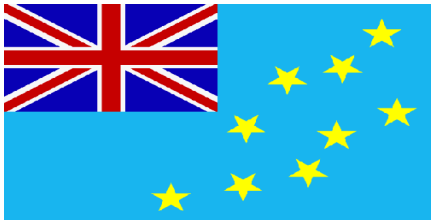
CLIMATE CHANGE PROFILE



TUVALU

Version 2, July 2013

GLOBAL CLIMATE CHANGE ALLIANCE: PACIFIC SMALL ISLAND STATES PROJECT


Tuvalu
0
Kilometres
200
Nanumea
Niutao
Nanumanga
Nui
Vaitupu
Nukufetau
FUNAFUTI
Nukulaelae
Niulakita

Contents

Abbreviations

ADB	Asian Development Bank
AusAID	Australian Agency for International Development
CCA	Climate Change Adaptation
CCCPIR	Coping with Climate Change in the Pacific Island Region
CIF	Consolidated Investment Fund
EU	European Union
GCCA:PSIS	Global Climate Change Alliance: Pacific Small Island States Project
GDP	Gross Domestic Product
IWRM	Integrated Water Resources Management
NAPA	National Adaptation Programme of Action
NSSD	National Strategy for Sustainable Development
NSAP	National Strategic Action Plan for Climate Change and Disaster Risk Management
NZAid	New Zealand Aid Programme
ODA	Overseas Development Assistance
PEFA	Public Expenditure and Financial Accountability Assessment
SOE	State-Owned Enterprises
SPC	Secretariat of the Pacific Community
SPREP	Secretariat of the Regional Environmental Programme
TTF	Tuvalu Trust Fund
TCCP	Tuvalu National Climate Change Policy
UNFCCC	United Nations Framework Convention on Climate Change
UNICEF	United Nations Children

OBJECTIVE OF THE CLIMATE CHANGE PROFILE

This second version of the climate change profile for Tuvalu 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 the GCCA: PSIS project is to support the governments of nine Pacific smaller 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 and the wider 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 a work in progress and will be revised and enhanced as the project develops.

COUNTRY BACKGROUND

Country Information[i]	
Geographic coordinates	Lat.5^0 – 11^0 S, Long.176^0 -180^0 E
Total land area	26 km^2
Length of coastline	24km
Exclusive economic zone (EEZ)	757,000 km^2
Population 2008 estimate and 2015 forecast	11,035 and 11,445
Population growth rate	0.5%
Population density (2008 estimate)	424 per km^2
Access to improved water supply (2010 est.)	98% of households[1a]
Improved sanitation facilities (2010 est.)	85%[1b]
Infant Mortality rate	31 deaths per 1000 births[1c]
Human development index score	0.700[1]

Introduction

Tuvalu is situated in the western South Pacific Ocean between 176°E–180°E and 5°S–11°S. It consists of five true atolls and four raised limestone reef islands, with a total land area of approximately 26 km^2. Land levels are very low, with maximum heights above mean sea level typically ranging from 3 to 4m and the highest elevation being 4.6 m.

Government

Tuvalu is now known as one of the world's smallest independent nations, but from 1916 to1974 it was a British colony, then called the Ellice Islands, together with the Gilbert Islands

[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 Tuvalu is in the medium human development category.

(now Kiribati). The country Tuvalu became fully independent in 1978. It is a constitutional monarchy, with Queen Elizabeth II as head of state, and a 15-member parliament elected every four years. Members of parliament generally have close links with their island constituencies and an effort is made to balance island representation in the cabinet, which is comprised of the prime minister and several ministers. Presently there are eight government ministries (Table 1).

