GOVERNMENT OF TONGA

JOINT NATIONAL ACTION PLAN 2 ON CLIMATE CHANGE AND DISASTER RISK MANAGEMENT

2018 - 2028

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JOINT NATIONAL ACTION PLAN 2 ON CLIMATE CHANGE AND DISASTER RISK MANAGEMENT (JNAP 2) 2018-2028

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Foreword

It is well documented that Tonga is highly exposed to multiple natural hazards and the effects of climate change. Our island home is also exposed to a range of domestic environmental, social and economic vulnerabilities. Climate change further exacerbates these vulnerabilities. Recently, we experienced limited economic opportunities, mostly from agriculture and fishing, high climate variability, and an increasing trend of drought, sea-level rise, temperature increases, changing patterns of precipitation and more severe tropical cyclones.

The Tonga Strategic Development Framework 2015-2025 prioritises 'resilience development' as one of the key national objectives underpinning sustainable development. The Framework called for a 'whole of country' integrated approach to climate change and disaster risk management. These must be considered in every level of development planning and in the execution of programs, projects and activities.

In 2010, the Government of Tonga endorsed its first Joint National Action Plan for Climate Change Adaptation and Disaster Risk Management (JNAP 1), the first in the Pacific island region. JNAP 1 emphasized the need to build climate resilience and to work collaboratively across government and society to combat climate change and reduce the risk of disasters. Such a joint approach, with an emphasis on building climate resilience, makes a lot of sense for a small Pacific island nation, such as Tonga at risk. Climate change and disaster risk management are 'cross cutting' themes, impacting every aspect of Tonga's development. In November, 2015, Tonga submitted its Intended Nationally Determined Contribution, INDC, (more recently called 'NDC') to the Secretariat of the United Nations Convention on Climate Change (UNFCCC). The NDC details Tonga's commitment to reducing greenhouse gas emissions and increasing investment in climate resilience.

The Tonga Climate Change Policy (2016) established a framework for climate action and a policy goal, for a 'Resilient Tonga' by 2035. The policy reinforces the need for an integrated approach to 'mainstreaming' climate change mitigation, adaptation and disaster risk management; an approach that requires multi-sector and cluster coordination and cooperation. The JNAP 2 aligns with this policy.

The second JNAP is the strategic action plan for climate change and disaster risk management initiatives for the next 10 years. JNAP 2 is consistent with the Tonga Strategic Development Framework (TSDF) and the Sustainable Development Goals (SDGs). It also recognises the importance and critical role of political leadership and commitment, and the role of government agencies as key actors and further embraces the role of the private sector and civil society towards building resilience in Tonga. There will also be existing and unforeseen challenges to achieving and maintaining the resilience of development outcomes in Tonga. These include, but are not limited to, addressing loss and damage associated with the adverse effects of climate change, extreme weather events and slow onset events. JNAP 2, in this context, has opportunities for reviews and, through its monitoring, evaluation and learning (MEL) framework, emerging issues and additional strategic actions could be considered and adopted.

The driving force and enabling structure for achieving resiliency in Tonga are also to be triggered and supported by strengthened data and information management; relevant climate and disaster risk research; appropriate

leadership, management and technical capacitances of government staff, civil society, NGO's and communities to take climate change action.

I wish to acknowledge with gratitude the financial support of the European Union (EU), Ministry of Economic Cooperation (BMZ) of the Federal Republic of Germany and the Deutsche Gesellschaft fuer International Zusammenarebeit (GIZ), GEF-UNDP "National Adaptation Plan Global Support Programme" (NAP-GSP), USAID Climate Ready Project and GCF Readiness and Preparatory Support Programme with the development of this JNAP 2.

I would also like to extend my sincere thanks to the team from the Department of Climate Change, MEIDECC, for their efforts in facilitating the development of this plan; also to the JNAP Task Force and all of the national stakeholders who have contributed to the synthesis of JNAP 2.

I look forward to the on-going support and assistance from all stakeholders, both within Tonga and regionally as well as internationally, in helping us to build a Resilient Tonga.

As the Minister for Climate Change, I have the honour to present JNAP 2 for its timely implementation.

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HONOURABLE POASI TEI

Minister for Climate Change
Meteorology, Energy, Information, Disaster Management, Climate Change and Communications (MEIDECC), TONGA.

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List of Abbreviations and Acronyms

CCSCP	Climate Change Standing Committee in Parliament
CRSP	Climate Resilience Sector Project
CCCPIR	Coping with Climate Change in the Pacific Islands Region
CSIRO	The Commonwealth Scientific and Industrial Research Organization
°C	Degree Celsius
DSIR	Department of Scientific and Industrial Research
EC	Electrical conductivity
EIA	Environment Impacts Assessment
ENSO	El Nino Southern Oscillation
FAO	Food and Agriculture Organization of the United Nations
FRDP	Framework for Resilient Development in the Pacific
GCF	Green Climate Fund
HDI	Human Development Index
HIES	Household Income and Expenditure Survey
JNAP	Joint National Action Plan for Climate Change and Disaster Risk Management
LIDAR	Light Detection and Ranging
MAFFF	Ministry of Agriculture, Food, Fisheries and Forestry
MDA	Ministries, Departments and Agencies
MEIDECC	Ministry of Meteorology, Energy, Information, Disaster Management, Climate Change and Communications
MEL	Monitoring, Evaluation and Learning
MFNP	Ministry of Finance and National Planning
MIA	Ministry of Internal Affairs
MLNR	Ministry of Lands and Natural Resources
mm	Millimeter
MORDI	Mainstreaming of Rural Development Innovation
NBSAP	National Biodiversity Strategy and Action Plan
NCCCC	National Climate Change Coordinating Committee
NEMC	National Emergency Management Committee
NGO	Non-Governmental Organization
PACC	Project and Aid Coordinating Committee
PACCSAP	Pacific-Australia Climate Change Science Adaptation Planning program
SDGs	Sustainable Development Goals
SAMOA	Small Islands Developing States (SIDS) Accelerated Modalities Of Action
SMART	Specific, Measurable, Achievable, Realistic and Time-bound
SPCZ	South Pacific Convergence Zone
SPDB	South Pacific Business Development
SPREP	Secretariat of the Pacific Regional Environmental Programme
TERM	Tonga Energy Road Map
TMS	Tonga Meteorological Service
TSDF	Tonga Strategic Development Framework
TSNC	Tonga Second National Communication
TWB	Tonga Water Board
UNFCCC	United Nations Framework Convention on Climate Change

Executive Summary

In 2010, Tonga developed its first Joint National Action Plan on Climate Change Adaptation and Disaster Risk Management (JNAP 1). This was a first for the Pacific Islands region. It makes a lot of sense for Tonga to continue an integrated approach to address climate change and natural disasters. Tonga's high exposure to both is reflected in the fact that Tonga is ranked as one of the most at risk countries in the world according to the annual 2016 World Risk Report. Additionally as a small Pacific island nation with limited human and financial resources, Tonga needs to be as efficient as possible in the development and implementation of responses.

The first JNAP therefore provided a strong platform, which has proven to be very successful in attracting donor support in the development and implementation of projects aimed at building resilience both in Climate Change and natural disasters (Annex 3). However, there is room for improvement and still much work to be done.

An important recent development was the revised Tonga Climate Change Policy, which was approved by Cabinet in February 2016. A key requirement in the formulation of this policy was to ensure alignment with the new JNAP 2. In essence the JNAP 2 is aimed at achieving the Mission and Goals of the Tonga Climate Change Policy. The Mission of the policy and for the JNAP 2 is: ***To develop a resilient Tonga through an inclusive, participatory approach that is based on good governance, builds knowledgeable, proactive communities and supports a strong, sustainable development pathway.***

The goal of the policy, and for JNAP 2 is: ***To achieve the vision of a Resilient Tonga by 2035. This will be realised through the achievement of specific targets.***

To achieve this goal the policy lays out a strategic 'whole of Tonga' approach, which recognises that climate change is the single biggest issue that will determine the future of Tonga over the coming decades. Climate change is already occurring in Tonga, through both sea level rise and changes in climate. This is reflected in the intensity of extreme weather events.

In a practical sense, the policy objectives become the objectives of the JNAP 2 which are:

i. Mainstreaming for a Resilient Tonga
ii. Implement a Coordinated Approach to Research, Monitoring and Management of Data and Information
iii. Resilience-building response capacity
iv. Resilience Building Actions
v. Finance
vi. Regional and International Cooperation

[1] UNU-EHS, 2016. World Risk Report 2016.

[2] Note that the JNAP 2 explicitly covers Climate Change Adaptation (CCA) and Disaster Risk Management (DRM). The latter also covers disaster preparedness, response and recovery which are addressed separately by Tonga's National Emergency Management Plan

These six objectives have been developed in JNAP 2 to form a coherent, strategically focused, 'whole of Tonga' approach to building resilience over the next decade. This approach aligns strongly with the Framework for Resilient Development in the Pacific (FRDP) and with international agreements and frameworks, including the Paris Agreement under the United Nations Framework Convention on Climate Change (UNFCCC), the Sendai Framework, the Montreal Protocol, and the Sustainable Development Goals (SDGs) as well as the SAMOA Pathway. A key element of the 'whole of Tonga' strategic approach is the strong focus on development of sector, cluster, community and outer islands' resilient plans that fully integrate climate resilience and practical on-the-ground adaptation, reduction of greenhouse gases and disaster risk reduction. The focus is to ensure all plans are aligned with the targets for a Resilient Tonga by 2035.

Development of these plans will then allow for a coherent, cooperative, and strategic approach to identify and develop resilience building actions. This work will be supported by strengthened information, data, research and comprehensive capacity building; improved, streamlined, mechanisms for accessing finance to support all identified activities resulting in a cross-cutting programme, as presented in the Tonga Climate Change Policy, along with on-going regional and international engagement and cooperation. Furthermore, the sub-objectives of the Climate Change Policy form the basis for the JNAP 2 activities which will be specific, measurable, achievable, realistic and time-bound (SMART), guided by the long-term targets presented in this policy.

The implementation of the JNAP 2 will be supported by a strengthened JNAP Secretariat that will be established at the Department of Climate Change (DCC). The department will have a clear and strong emphasis on monitoring and evaluation, and a clearly defined role for the JNAP Taskforce in support of the Secretariat. The time frame for completion of the JNAP 2 is 10 years, from 2018 to 2028. A critical early measure of success will be the completion of all relevant plans with climate resilience, encompassing Climate Change Adaptation (CCA), reduction of greenhouse gases (clean and efficient energy) and Disaster Risk Management (DRM) fully integrated. Successful completion of these plans is vital to further development and implementation of the JNAP 2.

The implementation of the plan as outlined in the Results Framework (Annex 1) will be an iterative process, with progressive additional activities identified through annual reviews of completed sector plans. There will also be at least two formal progress reviews over the 10-year time frame of the JNAP 2.This JNAP 2 can be rightly be considered ambitious in what it is seeking to achieve. However, first and foremost it needs to be recognised and embraced by all as a necessity for Tonga to effectively manage its response to the effects of climate change and associated natural hazards, as well as on-going exposure to geological hazards, over coming decades.

JNAP 2 is structured in the following sections;

Section 1: National Circumstances and climate change vulnerabilities

This section presents the geographical and geological context, key social, economic and environmental sectors and issues in Tonga. These underlying issues are being exacerbated by the unfolding impacts of climate change and disaster risks. Understanding these issues are crucial in developing effective responses to climate change, extreme events, climate variability and geological disasters. Observed and projected climate and impacts on vulnerable sectors in Tonga are also discussed.

Section 2: Lessons learnt from Tonga JNAP 1

This section highlights valuable lessons learnt from the first JNAP (JNAP 1) which lay out the foundation for the development of JNAP 2.

Section 3: Tonga JNAP 2 Development Process

This section describes the process undertaken towards the development of JNAP 2 which include (i) Lessons learnt from JNAP 1 and Tonga Climate Change Policy as foundation for JNAP 2 synthesis (ii) Stakeholders consultations and community engagement (iii) Vulnerability and adaptation assessment.

Section 4: The Tonga JNAP 2

This section provides priorities and actions of JNAP 2 for addressing climate change in Tonga which align to the vision, mission objective and guiding principles of the Tonga Climate Change Policy in achieving a Resilient Tonga by 2035.

Section 5: Implementation Strategy

This section presents responses to identified vulnerabilities and associated effect of climate change and natural disasters, focused towards the goal of a Resilient Tonga by 2035. This is the core of the JNAP 2 and includes a description of the JNAP 2 Objectives, Activities, Results Framework and Indicative Budget.

Section 6: Tonga JNAP 2 linkages to national, regional and international frameworks

This section highlights that JNAP 2 is aligned to the national development framework (TSDF). It is also linked to the regional and international climate change and disaster risk management frameworks (FRDP, UNFCCC, Kyoto Protocol, Paris Agreement, Sendai Framework, Montreal Protocol and the SAMOA pathway).

National Circumstances and Climate Change Vulnerabilities

Section 1: National Circumstances and Climate Change Vulnerabilities

This section provides a succinct insight to the major environmental, social and economic challenges that affect Tonga today. Extreme weather events, increased climate variability, frequent natural disasters and the onset of human-induced Climate Change compound the challenges further. It is these challenges that provide the gravitas and drive behind JNAP 2.

1.1 Geographical and Geological Context

Tonga consist of four main island groups. Tongatapu and ‘Eua in the south, Ha‘apai in the middle, Vava‘u in the north and Niuafo‘ou and Niuatoputapu in the far north (Fig 1).

Tongatapu the main island is a raised coral atoll and is distinctively flat and low lying. Vava‘u is mostly raised coral atolls with some low lying islands whereas Ha‘apai is typically flat with some islets and sand cays. Kao and Tofua are two volcanic islands in the Ha‘apai group. The two Niuas are high volcanic islands surrounded by fringing and barrier reefs similar to ‘Eua which is located northeast of the main island of Tongatapu.

Tonga is the second most vulnerable country in the world (Work Risk Report, 2016). This is due to the combination of several factors such as extreme exposure coupled with its geographical locations and geological characteristics. Tonga is situated at the subduction zone where the Australian and Pacific Tectonic plates meet and where most seismic activities occur. Tonga is also vulnerable to earthquakes and the resultant tsunami waves due to its location within the Pacific Ring of Fire. Tonga also experiences cyclones caused by warm, seawater temperatures and is frequently visited by tropical cyclones during November to April each year.

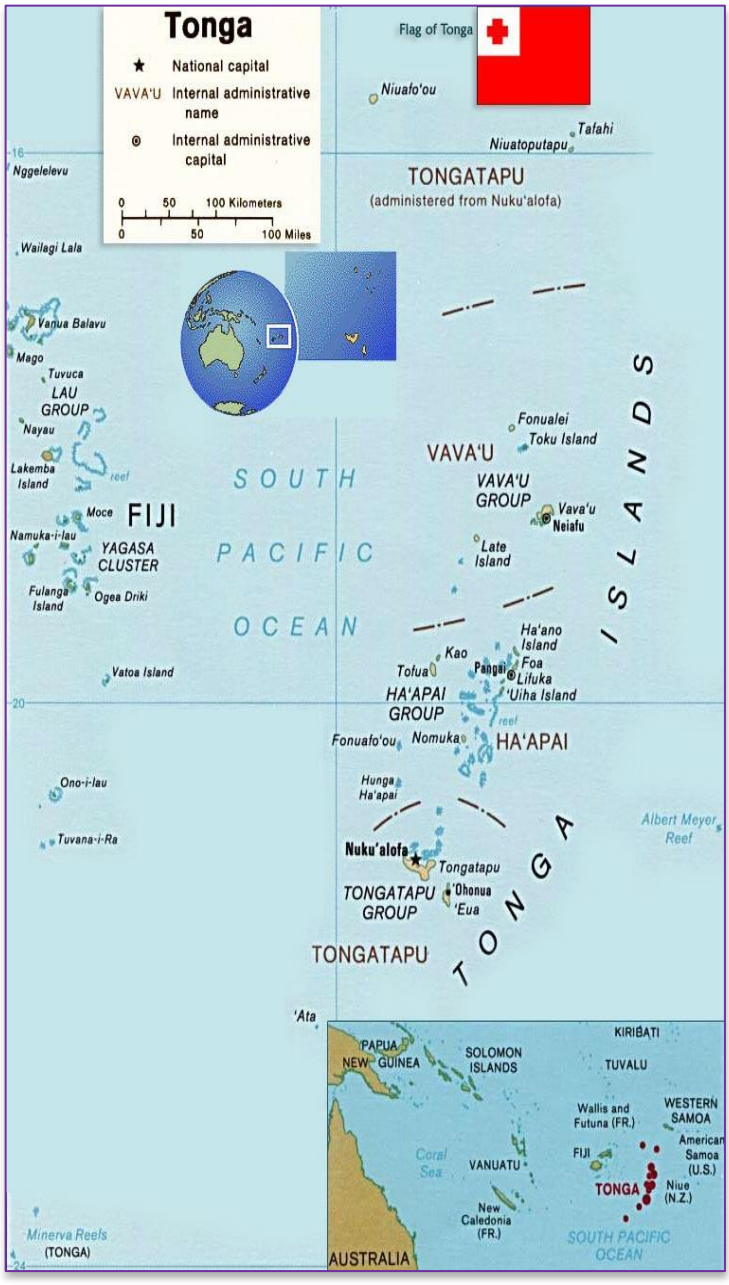


Figure 1: *Map of Tonga.*

Source: *Geographic Guide*

1.2 Observed and Historical Climate Trend in Tonga

Tonga has a tropical climate throughout the year reflecting its position within the southeast trade wind zone of the South Pacific. Tonga has two seasons; the hot-wet season from November to April and the dry season from May to October. The historical and observed climatic trends for Tonga include temperature, rainfall, El Nino Southern Oscillation/ENSO, sea level rise and tropical cyclone.

1.2.1 Temperature

a) Air temperature: Observed air temperature varies throughout the Islands archipelago. Mean annual temperatures vary from 27◦C in Niuafo'ou and Niuatoputapu to 24◦C in Tongatapu. In Fua'amotu station temperatures have increased at a rate of over 0.32◦C/decade since 1980 (Fig 2). A similar trend of increase temperatures was observed in all the main islands of Tonga.

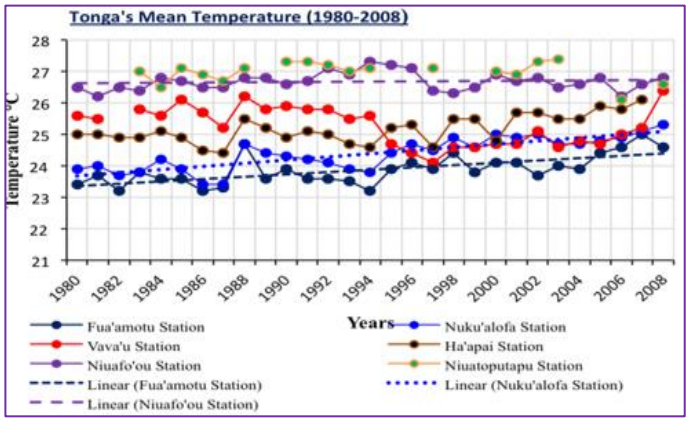


Figure 2: *Decadal Maximum Temperature, Nuku'alofa, 1980 – 2013.*

Source: *Tonga Meteorology Report 2017.*

b) Sea temperature: The sea temperature remained relatively constant between 1993 and 2015 (Fig 3). In Nuku'alofa, the sea level monitoring station detected only a slight increase in temperature in the order of 0.0004 °C/yr over a 22 years period (TMS Report, 2017).

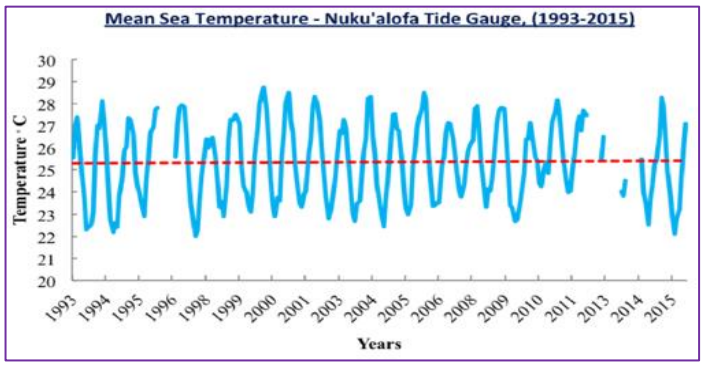


Figure 3: *Yearly Sea Temperature in Nuku'alofa, (1993-2015).*

Source: *Tonga Meteorology Report 2017.*

1.2.2 Rainfall

Tonga's rainfall is seasonal with almost two thirds of its annual rainfall occurring during the summer, cyclone season (November - April). Between 1947 and 2017, the mean annual rainfall for Tongatapu was 1721 mm, Vava'u (2150 mm), Niuatoputapu (2374 mm), Niuafo'ou (2453 mm) and Ha'apai (1619 mm). Figure 4 shows Tonga's Annual Rainfall from 1980-2013. The graph shows a lot of annual variability from year to year with an overall increasing trend. One possible explanation for this is that the South Pacific Convergence Zone (SPCZ) is slowly moving north (TMS Report, 2017 & Tonga TNC Report, 2018).

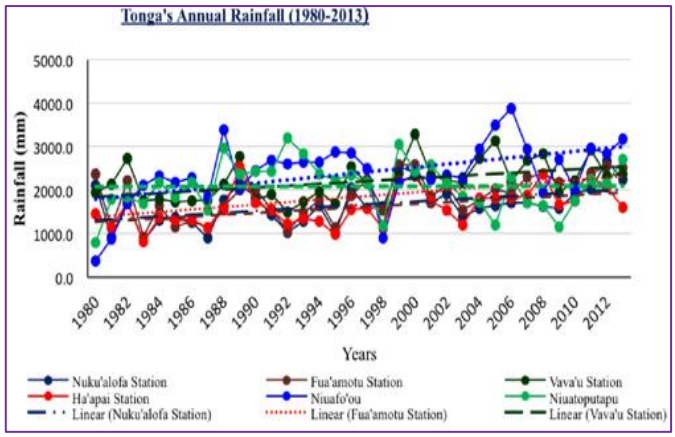


Figure 4: *Tonga's Annual Rainfall, (1980-2013).*

Source: *Tonga Meteorology Report 2017.*

1.2.3 El Nino-Southern Oscillation

The El Niño Southern Oscillation (ENSO) is an irregularly periodical variation in winds and sea surface temperatures over the tropical eastern Pacific Ocean. ENSO affects much of the tropics and subtropics. The warming phase is known as El Niño whereas the cooling phase is La Niña. ENSO is associated with large year to year changes in the risks of drought, flood, tropical cyclones and coral bleaching throughout the Pacific region, including Tonga. Consequently, ENSO has significant impacts on Tonga's agriculture, ecosystems, water resources, and health and disaster management.

1. ENSO effects on rainfall regime.

Plate 1: Flood Scenes, Nuku'alofa, 2017.

Image by: *National Emergency Management Office*

Plate 2: Flood Scenes, Nuku'alofa, 2018.

Image by: *National Emergency Management Office*

Rainfall is reduced significantly in Tonga during the El Nino summer periodically causing severe drought. Conversely, rainfall in Tonga during the La Nina summer can increase up to 3 times the monthly average rainfall and thus cause severe flooding (**Plates 1 and 2**). During Tonga's 2015 El Nino driven drought event for example, the annual rainfall in Tongatapu was 1201 mm, Ha'apai (1346 mm), Niuatoputapu (1861 mm) and Niuafo'ou (1763 mm).

2. ENSO effects on tropical cyclone regime.

From 1970-2015, a total of 73 cyclones passed through Tonga waters (Fig 5) of which 24 cyclones (32%) were recorded severe as they passed part of Tonga's boundary or 15 S 177 W, 15 S 173 W, 23.5 S 173 W, 23.5 S 177 W (TMS Report, 2017).

