SECTOR ASSESSMENT (SUMMARY): CLIMATE CHANGE

Sector Road Map

1. Sector Performance, Problems, and Opportunities

1. Tonga is being affected by climate change, with major environmental, economic, and social consequences possible in the future. Particular concerns include impacts on agricultural production, water supply, coastal infrastructure, and resources. The effects of climate change are exacerbating natural hazards such as tsunamis, cyclones, coastal flooding, and droughts. Over the last few decades, Tonga has observed a higher variability of rainfall causing localized flooding as well as droughts related to El Niño events. In the next 50 years, Tonga has a 50% chance of experiencing loss of more than $175 million and casualties of more than 440 people due to natural hazards.[1] Air temperature in Tonga is expected to continue to increase: <1°C is projected by 2030, with up to 2.5°C by 2090. The intensity and frequency of extreme hot days is projected to increase.[2] Increases in mean sea level are expected to continue and climate change is expected to have a significant effect on the return of periods of extreme high sea levels that persist for at least an hour and can cause coastal flooding, accelerated coastal erosion, and saline intrusion into groundwater. The National Infrastructure Investment Plan (NIIP) records that with a sea level rise of 0.3 meters (a scenario in the middle of the projected range), 14% of the population and nearly 4% of the land area of Tongatapu (the main island) could be inundated.

2. **Impacted sectors and threats**. As part of the latest NIIP, 2013–2023,[3] a qualitative rapid risk assessment indicates that, in the short-term, cyclones and storm surge are potentially the most damaging climate manifestations across all economic infrastructure sectors. The risks are greatest for energy and ports, with fuel storage facilities, overhead transmission lines, and outer island ports infrastructure particularly at risk. Sea level rise, while anticipated, is considered to be of lower risk than cyclones, storm surge, and non–climate–related natural disasters in both the short and long term. The relatively gradual and predictable nature of this climate manifestation will allow the severity of impacts to be progressively managed. Sector risks associated with the remaining identified climate manifestations–increased rainfall intensity, drought, higher air temperature, and ocean acidification–are likely to be lower in both the short and long term.

3. **Options**. The (not mutually exclusive) options for governments and individuals for future adaptation are to (i) continue current activities with climate change adaptation options limited to incremental improvements in current systems of water supply, coastal protection, and accessibility with experiments in alternative livelihoods (short–term, minor, and incremental); (ii) accept changes in livelihoods to adapt to changing circumstances, more robust infrastructure including water supplies and coastal protection, and individual house improvements to adapt to climate change (medium–term, major, and evolutionary); and (iii) relocate some property and infrastructure to locations that can be better protected from increasing climate change impacts, but make use of opportunities created through a retreating coastline or maintenance of coastal protection devices (long–term, strategic, and relocational).

4. **Investment opportunities**. Due to the high climate and natural disaster vulnerability of Pacific countries, the region has been a focus of climate change adaptation (CCA) and disaster risk management (DRM) support from a wide range of development partners.[4] Most support has been in technical assistance (TA), i.e., policy development, capacity building,

[1] Pacific Catastrophe Risk Assessment and Financing Initiative. 2011. *Country Risk Profile: Tonga*. World Bank and Asian Development Bank (TA 6496-REG).
[2] Government of Tonga. 2013. *National Infrastructure Investment Plan 2013–2023*. Nuku'alofa, Tonga; Pacific Climate Change Science Program, Annex D; Pacific Region Infrastructure Facility.
[3] The first NIIP was produced in 2010. The second NIIP covers 2013–2023.
[4] Development Coordination (accessible from the list of linked documents in Appendix 2 of the report and recommendation of the President).

and institutional reform or community adaptation work. Given the multisector nature of climate change, a wide range of often overlapping or marginal proposals need to be better coordinated by the government and focused on addressing the country's needs. The NIIP is the starting point for identifying projects that are government priorities according to individual infrastructure sectors. It identifies and analyzes potential projects from a CCA and DRM perspective that were endorsed by the Joint National Action Plan on Climate Change Adaptation and Disaster Risk Management Technical Working Group (JNAP–TWG). The Strategic Program for Climate Resilience used this list to develop the subproject selection criteria to identify potential climate-proofing infrastructure projects.

