South Tarawa Water Supply Project

Part I: Project Information

Name of Parent Program
Climate Resilient Urban Development in the Pacific

GEF ID
10593

Project Type
FSP

Type of Trust Fund
LDCF

CBIT/NGI
- ☐ CBIT
- ☐ NGI

Project Title
South Tarawa Water Supply Project

Countries

Kiribati

Agency(ies)
ADB

Other Executing Partner(s):
Ministry of Infrastructure and Sustainable Energy (Kiribati)

Executing Partner Type
Government

GEF Focal Area
Climate Change

Taxonomy
Climate Change, Focal Areas, Climate Change Adaptation, Livelihoods, Community-based adaptation, Sea-level rise, Private sector, Least Developed Countries, Disaster risk management, Climate resilience, Type of Engagement, Stakeholders, Consultation, Participation, Indigenous Peoples, Communications, Awareness Raising, Public Campaigns, Private Sector, Civil Society, Community Based Organization, Gender Equality, Gender Mainstreaming, Beneficiaries, Women groups, Gender results areas, Capacity Development, Freshwater, International Waters, Aquifer, Small Island Developing States, Influencing models, Convene multi-stakeholder alliances, Strengthen institutional capacity and decision-making, Local Communities, Integrated Programs, Sustainable Cities, Urban sustainability framework, Urban Resilience

Rio Markers
Climate Change Mitigation
Climate Change Mitigation 0

Climate Change Adaptation
Climate Change Adaptation 2

Submission Date
5/12/2020

Expected Implementation Start
1/1/2021

Expected Completion Date

6/30/2027

Duration

78In Months

Agency Fee($)

412,844.00

A. FOCAL/NON-FOCAL AREA ELEMENTS

Objectives/Programs	Focal Area Outcomes	Trust Fund	GEF Amount($)	Co-Fin Amount($)
CCA-1	1.1. Technologies and innovative solutions piloted or deployed to reduce climate related risks and/or enhance resilience	LDCF	4,130,000.00	46,081,000.00
CCA-2	2.1 Strengthened cross-sectoral mechanisms to mainstream climate adaptation and resilience	LDCF	457,156.00	15,750,020.00
		Total Project Cost($)	4,587,156.00	61,831,020.00

B. Project description summary

Project Objective

The overall objective of the project is to provide South Tarawa's population with reliable access to a safe, resilient and low carbon water supply under a changing climate.

Project Component	Financing Type	Expected Outcomes	Expected Outputs	Trust Fund	GEF Project Financing($)	Confirmed Co-Financing($)
1. Technologies and innovative solutions piloted or deployed to reduce climate related risks and/or enhance resilience	Investment	1. Climate resilient and low carbon water supply infrastructure	**Baseline funded by STWSP loan** 1.1 Desalination plants with capacity to produce 6,000 cubic meters per day; 1.2 A 2,500-kilowatt solar photovoltaic energy production system; 1.3 Rehabilitation of the water supply distribution network in line with previous sea level rise **LDCF Funded** 1.4.1 Full options analysis to determine the costs and benefits in terms of climate change adaptation (i.e. of adapting to the updated SLR projections). The two options considered: (i)	LDCF	4,130,000.00	46,081,000.00

strengthening the Stewart Causeway, Anderson Causeway and the Nanikai – Bairiki Causeway and (ii) contributing to the upgrading of the water supply network, notably in the eastern areas of Buota, Bikenibeu and Bangantebure;

1.4.2 Selection of optimal intervention strategy;

1.4.3 Detailed design of optimal measures to ensure critical infrastructure is protected against climate change impacts

1.4.4 Construction of optimal protection measures;

1.4.5 Documentation of impact of protection measures.

2. Strengthened cross-sectoral mechanisms to mainstream climate adaptation and resilience	Technical Assistance	2. Capacity of MISE and PUB to effectively manage water supply infrastructure increased	**Baseline funded by STWSP loan** 2.1 Institutional strengthening of water supply sector. This includes activities: 2.1.1 (O&M of desalination plants); 2.1.2 (Institutional strengthening); 2.1.3. (Ensuring safeguards and project implementation); 2.1.4 (Undertake detailed Project design)[c] and; 2.1.5 (water treatment). **LDCF Funded** 2.2 Integrated management information system for climate resilience. 2.3 Strategic Asset Management System for Climate Resilience.	LDCF	344,000.00	12,300,000.00

2. Strengthened cross-sectoral mechanisms to mainstream climate adaptation and resilience	Technical Assistance	3. Awareness of WASH and climate change issues is raised	**Baseline funded by STWSP loan** 3.1 Implement water conservation and WASH awareness program (WAP). 3.2 Construct climate change and water visitor education center.	LDCF		1,250,020.00
			Sub Total ($)		**4,474,000.00**	**59,631,020.00**
Project Management Cost (PMC)						
				LDCF	113,156.00	2,200,000.00
			Sub Total($)		**113,156.00**	**2,200,000.00**
			Total Project Cost($)		**4,587,156.00**	**61,831,020.00**

C. Sources of Co-financing for the Project by name and by type

Sources of Co-financing	Name of Co-financier	Type of Co-financing	Investment Mobilized	Amount($)
GEF Agency	ADB	Grant	Investment mobilized	13,000,000.00
Others	GCF	Grant	Investment mobilized	28,631,020.00
Donor Agency	World Bank	Grant	Investment mobilized	12,960,000.00
Recipient Country Government	Government of Kiribati	In-kind	Recurrent expenditures	7,240,000.00
			Total Co-Financing($)	**61,831,020.00**

Describe how any "Investment Mobilized" was identified

The investment was mobilized through consultation in-country, working closely with in-country counterparts. The project was identified through the Country Partnership Strategy process and has been included in the Country Operational Business Plan of ADB.

D. Trust Fund Resources Requested by Agency(ies), Country(ies), Focal Area and the Programming of Funds

Agency	Trust Fund	Country	Focal Area	Programming of Funds	Amount($)	Fee($)
ADB	LDCF	Kiribati	Climate Change	NA	4,587,156	412,844
				Total Grant Resources($)	**4,587,156.00**	**412,844.00**

E. Non Grant Instrument

NON-GRANT INSTRUMENT at CEO Endorsement

Includes Non grant instruments? **No**

Includes reflow to GEF? **No**

F. Project Preparation Grant (PPG)

PPG Required ☐

PPG Amount ($)

PPG Agency Fee ($)

Agency	Trust Fund	Country	Focal Area	Programming of Funds	Amount($)	Fee($)
				Total Project Costs($)	0.00	0.00

Part II. Project Justification

1a. Project Description

1A.1 THE ADAPTATION PROBLEMS, ROOT CAUSES AND BARRIERS TO BE ADDRESSED

Introduction

The Republic of Kiribati is located in the Pacific and is comprised of 33 islands with a total land area of 810 km^2 distributed over approximately 3.5 million km^2 of ocean. It is one of the smallest, most remote, geographically dispersed and climate vulnerable Least Developed Countries (LDC). These remote atoll islands are mostly less than two meters above sea level, lack surface water and soil, have fragile groundwater systems and limited terrestrial biodiversity, and are vulnerable to the impacts of climate change. Kiribati is also classified as a Fragile State. It ranked 168th of countries in the world in terms of GDP per capita in 2018 (IMF). Kiribati faces significant economic development challenges due to its geographical remoteness and vulnerability to climate change.

South Tarawa is the nation's capital and lies on the Tarawa atoll. South Tarawa (the area stretching from Betio to Bonriki in Figure 1) has a land area of just 15.72 km^2 and its highest point is only 3 meters above sea level.

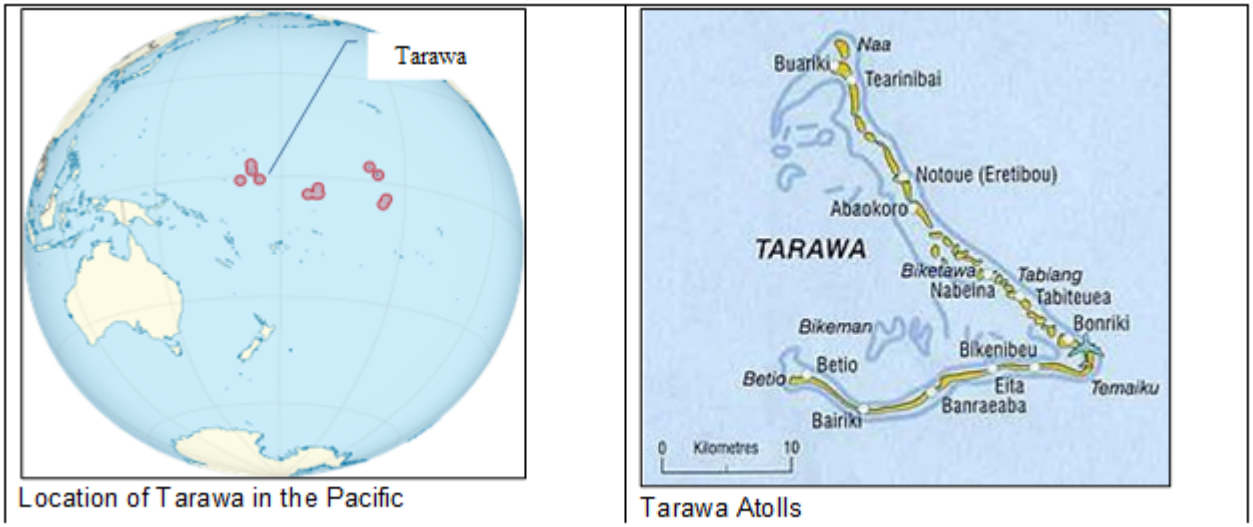

Figure 1 – Location of South Tarawa, Kiribati

The most recent official census (2015)[1] stated that the population of Kiribati had increased from 92,533 in 2005 to 110,236 in 2015 and over 118,000 in 2020. It is projected to reach approximately 156,000 by 2040 (UN 2017[2]). In 2015 South Tarawa accounted for 56,388 persons or just over half the national population. This had increased by 12% in the preceding 5 years - a growth rate significantly faster than the national average. Over the period 2015-2041, South Tarawa's population was projected to increase by approximately 62.5% to reach over 90,000.

Water Supply – Current Situation

As for all Pacific states, the sourcing and provisioning of drinking water to the population is both a priority and a challenge. The Government of Kiribati (Government) is committed to providing a climate resilient potable water supply to all its people, including the population of South Tarawa. To meet these ends, in 2008, the Government adopted the *National Water Resources Policy* and the *National Water Resources Implementation Plan*. Subsequently, and as an indicator of the importance attached to this sector, and reflecting the importance of South Tarawa's growing population, the Government developed the *Tarawa Water Master Plan 2010-2030*[3] and the *Tarawa Water and Sanitation Roadmap 2011-2030*.

Currently, residential and commercial consumers on South Tarawa obtain water from the following range of freshwater sources: (i) the Bonriki and Buota underground lenses located at the eastern end of the island, away from the main population centers[4]; (ii) harvesting rainwater into tanks, by households and by small community groups; (iii) household level groundwater wells (drawing from small lenses located below residential areas); (iv) small-scale desalination plants and; (v) imported water. The proportional use of these sources varies between households, and differs from season to season and from year to year. The following can be observed (source: Government of Kiribati, 2010):

· *Bonriki and Buota lenses*. These are by far the largest source of freshwater for South Tarawa. It is estimated that, in combination, these two lenses can currently provide an estimated 2,000 m^3/day of good quality freshwater.[5] This estimate is based on empirical observations and estimates of long term average rainfall recharge. Water is abstracted from a grid of 22 galleries on Bonriki lens and 3 galleries on Buota lens. The water is treated using aeration and chlorination. The water from each individual gallery is pumped into a main trunk and then onto the reticulated water supply network, through which it is pumped to most residential and commercial areas across South Tarawa;

· *Rainwater harvesting*. This is considered a useful secondary source of freshwater, but only for small-scale uses. It is estimated that rainwater harvesting if maximized could provide up to 93 m^3/day of good quality freshwater, i.e. less than 5% of the lenses. In recent years, collection tanks have often been empty for a period of weeks, sometimes for several months, due to low rainfall;

· *Groundwater wells.* These small, usually individual household, wells tap into small lenses near people's homes. Historically these were a major source of water. However, in recent decades, rapid population growth on the land over these lenses and localized animal farming have led to the contamination of the water in these lenses. In most cases, the lens water is saline due to over-abstraction and highly polluted due to domestic waste. Generally the water is unsafe for use and continues to deteriorate;

· *Small-scale private desalination plants*. These provide good quality water. However, the existing plants are very small scale and can only meet a very small proportion of overall demand. Further, the plants have proven unreliable, challenging to operate and to maintain. The water produced is too costly for most of the population; and,

· *Imported water* (bottled). This provides good quality water. However, this remains a very marginal source due to the cost.

Most consumers receive water through the existing reticulated water supply network. This network reaches an estimated 69% of the population in South Tarawa.[6] However, the quantity of water supplied through this network is insufficient to meet even a basic level of demand. The limited sustainable yield from the lenses, as well as very high physical losses from the network, mean that the quantity of water reaching customers from this network is below 20 litres per person per day. Hence, customers receive an intermittent service, typically for two hours every two days. The water is delivered at a very low pressure. There is much tampering, many illegal connections and significant leakages. One consequence is that the water delivered is generally unfit for human consumption. Accordingly, almost all residents boil the water from the network before consumption.

Further details are provided in Appendix I – the Climate Change (Impact) Assessment of the South Tarawa Water Supply Project[7].

Institutional Arrangements for the Water Supply Sector on South Tarawa

This section lists the main institutions involved in water supply on South Tarawa. A full stakeholder assessment of the sector is provided in Appendix II[8], providing information on the roles and responsibilities of all stakeholders.

Ministry of Infrastructure and Sustainable Energy (MISE). MISE takes the lead on policy, planning and regulation across the water, sanitation and health (WASH) sectors in Kiribati. Within MISE, the Water and Sanitation Engineering Unit (WSEU), is responsible for the monitoring and management of National Water Reserves in Bonriki and Buota and it acts as a regulator of operations to abstract from the freshwater lens. The WSEU is also responsible for sanitation

in Kiribati. MISE also has responsibilities for establishing building regulations that include installation of rainwater collection systems and appropriate toilets.

The Public Utilities Board (PUB). The Public Utilities Board (PUB) is the key actor at the operational level. PUB is a state-owned enterprise established in 1977 to coordinate and manage power generation, water supply and sewage disposal in urban South Tarawa. PUB operates the infiltration gallery pump stations in Buota and Bonriki and operationally abstracts all water from the lenses. PUB also manages the water treatment plant and the transfer pumps. PUB operates and maintains the reticulated supply network. PUB is responsible for the maintenance of these assets, and the provision and regulation of water supply throughout consumers on South Tarawa. PUB assets include the galleries to abstract the water from Bonriki and Buota lenses, the reticulated water network, the pumps, treatment facilities, storage facilities, transmission and distribution pipes.

Community organizations and churches Much of the rooftop harvesting is undertaken on the large roofs of schools, churches and other community building. Hence these organizations play an important role in collection rainwater and on providing to consumers.

Households Finally, many households are directly responsible for their individual water supply from rooftop rainwater tanks and from local ground wells. They are likewise responsible for the associated infrastructure.

The Office of the President (**OB** for Office of Te Beritítenti) stands in support of the President to deliver the vision for the people of Kiribati. The OB responsibilities for ministerial co-ordination. It also holds cross-Ministry functions including on disaster risk management and climate change policy.

Ministry of Finance and Economic Development (MFED) is responsible for overall economic planning and guiding economic development. MFED is also the lead partner for development banks (ADB and World Bank), reporting on all projects and ensuring government counterparts funds are provided. MFED also takes the lead in national asset management systems, and has important roles in coordinating government agencies and information management.

Ministry of Environment, Lands and Agricultural Development (MELAD) through the **Environment and Conservation Division** (**ECD**) implements local and externally funded climate change initiatives and programmes. ECD is responsible for data and information management related to the environment, environmental protection and climate change. The **Lands Management Division** of MELAD manages all Government leased lands including those that house water reserves and water desalination plants.