Tropical cyclones in Tonga are most frequent in El Niño years (1.64 cyclones per season) and less frequent in La Niña (1.58) and ENSO-neutral years (1.63 cyclones per decade). For severe tropical cyclones that affect Tonga, data shows that the highest number occurs in ENSO years (0.6) and then La Nina and 'Neutral' years follow on 0.5/year respectively.

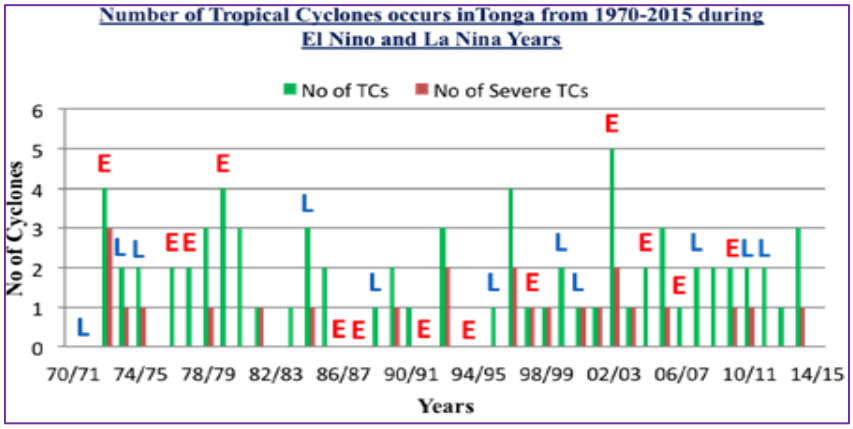


Figure 5: *Number of Tropical Cyclones occurs in Tonga, (1970-2015)*
Source: *Tonga's National Communication Report 2017*

[3] Tonga National Meteorological Services (2015)

3. El Nino and Air Temperature.

During El Nino, the night time temperature particularly during the winter months is cooler than normal whereas in summer, it is hotter than normal.

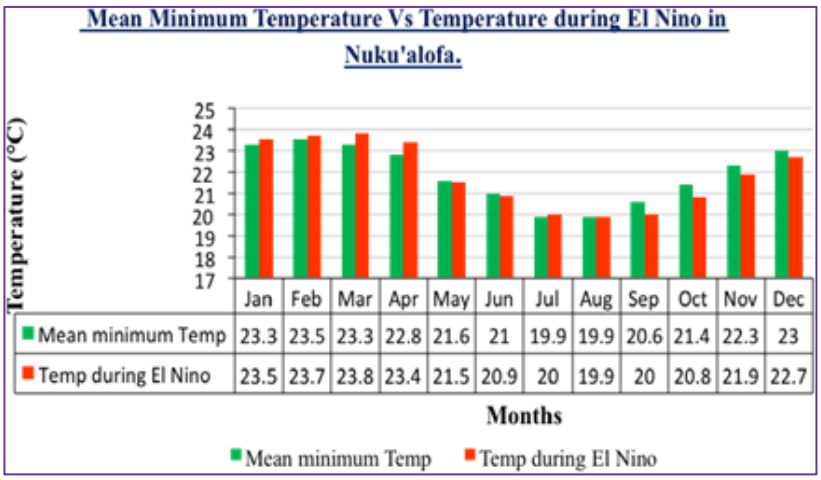


***Figure 6**: Mean Minimum Temperature Vs Temperature during El Nino in Nuku'alofa*

***Source:** Tonga's National Communication Report 2017*

1.2.4 Sea Level

As of December 2015, after accounting for the inverted barometric pressure effect and vertical movements in the observing platform, the net sea level trend in Tonga was +7.3 mm per year (Fig 7) in comparison with the global average sea level rise between 1993 and 2010 of just 3.2 mm/yr (IPCC 2015).

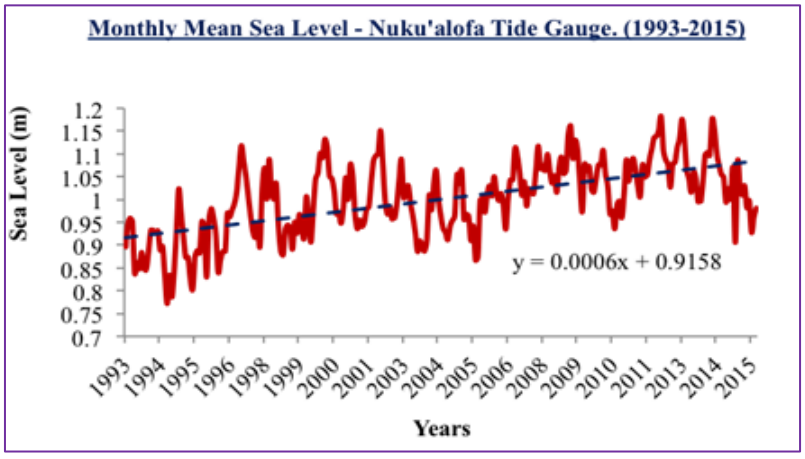


***Figure 7**: Monthly Mean Sea Level in Nuku'alofa, (1993-2015)*

***Source:** Tonga's National Communication Report 2017*

1.3 Social Sector Issues

Tongatapu has the highest population with a total of 75,416 which accounted for 74% of the total population of Tonga, for Vava'u 13,738 (14%), for Ha'apai 6,125 (6%), for 'Eua 4,925 (5%) and 1,232 (1%) for the two Niuas (Fig 8).

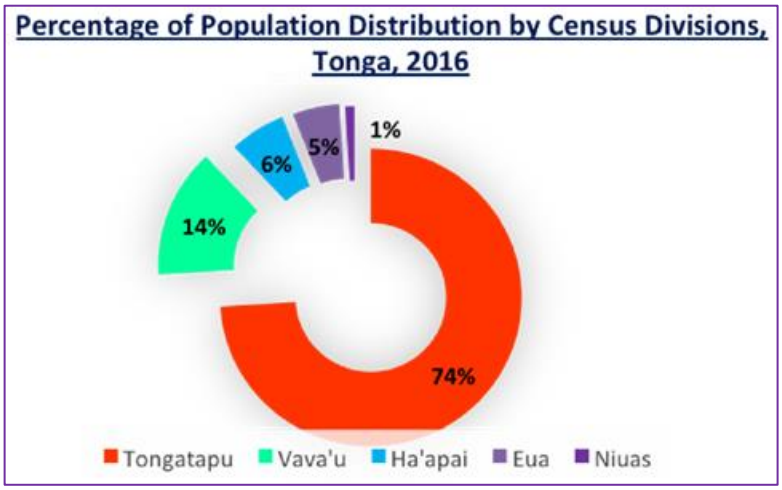


***Figure 8**: Population Distribution in Tonga, 2016*

***Source:** Tonga Census Division 2016*

1.3.1 Population Changes in Tonga

Table 1.1: *Census of population by divisions and changes, 2006-2016*

Years	Divisions	Total number by divisions	No. of Population Change in 10 years (1996-2006) and 5 years (2006-2011 & 2011-2016)	Population Change (%)
2006	**Tonga**	**101991**	**4207**	**4.3**
	Tongatapu	72045	5066	7.6
	Vava'u	15505	-210	-1.3
	Ha'apai	7570	-568	-7.0
	'Eua	5206	-272	5.5
	Two Niuas	1665	-353	17.5
2011	**Tonga**	**103252**	**1261**	**1.2**
	Tongatapu	75416	3371	4.7
	Vava'u	14922	-583	-3.8
	Ha'apai	6616	-954	-12.6
	'Eua	5016	-190	-3.6
	Two Niuas	1282	-383	-23.0
2016	**Tonga**	**100651**	**-2601**	**-2.5**
	Tongatapu	74611	-805	-1.1
	Vava'u	13738	-1184	-7.9
	Ha'apai	6125	-491	-7.4
	'Eua	4945	-71	-1.4
	Two Niuas	1232	-50	-3.9

Source: *Census 2016, Statistics Department.*

Tonga's population grew by 0.4% from 1996-2006, by 1.2% from 2006-2011 and then declined by 2.6% from 2011-2016. This equals a net annual growth rate of 0.5%, or 520 people per year (Table 1.1). Decline in the total population in recent years could partially be attributed to emigration.

The net migration of Tongans from the outer island to Tongatapu, as people seek the conveniences and opportunities that urban life offers, also shapes and reshapes modern Tonga, its culture, economy and relationship to nature.

Plate 3*: Mangrove Destructions, Tongatapu.*

Some consequences include increased human settlement on marginal, low lying and flood-prone lands, reclamation of environmentally sensitive areas, increased fishing pressure adjacent to urban areas, removal of coastal vegetation and mangroves (Plate 3) causing soil loss and coastal erosion, and a general long-term loss of terrestrial and marine habitats and species.

***Plate 4**: Flood Prone Areas of Nuku'alofa*

Settlements in low lying and flood prone areas in Nuku'alofa (Plate 4), for example, are highly vulnerable to flooding and soil loss caused by sea level rise, storm surge, heavy and frequent rainfall and intense tropical cyclones. Soil losses can be readily seen in places like Kolomotu'a, Sopu, Popua and Patangata.

***Plate 5**: Fanga'uta Lagoon Development, Mangrove Loss and Sedimentation since 2010*

Urban migration has inspired extensive land reclamation projects and housing developments along the shores of Fanga'uta Lagoon. This reactive situation has caused severe coastal degradation including sedimentation and pollution of the lagoon and extensive removal of valuable mangrove forests (Plate 5). This has further led to a reduction in valuable marine and coastal habitats and is causing the irreversible loss of biodiversity and ecological services in the affected coastal areas.

***Images by:** Ministry of Lands and Survey*

1.3.2 Education

Tonga's education system is slowly moving towards integrating climate change into the national curriculum; however, there is still considerable work to do in training teachers and resourcing this integration in a systematic way. Targeted donor programs have supported many of the advancements made to climate change education in Tonga to date. These programs have focused on integrating climate change concepts and practices into primary or secondary school syllabuses, and on targeting vulnerable children and communities with climate change information and resources. Further developing 'child-centred' approaches to education generally, and to climate change education specifically, can only be good for Tonga. Child-centred approaches offer a powerful pathway to lifting the knowledge and resilience, not only of children, but also of the entire community.

1.3.3 Gender and Disability

Climate change and disasters affect men, women, children, as well as people with disabilities, the poor and the elderly, in often very different ways. Considerations of gender, disability and vulnerability must be placed at the centre of all planning and climate change, disaster preparedness and response activities. Tonga's National Policy on Gender and Development highlights this fact.

Global statistics indicate that women and children, for example, are 14 times more likely to die from natural disasters than men. Shockingly, 70% of those who died in the 2009 Tsunami in Tonga, for example, were female.

Plate 6: *Tongan Mat Weaving.*

Image by: *Ministry of Internal Affairs Women's Division*

Women make up 42.3% of the formal labour force in Tonga. Women are also very active in the informal sector, constituting the majority of entrepreneurs who are managing small and micro enterprises. Women are active in the production of handicrafts, planting and sale of cash crops, utilization of coastal fisheries and in management of small retail outlets.

In the outer islands of Haʻapai, Vavaʻu and the Niua group, handicrafts (predominantly weaving) make up at least 50% of household income (**Plate 6**). Following natural disasters such as cyclones and droughts, which impact strongly on agriculture, there is greater reliance on handicrafts to sustain them and their families.

Despite this, facilities built in villages for Tonga's famous mat weaving, for example, are underdeveloped, and are often constructed by women's groups with limited resources. Mat weaving is also vulnerable to human impacts and climate change with a slow loss of weaving materials from nature.

Climate-proofing weaving facilities, developing seed banks for replanting materials, ensuring society protects the raw materials that weavers need, and integrating solutions into community resilient development plans are all critical actions needed to address this particular vulnerability.

1.3.4 Health

Dengue fever, Zika virus and Chikungunya are transmitted by Aedes aegypti mosquitoes. With increasing rainfall and increased settlement of Tongans from outer islands to swampy areas of Nukuʻalofa, the spread of dengue fever reached epidemic proportions in 2014 and 2016

While the majority of people in Tonga have access to safe drinking water, this can be compromised during droughts, when water availability becomes limited, particularly in rural areas and outer islands. Saltwater is increasingly contaminating Tonga's freshwater groundwater lenses, particularly on low-lying islands with shallow and thin groundwater lenses.

Plate 7: *Vaiola Hospital, Nuku'alofa*

Image by: *Ministry of Internal Affairs Women's Division*

Rising sea level stands to exacerbate the contamination and increase the impact on communities relying on these groundwater supplies. The protection of health facilities against climate change and disaster impacts throughout Tonga is crucial (Plate 7). There is a need for a systematic evaluation of all health facilities in Tonga to determine their capacities to withstand extreme weather events such as cyclones and to assess costs for developing secure and sustainable water supplies (roof collection into underground tanks), energy independence (solar power systems), and climate proofing of buildings.

1.4 Economic Sector Issues

1.4.1 Agriculture

Table 1.2*: Vulnerable Agricultural Lands in Tonga*

Agricultural/ Vulnerable Land (km^2/%)	Tongatapu	'Eua	Ha'apai	Vava'u	Total	Excluded
Agricultural land (km^2)	254	110	84	83	530	118
Vulnerable land (km^2)	48	27	8	30	113	
Vulnerable land (%)	19	25	10	36	21	

Source: *Ministry of Agriculture, Forestry and Fisheries*

Agriculture forms an integral part of Tonga's economy and culture. Agriculture is primarily a subsistence activity. Most produce is consumed locally. Subsistence crops include yam, taro, sweet potato and cassava. Tonga also maintains a considerable export markets for some species. These include squash pumpkin, vanilla and kava. In 2014, agriculture accounted for 15% of Tonga's Gross Domestic Product (NRBT Report, 2014).

Tonga's agriculture remains vulnerable to the impacts of climate change and natural disasters. Increased weather variability makes farming less predictable. Increasing trends in storm frequency and intensity threaten crops and the intensification of agriculture production in Tonga is only exacerbating this vulnerability. More farmers today strive to maximise yields through use of fertilizers and pesticides and by expanding their plots, clearing land and denuding forests cause extensive soil erosion.

Agricultural lands throughout Tonga that have a slope greater than 15°, or have been planted, are particularly susceptible to soil erosion caused by rain and wind. Erosion is exacerbated by extreme weather events such as cyclones producing high winds, storm surge and intense rainfall. As Table 1.2 shows, the area of vulnerable agricultural land in Tonga, is considerable. In total, 133 square kilometres (km^2) or 21% of Tonga's agricultural land is vulnerable to erosion.

The vulnerability of Tonga's agriculture sector is also exacerbated by an increasing lack of access to arable land. Land shortages are caused by the urban footprint of an expanding population, particularly with significant levels of migration to Tongatapu, but also because of a loss of access to bush allotments. Figure 9 shows that in 2015, nearly 60% of households on Tongatapu, and 40% on Vava'u, nearly 40% on 'Eua and Ha'apai and 20% on the two Niuas did not have bush allotments (Agriculture Census 2015). This places limits on the growth of agricultural production, reduces the flexibility of the agriculture sector to adapt to climate change, and threatens domestic food security.

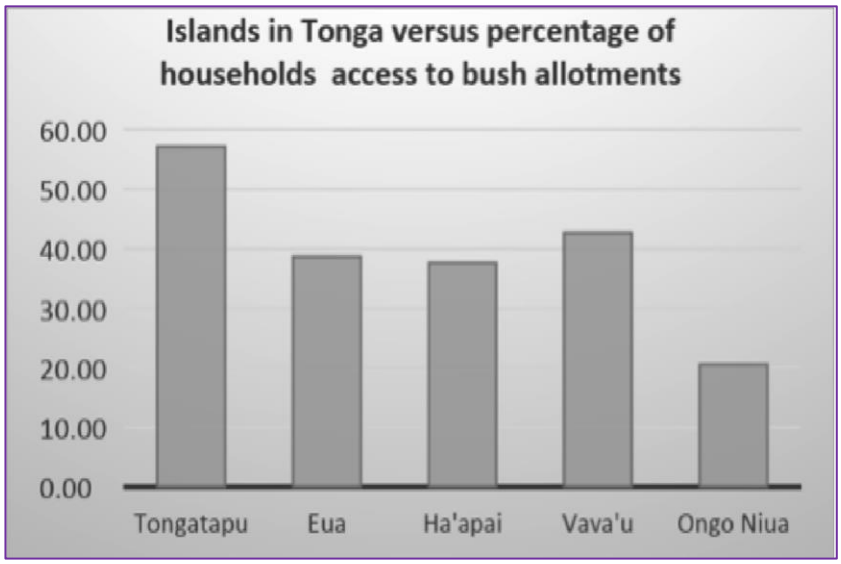


***Figure 9**: Percentage of Tongan Households with Bush Allotments, 2015*

***Source:** Gavin Kenny Report, 2016*

***Plate 8:** Post Cyclone Gita Damage, Nuku'alofa, 2018*

Agricultural production was severely affected by Tropical Cyclone (TC) Renee in 2011, Ian in 2014, and recently by Gita in 2018 (Plate 8). Perennial tree crops, such as coconuts, bananas and breadfruit, as well as root crops were severely damaged. The total costs of damage to agricultural sector as inflicted by TC Renee was TOP $19.4 M, by TC Ian, TOP $20.6 M and by TC Gita, TOP $300 M+ (Tonga TNC Report, 2018, MAFFF Reports, 2011, 2014 & 2018)

***Image by:** National Office of Disaster Management*

Sea level rise poses a growing risk to Tonga's arable land. Tonga has experienced a considerable loss of coastal agricultural land and increased salinity of groundwater lens, with lesser amounts of groundwater available today for irrigation. The total loss of coastal agricultural land from sea level rise has been estimated to be in the order of 43 km^2 or about 8% of the total land area with the higher proportion of 25 km^2 for Tongatapu including Nuku'alofa, Sopu, Fatai soils and 15% for the Ha'apai group (Uoleva soils) including Kauvai Ha'ano, Foa, Lifuka, Uoleva, Ha'afeva, Tungua, Mango. These areas are found to be between 0 – 5 m above mean sea level (Tonga SNC &TNC Report, 2012& 2018).

Drought also affects agriculture in Tonga. The severe droughts of 1983, 1998, 2006 and 2015 have caused stunted growth of annual crops such as squash, vegetables, yams, sweet potatoes, root crops and coconuts. There was also a reduction in number of fruit set and size of fruit trees including breadfruits and coconuts. Yields of most traditional root crops in Tonga, such as taro, yams and cassava, were also drastically reduced. The annual export volume of commercial crops, such as squash and pumpkins, to Japan was also reduced.

During the 1998 drought, the squash export was expected to be in the order of 15,000 metric tons, but was reduced by 52%. In 2014, the target export was 6000 metric tons, but was also drastically reduced, this time by 69% (Tonga TNC Report, 2018).

Table 1.3: *Agricultural Lands in Tonga that are vulnerable to droughts*

Agricultural/ Vulnerable Land (km^2/%)	Tongatapu	'Eua	Ha'apai	Vava'u	Total	Excluded
Agricultural land (km^2)	254	110	84	83	530	118
Vulnerable land (km^2)	125	34	17	32	208	
Vulnerable land (%)	49	31	21	39	39	

Source: *Ministry of Agriculture Report*

Agricultural land vulnerable to drought is estimated to be 208 km^2 or 39%, with a higher proportion for Tongatapu and Vava'u (Table 1.3). This implies that with the effects of climate change, the productivity of these vulnerable areas is severely threatened under current farming practices.

Plate 9: *Diseased Crop leaves, Tonga*

Image by: *Ministry of Agriculture Report*

Climate change will enhance the spread of pests, disease and weeds, placing pressure on crop production in Tonga (Tonga TNC Report, 2018). Increased temperatures, increased rainfall, high humidity and prolong rainy seasons may cause a rise in the prevalence of fungal diseases (Plate 9). 'Anthracnose disease' in yams, 'powder-mildew fungal disease' in squash, 'leaf scab fungal disease', 'mosaic virus', 'silver leaf disease' in cucumber, 'gummy stem blight' in watermelon, 'punchy top virus' in bananas, are examples. The increased Carbon dioxide levels in the atmosphere will also favour the growth of most species of weeds.

1.4.2 Fisheries

The fisheries sector in Tonga remains productive and contributes significantly to Tonga's economy. Both inshore (shallow water and reef) and offshore (oceanic and deep-sea) fisheries contribute to food security, sustenance and income earning of coastal communities and the country of Tonga.

1.4.2.1 Coastal fisheries

Coastal fisheries are at risk to climate change and non-climate change factors. The recent trend in sea temperature warming around Tonga's coastal waters have caused wide spread coral bleaching and increased algae blooms, both which impact on fishery species and, importantly, the complex ecosystems of bays, inlets and coral reefs where they live.

Plate 10: *Red Tide, Neiafu Tahi, Vava'u, 2014*

In December 2014, for example, a prolonged period of drought, associated with warm weather, increased sea surface temperatures and an influx of nutrients, catalysed an extensive 'red tide' algal bloom in Vava'u (Plate 10). Red tides later spread to other places including Ha'apai.

Image by: *National Emergency Management Office Report 2018*

Plate 11*: Soil Run off Tefisi, Vava'u*

When rain falls intensively over a short period, increased overland flow and runoff results (Plates 11 and 12). Runoff laden with sediments is most profound on steep land formations, for example on Tefisi and Vava'u. This runoff increases the amount of freshwater, sediments and pollutants (pesticides and herbicides from farming) that enter coastal waterways. These sediments smother and poison intertidal and subtidal areas, affecting ecosystem health, fisheries productivity and threatening important food sources, especially for those people residing around such areas.

Plate 12*: Heavy Sedimentation Tefisi Vava'u*

Increased sedimentation from erosion coupled with increase sea surface temperature is unfavourable to coral reefs. Coral Reef mortality means loss of habitat for reef species, a reduction in diversity of reef species. When coral reefs are impacted, their ability to produce coral sand for beaches is reduced, as well as their effectiveness at reducing the energy of storm waves approaching the coast. Intense fishing pressure of these shallow water habitats further exacerbates the risk of long term impacts to coastal ecosystems and fisheries.

Image by: *TSNC, 2012*

1.4.2.2 Offshore fisheries

Offshore pelagic (surface) fisheries include tuna, shark, marlin, sailfish, trevally, mahi-mahi and wahoo, for example. These are highly lucrative fisheries, artisanal, charter and commercial, but they are also vulnerable to the pressures of intense fishing (often occurring on the one species population across many national jurisdictions), the trend of warming seas and changing ocean currents. In 2003, for example, tuna catches in Tonga declined due to the effects of El Nino. With the projected sea temperature changing ocean currents variations, catches are expected to change including the projected warm pool moving eastwards which will affect the direction of micro-organisms used as food by the Tuna (IPCC AR 5, 2016).

Offshore deep-sea fisheries for species such as snapper, bream, emperors, perch and sharks, occur over deep reef slopes and on oceanic underwater seamounts. Many deeper water species are long lived, vulnerable to fishing which rely on food chains fed by cold water planktonic upwelling will be affected by climate change.

Plate 13: *Installation of Tracking Device System*

The Ministry of Fisheries has renewed its Tuna Development Management Plan (2015-2017) and developed a Sport Fishing Plan for 2018. In October 2017, the Ministry successfully installed solar powered Pelagic Data System tracking devices on four aquarium fishing boats that will enable fisheries staff to monitor the movements of aquarium fishery boats, to check compliance with local policy and guidelines thus ensuring a sustainable aquarium fisher in Tonga for the future.

Image by: *Ministry of Fisheries, 2018*

Tonga signed the Port State Measures (PSM) agreement in Tongatapu in 2016 aimed at eliminating all illegal, unreported and unregulated (IUU) fishing, through globally agreed minimum standard for concerted action, enabling better inspections and control at the ports and on vessels and strengthened flag state responsibility. In November 2017, Tonga hosted a one week workshop for the Formulation of the National Strategies and action plans to improve compliance with the agreement on PSM. The workshop was attended by members from FAO, FFA, SPC Ministry of Primary Industries, New Zealand and the Government of Tonga.

