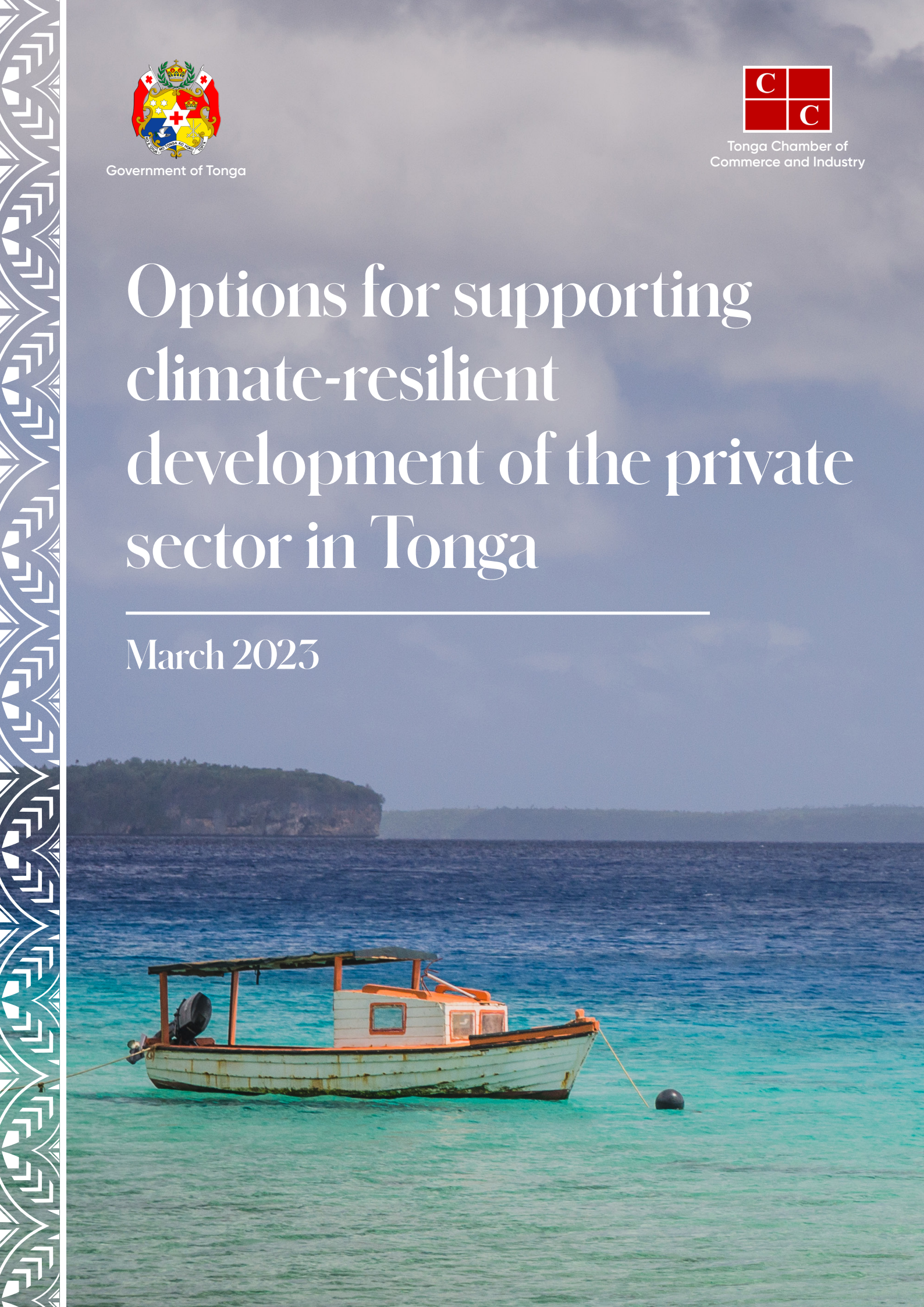
Government of Tonga

Tonga Chamber of Commerce and Industry

Options for supporting climate-resilient development of the private sector in Tonga

March 2023



Copyright

Original text: English

PIFS Cataloguing-in-Publication data

Options for supporting climate-resilient development of the Private Sector in Tonga / [Commissioned by the Pacific Islands Forum Secretariat and Tonga Chamber of Commerce and Industry]. Suva, Fiji : Pacific Islands Forum Secretariat, 2023.

59 pages : col. illustrations ; 30 cm.

ISBN: 978-982-202-085-4

1. Climate changes – Environmental aspects—Tonga 2. Climate change – Government policy – Tonga 3. Climate change mitigation I. Pacific Islands Forum Secretariat II. Tonga Chamber of Commerce and Industry.

363.738'74'099612 dc23 AACR2

INTRA-ACP GCCA+ PROGRAMME An Initiative of the Organisation of African, Caribbean and Pacific States funded by the European Development Fund

GCCA+ THE GLOBAL CLIMATE CHANGE ALLIANCE PLUS INITIATIVE

PACRES PACIFIC ADAPTATION TO CLIMATE CHANGE AND RESILIENCE BUILDING

Gouvernement Princier PRINCIPAUTÉ DE MONACO

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra
Federal Department of Foreign Affairs FDFA

PACIFIC ISLANDS FORUM SECRETARIAT

Contents

Executive Summary

Development of the private sector is the centrepiece of Tonga's strategic development pathway towards "a more progressive Tonga, supporting a higher quality of life for all" (TSDF 2015:16). However, despite important progress in some areas, development of Tonga's formal private sector continues to be slow and overall activity remains at a low level.

A key challenge that has impeded private sector development efforts has been the impacts of climate events. In 2014, Tonga was struck by Tropical Cyclone Ian, which caused widespread damage and loss to businesses and, in 2018, the country was struck by Tropical Cyclone Gita. Many businesses are still recovering from TC Gita.

Climate change is expected to increase the frequency of severe climate events (e.g. cyclones) that have historically disrupted business development and also create new and very significant development challenges – most notably, changing rainfall patterns, sea-level rise and ocean temperature rise.

To be successful in developing Tonga's private sector, the capacity of enterprises to manage climate risks needs to be strengthened. Climate risk management must become a core part of doing business.

Barriers constraining businesses' capacity to manage climate risks

Businesses' capacity to manage climate risks is currently constrained by several barriers. These barriers can be thought of as the root cause of the climate change risk problem (aside from greenhouse gas pollution) experienced by the private sector.

Four key barriers currently impeding the adaptive capacity of enterprises were highlighted by Tonga businesses. These are:

- lack of knowledge and skills within enterprises to assess climate risks to their business;
- lack of readily accessible information on climate risk management measures/actions;
- difficulties accessing affordable credit to finance climate risk management measures; and
- weak engagement of the local private sector in the delivery of government programmes, including climate resilience elements.

Strategies for strengthening the capacity of Tonga businesses to manage climate risks

To address the key barriers, three inter-related project ideas are suggested; these are interventions that would support businesses to strengthen their climate-resilience at this stage of Tonga's private sector development. They are targeted at the tourism and construction industry sectors in the first instance, as these are industries that make up a large proportion of private sector activity in Tonga and are vulnerable to climate change. They can be expanded to the agriculture and fisheries sectors (as industries where formal private sector activity is small but which have the potential to make greater contributions) as a second phase of work once more experience is gained.

The intervention areas are briefly described below.

a) Climate skills for business

This project idea comprises a range of training, mentoring and knowledge exchange type measures aimed at building the knowledge and skills of local enterprises to effectively manage climate risks to their businesses. This project will build on and potentially integrate with existing programmes being implemented to develop general business management skills (e.g. the Tonga Business Enterprise Centre Facility). The project will also undertake dedicated activities that promote the adoption of knowledge generated in other parts of the region from research, pilots and good-industry practice, as well as offer business mentoring.

It is envisaged that this programme will be established in the Tonga Chamber of Commerce and Industry (TCCI) and will include targeted institutional strengthening activities to help it manage programme implementation. To the extent practicable, local and regional enterprises will be engaged in the delivery of project components.

b) Climate-smart financing facility

The aim of the climate-smart financing facility is to establish a risk-sharing facility that makes it easier and more attractive for Tongan MSMEs to **access finance** to invest in climate risk management measures and the development of their business more generally. It is envisaged that this facility will be set up in the Tonga Development Bank (TDB) and will build on and potentially integrate with other sectoral development loan products currently offered through onlending of government funds (e.g. the Tourism Loan Fund). Importantly, the project will also undertake some targeted institutional strengthening activities (e.g. climate risk assessment tools) to improve TDB's capacity to analyse and manage any climate risk elements of loans.

c) Inclusive and resilient delivery of public infrastructure services

The third project idea recognises that a stronger, locally-based, private construction sector is required to effectively implement the ambitions of the *Tonga National Infrastructure Investment Plan 2013–2023 (NIIP)* and thereby contribute to broader, more resilient private sector development.

The key components of this idea are to: (i) provide targeted and forwardlooking technical skills training; and (ii) review government procurement processes for public infrastructure projects with a view to enhancing the ability of local construction businesses to contribute to the delivery of these infrastructure services more extensively and effectively.

Other components may also include: (i) strengthening the monitoring and evaluation of NIIP implementation; and (ii) investigation of alternative public-private partnership models to further enhance private sector investment and delivery of infrastructure services.

Introduction

The Tonga Chamber of Commerce and Industry (TCCI), in collaboration with the Ministry of Meteorology, Energy, Information, Disaster Management, Environment, Climate Change and Communications (MEIDECC), is developing a work programme to help increase the climate-resilience and reduce the emissions-intensity of private sector development in Tonga. This work is supported by the Pacific Islands Forum Secretariat (PIFS) as part of the Pacific Adaptation to Climate Change and Resilience Building project and Global Climate Change Alliance Plus initiative.

This document is an options paper to help inform the strategic direction(s) of this programme.

Objectives of this assessment

The overarching objective of the assessment is to provide strategic guidance on potential project options (ideas) to increase climate-resilience and reduce the emissions-intensity of private sector development in Tonga. More specifically, the objectives of the assessment are to:

- develop a shared and sound understanding of the size and structure of the private sector in Tonga;
- identify barriers that are constraining the capacity of businesses to manage climate risks effectively and invest in low emissions technologies/practices;
- develop a shared and sound understanding of projects that are currently being undertaken in Tonga to address the identified barriers;
- identify other project options that could also be considered to help address barriers;
- provide strategic guidance on what could be the priority project options for further development in the next phase of project design work;
- provide information and guidance on what climate finance opportunities and development partners / accredited entities are available to support further development and implementation of projects; and
- provide strategic guidance on processes for further developing ideas into more detailed concepts.

The target audience for the assessment is TCCI, MEIDECC and PIFS.

Report structure

The options paper is organised into seven chapters as follows:

Chapter 1 provides contextual information for private sector development in Tonga. This is intended to set the scene for the remainder of the report.

Chapter 2 describes the methodological approach that has been employed in the study.

Chapter 3 provides an overview of the size and structure of the private sector in Tonga. This is intended to guide the analytical work towards the most important areas for private sector development in the Tonga context.

Chapter 4 outlines the climate-related problems that private sector businesses in Tonga are facing, and which this programme will ultimately seek to address. A focus of this chapter is to describe key barriers that are constraining the capacity of enterprises to effectively manage climate change risks to their businesses.

Chapter 5 identifies a set of high-level options that could be considered for inclusion in the programme design, building on the analysis reported in Chapter 4.

Chapter 6 suggests which options could be prioritised and describes the opportunities available to support further development and implementation of projects.

Chapter 7 has concluding remarks and some suggestions for next steps.

Chapter 1

Context

Development of the private sector is the centrepiece of Tonga's strategic development pathway towards "a more progressive Tonga supporting a higher quality of life for all Tongans" (GoT 2015:9). However, despite important progress in some areas, Tonga's formal private sector continues to be slow to develop and overall activity remains at a low level (IMF 2020b).

Tonga is challenged by several characteristics that hamper the development of the private sector. These include:

- remote and fragmented geography – Tonga is comprised of 169 islands spread out over an exclusive economic zone of 659,558 square kilometres. Commercial centres on Tongatapu are located some 2,379 kilometres and 5,212 kilometres from the large markets of New Zealand and Australia respectively;
- a small and dispersed population – around 100,600 people make up the population, with some 75 per cent located on the capital of Tongatapu and the remainder dispersed across 35 other islands;
- a narrow resource base; and
- fragile environments.

Of particular note is the fact that Tonga is also highly susceptible to natural disasters. In 2014, the country was struck by Tropical Cyclone Ian, which caused widespread damage and loss to businesses and, in 2018, Tropical Cyclone Gita struck. Many businesses are still recovering from this cyclone.[1]

Climate change is expected to exacerbate climate-related development challenges into the future. The frequency of severe climate events (e.g. cyclones) that have historically disrupted business development is expected to increase. Climate change also creates new and very significant challenges – most notably, changing rainfall patterns, sea-level rise and ocean temperature rise.[2]

To be successful in developing Tonga's private sector, the capacity of enterprises to manage climate risks will need to be strengthened. Climate risk management must become a core part of doing business.