Climate and Climate Change on South Tarawa

A detailed climate change (impact) assessment of the STWSP is attached in Appendix I. This provides information on the current climate, projected climate change, climate and climate change threats to the water sector and recommended adaptation measures. Appendix I also provides a preliminary estimate of greenhouse gas emissions associated with the baseline and alternative projects.

Climate. Kiribati has a hot and humid tropical climate. Air temperatures are closely related to the temperature of the surrounding oceans. Average temperatures are relatively constant year-round, with changes in the temperature from season to season no greater than approximately 1°C [9]. Apart from air temperature, Kiribati's climate varies considerably from year to year, driven largely by the El Niño-Southern Oscillation (ENSO).

Rainfall in Kiribati is affected by the movement of the South Pacific Convergence Zone and the Intertropical Convergence Zone. Annual rainfall: Mean annual rainfall at Betio (South Tarawa) over the period 1947-2016 is estimated to be 2,063 millimeter (mm)[10]. A slight upward trend is observable during this period. Notably, there is significant inter-annual variability - from a minimum of 398 mm in 1950 to a maximum of 4,356 mm in 1993. Monthly rainfall: is also characterized by extreme variability. Recorded monthly rainfall ranges from 0 to 825 mm. The mean monthly rainfall is 171 mm. The mean monthly rainfall varies from between approximately 116 mm for October to 277 mm in January.

Drought. White[11] (2011) defines drought in the Tarawa context as a function of the rainfall over the preceding 12 months compared to averages. Using this definition, 9 severe droughts were recorded between 1947 and 2010, with an average duration of 23.6 months. The most severe drought was registered in April 1974 as only 217.0 mm of rain had fallen in the preceding 12 months. The gap between successive severe droughts also varies widely, with the shortest gap being 2.8 years and the longest 16.3 years.

Wind-waves climate, and sea over-topping. Wind waves in Kiribati are strongly influenced by both north-easterly and south-easterly seasonal trade winds, and the location of the South Pacific Convergence Zone, and by the El Niño–Southern Oscillation from year to year. In Tarawa, waves consist of locally generated trade wind waves from the east and northeast from December to March, and from the east and southeast from June to September. In this latter period there are also swell waves induced by trade winds, as well as some swells propagating from extra-tropical storms in the North Pacific and Southern Ocean[12].

A key factor for consideration is “over-topping” – whereby a combination of wind, waves, tide and sea level surge leads to seawater flowing onto the island before percolating down into the island’s groundwater lenses. This contaminates the water in the lenses and damages the freshwater stored. Studies show that astronomical tide is by far the dominant influence on sea levels, however swell conditions, linked to low pressure and distant storms, cause the most significant occurrences of wave set-up, wave run-up and subsequent overtopping. Wind waves are not a significant cause of overtopping in current climate conditions.[13]

Sea overtopping also threatens to lead to significant flooding. A recently completed study on coastal risk in Kiribati[14] identified many areas where overtopping leads to the threat of regular flooding. This is increasingly a risk on the eastern side of South Tarawa, including in densely populated areas.

Climate Change. The most recent comprehensive assessment of projected climate change on Kiribati was undertaken in 2015 within the context of the PACCSAP project (PACCSAP 2015). PACCSAP 2015 considered 3 representative concentration pathways (RCP): RCP2.5, RCP6 and RCP8.5, and constructed the following projections:

- Sea level is to rise by 13 - 33 centimetres (cm) by 2050, depending on the scenario adopted;
- Air temperatures to continue to rise, with a projected increase ranging between 0.6°C and 2.2°C by 2050;
- The number of very hot days and hot nights to continue to rise[15];

· Sea surface temperature expected to rise by a similar amount to air temperatures (but slightly less);

· Average annual rainfall and seasonal rainfall to increase, as will the number and intensity of extreme precipitation events;

· Ocean acidification is expected to increase. The aragonite saturation state has declined from about 4.5 in the late 18th century to an observed value of about 3.9±0.1 by 2000 and is expected to decline to under 3 in the 2030's (RCP8.5)[16];

· Wind wave height is projected to decrease during the months of December to March. Wind driven waves may be more directed from the south the month of October. Wind wave height is projected to increase slightly in the month of September;

· As the wave climate is also affected by swells caused by distant typhoons, it is affected by the path and intensity of the distant typhoons. There is no consensus on how these paths and intensity will change with climate change – a range of possibilities including more intense, closer storms has to be considered a possibility. There is a possibility of increased over-topping;

· Frequency and intensity of drought -see section below on drought.

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Sea level rise (SLR). The PACCSAP 2015 projections on sea level rise are now considered out dated and unrealistic. Many recent studies, including work in 2018 and 2019, have projected earlier and far more rapid sea level rise, particularly for the Pacific region. As a result, for Kiribati, high-end estimates inclusive of Antarctic ice-sheet loss project sea level rises approaching 2m by 2100.[17]

The following table, although based on a single study[18], illustrates just to what extent projections for SLR have increased subsequent to IPCC 5 and to PACCSAP 2015, they have increased by over 100%.

SCENARIO	RATE OF GLOBAL MEAN SEA-LEVEL RISE IN 2100	GLOBAL MEAN SEA-LEVEL RISE IN 2100 COMPARED TO 1986-2005
RCP2.6	4.4 mm/yr (2.0-6.8)	0.44 m (0.28-0.61)
RCP4.5	6.1 mm/yr (3.5-8.8)	0.53 m (0.36-0.71)
RCP6.0	7.4 mm/yr (4.7-10.3)	0.55 m (0.38-0.73)
RCP8.5	11.2 mm/yr (7.5-15.7)	0.74 m (0.52-0.98)
Estimate inclusive of high-end Antarctic ice-sheet loss		1.84m (0.98-2.47)

Drought is another climate change factor that may affect water supply. There is little certainty with regards to how climate change may affect the occurrence and intensity of future droughts on Pacific islands. PACCSAP 2015 projects that droughts will be less frequent overall, albeit with *low confidence*. And this relates only to short and medium-term droughts. Long-term droughts (i.e. those lasting more than one year) on Tarawa are understood to be almost entirely driven by ENSO, and there is no consensus or agreed understanding of how climate change will impact ENSO. Hence, there is the possibility that, due to climate change, droughts caused by ENSO will be longer or more intense, even if the *average* length and intensity of droughts is reduced.

How does Climate Change Threaten Water Supply on South Tarawa

Climate change will affect both the supply and the demand for water, as detailed in Appendix I.

The most significant factor is the greatly increased risk of sea overtopping that will damage the freshwater lenses. Several factors affected by climate change contribute to the increased risk of sea overtopping and contaminating the lenses. These include (i) increased storm surges in which low atmospheric pressure leads to a temporary rise in sea level, possibly exacerbated by local winds; (ii) increased swells, or large, low-frequency waves, driven by winds from distant weather formations (including cyclones); (iii) tide level – with the possibility of very high tides in certain seasons; and (iv) long-term sea level rise, such as that caused by climate change. At any given time, the risk of overtopping is a function of all these factors – if all four factors combine to drive a high sea there is a very high risk of overtopping.

Climate change will most significantly affect sea level rise, factor (iv) above, and will thereby progressively increase the risk of overtopping and the percolation of sea water into the lens. Models demonstrate that a lens contaminated by such overtopping remains contaminated for over 1 year. Due primarily to sea level rise, by the year 2050, most of the freshwater lenses will be vulnerable to regular overtopping and seawater flooding.

Modelling undertaken within the *Bonriki Inundation Vulnerability Assessment 2015* (BIVA) determined:[19]

- *Without climate change* - the return period for an overtopping event that leads to a temporary reduction in the available yield from Bonriki lens is 100 years, or more;
- *With climate change* - under several reasonable scenarios, more regular overtopping events that lead to damage to the lens and a consequent significant reduction in the available yield from the Bonriki lens. For example, the yield may be reduced by 54% and the reduction may persist for up to five years, depending on conditions. In some scenarios, such overtopping events have a return period of 20 years or less.

In essence, under current conditions the lenses are not threatened by overtopping. After climate change induced sea level rise, the lenses face a high threat of being significantly damaged for up to give years, and so can no longer be relied upon as the primary source of freshwater.

A second climate change factor that will affect the lenses is drought. *Climate and Abstraction Impacts in Atoll Environment* (CAIA, 2016) modelled the impacts of droughts on the available freshwater yield from Bonriki lens. The models demonstrated that extreme drought conditions, which may become more frequent due to climate change, lead to a 40% reduction of the available yield from the lens. This reduced yield persists for several years.

Notably, as climate change occurs, the two above threats to the water in the lenses - sea overtopping and extreme drought – could occur simultaneously or in quick succession. Such a catastrophic combination threatens to reduce the freshwater yield from the Bonriki lens to close to zero for several years.

In summary, the Bonriki lens, which has no previously recorded incidents of climate events affecting its yield, may, after projected climate change, have its yield catastrophically reduced by either overtopping, or drought or a combination of both.

The above modelling, projections and calculations were undertaken before early 2018. They are based on the PACCSAP 2015 projection of the sea level rising up to 33cm by 2050. Subsequently, new evidence became available suggesting far faster and earlier sea level rise in the Pacific (as mentioned above). The more recent, more serious projections suggest that the threat of climate change to the water supply for Tarawa may be catastrophic and imminent.

This accelerated sea level rise means that all impacts of high tides, wave action and storm surges will be magnified. As a result, there will be more frequent and more intense flooding of areas subject to flooding. This is notably a threat in eastern areas of South Tarawa. This will increasingly pose a threat to all low-lying coastal infrastructure in affected areas, including the water distribution network. In addition, the accelerated sea level rise will lead to more active coastal and shoreline processes, potentially damaging the fragile causeways. These causeways currently house the main water transmission pipelines. Hence climate change may lead to irreversible damage to the main water transmission pipes at critical points on the causeway. Annex H provides a summary of the areas exposed to flooding and to coastal/shoreline erosions due to this accelerated sea level rise, and an initial estimate of the costs of adaptation measures.

Water demand: Finally, as mentioned previously, climate change will also lead to increased water demand, notably by (i) increasing temperatures and leading to increased demand from individual consumers and (ii) climate change is a contributing factor to internal migration, causing people to move from outer islands to South Tarawa. For these reasons, just at the time when the water supply is threatened by climate change, there is an increased demand for water due to climate change.

1A.2 BASELINE SCENARIO AND ASSOCIATED BASELINE PROJECTS

This Section, Section 1A.2, describes the overall 'baseline' situation – that is it describes the situation and activities to be supported in the STWSP by ADB, WB, GCF and Government of Kiribati ***before*** the GEF/LDCF request is considered. All activities described in this section have already been reviewed and approved by the Government of Kiribati.

Editorial notes for the following sections.

1. GEF/LDCF and ADB terminology differ regarding Outcomes, Outputs and Activities, as follows:

GEF/LDCF terminology	ADB terminology
GEF Project Outcome	ADB Project Output
GEF Project Output	N/A, otherwise could be referred to as project activities

The following sections of this proposal **use ADB terminology**.

Without major interventions, the people of South Tarawa face a future with no reliable water supply, which is partly caused and greatly exacerbated by climate change.

In response, in the baseline, the Government of Kiribati, with support from international partners, is developing a comprehensive baseline project with the overall aim of providing the entire population of South Tarawa with a reliable, safe and climate resilient water supply. The baseline project – the South Tarawa Water Supply Project (STWSP) - has four Outputs[20]:

Output 1: Climate resilient and low carbon water supply infrastructure. This will be achieved by building two desalination plants with a combined capacity of 6,000 cubic meters per day[21], whose energy consumption is to be offset by a new 2,500-kilowatt solar photovoltaic system, and by the rehabilitation of the water supply distribution network to current standards in order to minimize leakages, and adding new metered household connections to piped water supplies. See Box for description of proposed baseline plan for water production and distribution.

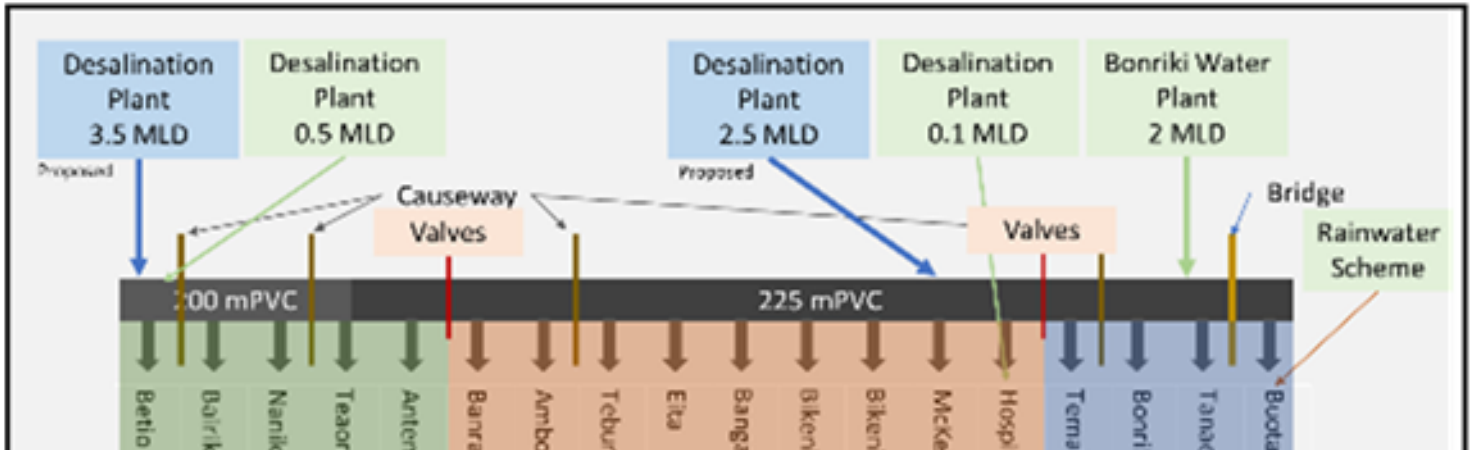
Box: Proposed outline of water production/distribution (baseline)

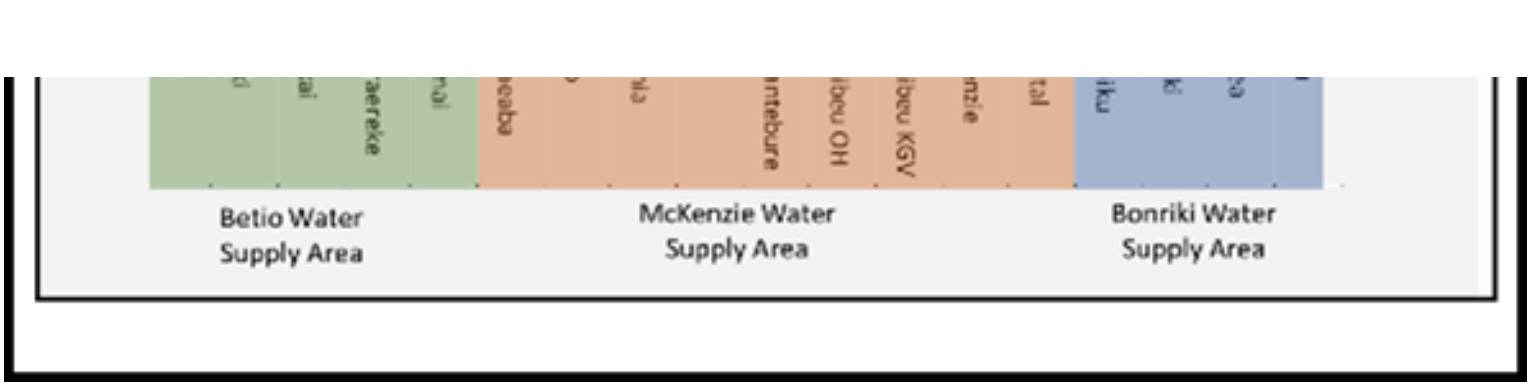
The existing lenses at Bonriki/Buota will supply the eastern zone including the villages of Buota, Tanaea, Bonriki and Temwaiku, via treatment at the existing (to be upgraded) Bonriki water treatment plant.