The amount of research and data collected for pelagic fisheries has improved significantly in recent years, together with work on predicting and forecasting climate change impacts on this sector. There is however, an urgent need for similar investments in research into the nature and extent of human impacts, including climate change, on the survivability of deep-sea species, habitats, particularly with ever-expanding fishing effort being directed into the deep sea.

1.4.3 Remittances

Like many Pacific Island countries, Tonga is challenged economically due to its small size and geographical remoteness. Historically, agriculture and fisheries were the main sources of income. Since the 1960s, remittances have become a significant source of income. With its small economy and high dependence on remittances, Tonga can be susceptible to external shocks. In 2008, during the Global Financial Crisis, there was a significant decrease in remittances to Tongan households.

Subsequently, assistance such as seasonal work schemes has been provided to Tonga by Australia and New Zealand. These schemes have generated significant revenue for Tonga, but it isn't without risks. Social problems are not considered carefully where able bodied men leave their families behind for extended periods. This then affects the ability of families to grow food for themselves and to generate local income. Seasonal schemes are mainly in the fruit picking sector, a sector dependent on appropriate weather and predicable climate patterns.

1.4.4 Energy

There are three main sources of energy in Tonga: Indigenous sources (particularly biomass), renewable energy (e.g. solar photovoltaic) and imported petroleum products. In 2006, indigenous biomass energy accounted for

46.5% and solar energy accounted for 0.2%, while imported petroleum products (e.g. diesel, unleaded fuel, kerosene) accounted for more than half, 53.3% of the total energy supply in Tonga (Tonga SNC Report, 2012).

***Plate 14**: Maama Mai Solar Farm, Vaini*

The energy sector is a major greenhouse gas emitting sector in Tonga. The sector remains highly dependent on imported petroleum products to meet Tonga's growing energy demand. There is a particularly heavy reliance on these imported petroleum products for transport and energy generation, with over 90% of grid-supplied electricity being supplied by diesel-powered generators.

***Image by:** Tonga Power Limited*

Although Tonga's emission are insignificant on a global scale, the impact of the cost of petroleum products on Tonga's economy is very high. Electricity consumers, in particular, have been exposed to high and volatile electricity prices (linked to oil prices) over the last fifteen years. This impact is more acute than in some other larger Pacific Island countries, such as Fiji, as Tonga does not have the potential to offset diesel consumption with an alternative high-energy source, such as hydropower.

Tonga is working to reduce its reliance on oil imports, and to respond to the Paris Agreement to reduce greenhouse gas emissions, targeting a much cleaner energy through its nationally determined contributions (NDC, 2015) and the Climate Change Policy (to achieve a Resilient Tonga by 2035). In 2010, the Government of Tonga released the Tonga Energy Roadmap (TERM), a "ten year road map to reduce Tonga's vulnerability to oil price shocks and increase access to modern energy services in an environmentally sustainable manner". Tonga is committed to reducing its greenhouse gas emissions from the energy sector principally by increasing its utilisation of renewable sources of energy such as solar (Plate 14) and energy efficient technologies. Tonga aims to achieve 50% of electricity generation from renewable sources by 2020 and 70% by 2030. Tonga also plans to improve energy efficiency through reduction of electricity line losses from 18% in 2010 to 9% by 2020.

1.4.5 Infrastructure

Tonga's infrastructure includes airports, road network, all public and private buildings (government offices, business centres, schools, churches, community halls, hospitals, hotels, tourist resorts), power distribution systems, telecommunication systems, wharves and jetties, coastal protection (rock revetment, sand bags revetment, groynes and detach breakwaters), bridges and causeways.

***Plate 15**: Cyclone Gita Damage, Nuku'alofa, 2018*

Most buildings and major infrastructure developments in urban and rural areas throughout Tonga occur on vulnerable, low lying coastal areas that are at risks to climate change (Plate 15).

Image by: *National Emergency Management Office*

Tonga's road and other drainage systems remain underdeveloped and ill-suited to cope with intense and frequent rainfall, or storm surge. The lack of appropriate drainage on some roads in Vava'u, for example, also causes large amounts of sedimentation to flow into coastal waters during heavy rain.

Plate 16*: Drainage Outlet, Neiafu, Vava'u*

Image by: *Johnathan McCue, 2012*

Often storm drains, culverts and other flood mitigation devices are well built but poorly designed or the wrong design selected for the specific need of the site. This drainage outlet in Neiafu, for example, has no sedimentation trap or curtain, thus allowing waste materials and large amounts of sediment from the land to pass through the drain and into coastal waters during storms (Plate 16). Hence Vava'u's Port of Refuge thus becomes muddy and murky, reducing water visibility and damaging the complex nearshore and coral reef communities.

The causeways located near Holeva, Vaipua, Utungake and Pangiamotu were not appropriate for the environment in these areas, or were selected without considering the appropriate level of climate change or disaster risk in mind. Some existing coastal protection systems and causeways in Vava'u (Holeva, Koloa, Pangaimotu, Talihau) and Ha'apai (Foa and Pangai), for example, need to be reassessed, redesigned and climate-proofed. On the outer islands, and in rural areas, the infrastructure is centralised but the communities are dispersed. As communities demand better servicing away from the town centres, governments are faced with an increasing cost and complexity of service provision, not the least being the cost of maintaining this every growing infrastructure network.

Infrastructure development generally, is also hampered by a lack of raw materials, high cost of construction and maintenance, lack of local expertise and skills, lack of compliance with and enforcement of Tonga's Building Code and the Environment Impact Assessment Act (EIA Act 2010).

There remains however, very few buildings in Tonga that are designed to withstand Category 4 and 5 cyclones. Partly for this reason, many buildings in Ha'apai were destroyed by TC Ian, and in Tongatapu and 'Eua, by TC Gita. Incentives are required to ensure compliance with, and enforcement of the Building Code and EIA Act 2010. The development and adoption of infrastructure maintenance and building monitoring mechanisms is critically needed across Tonga's construction and infrastructure sector.

1.5 Environmental Sector Issues

1.5.1 Water Resources

'Eua enjoys a number of fresh water springs (Plate 17). Most other islands in Tonga rely on groundwater lenses for their freshwater supply. Increasing the capacity of islands to collect and store rainwater is an important component of Tonga's water reservoirs. Available water resources throughout Tonga were comprehensively assessed and documented in a hydrogeological study published in 1993. Plans are currently in place to upgrade and extend monitoring of groundwater resources, but gaps will remain.

***Plate 17**: Water catchment area, 'Eua*

***Image by:** Tonga Second National Reports, 2012*

Development issues, such as over pumping groundwater, in places, high levels of leakage from water pipes, fecal coliform and other forms of contamination from urban and agricultural activities in watersheds, place additional pressures to Climate Change and natural disasters on these fragile, finite resources. In Tonga, there is need for further attention to groundwater management and greater investment in rainwater harvesting and storage to offset the groundwater supply.

A water resources bill has been in draft form for at least a decade. A 2009 report on the Vulnerability of Groundwater in Tongatapu concluded that the main threat to groundwater was institutional with "no legal basis for protecting groundwater from harmful activity or overuse".

***Plate 18**: Groundwater Salinity Map, Tongatapu, 2016*

A rise in sea level will cause seawater intrusion, particularly in low lying coastal areas. Saltwater intrusion will be disastrous as it increases salinity of the groundwater lens therefore reduces the availability of sufficient freshwater for drinking purposes. A reduction in the area of freshwater lens due to erosion and subsequent land loss also exists.

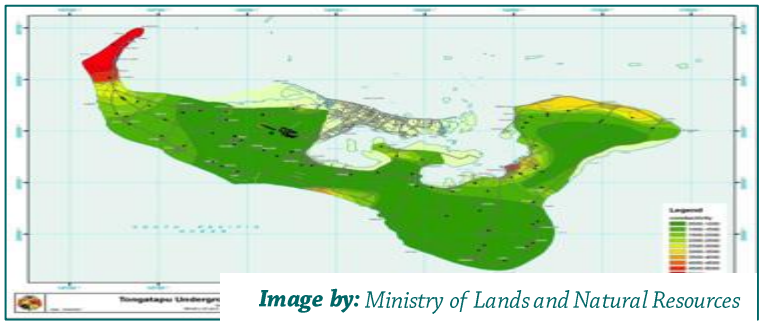


***Image by:** Ministry of Lands and Natural Resources*

4 Furness, L.J. and Helu, S.P. 1993. The Hydrogeology and Water Supply of the Kingdom of Tonga, Ministry of Lands, Survey and Natural Resources.

5 Monitoring of groundwater is to be extended through the ADB funded Climate Res Groundwater salinity (EC) distribution map of Vava'u in 2011 showing areas prone to seawater intrusion and the freshest around 'Uta Vava'u (Source: MLSNRE) Resilience Sector Programme.

***Plate 19**: Freshwater Lens, Lifuka, Ha'apai, 2011*

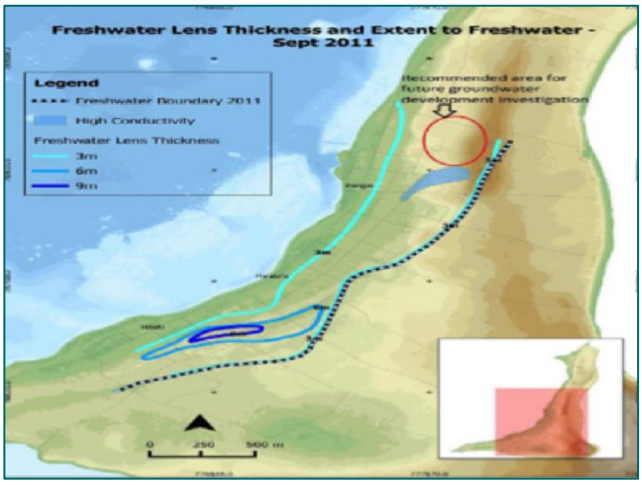


***Image by:** South Pacific Commission Report 2014.*

The Groundwater salinity (EC) map of Tongatapu shows areas prone to seawater intrusion in red, yellow and light green (see Plate 18). The most salinity prone areas are located on the ends of the western and eastern Tongatapu peninsulas. The freshest groundwater, shown in green, occurs around Fua'amotu.

Plate 19 shows the extent of the freshwater lens at Lifuka as well as areas prone to seawater intrusion. The freshest water is found in Pangai in the western district of Ha'apai (SPC 2014). The groundwater salinity (EC) map of Vava'u for 2011 shows areas prone to seawater intrusion lie mostly to the southeast and that the freshest water is found around 'Uta, Vava'u (see Plate 20).

***Plate 20**: Groundwater Salinity Map, Vava'u, 2011*

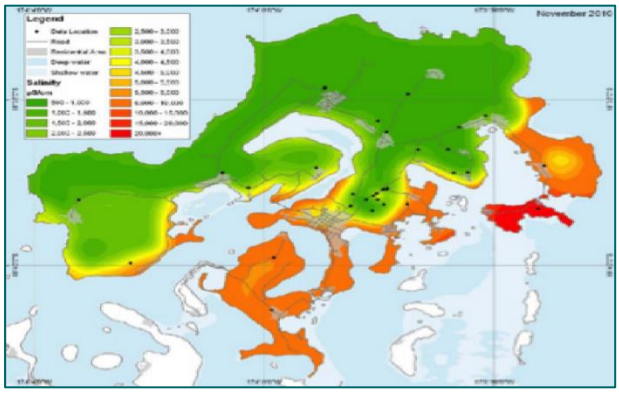
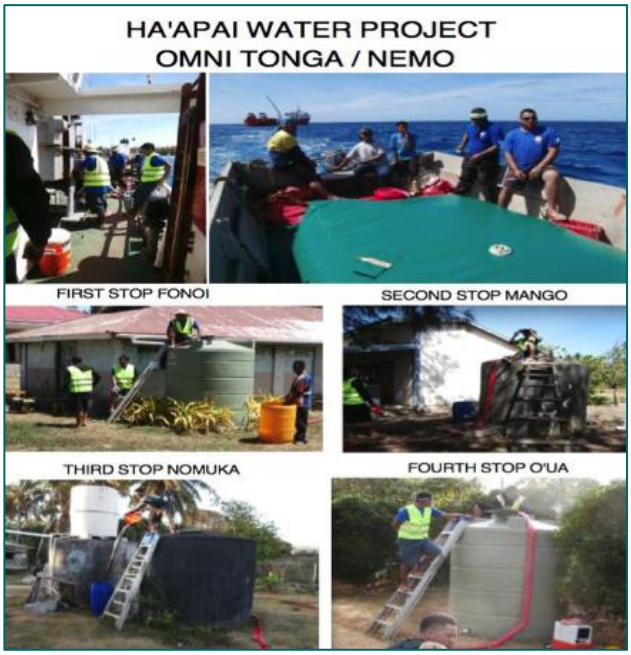


***Image by:** Ministry of Lands and Natural Resources.*

***Plate 21**: Ha'apai Water Project, 2014-2015*



During the 2014/15 El Nino event, Government of Tonga approved $400,000.00 TOP for the first drought response, for all islands of Tonga, and for the second drought response in Ha'apai, Tongatapu and 'Eua (Plate 21). The 2014/15 drought also led to increased calls for groundwater fed irrigated agriculture in Tongatapu. However, while the basic Math suggest that, some level of irrigation might be feasible, the depth of available groundwater fluctuates with rainfall and is at its lowest during prolonged drought.

[6]White, I, Falkland, T., Fatai, T. 2009. Vulnerability of groundwater in Tongatapu, Kingdom of Tonga. Groundwater evaluation and monitoring assessment. Australian National University, Canberra, Australia.

1.5.2 Biodiversity

Tonga has adopted a broad interpretation of biodiversity to encompass plant and animal species that are of ecological, cultural, and economic importance. This covers agrobiodiversity, terrestrial fauna, forest ecosystems and marine ecosystems.

***Plate 22**: Crabs and Sea Cucumber are threaten by increasing of sea temperature*

Biodiversity conservation is one of the most difficult environmental issues facing Tonga. The combined impacts of climate change and disasters on biodiversity only compound the scale of the challenge. It takes 5-10 years for a coral reef, which was destroyed by a cyclone, to recover. In 2014, TC Ian destroyed most of the mature remaining forest cover in the Haʻapai Group. In 2018, TC Gita similarly affected forest cover on Tongatapu and ʻEua, although the damage assessment of the ʻEua native forest had not been completed at the time of writing, but a similar level of forest devastation to that on Tongatapu is expected. Whistler (2011) pointed out that there was very little native or endemic forest in Tonga, with the largest remnants being found on ʻEua.

While agricultural developments have direct negative impacts on natural ecosystems, there are also concerns about the loss of agrobiodiversity. There are now fewer traditional crop species on the smaller islands compared to on Tongatapu. The variety of fruit trees, for example, has decreased due to increased competition for land for other uses, especially for commercial farming, and as a result of population growth and disease spread.

In Haʻapai the sequence of drought in 2013, TC Ian, and drought again, in 2014/2015, had severe effects on agrobiodiversity. Sustainable management of Tonga's biological resources is essential for a sustainable development pathway that is aligned with the unfolding realities of climate change.

1.6 Climate Change Projections and Impacted sectors.

A summary of climate change and disaster risk projections for Tonga, as well as the likely impacts on the people and environment of Tonga is provided in Table 1.4 below.

***Table 1.4:** Projected climate change and disaster risks and their likely impacts on Tonga*

Climate Factor	Climate and Disaster Events Trend	Impacted Sector	Likely Impact
Tropical Cyclones	Increase in intensity with associated higher storm surge. May decrease in overall number of cyclones.	All sectors	❖ Flood and inundation of low lying areas ❖ Infrastructure losses, all sectors ❖ Power outages ❖ Damage to communication networks ❖ Damage to roads

			❖ Transportation disruptions and increased cost of provision and maintenance ❖ Ecosystem/ biodiversity losses, long term and permanent ❖ Water pollution and salt water intrusion into groundwater ❖ Agriculture diversity and productivity losses ❖ Loss of human life or causalities
Temperature	Air and sea surface temperatures increasing	Health Agriculture Fisheries	❖ Heat stress on people and ecosystem ❖ Reduced fisheries catches ❖ Coral bleaching ❖ Loss of habitat ❖ Soil properties damage
Rainfall	Decrease in dry season rainfall (May- October) and increase in wet season rainfall (November- April) consistent with intensification of the South Pacific Convergence Zone (SPCZ)	Agriculture Health Import/Export Sector Infrastructure Transportation and Communication	❖ Drier in dry seasons (drought) impacting on agriculture and forestry ❖ Wetter in the wet seasons causing flood damage, and increasing mosquito breeding areas thus increases of dengue fever cases ❖ Damage to infrastructures including roads and communication networks ❖ Saltwater intrusion and other associated damages and possible benefits.
Sea level rise	Continue to rise	All sectors	❖ Flood and inundation damage ❖ Saltwater damage ❖ Water Pollution ❖ Coastal erosion ❖ Infrastructure damage ❖ Beach degradation
Ocean Acidification	Continue to Increase	Fisheries Marine Biodiversity	❖ Damage to coral reefs ❖ Reduction of reef fishes ❖ Reduction of shellfish ❖ Combined with other stressors will cause other impacts
Volcanic Eruption	Not known	Most sectors	❖ But depend on magnitude, location, wind direction, lava and flow direction
Tsunami	Not known	All	❖ Depend on the strength of the phenomena that trigger the tsunami, location and magnitude, sizes of the waves and other factors such as shape and slope of the coastline and reefs ❖ Damages would be widespread
Earthquake	Not known	All	❖ Damages to housing ❖ Damages to infrastructure (*wharfs, roads, water infrastructure, solar farms*) ❖ Damages would be widespread

Source: *Third NTC, Tonga Climate Change Projection (NMSs), 2017*

Lessons Learnt From JNAP I, 2010 – 2015

Section 2: Lessons Learnt From JNAP 1, 2010 – 2015

Tonga was the first country in the Pacific Island region to develop a joint national action plan for climate change and disaster risk management. JNAP 1 (2010-2015) detailed Tonga's Climate Change and disaster risk management priorities. Under JNAP 1, the government secured significant funds to implement climate change and disaster risk programs and projects (Annex 3). The government also learnt many lessons in developing and implementing JNAP 1. These lessons and the actions they inspired are presented below.

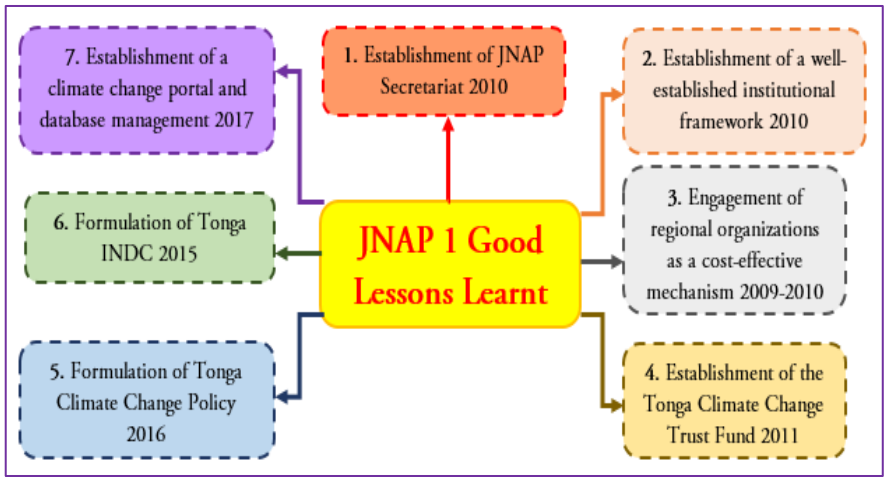


***Figure 10**: Lesson learnt from JNAP 1*

1. Establishment of JNAP Secretariat

A Secretariat was established to be fully responsible for driving the implementation of JNAP 1 funded from the Government of Australia. The Secretariat was composed of a Team Leader, Climate Finance Officer and a Technical Supporting Officer. The secretariat was housed at the Ministry of Environment and Climate Change.

2. Establishment of a well-established institutional framework

It was evident that a well-established institutional framework in place was indeed a very effective and efficient coordination mechanism for the JNAP 1 implementation. This lesson needs to be replicated in JNAP 2. Several Climate Change committees were established including Climate Change Standing Committee in Parliament, Cabinet Committee, Coordination Committee and the JNAP Taskforce. These committees supported the implementation of JNAP 1

A NGO forum was also established during the JNAP 1 implementation period. There were climate change and disaster risk management programs and projects implemented by NGOs. The establishment of this forum was intended to strengthen networks and partnerships with NGOs. A donor roundtable and one-to-one consultations was held with resident donors. This was very significant in building and strengthening the relationship with the donors to secure funding to implement climate change and disaster risk programs and projects (Annex 3), and support the implementation of JNAP 1.

3. Engagement of regional organizations as a cost-effective mechanism

The Tonga JNAP Task Force and the Project Management Unit of SNC Project worked collaboratively with a team of experts from SOPAC and SPREP who provided technical assistance throughout the process of formulating the JNAP 1. This is a cost effective mechanism utilized to help reduce Tonga's reliance on international consultants which is very costly.

[1] In 2015, MEIDECC the former MECC was established.

4. Establishment of the Tonga Climate Change Trust Fund

Through JNAP 1 experience the JNAP secretariat realised the need to establish a sustainable climate change financing mechanism especially to respond to community adaptation priorities at a pace and rate suitable for the communities to ensure buy in with full integration into community development in the long run. Based on various consultations led by the JNAP Secretariat with relevant stakeholders, the Climate Change Trust Fund was adopted as a feasible funding modality for Tonga. This was approved by Cabinet in 2011.Through the ADB funded Tonga Climate Resilient Sector Project, the Tonga-Climate Change Trust Fund was established with a USD $5M. To regularize the establishmentand the operation of the Trust Fund, a Tonga Climate Change Fund Bill was formulated and currently is under considerations.

5. Formulation of Tonga Climate Change Policy

JNAP 1 also gives rise for the formulation of the Tonga Climate Change Policy. The process was led by the JNAP Secretariat and the JNAP Task Force. The policy was endorsed by Cabinet in 2016.