1 Tonga is consistently ranked on the World Risk Index as one of the most at-risk economies due to its exposure to natural hazards and its capacity to manage risks.

2 Ocean temperature rise is expected to affect the health of ecosystem assets and the flow of ecosystem services provided by these assets to businesses.

Chapter 2

Methodological approach

The methodological approach used in the rapid assessment draws on key guidance provided by the Green Climate Fund for engaging with micro, small, and medium enterprises in climate finance (GCF 2015) as well as the Productivity Commission 2012 Inquiry Report entitled *Barriers to effective climate change adaptation.*

The methodological approach can be described as comprising five key steps, as illustrated in Figure 1. More information on each of the steps is provided below.[3]

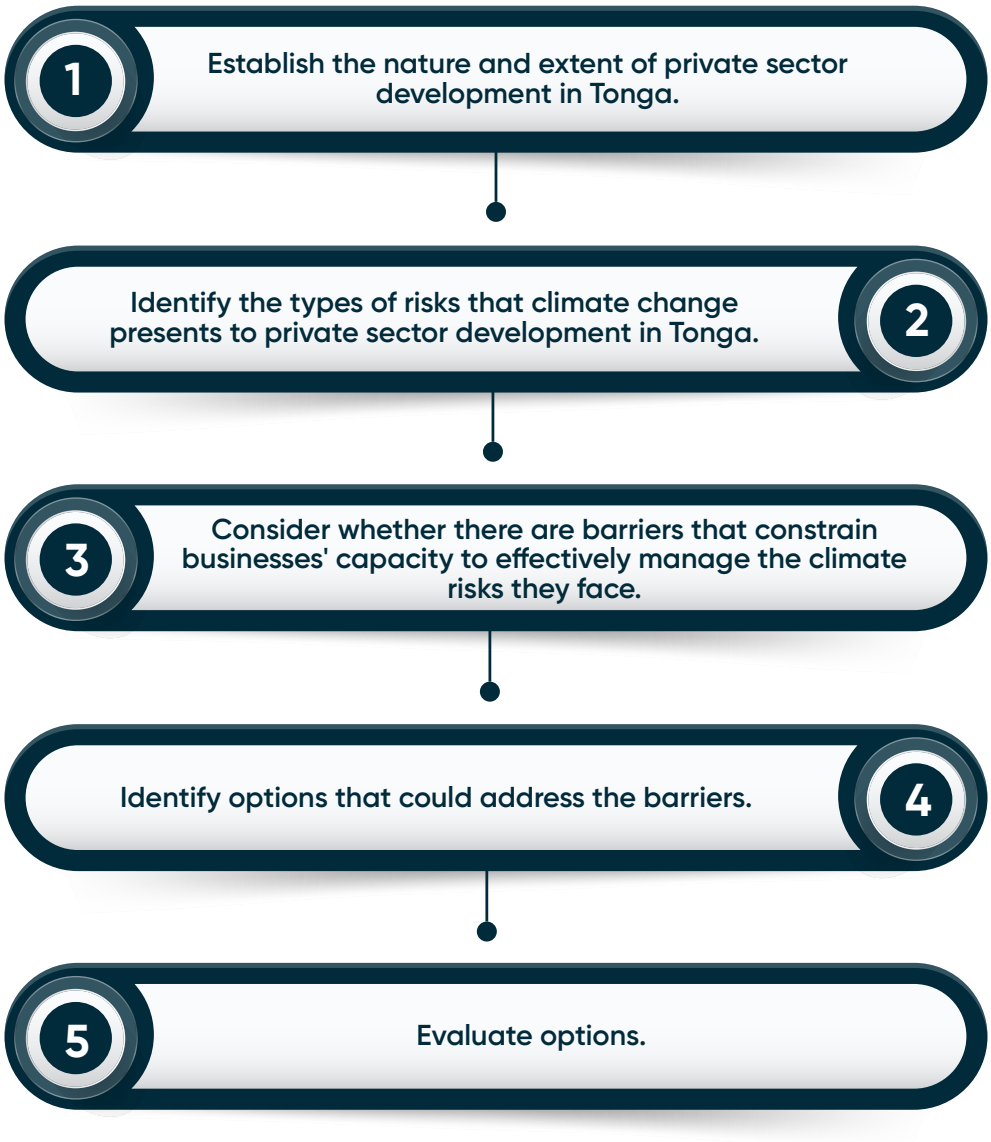


Figure 1. Methodological steps

3 More information on the key concepts and terminology used in this assessment is outlined in Appendix A.

1. Establish the nature and extent of private sector development in Tonga.

The first step of the methodology was to establish a sound and shared understanding of the size and structure of the private sector in Tonga. This was intended to guide subsequent analytical work (in steps 2 to 5 below) towards areas that are most important for resilient sustainable development led by the private sector.

The analysis in this step was mostly undertaken as a desktop exercise, drawing on summary statistics outlined in Tonga's system of national accounts and the agriculture census, as well as information outlined in relevant sectoral plans and budget statements. The analysis also incorporated business registration information maintained by the Tonga Business Registry Office.

2. Identify the types of risks that climate change presents to private sector development in Tonga.

The second step was to rapidly appraise the nature and extent of climate change risks affecting the Tonga private sector, based on the existing knowledge base. The focus of this assessment was on the tourism, agriculture, construction and fishery sectors which, as determined in step 1, currently represent the key industry sectors in Tonga most important for sustainable private sector development.[4]

Appraisal work undertaken in this phase was primarily based on previous work undertaken as part of the process for developing Tonga's second joint national adaptation plan and Green Climate Fund Country Program.

3. Consider whether there are barriers that constrain businesses' capacity to effectively manage the climate risks they face.

The third step was to analyse the key barriers constraining the capacity of MSMEs to effectively manage these risks (and thereby contribute to resilient development in Tonga) and/or employ low-emissions practices. This can be thought of as the underpinning, or root, causes of the climate change problem.[5]

The approach for analysing barriers was guided by previous work undertaken by the Green Climate Fund in 2015 and 2017 and the Productivity Commission in 2012, which suggest that barriers may result from one or more of the broad typologies described below.

- Market failures – conditions that prevent markets from allocating resources to the uses or areas where they are most highly valued. For example, a barrier could arise where there is insufficient or inadequate information on climate change impacts for businesses to make well-informed climate risk management decisions.

4 Of locally-based MSMEs, which are the primary interest group of TCCI.

5 This is aside from greenhouse gas pollution externalities, which are generated by third parties located outside Tonga.

- Policy and regulatory barriers – regulation (or an absence of regulation) that inhibits effective adaptation. For example, a lack of groundwater resource-use plans and regulations could create uncertainty for businesses regarding the security of water for irrigation, thereby disincentivising irrigation as a drought-risk management measure.

- Capacity barriers – the way people process information and make decisions can act as a barrier to effective risk management or investment in low emissions technologies. For example, businesses may have trouble weighing up the costs and benefits of risk management actions where climate change impacts and potential resultant damages are uncertain and occur over long time frames. As a result, they might procrastinate or defer actions that would be in their best interest.

4. Identify options that could address the barriers.

The fourth step of the approach was to identify high-level project options (i.e. project ideas) that could be considered to address the barriers identified in step 3.
Options were identified through:

- a rapid review of projects that have previously been, and are currently being, implemented in Tonga and which relate to the key barriers constraining adaptive capacity and investment in low-emissions practices;

- consideration of projects that have been implemented elsewhere in the Pacific and beyond; and

- consultations with key private sector and government stakeholders.

5. Evaluate options

The final step of the methodology was to evaluate project options for inclusion in the programme that support MSMEs to contribute to the low-emissions more effectively, high-resilience development agenda for Tonga.

The analytical method employed for this phase was a basic multi-criteria analysis.
More information on criteria and related scoring is outlined in Appendix B.

Data collection

A range of data collection methods was used to input data into the abovementioned problem analysis components. This comprised:

- a literature review;

- semi-structured interviews with key informants (a list of persons consulted is provided in Appendix C); and

- a participatory workshop (a brief workshop report is in Appendix D).

Limitations

A limitation of the analysis was that disaggregated data on construction sector activity into locally owned and foreign-owned private sector enterprises were not available. Insights on this aspect therefore was limited to anecdotal evidence.

Another (minor) limitation was that several technical reports (e.g. Value chain development in Tonga by Shepherd 2015) could not be located in the time available for the assignment.

These limitations can be addressed as part of a more in-depth analysis in the next phase of project development work.

Chapter 3

Overview of Tonga's private sector

As at 2019, the size of the Tonga economy was measured (in GDP terms) at 2019 T$ 1,164 million (Tonga Statistics Department 2020a). The main industry contributors to this were tourism (18.1%)[6], agriculture (17.7%), and construction (7.0%). To a much lesser extent, electricity and water supply (2.2%) and fisheries (1.9%) were also contributors (Tonga Statistics Department, 2020c).

Tourism

The tourism sector has been the main driver of private sector (led) development in Tonga over the last ten years or so. Until the coronavirus pandemic, there was a steady increase in the contribution of the industry to GDP – from 7% in 2010, to 11.5% in 2017 to 18.1% in 2018 (MoT 2018).[7][8]

The Tonga tourism sector is based on the pristine natural environment, along with cultural attractions. Marine nature-based activities such as whale-watching, swimming, snorkelling, and diving are identified in visitor surveys as the main attractions in Tonga.

In 2019, there were some 326 businesses directly involved in the Tonga tourism industry (MoT 2020b). These include:

- 130 accommodation businesses;
- 109 restaurants;
- 8 travel agents;
- 25 tour operators; and
- 54 marine (primarily whale-watching) businesses.

The majority of Tonga tourism businesses are classified as micro and small size enterprises, according to IMF categorisations. As at 2019, most of these were located in Tongatapu (58%) and Vava'u (29%), with the remainder in the Ha'apai (8%) and Eua (5%) island groups (MoT 2020b).

Tourism is the industry sector that has been most affected by the Coronavirus pandemic and it has essentially collapsed in the short-term with the closure of Tonga's border to source markets.

6 This figure is from the 2018 year, as the information for the 2019 year could not be sourced in the time available for the assignment. This 2018 figure is based on expenditure analysis and is reported in the Ministry of Tourism Annual Report for 2017/2018. The tourism sector includes a share of several different industry sub-sectors included in the production approach to measuring GDP, including, but not limited to, accommodation and food services, retail trade and transport.

7 In 2019, there were around 91,000 visitors (MoT 2020a), primarily from New Zealand and Australia. New Zealand is the main source market (at 45.2% – 27,290 visitors – in 2017) followed by Australia (which constitutes 20.7% – 12,483 visitors – in 2017) (SPTO 2018).

8 As at 2017, Tonga was ranked tenth out of the fifteen South Pacific countries in terms of visitor arrivals (SPTO 2018).

Currently, there is no sector plan that takes a whole-of-Tonga approach for developing (and recovering) this important productive sector in a strategic and co-ordinated way. The previous sector plan – the Tonga Tourism Sector Roadmap – expired in 2018.[9]

Agriculture

The agriculture sector is a similar contributor to economic output in GDP terms as tourism; and over the last decade has experienced moderate growth at an average rate of around 2.9 % per annum in real terms (Tonga Statistics Department 2020c). Compared to the tourism sector, however, formal business enterprises are far less active in this sector. As at 2015, only 5% of farmers were identified as business enterprises producing commercial scale quantities for the formal market (MAFFF et al. 2015). Currently, there are only 18 agriculture businesses formally registered on the Business Registries of Tonga. Most of Tonga's agriculture is still based on traditional/subsistence and semi-subsistence farming systems that produce primarily for their own consumptive needs (MAFFF et al. 2015).[10]

The majority of commercial producers (83% of crop producers, and 75% of livestock producers) are located on Tongatapu, close to the main population centre and key export infrastructure (MAFFF et al. 2015).[11] The agriculture sector workforce is overwhelmingly male and is ageing (Tonga Statistics Department 2018).

Commercial crop production comprises a mix of: (i) annual traditional crops, such as cassava (manioke), yam (ufi), yautia (talo futuna), sweet potato (kumala), and swamp taro (talo Tonga); (ii) annual vegetables, such as watermelon, tomatoes, tobacco, capsicum, cabbage, squash and pumpkin; and (iii) perennial crops, such as kava, mulberry, and vanilla. Most of this crop production is for the domestic market, although some products, including talo, kava, squash and pumpkin, are exported to niche overseas markets.[12] The main farming practices used in commercial agriculture are a variant of traditional (slash and burn[13]) agroforestry systems, and features the use of modern agricultural machinery (tractors and ploughs), as well as agrochemicals (mainly fertilisers). There is little irrigated agriculture, due in large part to very limited availability of water resources (MAFFF et al. 2015, SMEC 2019).