Table 1: Ministries of the Government

Ministry of Finance and Economic Development
Ministry of Education, Youth and Sports
Ministry of Public Utilities
Ministry of Foreign Affairs, Trade, Tourism, Environment, and Labour
Ministry of Health
Ministry of Home Affairs
Ministry of Natural Resources
Ministry of Transport and Communications

Falekaupule (island councils)

Each inhabited island has its own high chief *(ulu-aliki)* and several sub-chiefs *(alikis)* and elders *(te sina o fenua)* and together they form an island council or *falekaupule*. The *falekaupule* cooperates with the national government on matters relating to the island and on matters of custom. Based on this traditional system a Falekaupule Act was promulgated in 1997, essentially establishing a local government system based on traditional ways of decision making in Tuvaluan society[2]. Under the Falekaupule Act, increasing autonomy was given to the island councils to determine development priorities within the national government's overall development goals of public sector reform, human resource development, improvement of the country's economic and education infrastructure and the further development of its capacity to manage its narrow resource base. An outer island trust fund (the Falekaupule Trust Fund) was established.

One of the key development challenges of Tuvalu is providing residents of the outer islands with greater access to services and opportunities for paid employment. Residents of the outer islands depend on remittances from relatives working and living overseas (e.g. as seafarers) and those who are working for the government in Funafuti. However, the allocations to island councils through the Falekaupule Trust Fund have proven successful in generating income-earning opportunities for some of the residents of outer islands. Another key development challenge is the lack of transport infrastructure, which severely constrains service delivery to the small populations dispersed across nine remote atolls.

National and sector policies and strategies

Tuvalu's national development strategy, Te Kakeega II: National Strategy for Sustainable Development (NSSD) 2005–2015, was developed through extensive consultation and participatory processes. Prioritised strategic areas are: good governance; macroeconomic growth and stability; social development: health, welfare, youth, gender, housing and poverty alleviation; outer island and *falekaupule* development; employment and private sector

[2] The Falekaupule Assembly is the consultative forum which represents residents of the island who are 18 years and above. This Falekaupule Assembly is where the budget and planning processes is presented for discussion before it goes to the Falekaupule for finalizing.

development; human resources development; natural resources development: agriculture, fisheries, tourism and environmental management; and infrastructure and support services. The expected outcomes are: increased employment opportunities, higher economic growth, better health care, better basic infrastructure, and continued social stability. To help monitor the progress of the NSSD, the government adopted five performance benchmark indicators to track the achievements of the stated social sector outcomes through a focus on improved financial management.

1) Benchmark 1.1 – the government's recurrent expenditure each should not exceed the total of its recurrent revenue plus a sustainable Tuvalu Trust Fund (TTF) distribution (Consolidated Investment Fund drawdown).
2) Benchmark 1.2 – target minimum value of funds retained in the Consolidated Investment Fund should be not less than 16% of the maintained value of the TTF at the beginning of the TTF year so as to ensure that a sustainable distribution is available to help finance annual budgets.
3) Benchmark 1.3 – The government's total debt liability (both domestic and external) at any time should not exceed 60% of the GDP, as specified in Te Kakeega II.
4) Benchmark 2.1 – In 2008 the government will increase its budgeted non salary expenditure on basic education by at least 5%.
5) Benchmark 2.2 – In 2008, the government will increase its budgeted non salary expenditure on primary and preventive health services by at least 5%.

An assessment in May 2010 by the TTF Advisory Committee, which monitors the progress of the benchmarks, concluded that the government met all the benchmarks except in the area of health services where there was a significant under-expenditure.

Additionally, *Fakafoou* – To Make New: Tuvalu Infrastructure Strategy and Investment Plan (February 2012), formulated as an initiative of the Government of Tuvalu with support of the Pacific Infrastructure Advisory Centre, represents a country-led, prioritised investment plan for the next five to ten years. It identifies the needs and priorities for investments in economic infrastructure and assesses the financial resources for implementation in water consolidation, outer island sanitation, Funafuti sanitation, renewable energy, solar telecommunications, outer island telecommunications and the port. The total estimated value of investments is approximately AUD 40 million. Other supporting activities that complement the investment priorities include:

1) preparation of a water and sanitation policy (including revision of the building code);
2) finalisation of renewable energy master plan (emphasis on use of solar power);
3) a transport sector feasibility study;
4) an assessment of state-owned enterprises (SOEs) reforms and private sector facilitation.
5) a ten-year infrastructure strategy with rolling three-year implementation plans to support NSSD.
6) *Fakafoou* – a proposed programme to use south-south exchanges of maintenance supervisors, teamed with local labour, to change Tuvalu's perspective and practice to maintaining, repairing and refurbishing infrastructure rather than replacing it.