6. Formulation of Tonga Intended Nationally Determined Contributions (INDC), 2015

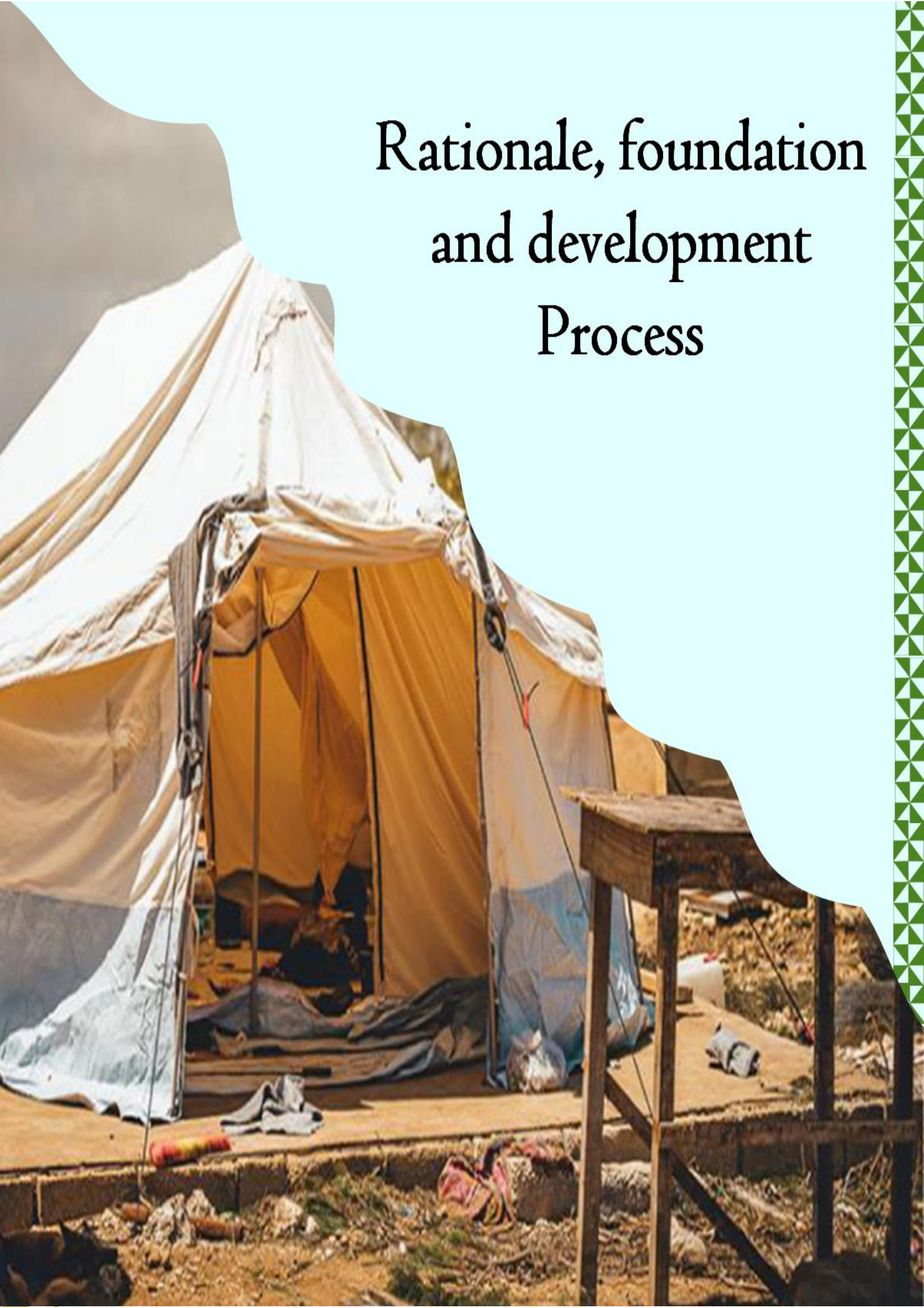
Experiences and information from JNAP 1 supported the development of Tonga's INDC which was submitted at the 21st session of the Conference of the Parties to the United Nations Framework Convention on Climate Change, Paris, France, 2015. Tonga had also deposited its instruments of ratification to the Paris Agreement on 18 September, 2016. Tonga's NDC was designed for reduction of greenhouse gas emissions and increased investment in climate resilience. Climate resilience is a common goal that is found not only in Tonga's NDC but in Tonga's Third National Communication, Climate Change Policy and JNAP 2.

7. Establishment of a climate change portal and database management system

Accessing appropriate climate change and disaster information and data for adaptation and mitigation planning was a major capacity constraint in Tonga. This was also experienced during JNAP 1. A climate change portal and database were established during the implementation phase of JNAP 1 but needs to be sustained and strengthened to ensure credible data and information are being accessed to inform development decision making.

[2] The development of the EU-SPC Global Climate Change Alliance Project.
[3] The Climate Change portal was supported by the German-GIZ-Coping with Climate Change in the Pacific Island Region Program, GEF-UNDP and SPREP Pacific Adaptation to Climate Change Project and the SPREP-Griffith University of Griffith, iCLIM Project funded by DFAT.

Rationale, foundation and development Process



Section 3: JNAP 2 - Rationale, foundation and development Process

Rationale

Tonga's existence is threatened by Climate Change and significantly undermines its sustainable development. Many factors confirm that Tonga is one of the most vulnerable countries in the world: The results of vulnerability assessments, the observed and the projected climate change trends, on ground impacts, loss and damages experienced, Tonga's limited capacity, level of awareness, exposure level, the nature of donor support and commitments (pilot projects) and government commitments. Climate Change exacerbates the magnitude and impacts of climate variability and climate related natural hazards.

JNAP 2, together with the Tonga Climate Change Policy, TSDF, and with reference to the regional Framework for Resilient Development in the Pacific (FRDP) have a role to build a more resilient future Tonga. JNAP 2 actions represent a non-exhaustive list of initiatives which are activities prioritised to be implemented in the next ten years. These actions provide guidance only and are to be implemented as relevant to the objectives and goals of the JNAP 2. The relevance of the suggested priority actions will evolve over the lifetime of JNAP 2 and as the sectors' resilience plans are being developed.

Foundation

JNAP 2 is built on strong foundations: JNAP 1, JNAP 1 review, review of five other Pacific Island JNAPs, the Tonga Climate Change Policy and Tonga Strategic Development Framework. The JNAP Task Force and the Secretariat led in the facilitation and consolidation of related information.

Development process

The government took several approaches to ensure climate change and disaster concerns, and issues of local communities were adequately discussed and incorporated into JNAP 2. These included:

- One-on-one stakeholder consultations followed by a series of workshops with a focus on clarifying gaps and affirming priority activities for JNAP 2. These activities were then aligned with the objectives and sub-objectives of the Climate Change Policy;
- Civil society and NGO's forums were invited to participate in consultation workshops;
- Incorporating results of recent community engagement activities undertaken by MORDI Tonga in partnership with the Ministry of Internal Affairs (MIA) while developing 119 Community Development Plans (CDPs); and,
- Incorporating findings and recommendations from the review of the Community Development Plans (CDPs).

Key findings of the CDP review included:

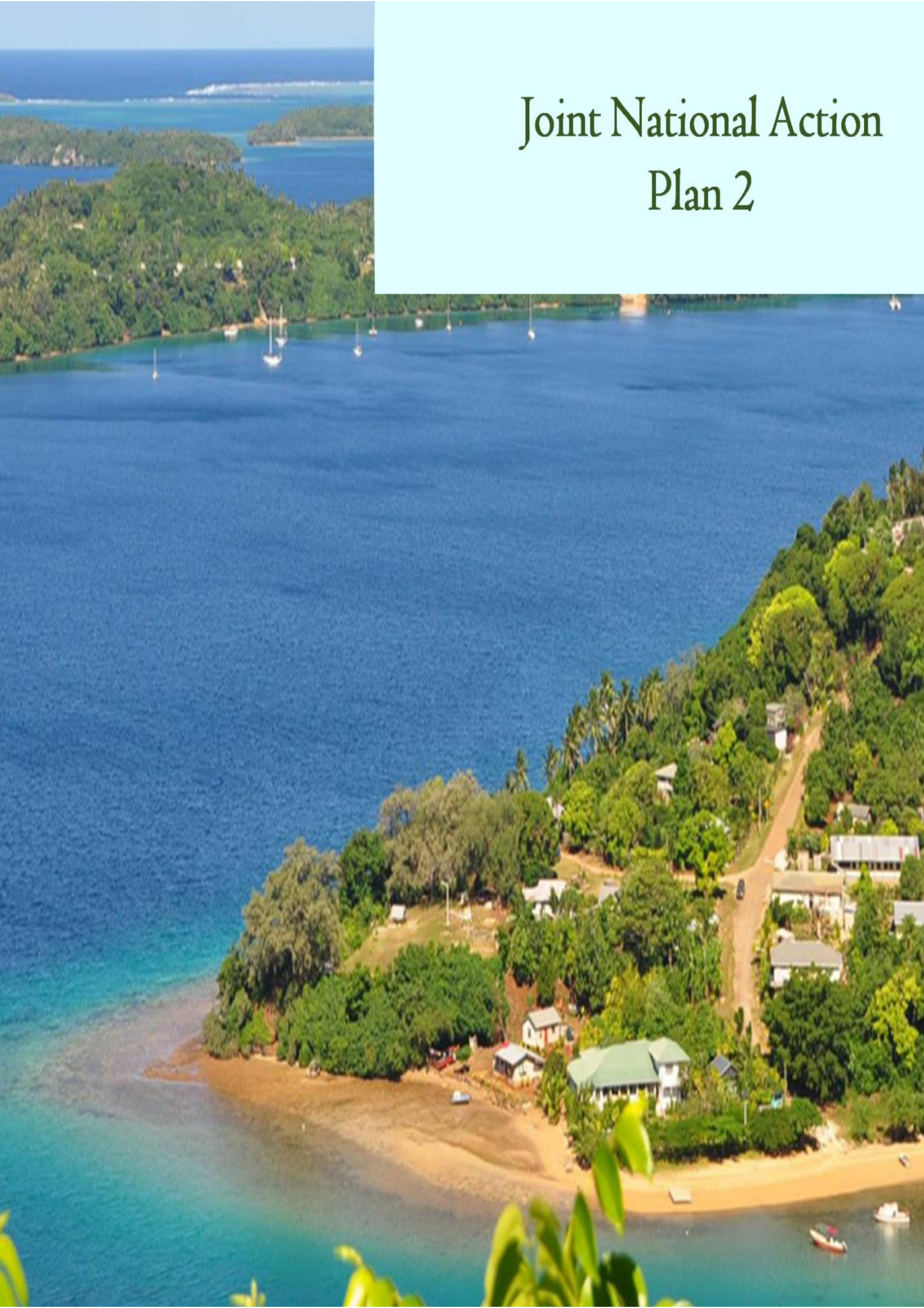
- The CDPs reflect the immediate needs of communities and the addressing of these provides a strong platform for addressing climate resilience.
- There is no clear linkage between identified needs and their vulnerability to climate change and natural disasters.
- There is no explicit consideration of CCA and DRM, nor any linkage to the targets for a Resilient Tonga.
- There are many issues identified in the CDPs that are of relevance within a resilience building context.

- The highest priority issues across all CDPs related to water and agriculture, covering issues such as limited water supply, issues with roaming livestock, access to equipment and machinery, rural roads.
- Other issues relate to education, infrastructure, governance, economic development, communication, transportation, health and sanitation.

Information collated from the Vulnerability and Adaptation Assessment, under the Tonga Third National Communication to the UNFCCC in June 2018, and associated stakeholder consultations, were also used to identify the impacts, both observed and forecast, of climate change in Tonga. These were also used as a basis for the development of actions under JNAP 2.

[11] Tonga Climate Resilience Sector Project (CRSP), 2017. Assessment of Community Development Plans of Tonga to align with Climate Change Policy and JNAP on Climate Change Adaptation and Disaster Risk Management.

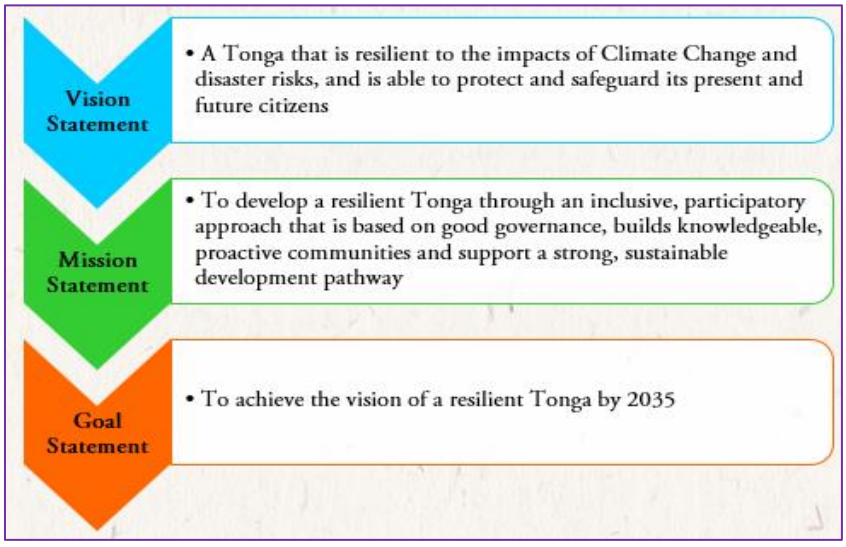
Joint National Action Plan 2



Section 4: Joint National Action Plan 2

JNAP 2 adapted the following vision, mission, objectives and guiding principle from the Tonga Climate Policy (2016). The Policy and JNAP 2 provide the overarching framework and strategic actions for climate change in Tonga.

4.1 Vision, Mission and Goal Statement



4.2 Guiding Principles

1. A Resilient Tonga for the future
   A Resilient Tonga requires a redesigned approach that brings together traditional knowledge and values with up to date knowledge and technology, in order to address the realities of climate change and disaster risks.
2. Strong leadership and good governance
   The realisation of a Resilient Tonga will require clear, strong and consistent governance.
3. A holistic, multi-faceted, multi-sectoral approach
   A holistic, multi-faceted, multi-sectoral and multi-hazards risk approach will be adopted. Inherent in this approach will be the precautionary principle, early warnings and effective and efficient response and recovery.
4. Integration and mainstreaming
   The design and development of a Resilient Tonga will require proactive changes involving an integrated approach to adaptation and mitigation (reducing greenhouse gas emissions) and disaster risk management. This will be mainstreamed into all applicable laws, policies, plans and activities from national to local level.
5. Community ownership, stakeholder participation and collaboration
   The realisation of a Resilient Tonga will require strong community ownership, participation of all stakeholders, and collaboration between all government ministries as well as the private sector and civil society.
6. Equity and fairness
   Initiatives, programmes and projects will ensure the equitable accessibility and distribution of all benefits, information and support to marginal and disadvantaged groups, recognising their differing vulnerabilities and capabilities to climate change and disasters.

7. Gender inclusivity

   In recognising that men and women face different social, environmental, and economic situations, gender issues will be considered in all planning and implementation processes. A better understanding of the vulnerabilities and capacities of different gender groups to deal with climate change and disasters will be promoted.

8. On-going capacity development

   On-going capacity development will be required at all levels to ensure a sustained effort towards the common goal of building resilience.

9. Long-term sustainability

   Initiatives and programmes will be designed to deliver long-term, positive, environmental, social, and economic benefits that are founded on ensuring self-sufficiency at all levels of Tongan society.

10. Multi-disciplinary science and evidence based responses

    Policy formulation, planning and action will be based on scientifically and technically sound data, information and knowledge combines with the value of traditional knowledge.

4.3 Objectives, Outcomes and Activities

Image by: *Geology Office*

The six objectives of the Climate Change Policy (2016) provided the basis for JNAP 2. The activities identified were prioritized based on lessons learnt during JNAP 1, consultations during the JNAP 2 development process and detailed vulnerability assessment carried out the by JNAP Task Force for the Tonga Third Communication Plan (2017). The Results Framework provides expanded details (Annex 1). A timeline for the completion of all activities and achievement of outcomes under JNAP 2 is provided in Section 5. JNAP 2 should be implemented in a fully iterative manner. This is essential as many activities are yet to be identified through the development of relevant sector and other plans under **Objective 1**. Provision has been made under **Objective 4** for an annual review of these plans, which will provide the opportunity for regular review of progress and revision of the JNAP 2 and associated activities. The JNAP 2 has a 10 year time horizon: 2018 to 2028. During this period, the government will facilitate a minimum of two progress reviews of the JNAP 2; subject to development of a monitoring, evaluation and learning plan (Section 6.4).

Objective 1: Mainstreaming for a Resilient Tonga

Mainstream climate change and disaster risk management approaches into government legislation, policies and plans at all levels.

Sub-objective 1.1:

Strengthen existing decision-making structures, in particular the National Climate Change Coordinating Committee (NCCCC) and the Environment and Climate Change Standing Committee (CCSCP) in Parliament.

Expected Outcome:

Climate change and disaster resilience approaches are embedded in legislation, policy and plans to promote and enforce resilient development approaches in all Government development processes and on-the-ground-implementation.

Activities:

1.1.1 Conduct relevant awareness and training programmes for the NCCCC and the CCSCP;

1.1.2 Develop national monitoring and evaluation plan for JNAP 2 and recruit a monitoring, evaluation and learning (MEL) officer;

1.1.3 Review and strengthen the JNAP Task Force Terms of Reference (TOR) including roles that would be expected in addition to JNAP 2.

Elaboration:

The NCCCC and CCSCP play a crucial role in ensuring that climate change considerations are taken into account by government. This role will be even more critical for the JNAP 2 targets for a *Resilient Tonga by 2035* to be achieved. Strengthening the capacity of the NCCCC and CCSCP is therefore a high priority. The JNAP Secretariat was established after approval of the first JNAP and was initially funded by Australia Department of Foreign Affairs and Trade (DFAT). For effective implementation of the JNAP 2, the Secretariat needs to be revitalized and strengthened with the recruitment of a dedicated and monitoring, evaluation and learning (MEL) staff. JNAP 1 would have benefited from a coherent and effective MEL plan. A MEL plan is to be developed at the early stages to JNAP 2 implementation. The development of a *Results Framework* (outlined in Annex 1) including verifiable indicators, is a step towards supporting this.

Sub-objective 1.2:

Mainstreaming the goal of a *Resilient Tonga* in all government ministries planning, design and execution of programmes, with supporting guidelines and training incorporating the JNAP 2 adapted targets for a *Resilient Tonga*.

Expected Outcomes:

There is capacity and confidence in all government agencies to drive the Resilient Tonga goal and to execute resilient processes in decision making on a daily basis.

Activities:

1.2.1 Develop guidelines, based on the targets for a *Resilient Tonga* adapted for JNAP 2, to guide ministries and sectors mainstreaming;

1.2.2 Develop processes, guidelines and/or check lists to enable mainstreaming at the decision making, developing planning and budgetary planning levels e.g. in project development and screening, licensing, development license and permits et cetera including social, environment safeguards and gender inclusions;

1.2.3 Assess capacity needs and develop appropriate capacity building programmes for each government ministry, NGOs, and the private sector;

1.2.4 Recruit dedicated climate resilience staff to all outer islands ministries based on the capacity assessment above.

Elaboration:

Mainstreaming was also a priority for JNAP 1 but mainstreaming needs to be continued because of new policies, processes and limited capacity. A guideline to sector mainstreaming will cover these gaps. This is a considerable task but necessary as the vast majority of corporate planning and budgeting in government ministries would benefit from this objective. Initial funding for dedicated climate resilience staff in Haʻapai and Vavaʻu has been provided through the UNDP Pacific Risk Resilience Programme (PRRP) and there is the likelihood of further support for dedicated people in the two Niuas. However, these positions need to be integrated into government and fully resourced.

Sub-objective 1.3:

Develop and implement the prioritized sector resilient plans such as biodiversity, education, energy, fisheries, forestry, health, infrastructure, land, water, and youth, including supporting policies and legislation where necessary.

Expected Outcome:

A fully coordinated and streamlined *resilience* planning approaches implemented across all government ministries.

Activities:

1.3.1 Conduct sector-specific vulnerability assessments to establish baselines and to inform resilience planning;

1.3.2 Priority sectors resilient plans to be developed, integrating gender, youth, and people with disabilities and other vulnerabilities. These must be costed and fully aligned with the JNAP 2 adapted targets for a *Resilient Tonga;*

1.3.3 Develop multi-hazard disaster preparedness, response and recovery plans for priority sectors including regular drill exercises;

1.3.4 Review, and if necessary revise the new forestry plan to ensure that it is fully aligned with JNAP 2 adapted targets for a *Resilient Tonga*;

1.3.5 Review, and if necessary revise the new water resources supply and management plan to ensure that it is fully aligned with the JNAP adapted targets for a *Resilient Tonga*;

1.3.6 Develop a national coastal zone management plan and national land use plan integrating the adapted JNAP targets for a *Resilient Tonga*;

1.3.7 Review the National Biodiversity Strategy and Action Plan;

1.3.8 Complete studies to determine what is required for Tonga to achieve 100 percent renewable energy uptake by 2035;

1.3.9 Develop Tonga's National Determined Contributions (NDC) Stock Take and reporting to the UNFCCC Conference of Parties (COP) under the Paris Agreement by 2020;

1.3.10 Develop a new energy sector plan based on lessons learnt from the Tonga Road Map aimed at achieving the goal of 100 percent renewable energy by 2035, and consistent with Tonga's NDC;

1.3.11 Complete specific studies to determine the feasibility for Tonga to transition away from petrol and diesel (alternative sources) in the transport sector (shipping and vehicles);

1.3.12 Develop a Tonga Climate Change Management Act.

Elaboration:

The Climate Change Policy, JNAP 2 and in addition to the guideline outlined in JNAP 2, are to guide the development of the resilience plans for each sector of society. Sector plans are to be costed, resourced, and result frameworks, monitoring and evaluation frameworks developed. In the majority of cases, costed plans do not yet exist. Of those that do, the Tonga Agriculture Sector Plan (TASP) and the Strategic Plan on Gender and Development (SPGD) are the only two that have climate resilience strongly embedded in them.

Sub-objective 1.4:

Develop appropriate, standardized resilience guidelines, incorporating the adapted JNAP 2 targets for a *Resilient Tonga,* for community engagement activities, which are to be implemented through strengthened partnerships between government, civil society, and the private sector. The Ministry of Internal Affairs must also be strengthened in its coordinating role, and all community development plans and island strategic development plans progressively aligned with the goal of a *Resilient Tonga*.

Expected Outcome:

Streamlined, coordinated and standardized community resilience engagement processes approved and Ministry of Internal Affairs (MIA) coordination role strengthened.

Activities:

1.4.1 Develop standard resilience guidelines for all community engagement activities;

1.4.2 Develop integrated water resource management plans for all rural villages, integrated with village specific information from the national coastal zone and land use management plans;

1.4.3 Review and revise all community development plans to ensure they are align with the adapted JNAP 2 targets for a *Resilient Tonga*;

1.4.4 Review and revise all district and island development plans to ensure they are aligned with the adapted JNAP 2 targets for a *Resilient Tonga.*

Elaboration:

The Climate Resilience Sector Project (CRSP) review of the community development plans (CDPs) identified that "The current methodology, procedures and institutional set up to develop community based plans is fragmented in Tonga. Agencies and organisations have their own methodology and procedures including for climate change and disaster risk management. While a standard approach has been applied in the development of CDPs, it has already been identified that these lack specific focus on vulnerabilities and resilience building." At present, most, if not all community level interventions in Tonga occur in the absence of quantitative studies and information about their natural resource base and associated vulnerabilities. This *ad hoc* approach leads to potential for maladaptive interventions that result in increased environmental, social, and economic costs over time. The solution is to develop and implement a comprehensive natural resource planning approach, which can then be integrated with community based plans. Once standard resilience guidelines and natural resource plans are in place, there is a need to progressively re-engage communities to revise their CDPs. It is essential that this occurs in a fully participatory manner, involving awareness raising and education, as well as ensuring that women, youth, and people with disabilities, or otherwise disadvantaged, are not left behind. District and outer islands' development plans also need to be reviewed and revised, drawing from all completed sector plans and revised CDPs.

Sub-objective 1.5:

Improve knowledge on gender and community-based perspectives and capacity for adaptation, and for responding to climate change and natural disasters.

Expected Outcome:

Balanced, well- informed and coordinated resilience policies, strategies, programmes plans and projects from government, civil society, NGOs, the private sector, communities and donors.

Activities:

1.5.1 Conduct a study to identify local knowledge regarding the distribution of responsibilities within the family in climate change adaptation and in preparation and response to natural disasters and climate stresses;

1.5.2 Conduct pilot studies to estimate the cost of climate change and natural disasters impacts on community livelihoods. The case studies could be representatives of urban, rural and outer islands settings;

1.5.3 Conduct a study of scenarios of relocation due to climate change and natural disasters impacts taking into considerations gender perspectives.

Elaboration:

Tonga's *National Policy on Gender and Development* identifies the need for a gender perspective to be integrated into all disaster risk management and climate change adaptation approaches. Women in Tonga generally have

lower levels of economic powers and access to productive resources than men do. Different types of social vulnerabilities intersect, such as people with disabilities, elderly, women and girls, and must therefore be placed at the centre of all planning, preparedness and response activities. The more we can understand the values, needs and aspirations through a gender lens, and how we can better prepare to protect these, the more resilient Tongan society will become.

Objective 2: Research, monitoring and management of data and information

Implement a coordinated approach to research, monitoring and management of data and information.

Sub-objective 2.1:

Identify national capacity needs for climate resilience research, monitoring and evaluation, data acquisition and information and knowledge management. Priorities include enhancing data analysis, gender analysis, vulnerability assessment and cost benefit analysis, and developing appropriate capacity building programmes for implementation.

Expected Outcome:

Enabling frameworks and protocols to guide research, monitoring and evaluation, data acquisition, and information and knowledge management for resilience-building established and functional.