Livestock production includes pigs, (beef) cattle, sheep and chicken and is sold exclusively to the domestic market for daily consumption and cultural events.

It is noted that Tonga imports far more food than it exports, with approximately 29,854 tonnes of food imported in the 2018/19 financial year (MAFFF 2019). This corresponds to some 297 kilograms of imported food per capita per year, indicating a high dependence on food imports.[14] Imported food items are generally lower in nutritional value compared to local produce and are a major contributor to the high incidence of non-communicable diseases (NCDs) observed in Tonga, where 45.9% of the adult population are obese (FAO 2019).

9 This roadmap document did not integrate climate resilience in a clear or meaningful way.

10 According to the Agriculture Census (MAFFF et al. 2015), there were some 89 households involved in commercial-scale crop production and 329 households involved in commercial livestock production in 2015.

11 This is inferred, based on the location of households involved in commercial agriculture.

12 It is noted that data collection methods used in the Agriculture Census did not provide for ready cross-tabulation – to identify the specific commodities produced by households that were involved in commercial agriculture (MAFFF et al. 2015).

13 Cropping in traditional agroforestry systems is staggered (time-dominant) but the system also includes some spatially-integrated permanent light canopy tree species, such as coconuts and papaya. The system involves sequential planting of root crops, starting with yam, taro and/or kava, followed by giant taro, taro, plantain and/or kava, and then finally cassava, before the land is left to lie fallow. During the earlier stages, the land is intensively cultivated and kept largely weed-free, but during the final cassava stage, trees are allowed to regenerate naturally and then to develop fully during the fallow phase.

14 The most commonly imported food items in 2018/19 included meat products (primarily poultry and mutton flaps), prepared meat (corned beef, tinned fish, and sausages) and prepared foods (e.g. biscuits).

The government has in place the Tonga Agriculture Sector Plan: 2016–2020 (TASP). A key strategic direction in this plan is a food first approach, which advocates prioritising interventions that promote production for the domestic food market and which target import-substitution in particular. Another strategic priority outlined in TASP is to strengthen formal private sector participation in the sector, with a focus on shifting semi-subsistence farmers into (small) commercial scale operations and involving the private sector in the delivery of agriculture extension services.

Construction

Construction is a material part of economic activity in Tonga, representing some 7% (2019 T$ 80.9 million) of GDP in 2018/19 (Tonga Statistics Department 2020b, 2020c).

The construction sector is highly segregated, with large foreign organisations carrying out complex projects, often to very high standards; small domestic contractors operating in the residential market segment, using a mix of traditional and western technologies adapted, often poorly, to local conditions; and a significant informal sector. As at August 2020, there are some 142 local MSMEs registered in the construction sector (Business Registries Office 2020).

Consultations undertaken for this assignment indicate that enterprises operating in the residential market segment are typically micro size (with one to nine employees). Some local contractors are headed by very experienced builders, although few have an architect or engineer on their staff. Some are headed by individuals with few credentials in the construction industry beyond the ability to arrange funding to start up and the ability to get contracts to keep going. Similar to agriculture, employment in this industry sector is dominated by men (Tonga Statistics Department 2018). Most enterprises are based in the major urban centre on Tongatapu.

Details relating to the size and ownership of businesses involved in the delivery of large, donor-supported infrastructure projects (such as roads and ports) are not readily available. - and how this has changed over time. Businesses consulted for this study indicated that this segment is dominated by large foreign-owned firms.

The Tonga National Infrastructure Investment Plan (NIIP) outlines the government's priorities for major infrastructure investments in transport, telecommunications, water, energy, and solid waste management over the period 2013 to 2023. The plan highlights the fact that climate-resilient infrastructure services underpin wider private sector productivity and growth.

Electricity

Together with water and waste, electricity currently contributes around 2.2% (2019 T$ 25.5 million) of total economic output in Tonga (Tonga Statistics Department 2020b, 2020c).

The vast majority of electricity services are provided by the state-owned enterprise, Tonga Power Limited. These services are mostly provided to urban centres in Tongatapu, and to a lesser extent to the smaller grids on Vava'au, Ha'apai and Eua island groups.

The electricity sector is the subject of an ambitious reform effort and investment programme, as outlined in the Tonga Energy Roadmap (GoT 2010). A feature of this reform effort is to promote private sector investment and participation in the generation market segment. More specifically, these reforms aim to foster competition by facilitating entry by private sector generators, as well as promoting the use of renewable technologies.[15] Given the size and technical complexity of these investments, reforms primarily target larger foreign-owned private sector enterprises, not locally owned MSMEs.[16] Two foreign-owned private sector firms are expected to enter the market in the 2020 and 2021 financial years (MoF 2020).[17] This entry is being facilitated through the ADB-implemented Tonga Renewable Energy Project (TREP), which is partly funded by climate finance (a concessional loan) from the GCF and the Government of Australia.[18]

Currently, the primary relevance of electricity for local MSMEs in Tonga is as an input to production – not the actual provision of electricity services.[19]

Fisheries

The fisheries sector contributes around 2019 T$ 22.2 million to the national economy and has remained at around this level in real terms for the last 10 years (Tonga Statistics Department 2020c).[20]

Similar to agriculture, only 5% of households engaged in fishing were identified as business enterprises harvesting commercial scale quantities for the formal market (MAFFF et al. 2015) and only 24 fishery businesses were registered on the Business Registries of Tonga. The majority of Tonga's fishery industry is still based on traditional/subsistence and semi-subsistence systems, and people fish primarily for their own consumptive needs (MAFFF et al. 2015).[21]

The main commercial fisheries are tuna, deepwater snapper[22] and bêche-de-mer, and to a lesser extent, seaweed and aquarium fish.

As at 2016, there was only one Tonga-owned, locallybased company licensed to practise longline tuna fishing methods. This company was operating three operational longline vessels and selling target species to export markets in Japan, Australia and New Zealand. Bycatch was generally sold on the local market (GoT 2016a). There were also six foreign-owned longline vessels licensed to operate in Tonga waters. These were owned by five Asian companies operating from bases in Fiji and American Samoa (GoT 2016a).[23] [24]

The deepwater snapper fishery operates on Tonga's continental slopes and seamounts,

15 The latter is also intended to contribute to Tonga's 50% renewable energy target.

16 Which is the membership of TCCI and focus of this assessment.

17 Capital investments are expected to be in the order of T$ 40 million.

18 As part of the Australian Pacific Climate Partnership.

19 As part of the Tonga Outer Island Renewable Energy Project, ADB is also helping to construct solar power plants on the outer islands of Tonga. The project will install grid-connected solar photovoltaic power systems with a total capacity of 1.25 megawatts peak on nine outer islands. It will also build the capacity of TPL in the operation and maintenance of renewable technologies. Refer to: https://www.adb.org/projects/43452-022/main.

20 It is not clear whether this figure includes revenue generated from (foreign) fishing licences – longliners mainly targeting albacore. As at 2016, annual foreign longline fishing license revenues were in the order of USD 0.12 million (GoT 2016a).

21 According to the Agriculture Census (MAFFF et al. 2015), there were some 96 households involved in commercial fishing, of which the large majority (88%) were based on Tongatapu. Employment in this sector is overwhelmingly dominated by men (Tonga Statistics Department 2018).

22 Including 14 snapper and grouper species and some jacks.

23 In 2013, total catches were over 2,700 tonnes. As at 2016, annual foreign longline fishing license revenues were in the order of USD 0.12 million (GoT 2016a).

24 Conservation and management of the tuna fisheries are subject to WCPFC measures and Tonga is compliant with such measures and receives support from FFA and other partners to implement the measures (GoT 2016a).

harvesting around 140 tonnes/year. The active fleet varies between 14 and 25 vessels (GoT 2016a). Catch is sold to both the export and domestic markets. Some vessels fish only for the domestic market.

The bêche-de-mer fishery has collapsed in recent years due to over-exploitation (GoT 2016a). Prior to this, the long-term average harvest was in the order of 100 tonnes per year, mostly in Vava'u. Studies indicate that Tonga could have sustainable exports in the order of USD 0.5 million (GoT 2016a).

Sector-level plans to more strategically manage the fisheries sector are outlined in the Tonga Fisheries Sector Plan 2016–2024 and, to a lesser degree, the Tonga Agriculture Sector Plan: 2016–2020 (TASP).[25] [26]

Key points

The largest contributor to private sector led development in Tonga has been the tourism sector. This is underpinned by Tonga's pristine natural environment as well as strong culture. The coronavirus pandemic has however caused this industry to temporarily collapse.

The construction sector is also an important contributor to the Tonga economy. The construction sector generates around 7% of Tonga's GDP. Local MSMEs also play a critical and increasing role in the delivery of fit-for-purpose, climate-resilient infrastructure projects, which in turn underpins wider development led by the private sector.

Agriculture business contribution to the economy is small. The majority of Tonga's agriculture production is still based on traditional/subsistence and semi-subsistence farming systems that produce primarily for local consumption. A strategic priority – as outlined in TASP – is to move semi-subsistence farmers towards commercial production, with a focus on supplying the domestic food market.

The fisheries sector, whilst potentially an important contributor to development in Tonga, remains a small area for private sector activity and has not grown over the last 10 years.

Local MSMEs are not materially involved in the delivery of electricity services in Tonga and are not envisaged to do so in the medium-term future under the Tonga Energy Roadmap. This sector is thus not a priority area for further analysis in this paper.

25 Connected to the fisheries sector plans are several individual fishery management plans. These are for snapper, tuna and aquaculture.

26 The Fisheries Sector Plan 2016–2024 advocates for a range of interventions to enhance private sector development of the industry. They include a participatory review of existing species-specific commercial fishery plans (tuna, deepwater snapper, bêche-de-mer, etc.), technical and business advisory services to small-scale fishers and associations, facilities to enhance access to credit, and investigation of public-private partnerships (especially for fish processing in fishing infrastructure). The plan further highlights the threats presented to the sector relating to coral reef degradation from climate change (sea temperature rise, ocean acidification, and cyclones), but does not include any dedicated strategies to actively manage this risk specifically, rather that climate change be considered as part of the enhanced and expanded Special Management Area (SMA) programme, primarily as a source of finance.

Chapter 4

Climate challenges affecting private sector development in Tonga

As outlined above, climate events have historically caused significant disruptions to business activities in Tonga. For example, in 2014, Tonga was struck by Tropical Cyclone Ian, causing widespread damage and loss to businesses and, in 2018, Tonga was struck by Tropical Cyclone Gita. Many businesses are still recovering from TC Gita.[27]

Restaurant in Tonga

Climate change is expected to increase the frequency of severe climate events (e.g. cyclones) that have historically disrupted business development. Climate change also creates new and very significant challenges – most notably, changing rainfall patterns, sea-level rise and ocean temperature rise.[28]

When these (slow and fast onset) climate events occur, they can affect MSMEs in a number of different and inter-related ways. Impacts can be experienced as direct damage and losses – as direct effects on the privatelyowned assets and productivity of inputs. Impacts can also be experienced indirectly, through: (i) damage to public assets (e.g. road infrastructure, marine ecosystems) which provide services important for production, (ii) disruptions to other MSMEs that form part of a businesses supply-chain, and/or (iii) impacts on demand.

27 Tonga is consistently ranked on the World Risk Index as one of the most at-risk economies due to its exposure to natural hazards and its capacity to manage risks.

28 Ocean temperature rise is expected to affect the health of ecosystem assets and the flow of ecosystem services provided by these assets to businesses.

Table 2 summarises, at a high level, the broad types of risk that climate change presents to the Tonga private sector. This is intended to provide some basic context for the analysis of barriers constraining the capacity of private sector businesses to manage climate risks discussed in the next section.

Table 1. Overview of the nature of climate risks affecting the Tonga private sector

Climate hazard	Tourism	Agriculture	Fisheries	Construction
Cyclone/Storm surges	●	●	●	●
Drought	●	●		
Extreme heat	●	●		
Flood/Extreme rainfall	●	●		●
Ocean acidification and sea-surface temp.	●	●	●	●
Sea-level rise	●	●		●

More information on current and future climate expected in Tonga is outlined in Appendix E.

Further details on the nature and extent of corresponding risks affecting each sector of the Tonga economy can be found in the Tonga – Green Climate Fund Country Programme report.

Key points

Climate change presents a range of risks to businesses in Tonga. It is expected to increase the frequency of severe cyclone events that have historically disrupted businesses in all industry sectors. Climate change also creates new and very significant challenges for all sectors, most notably:

- changing rainfall patterns, which is expected to affect agriculture in particular;
- sea-level rise, which is expected to affect tourism, agriculture, and construction;
- ocean temperature rise/ocean acidification, which is expected to affect tourism and fisheries in particular; and
- the magnitude of climate risk appears to be greatest in the tourism sector and least in the construction sector – where most of the business activity takes place.[29]

Climate risks for individual businesses in the agriculture and fisheries sectors are high. However, because there are far fewer businesses operating in these sectors and the value of production by these firms is lower, the magnitude of overall climate risk accruing to these sectors is less.