Under Strategy 11.4 of Tuvalu's current national development plan, *Te Kakeega II* outlines key policy directives for the environment. One of the priorities includes development of the TCCP and its implementation plan (NSAP) for Climate Change and Disaster Risk Management. NSAP activities will strengthen adaptation, mitigation and disaster risk reduction and disaster management including mainstreaming climate change and disaster

risk reduction into sector plans. This NSAP is a direct response to achieving *Te Kakeega II* goals and objectives thus contributing to Tuvalu's sustainable development.

The analysis of national policies and strategies indicates that a well-defined national strategy that responds to the challenges and problems faced by Tuvalu is already under implementation.

Economy

Tuvalu is characterised as having a small, open economy and as such it is highly vulnerable to external and natural shocks. Therefore, its economic performance tends to be highly volatile. The main focus of economic activity is fishing and subsistence farming and there are nascent tourism and retail industries. However, the majority of the country's income stems from external flows such as grants from donors, receipts from the Tuvalu Trust Fund and overseas remittances. The Trust Fund and donor flows act as an important financial buffer against financial uncertainty.

The government is pursuing public sector reforms in line with the Te Kakeega II 2005–2015 strategic plan to improve financial stability. Key reforms include debt management; privatisation of some government functions; and improved public financial management capacity. Tax reforms were implemented in late 2008 and included changes to personal income tax (a higher threshold and a more progressive scale), business/net profit changes (uniform 30% tax rate), and the introduction of the Tuvalu consumption tax (TCT). Moreover, customs reforms (tariff reductions to reflect trade agreements, introduction of excise duties, change of customs valuation systems, reduction of tariff exemptions, and removal of sales tax) were also approved by parliament in mid-2009. A revenue monitoring framework has been developed and estimates of revenues from customs and the TCT were used in formulating the 2010 budget.

While the majority of the population is engaged in subsistence farming and fishing, the monetary economy is dominated by government activities. Fishing licences and marketing of its internet domain name '.tv' contribute to government revenue. A private sector-led economy has not emerged.

Economic Information[ii]	
Gross national income per person (2007)	USD 2,720
Gross domestic product (GDP) (2008)	USD 28.3 million
GDP per capita (2008)	USD 2,874
Real GDP growth rate (2011 est.) [ix]	0.4%
Inflation rate (2006 est.)[ix]	3.8%
Unemployment rate (2002 est.)[x]	8.9%
Number of employees	3,869

Financial management

The main challenge for the government is to correct the fiscal imbalance and produce a credible budget with appropriate allocations to the priority social development sectors.
Tuvalu has struggled to produce credible and prioritised budgets in past years due to: weak budgeting skills across ministries, limited recording or monitoring of expenditures, poor accounting of donor-funded activities, capacity constraints in ministries preparing sector plans with financial forecasts, and legacies of past policy decisions. Successive governments have focused on education and health in recognition of the importance of the country's primary asset, its human capital.

An area of potential financial risk is that posed by SOEs. The Tuvalu Electricity Commission and Telecommunications Corporation both receive substantial government subsidies — with the aim of keeping prices down in the rural areas. The Public Enterprise Reform and Management Unit within the Finance Ministry is working to strengthen SOE reporting and monitoring.

Key national strategies for improving governance in relation to fiscal prudence are:

1) to set strict compliance to fiscal targets, review the Public Finance Act and other related legislation, formulate a medium-term fiscal policy framework, establish a macro-economic policy committee, and restructure tax and tariff regimes;
2) to produce publicly available annual reports and audited accounts, clearly define and cost government subsidies, assess the viability of privatising selected public enterprises, improve selection process of boards of directors, and establish clear guidelines on the management of public enterprises.

Tuvalu Trust Fund and direct budget support

The government depends heavily on donor grants and transfers from the TTF to fund the recurrent budget. The TTF was established in 1987 (with an initial injection of AUD 27m by the governments of Australia, New Zealand and the United Kingdom) as a supplement to cover shortfalls in the national budget. The fund now has a market value of approximately AUD 100 million. Contributions to the TTF are invested overseas and the returns are used to meet the Tuvalu Government's expenditure. In 2009, the global recession impacted on the market value of the TTF.