Activities:

2.1.1: Resource priority areas guided by capacity needs assessments;

2.1.2: Strengthen inter-connected web portals;

2.1.3: Develop protocols for integrating data and information sharing and knowledge management;

2.1.4: Enhance the existing coordination system (established under JNAP 1) for effective management of climate change data, information and knowledge management;

2.1.5: Develop and approve national indicators (starting with the priority sectors) to regularly collect to assist in evaluation of projects' impacts;

2.1.6: Establish a link from the climate change portal to the existing data management system at Statistics Department;

2.1.7: Enhance the research and documentation, data collection information and knowledge on Traditional Knowledge on climate;

2.1.8: Review hardware, software and maintenance needs through a technology needs assessment and resource implementation of priority actions identified.

Elaboration:

There is also a need to enhance access to available data and to acquire additional data needed to support quantitative assessments of impacts; vulnerability and risk assessments integrated with gender disaggregate data and traditional knowledge to inform resilient development. One important area is to develop greater understanding and capacity in the analysis and use of spatial data, in particular through the use of Geographic Information Systems (GIS). Linking the climate change portal to the Statistics Department would help in collecting data against agreed indicators and support data and information discovery and sharing.

Sub-objective 2.2:

Enable effective, interactive and accessible GIS hubs building on the existing environment and climate change portal, (including the private sector, civil society organization s, and communities) to inform wise development for achieving a *Resilient Tonga.*

Expected Outcome:

Systematic scientific assessments, data acquisition, processing analysis and information sharing through appropriate means, accessible and provided the basis for resilient development at all levels.

Activities:

2.2.1 Strengthen the existing climate change portal for information management and sharing;

2.2.2 Establish accessible GIS hubs for management and use of all relevant data;

2.2.3 Conduct LIDAR surveys aiming to cover the remaining areas of Tonga not yet surveyed;

2.2.4 Conduct training on the management and use of the climate change portal and GIS-based systems.

Elaboration:

A climate change portal for information and knowledge management and sharing was established under the JNAP 1. The portal needs strengthening and inclusion of all relevant information and knowledge from government ministries, the private sector, NGOs and communities. There is a GIS unit within the Ministry of Lands and Natural Resources (MLNR). A common challenge for the unit however, is making data and mapping readily accessible or freely available. The GIS unit is aware of these challenges and is open to finding solutions, with a focus on the GIS unit serving as a hub for all relevant data and users. Building on this current capability, and in particular developing and incorporating capacity for climate change and climate risk assessments, is a high priority to support all other JNAP activities, in particular the ever-important planning activities. LIDAR data were gathered for Tongatapu and the main island of Lifuka, in Ha'apai, as a priority activity identified from JNAP1. Similar data sets are needed for the whole of Tonga, importantly to facilitate accurate sea level rise, inundation, and storm surge assessments for all coastal areas and communities as an integral part of the development of the national coastal zone management plan. There is some existing capacity within the Natural Resources Division (NRD) of MLNR to do this work, but additional resources are needed to facilitate an up-to-date LIDAR survey for the whole country. This is a high priority. Training and capacity building is required to support government staff in the provision of content to, and access to the climate change portal. GIS offers will need further training, in a structured ongoing way, to enhance their skills, but also for GIS offers to demonstrate to agencies and stakeholders the current and near future capabilities of GIS and GIZS can be integrated into the activities of agencies and stakeholders.

Sub-objective 2.3:

Develop fully operational monitoring systems, focusing in particular on groundwater integrity, soil health, coastal and oceanic condition and change, and a comprehensive climate early warning system.

Expected Outcome:

Fully operational monitoring systems for groundwater, soil health, coastal vulnerability and climate early warning established and strengthened.

Activities:

2.3.1 Explore the feasibility and to purchase a Doppler radar infrastructure and management system for detecting and monitoring of extreme weather events;

2.3.2 Establish a monitoring system for currents, waves and ocean pH levels;

2.3.3 Identified gaps in water, soil, health, coastal erosion plus related sectors and strengthen the monitoring and management systems for each sector;

2.3.4 Strengthen meteorological services throughout Tonga.

Elaboration:

Effective monitoring is essential for effective risk management and decision-making at all levels. There are presently many gaps in monitoring capability within Tonga. Major constraints include the cost of monitoring technology and its maintenance, local skills to undertake monitoring the appropriate scale, the systematisation of priority monitoring actions and reporting and integrating of monitoring results into decision making processes. The need for a Doppler radar system and associated training to enhance the capacity of government

for effective detect and monitoring of extreme rainfall events. This is important because of the limited capacity and limited stations to cover the whole of Tonga and its waters. Tonga needs to enhance its in-country capacity to monitor ocean currents, waves and ocean pH. This is important due to the vast impacts of the ocean on the small land mass of Tonga. In addition, Tonga needs to establish a reliable baseline of these ocean variables to allow responsible agencies to develop suitable adaptation programmes. There are considerable gaps in monitoring of water, soil, health, coastal areas and considerable room to improve the management of these resources. Priority focuses for action are water quality monitoring, soil mapping, shoreline mapping and erosion monitoring and riparian vegetation distribution, composition and condition. Management plans for groundwater, soil conservation, shoreline erosion and riparian vegetation, for priority areas, are needed in the short term. National management plans for these resources are needed in the medium term.

Sub-objective 2.4:

Develop and implement a fully coordinated, multi-disciplinary 'Research for Resilience Centre'.

Expected Outcomes:

Linked with the sub-objective 2.3 outcomes, a 'Research for Resilience Centre' is established.

Activities:

2.4.1 Formulate a strategy and plan for establishing a climate resilience research centre;

2.4.2 Establish a climate resilience research centre. A laboratory and a library are to be part of the centre.

Elaboration:

While research support to Tonga is provided by various CROP agencies and other regional research agencies (e.g. the CSIRO, New Zealand Crown Research Institutes), there is need for a dedicated in-country research facility to facilitate development and transfer of relevant research results in a timely manner. A comprehensive in-country strategy process is required to develop detailed parameters for this proposal.

Objective 3: Resilience-building response capacity

Develop the capacity for resilience building responses throughout government, the private sector and civil society.

Sub-objective 3.1:

Establish necessary mechanisms to ensure that all government agencies, the private sector, and civil society organisations are working together in a fully coordinated manner on all resilience-building activities across all sectors.

Expected Outcome:

Mechanisms are established to ensure that all government agencies, the private sector and civil society organisations are working together in a fully coordinated manner.

Activities:

3.1.1 Establish an umbrella framework document to coordinate resilience-building across the public sector, private sector and civil society organisations;

3.1.2 Develop an online self-directed course to promote and educate about the substance of the framework document.

Elaboration:

At present, there is a fragmented and *ad hoc* approach to building understanding of climate change within and across the public sector, private sector and civil society organisations. Sometimes there are overlapping activities, particularly at community level, which generate confusion and lead to information overload. JNAP 2 has an ambitious but essential goal of getting everyone on the same page. An umbrella framework document

is required to ensure that everyone receives a consistent understanding of Tonga's approach to resilience, Tonga's targets for a *Resilient Tonga* and so everyone understands who to go to and coordinate with before designing programmes or actions. While there are relevant courses available, such as provided by USP, many people are still thrown in at the deep end with climate change and tend to learn on the job. An on-line, self-directed course could expose people to resilience terminology, the Tongan approach, Tongan targets and outline whom to go to and coordinate with before designing programmes or activities.

Sub-objective 3.2:

Implement systematic capacity-building programmes on resilience in a consistent and coordinated manner for all government ministries, the private sector, and civil society to ensure a 'whole of Tonga' approach to achieving the goal of a *Resilient Tonga*.

Expected Outcome:

Systematic capacity building on resilience programmes are implemented in a consistent and coordinated manner for all government ministries, the private sector and civil society.

Activities:

3.2.1 Implement capacity building on resilience, incorporating the JNAP 2 adapted targets for a *Resilient Tonga*, for all public sector employees;

3.2.2 Implement capacity building on resilience, incorporating The JNAP 2 adapted targets for a *Resilient Tonga*, for all private sector organizations and employees;

3.2.3 Implement capacity building on resilience, incorporating the JNAP 2 adapted targets for a *Resilient Tonga*, for all civil society organizations.

Elaboration:

The ambitious goal is to implement capacity building on resilience as widely as possible. With development of a self-directed online course this is achievable for all government employees. The private sector, through the Tonga Chamber of Commerce and others, has indicated a strong desire to be engaged. Their preferred approach is to implement a training-the-trainer's programmes. While many NGOs in Tonga already have relatively strong capacity relating to climate change and natural disasters they need to be brought together to develop a common understanding of what is required to achieve resilience throughout the country. It is essential that this includes all church groups. The NGOs and churches together are strong entry points for widespread engagement with communities, along with District and Town Officers.

Sub-objective 3.3:

Implement a fully coordinated approach to community awareness raising on climate change and resilience building involving all civil society organizations that are working with, or are part of, communities. Include strengthening the important role of the arts and media in fostering the essential behavioural changes needed throughout Tongan society to achieve a *Resilient Tonga*.

Expected Outcome:

Fully coordinated approaches to community awareness raising and behavioural change actions are formulated and implemented including strengthening the important role of the arts and media.

Activities:

3.3.1 Develop and implement a fully coordinated capacity building programme on resilience with households/communities throughout Tonga;

3.3.2 Develop activities and programmes involving the arts and media to support 3.3.1.

Elaboration:

Non-government organisations, including all church groups, along with District and Town Officers, are the key entry points for effective engagement with households/communities. Effective capacity building of these

organizations is therefore the primary means towards building capacity of communities. These organisations will then need resources to carry out activities. Awareness of grant programmes, support with grant applications, tailored consultancies to these groups from within larger programmes or projects, can all build capacity. Tonga's challenge is to do it in a more coordinated way. The arts and media have an important role to play in building awareness, knowledge and capacity of communities. Engagement with them needs to be an integral component of the overall capacity building programme with communities.

Sub-objective 3.4:

Ensure that understanding of a *Resilient Tonga* is incorporated into all school and tertiary education curricula.

Expected Outcome:

Relevant resources for teachers and students identified and developed and new resilient curriculum components, where needed, are completed and integrated.

Activity:

3.4.1 Build on the 4CA (Child Centred Climate Change Adaptation) project and the 'Climate Change Warrior' project to ensure that climate resilience is integrated into school curricula at all levels.

Elaboration:

The former Aus AID (now within DFAT) supported a child-centred climate change adaptation project in Tonga which was targeted at 9-12 year olds at two schools in Tongatapu, ten schools in Ha'apai, and 14 schools in Vava'u. Additionally GIZ has supported a 'Climate Change Warrior' project through its Coping with Climate Change in the Pacific Islands Region (CCCPIR) project. These projects need to be reviewed and revised into a single coherent education for resilience programme, which is extended to all school-age groups. Additionally, understanding of climate change, natural disasters, and climate resilience needs to be integrated, as much as possible, into all education curricula within Tonga.

Sub-objective 3.5:

Upgrade climate resilience skills through climate change scholarships, short-term professional trainings, attachments in the areas of Climate Change and Disaster Risk Management.

Expected Outcome:

A measurable increase in the number of Tongans completing climate change scholarships, short-term training courses and professional attachments.

Activities:

3.5.1 Enhance opportunities for Tongans to secure climate change scholarships at both undergraduate and post-graduate level;

3.5.2 Enhance opportunities for Tongans to secure professional attachments to regional and international institutions and agencies (CCCCC, SPREP, AusAID, NZAID, UNFCCC);

3.5.3 Enhance opportunities for Tongans to participate in short-term training courses to CCDRR relevant institutions and agencies (BOM, NIWA, and UNFCCC Negotiations).

Elaboration:

Professional skills development in the field of climate change, including climate resilience, is widely needed throughout Tonga to help strengthen the country's resilience-building capacity. Government, civil society, NGOs and the private sector could all benefit from strategically investing in climate change scholarships, and by working with partners to create greater access for Tongans to climate change scholarship programmes domestically and abroad. Professional attachments offer great potential to strengthen Tonga's climate change skills. These attachments need active facilitation by government through a carefully constructed programme of action to engage institutions and secure more placements for Tongans.

Objective 4: Resilience- building actions

Design and implement on-the-ground actions that build a *Resilient Tonga by 2035* at national, island and community levels.

Sub-objective 4.1:

Design and implement key resilience 'pipeline programmes' for a resilient Tonga by 2035

Expected Outcome:

Safer and stronger coastal and marine infrastructures; cleaner and renewable sources of energy; integrated coastal and ecosystem based adaptation implemented; flood management and to achieve food and water security.

Activities:

4.1.1 Strengthen coastal infrastructures through the timely implementation of the *Tonga Coastal Resilience Project* and to replicate this project in the outer islands;

4.1.2 Implement the *Tonga Climate Resilient Transport Project* in a timely manner to facilitate the safe, efficient and sustainable movements of people and goods in Tonga while strengthening the resilience of the transport sector;

4.1.3 Strengthen Tonga's renewable energy infrastructure through the timely implementation of renewable energy initiatives including grid-connection of the existing solar farms in line with, and to achieve Tonga's NDC and Energy Road Map targets;

4.1.4 Implement SMART agricultural and water management approaches in the context of climate change and disaster risks;

4.1.5 Design and implement appropriate, environmentally sensitive flood management responses in all low-lying areas around Tonga.

Elaboration:

Tonga has a range of priority projects and project proposals, which in themselves could build climate resilience, or which need additional resources, or reviewing using a climate resilience lens, in order to become climate resilience building. These include coastal infrastructure, transport, renewable energy, agriculture and water management and flood mitigation projects.

Sub-Objective 4.2:

Strengthen the sustainable development and management of fisheries and aquaculture resources to increase these sectors' resilience to the impacts of climate change.

Expected Outcome:

Improved resourcing for fisheries monitoring, extension and management, particularly for inshore areas, including for the monitoring capacity of Special Management Areas (SMA).

Activities:

4.2.1 Undertake training for communities in management and monitoring of SMAs;

4.2.2 Resource environmentally sensitive fishery resources enhancement programmes including farmed coral and aquaculture of giant clam;

4.2.3 Strengthen the knowledge of fisheries managers about Fish Aggregation Devises (FADs), extending their use where appropriate and improving the design to be more resilient to the impact of storms and cyclones.

Elaboration:

These are pipeline resilient projects that need to be implemented urgently in Tonga. These projects are at the front line of building the resilience across Tonga. Prolonged delay in implementation would not only raise the cost but it continues to weaken natural and socio-economic systems that supported Tonga's sustainable

development. These are the pipeline projects that are extending beyond anticipated worsening of extreme events and climate change impacts, including slow onset events, to also consider the underlying causes of vulnerability. These pipelines address the core of Tonga's vulnerability to climate change and disaster risk. Special Management Areas (SMAs) are Tonga's response to direct community action and involvement in the management of local fisheries resources. They have proved highly successful in activating local communities. Communities need further support to strengthen their local SMA monitoring and management capacity. Due to declines in inshore fisheries, a few species have been found to be suitable, low-impact income-generating aquaculture alternatives to fishing. The further development of farmed coral and giant clam aquaculture, for example, should be fully supported as a climate-resilience building mechanism for local communities. Fish Aggregation Devises (FADs) offer inshore fishers a way to more effectively to target pelagic fish such as tunas, which are attracted to such devices. Resources are needed to help fisheries managers expand their understanding of the impact and dynamic interaction of FADs with wild fisheries and ecosystems, and to help managers design more appropriate and effective FADs that are resilient to storm and cyclone impacts.

Sub-objective 4.3:

Begin the progressive implementation of national level actions from relevant sector plans aimed at achieving the identified targets for a *Resilient Tonga by 2035*.

Expected Outcome:

National-level actions from relevant sector plans aimed at achieving the identified targets for a *Resilient Tonga by 2035* are implemented.

Activity:

4.3.1 Annual national forums involving all relevant national stakeholders are facilitated, beginning in the first half of 2019, to identify, review and/or update all actions identified from completed resilience sector plans.

Elaboration:

A core element of the JNAP 2 is to develop resilience sector plans. Once these plans are completed, it will then be possible to engage in meaningful dialogue to identify priority areas for action. This may involve sector specific actions and projects, or multi-sector projects. To facilitate identification of priority actions, a national forum will be held annually. This will be held in the first half of the year, beginning in 2019, involving all relevant national and island districts stakeholders.

Sub-objective 4.4:

Fully implement community development plans that are aligned with the goal and targets of a *Resilient Tonga* in 23 champion villages, one in each district throughout Tongatapu and the outer islands.

Expected Outcome:

Community development plans that are aligned with the goal and targets of a *Resilient Tonga* are fully implemented in 23 champion villages, one in each district throughout Tongatapu and the outer islands.

Activity:

4.4.1 Identify at least 23 champion villages, one in each of the 21 districts, and two in 'Ongo Niua, and progressively implement revised community development plans, which integrate natural resource management arrangements.

Elaboration:

This sub-objective will involve the biggest programme of activities associated with the JNAP2. The sub-objective is focused on implementing the targets for a *Resilient Tonga* in at least 23 identified champion villages. To achieve this, it is essential that there is further engagement with communities to develop a comprehensive planning approach aimed at realising the resilience building targets. This engagement process

will need to occur within the 10 year timeframe of JNAP 2 as the current CDPs are designed to be living documents and, by necessity, need to evolve and develop over time. The CDPs will also need to include resource management arrangements for water, environment, land use and coastal zone protection, where these apply. Many activities with communities are occurring in an *ad hoc* manner. Even where there might be a more coordinated approach, there is still a fragmented approach to addressing issues within communities. Many current interventions are rightly focused on addressing immediate needs.

Objective 5: Finance

Secure and mobilize the required finances and resources to build a Resilience Tonga by 2035.

Sub-objective 5.1:

Ensure that all relevant stakeholders have access to finance and resources to achieve the goal and targets for a *Resilient Tonga* through accessing the *Tonga Climate Change Fund*.

Expected Outcome:

All relevant stakeholders have access to finance to achieve the goal and targets for a *Resilient Tonga* through the *Tonga Climate Change Fund*.

Activities:

5.1.1 Develop a *Resource Mobilization Plan* for the *Tonga Climate Change Fund* including periodic replenishment schedule;

5.1.2 Collaborate with NEMO in developing a climate resilience Donor directory;

5.1.3 Create a mechanisms to continually update the climate resilience Donor Directory.

Elaboration:

An essential component of the JNAP 2 is to ensure that all stakeholders have access to funds to both develop relevant plans and implement the plans or identified activities from the plans. The *Tonga Climate Change Fund* will be an important mechanism for accessing funds. The *Resource Mobilization Plan* should prioritise expenditure from the Fund on an annual basis and be structured to ensure that all stakeholders have equitable access to funds. Informing stakeholders of relevant donors and opportunities for donor funding is also very important.

Sub-objective 5.2:

Develop and implement a development partner's coordination mechanism for all relevant funding to ensure full alignment with JNAP 2.

Expected Outcome:

A development partner's coordination mechanism is developed and implemented to ensure alignment with JNAP 2.

Activities:

5.2.1 Implement the Tonga 'no objection procedure' for the Green Climate Fund (GCF) and for accredited entities to work closely with the National Designated Authority (NDA) on project identification and concepts approval aligned with the priorities of JNAP2;

5.2.2 Conduct national climate resilience donor roundtables;

5.2.3 Collaborate with development partners for inclusion of specified JNAP 2 programmes into Joint Policy Reform Matrix (JPRM) and through the monitoring and evaluation system;

5.2.4 Engage with regional agencies to coordinate all climate resilience regional initiatives which closely align with JNAP 2 programmes;

5.2.5 Undertake an analysis to determine suitable and applicable institutions for accreditation to Direct Access funds including but not limited to the Adaptation Fund and Green Climate Fund.

Elaboration:

While the first JNAP provided a coherent plan for donors, there is still a need for better coordination of donors in their support to Tonga. With the significant step up in activities proposed in JNAP 2, it is vital that all of the donors are fully aware of, and align with, the programmes, objectives, and activities that have been identified. This JNAP 2 presents a coherent, strategically focused, 'whole of country' approach to building climate resilience. It is essential therefore that all donors and development partners align themselves fully with the JNAP 2 to ensure its success. The potential for direct accreditation of relevant institutions within Tonga needs to be determined to facilitate direct access to international funds such as the Adaptation Fund and the Green Climate Fund.

Sub-objective 5.3:

Develop and implement a strategy for supporting communities, including women, youth, and vulnerable groups, to directly access relevant funding to implement community development plans that are fully aligned with the goals and targets of a *Resilient Tonga*.

Expected Outcome:

Strategy developed and implemented to support communities directly accessing funds to implement community development plans that are fully aligned with the goals and targets of a Resilient Tonga.

Activities:

5.3.1 Develop strategies to support communities in sourcing and accessing relevant climate resilience funding for implementing CDPs;

5.3.2 Government to make an annual contribution to the existing *Tonga Climate Change Trust Fund* to ensure readily available sources of funds for implementation of CDPs.

5.3.3 Support line ministries and agencies dealing with climate change and disaster risk management (CCDRM) with gender mainstreaming and social inclusion capacity building based on detailed human resources capacity assessments;

5.3.4 Incorporate the ability to track the allocation of funds for gender and social inclusion in CCDRM projects.

Elaboration:

The building of a *Resilient Tonga* will depend strongly on community engagement and action, which hinges on having access to funds. Providing access to funds however, is not sufficient on its own. There also needs to be a strong capacity building focus and emphasis on ensuring that CDPs are fully aligned with the targets for a *Resilient Tonga* and supported by natural resource management plans. There are still strong awareness and knowledge gaps within communities regarding the importance of building resilience and avoiding maladaptive practices. These gaps need to be addressed and then there needs to specific support for communities in sourcing and accessing relevant climate resilience funding.

Sub-objective 5.4:

Develop simplified and harmonized procedures for disbursement of relevant funds to communities.

Expected Outcome:

Simplified and harmonized procedures are developed for disbursement of relevant funds to communities.

Activities:

5.4.1 Enact the Tonga Climate Change Fund Bill & Regulations;

5.4.2 Develop sub-national planning, budgeting, and monitoring guidelines inclusive of climate resilience considerations (see 1.4.3).

Elaboration:

These measures are designed to ensure that communities can access funds in a timely manner. However, this needs to go hand-in-hand with awareness raising and capacity building.

Sub-objective 5.5:

Support effective and responsible financial management of climate resilience building resources.

Expected Outcome:

Effective and responsible financial management is supported.

Activities:

5.5.1 Engage an expert to develop a comprehensive monitoring and evaluation plan for JNAP

5.5.2 Develop a compulsory and single standardised government reporting framework/template for all aid activity reporting including climate *resilience* activities.

Elaboration:

There is presently a lack of coherence to financial management of aid activity relating to climate resilience, and other related activities. This needs to be addressed directly by establishment of a single standardized internal reporting system for government.

Objective 6: Regional and International Cooperation

Develop and maintain strong regional and international partnerships and contribute fully to all relevant negotiations aimed at the required transformation to a resilient and sustainable future.

Sub-objective 6.1:

Continue to participate in all relevant regional and international fora and negotiations and strongly promote the policy goal and associated targets of a *Resilient Tonga by 2035*.

Expected Outcome:

After-mission reports are presented and government in-house seminars and trainings on regional and international forums/meetings/negotiations facilitated.

Activities:

6.1.1 The policy goal and targets for a *Resilient Tonga* are promoted through regular participation in relevant regional and international fora and negotiations;

6.1.2 After mission reports are widely disseminated and in-house seminars and trainings facilitated to share lessons and build capacity within MEIDECC.

Elaboration:

National policies and strategies need to inform the position of Tonga and MEIDECC in both regional and international forums/workshops/negotiations. All MEIDECC staff should be very familiar and confident to present and or discuss the Tonga National Climate Change Policy and JNAP 2 to ensure that Tonga's priorities inform regional and international projects/programmes that Tonga is participating in.

Sub-objective 6.2:

Identify and work with regional and international agencies that are best able to support the required transformation to a *Resilient Tonga by 2035*.

Expected Outcome:

The transformation of a *Resilient Tonga by 2035* is supported by regional and international agencies.