The proposed 2,500 cubic meters per day (2.5 million litres per day or MLD) desalination plant will provide water to the Mackenzie water supply area, covering the villages from 'Hospital' to Banraeba.

The proposed 3,500 cubic meters per day (3.5 million litres per day or MLD) desalination plant will provide water to Betio water supply area, covering the villages from Antemai to Betio.

This is illustrated in the following figure. As seen in the figure below, existing small scale desalination plants may provide up to an additional 0.6 MLD.





Output 2. Capacity of MISE and PUB to effectively manage water supply infrastructure increased The baseline project provides all the necessary software and hardware to ensure the water supply infrastructure – notably the desalination plants, water treatment and the distribution network - continues to function effectively throughout the lifetime of the project. This includes capacity development, support to operations and maintenance, undertaking quality control, providing specialist support and associated training, vocational training. The baseline project also provides essential project support such as undertaking detailed infrastructure design and ensuring safeguard compliance.

Output 3: Awareness of WASH and climate change issues is raised. In addition to community outreach and awareness raising, this Output will include essential institutional strengthening, capacity building and support to managing infrastructure;

Output 4: Project implementation is managed efficiently and effectively. This covers support to project management and project management capacity in the partner organizations.

More details of each of the above are provided in section 1A.3 below.

The baseline project is an investment of over $60 million to address water supply challenges due to development pressures, population growth, climate variability and climate change. The baseline project is a comprehensive effort designed primarily during 2018. Infrastructure construction activities are scheduled to commence in 2020. The baseline project is financed by the ADB, the World Bank, the Green Climate Fund (GCF) and the Government of Kiribati.

Although the baseline project, with GCF support, does address many climate and climate change challenges to water supply on South Tarawa, it falls short of comprehensively climate proofing and adaptation as explained in the following:

(i) As discussed above, recent climate change projections, notably regarding increased and earlier sea level rise, mean a higher risk level has to be addressed than that which was considered in the baseline project design.[22] This has two notable aspects:

a the risk of sea overtopping is significantly increased. Hence there is a greater risk of lens freshwater being 'temporarily' being unavailable. This increases the urgency to establish an alternative water supply. This should still be covered by the activities planned under Output 1 of the baseline project. Current calculations determine that no additional GEF support is required;

b infrastructure elements that lie very close to the coast or are very low-lying are at increased risk of storm, tide and wave damage due to sea level rise. The infrastructure most critically concerned is (a) the low-lying elements of the reticulated network, particularly on eastern edges of the island; and (b) the main transmission pipes that cross the causeways linking the islands on South Tarawa. These will be increasingly exposed to damage and erosion.

(ii) In the baseline, the underlying strategic approach to urban services could be further strengthened. The current responses are *reactive* to challenges and emergencies, rather than strategic and anticipative. Further, two recently emerging technology sets – related to information management and asset management – create new broad opportunities to enhance climate resilience of the water supply network, and these are not exploited in the baseline.

These issues will be addressed through the LDCF alternative as elaborated in the following section.

1A.3 PROPOSED ALTERNATIVE SCENARIO – AND DESCRIPTION OF PROJECT COMPONENTS, OUTPUTS AND ACTIVITIES

This Section, Section1A.3, describes the Alternative scenario to be achieved with LDCF support. This section describes the additional activities and inputs to be financed by LDCF for which GEF/LDCF approval is to be requested.

After the general introduction, this section is presented Output by Output. For each Output, it first describes the situation without GEF/LDCF support, it then describes the challenges faced, the actions/activities that LDCF/GEF will support to address the challenges, and the differences that this will achieve.

It is noted that in addition to funding from GEF, the alternative scenario includes a contribution of $0.5 million from the Government in tax and duties exemptions. This is in addition to the contribution already made by the Government in the baseline scenario.

Overall STWSP is aligned to the following impact: health and climate change resilience of South Tarawa's population improved.

Overall STWSP will have the following high level Outcome: access of South Tarawa's population to safe, climate-resilient water supplies increased.

GEF/LDCF will provide critical and strategic support to the baseline STWSP in order to further ensure it is adapted to climate change and resilient to climate risks. GEF/LDCF notably addresses the newly understood risks from sea level rise and will help Kiribati to exploit emerging resilience opportunities.

GEF/LDCF will support, modify and strengthen baseline Outputs 1, 2 and 4. GEF/LDCF leverage is illustrated in the theory of change diagram below.

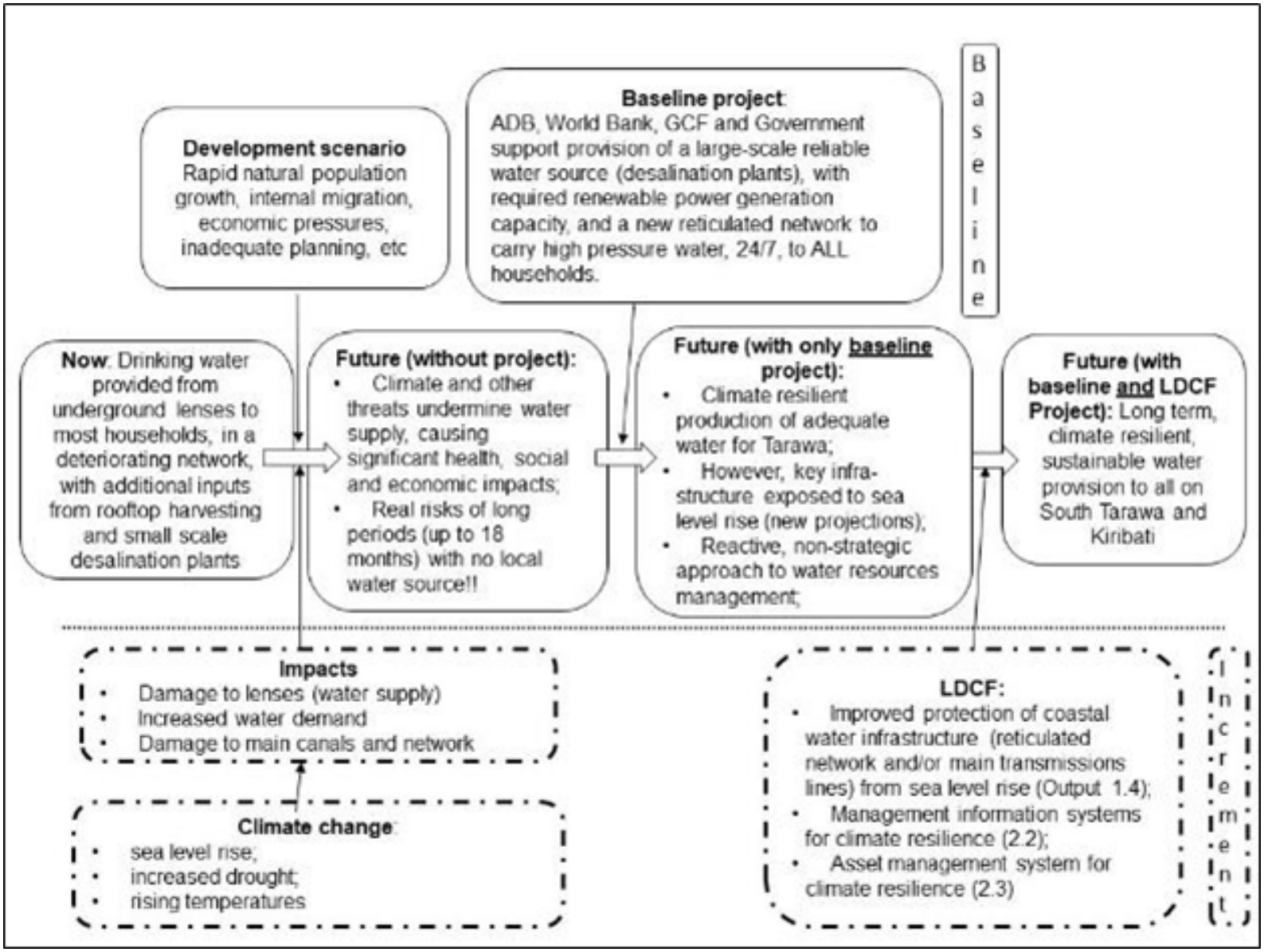


Diagram illustrating the theory of change, i.e. the overall change that LDCF will bring to the baseline.

The following sections describe how LDCF will modify and complement the Outputs in the baseline. LDCF will both modify activities and support new activities.

Output 1: Water supply infrastructure is climate resilient and low carbon

Baseline (with no finance by GEF/LDCF)

As mentioned earlier, a detailed climate change impact assessment (CCIA) of the STWSP was prepared during the initial preparation of the STWSP in late 2017 and is attached in Appendix I. Appendix I demonstrated that the existing, natural sources of fresh water (Bonriki and Buota lenses) will be greatly threatened by sea level rise, therefore providing a main justification for support to this project from the Green Climate Fund (GCF).

In Appendix I, adaptation options are reviewed, and the option to install a single desalination plant, together with power generation, is recommended as the optimal adaptation measure. Subsequent calculations (subsequent to the preparation of the CCIA in Appendix I) led to a recommendation for two desalination plants, as explained and illustrated in the above Box. Appendix I also reviewed the resilience of all components of STWSP to climate change, and made necessary recommendations to ensure resilience.

Hence Output 1 includes the following three activities to be implemented under STWSP in the baseline:

1.1 Desalination plants with capacity to produce 6,000 cubic meters per day;

1.2 A 2,500-kilowatt solar photovoltaic energy production system;

1.3 Rehabilitation of the water supply distribution network in line with previous sea level rise projections;

Two developments subsequent to the preparation of Appendix I have led to additional infrastructure needs, as follows:

(i) recent projections for sea level rise project much more significant and much earlier rises in sea levels, notably for the Pacific islands. The CCIA is based on 'sea level is projected to rise by between 13 to 33 centimeters (cm) by 2050'. This figure was based on modelling that did not account for Antarctic glacier melt. Subsequent publications [23] project a faster and earlier rise, including for example a rise of up to 1.84m by 2100;

(ii) a recently completed study on coastal risk in Kiribati (NIWA, 2019) identified many areas where existing water supply infrastructure is at risk to sea level rise, overtopping, shoreline movement and coastal erosion (see summary of findings in Annex H). The study identifies three categories of coastal risk, each of which may threaten water sector infrastructure:

a Coastal areas exposed to dynamic shoreline change and frequent flooding. This will increase with climate change. All infrastructure in these areas, including water main transmission lines and the reticulated network, will be under an increased threat due to climate change;

b Sea edge areas exposed to wave over-washing and slow shoreline changes. This will increase with climate change. The main water transmission lines lying in these areas may be at increased threat due to climate change;

c Low lying inland residential areas exposed to flooding. This will increase with climate change. The reticulated network in these areas will be under an increased threat due to climate change. As can be seen from Annex H this is mostly a risk in eastern areas.

See Annex H and NIWA (2019) for more details.

Alternative (**the additional activities Funded by GEF/LDCF**)

As can be seen from above and as elaborated in Annex H, the climate change threat notably brings increases in two risks to the infrastructure planned and existing under the baseline: (i) to existing main water transmission lines in coastal areas/fragile causeways and (ii) to the reticulated water supply network in the eastern areas. In both cases, the response to these risks will require significant infrastructure investments.

The increased risk, the proposed adaptation measure and the estimated costs are provided in the following table (source: Annex H):

Increased risk to infrastructure due to climate change	Adaptation Measure	Estimated cost of adaptation measure
The existing main water transmission lines in coastal areas and along the sea edge are threatened by increased shoreline movement and coastal erosion. NIWA (2019) identified the critical stretches of coast that carry vital water supply infrastructure at high risk– these are notably the lagoon-facing sides of Stewart Causeway, Anderson Causeway and the Nanikai – Bairiki Causeway. These were initially confirmed by MISE as the key causeways at risk carrying water supply infrastructure.[24] If damaged, this would entirely undermine the water supply sector on South Tarawa.	Strengthen the causeways in order to protect against climate change damage.	The costs of strengthening the three causeways in order to protect against climate change damage are estimated to be in the range of US$3.8 - US5.9 million (see cost tables in Annex H).
The planned reticulated water supply network, to be provided under the baseline project, is at increased threat from flooding and tidal damage.	From Annex H, it can be seen that this threat is greatest in the eastern areas of Buota, Bikenibeu and Bangantebure. The supply to 1,021 households is particularly threatened. 1,577 standpipes and 37,576m of reticulate network are most threatened. Hence the wate	The base CAPEX cost estimate for the overall upgrading of the reticulated water supply network prepared in 2017 was approximately US$15 million. Recent cost estimates for the ov

	most threatened. Hence the wate r supply network in these areas s hould be reconstructed to be part icularly resilient to climate threat s.	Recent cost estimates for the ov erall upgrading of the reticulated water supply network are closer t o US$20 million. Hence, the cost estimate for the overall upgrading of the reticulat ed water supply network increas ed by approximately US$5 millio n. It has to be noted that there ar e many reasons for this increase d cost estimate, of which the incr eased threat from climate chang e may be one. See Annex H for details.

From the above table, it is clear that the GEF/LDCF funds are unlikely to be sufficient to address both increased risks, however GEF/LDCF funds can make a significant contribution to lowering at least one of the risks and therefore to adapting to climate change.

Hence, the alternative, supported by GEF/LDCF, consists of the following activities:

· 1.4.1 Options analysis to determine the costs and benefits in terms of climate change adaptation of (i) strengthening the Stewart Causeway, Anderson Causeway and the Nanikai – Bairiki Causeway causeway. This will include an assessment of ecosystem based measures notably maintaining and enhancing beach and natural crest berms on protection lines and (ii) contributing to the upgrading of the water supply network, notably in the eastern areas of Buota, Bikenibeu and Bangantebure. This options analysis will include:

· The definition of the additional costs due to climate change for both options. For the 'causeways' option, this will first include a validation, or otherwise, that the three mentioned causeways are the priority causeways for protection in terms of protecting the water supply;

· The definition of the additional climate change benefits for both options;

· 1.4.2 Selection of intervention strategy;

· 1.4.3 Detailed design of optimal measures to ensure critical infrastructure is protected;

· 1.4.4 Construction of optimal protection measures;

· 1.4.5 Documentation of impact of protection measures. Regular monitoring will ensure the effectiveness of the measures is determined, together with any additional positive or negative social or environmental impacts. This will be documented into a lesson learning/best practices knowledge product for use across Kiribati and other atoll islands with infrastructure threatened by sea level rise.

Output 2: Water supply infrastructure is effectively managed

Activity 2.1 Institutional strengthening of water supply sector.

Baseline (no finance by GEF/LDCF)

The baseline STWSP project provides all the necessary software and hardware to ensure the water supply infrastructure continues functioning effectively throughout the lifetime of the project. The baseline project will include the following activities:

2.1.1 Undertake O&M of desalination plant, including capacity development for operations and maintenance of the desalination plants. This will provide 'capacity development through doing' during a five year period. Through an O&M contract, in addition to ensuring reliability of the plants and water supply, this will include activities to develop MISE and PUB's capacity. This will cover, inter alia, developing capacity to undertake the O&M (covering issues such as maintenance procedures, asset management, trouble-shooting and inventory control). The 'mentoring and capacity transfer' approach will take over as the project financing draws to a close, handing progressively functions over to PUB.

2.1.2 Institutional strengthening. This notably includes a focus on capacity development for operations and maintenance of the water supply network, and the water storage and pumping infrastructure. Again, through a five year period, the project will provide 'capacity development by doing'. This will include specific capacity development measures focusing on reducing non-revenue water, ensuring 100% reliability of supply, improved energy management, improved health, environment and safety compliance, and improved water quality compliance. Examples of tools used to develop this are target setting linked to financial targets and compliance data and reporting. This will also cover:

- Capacity to oversee and manage construction, and to undertake infrastructure quality control. Again, the learning by doing approach, supported by international standard experts, will ensure nationals gain the expertise to oversee and manage future construction on Kiribati;

- Specialist support and associated training to MISE and PUB on issues such as customer service and billing, human resource management, financial sustainability and asset management;

- Vocational training for PUB managers, technical and administrative staff on issues such as water industry operations, electrical support, project management (including contract management and procurement skills) and customer service.

