breeding grounds, habitats and species that are considered vulnerable to the impacts of natural disasters (tropical cyclones, flooding, droughts, etc.) and human induced activities.
- Improve water management efforts with better supply-side and demand-side management.

2.4 The SPC GCCA: PSIS project in Tonga will implement and evaluate different coastal protection measures along a 6km stretch of low-lying coast in Eastern Tongatapu. The target area includes 6 villages and a population of 3,367 people living in this area. A feasibility study, a coastal engineering study and an environmental impact assessment for various options were completed in 2012. The coastal engineering design and costing of the options for coastal protection point to the construction of (i) permeable groynes, sand re-charge and coastal planting; and (ii) detached offshore breakwaters, sand re-charge and mangrove planting. The tendering process will follow the government procurement policy/plan. The engineering specifications for the coastal protection measures are provided in the detailed design and costing document prepared by eCoast Marine Consulting and Research^x. The project adopts a consultative and participatory process with all sectors of civil society, including women and youth, whilst involving the communities living in the affected area.

Gaps and constraints

Significant gaps still exist in the areas of data collection, monitoring, expertise, and skills that are required to conduct vulnerability and adaptation assessments on a continuous basis. Therefore, there is an urgent need for training and capacity building on:

- 1) Development and use of appropriate methodologies and tools for conducting vulnerability and adaptation assessments at the community, national and sectoral levels and the use of appropriate tools/methods for climate change adaptation integration into sectoral and national planning processes;
- 2) Strengthening of existing and, where appropriate, development of data management systems to ensure that a vulnerability and adaptation assessment is carried out on a continuous basis;
- 3) Evaluation (including cost-benefit analysis), prioritisation and costing of adaptation options, strategies and measures;
- 4) Incorporation of vulnerability and adaptation assessment work into development planning, including risk-based assessment methods;
- 5) Research, systematic observation and data collection, analysis and dissemination;
- 6) Enhancement of the capacity of communities to identify capacity building and training needs as they relate to vulnerability and adaptation assessments, building on the community vulnerability and adaptation assessments currently being carried out in several communities;
- 7) Methods across sectors for collection, collation, analysis, archival and retrieval of data and information; a user-friendly database management system is needed to support this work;
- 8) Management and/or integration of climate change issues into design and development of infrastructure (climate proofing).

Key challenges

The government of Tonga highlighted its priority needs for adaptation to climate change in the Joint National Action Plan for Climate Change Adaptation and Disaster Risk Management and other documents⁵. Since 2006⁶ Tonga has made good progress in addressing climate change issues with the support of its regional and international development partners. However, some key challenges still remain and will compromise future long term efforts unless effectively addressed.

Of particular note are capacity constraints. There is a general lack of highly skilled personnel, in permanent positions, to take on the task of managing climate change risks over the near and long term. Short term personnel and project personnel only go some way to addressing this gap, Climate change education at primary, secondary and tertiary levels, short term training, on-the-job training and job attachments are critical to address the capacity gap. So too is the need to develop innovative ways to retain skilled personnel in country through appropriate levels of remuneration and other means.

Raising public awareness about climate change risks is another important activity that needs to be implemented through a planned process thereby moving away from ad hoc approaches.

⁵ Tonga prepared and submitted its Second National Communication under the UNFCCC in 2012. The Second National Communication also outlines the priority needs for climate change adaptation, mitigation and technology transfer.

⁶ National Climate Change Policy was endorsed by Cabinet in 2006. The climate change policy was developed as part of the preparation of the initial national communication under the UNFCCC.

Given that many of climate change activities implemented in Tonga are project based, with 3-5 year time frames, the results and outcomes may not always be sustainable. Tonga is already making efforts or/considering ways to prepare a financing strategy for disaster risk management and climate change activities and to tailor new projects to address specific gaps in their national agenda, and this approach needs to be maintained and expanded. .

Integration of climate change into national, sector and community programmes, projects and activities is needed on a continual basis over the long term and there is a need to create an enabling environment for engaging with both local communities and national level government.

Another key challenge for Tonga is to ensure that gender-sensitivity and disability inclusiveness is addressed in its climate change programmes, projects and activities. Climate change affects communities and individuals in different ways and it is important to ensure that climate change activities are fully inclusive of these special groups.

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