Activities:

6.2.1 Regional and international agencies that are best able to support the transformation to *a Resilient Tonga* are identified and engaged with;

6.2.2 When developing guidelines for a *Resilient Tonga*, take into considerations the Climate Change Policy, JNAP 2 and the FRDP

Elaboration:

Tonga's and MEIDECC capacity to elaborate clearly the linkages of its policies and strategies with relevant ones at the regional and global levels and ensure that each are complementing each other's and to align reporting responsibilities will not only same time and money but in a position to be proactive in promoting JNAP 2 and to influence regional projects and convince donors.

Image by: *NEMO.*

4.4 Targets for a Resilient Tonga

JNAP 2 is fully aligned with the Tonga Climate Change Policy 2016. The JNAP 2 goes one critical step further however, fully integrating disaster risk management considerations into a set of resilient targets adapted from those outlined in the Climate Change Policy. **Figure 11** summarizes these adapted targets.

Figure 11: *JNAP 2 Adapted Resilient Targets.*

Implementation Strategy

Section 5: Implementation Strategy

5.1 Indicative Budget

Table 1.5: *Initial Indicative Budget.*

JNAP 2 Objectives	Indicative Costing (US$'000)
Objective 1: Mainstreaming for a Resilient Tonga Mainstream climate change and disaster risk management approaches into government legislation, policies and plans at all levels.	10,375
Objective 2: Research, monitoring, data, information Implement a coordinated approach to research, monitoring and management of data and information.	5,860
Objective 3: Resilience-building response capacity Develop the capacity for resilience building responses throughout government, the private sector and civil society.	5,055
Objective 4: Resilience-building actions To design and implement on-the-ground actions that focused on building a Resilient Tonga by 2035 at national, island and community levels.	125,600
Objective 5: Finance Secure and mobilize the required finances and resources to build a Resilience Tonga by 2035.	283
Objective 6: Regional and international cooperation Develop and maintain strong regional and international partnerships and contrite fully to all relevant negotiations aimed at the required transformation to a resilient and sustainable future.	0
Total Costing	147,173

The JNAP 2 is presented with an indicative budget of $147,173,000 USD **(Table 1.5).** The resources allocated to specific activities should be refined as activities are further refined and developed into full project proposals. The costings presented here are conservative and are based on the cost of goods and services at the time of writing.

Once sector and other plans are completed additional activities and costings should arise; for example, from the annual review of CDPs, identification of actions to build monitoring capacities; scoping work to develop a national climate resilience research centre, and completion of integrated natural resource plans. Actions resulting from Objective 6 were not costed as these costs are mostly borne by regional programmes and organisations. Details of the indicative budget are presented in Annex 2.

5.2 Resource Mobilisation

Resourcing is a whole of Government, whole of country/communities responsibility if a Resilient Tonga is to be promoted and achieved. A strong coordination and advocacy structure however, needs to drive this process. The JNAP Secretariat and the JNAP Task Force, in partnership with government agencies, civil society and NGOs, private sector and communities have credible track records since JNAP 1. This institutional arrangement is continuing with JNAP 2.

Both human and financial resources are required for the timely, efficient and effective implementation of JNAP 2. There is critical and urgent need for financial support to enable Tonga to significantly reduce vulnerability to climate change and reduce disaster risk in order to achieve sustainable and resilient development. The integrated approaches advocated in the JNAP 2 and the Tonga-GCF National Designation Authority (NDA) 'no objection procedures' should result in resource efficiencies and may, thereby, facilitate improved and coordinated access to financing.

Financing however, must reach the most vulnerable to be effective, and will often involve working with the disadvantages, living in already vulnerable areas such as those prone to flooding and from remote islands.

It is also important to build and enhance the knowledge and evidence basis for disaster risk management and for addressing climate change concerns. This includes ongoing investment in research and its application. Training, education, community planning workshops involving multi-sector participation, and other forms of human resources development, are critical to building resilient communities, communities more able to effectively participate in risk reducing initiatives and protect the interests of their most vulnerable people. Training is also essential for national disaster and climate change agencies and for other key national departments, as is prioritised in JNAP 2 (such as lands, health, education, tourism and planning). Such needs based capacity building can provide a significant return on investment.

The private sector can make specific contributions to enhancing resilience on a local scale, for example in raising awareness around disaster risk reduction, climate change adaptation and emissions reduction as the first step towards increased resilience at community level. The JNAP 2 urges national, regional and development partners to provide financial and technical support for its implementation.

5.3 JNAP Management structure

The management structure for implementation of the JNAP 2 is a refinement of the management structure developed for JNAP 1. The focal point for all relevant climate resilience activities remains in the Department of Climate Change (DCC) with the JNAP Secretariat taking a lead role in coordination and implementation with direct linkages to Parliament and Cabinet, the NCCCC and NEMC, and the JNAP Taskforce. Regionally the Department of Climate Change is the focal point in Tonga for the Pacific Resilience Partnership (PRP), and all development partners, multilateral agencies, and CROP agencies.

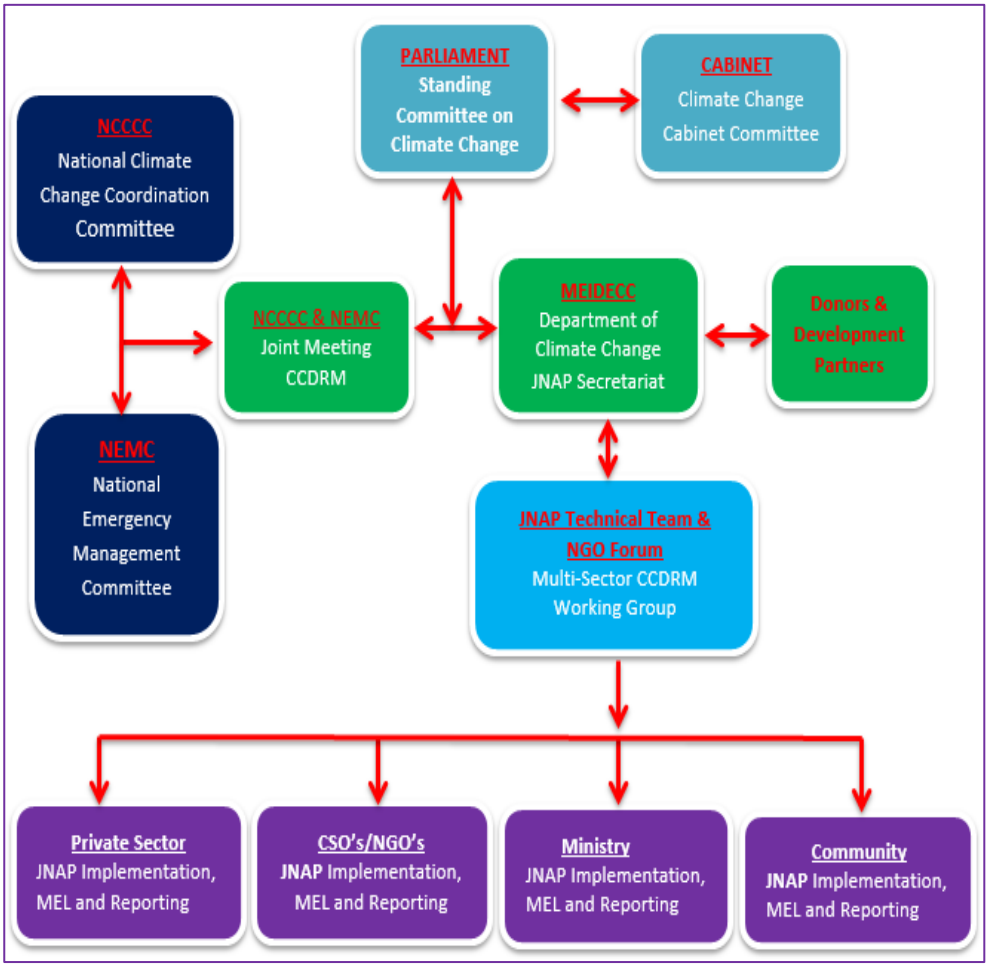


Figure 12: *The JNAP 2 Management Structure.*

Formation of the JNAP Secretariat was a key development from JNAP 1. The Secretariat comprised of three staff: a team leader, climate finance officer, and climate change officer. This structure should remain with the addition of a disaster risk management officer and a monitoring, evaluation and learning officer. The Terms of Reference (TOR) for the JNAP Secretariat should be revised and strengthened to reflect the demands of JNAP 2. The roles and functions of the JNAP Secretariat (**Table 1.6**) will be those of a Programme Management Unit (PMU).

Table 1.6: *The roles and functions of the JNAP Secretariat.*

Stakeholder Group	Roles and Responsibilities
Parliament Climate Change Standing Committee	➢ Consider and report any matters relating to climate change, Environment and Sustainable Issues
Cabinet Committee	➢ Advice the Government of Tonga on appropriate and effective policy responses on the issue of climate change and for Tonga to effectively access climate change funds. ➢ Endorsement and approval of JNAP 2
National Climate Change Coordinating Committee (NCCCC former NECC)	➢ High level oversight, policy guidance and direction ➢ Coordination of all Climate Change related activities ➢ Review of JNAP implementation progress
MEIDECC (former MECC)	➢ High level oversight, policy guidance and direction
JNAP Task Force	➢ Provide high level guidance to the JNAP Secretariat ➢ Advice the NCCCC on Technical matters relating to JNAP 2 ➢ Liaise with all Ministries to ensure that all mainstreaming, data and information management, capacity building, and resilience building actions are fully implemented.
JNAP Secretariat	➢ Manage and coordinate all climate and disaster activities in Tonga. This will also assist in avoiding duplication and promoting replication ➢ Souring variable climate finance and new climate initiatives applicable to the Tonga context including further capitalization of CCTF ➢ Integrate JNAP actions into Corporate Plans and Annual Management Plans.

	➢ Organise meetings and develop project profiles and related documentation to facilitate requests for funding and technical assistance from donors ➢ Liaise with donors and development partners to secure funding and technical assistance to implement JNAP activities ➢ Carry out monitoring and evaluation of the JNAP implementation including activities and projects develop under JNAP ➢ Provide narrative and financial reports of the JNAP on quarterly basis.
Ministries agencies and local partners	➢ Ministry: Support the implementation of JNAP 2 activities Facilitate the integration of JNAP actions into Corporate Plans and Annual Management Plans ➢ Local Partner: Facilitate integration of JNAP actions into respective planning and budget and, assist with the implementation of JNAP 2 activities in collaboration with the Task force.
Private Sectors	➢ Support the implementation of JNAP 2 activities and provide feedback for monitoring
Villagers and Community Groups	➢ Support implementation of JNAP 2 activities particularly the community projects ➢ Provide feedback to assist monitoring and evaluation
Donors and Development Partners	➢ Provide financial and technical support to enable the successful implementation of the JNAP activities.

5.4 Communications strategy

A comprehensive communication strategy for the JNAP 2 will be developed within six months of the JNAP release. This communication strategy will be aligned with the Department of Climate Change overall Communication Plan. Some of the considerations the communications strategy will cover include:

- Ensuring that Cabinet and key government fora such as the Project & Aid Coordinating Committee (under the Ministry of Finance & Planning) are regularly updated on JNAP implementation progress;
- Strengthening communication linkages with island development committees in order to facilitate the communication of the JNAP 2 to rural communities;
- Maximising the use of free to air broadcasts on radio and television through the Ministry of Finance;
- Utilising specialist public relations expertise to help define and develop awareness campaigns and associated material.

- Using the networks provided through church and affiliated groups to ensure wide dissemination of information.

5.5 Monitoring and evaluation

Monitoring and evaluation is a key area that needs to be strengthened in implementation of the JNAP 2. A comprehensive monitoring and evaluation plan for the JNAP 2 will be developed and implemented by the monitoring and evaluation officer, to be appointed to the JNAP Secretariat. This is a high priority for the JNAP 2. The monitoring and evaluation plan will cover the full 10 year duration of the JNAP 2 with provision for at least two progress reviews. Annual reviews will also be incorporated into the planned annual forums to review and revise JNAP 2 activities based on completed plans.

JNAP 2 Linkages with National, Regional and International Frameworks

Section 6: JNAP 2 Linkages with National, Regional and International Frameworks

JNAP 2 is well aligned to the National, Regional and International Frameworks as illustrated in Figure 13.

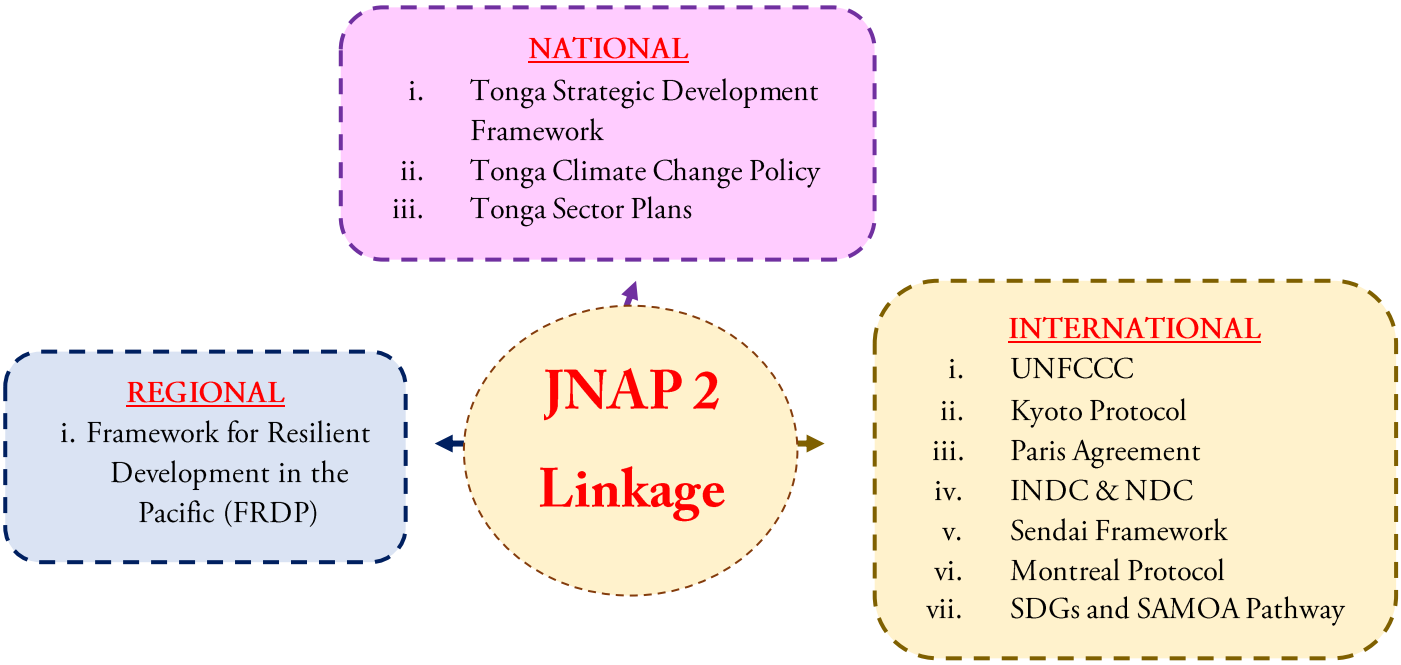


Figure 13: *The JNAP 2 Linkages with National, Regional, and International Frameworks*

Source: *Climate Change Department*

6.1 JNAP 2 linkages with the Tonga Strategic Development Framework

The Tonga Strategic Development Framework (TSDF) 2015-2025 is the overarching framework for development of the JNAP 2. The overarching motto for the Tonga Strategic Development Framework 2015-2025 (TSDF 2015-2025) is **God and Tonga are my inheritance** established by King Tupou I. It signifies that *"Tonga is our inheritance and our wealth in the form of our people, our land, and our strong Christian and traditional values that underpin our culture. We have inherited this from our families. We must pass it on to our children in an improved condition. This requires us to be wise and prudent in our use of our inherited wealth. Our plans, strategies and policies must be supportive to our inheritance and they must be inclusive and sustainable, so that we leave a more valuable inheritance for those who follow us."* To support our inheritance which is our people and our land, the TSDF 2015-2025 is designed to achieve the National Goal of "A more progressive Tonga supporting a higher quality of life for all".

The achievement of this is supported by seven National Outcomes:

A. A more inclusive, sustainable and dynamic knowledge-based economy.
B. A more inclusive, sustainable and balanced urban and rural development across island groups.
C. A more inclusive, sustainable and empowering human development with gender equality.
D. A more inclusive, sustainable and responsive good-governance with law and order.
E. A more inclusive, sustainable and successful provision and maintenance of infrastructure and technology.
F. A more inclusive, sustainable and effective land administration, environment management, and resilience to climate and risk.

G. A more inclusive, sustainable and consistent advancement of our external interests, security and sovereignty.

While the JNAP 2 is most clearly aligned with **National Outcome F** - A more inclusive, sustainable and effective land administration, environment management, and resilience to climate and risk, it is also strongly aligned with the other six national outcomes.

This alignment recognizes that climate change and natural disasters will increasingly affect all aspects of life in Tonga, and will threaten our inheritance and our wealth, that is, "our land, our people and strong Christian and traditional values that underpin our culture". Addressing all seven national outcomes is essential for the realization of a Resilient Tonga.

6.1.1 Linkages between the TSDF, JNAP 2, Policy and Planning

The relationships between the TSDF, JNAP 2, Policy and Planning, National budgeting and donor funding are shown in **Figure 14.**

For these relationships to function effectively a number of key weaknesses need to be addressed;

1. Climate change and disaster risk management needs to be an integral part of all policy, planning, and budgeting, across all sectors and from national to local level.
2. Sector plans need to be developed for a number of key areas, including health and education, with climate change and disaster risk management fully integrated.
3. Sector plans, once developed, need to be fully integrated into corporate planning.

The Tonga Climate Change Policy 2016 is a key document for ensuring full integration of climate change and disaster risk management. The latter will be achieved through implementation of the JNAP 2. As stated in the Policy and associated JNAP 2 "it is not intended to replace sector specific policies and plans, rather, it provides an overarching context and guiding framework, with policy objectives that, for the most part, will require multi-sector coordination". This recognizes that climate change is the single biggest issue that will determine the future of Tonga over coming decades and will require a 'whole of Tonga' level of cooperation and coordination. In simple terms, the Tonga Climate Change Policy defines the policy environment for building climate resilience, and the JNAP 2 identifies priority activities to put the policy into action, which requires the integration of climate resilience into all policies, plans and projects.

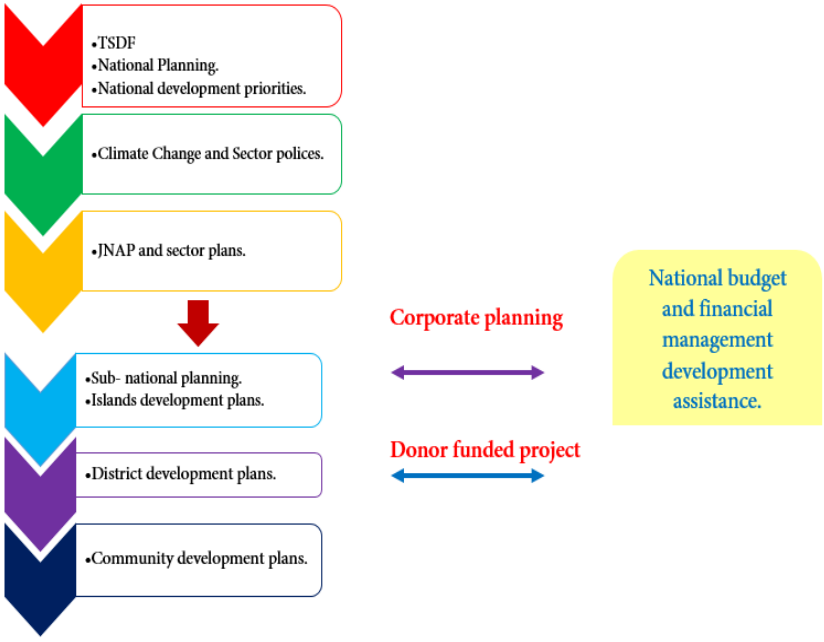


Figure 14: *The relationship between the TSDF, JNAP 2, Policy and Planning, and Budgeting Processes.*
Source: *Climate Change Policy 2016.*

The policy further states that "The objectives of this policy will become the objectives of the JNAP 2, while the sub-objectives and outcomes will become the basis for its activities, which will be specific, measurable, achievable, realistic and time-bound (SMART), guided by the long-term targets presented in this policy".

6.2 Linkages with Regional and International Frameworks

The JNAP 2 is also closely linked to a number of Regional and International Frameworks and Agreementsthat Tonga is a party to.

6.2.1 Regional context

1. Framework for Resilient Development in the Pacific (FRDP).

The FRDP replaces two separate regional frameworks on climate change and disaster risk management namely the 2005 – 2015 Pacific Disaster Risk Reduction and Disaster Management Framework for Action (commonly referred to as the Regional Framework for Action or RFA) and the 2005-2015 Pacific Islands Framework for Action on Climate Change (PIFACC).

The Framework for Resilient Development in the Pacific: An Integrated Approach to Address Climate Change and Disaster Risk Management (FRDP) is an integrated approach to addressing climate change and disaster risk management in the region.

The Framework is for all stakeholders (national and local government, civil society and communities, private sector, regional organizations and other development partners) aimed at building resilience to climate change and all natural hazards. The rationale for this integrated approach is very clear, with a strong inter-relationship between climate change and climate-related hazards, and approaches to building resilience that are universally relevant. Furthermore it acknowledges the limited resources and capacity within Pacific Island countries as well as the common linkages to underlying development issues.

6.2.2 International Context

Tonga is party to a number of regional and international frameworks and agreements that are of relevance to the formulation of the JNAP 2.

1. United Nations Framework Convention on Climate Change (UNFCCC).

   The United Nations Framework Convention on Climate Change (UNFCCC) was negotiated at the Earth Summit in Rio de Janeiro in 1992 and entered into force on 21st March 1994. The UNFCCC objective is to "stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system". The framework set no binding limits on greenhouse gas emissions for individual countries and contains no enforcement mechanisms. Instead, the framework outlines how specific international treaties under the UNFCCC (called "protocols" or "Agreements") may be negotiated to set binding limits on greenhouse gases. Tonga became a signatory party to the UNFCCC on 20th July 1998. As a signatory Tonga is obligated to produce national communications to the UNFCCC. The first and second national communications have been submitted, and the third is due for submission by the end of June 2018.

2. The Kyoto Protocol.

The Kyoto Protocol to the UNFCCC was adopted at the Third Session of the Conference of the Parties to the UNFCCC held in 1997, Kyoto, Japan. This contains legally binding commitments for developed countries to reduce greenhouse gas emissions. These countries agreed to reduce their greenhouse gas (GHG) emissions by at least 5% below 1990 levels on a global level in the commitment period 2008–2012. This Protocol came into force in 2005. Tonga acceded to the Kyoto Protocol in January 2008. Like all developing countries, Tonga has no reduction commitments under the Kyoto Protocol, however Tonga can undertake mitigation actions to contribute to the achievement of the core objective of the UNFCCC. The Government of Tonga has promoted the utilization of Renewable Energy Resources and Energy Efficiency and has set a target of 50% renewable energy by 2020 and 100% renewable energy by 2035.

3. National Adaptation Plans.

At its seventeenth session, the Conference of the Parties (COP) to the UNFCCC acknowledged that national adaptation planning can enable all developing and least developed country Parties to assess their vulnerabilities, and to mainstream climate change adaptation to address risks

The agreed objectives of the national adaptation plan process are;

- To reduce vulnerability to the impacts of climate change, by building adaptive capacity and resilience.
- To facilitate the integration of climate change adaptation, in a coherent manner, into relevant new and existing policies, programmes and activities, in particular development planning processes and strategies, within all relevant sectors and at different levels, as appropriate.

Through the JNAP 1 and JNAP 2, the government of Tonga's planning frameworks align with the principle objectives of the National Adaptation Plans processes as envisaged in NAP related COP discussions and decisions.