5. The Tonga Department of Statistics reports the country's gross domestic product in 2012 to be T$799.3 million ($456 million), dominated by the services sector (62.5%) with agriculture contributing 20.9% and industry 16.6%. The Asia–Pacific network for global change research states that 64.2% of households were agriculturally active, indicating the importance of agriculture, especially on the outer islands where the figure exceeded 80%. Fewer than 10% of the farms are commercial operations, 90% of farmers are subsistence farmers. Currently, climate change has not had adverse effects on the major food crops.[5] However, the Tongan participants in this project consider that climate change is likely to have substantial and widespread impacts on areas along the coast. Losses of coastal infrastructure and coastal erosion resulting from cyclones and sea level rise are already observable. They also are concerned that climate change could cause more intense cyclones and droughts resulting in crop failures. In the Tongatapu household survey,[6] an overwhelming 91% of respondents indicated that they personally observed climate change impacts. Of those that did, 65% thought this was reflected by unusual seasons, while 40% reported higher rainfall. In terms of crop production, 60% reported smaller crop yields, 29% reported more disease, while 31% were concerned about large changes in seasons.

2. Government's Sector Strategy

6. The Pilot Program for Climate Resilience is part of the Asian Development Bank (ADB) Strategic Climate Fund, a multidonor trust fund within the climate investment funds. Tonga was chosen as a pilot country because of its high vulnerability to climate change hazards and risks, because it has been identified as having country preparedness to adopt and implement climate-resilient development plans.

7. The Government of Tonga's development aims and program were reviewed and updated in the Strategic Development Framework (TSDF), 2010, which targets efforts for the next 5–10 years. The TSDF specifically targets infrastructure up to 2020 and the need to integrate environmental sustainability and climate change into all planning and execution of programs. The government has prepared, costed, and prioritized infrastructure development plans, including the NIIP, which will be the basis for the government's public sector investment program for the next decade. A similar document, the Urban Infrastructure Development Plan, has been prepared for Nuku'alofa. The high profile nature of both CCA and DRM in Tonga is strengthened through the TSDF, with an outcome objective of "Cultural awareness, environmental sustainability, climate change adaptation and disaster risk management, integrated into all planning and implementation of programmes."

8. Tonga was early to recognize the cross–cutting nature of climate change and extreme weather events between sectors, and became the first Pacific country to develop a joint national action plan on climate change adaptation and disaster risk management (JNAP) as its strategy to address climate and related disaster risk challenges.[7] The plan

[5] Asia–Pacific Network for Global Change Research. 2011. *Impact of Climate Change on Food Security and Biosecurity of Crop Production Systems*. Final Report. Victoria, Australia.

[6] The Department of Statistics conducted a household income and expenditure survey in 2009 and the Government of Tonga reported on it in 2010.

[7] Cabinet approved the JNAP, 2010–2015 on 28 July 2010.

comprises six goals, each with its own specific objectives and outcomes.[8] The publication of the JNAP report led to the establishment of the JNAP–TWG.[9] The TWG has multi–agency and organization representation to help coordinate, inform, and monitor CCA and DRM initiatives and progress. The JNAP–TWG reviews all ministry corporate plans, ensuring inclusion of a strategy to commit the ministry to implement the JNAP for CCA and DRM. Each ministry's annual management plan must reflect a commitment to implement actions under the JNAP for which they are responsible. This approach effectively commences the process of mainstreaming CCA and DRM within the planning and budgetary systems of each agency.

9. In line with the TSDF, a reshuffle of ministries, intended to streamline government services, was undertaken in 2012. This reduced the number of ministries to 14. Among other changes, it created the Ministry of Lands, Environment, Climate Change and Natural Resources and the Ministry of Infrastructure, which includes the National Emergency Management Office (NEMO) and the Tonga Meteorological Service (TMS). This placed these two ministries at the forefront of developing and implementing key CCA and DRM initiatives and they are the key implementing agencies for the project. The formation of the JNAP–TWG and the publication of the NIIP support the government's goal to improve integration and efficiency with the limited financial and human resources at its disposal.

10. **Planning, policy, and legislation**. The NIIP is an integrated strategy that includes priority investment projects and supporting initiatives (reforms, capacity building, TA) required to ensure effective development of the infrastructure sector. Supporting improvements to the CCA and DRM enabling environment will be indispensable to effective implementation of the CCA and DRM elements of the priority projects contained in the NIIP. Such activities will target actions in each of the three components of the enabling environment, namely (i) decision support tools, (ii) governance framework (i.e., institution and capacity building, planning, policy, and legislation), and (iii) financing mechanisms. The NIIP identified the following required tools: (i) reinforcement of the meteorological monitoring network, (ii) risk modeling and mapping, (iii) climate projections for building code and road design standard revision, and (iv) groundwater capacity analysis and measurement. The project includes TA and resources to provide these tools to the responsible ministries.