29 Risk is a value-adding function of production from private sector businesses that are exposed in each industry sector, the sensitivity to damage/loss from a relevant climate event, and the likelihood that the climate event will occur. Refer to Appendix A for further information on concepts.
The lower (approximate) risk rating for agriculture and fisheries here reflects the much lower value-adding production from private sector businesses in those industries (refer to Chapter 2).

Barriers constraining the capacity of private sector businesses to manage climate risks

Glorias Printing Business

Climate risks are high for businesses in Tonga but this does not mean that they are inevitable. Climate risks can be reduced or, in some instances, even eliminated altogether if careful and co-ordinated risk management interventions are implemented.

The capacity of MSMEs to manage climate risks efficiently and effectively is affected by several barriers (GCF 2017, Productivity Commission 2012). Barriers here refer to the factors or conditions that constrain the capacity of private sector actors to manage climate risks to their businesses autonomously. Barriers can be thought of as the underpinning cause of climate change problems in Tonga (aside from greenhouse gas pollution[30]).

Six barriers have been identified in this study as the main factors that impede the capacity of tourism, agriculture, fisheries and construction MSMEs to manage climate risks and invest in low-emissions practices. These barriers are a mix of market, regulatory and capacity type factors and conditions and are discussed below.[31]

The first four barriers are the key barriers highlighted in consultations with private sector stakeholders as currently the most important.

Constraints assessing climate-related risks to business

The first barrier relates to challenges faced by MSMEs in assessing the nature and extent of climate-related risks to their specific business operations.

These challenges pertain to a lack of tailored climate information services that can be used for business-level risk assessments. Whilst there have been some examples of good-

30 which is generated by third parties outside Tonga.

31 Barriers outlined here are not intended to be a comprehensive list but rather the ones highlighted in this rapid analysis from the desktop review and stakeholder workshop as being currently the most important.

practice developments in this regard in recent years, such as the Tonga Meteorological Service's maintenance of an online seasonal forecaster of rainfall and temperature for the agriculture sector,[32] many businesses consulted as part of this study report that climate information services are not provided in a form that can be readily applied or incorporated into the circumstances of their particular industry activities. For example, construction businesses consulted reported that longer term forecast information on cyclone frequency was not readily available to inform the design of long-life residential investments.[33]

Challenges assessing climate-related risks also relate to a lack of technical skills among businesses to conduct climate risk analyses of their operations/investments.[34] Many businesses consulted as part of this study reported that they were not able to confidently utilise climate information inputs to analyse risks to different elements of their business. This in part relates to a low awareness of tools to conduct climate risk assessments and the skills to apply the tools.[35]

Ultimately, these barriers mean that many businesses cannot properly understand the changing climate risks to their business.

Constraints identifying and assessing climate risk management measures and low-emissions technologies in the context of businesses

The second barrier relates to challenges formulating effective and efficient risk management response measures.

One component of this barrier is a lack of information to identify risk management measures that are suitable for the Tonga context.

For agriculture, stakeholders consulted reported that:

- whilst the Ministry of Agriculture, Food, Forests and Fisheries (MAFFF) is delivering some limited agriculture extension services, including some that specifically aim to support management of climate risks, the scale and scope of these extension services are below what was envisaged under the Tonga Agriculture Sector Plan: 2016–2020 and are not sufficient for farmers' needs. This has been an ongoing deficiency related in large part to a lack of resources and capacity within MAFFF; and

- farmers do not generally (directly) utilise information on climate risk management measures employed by farms and extension programmes in other Pacific Island countries, including regional programmes that commonly have a knowledge-sharing component. One reason offered for this is that it is considered the role of MAFFF, as they are the ones who are (generally) funded to attend regional meetings where this information is typically shared.

32 See http://met.gov.to:2016/index.do

33 Some information does exist on the Pacific Climate Futures tool website - https://www.pacificclimatefutures.net/en/ - which is implemented by the Australian BoM/CSIRO as part of the Pacific Climate Change Science Program. There is, however, no information to raise awareness of this resource on the Tonga Meteorological Service website. Nor are any knowledge products using information generated from the Pacific Climate Futures tool provided on the Tonga Meteorological Service website. Refer to http://www.met.gov.to/.

34 Consultations undertaken for this assignment indicate that this dimension, i.e. skills of businesses to undertake risk assessments, is a constraining factor, impeding assessment of risk.

35 It also relates to a low awareness of tools to conduct general risk assessments of their business operations and the skills to apply the tools.

Watemeleon Plantation in East side of Tongatapu

For tourism and construction, stakeholders consulted noted that:

- there are insufficient information products and forums available in Tonga that explain the adaptation measures they could potentially implement, such as diversifying supply-chains, ensuring that emergency procedures (for their own businesses) are in place, diversifying offerings, and cyclone-proofing accommodation buildings.

Challenges formulating appropriate risk management measures also relate to a lack of skills to analyse the business-case of investing in new measures.[36] More specifically, many businesses do not have the skills to accurately measure the benefits generated from risk management measures (in terms of damages and loss avoided) over time, and to compare this against the cost of implementing these measures. This in part relates to a low awareness of tools and methods[37] that can be employed to undertake such business-case assessments.

Ultimately, these barriers mean that many businesses cannot make informed decisions about what are the most effective and efficient risk response measures for their circumstances.

Difficulties accessing financial services for climate risk management measures

The third barrier identified relates to difficulties accessing affordable credit to finance climate risk management measures and low-emissions technologies, as well as other financial products to manage risk.

In Tonga, there are four commercial banks licensed to operate: two locally incorporated (the Tonga Development Bank, and the Malaysian Banking Finance Bank), and two international banks (the Bank South Pacific and the ANZ Banking Group). In 2016, the IMF

36 Lack of business literacy skills is identified in the Tonga Agriculture Sector Plan: 2016–2020 and the Tonga Fisheries Sector Plan 2016–2024 as a barrier constraining private sector development generally – not just climate risk management elements.

37 Including adaption of tools/methods already being used.

noted that competition between these banks is increasing (as indicated by a narrowing of interest rate offerings), and that there is a steady growth in credit consistent with financial deepening.

Despite these positive developments, MSMEs consulted as part of this study (and as reflected in other reports, e.g. TRIP consultants 2013; GoT 2016b) report difficulties accessing adequate amounts of affordable credit to fund business ventures – including climate risk management and low-emissions elements.

Reasons underpinning these difficulties commonly relate to: (i) a lack of awareness of available finance products (notably rural finance products available to farmers and fisherman); (ii) a lack of capacity (financial literacy) to develop high quality loan applications (including climate risk management elements); and (iii) difficulty in using land assets as loan security (discussed further below). Another reason is likely to include product conditions that are unfavourable for investments with longer payback periods. For example, concessional loans offered by the Tonga Development Bank through the Agriculture Marketing and Production Fund requires loans to be repaid within a nine-month period.[38]

A further reason may be the potentially conservative (i.e. risk averse) nature of the banking sector in Tonga as noted in the National Strategic Development Framework (GoT 2015).[39] [40] In the Tonga situation, where there is a lack of good quality scientific information to input to accurate climate risk assessments, a conservative lending institution would be expected to put a higher risk premium on investments that are subject to material climate risks / uncertainties. Moreover, where there is a lack of technical capacity amongst lending staff to properly evaluate climate risk (and this is not effectively demonstrated in the loan application), a conservative lending institution would also be expected to offer minimal interest rate reductions (or other loan parameters/conditions) for climate risk reduction elements of business proposals. The IMF (2020b) states that currently there is inadequate supervision (regulatory) of the financial sector on assessing the impact of stress events related to climate change.

Weak engagement of the local private sector in delivery of infrastructure services

The fourth barrier relates to the delivery of public infrastructure services.

The Tonga National Infrastructure Investment Plan (NIIP) outlines the government's priorities for major infrastructure investments in transport, telecommunications, water, energy, and solid waste management over the period 2013 to 2023.

The NIIP recognises the substantial risks to the provision of infrastructure services presented by climate change and outlines a number of strategies to help manage them into the future. Amongst other things, these strategies focus on: (i) strengthening the regulatory arrangements for infrastructure developments; and (ii) building the capacity of government institutions to manage this work programme.

38 See https://www.tdb.to/2015-campaigns-agriculture-marketing-and-production-fund.html

39 This position is not necessarily supported in other financial sector-related assessments reviewed as part of this study (e.g. GoT 2016b; IMF 2020; ADB 2019).

40 The IMF (2020b) recommends that "the insolvency regime should be improved to provide banks and private companies a predictable, speedy, and transparent resolution framework to recover non-performing loans." This would be expected to go a long way to address concerns that Tonga commercial banks are conservative in their approach to providing credit to business formation.

NIIP[41] pays little attention, however, to directly supporting the capacity of local private sector enterprises to more effectively participate and contribute to the delivery (i.e. design, construction and maintenance) of climate-resilient infrastructure in Tonga. As outlined in barriers 1 and 2 above, construction-sector MSMEs consulted for this study reported that they currently lack the skills and knowledge to assess and manage climate risks to their activities. They also stressed that a lack of clear communication (to the local private sector segment) on the scheduled implementation of the NIIP investments (e.g. clear timelines for project pipelines and local advertisement of component tasks) was an impediment to their engagement in delivery of projects. The MSMEs noted that these issues affected their ability to undertake medium-range business planning (including human resourcing), which in turn affects their ability to prepare the high quality tenders necessary to win and effectively deliver contracts.

This NIIP outlines a very ambitious work programme that requires a strong(er) locally based private sector to effectively implement and thereby contribute to broader private sector development.

Weak regulatory arrangements for land-lease


A. Guttenbeil Vanilla

The fifth barrier relates to difficulties accessing secure land for business activities, including for locally owned businesses.

The land tenure system in Tonga is based on a modified Tonga hierarchical structure. This system was developed as part the Topou I's reforms, which aimed to "increase access to land resources so that Tongan people would not suffer the lack of access to land and associated poverty observed in the West" (GoT 2016b). This system is a land lease arrangement, which has effectively supported significant economic progress in other developing countries (GoT 2016b).

Some aspects of the existing legal and regulatory arrangements under this system are complex and are not being efficiently administered. Select examples of these impediments relate to: (i) the complexity of arrangements for dealing with absentee land-owners to resolve disputes (GoT 2016b); (ii) ad hoc processes for lease renewal; and (iii) non-transparency and delays in the operation of the market (IMF 2020c).

For climate risk management specifically, these land tenure barriers reduce incentives to invest in resilience of long-life assets located on disputed land (e.g. climate proofed accommodation infrastructure, climate-resilient agro-forestry investments) amongst other impediments. Land ownership issues also affect the capacity of businesses to access credit[42] as business owners are not able to use land as security/collateral.

41 or any other sector planning document reviewed as part of this study.

42 For finance climate risk management measures and investment in low-emission technologies.

Weak governance of public marine ecosystem assets

The sixth and final barrier identified in this assessment is related to the management of near-shore marine ecosystem assets.

Marine ecosystem assets in Tonga provide a range of ecosystem services that are important for MSME operations across the tourism, fisheries and agriculture industry sectors. These services include recreation attractions (important for nature-based tourism businesses), the provision of fish, and storm protection. Marine ecosystems are, however, sensitive to damage from climate events (ocean temperature rise, ocean acidification and cyclones). When these events occur, ecosystems can be degraded, resulting in a loss of important ecosystem services to MSMEs.

Vava`u Pearl Farmer Business

Marine ecosystems in Tonga are publicly owned and managed assets,[43] which means that the ability and incentives to manage climate risks to these assets is generally beyond that accruing to individual MSMEs. The key instrument that is currently used to collectively manage marine ecosystem assets are special management area (SMA) plans, which are collaborative management instruments developed by the government and local communities. Communities request the establishment of an SMA and, after the necessary mapping, survey and consultations, ministerial approval is given and the community establishes its SMA management committee to implement an agreed SMA plan.[44] Currently, however, the measures included in these SMAs are not sufficient to effectively manage climate risks to marine ecosystems and/or are not implemented (GoT 2016a).

43 And provide goods and services that have public-good characteristics.

44 Complementing SMAs are speciesspecific fishery management plans, e.g. aquaculture. There is also an integrated environmental management plan for the Fanga'uta Lagoon. This is a pilot project implemented as part of the GEF funded Ridge to Reef project.

The Tonga Fisheries Sector Plan 2016–2024 outlines a strategy to enhance the scale and scope of SMAs[45] and SMA processes in order to provide appropriate incentives for all stakeholder groups to manage the marine areas sustainably and efficiently – including management of climate risks.

Some progress is being made in this regard but this is a major reform area and substantial work remains to be done.

Key findings

There are several factors and conditions that constrain the capacity of tourism/agriculture/construction/fisheries MSMEs to manage climate risks to their businesses.

These barriers are a mix of market, regulatory and capacity type factors and conditions.