The New Zealand Aid Programme funds an expert economic and investment advisor to represent New Zealand on the TTF Board of Directors and the TTF Advisory Committee (Tuvalu and Australia are also represented on the board and the advisory committee). The board and the committee provide advice and support on wider economic and social issues facing Tuvalu. The New Zealand Aid Programme makes periodic capital contributions to the TTF.

In 1999 and 2000, loan funds were used to finance one-off capital projects but for the most part the Fund is used to finance any budget deficit. In Tuvalu's micro-sized economy, even small capital projects can result in short-term, high economic and employment growth, but the stimulus can quickly dissipate. From 2008 to 2010 Australia contributed approximately AUD 6.93 million to the TTF and returns from the fund are used to help finance Tuvalu's budget deficits, and to supplement its national budget.[iii] The European Union (EU) provided, in response to a request from the government of Tuvalu, a tranche of € 1.5 million[3] to Tuvalu, as direct budget support, in response to the global economic crisis in 2010. (Direct budget support refers to aid channelled directly to the government budget, to be disbursed using its own allocation, procurement and accounting systems).

There has been no direct budget support provided by any of the bilateral and multilateral donors for addressing climate change issues.

Aid management policy

The responsibilities for managing aid in Tuvalu are split between four government ministries and offices:

[3] Vulnerability FLEX general budget support programme financed from the B-envelope of the 10th EDF.

1) The Ministry of Finance and Economic Development has formal responsibility for aid coordination. The Planning and Budgeting Department of the Ministry is the focal point for some development partner relationships (e.g. AusAID, NZAID, the EU and the Asian Development Bank [ADB]) and is responsible for aid forecasts in the budget. The Treasury Department tracks aid expenditure passing through the Development Fund.
2) The Ministry of Foreign Affairs is the formal focal point for a number of development partners.
3) The Office of the Prime Minister hosts a Japanese expert who helps to manage the Japanese aid programme.
4) The Tuvalu High Commission in Suva has tried in the past to provide a channel for aid coordination but has suffered from lack of a more formal role in aid coordination.

Involvement of more than four different organisations in aid management has led to coordination problems. Experience in the region suggests that countries with effective aid systems have solved the internal coordination problem by bringing aid and planning-related functions together in one ministry. For example, Cook Islands, Kiribati and Nauru have consolidated most of the aid management functions in their ministries of finance.

To improve aid coordination and effectiveness, a declaration was drawn up between the Government of Tuvalu and development partners in 2009 to improve overseas development aid effectiveness and maximise benefits for the people and nation of Tuvalu. The declaration deals with five key principles: (a) ownership, where partner countries exercise effective leadership over their development policies and strategies; (b) alignment, where donors base their support on partner countries' national development strategies, institutions and procedures; (c) harmonisation, where donor's actions are more harmonised, transparent and collectively effective; (d) managing for results, where managing resources and improving decision-making lead to good results and (e) mutual accountability, where donors and their partners are accountable for development results. The declaration provides a shared vision and recognition for enhancing aid delivery and effectiveness.

Public expenditure and financial accountability assessment

A public expenditure and financial accountability (PEFA) assessment was conducted by the Asian Development Bank[iv] in 2011. The aim was to identify the main strengths and weaknesses of Tuvalu's public finance management system and to gauge the extent to which weaknesses in the system impact on its fiscal discipline, strategic allocation of resources and efficiency in service delivery.

The strengths of the public finance management system include:

1) Tuvalu's budget formulation now represents good international practice. The budget formulation process (underpinned by a medium-term fiscal framework, engaging cabinet, utilising a meaningful classification system, and following a clear budget calendar with supporting budget guidelines) is a key strength of the system.
2) Domestic revenue estimates are considered appropriate, given the volatility of some revenue items (evidenced by the deterioration in the 2010 projected revenue out-turn).
3) The medium-term fiscal framework, which accompanies the budget, provides a good picture of budget aggregates and identifies emerging issues.
4) The recent reforms to the tax system (i.e. the introduction of a consumption tax, a presumptive tax and a unified business registration process) and an effective public education programme provide a sound platform.