2.1.3 Project implementation and safeguards. TO ensure appropriate procedures and safeguard compliance in all project supported investments.

2.1.4 Undertake detailed Project design. For all STWSP activities and investments. Note that this activity is ongoing and is funded by a separate ADB Project Design Advance of $2 million.

2.1.5 Water treatment. Supporting part of the water treatment costs for water produced by the desalination plants for a five year period.

All the above is financed by the baseline project. The aim of the activities under the baseline project is to ensure that the infrastructure provided by the baseline project remains operational and efficient throughout the lifetime of the project, and that Kiribati nationals develop the capacity to operate, manage and maintain the water supply infrastructure into the future, once the SWTSP funding ends. The focus of activities under the baseline project is on MISE and PUB.

However, the baseline adopts an infrastructure focused, reactive approach and accordingly misses some essential steps and opportunities to greatly increase the sustainability and resilience of the water sector on Kiribati, as explained in the following paragraphs.

Activity 2.2 - Integrated Management Information System for Climate Resilience

Baseline – without LDCF/GEF support

Recent technological developments mean that Kiribati can now benefit from smart, real-time integrated information management systems that provide high-quality information to decision makers across multiple sectors in order to determine short and long-term pathways that are optimally climate resilient. Such information management systems could support multi-level decision-making that encompasses policy processes, planning processes, investment design and resource allocation. This can also ensure that all sectors can not only respond to, but can also anticipate, the risks associated with climate variability and climate change.

These recent technological developments include the use of satellites, aircraft and drones to collect affordable, accurate, up-to-date, high resolution data. This data can cover all forms of natural resources and man-made assets. Users may be government agencies, private sector and projects. Other technological developments have led to improved computing power, software and expertise for the real-time monitoring, analysis and interpretation of data and production of information. Further technological developments have greatly enhanced the capability to model, to forecast and to develop scenario that can feed into policy, planning and decision-making that is optimized across geographical areas, sectors and potential futures. Finally, improvements in connectivity mean that (i) Kiribati can be fully and rapidly integrated into regional and global data networks and (ii) all Kiribati stakeholders can participate in rapid data exchange in real time in order to facilitate connected and optimal decision-making.

In Kiribati, specifically, there is the potential to integrate data and information management systems covering meteorology, climate change, water resources, water sector infrastructure, freshwater distribution networks, coastal dynamics, environment, biodiversity, water quality, flood risk, drought risk, the risks associated with sea level and high waves, public health, population and other factors. With regards to both short term climate resilience and long term climate change adaptation, this would lead to improved decision-making in each sector as well as to synergies across sectors.

The baseline includes the following strengths:

- Under STWSP, MISE/PUB is upgrading its data and management information systems, including (i) a supervisory control and data acquisition (SCADA) system for gathering and analysing real time data that will be used to monitor and control a water sector equipment; (ii) a maintenance management system (MMS) to schedule and record maintenance activities and to accommodate fault types and fault resolution times; (iii) a Geographic Information System (GIS) for high-resolution, dynamic mapping of all assets and water resources and; (iv) an on-line, real time meter reading and billing system (MBS)[25].

- Under MELAD, the Environment and Conservation Department (ECD) is establishing an environmental management information system. The system focuses support on reporting to international conventions, including on climate change, and on state of the environment (SOE) reporting and the environmental impact assessment process. This system notably covers biodiversity, land status and climate change impacts on the ecosystems. The Environment Information and Database Management Section in ECD is responsible for the ECD database and for the identification/monitoring of Climate Change and Environmental indicators, in support of SOE reporting;

- The Lands Department (LD) under MELAD has a digitized GIS database to support decision-making related to land ownership and land use management.

- The Officer of the President (OB) has a database, updated regularly, to support monitoring and reporting on greenhouse gas emissions.

- The ICT Policy and Development Division of the Ministry of Information Communication Transport and Tourism Development (MICTTD) is investing in both hard and software in order to create the architecture for nationwide effective data and information management systems;

- The Kiribati GIS Users Group has been established as a fledgling mechanism for information exchange and collaboration. Members include the above mentioned government agencies and representatives of internationally supported projects. The Group meets regularly on a voluntary and informal basis to exchange information on databases and management systems;

- In addition, regional partners, such as SPC and USP, have provided regular support to agencies in Kiribati on data management, and also host regionally accessible databases and analytical tools;

- In addition, a large number of databases and GIS products have been established in recent years, notably associated with international projects.

However, several barriers in the baseline mean that currently an integrated, coordinated information management system to support decision-making in the water, climate and environment domains is not possible. This undermines and weakens decision-making, and subsequently undermines planning, policy and the returns on investments. These barriers are:

- Each actor acts independently, developing different data and information systems at different times, with incompatible databases, protocols and analytical tools;

- Most datasets and interpretive information products are 'project-based' – they are not updated after project closure, and in many cases they may not be accessible after project closure;

- Although many Kiribati stakeholders are highly connected to one or more international partners, connection within and across national stakeholders is less optimal;

- The above have also led to an intrinsic culture paradigm where data sharing is not always the default option. There is a persistent tendency to hold on and not share data. Incentives to boost data and information sharing are lacking.

LDCF Financed Project interventions

2.2.1 Establish a joint MFED/MISE/MELAD climate resilient management information unit. This will be physically hosted in ECD within MELAD, but will be guided and supported by MFED and MISE. The Environment Information and Database Management Section in ECD will take the lead in the design, coordination, managing and technically supporting this joint MFED/MISE/MELAD information unit. The heart of this unit will be the ECD Database used, amongst others, to generate SOE reports.

2.2.2 Prepare detailed inventory of all pertinent datasets, databases and information systems This will cover all systems in Kiribati related to water resources, water sector infrastructure, environment, climate change, coastal ecosystems and disaster risks and draw upon the results of previous support provided to government in asset and inventory management. This will cover all datasets established after 2014. This will cover all inhabited islands. This will cover all ministries and government agencies, all NGOs, all international partners, all projects and to the extent possible all private sector stakeholders. The inventory will list information on data stored and resolutions, scope and coverage, formats and protocols, the access protocol, the analytical tools and the major analytical products.

2.2.3 Review management information system for climate resilience in neighboring countries and prepare best practices guidance manual.

2.2.4 Undertake in-depth user needs analysis. In order to ensure that any future management information system is driven by potential users and real needs, and is not supply driven, a thorough assessments of the needs of all potential information users will be undertaken. This includes government agencies, private sector, NGOs, communities and projects. The findings will drive the design of the ultimate information system (2.2.7).

2.2.5 Host national workshop on management information systems for climate resilience. The purpose of the workshop will be to prepare the roadmap for establishing the management information system for climate resilience in Kiribati. The workshop will review the results from Activities 2.2.2, 2.2.3 and 2.2.4 as a basis for the roadmap.

2.2.6 Multi-level training. A series of training activities for Kiribati stakeholders involved in data management, management information systems, GIS, modelling, mapping, forecasting and data communications. This will cover access tools, protocols, potential architecture, reporting needs, software and hardware, and communication approaches.

2.2.7 Propose and establish a common data/information platform The platform will provide management and decision making support to OB, MFED, MISE, MELAD and other government agencies on all issues related to water resources, water sector infrastructure, environment, climate change, coastal ecosystems and disaster risks. The proposal will establish the standards, norms and protocols to collect, analyze, store and disseminate data and information. This activity will include establishing the legal infrastructure or MoUs or commitments required for the common platform. The platform will include its own databases and information products, as well as establishing common access to existing databases and information products existing in the participating agencies. The platform and all related databases and information products will be on-line and dynamic, regularly updated.

2.2.8 Provide equipment for common data/information platform This may include hardware and software, storage and networking equipment, and communications equipment.

Activity 2.3 - Strategic Asset Management System for Climate Resilience

Baseline – without LDCF/GEF support

There are no specific pertinent activities in the baseline. The following section describes the general situation with regards to asset management without GEF/LDCF support. Appendix III, '*Achieving climate resilience through asset management'*, provides further information on the potential for using asset management to achieve climate resilience in Kiribati, the methodologies, with a particularly focus on the water supply sector, and on the barriers to setting up the asset management system, and on the recommended ways to remove the barriers.

Assets are the physical basis on which all services depend. All services – including the supply of high quality fresh water - are provided to society and to communities *via assets*. Asset management is the methodology and mechanisms through which existing assets are maintained and optimized, and through which future assets are chosen and maintained. Asset management is a systematic process of developing, operating, maintaining, upgrading, and disposing of assets in the most cost-effective manner and efficient manner. Assets are both man-made (or engineered) assets – e.g. storage tanks, water pipes etc., and natural assets – e.g. natural freshwater lenses and mangrove stretches that protect coastlines.

Improved asset management will lead to improved individual assets, including individual assets that are more resilient to climate risks and to climate change. Further, improved asset management will lead to an improved selection, design, allocation and installation of all assets, meaning that entire communities and sections of society and the economy are more resilient to climate risks and are better adapted to climate change.

There is a two-way interaction between asset management and climate change resilience. *In one direction*, for services that are asset intensive (such as water supply), climate change leads to risks to the assets which makes it more challenging for authorities to deliver the desired levels of service. Climate change amplifies risks, increases uncertainty, and increases the costs of managing risks. The greatest impacts would be on transportation systems, buildings, energy production, water management systems, and marine infrastructure. *In the other direction*, improved asset management can help governments and communities manage climate variability and climate change. The decisions about the way assets are planned, designed, constructed, operated, maintained and decommissioned are important opportunities for local government to increase resilience (and to reduce GHG emissions). Good asset management practices can increase a community's resilience to the impacts of changing climate and lessen exposure to natural disasters – whereas weak asset management increases the exposure of economies and communities.

A well designed, resourced and implemented Asset Management System facilities a faster response to climatic impacts and increases the resilience of the community it serves. However, in the baseline, there are several barriers to optimal asset management in the water sector in Kiribati:

- Asset management is a relatively new development tool. Hence, the understanding of asset management, and capacity to undertake it are limited. Kiribati does not have the people, the equipment and the institutions to perform optimal asset management;

- Asset management is currently distributed across many actors and agencies in Kiribati. There is no national approach to asset management. In particular, there is no database or information system to support asset management. As a result, opportunities for synergies are lost, and operational level conflicts may arise;

- In cases where asset management is a priority in Kiribati, the focus is usually limited to the maintenance of individual assets, rather than on a holistic asset management strategy;

- The prevailing culture in Kiribati tends against asset maintenance. Kiribati, as a nation, is greatly exposed to natural disasters, and reoccurring 'natural' events which damage assets are understood to be a natural process. Hence the culture has always been to '*fix it after it's broken*';

- Recent cultural developments have led to breakdown in the trust of natural assets. Until recently, Kiribati stakeholders worked closely with natural assets – e.g. freshwater lenses, marine biodiversity and fisheries, mangroves and reefs – in order to secure long-term prosperity. These assets were highly valued and managed. However, more recently, in line with global tendencies, man-made and engineered solutions have been introduced and have displaced

the role of natural assets;

LDCF Funded Project interventions

As described above, strategic asset management is in some ways new to Kiribati, and as integrating climate change into asset management is somewhat new globally, the project will progressively introduce climate resilient asset management into the embryonic national asset management process described above. This will create a strong foundation for upscaling and rolling out climate resilient asset management nationally within a few years. The following actions are supported by LDCF in support of the embryonic national asset management process, in order to integrate climate change resilient at this key stage.

2.3.1 Establish an "Asset Management Centre". This is to be within the National Economic Planning Office (NEPO) of MFED.

MFED is at the center of influence for assets in the Republic of Kiribati. Assets must be purchased on the capital budget and operated on the expense budget. With the age of assets often measured in decades, long term planning is crucially important to the success of asset management.

NEPO is uniquely placed to provide "ownership" over a whole-of-Government asset strategy and enforce compliance and rules around asset management in the different Ministries. This inter-ministry coordination would ensure not only that asset management is conducted in a consistent manner across ministries but would also push skills and knowledge of asset management procedure down to those who need it.

NEPO already provides specialist Procurement assistance to other Government authorities and Ministries. Establishing specialist asset management expertise within NEPO would do much to reinforce long term financial stewardship, improve whole of lifecycle asset performance and drive asset management knowledge in the wider Ministries as processes and procedures were enacted.

2.3.2 Undertake stakeholder analysis. Given the innovative nature of asset management, and the parallel challenge of integrating climate change into asset management, this focused stakeholder analysis is a necessary activity. This analysis will draw upon any assessments undertaken previously and identify all stakeholders who are involved in asset management, all who should be involved in asset management, and all who could be involved in asset management. It will clarify the nexus with climate variability, climate change and disaster risk management. For each current and potential stakeholder, it will identify the current roles, the future and potential roles, and the barriers to achieving optimal participation of each stakeholder.

2.3.3 Stakeholder management and change management. Using the output from 2.3.2 (stakeholder analysis), work is needed to identify the training requirements and community engagement required to operate the asset management system. This is particularly important for natural assets such as the water lenses because extensive community engagement will be required to ensure understanding and cooperation to achieve the sustained goals. The Bonriki water lens is threatened by domestic encroachment and industrial degradation and significant effort could be required to halt and reverse this trend.

2.3.4 Multi-level training. As the target for the training will be primarily asset management stakeholders and not the climate change community, this training will commence with basic training on climate change and on the implications of climate change for Kiribati and in particular for infrastructure assets. Then, training activities will be implemented in order to develop the seed '*top of the range'* capacity for asset management system in Kiribati with climate change fully integrated.

2.3.5 Demonstration of asset management using “one-government” asset management to support climate change adaptation, and pursue with upscaling and rolling out where appropriate. This will cover, for one agency or project, all asset management stages from the planning stage through operations, maintenance, rehabilitation and decommissioning. Through this activity, the project will (i) demonstrate the advantages and benefit to climate resilience of asset management; (ii) develop capacity for asset management and; (iii) integrate climate change adaptation into the asset management system and into all asset management measures for one agency or project. The following asset management steps and tools may be developed:

- Demonstrating lifecycle costing, and rolling out where appropriate. When planning and budgeting, governments should include the costs to operate, maintain, renew, and dispose of or repurpose infrastructure over the full life of the assets. Life cycle analysis seeks to minimize the overall cost of service delivery. This may defer or eliminate the need for additional grey infrastructure by considering how service delivery can be supported with complementary solutions. For example, measures to support conservation, like demand management for water, will lower the cost of delivering those services while treading more lightly on natural resources. Another example is utilizing or leveraging natural assets to provide services like rainwater and stormwater management. Climate change scenarios covering sea level, rainfall, drought and disaster risk will be integrated into the models for life-cycle costing.

- Demonstrating triple bottom line (TBL) assessment and rolling out where appropriate. This goes one step further than life cycle costing by integrating socio-cultural, economic and environmental considerations when evaluating service delivery options. It recognizes that a holistic and balanced assessment is required to achieve the best long-term outcome. With TBL assessment, considerations around goals like climate change, social equity and efficiency, may be brought formally into the analysis and support decisions. Sustainable solutions are a desired outcome of triple bottom line assessment. Again, all credible climate change scenarios covering sea level, rainfall, drought and disaster risk will be integrated into the demonstration of TBL.

- Demonstrating asset management in land use and development decisions. Asset management brings infrastructure service delivery much closer to land use planning and development policies. As a result, governments can be proactive in shaping land use, development charges and zoning in order to support communities in their journey toward sustainability and resilience. Climate change adaptation can become a key goal of land use decisions and planning and zoning. This is particularly relevant to building encroachment over the Bonriki water reserve.

- Demonstrating climate resilient procurement, and rolling out. Governments can find ways to favour the procurement and selection of assets and services that achieve multiple social, environmental and economic benefits. For example, green buildings and clean fleets can support local governments in meeting greenhouse gas emissions reduction goals while saving operational costs over the long run. Another example is the acquisition of natural areas such as wetlands or forests. Adding green infrastructure and natural assets to the mix has the potential to support more resilient service delivery. In this case, procurement practices that give weight to more resilient approaches and equipment will be developed.