The barriers highlighted by businesses consulted in key industry sectors[46] as being the main barriers impeding the adaptive capacity of MSMEs at this time are:

- constraints assessing climate-risks to businesses;
- constraints identifying and assessing climate risk management measures and low-emissions technologies in the context of businesses;
- difficulties accessing financial services for climate risk management measures and low-emissions technologies; and
- weak engagement of the local private sector in delivery of infrastructure services.

Other barriers identified as part of this rapid analysis, but not considered by businesses to be as important/urgent (for climate risk management) at this stage were:

- weak regulatory arrangements for land-lease; and
- weak governance of marine ecosystem assets.

It is important to also recognise that there is a range of other barriers (i.e. non-climate-related barriers) that constrain the ability of MSMEs to develop more generally. To achieve climate-resilient private sector development, both climate and non-climate barriers need to be addressed, ideally as part of a sector-wide programmatic approach. Addressing climate barriers by themselves is not likely to be effective in achieving the private sector's climate-resilient, low emissions development goals in the Tonga context.

45 and complement it with a range of other regulatory and economic instruments.

46 Industry sectors included: (i) tourism; (ii) agriculture; (iii) fisheries; and (iv) construction.

Chapter 5

Ideas for supporting climate resilient development of the private sector

This chapter describes a set of options that could potentially help strengthen the climate-resilience of private sector development in Tonga.

- The options outlined here are not a wish list but rather have taken guidance from, and align with, the key barriers identified in Chapter 3 as being most important at this point in time (i.e. barriers 1 to 4). In this way, there is a clear climate and policy rationale for the ideas identified.

The ideas further aim to:

- align with priority strategies/actions set out in relevant sectoral plans to the extent that is possible, recognising that there are deficiencies in existing plans for some sectors;[47]
- harmonise with existing projects that are funded through climate finance; and
- be practical and achievable to implement.

The alignment is important to ensure that climate interventions work coherently alongside and/or are integrated as part of other interventions aimed at unlocking private sector development.

The options presented are intended as high-level ideas. Options that are considered by TCCI and MEIDECC to have the greatest merit will be further developed into concept notes in the next phase of project/programme design work.[48] A deeper dive into the barriers and project design elements will be undertaken at that stage.

Four potential project ideas have been formulated and are outlined in Table 2, Table 3, Table 4 and Table 5.

47 Consistent with the intent of the Tonga Strategic Development Framework, the National Climate Change Policy (2016) and the Second Joint National Adaptation Plan: 2018–2028 (JNAP 2).

48 It is noted that options outlined here are not a comprehensive list. Rather they are a selection of options identified in this rapid assessment as having a clear rationale and potential to contribute meaningfully to resilient private sector development in Tonga.

Table 2. Project Idea #1

Title	Climate skills for business
Barrier(s)	1, 2, 3
Sectors	Tourism, agriculture, fisheries and construction
Key Elements	This project idea comprises a range of technical assistance type measures aimed at building MSME **knowledge** and **skills** to manage climate risks to their businesses effectively. The project is envisaged to be delivered through the Tonga Chamber of Commerce and Industry (TCCI). To the extent practicable, MSMEs will be engaged to deliver selected elements. Suggested components are shown below. **1. Analysing climate risks** • Develop and assist MSMEs to apply simple and user-friendly **tools**/**methods** to analyse climate risks to their businesses. • This is envisaged to be a simple financialtype analysis that is compatible with other financial risk analyses and methods used by Tonga MSMEs, TCCI, TDB and any courses run through the national TVET system. • This component would also work with the Tonga Meteorological Service as needed to further tailor climate information services to the climate risk assessment needs of MSMEs. **2. Identifying climate risk management measures** • Provide coaching and mentoring support to MSMEs to identify fit-for-purpose measures that could be incorporated into their businesses to manage climate change risk. • Local (i.e. Tonga-based) and regional (e.g. Fiji) businesses would be engaged to the extent possible to provide these mentoring and coaching services.[49] • Activities would link with and reinforce/complement other knowledge generation/sharing/extension programmes delivered through line ministries (e.g. MAFFF agriculture extension services). • Activities would also draw from regional research and extension programmes to promote knowledge-adoption actively. • Further, to the extent that MSMEs permit, taking into account commercial-in-confidence considerations), activities will also draw from strategies/investments employed by relevant businesses in Tonga. Examples of climate risk management measures employed by selected commercial agriculture businesses are described in Appendix F.

49 For example, this could potentially include Nishi Trading, which already provides some outreach and extension services, if this idea is progressed for the agriculture sector.

Title	Climate skills for business
Key elements	**3. Assess business case of climate risk management measures** • Mentoring and coaching to MSMEs on business-case assessment of risk management measures and, where relevant, formulation of loan application. • Local (i.e. Tonga-based) and regional (e.g. Fiji) businesses and business organisations, including TCCI itself, will be engaged to the extent possible to provide these mentoring and coaching services. This is envisaged to be a simple financial type analysis that is compatible with other financial (business-case) analysis methods used by Tonga MSMEs, TCCI, TDB and any courses run through the national TVET (technical and vocational education and training) system. **4. National knowledge-exchange summits** Support wider (national) dissemination of knowledge learned and generated in the above-outlined components. This is envisaged to be a national workshop summit convened annually. **5. Strengthen institutional arrangements for project management (provisionally TCCI)** A focus in each component will be to include/target women, recognising that workforce participation of this group has been identified as a key issue constraining growth.
Alignment with sector plans	TASP includes dedicated strategies to build knowledge and skills in climate risk management and financial literacy, and to involve the private sector in the delivery of extension services.
	For the tourism sector, there is no current sector plan in place.
	For construction, there are no priority actions/strategies that closely align with the proposed idea in relevant sector plans, notably the NIIP.

Title	Climate skills for business
Harmonise with existing climate projects	**Agromet** This is a continuation of the APEC Climate Center project delivered with support from Korea, which aimed to provide tailored climate information services for agriculture sector users. Climate information generated through Agromet – and other climate information services provided by the Tonga Meteorology Services – would input to climate risk analysis exercises/tools suggested in this project idea.
	Climate and Oceans Support Program in the Pacific (COSPPac). COSPPac is a regional programme implemented by the Australian Bureau of Meteorology, which aims to strengthen provision of climate information services in a number of Pacific Island countries. Climate information generated through COSPPac – and other climate information services provided by the Tonga Meteorology Services – will input to climate risk analysis exercises/tools suggested in this project idea.
	Skills for inclusive economic growth. S4IEG is an Australian DFAT-funded project to build the skills of the Tonga labour force and in turn contribute to improved productivity of MSMEs. A large part of this programme is delivered through the Tonga Business Enterprise Centre (TBEC), an arm of the Tonga Chamber of Commerce and Industry. S4IEG also includes support to strengthen the national TVET system. S4IEG does not currently incorporate targeted/extensive initiatives that build business skills/capacities in climate risk management.
	R2R Integrated Land and Agro-ecosystems Management Systems. ILAMS is a GEF-5 funded project that includes a component to pilot an integrated agro-ecosystem approach to rehabilitate degraded landscapes and thereby strengthen resilience. The target group for this project is communities, not businesses.
	Future farmers of Tonga. This is an FAO project to build the capacity of young farmers in farm management, marketing and agribusiness. Detailed information on the design of this project could not be located in the time available for this study but is understood not to include dedicated elements that aim to build business skills/capacities in climate risk management.
Comments	To meet the needs of MSMEs, most components of the project will be designed and delivered on a sectoral basis, recognising that there are significant differences in existing skills and types of tools/climate risk management measures across industry sectors. In this way, project components could also be combined with other sector-oriented initiatives as part of a larger sectoral programmatic approach. As part of more detailed concept design in the next phase, effort will be allocated to look at the merits of integrating certain project components into other programmes that aim to build business skills more broadly. An example is the DFAT-funded S4IEG programme.

Table 3. Project idea #2

Title	Climate-smart finance facility
Barrier(s)	2, 3
Sectors	Tourism, agriculture, fisheries and construction
Key elements	This project idea seeks to establish a risk-sharing facility that aims to make it easier and more attractive for Tonga MSMEs to **access finance** to invest in climate risk management measures and the development of their businesses more generally. It is envisaged that the facility will be established in the Tonga Development Bank (TDB). **1. Concessional loans and other financial products** • The facility will provide financial products (e.g. concessional loans) specifically tailored for the needs of MSMEs in key sectors, notably tourism, construction, agriculture, and fisheries. It is envisaged that this will cover climate risk management measures and the development of their business more generally. Products will potentially integrate with and strengthen existing government development loans provided by TDB through on-lending, i.e. the Tourism Loan Fund, the Construction and Utilities Fund, the Agriculture Development Fund, the Fisheries Development Fund and the Livestock Development Fund.[50] **2. Technical assistance grants** • The facility may also potentially provide technical assistance grants. • It is envisaged that this will cover the domains in project idea #1 above (if needed), with the technical assistance focused on supporting sound business case development and corresponding loan applications. **3. Strengthen institutional arrangements for managing climate change risk in theTonga Development Bank** • Develop, and assist TDB staff to apply, **tools**/**methods** to analyse climate risks elements of loan applications. • It is envisaged that this will be compatible with and build on other financial (risk) analysis tools and methods used by TDB._
Alignment with sector plans	TASP does include strategies to increase access to affordable credit for commercial farmers and fishing businesses but does not include specific provisions for climate resilience or climate finance.
	For the tourism sector, there is no current sector plan in place.
	For construction, there are no priority actions/strategies that closely align with the proposed idea in relevant sector plans (notably the NIIP).
Harmonise with existing climate projects	No projects currently exist that are funded through climate finance.

50 Refer to https://www.tdb.to/loans-government-managed-fund-tourism-and-manufacturing.html

Title	Climate-smart finance facility
Comments	To meet the needs of MSMEs, most components of the project idea will be designed and delivered on a sectoral basis, recognising that there are significant differences in needs across industry sectors. As part of more detailed concept design in the next phase, special effort will be made to look at the merits of integrating the project into existing funds/facilities, such as the *Tourism Loan Fund*. There will also be merit in engaging with the international banks that operate in Tonga – i.e. BSP and ANZ – to explore their interest in engaging with climate finance. PIFS could potentially do this from a regional perspective, given that BSP and ANZ operate in most countries across the Pacific region. There are significant potential benefits for the region if BSP and ANZ were to be more engaged in climate finance, notably, as an accreditation entity to the Green Climate Fund.

Table 4. Project idea #3

Title	Resilient value-chains and co-operatives
Barrier(s)	2
Sectors	Tourism, agriculture and fisheries
Key elements	This project idea seeks to establish stronger links and co-operation between MSMEs within and across different industry sectors – as a measure/strategy/mechanism to build resilience and facilitate growth generally. The idea will investigate and promote as appropriate strengthening of short, local value chains and co-operatives. **1. Investigate opportunities for enhancing short value chains** • Conduct a basic value-chain analysis for key sectors (notably agriculture and tourism), building on studies that have already been made. • Identify options for diversifying and enhancing the resilience of short value-chain links. • Conduct stakeholder consultation on options. • Evaluate options. **2. Investigate opportunities for promoting resilience through co-operatives** • Review previous co-operatives conducted for industry sectors in Tonga. • Review similar work undertaken in other areas. • Conduct stakeholder consultation on options. • Evaluate options. **3. Pilot initiative(s)** • Pilot/trial initiatives

Title	Resilient value-chains and co-operatives
Alignment with sector plans	TASP includes dedicated strategies to strengthen links between producers and tourism businesses as part of a growth strategy (not risk management strategy per se).
	For the tourism sector, there is no current sector plan in place.
Harmonise with existing climate projects	No projects were identified in consultations undertaken for this study.
Comments	To be effective, this idea likely requires MSMEs to firstly build foundational knowledge and skills in climate risk management and gain better access to finance (as targeted in project ideas #1 and #2). This idea is thus perhaps more appropriate as a medium-term intervention. It is highlighted here as an idea to be included and investigated in future sector plans. It is noted that there was a study completed in 2015 by Andrew Shepherd for the World Bank, entitled *Value chain development in Tonga*. This study could not be located in the time available for this assessment.

Table 5. Project idea #4

Title	Inclusive and resilient delivery of infrastructure projects
Barrier(s)	5
Sectors	Construction
	This project idea comprises several strategies aimed at enhancing the local private sectors' role in the delivery of non-residential climate-resilient infrastructure projects. This project idea recognises that a stronger, locally based, private construction sector is required to effectively implement the ambitions of the *National Infrastructure Investment Plan (NIIP)* and thereby contribute to broader, more resilient private sector development. The key thematic areas of this project idea are listed below. **1. Technical training to enhance local MSME skills to participate in project delivery, including climate risk elements** • This is envisaged to mostly be formal training that focuses on engineering and trade skills. **2. Review of government planning processes for identifying and prioritising infrastructure projects** • Amongst other things, this should review tools and criteria (e.g. multi-criteria analysis) used to inform prioritising decisions, with a view to increase the weighting for criteria relating to direct generation of local jobs/employment and climate-resilience. **3. Review of government procurement processes for larger scale infrastructure projects** • Amongst other things, this will review how project pipelines are communicated and advertised locally. • It will also investigate whether/how framework agreements can potentially foster stronger collaboration between foreign-owned and locally owned firms.