5) Government's ability to track key service delivery points such as primary schools and clinics is currently limited but the development of medium-term expenditure frameworks for the education and health sectors will strengthen its tracking exercises.
6) Parliamentary processes in relation to audit reports have improved in recent years through its public accounts committee reports, which are also tabled in parliament.
7) In terms of donor practices, there is a good working relationship between donors and government in addressing development issues.

The weaknesses of the public finance management system include:

1) There seems to be a lack of willingness to live within the budget (lack of expenditure restraint) in recent years and an over-use of supplementary appropriations added to the budget.
2) Data recorded in the budget for both revenue and expenditure have been limited to estimates rather than actual, while oversight and monitoring of the finances of sub-national governments are not properly monitored and reported.
3) Forward projections of ministries and programme allocations, used as a basis for expenditure ceilings, are not published in the budget as part of the medium-term fiscal framework, which limits debate on resource allocation.
4) The procurement system contains little formal guidance at present and will require a government-wide policy and regulatory framework for procurement.
5) Monitoring of the government's financial position is often affected by late (in excess of four months) submission of bank reconciliations.
6) Budget execution is affected by lack of regular in-year reporting against the budget.
7) There is a lack of systematic follow-up of audit recommendations, many of which remain outstanding from year to year.
8) Information flows between donors and the government tend to revolve around the aid programming cycles of donors, rather than budget cycles of the government, and the use of national procedures in the delivery of aid is low and confined mainly to aid provided as direct budget support.

Support is being provided by the Pacific Technical Financial Assistance Centre[4] for the development of national accounts and balance of payments statistics (improving government financial statistics) and the development of a public finance management roadmap based on the 2011 PEFA assessment.

Donor support

Tuvalu relies heavily on international donor assistance, accounting for approximately 63% of the 2008 recurrent budget. ROC-Taiwan and Japan are the major donors for capital investment projects. Australia, New Zealand and the European Union are also significant aid providers.

Australia's aid programme is currently guided by the Tuvalu-Australia Pacific Partnership for Development (signed August 2009), which focuses on the prudent management of the country's limited resources to support Tuvalu's economic prospects and achievement of Te Kakeega II: National Strategy for Sustainable Development 2005–2015 and the Millennium

[4] The Pacific Financial Technical Assistance Centre is an office of the International Monetary Fund that is responsible for providing technical assistance and training to Pacific Island Countries. It is a collaborative venture between the International Monetary Fund, the recipient countries, and bilateral and multilateral donors.

Development Goals (including improved delivery of essential health and education services and development of private sector activity). Priorities of the partnership include stronger public financial management of Tuvalu's limited economic resources, which includes: (a) continued annual financial support to the Tuvalu Trust Fund; (b) performance-linked budget support to the Consolidated Investment Fund linked to reform; (c) targeted in-line advisers in key, central economic and oversight institutions and (d) a medium-term expenditure framework for the health and education sectors.

Major donor/external assistance in recent years includes: (a) a power plant on Funafuti (AUD 11 million in 2006), (b) a new wharf at Funafuti (AUD 10 million in 2008), and (c) the proposed upgrade of Vaiaku Lagi Hotel (AUD 3 million). While support from ROC-Taiwan and the Government of Japan focuses on capital investment projects, other donors, including the EU, AusAID and NZAid provide significant aid for other sectors.

RESPONSE TO CLIMATE CHANGE

Current and future climate

Current climate

The climate of Tuvalu is tropical and marine. The mean air temperature is 28°C, with a mean maximum of 31°C and a mean minimum of 25°C. The mean rainfall ranges from 2,300 mm to 3,700 mm annually. Climate variability and extremes, in particular the El Niño-Southern Oscillation and tropical cyclones, are important features of the Tuvaluan climate.

Expected future climate[v]

Projected increases in rainfall are consistent with the expected intensification of the South Pacific Convergence Zone, Intertropical Convergence Zone and the West Pacific monsoon. However, not all model results show consistent results giving rise to some uncertainly in rainfall projections. Less frequent droughts are projected for Tuvalu over this century.