- Demonstrating asset management in efficient resource use decision-making. Local governments can seek out the most efficient operational processes — those that reduce costs as well as social and environmental impact. For example, processes that support recycling, minimize waste, or conserve energy and water are win-win solutions for the community that help achieve lower costs with a lighter environmental footprint. This automatically increase community resilience by contributing to conservation.

- Demonstrating the value of adhering to maintenance schedules and replication. When local governments adhere to a maintenance schedule for their assets, the assets tend to last longer and the overall cost of the assets tends to be lower over their full life. It is very tempting for authorities to defer maintenance of an older asset and transfer those funds into a new capital project. However, short-term decisions can lead to bigger costs to the community in

the long run and are likely not in the best interests of future generations of taxpayers. Maintenance schedules will be modified to reflect all credible climate change scenarios (covering sea level, rainfall, drought and disaster risk). The use of maintenance to achieve climate resilience will be monitored, documented and created as a 'best practice'.

2.3.6 Develop Road Map to Upscale and Roll-Out one government, climate resilient asset management. The road map will clearly set out the path for having a strategic asset management framework for Kiribati that deliver increase climate resilience and other benefits. The road map will cover all islands, all key agencies, and all key natural and engineered assets. The road map will determine the management and coordination units. It will identify the responsibilities of all participating stakeholders. It will determine which asset management methodologies are to be used for each asset. It will determine resource needs, costs and sources of finance. It will set targets and provide a monitoring framework to ensure that the asset management framework is delivering results.

Output 3: Awareness of WASH and climate change issues is raised

Baseline

The baseline STWSP project entirely covers this key Output. No LDCF funds are allocated to this Output.

This Output includes the following two Activities:

Activity 3.1 - Implement water conservation and WASH awareness program (WAP). This consists of the implementation of a comprehensive and intensive 5-year 'Water Conservation and WASH Awareness Program (WAP)' in South Tarawa by an international NGO (INGO) supported by local Civil Society Organizations (CSOs) at the community level.

In general terms, the situation regarding WASH in South Tarawa is highly challenging. There is insufficient potable water available to facilitate hygiene practices, only 35% of the population has access to improved sanitation facilities, and incidence of water borne disease is high. The project (Outputs 1 and 2) is going to significantly improve the water service, in quality and volume, and the community welcomes this. However, in addition, the WAP is critical to ensure the successful outputs of the project, especially community adaptation and improved resilience to climate change impacts.

The WAP responds to several significant changes brought by the project, notably: a) supply of 24/7 pressurized water to individual households; b) supply of safe, treated water; c) requirement for households to pay for water according to metered consumption; d) supply of a new type of water unfamiliar to most customers; and e) supply of free water availability at community taps (as a safety net for the poor). In response, the WAP will facilitate behavioral change through the three following sub-programs:

- A - 'Water for Life' - A water focused communication and engagement program that expands on the PUB's existing information, education and communications program and extends across all of South Tarawa.;

- B - 'WASH Community Partnership' – A broader WASH behavior change campaign with a focus on tackling behaviors linked to climate change adaptation, climate mitigation benefits, water security and safety, sanitation, hygiene, menstrual hygiene management, and solid waste management;

- C - 'Walk the Talk' – A program focused on strengthening the enabling environment (including policy, regulations, institutional capacity and leadership) required for comprehensive and sustainable adaptation to climate change, behavior change, and effective sector coordination;

Activity 3.2 – Construct climate change and water visitor education center. This is linked to the WAP. It is the construction of a small public education center co-located nearby the main desalination plant (Bairiki). The objectives of the center are to educate plant visitors about climate change, desalination and water resources management, and how these are linked to topics such as water conservation, disaster risk management and renewable energy. The centre will provide awareness on key issues such as: What is climate change and what are the impacts to Pacific Islands and to Kiribati? How does climate change affect natural disasters in the Pacific and how is this linked to water resources management? Why is renewable energy important and why are we using solar at the desalination plant? Visitors to the plant are expected to include students from local schools, government officials, CSOs, and interested community members.

Output 4: Project implementation is managed efficiently and effectively

This Output is primarily covered by the baseline project, some LDCF funds will support management activities and inputs that are necessary for the management of LDCF funds.

Baseline

The baseline project will support a government's project management unit (PMU) housed in MISE. The PMU will be the core unit responsible for the overall implementation of the STWSP including the day-to-day project activities, compliance with the provisions of the grant and project agreements and government policies and guidelines, project administration, preparation of grant withdrawal applications, and maintenance of records. PMU will also be responsible for knowledge management and the preparation and dissemination of knowledge products. Baseline project support will ensure that the PMU operates to international standards and norms.

Alternative (the additional activities **Funded by GEF/LDCF)**

In addition to baseline, LDCF funds will support: (i) monitoring project contribution to climate change adaptation; (ii) monitoring project contribution to other global environment goals, notably reduction of GHG emissions and biodiversity conservation; (iii) knowledge management pertaining to LDCF goals and preparation and dissemination of knowledge products pertaining to LDCF goals and; (iv) reporting to LDCF in line with LDCF expectations and requirements.

1A.4 ALIGNMENT WITH GEF FOCAL AREA

The project supports LDCF Climate Change Adaptation Objective 1 ("*Reduce vulnerability and increase resilience through innovation and technology transfer for climate change adaptation*") and Objective 2 ("*Mainstream climate change adaptation and resilience for systemic impact*") as follows:

Under LDCF Objective 1 the project contributes to LDCF Outcome 1.1 (*Technologies and innovative solutions piloted or deployed to reduce climate-related risks and/or enhance resilience*) and notably to LDCF Output 1.1.1. (*Physical and natural assets made more resilient to climate variability and change*).

The overall STWSP project provides South Tarawa with a climate resilient water supply. This includes a source of freshwater (two desalination plants), a reliable energy source to power water production and distribution (the solar PV plant) and the reticulated network to households.

The LDCF support, *directly*, under project Output 1, will provide protection from sea level rise to either 2km (figure to be confirmed) of exposed coastline that carry critical infrastructure – water supply and transport or to 37,576 of reticulated network and 1,577 standpipes (subject to options analysis)[26].

The project will do this by providing infrastructure strengthening that is adapted to the Kiribati socio-economic conditions, using approaches and technologies that can be replicated to many islands in the Pacific and other oceans. The entire population of South Tarawa – currently 60,000 and an estimated 90,000 by 2045 – will benefit from this protection in terms of resilient water supply.

Further, LDCF support to project Output 2 will *indirectly* support ensuring that physical and natural assets are made more resilient to climate variability and change. Improved management information systems (project Activity 2.2) will ensure better decisions regarding asset management, leading to more resilient asset. This will be greatly enhanced by the climate resilient asset management system to be developed and rolled out under this project (project Activity 2.3).

Key indicators	Target
Total no. of beneficiaries, male/female	69,920, of which 36,009 are female. This is equivalent to 95% of South Tarawa Population in 2027, of which 51.5% are women. (Calculated from figures in STWSP Inception Report, Table 21).
Km of coast/road	Dependent on results of options analysis, either: 2 km of exposed coastline that carry critical infrastructure – water supply and transport, or, 37,576 of reticulated network and 1,577 standpipes.

Under LDCF Objective 2, the project contributes to LDCF Outcome 2.1 (*Strengthened cross-sectoral mechanisms to mainstream climate adaptation and resilience*) and notably to LDCF Output 2.1.1 (*Cross-sectoral polices and plans incorporate adaptation considerations*) and LDCF Output 2.1.2 (*Cross-sectoral institutional partnerships established or expanded).*

The LDCF contribution makes a key contribution to governance and management in the water sector by empowering national agencies and units. Notably, the information management system from project Activity 2.2 and the asset management system from project Activity 2.3are to be prepared through a cross-sectoral process, and through a process that is designed to empower, strengthen and operationalize cross sectoral mechanisms. The cross-sectoral mechanisms that will benefit include the common information platform (project Activity 2.2), and the Asset management center of excellence (project Activity 2.3).

Key indicators	Target
No. of institutional partnerships established or st rengthened	2: · common information/data platform, · Asset management center of excellence

1A.5 INCREMENTAL COST REASONING AND EXPECTED CONTRIBUTIONS FROM BASELINE, LDCF AND CO-FINANCING

The Project components are aligned to the GEF/LDCF Focal Area Objectives/Outcomes: Component 1: *Technologies and innovative solutions piloted or deployed to reduce climate related risks and/or enhance resilience* and Component 2: *Strengthened cross-sectoral mechanisms to mainstream climate adaptation and resilience*. The baseline, incremental and co-financing contributions are summarized in the following table, and detailed in the subsequent paragraphs.

LDCF Component/	Project Output	Baseline ($ million)	LDCF contribution to incremental cost ($ million)	Co-financing to increment ($ million)[a]
LDCF Component 1	Project Output 1	45.62	4.13	0.45
LDCF Component 2	Project Output 2	12.40	0.34	0.04
	Project Output 3	1.41	0	0
	Project Output 4	2.39	0.11	0.01
Total		61.83	4.59	0.5

[a] In-kind contribution from government in the form of taxes and duties exemption

GEF Focal Area Component 1 *Technologies and innovative solutions piloted or deployed to reduce climate related risks and/or enhance resilience*

This is addressed under Output 1: Water supply infrastructure is climate resilient and low carbon.

Baseline: This consists of building two desalination plants with a combined capacity of 6,000 cubic meters per day, whose energy consumption is offset by a 2,500-kilowatt solar photovoltaic system, and by rehabilitating the water supply distribution network to minimize leakages and to add new metered household connections to piped water supplies. All the initial infrastructure investments are supported by the baseline project. The costs to the baseline project of Output 1 over the 5 years of the project are $45.62 million[27].

Increment: This includes the options analysis followed by detailed design and construction of measures to improve climate resilience – either the coastal protection measures to protect critical water mains or the further upgrading of the water supply network. This also includes the documentation of the impact of the said protection measures. The costs of Output 1 are $4.58 million. These are financed as follows:

- LDCF: $4.13 million
- Government: $0.45 million (taxes and duties).

The total co-financing contribution to Component 1(baseline plus increment) is therefore $46.07 million.

GEF Focal Area Component 2 *Strengthened cross-sectoral mechanisms to mainstream climate adaptation and resilience*

This is addressed under Outputs 2, 3, and 4:

Output 2: Water supply infrastructure is effectively managed

Baseline: The baseline project provides all the necessary software and hardware to ensure the water supply infrastructure continues functioning effectively throughout the lifetime of the project. This includes capacity development, support to operations and maintenance, undertaking quality control, providing specialist support and associated training, vocational training. The baselines project also provides essential project support such as undertaking detailed infrastructure design and ensuring safeguard compliance. The costs to the baseline project under Output 2 over the 5 years of the project are $12.40 million[28].

Increment: The increment consists of two LDCF project activities:

· Activity 2.2 - Integrated management information system for climate resilience. This includes the full participatory process, the capacity development, and the design and creation of the common data and information management system. The costs to LDCF under Activity 2.2 are $0.17 million.

· Activity 2.3 - Strategic Asset Management System for Climate Resilience. This includes the full participatory process, the capacity development, and the design and creation of the Asset Management System. The costs to LDCF under Activity 2.3 are $0.17 million.

Total costs to LDCF under Output 2 are $0.34 million. Government will fund $0.04m through taxes and duties exemptions.

Output 3: Awareness of WASH and climate change issues is raised

Baseline and Increment: The baseline STWSP project covers this Output in entirety. The costs to the baseline project of Output 3 over the 5 years of the project are $1.41 million[29]. No LDCF funds are allocated to this Output. The costs to LDCF under Output 3 are $0.

Output 4: Project implementation is managed efficiently and effectively.

Baseline: The baseline project will support the government's project management unit (PMU) housed in MISE. The PMU will be the core unit responsible for the overall implementation of the STWSP. The costs to the baseline project of Output 4 over the 5 years of the project are $2.39 million.

Increment: LDCF funds will support additional management activities and inputs that are necessary for the management of LDCF funds. The costs to LDCF under Output 4 are $0.11 million. Government will fund $0.01m through taxes and duties exemptions.

1A.6 ADAPTATION BENEFITS

Without the project, climate change will affect the current sources of fresh water – i.e. the two lenses – as follows:

· Overtopping – where sea level rise and storm surges lead to sea water passing onto the land of the island and infiltrating the lenses. For example, in several plausible *climate change* scenarios, such overtopping events are likely to occur that will lead to a 54% reduction in water availability for up to five years;

· Drought - although far less certain than sea level rise, climate change may lead to more intense or longer droughts, that, in turn, may, under reasonable scenarios, lead to a 40% reduction of the available yield from the lens, persisting for several years.

In addition, without the project, climate change will lead to increased destruction of critical water supply mains in coastal areas, including the reticulated network. Further increased water demand due to climate change will mean that, without the project, demand continues to further outstrip supply.

In essence, without the project, there can be no reliable water supply for the people of South Tarawa due to climate change.

In response, the overall STWSP project – baseline and LDCF included - will provide the entire population of South Tarawa with a reliable, safe and climate resilient water supply. To achieve this, the project will provide the following:

· A 3,500 m3/day and a 2,500 m3/day seawater reverse osmosis desalination plant, providing fresh water. In addition, a new solar photovoltaic (PV) plant will be installed to ensure that the desalination plants' demand for electricity does not lead to excessive increases in GHG emissions;

· New and rehabilitated and resilient water supply network infrastructure. This will ensure that all residents can access the new clean water source. It will reduce leakages and therefore effort to pump water;

· Protection of critical water mains in coastal areas (LDCF funded, subject to options analysis);

· Institutional strengthening, capacity building and long-term performance-based contracts for operation of the new infrastructure. This includes the following supported by LDCF: common data management and information management systems incorporating climate change and water sector and other variables; and a climate resilient asset management system; and

· An intensive 5-year climate change, water, sanitation and hygiene awareness program with strong involvement of local civil society organizations.

1A.7 INNOVATIVENESS, SUSTAINABILITY AND SCALING-UP POTENTIAL

Innovativeness

Two aspects of this project are particularly innovative:

i) The establishment of a common data/information platform to provide management and decision making support to multiple stakeholders. Recent developments in hard and soft technology for data and information management have greatly increased the potential of these tools. However, in many countries this is leading to a plethora of unconnected initiatives, which further tend to be separate and short lived. This can cause division and fragmentation rather than an optimal, coordinated approach. This project will demonstrate how to create a common platform, common across multiple users and many sectors. It will demonstrate how to ensure the platform performs sustainably, through the provision of capacity and ultimately an incentive framework ensuring all stakeholders with to participate.

ii) The strategic use of asset management as a tool to achieve climate resilience. Asset management at the city level is a relative new technology, and globally there is only a few decades of experience. Until recently, its practice focused uniquely on achieving financially sustainable service delivery. This will be the first time that Pacific Island country has attempted to use asset management as a tool to achieve climate resilience. As with all innovative approaches, there is of course risk. This promises to generate many lessons. The project will take a progressive approach to asset management for climate resilience, starting with reflection and small-scale, capacity building activities.

Sustainability

Environmental and social safeguards

Environmental and social safeguards are a cornerstone of ADB's support to inclusive economic growth and environmentally sustainable growth. Accordingly, ADB's safeguard policy[1] aims to help developing member countries (DMCs) address environmental and social risks in development projects and minimize and mitigate, if not avoid, adverse project impacts on people and the environment.

The Safeguard Policy Statement (2009, amended from time to time) covers environment, involuntary resettlement, and indigenous peoples in a consolidated policy framework. It applies to all ADB-financed projects, including ADB-administered co-financing . The statement also provides a platform for participation by affected people and other stakeholders in project design and implementation.

ADB has classified the approved (baseline) project as category 'B' for environment safeguards. An environmental and social impact assessment—equivalent to an initial environmental examination and appropriate for the category B project—was undertaken and includes an environmental management plan that will be updated based on the detailed design.