Title	Inclusive and resilient delivery of infrastructure projects
Key elements	**4. Review of alternative infrastructure service delivery models for roads and ports, i.e. public-private partnerships (PPPs)** • A specific emphasis of this component will be to explore PPP models potentially suited for service delivery by local businesses, which typically do not have access to high amounts of up-front capital. • This review will also undertake an objective and sober analysis of the potential advantages and disadvantages of PPPs, drawing on experiences from other parts of the Pacific and internationally.[51] **5. Enhanced monitoring and evaluation (M&E) of NIIP implementation** • This will look to enhance M&E of the NIIP with a view to informing ongoing adaptive management of the plan implementation. Key elements of enquiry will include: (i) role/capacity of local private sector in delivery; and (ii) performance of investments against climate resilience criteria.
Alignment with sector plans	The NIIP does not include any strategies aimed at strengthening the capacity of local MSMEs to help deliver large public infrastructure projects.
Harmonise with existing climate projects	**Skills for inclusive economic growth.** S4IEG is an Australian DFAT-funded project to build the skills of the Tonga labour force and in turn contribute to improved productivity of MSMEs. Part of this programme will strengthen the national TVET system. It also supports delivery of trade skills through the Australian Pacific Training Coalition (APTC). The Tonga skills programme does not currently incorporate targeted/extensive initiatives that build skills/capacities in climate risk management.
	The World Bank is currently instituting reforms through the Ministry of Finance and implementing agencies to improve the delivery of infrastructure projects they are responsible for, including building climate-resilient roads, airstrips on outer islands, Tongatapu airport and better schools.
Comments	This project idea recognises that a strong(er) locally based private sector is required to effectively implement the ambitions of the NIIP and thereby contribute to broader, more resilient private sector development.

Key points

The ideas outlined here have taken guidance from, and align with, the key barriers identified in Chapter 3. In this way, there is a clear climate and policy rationale for the ideas identified.

The ideas further seek to be practical and achievable to implement.
The ideas are:

- climate skills for business (and the Chamber of Commerce);
- climate-smart financing facility;
- resilient value-chains and cooperatives;

51 The largest problem that PPP projects face is the fact that public and private entities have very different interests. For the public sector, the objective is to ensure that the money spent on infrastructure has been used effectively. On the other hand, private sector participants wish to maximise the profits. Furthermore, private companies are much more wary about carrying risks than government agencies. The objectives of public and private partners in PPPs are conflicting, and this can be a substantial challenge of such arrangements.

- inclusive and resilient delivery of infrastructure services; and
- the ideas also seek to align with strategies outlined in sector plans to the extent possible, noting that integration of climate resilience into some sector plans is weak (e.g. the Tonga Fisheries Sector Plan 2016–2024) and that the Tourism Sector Roadmap is no longer current.

Chapter 6

Suggested priorities and financing opportunities

The options identified in this study are intended as high-level project/reform ideas. Options that are considered by TCCI and MEIDECC to have the greatest merit will be further developed into concept notes in the next phase of project/programme design work.

Suggested priorities

As outlined in Chapter 2, a preliminary appraisal of the project options using a basic multi-criteria analysis method was undertaken in order to help prioritise project options to be taken forward in this next phase of work. The results of this appraisal are outlined in Table 6. Note, scoring for this appraisal has involved subjective judgements by the project team and is thus indicative. It has been undertaken for the purposes of providing early guidance on prioritisation only.

One important consideration in appraising the ideas is the extent to which they are aligned with strategies/actions outlined in sectoral plans. Among other things, this helps to ensure that climate resilience strategies work coherently alongside other interventions as part of a programmatic approach to unlocking private sector growth. It also helps to ensure that the ministries with mandated responsibilities in the sectoral area are appropriately involved in project design and implementation.

At this time, however, there has been limited integration of climate resilience into some key sector plans important for private sector development, particularly the Tonga Fisheries Sector Plan 2016–2024 and the Tonga Tourism Sector Roadmap. This has been identified as an important shortfall in current climate change policy for Tonga (IMF 2020a).[52]

52 It also substantially limits the extent to which these strategic documents can be used to guide climate change-related project development decisions.

Table 6. Project options scorecard

Title	a. appropriateness	b. climate risk benefits	c. broader development benefits	d. paradigm shift potential	e. alignment with sector plans	f. cost of project implementation	TOTAL SCORE	RANK
Climate skills for business	P	16	14	8	-	10	48	**1**
Climate-smart finance facility	P	14	16	8	-	10	48	**1**
Resilient value-chains and co-operatives	P	10	10	8	-	10	38	**4**
Inclusive and resilient delivery of public infrastructure services	P	10	16	8	-	10	44	**3**

Based on the results of the preliminary appraisal, Idea 1 (Climate skills for business) and Idea 2 (Climate-smart financing facility) are recommended as the highest priority options. These options rate well, as they address barriers constraining foundational aspects of adaptive capacity and, at this stage of private sector development, are expected to generate the highest climate-related benefits. It is suggested that these ideas be targeted at the tourism and construction industry sectors in the first instance, as they are the industry areas that make up a large proportion of private sector activity in Tonga and which are vulnerable to climate change. These ideas can subsequently be expanded to agriculture and fisheries as a second phase of work, once experience has been gained.

Idea 4 (Inclusive and resilient delivery of infrastructure projects) is recommended as the next priority option. This recommendation reflects the view that a stronger, locally based, private construction sector is required to implement the ambitions of the National Infrastructure Investment Plan (NIIP) effectively and thereby contribute to broader, more resilient private sector development. It is also in recognition of the fact that infrastructure investment will potentially be further upscaled as an economic stimulus measure to help recover from COVID-19.

Idea 3 (Resilient value chains and co-operatives) is suggested as a second phase option once foundational climate risk knowledge and skills are developed.

Finance opportunities

There are a number of development partners and funding sources that could potentially be pursued for the options that are considered by TCCI and MEIDECC to have the greatest merit.[53] It is prudent to have a reasonable idea of available opportunities and their requirements in order to ensure that analytical inputs to the next concept stage meet those requirements/expectations.

In determining the preferred approach, three high-level considerations should be kept in mind.

- The extent to which the development partner has a comparative advantage in the relevant sectoral area.
- The extent to which the development partner has a proven track record of providing efficient and effective assistance in Tonga.
- The extent to which the development partner provides assistance as part of a broader sectoral support programme.

A summary overview of climate finance opportunities and corresponding development partners / accredited entities that may be targeted for the project options are provided in Appendix G.[54]

Key points

Project ideas to be progressed as the highest priorities are: (i) climate skills for business; and (ii) climate smart financing facility. These ideas are suggested to be targeted at the tourism and construction industry sectors in the first instance, as they are the industry areas that make up a large proportion of private sector activity in Tonga and which are vulnerable to climate change. These ideas can subsequently be expanded to agriculture and fisheries as a second phase of work, once experience has been gained.

Idea 4 (inclusive and resilient delivery of infrastructure projects) is recommended as the next priority option. This recommendation reflects the view that a stronger, locally based, private construction sector is required to implement the ambitions of the National Infrastructure Investment Plan (NIIP) effectively and thereby contribute to broader, more resilient private sector development. It is also in recognition that infrastructure investment will potentially be further upscaled as an economic stimulus measure to help recover from COVID-19.

53 This is in terms of preparing a full project proposal and securing finance for project implementation.

54 This overview stresses that a key funding opportunity to progress project Idea 1 (climate skills for business) could be to integrate with the Australian DFAT funded Skills for inclusive economic growth (S4IEG) programme. Programme delivery could be through the Tonga Business Enterprise Centre in TCCI, utilising bilateral climate finance delivered through the Australian Pacific Climate Partnership.

Chapter 7

Concluding remarks

To be successful in developing Tonga's private sector, the capacity of enterprises to manage climate risks will need to be strengthened. Climate risk management must become a core part of doing business.

The project ideas identified in this study are intended to target the key barriers that are currently constraining the ability of businesses to manage risk effectively. They are also intended to be practical and achievable to implement.

Ideas that are considered by TCCI and MEIDECC to have the greatest merit will be further developed into concept notes in the next phase of project/programme design work. It is also suggested that the process for further developing the ideas be closely co-ordinated with processes for updating and revising relevant sectoral plans, consistent with the intent of the Tonga Strategic Development Framework, the National Climate Change Policy (2016) and Second Joint National Adaptation Plan: 2018–2028 to mainstream climate resilience into sectoral planning frameworks. Among other things, this helps to ensure that climate strategies work coherently alongside other interventions as part of a programmatic approach to unlocking private sector growth. It also helps to ensure that the relevant institutions, with mandates and expertise in relevant sectoral areas, are appropriately involved in the design and delivery of interventions.

In addition, the next phase work could usefully coordinate with COVID-19 recovery planning. Reforms and investments in the tourism sector (as the sector most affected) and infrastructure sector (as a key sector that can help stimulate private sector activity and jobs) will probably feature as large components of Tonga's recovery strategy. This will help Tonga build back better.

Appendix

Appendix A: Key concepts and terminology

This section outlines some key concepts and terminology that are used throughout the assessment.

A foundational concept is that of risk (refer to international risk management standard ISO 31000:2009).

A business is often affected by factors or **events** that are random in nature and that are fully or partly outside the control of the organisation(s). When these events occur, they can affect the extent to which the business is able to achieve its intended objectives, or even cause it to fail. The expected impacts, or expected consequences, from such random events is what is meant by risk. Formally, risk can be represented using the risk equation shown below.

Risk = Likelihood (of random event occurring) × Consequence (of random event)

[Source: adapted from Boardman et al. 2010; IPCC 2012]

Climate change and disaster risk is a type of risk where the random event is a climate or weather event. These events can arise from long-term changes in climate (such as changing temperatures, rising sea level or glacial melt), as well as from changing frequency and intensity of hydro-meteorological (or weather-related) hazards, such as floods, storms and droughts. They may be rapid or slow in onset, lasting for a few hours or leading to longer-term changes.

The standard risk equation adapted for climate change and disaster risk specifically is described in Box 1.

Box 1 Climate change and disaster risk equation

Climate change and disaster risk = Likelihood (of climate event occurring) × Consequence (of climate event)

where, Consequence = Function (Exposure, Vulnerability, Adaptive Capacity)

The consequence component of the climate change and disaster risk equation refers to the effects on assets and activities, if the climate events were indeed to occur. These effects, in turn, depend on:

- the **exposure** of business-related assets and activities to the climate event, e.g. infrastructure located in a cyclone path, crops located in a drought-prone area (adapted from World Bank Institute 2009);
- the **vulnerability** or susceptibility of assets and activities to damage and loss from the climate event, if it were to occur, e.g. fragility of infrastructure construction, sensitivity of crop to dry conditions (HM Treasury 2009); and

- the **capacity** of businesses and the wider industry sector **to adapt** to new ways of doing things in the face of climate change, including moderating the potential damage, taking advantage of opportunities, and coping with consequences (HM Treasury 2009; Productivity Commission 2012).[1]

Adaptation is about effectively managing the risks of climate change. Businesses already face a wide variety of risks – climate change is one of the many risks that need to be taken into consideration.

The capacity of businesses to manage the climate risks they face effectively can be constrained by one or more **barriers**. Barriers are the factors or conditions that impede the ability of businesses to identify, evaluate and manage their climate risks.

Another important concept is **climate change uncertainty**. In the medium to long-term future, the forecasted likelihood of heatwave events occurring is expected to change due to climate change, although the extent of this change is not precisely known, i.e. the likelihood component of the standard risk equation in the medium to long term is uncertain.[2]

This uncertainty has implications for how precisely a given climate change and disaster risk can be analysed and, in turn, how the risk should best be treated. In these instances, the key thing to recognise is that uncertainty is present. There is not always one right analysis of risk.

1 Adaptive capacity is commonly understood to be a determinant of the level of exposure and vulnerability.

2 The further into the future we look, the greater this uncertainty is.

Appendix B: Criteria and scoring used in evaluation

The criteria utilised in this analysis were based on key investment criteria of the Green Climate Fund. More information on the criteria and how they were scored is outlined below.