Projections of sea-level rise under the high emissions scenario (A2) indicate that by 2030 Tuvalu will experience sea-level rise in the range of 7 cm to 27 cm. Ocean acidification is likely to continue throughout the current century in waters around the Tuvalu region.

Table 2: Climate change projections for Tuvalu 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	+0.4 to +1.0^{o}C	+1.1 to +1.7^{o}C	High
Maximum temperature (1 in 20 year event)	More very hot days	NA	+1.0 to +2.0^{o}C	Low
Minimum temperature (1 in 20 year event)	Fewer cool nights	NA	–0.2 to +3.2^{o}C	Low
Annual total	Annual rainfall			

Climate Variable	Expected Change	Projected Change by 2030 (A2)	Projected Change 2055 (A2)	Confidence Level
rainfall (%)	will increase	–16 to +18%	–13 to +19%	Low
Wet season rainfall (%)	Wet season rainfall will increase	–14 to +20%	–10 to +20%	Moderate
Dry season rainfall (%)	Dry season rainfall will increase	–20 to +24%	–26 to +28%	Low
Sea surface temperature (^{o}C)	Sea surface temperature will increase	+0.2 to +1.0^{o}C	+0.9 to +1.7^{o}C	High
Annual maximum acidification (aragonite saturation)	Ocean acidification will continue to increase	+3.3 +3.5 Ωar	+2.9 to +3.1 Ωar	Moderate
Mean sea level (cm)	Sea level will continue to rise	+7 to +27cm	+12 to +50cm	Moderate

Institutional arrangements for climate change

All climate change programmes, projects and activities are being coordinated and implemented through the Department of Environment in the Ministry of Foreign Affairs, Trades, Labour, Environment and Tourism. The Department of Environment has two full-time staff who carry out tasks/activities relating to climate change in the country, such as the preparation of climate change enabling activities, e.g. the Second National Communication and the National Adaptation Programme of Action (NAPA). The Department of Environment also serves as a secretariat for the National Climate Change Committee.

The Department of Environment has been responsible for coordinating and implementing a number of climate change-related projects, programmes and activities since the entry into force of the United Nations Framework Convention on Climate Change (UNFCCC).

Ongoing climate change adaptation activities:

Title and Timeframe	Description, country focus and agencies responsible
South Pacific Sea-Level and Climate Monitoring Project *Ongoing*	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 Tuvalu station being installed in 1993. Ongoing training and capacity building provided to Tuvalu experts.
Pacific-Australia Climate Change Science and Adaptation Planning project *Ongoing,* 2012–2013.	Supporting the Government of Tuvalu to develop improved climate change projections and adaptation planning activities. Tuvalu and 14 other Pacific island countries are part of this AUD 32 million project.

Title and Timeframe	Description, country focus and agencies responsible
Second national communication under the UNFCCC. *Ongoing,* 2009–2012.	Tuvalu is currently preparing its second national communication to the UNFCCC. Through improved identification of national circumstances, government agencies and others that will increase their abilities to insulate at risk urban and rural populations from the adverse effects of climate change. *USD 405,000.*
Pacific Adaptation to Climate Change Project *Ongoing,* 2009–2013.	Multi-country regional project focusing on water resources management implemented by UNDP and executed through SPREP. USD 500,000.
SPC–GIZ and the Secretariat of the Pacific Regional Environment Programme. 2012-2016	Development of climate change policy and the joint national action plan for climate change adaptation and disaster risk reduction, with technical assistance.
Global Climate Change Alliance: Pacific Small Island States project *Ongoing,* 2012–2015.	Supporting the Government of Tuvalu to mainstream climate change into national and sector strategies (including sector budget support) and to implement specific adaptation actions into the nationally selected sector of Agriculture. Key results of the adaptation project will include introducing fast-growing and climate-ready crops in Funafuti and selected outer islands in order to enhance food security. Climate resilient crops are crop varieties that show tolerance to high temperatures, drought, salt, and water-logging. The project will focus on root crops including cassava, sweet potato and yams that are not traditionally grow in Tuvalu..
Integrated water resources management *(IWRM) Ongoing*, 2009–2013	Supporting the development of water sector plans and introduction of dry sanitation i.e. “EcoSan for Tuvalu” has strengthened arrangements for improved wastewater management and mainstreamed IWRM into National Policy. The project has successfully shared sanitation solutions with other Pacific countries. Key project results include: successful design and replication of sanitation solutions; successful engagement of Tuvaluan communities and government; development of a National IWRM Policy and Indicator Framework; reduction in sewage pollution across Funafuti and a reduction in freshwater use for sanitation uses.
Increasing Resilience of Coastal Areas and Community Settlements to Climate Change in Tuvalu	Project on climate change agreed to by the Government of Tuvalu and the United Nations Development Programme will address the country’s increasing climate change-related threats, particularly to its highly vulnerable, low-lying atoll island communities. This project is based on Tuvalu’s NAPA priorities.
Coping with Climate Change in the Pacific Island Region (CCCPIR) –	Support to Tuvalu to strengthen the competence and capabilities of the local population and government authorities to cope with the adverse impacts of climate change.