4. The Paris Agreement.

In 2015, all parties to the convention came together for the 21st UNFCCC Conference of the Parties (COP 21). By consensus they adopted the Paris Agreement. The Paris Agreement builds upon the UNFCCC and brings all nations together to undertake ambitious efforts to combat climate change and adapt to its effects. It includes enhanced support to assist developing countries to achieve this goal. The central aim of the Paris Agreement is to keep the 21st century global temperature rise below 2°C, and to pursue efforts to limit the temperature increase to 1.5°C. The agreement entered into force once ratified by 55 countries representing 55% of greenhouse gas emissions. This threshold was achieved on 5th October, 2016 and the Paris Agreement entered into force on 4th November, 2016.

5. Intended Nationally Determined Contributions and Nationally Determined Contributions.

At the 19th Conference of the Parties the UNFCCC created a mechanism for the development of Intended Nationally Determined Contributions (INDCs). The intention of the INDCs was for countries to submit their plans for addressing both mitigation and adaptation, as was deemed nationally appropriate. Unfortunately this was not clearly understood among Pacific Island Countries, with a number focusing only on mitigation despite their emissions being very low and needs for adaptation very high. Tonga's INDC, submitted during COP 21, was strongly guided by its new Climate Change Policy and so emphasised an integrated approach to adaptation and mitigation aimed at a Resilient Tonga by 2035. Tonga INDC also links to its Third National Communication and JNAP 2.

6. The Sendai Framework.

The Sendai Framework for Disaster Risk Reduction 2015-2030 succeeds the Hyogo Framework for Action (HFA) 2005-2015. It aims to achieve "the substantial reduction of disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of

persons, businesses, communities and countries". It was endorsed by the UN General Assembly in June 2015.

The Sendai Framework sets four priorities for action:

1. Understanding disaster risk.
2. Strengthening disaster risk governance to manage disaster risk.
3. Investing in disaster risk reduction for resilience.
4. Enhancing disaster preparedness for effective response, and to "Build Back Better" in recovery, rehabilitation and reconstruction.

The Framework recognises that climate change is leading to increased frequency and intensity of climate related disasters. It identifies and recommends specific actions aimed at achieving the four priorities for action. Many of these are aimed at reducing vulnerability and increasing resilience to climate change.

7. The Montreal Protocol.

The Montreal Protocol, agreed in 1987, is aimed at phasing out the production and consumption of ozone depleting substances. In October 2016 an amendment to the Montreal Protocol was signed by 200 countries, including Tonga, aimed at reducing the use of Hydrofluorocarbons (HFCs). HFCs can have global warming potentials up to 14,800 times that of Carbon dioxide, and are therefore extremely potent greenhouse gases. The Kigali amendment was adopted at the 28th meeting of the parties to the Montreal Protocol. This is aimed at eliminating HFC gases, which are also identified as greenhouse gases under the Kyoto Protocol.

8. SDGs and the SAMOA Pathway

The 2030 Agenda for Sustainable Development was adopted at the United Nations Sustainable Development Summit on 25 September 2015. It is a plan of action for "people, planet, and prosperity". The 17 Sustainable Development Goals and 169 targets seek to build on the Millennium Development Goals. The SIDS Accelerated Modalities of Action (SAMOA) Pathway is the outcome of the Third International Conference on Small Island Developing States, held in September 2014 in Samoa. The SAMOA Pathway reaffirms the commitment of SIDS "to move the sustainable development agenda forward, and in this regard we urge all parties to take concrete measures to expeditiously advance the sustainable development of small island developing states, including through the internationally agreed development goals, in order for them to eradicate poverty, build resilience and improve the quality of life". It further recognises that sea level rise and other climate change impacts pose a significant risk to SIDS and their efforts to achieve sustainable development, and calls for support to SIDS in building resilience.

Image by: *MAFF*

Image by: *NEMO*

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Annexes

Annex 1: Results Framework

JNAP 2 Goal: A Resilient Tonga by 2035				
Objective 1: Mainstreaming for a Resilient Tonga				
Expected Outcome: Climate Change Disaster Resilience approaches are embedded in legislation, policy and plans to promote and enforce resilient development approaches in all Government development processes and on-the-ground-implementation.				
Sub-Objectives	**Activities**	**Means of Verifications**	**Indicators**	**Lead Coordinating Agencies**
Sub-objective 1.1 Strengthen existing decision-making structures, in particular the National Climate Change Coordinating Committee (NCCCC) and the Environment and Climate Change Standing Committee (CCSCP) in Parliament.	1.1.1 Conduct relevant awareness and training programmes for the NCCCC and the CCSCP;	More effective integration of climate change and disaster risk reduction considerations into all parliamentary decisions by the end of 2019	Increased reference to climate change and disaster risk reduction in parliamentary records Climate change and disaster risk reduction considerations in all policy and legislation	MEIDECC and MFNP
	1.1.2 Develop national Monitoring and Evaluation plan for JNAP 2 and recruit a M&E officer;	A revitalised and strengthened JNAP Secretariat is established by the middle of 2018	Quarterly reporting Proposals and Technical reports Financial negotiations and resource mobilisation	Department of Climate Change, JNAP Taskforce
	1.1.3 Strengthen, revitalise and reconfirm the TOR of the JNAP Taskforce	Increased level of engagement and mainstreaming of climate resilience in sectors	Integration of climate resilience into corporate and sector planning and budget processes	Department of Climate Change and JNAP Secretariat
Sub-objective 1.2 Mainstreaming the goal of a *Resilient Tonga* in all government ministries planning, design and execution of programmes, with supporting guidelines and training (incorporating the JNAP 2 adapted targets for a *Resilient Tonga*).	1.2.1 Develop guidelines based on the targets for a *Resilient Tonga* adapted for JNAP 2 to guide ministries and sectors mainstreaming;	A published set of guidelines based on the targets for a Resilient Tonga by the end of 2018	Annual peer review of all Ministry corporate plans and budgets to ensure that climate resilience is fully integrated	MEIDECC, MOFNP, Line Ministries
	1.2.2 Develop processes, guidelines and/or check lists to enable mainstreaming at the decision making, developing planning and budgetary planning levels (e.g. in project development and screening, licensing, development licence and permits etc including social, environment safeguards and gender inclusions).	Every Ministry has a dedicated climate resilience senior staff member by the middle of 2019	Quarterly reports and other achievements to the JNAP Secretariat, Director of Climate Change and JNAP Taskforce	All responsible Government Ministries

	1.2.3 Assess capacity needs and develop appropriate capacity building programmes for each government Ministries, NGO's, and the Private Sector	TOR confirmed and long term funding is secured for outer island climate resilience officers by the middle of 2018	Climate resilience officers from outer islands to provide quarterly reports to the JNAP Taskforce and JNAP 2 Secretariat Implementation Reports	JNAP Secretariat and MIA
	1.2.4 Recruit dedicated climate resilience staff to all outer islands ministries based on the capacity assessment above;	Budget line for this positions created and budget approved	Timely recruitment	MEIDECC, CCD
Sub-objective 1.3. Develop and implement the prioritised sector resilient plans such as biodiversity, education, energy, fisheries, forestry, health, infrastructure, land, water, and youth (with supporting policies and legislation where necessary).	1.3.1 Conduct sector vulnerability assessments to establish baseline and to inform priority sectors resilient planning;	A published set of guidelines based on the targets for a Resilient Tonga by the of March 2018	Provision of Monitoring and Evaluation reports from all sector plan developments to the Monitoring and Evaluation staff member on the JNAP Secretariat	MEIDECC, all responsible line Ministries, and private sector stakeholders
	1.3.2 Priority sectors resilient plans to be developed, integrating the gender inclusions, youth, and people with disabilities and other vulnerabilities, costed and fully aligned with the JNAP 2 adapted targets for a *Resilient Tonga;*	Health sector plan developed by the end of 2018	Health sector plan published, approved by Parliament and disseminated	Ministry of Health with support from: JNAP Secretariat Natural Resources Division TWB
	1.3.3 Develop priority sectors multi hazard disaster preparedness, response and recovery plans including regular drill exercises;	Revised tourism sector plan developed by the end of 2018	Revised tourism sector plan published, approved by Parliament and disseminated	Ministry of Tourism and Tonga Tourism Authority, with support from JNAP Secretariat and Tonga Chamber of Commerce
	1.3.4 Review, and if necessary revise, the new forestry plan to ensure that it is fully aligned with JNAP adapted targets for a *Resilient Tonga*;	Education sector plan developed by the end of 2018	Education sector plan published, approved by Parliament and disseminated	Ministry of Education with support from JNAP Secretariat
	1.3.5 Review, and if necessary revise, the new water resources supply and management plan to ensure that it is fully aligned with the JNAP adapted targets for a Resilient Tonga;	Revised youth sector plan developed by the end of 2018	Revised youth sector plan published, approved by Parliament and disseminated	MIA with support from JNAP Secretariat
	1.3.6 Review/develop national coastal zone management plan and national land use plan with the adapted JNAP targets for a resilient Tonga;	New agriculture sector plan developed by 2021	New agriculture sector plan published, approved by Parliament and disseminated	MAFFF, AGC, with support from JNAP Secretariat

	1.3.7 Review the National Biodiversity Strategy and Action Plan;	New fisheries sector plan developed by 2025	New fisheries sector plan published, approved by Parliament and disseminated	MAFFF, FGC, with support from JNAP Secretariat
	1.3.8 Complete the background studies on what is required to achieve a 100 percent renewable energy by 2035	Review of forestry plan completed by the end of 2018	Revised forestry plan published, approved by Parliament and disseminated	Forestry Division, MAFFF with support from JNAP Secretariat
	1.3.9 Develop Tonga's NDC Stock Take and reporting to the COP under the Paris Agreement by 2020	Review of water resources supply and management plan completed by the end of 2018	Revised water resources supply and management plan published, approved by Parliament and disseminated	MLNR, Department of Geology, MOH, TWB, MIA with support from JNAP Secretariat
	1.3.10 Develop a new energy sector plan based on lessons learned from the Tonga Road Map (the Energy Roadmap is coming towards its deadline) aiming towards achieving the goal of 100 percent renewable energy by 2035 and consistent with Tonga's NDC	National coastal zone management plan and national land use plan developed by the end of 2020	National coastal zone management plan and national land use plans published, approved by Parliament and disseminated	MLNR with support from MEIDECC
	1.3.11 Complete background studies on feasibility to transition away from petrol and diesel (alternative sources) for the transport sector (shipping and vehicles)	Revised NBSAP by the end of 2017	NBSAP revised, published and disseminated	MEIDECC –Department of Environment
	1.3.12 Develop a Tonga Climate Change Management Act	Background studies are completed by the end of 2019	Background studies are published and disseminated	Department of Energy, MEIDECC with support from JNAP Secretariat
Sub-objective 1.4 Develop appropriate and standardise resilience guidelines (incorporating the adapted JNAP 2 targets for a *Resilient Tonga*) for community engagement activities, which are to be implemented through strengthened partnerships between government, civil society, and the private sector, with Ministry of Internal Affairs	1.4.1 Develop a standard resilience guidelines for all community engagement activities;	Standard resilience guidelines developed by 2019	Standard resilience guidelines are published and implemented, leading to revised community development plans	MIA, with support from MEIDECC
	1.4.2 Develop integrated water resource management plans for all rural villages, to be integrated with village specific information from the national coastal zone and land use management plans;	Comprehensive resource plans, incorporating coast, water, and land are developed for every village by the end of 2020	Village resource plans are published	MLNR in partnership with MEIDECC

strengthened in its coordinating role, and all community development plans and island strategic development plans progressively aligned with the goal of a *Resilient Tonga*.	1.4.3 Review and revise all community development plans to ensure they are aligned with the adapted JNAP 2 targets for a *Resilient Tonga*	All community development plans are revised by the end of 2022	Revised community plans are published	MIA, with support from JNAP Secretariat
	1.4.4 Review and revise all district and island development plans to ensure they are aligned with the adapted JNAP 2 targets for a *Resilient Tonga*.	District and island development plans are revised by the end of 2022	Revised district and island development plans are published	MIA, with support from JNAP Secretariat and all Ministries with relevant sector plans
Sub-objective 1.5 Improve knowledge on gender and community based perspective and capacity for adaptation and for responding to climate change and natural disasters,	1.5.1Conduct a study to identify local knowledge regarding the distribution of responsibilities within the family in climate change adaptation and in preparation and response to natural disasters and climate stresses;	Study reports and agreed responses strategies	Number of families participated	MEIDECC CCD and MIA
	1.5.2 Conduct pilot studies to estimate the cost of climate change and natural disasters impacts on community livelihoods. The case studies could be representatives of urban, rural and outer islands settings	Pilot studies report	Number of new livelihoods activities in the communities	MEIDECC CCD and MIA
	1.5.3 Conduct a study on scenarios of relocation due to climate change and natural disasters impacts taking into considerations gender perspectives	Relocation strategies and policies	Improved awareness on migration due to CC and Disaster Risks improved after the study	MEIDECC CCD and MIA
Objective 2: Implement a coordinated approach to research, monitoring and management of the data and information				
Expected Outcome – Enabling frameworks and protocols for research, monitoring and evaluation, data, information and knowledge management for resilience building established and are functional				
Sub-objective 2.1 Identify national capacity needs for climate resilience data, information collection analysis, including gender analysis, and vulnerability assessment, cost benefit analysis and develop appropriate capacity building programmes for implementation	2.1.1 Implement the capacity needs based on the assessment	The data, information and knowledge management system is enhanced by 30th June 2019 through: • A communication strategy • Development of GIS capacity • Enhanced data sharing	A published communication strategy A report on outcomes from GIS capacity building A report on outcomes from gender sensitive capacity building	JNAP Secretariat, supported by all relevant Ministries, private sector, and CSOs

		• Capacity building on importance of gender sensitive data completed		
	2.1.2 Strengthen inter-connected web portals	Link from the climate change portal to the data management system at Statistics Department is established by June 2018	Communication strategy between MEIDECC and Statistics Department for data and information sharing	Department of Climate Change, MEIDECC and Statistics Department
	2.1.3 Develop protocols for integrated data and information sharing and management	Approval of the protocol and improved sharing of data	Timely access to relevant data and information	Department of Climate Change, MEIDECC and Statistics Department
	2.1.4 Enhance the existing coordination system (established under JNAP1) for effective management of climate change data, information and knowledge;	Climate change websites maintained and regularly updated	Timely access of data and information	Department of Climate Change, MEIDECC and Statistics Department
	2.1.5 Develop and approve national indicators (starting with the priority sectors) to regularly collect to assist in evaluation of projects' impacts	Nationally agreed indicators widely used by sectors and or clusters	SMART Indicators collected	Department of Climate Change, MEIDECC and Statistics Department
	2.1.6 Establish a link from the climate change portal to the existing data management system at Statistics Department;	Websites maintained and updated	Number of visions and hits	Department of Climate Change, MEIDECC and Statistics Department
	2.1.7 Enhance the research and documentation, data collection information and knowledge on Traditional Knowledge on climate.	Research reports widely disseminated	Number of new and relevant research projects per year	Department of Climate Change, MEIDECC and Government Sectors and or Clusters
	2.1.8 Review hard ware's and maintenance need (technology needs assessment) for implementation	Information technology updated	Number of staff trained for technology maintenance	Department of Climate Change, MEIDECC and Government Sectors and or Clusters
Sub-objective 2.2	2.2.1 Strengthen the existing climate change portal for information management and sharing	The climate change portal is strengthened by the end of 2018	A fully operational climate change portal Number of registered users	JNAP Secretariat, supported by all relevant Ministries, private sector, and CSOs

Enable effective, interactive and accessible GIS hubs building on the existing environment and climate change portal, (including the private sector, civil society organization s, and communities) to inform wise development for achieving a *Resilient Tonga.*	2.2.2 Establish an accessible GIS hubs for management and use of all relevant data	An accessible GIS based hub is established by 30th June 2019 with all relevant data incorporated GIS data widely applied for resilience planning and accessible	A fully operational GIS based hub Documentation of all data that are incorporated, including gender disaggregated community data and information, and relevant climate change data and information Monitoring of usage of climate and climate change relevant data and information	JNAP Secretariat, supported by all relevant Ministries, private sector, and CSOs Natural Resources Division, MLNR, with support from the JNAP Secretariat
	2.2.3 Conduct LIDAR surveys aiming to cover the remaining of Tonga;	A LIDAR survey for all of Tonga is completed by 30th June 2019	LIDAR data are integrated into the GIS based hub	Natural Resources Division, MLNR, with support from the JNAP Secretariat
	2.2.4 Conduct training on the management and use of the climate change portal and GIS-based system.	Training on management and use of the climate change portal and GIS based system is completed by the end of 2018	Report on outcomes from the training On-going monitoring of use of the climate change portal and GIS based system	JNAP Secretariat, supported by all relevant Ministries, private sector, and CSOs
Sub-objective 2.3 Develop fully operational monitoring systems, focusing in particular on ground water, soil health, and coastal monitoring, and a comprehensive climate early warning system.	2.3.1 Explore the feasibility and to purchase a Doppler radar infrastructure and management system for detecting and monitoring of extreme weather events;	Doppler radar is operational for the 2018/19 cyclone season and is purchased by September 2018	Increased accuracy in forecasting and monitoring of extreme weather events	Department of Meteorology, MEIDECC
	2.3.2 Establish a monitoring system for currents, waves and the ocean pH level;	Monitoring system to be established and operational by the end of 2018	6 monthly reports provided to the JNAP Secretariat	Department of Meteorology, MEIDECC
	2.3.3 Identified gaps in water, soil, health, coastal erosion plus related sectors and strengthen the monitoring and management systems for each sector.	Gaps in water, soil, health, coastal plus related sectors monitoring and management are addressed by the end of 2019	6 monthly reports on water, soil, health, coastal plus related sectors from all monitoring are provided to JNAP Secretariat	JNAP Secretariat, Department of Climate Change and Ministries, Departments and Agencies (MDA)
	2.3.4 Strengthen meteorological services throughout Tonga	Warnings reaching to every island in Tonga	Number of lives and properties saved	MEIDECC NEMO, Clusters and Sectors
Sub-objective 2.4	2.4.1 Formulate a strategy and plan for establishing a climate resilience research centre;	Strategy and plan to be developed by the end of 2018	Publication and dissemination of the strategy and plan	JNAP Secretariat at Department of Climate Change and MDAs

Develop and implement a fully coordinated, multi-disciplinary 'Research for Resilience Centre'.	2.4.2 Establish a climate resilience research centre. A laboratory and a library are to be part of the centre	Climate resilience research centre is established and operational by the end of 2019	A research programme is developed, funded, and implemented with six monthly reports provided to the JNAP Secretariat and JNAP Taskforce	JNAP Secretariat and JNAP Taskforce and, with support from all Ministries
Objective 3: Resilience-building response capacity				
Expected Outcome: Mechanism are established to ensure that all government agencies, private sector, and civil society organizations are working together in a full coordinated manner for all resilience-building activities across all sectors				
Sub-objective 3.1 Establish necessary mechanisms to ensure that all government agencies, the private sector, and civil society organization s are working together in a fully coordinated manner for all resilience-building activities across all sectors.	3.1.1 Establish an umbrella framework document for coordinating resilience building across the public sector, private sector and wider community;	Umbrella framework for all resilience building activities is established by the end of 2018	Provision of six monthly reports to JNAP Secretariat and Taskforce	JNAP Secretariat and JNAP Taskforce, supported by all Government Ministries, the private sector, and all CSOs
	3.1.2 Develop an online self-directed course to promote and educate about the substance of the framework document.	Comprehensive capacity building programme is developed by the end of 2018	Publication of capacity building materials, including the launching of the online course	JNAP Secretariat and JNAP Taskforce, supported by all Government Ministries, the private sector, and all CSOs
Sub-objective 3.2 Implement on-going capacity building programmes on resilience in a consistent and coordinated manner for all government ministries, the private sector, and civil society to ensure a 'whole of Tonga' approach to achieving the goal of a *Resilient Tonga*.	3.2.1 Implement capacity building on resilience, incorporating the JNAP 2 adapted targets for a *Resilient Tonga*, for all public sector employees;	Capacity building is implemented for all public sector employees by the end of 2022	Reporting on outcomes to JNAP Secretariat: 25% of public sector employees by the end of 2019 50% of public sector employees by the end of 2020 75% of public sector employees by the end of 2021 100% of public sector employees by the end of 2022	JNAP Secretariat and JNAP Taskforce, supported by all Government Ministries, the private sector, and all CSOs
	3.2.2 Implement capacity building on resilience, incorporating The JNAP 2 adapted targets for a *Resilient Tonga*, for all private sector organization s and employees;	Capacity building is implemented for all private sector organization s and employees by the end of 2022	Reporting on outcomes to JNAP Secretariat: 25% of private sector employees by the end of 2019 50% of private sector employees by the end of 2020 75% of private sector employees by the end of 2021 100% of private sector employees by the end of 2022	

	3.2.3 Implement capacity building on resilience, incorporating the JNAP 2 adapted targets for a *Resilient Tonga*, for all civil society organization s.	Capacity building is implemented for all civil society organization s by the end of 2020	Reporting on outcomes to JNAP Secretariat: 50% of civil society organization s by the end of 2019 100% of civil society organization s by the end of 2020	
Sub-objective 3.3 Implement a fully coordinated approach to community awareness raising on climate change and resilience, involving all civil society organization s that are working with or are part of communities and including strengthening the important role of the arts and media in fostering the essential behaviour change that will be required throughout Tongan society in order to achieve a *Resilient Tonga*.	3.3.1 Develop and implement a fully coordinated capacity building programme on resilience with households/communities throughout Tonga;	Community capacity building programme is fully implemented by the end of 2021	Reporting on outcomes to JNAP Secretariat: 30% of communities by the end of 2019 65% of communities by the end of 2020 100% of communities by the end of 2021	MIA, JNAP Secretariat, JNAP Taskforce, CSOs, all Ministries
	3.3.2 Develop activities and programmes involving the arts and media to support 3.3.1.	Arts and media activities and programmes are developed and implemented as part of 3.3.1, by the end of 2021 with on-going activities	Publication of relevant materials Reports on outcomes to JNAP Secretariat	Arts and media organization s in partnership with JNAP Secretariat, MIA, CSOs
Sub-objective 3.4 Ensure that understanding of a *Resilient Tonga* is incorporated into all school and tertiary education curricula.	3.4.1 Build on the 4CA (Child Centred Climate Change Adaptation) project and the GIZ CCCPIR 'Climate Change Warrior' project to ensure that climate resilience is integrated into school curricula at all levels.	Climate resilience is integrated into school curricula at all levels by the end of 2020	Six monthly progress reports provided to the JNAP Secretariat	Ministry of Education, with JNAP Secretariat
Sub-objective 3.5 Upgrade climate resilience skills through climate change scholarship, short-term professional training, attachments in areas of Climate Change and Disaster Risk Management.	3.5.1 Climate Change scholarships at both Undergraduate and Post-graduate level;	High school leavers have scholarships	Number of vacancy timely filled Number of relevant scholarships available every year	MEIDECC CCD, Education and PSC
	3.5.2 Professional Attachments to regional and international institutions and agencies (CCCCC, SPREP, AusAID, NZAID, UNFCCC);	Up skilling of civil servants	Number of annual attachments completed	Natural Resources Division, MLNR, with support from the JNAP Secretariat
	3.5.3 Short-Term training courses to CCDRR relevant institutions and agencies (BOM, NIWA, and UNFCCC Negotiations).	Staff performance improved	Number of sources successfully completed every year	MEIDECC CCD, Education, PSC