11. **Institutions and capacity building**. The NIIP highlights the need to strengthen CCA and DRM focal points, especially the JNAP Secretariat, TMS, and NEMO in relation to climate change projections, climate and natural disaster risk analysis for infrastructure, and disaster response planning. The aim is that these institutions and personnel have the core competencies in relation to these issues and become sources of information for the rest of government. During the preparation of the NIIP, 2013, initial discussions were held between the JNAP Secretariat and the NIIP working group to identify future means of collaboration to facilitate the institutionalization of CCA and DRM issues in the infrastructure sector. The government will continue options to build a solid working relationship for the two organizations.

12. **Finance**. Traditional development partners are paying greater attention to the mainstreaming of climate issues in their operations and are providing enhanced support for targeted CCA and DRM activities, either through standalone financing or as an increment to traditional infrastructure or development financing. Several new national and international sources of funding have been (or are being) created that focus on CCA–related interventions. The most significant development partners in the CCA and DRM domain since

[8] Supplementary documents (accessible from the list of linked documents in Appendix 2 of the report and recommendation of the President).

[9] The Secretariat is located in the Climate Change Division of the Ministry of Lands, Environment, Climate Change and Natural Resources and comprises three individual consultants financed by the Australian Agency for International Development (financing until April 2014). The Secretariat coordinates the JNAP-TWG and acts on behalf of the ministry to promote appropriate CCA and DRM projects. The deputy chief executive officer for the Climate Change Division heads the Secretariat.

2007 have been ADB, Australian Agency for International Development, Global Environment Facility, and Japan International Cooperation Agency.[10] Much of this support has been channelled through regional initiatives coordinated by the Secretariat for the Pacific Community Applied Geoscience and Technology Division of the Secretariat of the Pacific Community or through the South Pacific Regional Environment Program.