Title and Timeframe	Description, country focus and agencies responsible
SPC/GIZ *Ongoing*, 2009–2015.	
University of the South Pacific-EU Global Climate Change Alliance *Ongoing,* 2011-2014.	Project addresses the challenges of climate change impacts in the 15 Pacific ACP countries, including Tuvalu, through capacity building, 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.
Establishing nurseries in Tuvalu to support conservation and distribution of staple food crops and climate ready diversity, AusAID, *Ongoing,* 2011-2014.	A bilateral agriculture project currently being implemented in two outer islands (Vaitupu and Nukulaelae). This project is establishing nurseries to grow pulaka and other 'climate ready' plant varieties.

National climate change priorities

Climate change issues and concerns are mainly addressed by project-based activities with close linkages to the policy framework provided by the Te Kakeega II: National Strategy for Sustainable Development 2005–2015.

A number of issues are of particular concern to Tuvalu in the context of future changes in climate:[vi]

1) Coastal erosion and infrastructure development – an increase in population and the growth in demand for permanent housing and infrastructure on Funafuti has resulted in an increased demand for sand and gravel for building and construction purposes. The sourcing of aggregate from coastal environments may increase the risk of coastal erosion, flooding and environmental damage in the future, especially as much of the land in Tuvalu is already low-lying and vulnerable to erosion
2) Housing, land availability and population growth – land limitation has become a problem due to a rapid increase in population on Funafuti.
3) Food and health – The overall population has changed their diet from traditional food to imported food. Funafuti depends more on imported food due to population pressure and limitation of land for subsistence farming. This has led to an increase in lifestyle diseases.
4) Agriculture- The porous and sandy soil of Tuvalu already has limited fertility, and supports a narrow range of crops, making the agriculture sector vulnerable to climatic changes. For example, saltwater intrusion due to erosion, coupled with drought, has recently damaged the majority of the pulaka pits on Funafuti, and has affected the subsistence farming economy.
5) Growth of cash economy – The development of a cash economy in Tuvalu is increasing the material expectations and aspirations of the people. Subsistence activities, sharing and reciprocity within the extended family and the community are

common features of Tuvaluan traditional life, but today people are increasingly participating in the cash economy.

6) Pollution from solid and liquid waste – Poorly controlled waste disposal is still commonplace throughout Tuvalu. Inadequate disposal management methods associated with land-use are common on Funafuti. These practices are contributing to increased health risks and environmental degradation, especially for marine ecosystems..
7) Marine resources – The exploitation of marine resources is increasing due to population pressure. This is mostly happening in the capital, Funafuti. The establishment of the Funafuti conservation area has been a response to this growing pressure on marine resources.
8) Water supply – Water supply is fairly adequate except during dry spells. Then there can be a problem on Funafuti, because of the population pressure. Tuvaluans are presently well-adapted to the limited land resources and variable climate of their atoll environments.