Table 7. Project option scorecard

Criteria		Score
A. Appropriateness		
i. Does the project address a (market, regulatory, or capacity) barrier constraining the capacity of MSMEs to manage climate risks?	Pass/Fail	Pass/Fail
B. Climate risk benefits		
i. To what extent does the project target significant / sizeable climate risks?	Score (1=min; 10=max)	/10
ii. To what extent are the interventions expected to be effective in helping to reduce risks?	Score (1=min; 10=max)	/10
C. Broader development benefits		
i. To what extent is the project expected to contribute to broader private sector development (i.e. beyond risk management)?	Score (1=min; 10=max)	/10
ii. To what extent is the project expected to generate broader social or environmental benefits (i.e. beyond risk management)?	Score (1=min; 10=max)	/10
D. Paradigm shift potential		
i. To what degree is the project expected to catalyse impact within Tonga beyond project investment?	Score (1=min; 10=max)	/10
ii. To what degree is the project expected to catalyse impact across the broader Pacific region beyond project investment?	Score (1=min; 10=max)	/10
E. Alignment with Tonga strategic priorities		
i. To what extent does the option align with actions/outputs outlined in the relevant sector plans?	Score (1=min; 5=max)	/20
F. Cost of project implementation		
i. To what extent will the project require substantive financial investment?	Score (1=min; 10=max)	/10
ii. To what extent will the project require substantive time and personnel investment?	Score (1=min; 10=max)	/10
Total score	**/100**	

Appendix C: Key informant interviews

Name/Position	Contacts
Dr Viliami Manu, CEO Ministry of Agriculture and Food	mafsoils@kalianet.to
Ms Luseane Taufa	MAFFF
Paula Maú, CEO, MEIDECC	paulm@mic.gov.to
Luísa Tuíáfitu, Director, Climate Change Division, MEIDECC	ltuiafitumalolo@gmail.com
Ófa Faánunu, Director, Tonga Meteorology	ofaf@met.gov.to
Taniela Kula, Director, Water Resources Division (MLNS)	tkula@naturalresources.gov.to
Saane Lolo, Deputy CEO, Aid and Project Division, Ministry of Finance	slolo@finance.gov.to
Siolaá Malimali., Deputy CEO, Ministry of Fisheries	siolaamalimali@gmail.com
Lakai Fonua, CEO, Chamber of Commerce and Industries	
Liz Sullivan, Tourism Entrepreneur	

Appendix D: Workshop report

WORKSHOP

Mapping of the private sector activities related to climate change adaptation and mitigation in Tonga

9:00 a.m. 30 July 2020, Davina House

TIME	ACTIVITY	PRESENTER
9:00 a.m.	**PRAYER**	
	Opening statement	Mr Paula Ma'u (CEO MEIDECC)
9:15 a.m.	Introduction (Request for this activity)	Ms Lakai Fonua (CEO Tonga Chamber of Commerce & Industry Inc.)
9.25 a.m.	ToR, objectives and approaches	Dr Netatua Pelesikoti Taufatofua (Consultant)
10:00 a.m.	Current climate change projects / pipeline (Opportunities for the private sector)	Ms Fololita Sila (Head of Policy and Planning, MEIDECC)
10:20 a.m.	Donors, climate change and resilience development projects through the government development programmes and processes	Ms Saane Lolo (Deputy CEO, Resilience Division, Ministry of Finance)
10:45 a.m.	Summary of climate change status in Tonga	Dr Netatua Pelesikoti Taufatofua (Consultant)
11:15 a.m.	**MORNING TEA**	
11:30 a.m.	Introduction to working groups	Dr Netatua Pelesikoti Taufatofua (Consultant)
11:45 a.m.	Working groups	
12:45 p.m.	Working groups discussions	
2:00 p.m.	**LUNCH (end of the day)**	

There were five working groups namely, agriculture, tourism, fisheries, construction and energy/electricity. The following key headline questions were adapted for each of the working groups.

Questions	
1.	What do you think are the main barriers (root causes) constraining the capacity of MSMEs in the [x] sector to manage climate change and disaster risks to their business and/or employ low-emissions practices?
2.	What projects/reforms/programmes are currently being implemented (or have recently been implemented) to address these barriers?
3.	What new projects/reforms/programmes do you think could be considered to (further) address key barriers?

List of participants

#	Names	Organisation	Contact number
1	Lupe Aleamotua	PTH	8803100
2	Meleane Lavakei'aho	PTH	8803103
3	Minoru Nishi Jr	Nishi Trading	6853091
4	Nobuaki Matsui	JICA	7799071
5	P. Taumoepeau	Tonga Chamber of Commerce	7718488
6	P. Taufatofua	Commerce Farmer	7746004
7	Moala	M. O Tourism	7842424
8	Benjamin Yu	China Embassy	7715788
9	Alexandra Sullivan	AJ & E HD	7706047
10	Sulieti Hufanga	MEIDECC/Environment	25050
11	Dorothy Foliaki	MEIDECC/Environment	7748628
12	Vutulongo Puloka	Puloka Construction	7828300
13	Mele Sisi Finefeuiiaki	Lotopoha Export Trading	7707661
14	Mele 'Atukei'aho	Ministry of Fisheries	
15	Mena Maile	Ministry of Fisheries	
16	Silesa Taumoepeau Pousima	TDB	7783242
17	Viliami Takau	MEIDECC	8845286
18	Eveline Kaufusi	Oregan Pacific	23213
19	Asopesio Lakalaka	MOF/PAMD	7400762
20	Luisa Taufa	MEIDECC/NEMO	26340
21	Soana 'Aloua	ANZ Tonga	20506
22	S.F. Vakata	JNAP/MEIDECC	7740614
23	Luseane Taufa	MAFFF	7715721
24	Isileli 'Aholelei	MAFFF	7702036
25	Eleni Leveni Tevi	EU	8412093
26	Alo Maileseni	PAT	8447006
27	Alfred Vaka	JICA	7838194
28	Nikolasi Fonua	TPL	7863208
29	Lavili Maka	Fiji Airway & T.T.A	8715331
30	Lopeti Palu	Raeworx	7767499
31	Fololita Sila	MEIDECC	8745123
32	Runte Likiafu	DFAT	20427
33	Sonia Lea	TCCI	25168
34	Lakai Fonua	TCCI	25168

Appendix E: Current and future climate

Current climate

Tonga has a tropical maritime climate, with a historic seasonal range of about 6 degrees Celsius between the warmest and coolest months (SPC 2013). The average annual rainfall is approximately 1,721 mm in Tongatapu (in the south) and 2,453 mm in Niuafo'ou (northern-most island) (SPC 2013) and there is high variability from year to year due mainly to the El Niño-Southern Oscillation (BoM & CSIRO 2011).

The main climate hazards that have historically affected Tonga are cyclones and, to a lesser extent, drought.

Between 1970 and 2010, an average of 20 cyclones per decade developed within or crossed the Tonga EEZ with some 35% of these classified as severe events (Category 3 or stronger). Over the last decade the most intense cyclones to hit Tonga have been TC Harold (2014) and TC Gita (2018). These cyclones caused significant and widespread damage and loss,[3] estimated to be in the order of 15% (GoT 2015) and 38% (IMF 2020a) of GDP for TC Gita and TC Harold respectively.

Expected future climate

Projections for all future climate scenarios show that temperatures will rise in Tonga (very high confidence).[4] Sea-surface temperatures are similarly expected to increase – by between 0.3 and 1.1 degrees by 2030 relative to 2014 levels under a high-emissions scenario[5] (Australian Bureau of Meteorology & CSIRO 2014).

The projected frequency of severe cyclone events (i.e. category 3 or above) in Tonga under climate change is unclear from the key climate science reports available to Tonga at this time. Analysis undertaken by the Australian Bureau of Meteorology and CSIRO (2014) reports a slight decrease in the total number of cyclones but an increase in the proportion of cyclones that are severe (category 3 or above).[6]

Average annual and seasonal rainfall over the course of the 21st century is projected to increase slightly, consistent with the expected intensification of the South Pacific Convergence Zone, the Intertropical Convergence Zone and the West Pacific Monsoon. Little change is expected in the frequency of severe droughts (Australian Bureau of Meteorology & CSIRO 2014). There is, however, only low confidence in the accuracy of these projections as climate models are not consistent in these result areas. Some climate models predict a decrease in average annual rainfall and an increase in the frequency of drought events (Australian Bureau of Meteorology & CSIRO 2014).

New and emerging climate hazards are also expected to occur in the future under the effects of climate change, most notably ocean acidification and sea-level rise. Ocean acidification in waters around Tonga is predicted to increase throughout the century, driven primarily by the increasing oceanic uptake of carbon dioxide in response to rising atmospheric carbon dioxide concentrations (very high confidence). Sea levels are also

3 The widespread damage and loss occurred in the private sector and the Tonga community more generally.

4 The increase in temperature will result in an increase in the number of hot days and warm nights.

5 This is the 'A2' emissions scenario as determined by the International Panel on Climate Change (IPCC).

6 The net result of the frequency versus intensity of cyclones is not reported.

forecasted to rise (very high confidence) (Australian Bureau of Meteorology & CSIRO 2014). A summary of the direction and magnitude of change in key climate variables in the medium and long-term future under the effects of climate change is shown below.

Table 8. Climate change projections for Tonga for 2030 and 2055 under high emissions scenario (A2)

Climate variable	Expected direction of change	2030	2055	Confidence level
Average air temperature (°C)	Increase	0.7±0.4	1.4±0.4	Moderate
Extreme heat (°C) temperature of 1-in-20 year heatwave event	Increase	1.4±0.6	2.4±1.4	Low
Sea-surface temperature (°C)	Increase	0.7±0.4	1.3±0.4	Moderate
Cyclone Frequency of extreme level events (cat 3 or above)	Not reported	Not reported	Not reported	Not reported
Annual rainfall (%)	Increase	3±13	5±12	Low
Drought	No change	Not reported	Not reported	Low
Ocean acidification Aragonite saturation state	Increase	3.4±0.1	3.0±0.1	Moderate
Sea level (cm)	Increase	10 (3–17)	20 (9–31)	Moderate

Source: BoM & CSIRO 2014

Appendix F: Examples of climate risk management measures implemented by Tonga businesses

The sections below describe selected measures/practices implemented by two commercial agriculture enterprises to help manage climate risks to their businesses in Tonga. This is intended to give readers a basic idea of the type of climate risk management strategies that are already being implemented in this sector. It does not, however, provide an analysis of the effectiveness of these practices in reducing climate risks to agriculture enterprises in the Tonga context (now and into the future). Nor does it discuss the (private) business-case of investing in these practices or the wider environmental costs/benefits associated with these practices. Nor does it necessarily reflect all of the climate risk management measures implemented by those businesses to address the range of climate risks they face (e.g. extreme heat, rainfall variability/drought, flooding, cyclone).

More detailed analysis of specific climate risk management measures[7] that Tonga businesses could implement will be undertaken as part of project implementation for project ideas #1 and #2, if progressed.

Example 1: Irrigation by Nishi Trading

Background

Nishi Trading is a 40-year-old business that started as a commercial farm for exports but has since broadened its scope of goods and services to include such things as farming supplies, pest management, a training centre,[8] and food-processing.

Nishi Trading pioneered production and export of Tongan squash (pumpkin) in Tonga, and continues this business line to this day. Squash production takes place on a 300-acre farm near Nuku'alofa using a modern mono-cropping farming system (Figure 2).

Figure 2. Tongan squash produced by Nishi Trading

7 In terms of the effectiveness of risk reduction, business-case, and potentially wider costs/benefits accruing to the public.

8 This training centre focuses on product-specific grower outreach extension and crop production input services.

Rainfall is the primary source of water inputs to production but in drier/drought years, such as 2010, rainfall is generally not adequate for plant health and growth. Plant health/growth is particularly vulnerable to water shortages during the early germination phase.

Description of risk management strategy

One measure implemented by Nishi Trading to manage drought risk to its squash production is irrigation. They use a manual system that is implemented only in times of drought/dry periods.[9] It involves carting water by lorry to a modified boom sprayer in the fields where water is needed (Figure 3).

Figure 3. Manual irrigation of Tonga squash at Nishi Trading farm

9 Such periods may become more frequent and/or longer in duration under the effects of climate change.

Example 2: Agroforestry by Tinopai Farm

Background

Tinopai Farm was established in 1993 and has a focus on exports, including coconut, Japanese taro, vanilla and coffee. The farmers grow some of their own produce and also source produce from other farmers across Tonga.

The Tinopai Farm is located near Nuku'alofa. Systems employed are a mix of mono-cropping and various agroforestry system variants (Figure 4.)

Agroforestry is defined as the deliberate integration of woody species with agricultural crops and/or pastures on the same land unit. Various forms of this system have been historically used in traditional Tongan farming systems.

Figure 4. Commercial agroforestry system at Tinopai Farms

Production on Tinopai Farm is subject to a range of climate risks, including but not limited to drought, cyclone, heatwave events and flooding.

Description of risk management strategy

The Tinopai Farm is continuously adapting and refining its traditional agroforestry systems to be able to deal with a changing climate.