ADB has classified the approved (baseline) project as category B for involuntary resettlement. Due diligence was undertaken to assess potential involuntary resettlement impacts on all the proposed sites. It found that the proposed water supply infrastructure will not have significant involuntary resettlement impacts. A resettlement framework was prepared to guide the preparation of necessary safeguard documents for the water supply network upon confirmation of the exact route, and a resettlement plan for assets where sites are confirmed. Consultations were held with affected persons and included the disclosure of draft safeguard documents; they will continue during project implementation.

The relevant safeguards documents for the baseline project are disclosed and available at https://www.adb.org/projects/49453-002/main#project-documents. Should additional activities be approved under LDCF funding (e.g. after the Options Analysis in Activity 1.4.1) and which involve land acquisition, further safeguards due diligence will be conducted per ADB SPS. This is likely to be undertaken by the government with assistance from the project implementation assistance consultants, and with guidance from ADB.

Finally, the approved baseline project includes institutional arrangements to ensure effective implementation of safeguards, and includes a funding provision for project management and project implementation assistance. In addition, under activity 2.1.3. of the LDCF-funded project, there is a provision for funding project management support, which may (if required) include further support for oversight of safeguards.

[1] https://www.adb.org/documents/safeguard-policy-statement

Institutional sustainability.

The baseline STWSP project has been designed to focus on sustainability and will assure sustainability of project impacts and outcomes. In particular, the following aspects of the baseline project contribute to ensuring the project's sustainability:

· All infrastructure outputs and activities have been designed with a planning horizon of 2041, and are sized to take into account the impacts of climate change on water supply and demand, are climate-proofed and to be built with high quality, durable materials. The network infrastructure has been designed to function under all reasonable 50-year growth scenarios. The desalination plants have been designed to be easily upscalable and, when necessary, increase production above 6,000 m3 per day in the future;

· Institutional strengthening of the water sector (including governance, management, O&M) is a priority of the project, addressed through several outputs. Capacity transfer is a key tool for this. The project has been designed to transfer capacity to PUB and MISE via (i) exposure to specialists in the PMU (contracted through the project); (ii) MISE and PUB staff working alongside specialist contractors during construction, commissioning, and during the defects

liability period of key infrastructure; (iii) mentoring from, and working alongside professionals undertaking the O&M contract of the desalination plants and of the network; and (iv) specialist support to PUB on key central functions (e.g. billing, asset management);

· A specific program focused on various on-the-job and external training schemes, through which staff will earn certificates in water industry operations, computing skills, leak detection, electro-technology and other new skills specifically needed for the new system;

· The use of long-term performance-based O&M contracts for the desalination plants and water supply network will ensure the strong performance of these key assets for at least 5 years, following completion of works. These contracts will be designed to include enhanced on-the-job training for PUB staff. Skills transfer for the 5 years following commissioning will be a priority. Subsequently, the Government can review whether outsourced maintenance should continue and/or shape the design of future private sector support;

· The WAP has been designed to achieve long-term and sustained behavior change of the general public, so that PUB can continually meet its objectives;

· The implementation of a socially-inclusive and regulated water tariff. Further, the Government is committed to meeting the balance of financial resources needed for ongoing operation of the water supply system through subsidies.

Scaling-up Potential

Much of the hard and soft solutions developed by the project can be replicated to other islands and countries, some specifically to atolls, some more broadly across the Pacific, and others more generally to all SIDS and all coastal areas.

The ADB has in recent years implemented water supply infrastructure projects in 12 countries in the Pacific and is currently developing water supply and/or sanitation investment projects in many of these. ADB is also developing urban resilience and/or water supply projects in many countries across Asia, outside of the Pacific. Through these investments, and the associated dialogue with partner governments and other partners, ADB is well placed to promote replication of the project successes to other islands and countries.

More specifically:

· The technology developed under Output 1 to protect highly exposed critical infrastructure in causeways (subject to options analysis) is relevant and replicable to all atolls in the Pacific;

· The approaches to common management information systems using latest data collection techniques and analytical tools (under Activity 2.2) will be relevant to all small countries, notably to SIDS in the Pacific. Successful measures can be replicated and upscaled across the region;

· Finally, the development of an asset management system, adapted to the needs and capacity in Kiribati, and designed to contribute to climate change adaptation and resilience (under Activity 2.3), will be highly relevant to all small countries, notably to SIDS in the Pacific. Successful measures can be replicated and upscaled across the region.

ADB will take the lead in fostering scaling up and replication, through its network of offices and urban and water sector projects throughout the region. ADB has a rolling program of support to improve urban services across the region, this includes providing infrastructure, hardware, strategy development and planning, and capacity building or policy support. In addition, several ongoing regional Technical Assistance projects are expected to directly support replication across the Pacific. These are: (i) Strengthening Climate and Disaster Resilience of Investments in the Pacific). This commenced in 2015, and currently has a total project budget of $3.95 million; (ii) Pacific Disaster Resilience Program, starting in 2019 with a $6 million budget; and (iii) Implementing a Differentiated Approach to Urban Development in the Pacific, which started in 2018, with an overall budget of $3.5 million. ADB is an active member of the

Asia Pacific Adaptation Network (APAN), hosting the 6th APAN conference in 2018. ADB will support Kiribati stakeholders in sharing the project lessons and experiences across APAN. The above project provide pathways and mechanism through which ADB can directly support the replication of project successes across the region, thereby contributing to regional adaptation benefits.

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[1] Additional census data was collected in 2018, but the findings are not yet available.

[2] United Nations. 2017. World Population Prospects: The 2017 Revision. UN Population Division. Department of Economic and Social Affairs.

[3] Government of Kiribati, 2010

[4] A lens is a convex layer of fresh groundwater that floats on top of denser saltwater. Approximately half of the countries in the Pacific islands region are reliant on ground water found in thin freshwater lenses for a large percentage of their freshwater needs. Some observers hold that the first pathway through which sea-level rise will make islands uninhabitable is via the destruction of the groundwater lenses. Hence, understanding how lenses react to climate is key to increasing adaptive capacity of Pacific islands.

[5] According to recent reports, historical average water production for the Bonriki and Buota facility for the period January 2017 to October 2019 was approximately 1,620 kl/day.

[6] Source: The International Benchmarking Network for Water and Sanitation Utilities (IBNET): https://www.ib-net.org/ Country Profile: Kiribati

[7] ADB, 2018.

[8] STWSP - Stakeholder Engagement Management Plan, 2019. FCG – Fraser Thomas.

[9] *Pacific-Australia Climate Change Science and Adaptation Planning Program* 2015. Current and Future Climate of Kiribati. BOM (Government of Australia)/CSIRO. (PACCSAPP, 2015).

[10] Source: A. Falkland, personal communication.

[11] Tarawa Water Master Plan: Te Karau, Rainwater Harvesting Storage and Use (2011)

[12] PACCSAPP, 2015

[13] E.g. *KAP II Climate Information for Climate Risk Management: Sea-levels, Waves, Run-up and Overtopping HAM 2008*-22, New Zealand. National Institute for Water and Atmosphere (NIWA, 2008)

[14] Coastal Risk Assessment - Long-term coastal security strategy for Kiribati, Prepared for Office of Te Beretitenti, Government of Kiribati in November 2018 (NIWA, 2019)

[15] Warm nights or hot days are those exceeding the 90th percentile of temperature. See https://www.pacificclimatechangescience.org/wp-content/uploads/2014/07/PACCSAP_CountryReports2014_RefGlossApp_WEB_140710.pdf for full glossary

[16] Note: this could affect the performance of desalination equipment

[17] A recent literature review completed for ADB ("*Sea level change in the Pacific islands region (PIR) – A literature review to inform Asian Development Bank (ADB) guidance on what projections to use in climate risk and adaptation assessments (CRAs)",* December 2019, Kiem, A.) concluded: "a precautionary approach for ADB CRAs in the PIR requires that a 2 meter SLR by 2100 scenario be used. Scenarios greater than 2 meters should be considered for projects with expected life-time beyond 2100."

[18] A high-end sea level rise probabilistic projection including rapid Antarctic ice sheet mass loss (Le Bars, D., Drijhout, S., de Vries, H. , 2017

[19] The BIVA project was implemented within the PACCSAPP program. It was undertaken during 2013-2015 as a partnership between the Government of Kiribati, the Australian Government and the Secretariat of the Pacific Community (SPC).

[20] See above editorial note. In GEF terminology, these are referred to as Outcomes.

[21] Important note: Initial calculations led to a proposed single desalination plant of 4,000 cubic meters/day, to be located at Betio. This was the design initially approved by GCF. Recent calculations led to a redesign as follows: (i) total production capacity of 6,000 cubic meters/day in line with current demand projections and (ii) separation into two production plants located at opposed ends of the island (see Box for details). The separation into two production facilities lowers the risk of supply interruption and also significantly lowers water distribution costs. This revised design is pending no-objection from GCF.

[22] *Sea level change in the Pacific islands region (PIR) – A literature review to inform Asian Development Bank (ADB) guidance on what projections to use in climate risk and adaptation assessments (CRAs)",* December 2019, Kiem, A.

[23] IPCC Special Report on the Ocean and Cryosphere in a Changing Climate. H.-O. Pörtner, ly, et el (2019) ; Le Bars et al (2017)

[24] The list of priority causeways to be protected would be confirmed as part of the Options Analysis.

[25] Standard water meters with monthly reading and billing system is currently proposed

[26] Source: Annex H

[27] Includes taxes, duties and contingencies.

[28] Includes taxes, duties and contingencies

[29] Includes taxes, duties and contingencies

Annex H: Summary of Areas Exposed to Coastal Hazards, Climate Change Threats and Initial Costing Estimate of Adaptation Measures

A Summary of Areas Exposed to Coastal Hazards

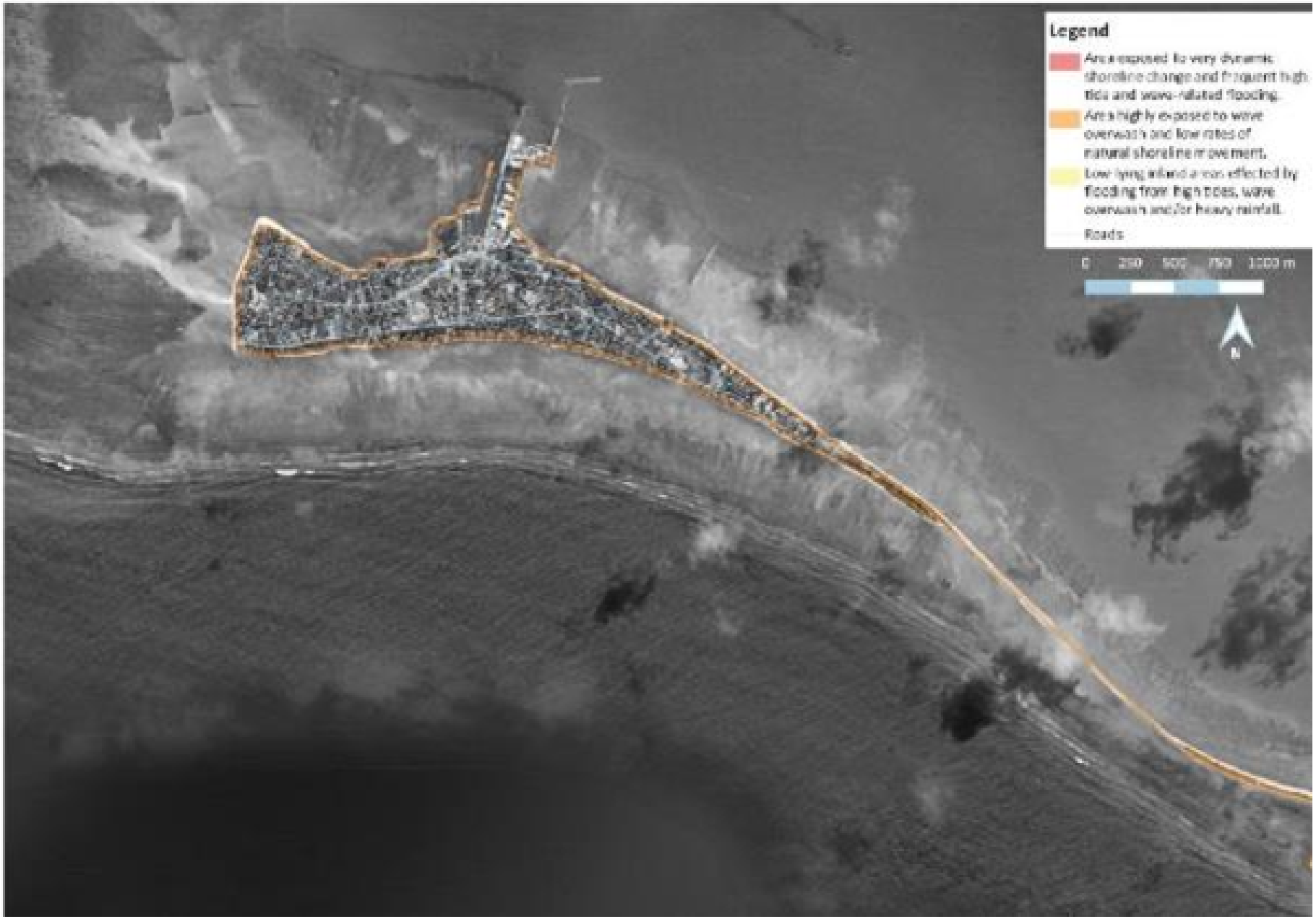
(Source: NIWA (2019): *Coastal Risk Assessment Long-term coastal security strategy for Kiribati, Prepared for Office of Te Beretitenti, Government of Kiribati*).

The following four diagrams illustrate the risks in coastal areas to climate hazards. Three kinds of risk are indicated:

- Red shading: coastal areas exposed to dynamic shoreline change and frequent flooding;
- Orange lines: sea edge areas exposed to wave over-washing and slow shoreline change;
- Green shading: low lying inland residential areas exposed to flooding.

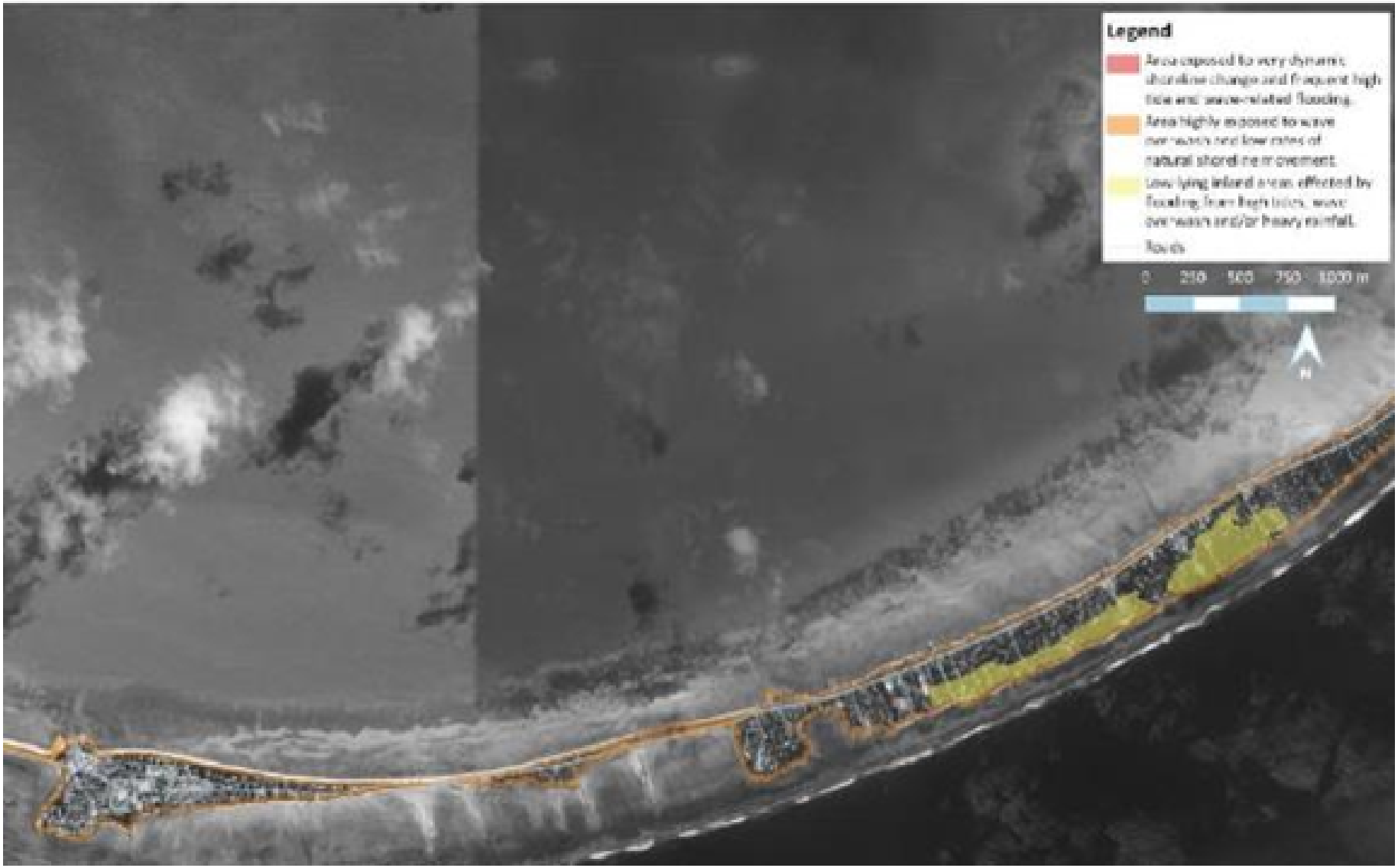
The four diagrams cover the entire South Tarawa island from west to east, consisting of (i) Betio, (ii) from Bairiki to Banraeaba, (iii) from Ambo to Bangentebure and (iv) from Bikenibeu to Buota.