3. ADB Sector Experience and Assistance Program

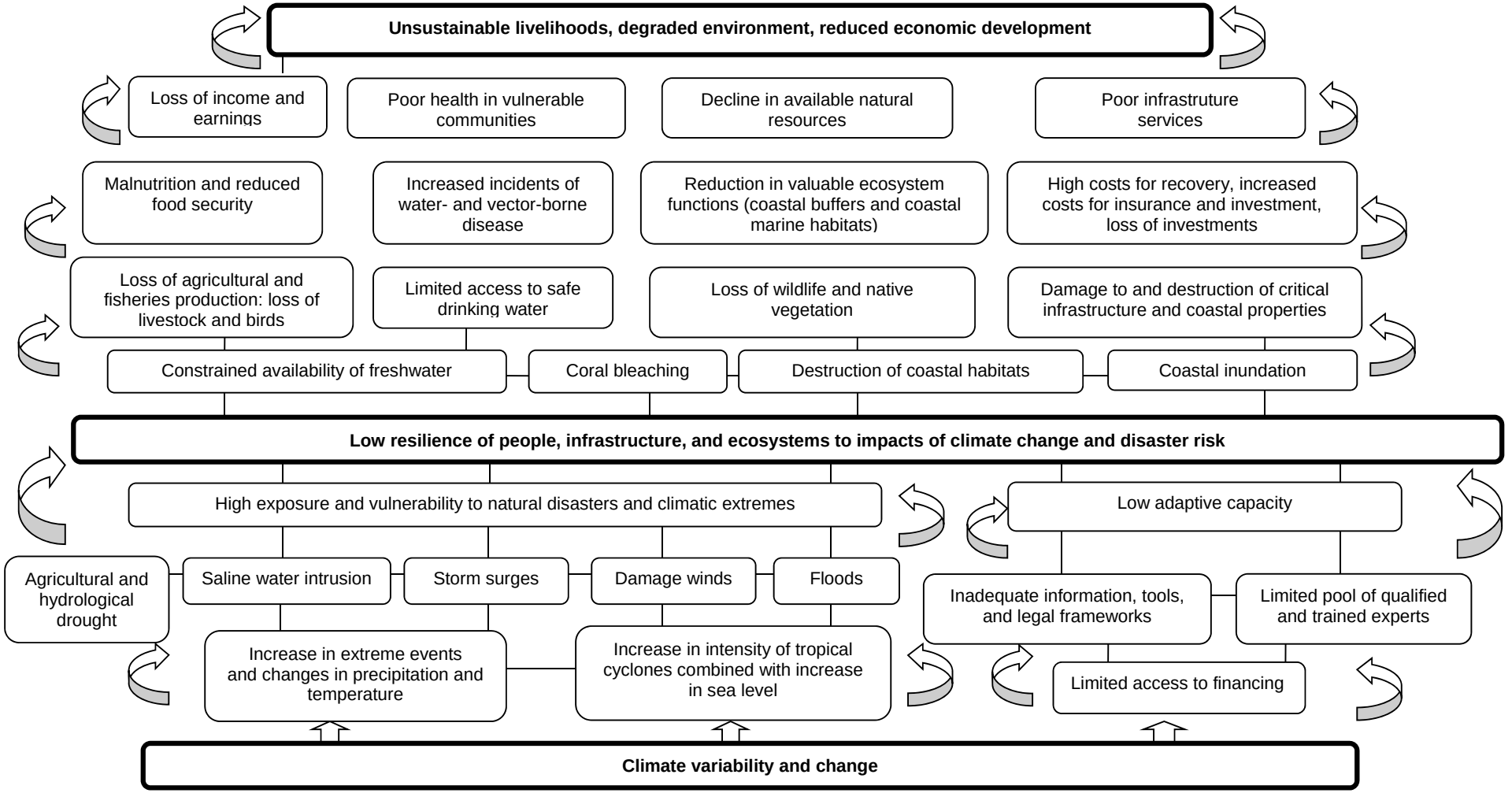
13. ADB has developed a strong partnership with the government. ADB's Pacific Approach 2010–2014[11] and country operations business plan, 2014–2016 for Tonga[12] emphasize the need for integration of CCA and DRM to deal with climate-induced natural disasters. ADB is currently supporting the Integrated Urban Development Sector Project, the Nuku'alofa Urban Development Sector Project, the TA for Implementing Strategic Economic Management, and the Public Finance Management Road Map. These projects and programs provide ADB with a clear understanding of the challenges Tonga faces in mainstreaming climate change considerations into government operations.

14. The Ministry of Finance and National Planning (MFNP) is currently the executing agency for all ADB-financed projects, including those focusing on infrastructure sector investments. In addition, the Ministry of Infrastructure has experience with ADB sector projects, including the Integrated Urban Development Sector Project and Nuku'alofa Urban Development Sector Project. JNAP–TWG, which is the leading institution in the sector, includes line ministries with relevant CCA and DRM divisions such as NEMO, Natural Resources Division, Meteorological Services, Tonga Water Board, all of which have experience working with ADB or with other projects financed by multilateral development banks.

15. Finally, ADB has extensive experience working with the Ministry of Finance and National Planning to implement its public financial management reforms, in particular corporate planning and program budgeting reforms. This support has been channeled through capacity development TA projects and the joint policy reform matrix process for budget support. It has resulted in several significant achievements including steady improvements in country performance assessment, public expenditure and financial accountability assessments carried out by both ADB and the World Bank. Moreover, among the 10 Pacific island countries that completed these assessments, Tonga had the most "high" (A or B) ratings in the region, i.e., 12 As or Bs out of the 31 dimensions assessed. More recently, a 2012 Australian Government assessment of national systems found that most aspects of the Tongan public financial management system were well enough developed that they could manage direct budget support in a transparent and accountable manner.

[10] Other development partners responsible for financing or implementing programs include GIZ, Global Facility for Disaster Reduction and Recovery, International Union for Conservation of Nature, United Nations Development Programme, and United States Agency for International Development.
[11] ADB. 2009. *ADB's Pacific Approach, 2010–2014.* Manila.
[12] ADB. 2013. *Country Operations Business Plan: Tonga, 2014–2016.* Manila.

PROBLEM TREE[a]



[a] Based on outputs of the Pilot Program for Climate Resilience National Consultative Workshop (23–25 November 2011) and the community consultations through semistructured interviews, focus groups, and household surveys of vulnerable communities in Vava'u and Tongatapu in November 2011.
Source: Asian Development Bank.