Generally speaking, agroforestry systems include functionality and features that serve to reduce risks/vulnerability associated with many climate events. These include, but are not limited to:

- trees providing buffering/protection against strong winds and cyclones, thereby avoiding/reducing crop damage that would otherwise occur during such events;
- trees helping to regulate a (micro) climate, thereby reducing the intensity and hence damage/loss caused by extreme hot days/nights;
- deeper root systems of trees helping to support soil structure, which in turn reduces vulnerability to erosion from flood events as well as maintaining soil moisture in dry periods; and
- diversified production, i.e. a mix of different crop types, reducing risk under a fluctuating climate.

Woodfine (2018) stresses that traditional agroforestry systems provide a strong foundation on which to build climate-resilience of food production in Tonga.

Appendix G: Climate finance opportunities and corresponding development partners / accredited entities

This appendix outlines climate finance opportunities and corresponding development partners / accredited entities that may be targeted for the project options identified in this paper.

The opportunities outlined here represent a selection of headline examples currently available for Tonga.

Bilateral modalities

Key climate finance opportunities available to Tonga are through bilateral modalities. These opportunities are summarised in Table 9.

Table 9. Climate finance available through bilateral development assistance modalities

Development partner	Climate finance opportunity	Comment
Australian Government (DFAT)	Australia Pacific Climate Partnership (APCP)	Australia's bilateral support to Tonga currently focuses on labour force skills, private sector development, governance, and health.[10] The investment to improve labour force skills is the Skills for inclusive economic growth (S4IEG) programme. A large part of this programme is delivered by the Tonga Business Enterprise Centre, an arm of the Tonga Chamber of Commerce and Industry. Expansion of this programme could be an excellent fit for project idea #1 (climate skills for business) in particular. This could be done utilising bilateral climate finance allocated through APCP. The key investment in private sector development is through a regional initiative delivered through the Asian Development Bank (ADB), entitled the Pacific private sector development initiative. Part of this initiative is to strengthen the capacity of national development banks, including the Tonga Development Bank. Expansion of this programme could be one way to implement project idea #2 (climate smart finance facility) or elements therein, utilising climate finance allocated to APCP.

10 https://www.dfat.gov.au/geo/tonga/development-assistance/Pages/development-assistance-in-tonga

Development partner	Climate finance opportunity	Comment
New Zealand (MFAT)	New Zealand Bilateral Development Assistance hypothecated for climate change[11]	Key areas of focus of development cooperation from New Zealand include support for governance institutions, such as the judiciary, and encouraging trade and economic growth.[12] New Zealand Bilateral Development Assistance hypothecated for climate change could potentially be used for project idea #1 and project idea #2 in particular. These also broadly align with New Zealand's existing key areas of focus in Tonga to encourage trade and economic growth.

Multi-lateral climate change funds

The other main modality of climate finance is through multi-lateral climate change funds. The headline funds and the entities that GoT/MEIDECC can potentially work with to access resources within these funds are summarised in Table 10.

11 See https://www.mfat.govt.nz/en/environment/climate-change/at-home-and-in-the-pacfic/#Pacific

12 See https://www.mfat.govt.nz/assets/IATI-PDFS/PACPF/Tonga.pdf. Current initiatives include cooperation in policing, support provided to the Tonga Electoral Commission, development of the vanilla industry and strengthening Nuku'alofa's electricity network.

Table 10. Climate finance available through multi-lateral climate change funds and corresponding entities to support implementation

Climate change fund	Accredited entities												Comments
	CROP agencies UN agencies			UN Agencies			Multi-lateral Development Banks			Others			
	PI	SP	SP	UN	FA	A	W	IF	IFA	GI	JI	IU	
	✖	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	In order to implement concessional loan elements of project idea # 2 (climate smart financing facility) using GCF resources, accredited entities (AEs) are required to have special fiduciary accreditation for on-lending. Of the entities listed here only ADB, World Bank, IFC, IFAD, and JICA are accredited at this level. It is noted that TDB is also considering applying to be a (national, direct access) AE. If TDB successfully progresses this accreditation application, it could directly develop and implement project idea # 2 (climate smart financing facility). If, however, TDB systems and track record are lacking in some areas as required by the GCF, TDB could work collaboratively with an international AE to develop and implement project idea #2 with a view to further developing its systems and track record as part of the project. This will enable it to prepare a successful application to be a Direct Access Enity (DAE). The GCF also offers a readiness facility that can be accessed relatively easily for institutional strengthening activities. This could be accessed/used to support much-needed mainstreaming of climate resilience into sector plans.
	✖	✔	✖	✔	✔	✔	✔	✔	✔	✖	✖	✖	Relative to GCF, AF projects tend to be smaller scale. The financial instrument used by the AF is grants.
	✖	✖	✖	✔	✔	✔	✔	✔	✔	✖	✖	✔	Relative to GCF, GEF climate change projects tend to be smaller scale. The financial instrument used by the GEF is grants.

Reference

- Adam Smith International (2016). Evaluation of New Zealand's Development Cooperation in Tonga, https://www.mfat.govt.nz/assets/Aid-Prog-docs/Evaluations/2016/Sept-2016/Tonga-Programme-Evaluation-Final-5-September-2016.pdf
- ADB (2019). Pacific Financial Sector Briefs: Tonga, https://www.adb.org/sites/default/files/publication/530266/pacific-finance-sector-tonga.pdf
- Australian Bureau of Meteorology and CSIRO (2011), Climate Change in the Pacific: Scientific Assessment and New Research, https://www.pacificclimatechangescience.org/publications/reports/report-climate-change-in-the-pacific-scientific-assessment-and-new-research/
- Australian Bureau of Meteorology and CSIRO (2014), Climate Variability, Extremes and Change in the Western Tropical Pacific: New Science and Updated Country Reports, https://www.pacificclimatechangescience.org/wp-content/uploads/2014/07/PACCSAP_CountryReports2014_WEB_140710.pdf
- Business Registries Office. (2020). https://www.businessregistries.gov.to/
- FAO (2019). Tonga Food Security Profile, http://www.fao.org/3/ca6039en/CA6039EN.pdf
- GCF (Green Climate Fund) (2015). Private Sector Facility: Working with Local Private Entities, Including Small and Medium-Sized Enterprises, https://www.greenclimate.fund/sites/default/files/document/gcf-b09-12.pdf
- GCF (Green Climate Fund) (2017). Analysis of barriers to crowding-in and maximising the engagement of the private sector, including Private Sector Advisory Group recommendations, https://www.greenclimate.fund/document/gcf-b17-03
- GCF (Green Climate Fund) (2019). GCF: Driving the transformation to a climate-resilient financial system, https://www.greenclimate.fund/document/gcf-driving-transformation-climate-resilient-financial-system
- GoT (Government of Tonga) (2010). Tonga Energy Roadmap 2010–2020, https://sustainabledevelopment.un.org/content/documents/1330tongaEnergy%20Strategy.pdf
- GoT (Government of Tonga) (2013). Tonga National Infrastructure Investment Plan: 2013 – 2023, https://www.theprif.org/documents/tonga/infrastructure-planning-and-management/tonga-national-infrastructure-investment-plan
- GoT (Government of Tonga) (2015), National Strategic Development Framework 2015 – 2025, http://www.finance.gov.to/sites/default/files/2020-02/TSDF%202015-2025-en.pdfhttps://policy.asiapacificenergy.org/sites/default/files/TSDF%20II.pdf
- GoT (Government of Tonga) (2018). Joint National Adaptation Plan 2 on Climate Change and Disaster Risk Management: 2018 to 2028, https://www.pacificclimatechange.net/sites/default/files/documents/JNAP%20II%20-%202018-2028.pdf

- GoT, World Bank, IFAD. (2016a). Tonga Fisheries Sector Plan. https://pafpnet.spc.int/attachments/article/628/Tonga%20Fisheries%20Sector%20Plan%202016-2024.pdf
- GoT, World Bank, IFAD &UNDP (2016b). Kingdom of Tonga: Tonga Agriculture Sector Plan 2016-2020. https://pafpnet.spc.int/attachments/article/574/Tonga%20Agriculture%20Sector%20Plan%202016-2020.pdf
- IMF (International Monetary Fund) (2020a). Tonga : Technical Assistance Report-Climate Change Policy Assessment, https://www.imf.org/en/Publications/CR/Issues/2020/06/30/Tonga-Technical-Assistance-Report-Climate-Change-Policy-Assessment-49537
- IMF (International Monetary Fund) (2020b). Tonga: Staff Concluding Statement IMF 2020 Article IV Consultation Mission, https://www.imf.org/en/News/Articles/2020/02/25/mcs022520-tongo-staff-concluding-statement-imf-2020-article-iv-consultation-mission#:~:text=The%20economic%20outlook%20is%2C%20therefore,the%20mainstay%20of%20the%20economy.
- IMF (International Monetary Fund) (2020c). Tonga—IMF Assessment Letter for the World Bank April 2, 2020, https://www.imf.org/en/Publications/Policy-Papers/Issues/2020/04/17/Tonga-IMF-Assessment-Letter-for-the-World-Bank-49348
- MAFFF (Ministry of Agriculture, Forestry and Fisheries) (2019). Annual Report 2018/2019.
- MAFFF (Ministry of Agriculture, Forestry and Fisheries) (2019). Tonga Framework for Action on Food Security, https://pafpnet.spc.int/attachments/article/636/Tonga%20Framework%20for%20Action%20on%20Food%20Security_DRAFT_For%20Consultation.pdf
- MAFFF, Tonga Statistics Department, and FAO (2015). 2015 Tonga National Agriculture Census: Main Report, http://www.fao.org/fileadmin/templates/ess/ess_test_folder/World_Census_Agriculture/Country_info_2010/Reports/Reports_5/TON_ENG_REP_2015.pdf
- MEIDECC (2018), Tonga Green Climate Fund Country Program, https://www.greenclimate.fund/sites/default/files/document/tonga-country-programme.pdf
- MoF (Ministry of Finance) (2020). Budget Statement 2020-21, http://www.finance.gov.to/sites/default/files/2020-07/Budget%20Statement%202020-21_20Apr%20-postLA_TC%20Harold_22.07.20%209am.pdf
- MoT (Ministry of Tourism) (2018). Annual Report 2017/2018.
- MoT (Ministry of Tourism) (2020a). 2018 &and 2019 Statistics Report.
- MoT (Ministry of Tourism) (2020b). Industry Empowerment Division Report 2020.
- National Reserve Bank of Tonga (2016). Tonga Financial Services Demand Side Survey, http://www.pfip.org/wp-content/uploads/2017/08/TONGA-DSS-REPORT-LOWRES-FINAL.pdf

- Productivity Commission (2012). Barriers to Effective Climate Change Adaptation, Inquiry Report No. 59, https://www.pc.gov.au/inquiries/completed/climate-change-adaptation/report/climate-change-adaptation.pdf
- SMEC (2019), National Water Resources Report Kingdom of Tonga, Climate Resilience Sector Project [ADB Grant 378 TON].
- SOPAC (2007). National Integrated Water Resource Management Diagnostic Report Tonga, https://www.pacificwater.org/userfiles/file/GEF%20IWRM%20Final%20Docs/SOPAC%20Tonga%20Final%20IWRM%20Diagnostic%20report.pdf
- SPC (2013). Climate Change Profile: Kingdom of Tonga, Global Climate Change Alliance Initiative, https://www.pacificclimatechange.net/sites/default/files/documents/Tonga%20CC%20Profile%20v2.pdf
- SPTO (South Pacific Tourism Organisation) (2018). Annual Review of Visitor Arrivals in Pacific Countries 2017, https://www.corporate.southpacificislands.travel/wp-content/uploads/2017/02/2017-AnnualTourist-Arrivals-Review-F.pdf
- TSDF (Tonga Strategic Development Framework 2015–2015). (2015). https://policy.asiapacificenergy.org/sites/default/files/TSDF%20II.pdf
- Tonga Statistics Department (2018). 2018 Labour Force Survey Report, https://tongastats.gov.to/survey/labour-force-survey/
- Tonga Statistics Department (2020a). Table 2: GDP By Industry At Current Prices, https://tongastats.gov.to/statistics/economics/national-accounts/#74-170-wpfd-gdp-2018-19-statistical-tables
- Tonga Statistics Department (2020b). Table 3 Gross Domestic Product by Industry at Constant 2016-17 Prices, https://tongastats.gov.to/statistics/economics/national-accounts/#74-170-wpfd-gdp-2018-19-statistical-tables
- TRIP Consultants (2013), Tonga Tourism Sector Roadmap: 2014 – 2018. http://www.mic.gov.to/ministrydepartment/14-govt-ministries/mctl/4353-the-tonga-tourism-sector-road-map-
- Tonga Statistics Department (2020c), Table 5 Contribution to Gross Domestic Product by Industry at Current Prices, https://tongastats.gov.to/statistics/economics/national-accounts/#74-170-wpfd-gdp-2018-19-statistical-tables

Notes

Options for supporting climate-resilient development of the private sector in Tonga | Dr Netatua Pelesikoti and Aaron Buncle

ISBN 978-982-202-085-4