(i) Betio: indicative areas exposed to coastal hazards



· Sea edge areas are exposed to wave over-washing and slow shoreline change (orange lines). Main water transmission lines lying in these areas may be at risk.

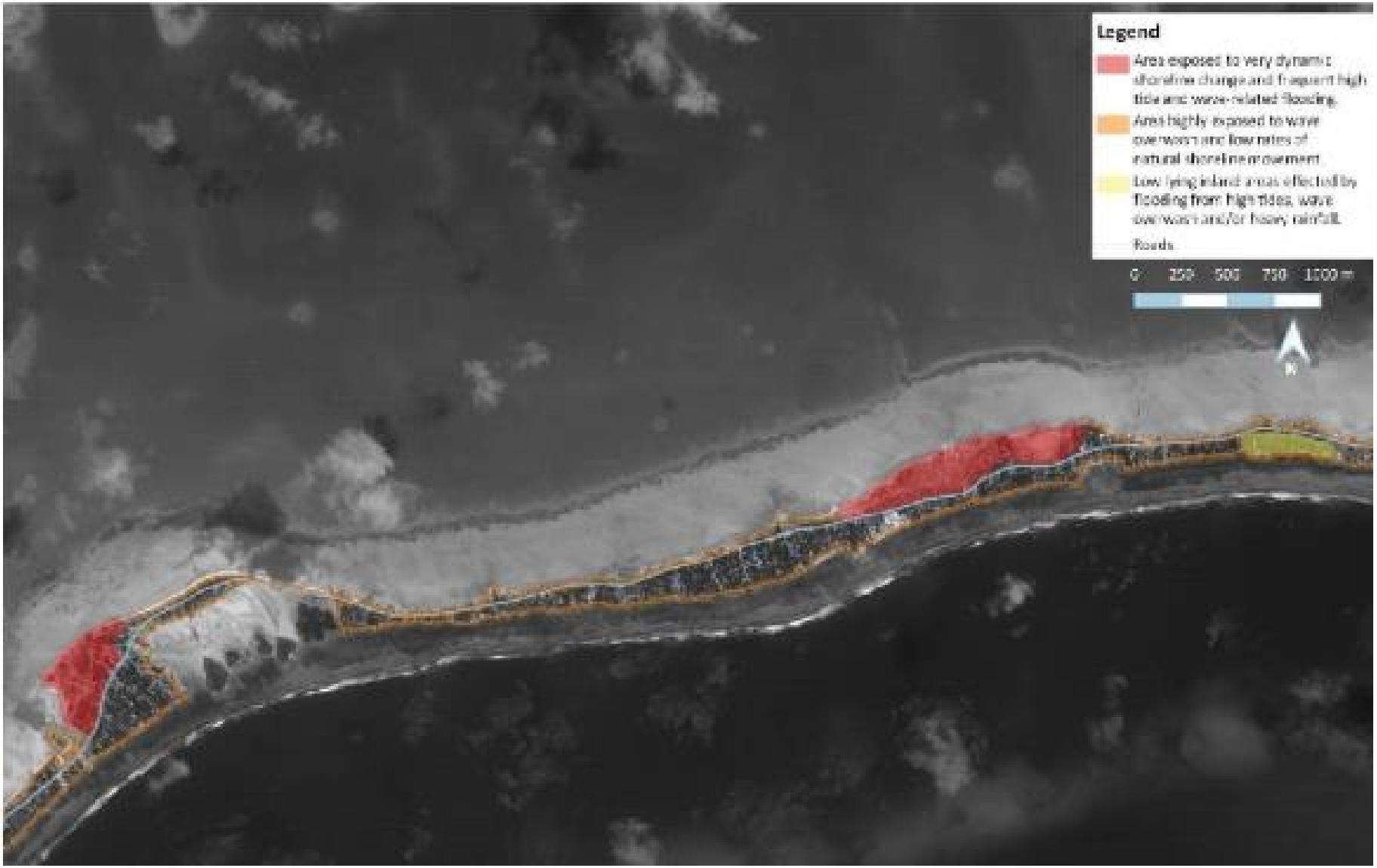
(ii) Bairiki to Banraeaba indicative areas exposed to coastal hazards



· Sea edge areas are exposed to wave over-washing and slow shoreline change (orange lines). Main water transmission lines lying in these areas may be at risk.

· Low lying inland residential areas (green shading) exposed to flooding. Reticulated network may be at risk.

(iii) Ambo to Bangentebure indicative areas exposed to coastal hazards

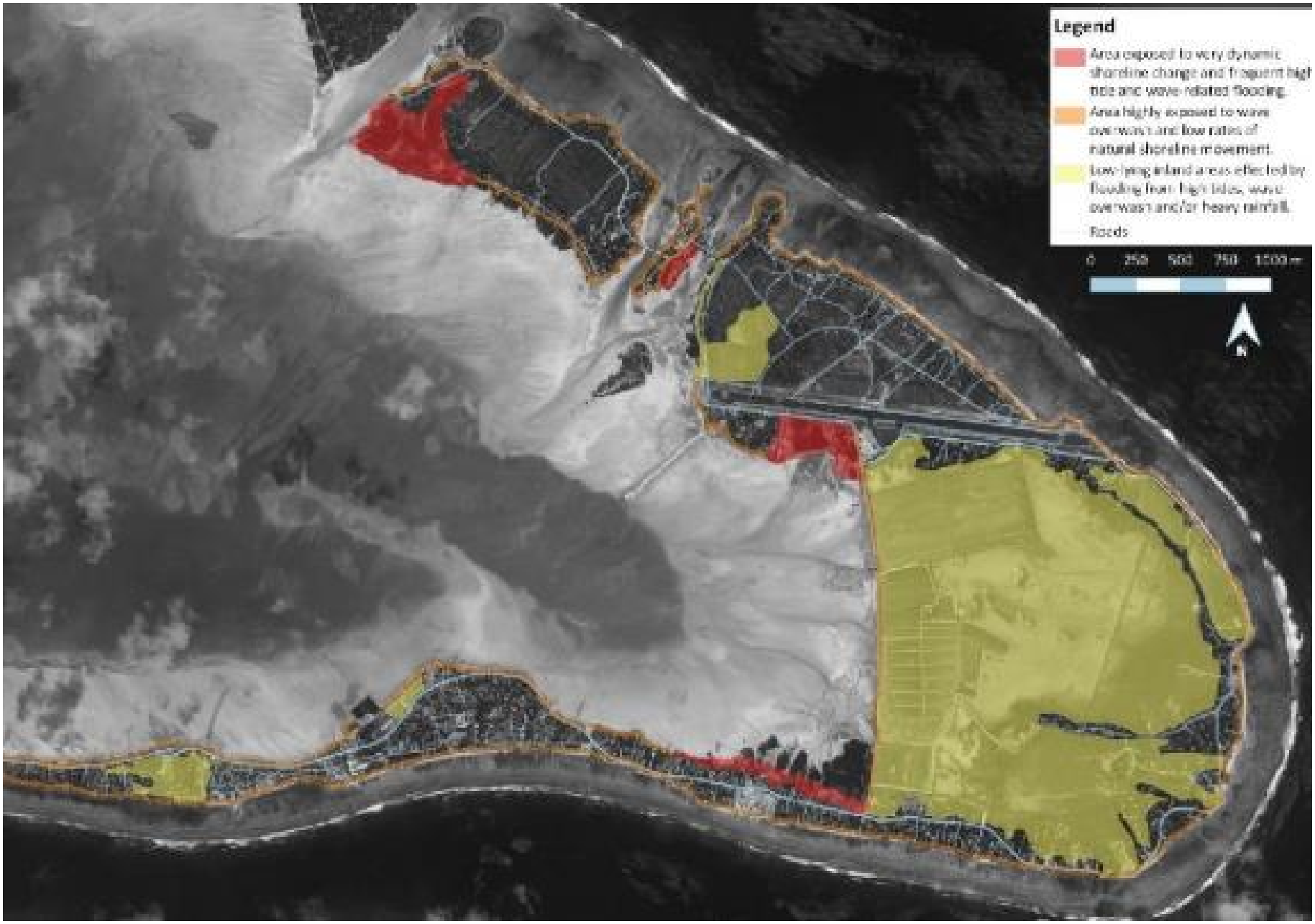


· Coastal areas exposed to dynamic shoreline change and frequent flooding (red shading). All infrastructure, including main transmission lines and reticulated network, threatened in these areas;

· Sea edge areas are exposed to wave over-washing and slow shoreline change (orange lines). Main water transmission lines lying in these areas may be at risk.

· Low lying inland residential areas (green shading) exposed to flooding. Reticulated network may be at risk.

(iv) Bikenibeu to Buota: indicative areas exposed to coastal hazards



· Coastal areas exposed to dynamic shoreline change and frequent flooding (red shading). All infrastructure, including main transmission lines and reticulated network, threatened in these areas;

· Sea edge areas are exposed to wave over-washing and slow shoreline change (orange lines). Main water transmission lines lying in these areas may be at risk.

· Low lying inland residential areas (green shading) exposed to flooding. Reticulated network may be at risk.

B. Climate Change Threats

As determined through other studies (e.g. Appendix I), the main climate change factor is to be the significant sea level rise. Sea level rise will lead to an increase in all impacts by tide, wave and storm surges. Hence the regularity and intensity of all issues indicated in the above maps will be increased significantly by climate change. However, the baseline STWSP will address most climate change threats, with support from GCF.

As can be seen from above figures, the climate change threat brings two increases in risk to the infrastructure that is to be supported under the STWSP baseline project. This is mostly due to increases in the rate of sea level rise, as a result of climate change projections available after STWSP was designed. The two raised risks are:

B (i) The existing mains water transmission in coastal areas and along the sea edge is threatened by increased shoreline movement and coastal erosion.

This is indicated in the areas with orange lines and some red shading in the above diagrams.

NIWA (2019) identified the critical stretches of coast that are at risk. These were further analysed to determine which carry vital water supply infrastructure and are at high risk. These are notably the lagoon-facing sides of (i) Stewart Causeway, (ii) Anderson Causeway and the (iii) Nanikai – Bairiki Causeway. This list was initially confirmed by MISE as the key causeways at risk carrying water supply infrastructure. If damaged, this would entirely undermine the water supply sector on South Tarawa.

B (ii) The planned reticulated water supply network, to be provided under the baseline project, is at increased threat from flooding and tidal damage.

This is indicated in the areas with green shading and some red shading in the above diagrams.

From NIWA 2019 and above figures, it can be seen that this threat is greatest in the eastern areas of South Tarawa, between Bikenibeu and Buota.

The following figures describe the water supply network to eastern areas:

Village	Population			Area (KM2)	No. of stand pipes	Pipelines (m)
	2020	2030	2040			
Temaiku	7,169	11,202	15,975	4.67	901	24,351
Bonriki	3,414	4,669	5,974	1.36	378	6,928
Tanaea (KA P III)	315	344	365	0.07	0	0
Buota	1,961	2,371	2,781	0.37	298	6,297
TOTALS	12,859	18,586	25,095	6.47	1,577	37,576

The following diagram[1] indicates the number and location of the threatened households in this area.

Figure illustrating the location and number of households whose supply network is threatened.

As can be seen from above table and figure, the network supply to 1,021 households is highly threatened due to accelerated sea level rise. This accounts for 1,577 standpipes and 37,576m of pipeline.

Hence the water supply network in this areas should be constructed to be particularly resilient to climate threats.

C Initial Estimate of Costs of Adaptation Measures

C (i) The existing main water transmission in coastal areas and along the sea edge is threatened by increased shoreline movement and coastal erosion.

NIWA (2019) identified critical stretches of coast that carry vital water supply infrastructure and are at high risk. These are notably the lagoon-facing sides of Stewart Causeway, Anderson Causeway and the Nanikai – Bairiki Causeway. If damaged, this would entirely undermine the water supply sector on South Tarawa. This list has been initially confirmed by MISE, but will be confirmed as part of the Options Analysis.