Sub-Objective 3.6 Increased capacity of households to respond to natural disasters and to the impacts of climate and associated environmental change.	3.6.1 Build the capacity of the Department of Environment and Department of Climate Change, the National Emergency Management Office, clusters and civil society in mainstreaming gender in disaster risk management and climate change adaptation and mitigation (reducing greenhouse gas emissions) strategies and plans through appropriate training or mentoring programmes;	Training and capacity assessment reports	Number of training completed every year	MEIDECC, Natural Resources Division, MLNR, with support from the JNAP Secretariat and all sectors, clusters
	3.6.2 Ensure equal access to information for all members of households about preparatory measures to natural disasters including emergency measures, safe roads and shelters, securing the house and productive assets, protecting lives, and other important measures;	Web Portals accessible and awareness programmes widely broadcasted	Number of households successfully completed preparedness programmes	Natural Resources Division, MLNR, with support from the JNAP Secretariat
	3.6.3 Raise awareness about the increased vulnerability of certain members of the family (pregnant women, children, elderly people, and people with disabilities) and certain households and ensure they receive proper attention in the preparedness and recovery phases;	Stock piling available and ready	Lives saved in time of a disaster	MEIDECC CCD, NEMO and sectors
	3.6.4 Build the capacity of population living in the rural area and in the outer islands to diversify/adapt their livelihoods to increase their resilience to natural disasters and climate change	Income generation activities identified	Lives and property saved at times of disasters and long term trend	MEIDECC, MIA, Natural Resources Division, MLNR, with support from the JNAP Secretariat
	3.6.5 Strengthen initiatives to improve the management and conservation of nature, natural places and natural resources notably	Relevant management and conservation programmes developed	Monitoring and evaluation report available	MEIDECC, MIA, Natural Resources Division, MLNR,

	of water resources and increase the numbers of Special Management Areas to preserve coastal fisheries, near shore coral reefs and forests;	At least 100 Special Management Areas established around Tonga by 2025	Report on the implementation of SMAs and Monitoring and Evaluation available	with support from the JNAP Secretariat
	3.6.6 Support initiatives to improve conservation of energy (in particular in relation to electricity consumption and transport) and promote technologies for renewable energy as a mitigation and adaptation measure keeping in mind that energy services must serve the needs of the household and for the livelihood;	Relevant infrastructure accessible	Number of energy saving and clean energy initiative linked to the grid	MEIDECC Energy Division
	3.6.7 Develop community strategies for the maintenance and adaptation of basic infrastructure and services (hospitals, roads, communication, water and sanitation, waste management) to climate stresses.	Reports and projects	Number of relevant strategies approved	MEIDECC, MIA, MOI, and the JNAP Secretariat and relevant Boards
Objective 4: Resilience building actions				
Expected Outcome: To design and implement on-the-ground adaptation, clean and efficient energy and disaster risk management actions that focused on building a *Resilient Tonga at the* national, outer-island and community levels.				
Sub-Objective 4.1 To implement key resilience pipeline programmes for a resilient Tonga by 2035	4.1.1 Strengthen coastal infrastructures through the timely implementation of the Tonga Coastal Resilience Project and to replicate this project to the outer islands	An annual national forum held, actions identified, integrated into a revised Results Framework, and costed, beginning in the first half of 2019	A revised Results Framework and Budget	JNAP Secretariat, JNAP Taskforce and all relevant Ministries
	4.1.2 To timely implement the Tonga Climate Resilient Transport Project to facilitate the safe, efficient and sustainable movements of people and goods in Tonga while strengthening resiliency of the transport sector	Ease and flow of communication and transportation	Length and number of infrastructures climate proofed	MEIDECC, MIA, Natural Resources Division, MLNR, with support from the JNAP Secretariat

	4.1.3 Strengthen Tonga's RE infrastructures through the timely implementation of RE initiatives including grid connection of the existing solar farms in line and to achieve Tonga's NDC and Energy Roadmap targets.	GHG emissions stock take	Number of RE targets reached within the lifetime of the JNAP2	MEIDECC, Energy Division and the JNAP Secretariat and relevant board.
	4.1.4 Implementing SMART agricultural and water management approaches in the context of climate change and disaster risks is critical for Tonga's food security and aimed at achieving a *Resilient Tonga*.	Food and water security and accessibility at all times	Amount of local food and locally sourced water accessible	MEIDECC, Agriculture, Lands and Natural Resources with support from the JNAP Secretariat
	4.1.5. Design and implement appropriate flood management system of low-lying areas around Tonga	Flood management systems are fully implemented in 80% of coastal communities by 2018	Six monthly reports on progress with implementation of the flood management system	JNAP Secretariat and all relevant Ministries
Sub-Objective 4.2 Enhance sustainable development of fisheries and Aquaculture to increase resilience to the impacts of climate change Improve Management and monitoring capacity of community Special Management Areas (SMA)	4.2.1 Undertake training for communities in Management and Monitoring of Community Based Management Areas to be more resilient for the impacts of climate change 4.2.2 Conduct fishery resources enhancement programme (aquaculture, including farmed coral and aquaculture of giant clam) 4.2.3 Extend and improve the design of the FADs to be more resilient to the impact of storm surge and cyclone	At least 80% of villages have SMAs	Increase fisheries resources production and the number of SMA communities	Ministry of Fisheries
Sub-objective 4.3 Begin the progressive implementation of national level actions from relevant sector plans that are aimed at achieving the identified targets for a *Resilient Tonga by 2035*.	4.2.1 An annual national forum involving all relevant national stakeholders, beginning in the first half of 2019, to identify, review and/or update all actions identified from completed resilience sector plans.	Revised community development plans are fully implemented in 23 champion villages, by 2028	Six monthly reports on progress with implementation of the plans Community agreed indicators for monitoring and evaluation of progress with implementation and of accrued benefits	JNAP Secretariat, all relevant Ministries, private sector, NGOs, communities

			On-going monitoring of communities ability to respond and recover from natural disasters	
Sub-objective 4.4 Fully implement community development plans that are aligned with the goal and targets of a *Resilient Tonga* in 23 champion villages, one in each district throughout Tongatapu and the outer islands.	4.4.1 Identify at least 23 champion villages, one in each of the 21 Districts and two in two Niuas, and progressively implement revised community development plans which integrate the natural resource management arrangements.	Village plans and strategies	Number of villages participated	JNAP Secretariat, all relevant Ministries, private sector, NGOs, communities
Objective 5: Finance				
Expected Outcome: Secure and mobilise the required finances and resources to build a *Resilience Tonga by 2035*				
Sub-objective 5.1 Ensure that all relevant stakeholders have access to finance and resources to achieve the goal and targets for a *Resilient Tonga* through the *Tonga Climate Change Fund*. . .	5.1.1 Develop a *Resource Mobilization Plan* for the *Tonga Climate Change Fund* including periodic replenishment schedule;	Resource Mobilization Plan developed by mid- 2018	Publication and distribution of Resource Mobilization Plan to JNAP Taskforce and relevant national CCDRR coordination mechanisms [NECC, NEMC, CCCC, Parliament Standing Committee on CC & DRR]	Department of Climate Change, MOFNP
	5.1.2 Collaborate with NEMO in developing climate resilience Donor directory;	Climate resilience Donor directory developed by 2018	DRR Donor Directory publicly accessible via Climate Change Portal Funding alerts sent to JNAP Taskforce and JNAP NGO Forum	JNAP Secretariat, Department of Climate Change Communications Division
	5.1.3 Create a mechanisms to continually update the climate resilience Donor Directory	New and additional climate resilience finance sources identified and input into donor directory through to the end of 2027	Updated lists distributed to JNAP Taskforce and JNAP NGO Forum	JNAP Secretariat, NEMO, Department of Climate Change Communications Division
Sub-objective 5.2 Develop and implement a development partner's coordination mechanism for all relevant funding to ensure full alignment with JNAP2	5.2.1 Implement the Tonga no objection procedure for the GCF and for accredited entities to work closely with the NDA on project identification and concepts approval aligned with the priorities of JNAP 2	Tri-annual donor roundtables convened in alignment with Financial year	Tri-annual reports distributed to relevant climate resilience stakeholders, development partners, and CROPs	JNAP Secretariat. PAMD [MOFNP]
	5.2.2 Conduct national climate resilience donor roundtables;	Specified JNAP Programmes incorporated into expanded budget support process	Distribution of JPRM progress monitoring to all relevant stakeholders	MOFNP, MEIDECC, JNAP Secretariat

		within the JPRM, by the end of 2019		
	5.2.3 Engage with regional agencies to coordinate all climate resilience regional initiatives which closely align with JNAP Programmes	At least five JNAP Programme activities fully implemented via regional climate resilience initiatives by 2027	Activity Reports distributed to JNAP Taskforce, JNAP NGO Forum, TCCI, and other relevant climate resilience coordinating mechanisms	JNAP Secretariat, JNAP Taskforce, JNAP NGO Forum, CROP national Focal points
	5.2.4 Engage with regional agencies to coordinate all climate resilience regional initiatives which closely align with JNAP programmes. 5.2.5 Undertake an analysis to determine suitable and applicable institutions for accreditation to Direct Access funds including but not limited to the Adaptation Fund; and Green Climate Fund	At least 80% of regional initiatives identified and implemented by 2028 Suitable and applicable national institutions identified At least two national institutions accredited to Adaptation Fund and/or Green Climate Fund by 2020	Activity Report Progress Report submitted to JNAP Taskforce Analysis Report distributed to relevant Ministries, NGOs, private sector, and made available via the Climate Change Portal Signed MoU between national institutions and Direct Access funds such as Adaptation Fund and/or Green Climate Fund Accreditation status publicly available on Climate Change Portal, Adaptation Fund and Green Climate Fund websites	JNAP Secretariat, JNAP Taskforce, CROP and other regional agencies Department of Climate Change [NDA], JNAP Secretariat Department of Climate Change [NDA], JNAP Secretariat, MOFNP
Sub-objective 5.3 Develop and implement a strategy for supporting communities, including women, youth, and vulnerable groups, to directly access relevant funding to implement community development plans that are fully aligned with the goals and targets of a Resilient Tonga	5.3.1 Develop strategy to support communities in sourcing and accessing relevant climate resilience funding for implementing Community Development Plans	CDP implementation support strategy developed by 2019	CDP implementation support strategy endorsed by Cabinet	Department of Climate Change, MIA, JNAP Secretariat, MOFNP, CSOs.
	5.3.2 Government annual contribution to the existing *Tonga Climate Change Trust Fund* to ensure readily available source of funds for implementation of Community Developments Plans.	Donor investment in the trust fund	Policy approved for the T-CCTF sustainability	Department of Climate Change, MIA, JNAP Secretariat, MOFNP, CSOs.
	5.3.3 Support line ministries and agencies dealing with CCDRM with gender mainstreaming and social inclusion capacity	Report and strategies accessible	Relevant and cluster assessment completed	Department of Climate Change, MIA, JNAP Secretariat, MOFNP, CSOs.

	building based on detailed human resources capacity assessments			
	5.3.4 Incorporate the ability to track the allocation of funds for gender and social inclusion in CCDRM projects	Monitoring programme applied	Number of new projects successfully funded	Department of Climate Change, MIA, JNAP Secretariat, MOFNP, CSOs.
Sub-objective 5.4 Develop simplified and harmonised procedures for disbursement of relevant funds to communities.	5.4.1 Enact the Tonga Climate Change Fund Bill & Regulations;	Tonga Climate Change Fund Bill and Regulations endorsed by Cabinet by 2018	Tonga Climate Change Fund Bill and Regulations gazetted.	Department of Climate Change, Crown Law
	5.4.2 Develop sub-national planning, budgeting, and monitoring guidelines inclusive of climate resilience considerations (see 1.4.3).	Climate resilience considerations incorporated into subnational planning, budgeting, and monitoring guidelines developed by 2022	Guidelines utilized in the review and revision of Island Development Plans, and all existing Community Development Plans	MIA. MOFNP, JNAP Secretariat
Sub-objective 5.5 Support effective and responsible financial management.	5.5.1 Develop a compulsory and single standardised government reporting framework/template for all aid activity reporting including climate *resilience* activities.	A standardised reporting framework/template is developed by June 2018	Documented reporting on all climate resilience aid projects	MOFNP, JNAP Secretariat, relevant line Ministries
Objective 6: Regional and international cooperation				
Expected Outcome: Develop and maintain strong regional and international partnerships and contrite fully to all relevant negotiations aimed at the required transformation to a resilient and sustainable future.				
Sub-objective 6.1 Continue to participate in all relevant regional and international fora and negotiations and to strongly promote the policy goal and associated targets of a *Resilient Tonga by 2035*.	6.1.1 The policy goal and targets for a *Resilient Tonga* are promoted through regular participation in relevant regional and international fora and negotiations.	On-going participation in relevant regional and international fora and negotiations	Back to office reporting to the JNAP Secretariat at the conclusion of participation in relevant fora and negotiations	JNAP Secretariat, relevant line Ministries
Sub-Objective 6.2 Identify and work with regional and international agencies that are best able to support the required transformation to a *Resilient Tonga by 2035*.	6.2.1 Regional and international agencies that are best able to support the transformation to a Resilient Tonga are identified and engaged with.	Partnerships are developed with relevant regional and international agencies, which is on-going	Signed MoUs and/or partnership agreements Development and submission of project proposals	MEIDECC CCD, JNAP Secretariat, relevant line Ministries

	6.2.2 When developing guidelines for a resilient Tonga to take into considerations the CC Policy, JNAP 2 and the FRDP	Agreed indicators widely collected and used for decision making	Integrated guideline widely applied

Annex 2: Details of the Indicative budget for JNAP 2

Summary of JNAP 2 Costs	USD Dollars										
	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Year 7**	**Year 8**	**Year 9**	**Year 10**	**Total**
Objective 1: Mainstreaming for a Resilient Tonga	$1,385	$1,030	$1,260	$1,000	$1,300	$1,300	$820	$760	$760	$760	$10,375
Objective 2: Research, monitoring and management of data and information	$1,000	$520	$520	$1,500	$1,500	$520	$200	$50	$50	$0	$5,860
Objective 3: Resilience building response capability	$1,355	$795	$495	$440	$420	$510	$460	$460	$60	$60	$5,055
Objective 4: Resilience building actions	$500	$25,000	$25,000	$25,000	$20,000	$25,000	$2,000	$1,500	$1,500	$100	$125,600
Objective 5: Finance	$62	$3	$53	$53	$50	$50	$3	$3	$3	$3	$283
Objective 6: Regional and international cooperation	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total	**$4,302**	**$27,348**	**$27,328**	**$27,993**	**$23,270**	**$27,380**	**$3,483**	**$2,773**	**$2,373**	**$923**	**$147,173**

Detailed JNAP 2 Costs	USD Dollars										
	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Year 7**	**Year 8**	**Year 9**	**Year 10**	**Total**
Objective 1: Mainstreaming for a Resilient Tonga											
Sub-Obj 1.1: Strengthen decision-making structures	$235	$130	$100	$100	$100	$300	$200	$250	$150	$300	$1,865
Sub-Obj 1.2: Mainstreaming into government planning	$650	$600	$600	$600	$600	$250	$300	$300	$310	$200	$4,410
Sub-Obj 1.3: Sector and cluster plans	$500	$200	$260	$0	$0	$150	$200	$100	$100	$200	$1,710
Sub-Obj 1.4: Resilience guidelines, community and island plans	$0	$50	$150	$150	$300	$300	$120	$110	$200	$60	$950
Sub-Obj 1.5: Improve knowledge on gender and community	$0	$50	$150	$150	$300	$300	$0	$0	$0	$0	$950
Subtotal	**$1,385**	**$1,030**	**$1,260**	**$1,000**	**$1,300**	**$1,300**	**$820**	**$760**	**$760**	**$760**	**$10,375**

Objective 2: Research, monitoring and management of data and information											
Sub-Obj 2.1: National capacity needs	$250	$0	$0	$0	$500	$220	$0	$0	$0	$0	$970
Sub-Obj 2.2: GIS hubs	$350	$520	$520	$0	$500	$100	$200	$50	$50	$0	$2,290
Sub-Obj 2.3: Fully operation monitoring systems	$200	$0	$0	$0	$500	$200	$0	$0	$0	$0	$900
Sub-Obj 2.4: Research for Resilience programme	$200	$0	$0	$1,500	$0	$0	$0	$0	$0	$0	$1,700
Subtotal	**$1,000**	**$520**	**$520**	**$1,500**	**$1,500**	**$520**	**$200**	**$50**	**$50**	**$0**	**$5,860**
Objective 3: Resilience building response capability											
Sub-Obj 3.1: Established mechanisms for a fully coordinated approach	$105	$0	$0	$0	$0	$0	$0	$0	$0	$0	$105
Sub-Obj 3.2: Capacity building for government staff, private sector, NGOs	$0	$15	$15	$10	$10	$0	$0	$0	$0	$0	$50
Sub-Obj 3.3: Fully coordinated community awareness raising	$0	$30	$30	$30	$10	$10	$10	$10	$10	$10	$150
Sub-Obj 3.4: Integration into all school and tertiary curricula	$500	$250	$200	$150	$100	$50	$0	$0	$0	$0	$0
Sub-Obj 3.5: Scholarships and short term attachments	$500	$250	$250	$250	$300	$450	$450	$450	$50	$50	$450
Sub-Obj 3.6: Household capacity to respond	$250	$250	$0	$0	$0	$0	$0	$0	$0	$0	$500
Subtotal	**$1,355**	**$795**	**$495**	**$440**	**$420**	**$510**	**$460**	**$460**	**$60**	**$60**	**$5,055**
Objective 4: Resilience building actions											
Sub-Obj 4.1: Resilient on the ground pipelines	$150	$10,000	$10,000	$10,000	$10,000	$15,000	$1,000	$1,500	$1,500	$100	$59,250
Sub-Obj 4.2: Sustainable development of fisheries and aquaculture	$150	$5,000	$5,000	$5,000	$0	$0	$0	$0	$0	$0	$50
Sub-Obj 4.3: Implementation of sector plans	$200	$10,000	$10,000	$10,000	$10,000	$10,000	$1,000	$0	$0	$0	$500
Sub-Obj 4.4: Implementation of community plans	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

Subtotal	**$500**	**$25,000**	**$25,000**	**$25,000**	**$20,000**	**$25,000**	**$2,000**	**$1,500**	**$1,500**	**$100**	**$125,600**
Objective 5: Finance											
Sub-Obj 5.1: Ensure all stakeholders have access for finance and resources	$10	$1	$1	$1	$10	$10	$1	$1	$1	$1	$37
Sub-Obj 5.2: Develop and implement a joint partners mechanism	$2	$2	$2	$2	$20	$20	$2	$2	$2	$2	$56
Sub-Obj 5.3: Develop and implement a strategy for supporting communities	$50	$0	$0	$0	$20	$20	$0	$0	$0	$0	$90
Sub-Obj 5.4: Procedures for disbursement of funds to communities	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Sub-Obj 5.5: Support effective and responsible financial management	$0	$0	$50	$50	$0	$0	$0	$0	$0	$0	$100
Subtotal	**$62**	**$3**	**$53**	**$53**	**$50**	**$50**	**$3**	**$3**	**$3**	**$3**	**$283**
Objective 6: Regional and international cooperation											
Sub-Obj 6.1: Strongly promote a Resilient Tonga by 2035	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
Sub-Obj 6.2: Work with agencies that are best able to support transformation to a Resilient Tonga	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
Subtotal	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total	**$4,302**	**$27,348**	**$27,328**	**$27,993**	**$23,270**	**$27,380**	**$3,483**	**$2,773**	**$2,373**	**$923**	**$147,173**

Annex 3: List of climate change projects with funds secured from donors and development partners under JNAP 1

GOAL	OUTPUT/ACTIVITY	NAME of PROGRAM, PROJECTS APPROVED THAT FUNDED THE OUTPUT/ACTIVITY	DONOR	TOTAL AMOUNT (PROGRAM, PROJECTS)
Goal 1: Improved good governance for CCADRM [Mainstreaming,	*National Forest Policy, 2009 * National Land Use Policy (draft)	*Germany-GIZ Coping with Climate Change in the Pacific Island Region Program (GIZ-CCCPIR)	*Germany-GIZ	***EURO 12M**

Decision Making, Organizational & Institutional Frameworks]	*National Water Policy, 2011	* Regional Pacific Adaptation to Climate Change (PACC)Project	*GEF/UNDP SPREP	***USD$ 0.75M & AUD$1.2M**
	*National Water Resources Bill	* International Water Project and Integrated Water Resource Management Project	*GEF/UNDP	
	*Tonga Climate Change Policy, 2016 *Tonga Climate Change Fund Bill	* Global Climate Change Alliance Project (GCCA Project)	* EU/SPC	**EURO 0.5M**
	*Tonga Agriculture Sector Plan *Community Development Plans	*Tonga Agriculture Sector Project?? *Pacific Risk Resilience in the Pacific Islands Project/MORDI Tonga and Climate Resilience Sector Project	*International Fund for Agricultural Development (IFAD)	
	*Implement Fangauta Management Plan	*Tonga Ridge to Reef Project	*GEF/UNDP	**USD$2.7M**
	*Climate Proofing of the Building Code	*Climate Resilient Sector Project	*Climate Investment, CIF Fund/ADB	**USD20M**
	* Formulation of Meteorology Bill (legal framework for Meteorology)			
2. Enhanced technical knowledge base, information, education and understanding CCADRM	*LIDAR survey was conducted and funded (GoA ICCAI PASAP)	*International Climate Change Adaptation Initiative-Pacific Adaptation and Strategy Assistance Program(ICCAI PASAP)	*Government of Australia/Department of Climate Change and Energy, Canberra	**AUD$20M**
	*Document of Traditional Knowledge on early warning systems and food preservation	*GIZ CCCPIR *Disaster Resilience Project *GIZ-CCCPIR, PACC, ICCAI-PCCSP and Pacific iCLIM Project	*Germany/GIZ *EU /SOPAC *Germany/GIZ,GEF/UNDP, Government of Australia	**EURO 12M** **USD$ 0.88M** **EURO 16M, AUD$20M, USD$0.75M, AUD$2M**
	*Awareness programmes on CCDRM (Health, TRCS plus others)			
	*Climate Change portal established	(GIZ CCCPIR, PACC)	*Germany, GEF/UNDP	

	*Produce past, present and future climate data for V&A assessment and climate projections *Establishment of the climate data management system at the Tonga Meteorology Office	Pacific Climate Change Science Program	Government of Australia via BOM and CSIRO	**AUD$20M**
3. Analysis and assessments of vulnerability to climate change impacts and disaster risks	*Coastal assessment and protection projects (Lifuka, Ha'apai & Eastern, & Western Tongatapu)	*ICAAI-PASAP, EDF10-BSRP, CRSP, GIZ-CCCPIR, PACC Projects	*Government of Australia, Climate Investment Fund, CIF/ADB GEF/UNDP, EU, Germany/GIZ	AUD$20M, USD$20M, EURO $0.5M, AUD$1.2M
	*BSRP (EDF10)- forestry, DRM and early warning systems, TMS office renovation..			EURO 1.3M
	*CRSP (SMAs, early warning systs) and NGOs projects	CRSP	CIF/ADB	USD$20M
	*GIZCCCPIR (Nakolo, Eua)		Germany	
	*PACC Project (Water) *TRCS relief supplies			
4. Enhanced Community preparedness and resilience to impacts of all disaster	*Construction of coastal protection system in Eastern and Western Tongatapu *Installation of water tanks in schools, churches and communities *climate proofing of schools and community halls *construction of evacuation roads *relocate Hospital in Haapai	*CRSP, EU-SPC GCCA, GEF/UNDP PACC, EDF10 BSRP	*CIF/ADB, EU, GEF/UNDP	USD$20M, AUD$1.2M
5.Technicallyreliable, economically affordable and evironmentally sound energy to support the sustainable development of Tonga	*Renewable and Energy Efficiency Projects and coordination and implementation are led by the Energy Department in close collaboration with Department of Climate Change and JNAP Technical Working Group	*Renewable and Energy Efficiency Projects	*EU, GEF/UNDP, Government of Japan, China Republic, Government of Italy	

6. Strong partnerships. cooperation, and collaboration within Govt. agencies, Civil Societies, NGO's, and the Private Sector	*Donor Rountable *NGO forum *CC committees and JNAP Technical Working group meetings	*various climate change projects	*Government of Tonga recurrent budget and various climate change donor funded programs and projects

Annex 4: Climate Change Department Organizational Structure