A number of adaptation options have been identified by a vulnerability and adaptation assessment conducted during the preparation of the initial national communication. The National Adaptation Programme of Action (NAPA)also identified urgent and immediate needs for adaptation in Tuvalu. Both the initial national communication and the NAPA processes identified water resources as the key vulnerable sector in the country. Other key vulnerabilities include agriculture, coastal areas and resources, fisheries, and human health. All of these sectors will require urgent and immediate action (as highlighted in the NAPA):

1) Coastal – increasing resilience of coastal areas and settlements to climate change
2) Agriculture – increasing subsistence pit grown *pulaka* productivity through introduction of a salt tolerant *pulaka* species
3) Water – adaptation to frequent water shortages through increasing household water capacity, water collection accessories, and water conservation techniques
4) Health – protecting community health through control of vector borne/climate sensitive diseases and promoting community access to quality potable water
5) Fisheries – strengthening community-based conservation programmes on highly vulnerable near-shore marine ecosystems
6) Disaster – strengthening community disaster preparedness and response potential
7) Fisheries – adaptation to near-shore coastal shellfish fisheries resources and coral reef ecosystem productivity

The first three priorities listed above are currently being implemented in Tuvalu with financial support from the Least Developed Countries Fund. Priorities 4–7 have not been implemented as yet, although funding is being sought from various sources to support implementation. Tuvalu is eligible for up to USD 7 million from the Adaptation Fund Board to support adaptation implementation. Plans are now under way to access this fund with assistance from the United Nations Development Programme.

With regard to water resources management, a number of adaptation options are currently being implemented with the support of bilateral donors such as AusAID and the European Union:

1) expansion of rainwater collection schemes
2) dry sanitation systems
3) coastal management and protection
4) desalination
5) importation of water.

Other adaptation priorities identified during the consultations include:

1) legislation to guide and manage Tuvalu meteorological services and improve the quality of management system in its operations;
2) strengthening and building capacity and capability for managing climate information;
3) development of appropriate and sustainable coastal protection for densely developed areas of Fongafale Island, Funafuti;
4) development and implementation of appropriate adaptation measures for protecting coastal systems and preventing saltwater intrusion into agricultural fields and freshwater lenses on the outer islands of Tuvalu;
5) development of a sound land use policy to facilitate better land management;
6) higher resolution modelling, such as LIDAR technology, for both terrestrial relief and bathymetry of islands, and develop a GIS system to facilitate better management of land resources;
7) capacity building to better understand the adverse impacts of climate change;
8) a greater level of financial and technical support for community-based adaptation programmes on a sustainable basis;
9) complete engagement of non-governmental organisations, community-based organisations and civil society organisations in implementing adaptation programmes at the community and island level.

SPC GCCA: PSIS Project Focus:

The SPC GCCA: PSIS project in Tuvalu will aim to improve access to a variety of fast-growing and climate resilient crops, including cassava, sweet potato and yams.Climate resilient crops are crop varieties that show tolerance to high temperatures, drought, salt, and water-logging. Farming and land-clearing equipment will be required to prepare the soils for the planting of the “new” non-traditional crops as well as planting of traditional crops including breadfruit, bananas, coconuts and pandanus. A nursery will also be constructed and supplied with farming equipment in order to cultivate the climate ready crops and to train local farmers. Training in the cultivation and usage of the non-traditional crops will be a key component of the project, and will focus on women.

Key challenges

Priority needs for adaptation to climate change have been outlined in the National Adaptation Programme of Action and national communications under the UNFCCC. Since 1999 Tuvalu 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.

Food and water security are a primary concern due to predicted sea level rise and irregular rainfall patterns. Coastal erosion has been prioritized under Tuvalu's NAPA, and coastal protection measures may be required to protect the land area, especially in Funafuti. Waste management is also major concern and climate change is deemed to exacerbate current waste management and health issues. There is concern that unmanaged waste could encourage mosquito breeding, leading to dengue fever as well as other pollution-related health issues. Regulating and responding to such environmental health issues as a result of changes in climate is likely to require improved health sector capacity.

Capacity constraints are also of general concern, as there is lack of highly skilled personnel, in permanent positions, to take on the task of understanding and 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. A focus on increasing awareness and preventing climate related disasters in the rural islands is of particular importance.

Given that many of climate change activities implemented in Tuvalu are project based, with 3-5 year time frames, the results and outcomes may not always be sustainable. 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 Tuvalu 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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