For illustrative purposes, the costs of strengthening these causeways in order to protect against climate change damage are estimated to be in the range of US$3.8 - US5.9m (see following tables, using data provided by MISE, and based on average rates quoted in Affordable Coastal Protection in the Pacific Islands (PRIF, 2017)).

a) Basic cost estimate of shoreline protection (**excluding** margins, contingencies and inflation)

Ref	Description	Unit	Quantity	Rate	Amount
	Stewart Causeway				
A1	Allow for the installation and backstop concrete wall upstand	m	237	1500	355,500
A2	wall along edge of pathway to west of existing wall to prevent				
A3	overwashing, including all necessary preprations, providing				
A4	key to existing structure to receive new concrete works,				
A5	formworks and the like				
A6					
A7	Ditto but for concrete wave upstand / return wall along pavement	m	190	1500	285,000
A8	edge to minimise high tide wave overwashing to road during moderate				

A8	edge to minimise high tide wave overwashing to road during moderate				
A9	wave conditions				
A10					
A11	<u>Anderson Causeway</u>				
A12	Allow for the placement of precast concrete tetrapods or rock	m	555	3000	1,665,000
A13	revetment including all necessary preparations, craneage, and the like				
A14	along the entire length of ocean face of causeway to dissipate				
A15	wave energy before reaching the current local block / retaining wall				
A16					
A17	Allow for the installation and backstop concrete wall upstand	m	555	1500	832,500
A18	wall along edge of pathway to west of existing wall to prevent				
A19	overwashing, including all necessary preprations, providing				
A20	key to existing structure to receive new concrete works,				
A21	formworks and the like				
A22					
A23	<u>Nanikai Bairiki Causeway</u>				
A24	Allow for the placement of precast concrete tetrapods or rock	m	143	3000	429,000
A25	revetment including all necessary preparations, craneage, and the like				
A26	along the entire length of ocean face of causeway to dissipate				
A27	wave energy before reaching the current local block / retaining wall				
A28					
A29	Allow for the installation and backstop concrete wall upstand	m	143	1500	214,500
A30	wall along edge of pathway to west of existing wall to prevent				
A31	overwashing, including all necessary preparations, providing				
A32	key to existing structure to receive new concrete works,				
A33	formworks and the like				

		Sub Total 1	**3,781,500**
B1	**Preliminaries, Contingency**		
B2	Preliminaries and General	756,300.00	
B3	Contingencies	-	
B4	Margin	-	756,300
		Sub Total 2	**4,537,800**
C1	**Fees , VAT, Miscelleneous**		
C2	Add Vat	567,225.00	
C3	Structural Engineers and Consultant Fees (PC Sum)	30,000.00	
C4	Logistics, Handling, Freight, and insurance (PC Sum)	453,780.00	
		Sub Total 3	1,051,005
			5,588,805
			-
			5,588,805
		Budget Estimate (AUD) for whole scheme (SAY)	**5,588,805**

NOTES:	1) All figures are in AUD.	
	2) AUD / USD Exchange rate 31/01/2020	0.67212
		BUDGET ESTIMATE (USD)

	BUDGET ESTIMATE (USD)			$	3,756,348

b) High end cost estimate of shoreline protection (**including** margins, contingencies)

Ref	Description	Unit	Quantity	Rate	Amount
	<u>Stewart Causeway</u>				
A1	Allow for the installation and backstop concrete wall upstand	m	237	1500	355,500
A2	wall along edge of pathway to west of existing wall to prevent				
A3	overwashing, including all necessary preparations, providing				
A4	key to existing structure to receive new concrete works,				
A5	formworks and the like				
A6					
A7	Ditto but for concrete wave upstand / return wall along pavement	m	190	1500	285,000
A8	edge to minimise high tide wave overwashing to road during moderate				
A9	wave conditions				
A10					
A11	<u>Anderson Causeway</u>				
A12	Allow for the placement of precast concrete tetrapods or rock	m	555	3000	1,665,000
A13	revetment including all necessary preparations, craneage, and the like				
A14	along the entire length of ocean face of causeway to dissipate				
A15	wave energy before reaching the current local block / retaining wall				
A16					
A17	Allow for the installation and backstop concrete wall upstand	m	555	1500	832,500
A18	wall along edge of pathway to west of existing wall to prevent				
A19	overwashing, including all necessary preparations, providing				

A20	key to existing structure to receive new concrete works,				
A21	formworks and the like				
A22					
A23	Nanikai Bairiki Causeway				
A24	Allow for the placement of precast concrete tetrapods or rock	m	143	3000	429,000
A25	revetment including all necessary preparations, craneage, and the like				
A26	along the entire length of ocean face of causeway to dissipate				
A27	wave energy before reaching the current local block / retaining wall				
A28					
A29	Allow for the installation and backstop concrete wall upstand	m	143	1500	214,500
A30	wall along edge of pathway to west of existing wall to prevent				
A31	overwashing, including all necessary preprations, providing				
A32	key to existing structure to receive new concrete works,				
A33	formworks and the like				
		Sub Total 1			**3,781,500**
B1	**Preliminaries, Contingency**				
B2	Preliminaries and General	756,300.00			
B3	Contingencies	1,491,032.00			
B4	Margin	1,134,450.00			3,381,782
		Sub Total 2			**7,163,282**
C1	**Fees , VAT, Miscelleneous**				
C2	Add Vat	879,198.75			
C3	Structural Engineers and Consultant Fees (PC Sum)	30,000.00			

C4	Logistics, Handling, Freight, and insurance (PC Sum)	703,359.00	
		Sub Total 3	1,612,558
			8,775,840
		Rounded Budget Estimate (AUD) for whole scheme (SAY)	**8,800,000**
NOTES:	1) All figures are in AUD.		
	2) AUD / USD Exchange rate 31/01/2020		0.67212
		BUDGET ESTIMATE (USD)	**$ 5,898,418**

C (ii) The planned reticulated water supply network, to be provided under the baseline project, is at increased threat from flooding and tidal damage.

Initial base CAPEX cost estimates for the overall upgrading of the reticulated water supply network, as prepared in 2017, were around US$15 million (see, for example, approved proposal to GCF, October 2018).

Recent base CAPEX cost estimates for the overall upgrading of the reticulated water supply network, prepared by MISE in late 2019, are in the order of US$20 million (source, ADB Project officer).

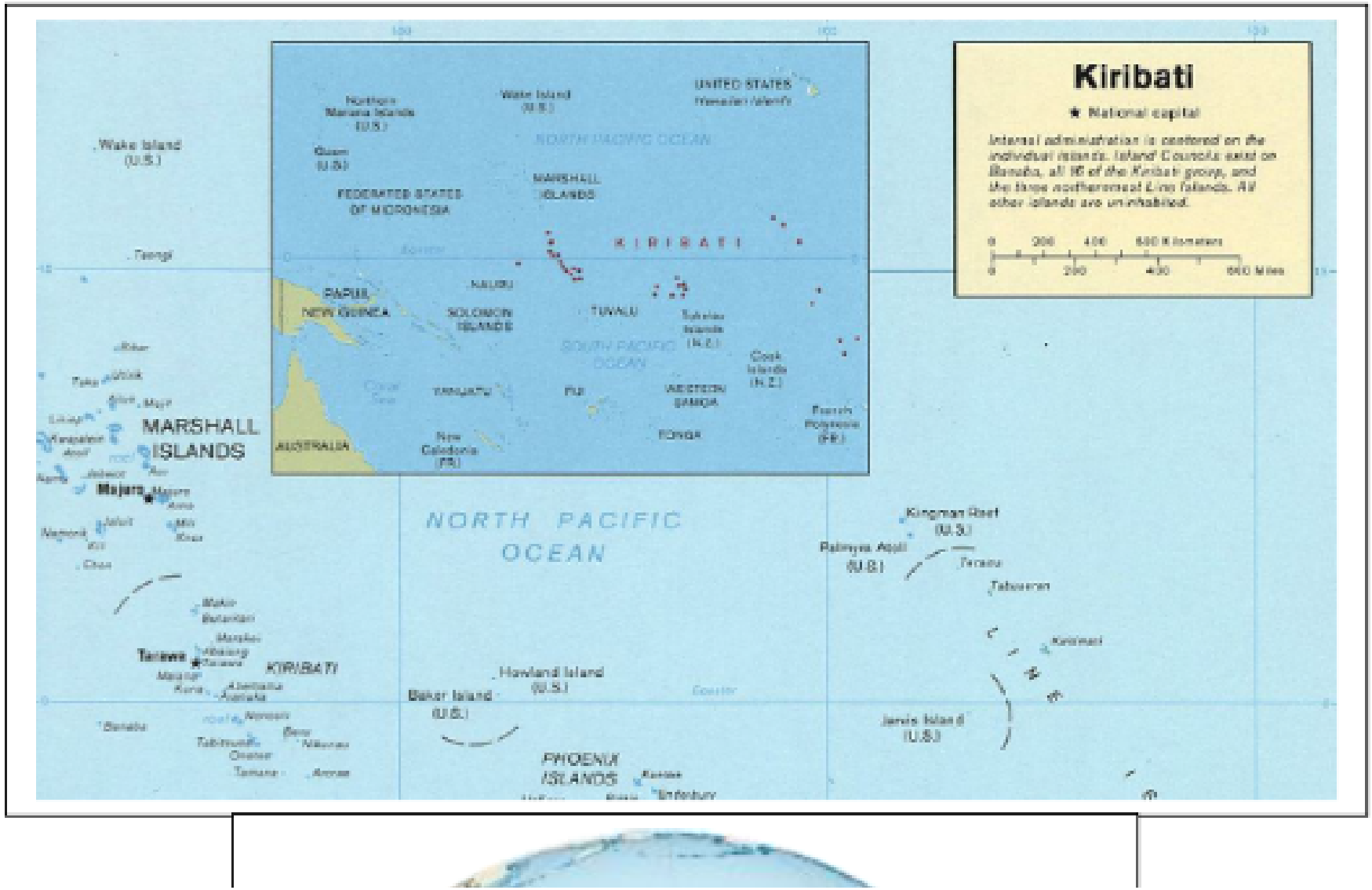
Hence, the base CAPEX cost estimate for the overall upgrading of the reticulated water supply network increased between October 2018 and end-2019 by an amount in the order of US$5 million. It has to be noted that there are many reasons for this increased cost estimate, of which the increased threat from climate change may be one.

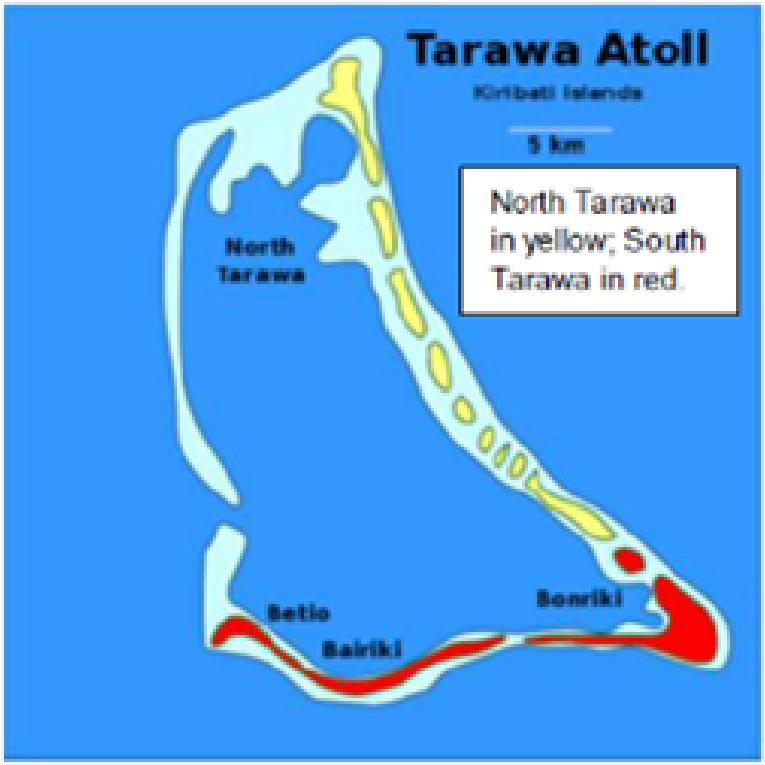
[1] Source: STWSP Project team

1b. Project Map and Coordinates

Please provide geo-referenced information and map where the project interventions will take place.

The project site is South Tarawa, Republic of Kiribati, located in the South, Central Pacific. The project coordinates are: 1°26'N 173°00'E.




Tarawa Atoll
Kiribati Islands
5 km
North Tarawa in yellow; South Tarawa in red.
North Tarawa
Betio
Bairiki
Bonriki


Naa
Buariki
Tearinibai
Notoue (Eretibou)
Abaokoro
TARAWA
Biketawa
Nabeina
Tablang
Tabiteuea
Bonriki
Bikeman
Bikenibeu
Betio
Betio
Eita
Banraeaba
Tomaiku
Bairiki
0 Kilometres 10

1c. Child Project?

If this is a child project under a program, describe how the components contribute to the overall program impact.

This proposed project is a Child project under the regional program "*Climate Resilient Urban Development in the Pacific*".

The regional program has the following Objective: "*Increased resilience of critical urban areas and urban services in the Pacific*" and the following two components: (1) *Facilitating climate resilient urban planning and development*; and (2) *Demonstrating/deploying climate resilient urban services: water supply, sanitation and disaster reduction*.

This child project contributes to these components as follows:

Regional Program Framework Component	Child Project Outputs
(1) Facilitating climate resilient urban planning and development. As described in the approved Program Regional Framework document, this should include activities to create the enabling framework, to establish the foundation and to build capacity so that there is the desire and the ability to integrate climate resilience and climate proofing into urban development, into urban services and into water supply and sanitation systems.	All LDCF financed activities under Child Project Output 2 contribute to this, but most notably the following LDCF financed Activity: "2.2 - Integrated management information system for climate resilience". The management information systems are to be designed to support climate resilient urban planning.
(2) Demonstrating/deploying climate resilient urban services: water supply, sanitation and disaster reduction. As described in the approved Program Regional Framework document, this should include activities and investments to achieve climate resilience and/or climate proofing, thereby demonstrating how to achieve this, how it is feasibility and the benefits. This will notably be in WSS, but also in other urban service sub-sectors as prioritized. Infrastructure is central to this component.	Output 1, all Activities: The water supply infrastructure provided will be climate resilient and low carbon. This Output will demonstrate infrastructural approaches to protecting critical infrastructure to sea level rise on atoll islands, whilst at the same time ensuring the water supply system on South Tarawa is climate resilient. Activity 2.3 - Strategic Asset Management System for Climate Resilience. This will demonstrate an innovative approach to ensuring climate resilient services, whilst at the same time developing an asset management system and ensuring critical assets are resilient.

2. Stakeholders

Select the stakeholders that have participated in consultations during the project identification phase:

Civil Society Organizations Yes

Indigenous Peoples and Local Communities

Private Sector Entities Yes

If none of the above,please explain why:

Stakeholder Assessment - During Project Formulation

An ongoing and thorough stakeholder involvement and assessment has been part of the project development process since early 2017.

The key stakeholder groups consulted include MISE, PUB, Office of the President, Ministry of Environment, Lands and Agricultural Development (MELAD), Ministry of Women, Youth and Social Affairs (MWYSA), Ministry of Health and Medical Services (MHMS), Ministry of Education, Ministry of Internal Affairs (MIA), international and national NGOs, KAPIII staff and specialists. Development partners such as the Australian Department of Foreign Affairs and Trade, New Zealand Ministry of Foreign Affairs and Trade and UNICEF were also consulted.

Full details of the assessment are included in the Stakeholder Management Engagement Plan (March 2019) in Appendix II. Appendix II provides, for every possible stakeholder, a description of the stakeholder, its role in the sector, its role in the project, the related risks, and a proposed strategy for engagement.

The consultations determined the following stakeholder groups[1] to be a priority.

Sector	Stakeholder	Involvement
Community	Chair Person for each ward Mother Community group	Awareness of the STWSP. Support (champions of) project implementation. Ongoing operations and maintenance.
	Community groups (minimum 15 households)	
	Members of the South Tarawa community (estimated 10,000 households).	
WASH	WHO	Oversight and support of WASH and allied programs. High level coordination.
	UNICEF	
	Relevant government entities - MHMS and ME (see below)	
	Committee of Churches (representative of the community groups and Churches)	Coordinating the work of the project implementation with the NGO Sector to ensure there is no overlap of responsibilities or program, and to keep them informed of the project and its benefits.

NGO Sector	Churches (Kiribati Union of Churches, Kiribati Presbyterian Church, Catholic Church)	
	Chairperson of the Mother Communities/Coordination Committee.	
	NGOs (all relevant to the project) Kiribati Local Government Association (KILGA)	
Local government	Island mayor and clerk	Critical stakeholder as works will be disruptive and affect local communities and individuals
	Ward elected councilor	
	Office bearer of Community Groups.	
National Government	Assembly Maneaba (National parliament)	
	Ministry of Infrastructure an Sustainable Energy	Executing Agent (EA) responsible for the delivery of the project and the day to day operating of the project.
	Ministry of Finance and Economic Development (MFED)	Implementing Agent (IA) responsible for funding the project and overseeing the delivery of the project's benefits.
	Ministry of Health and Medical Services (MHMS)	Consultation on drinking water quality
	Ministry of Education (ME)	
	Ministry of Environment, Lands and Agriculture Development (MELAD)	Consultation on land availability and use. Decisions on sites for water supply infrastructure.
	Ministry of Women, Youth, Sport and Social Affairs (MWYSSA)	
	National Infrastructure Development Steering Committee (NIDSC)	Oversight of project's works and coordination with other utility works.
	Kiribati Fiduciary Services Unit (KFSU)	Approval of various procurements and monitoring of expenditure.
	Project Management Unit	Direction of the STWSP. Approvals of project boundary conditions and design parameters. Facilitate approvals and meetings. Monitor PDA progress.
	Public Utilities Board (PUB)	Prove inputs to the design and operation of the assets and approve technical requirements

	Public Utilities Board (PUB)	Prove inputs to the design and operation of the assets and approve technical requirements.
	Kiribati Solar Energy Company (KSEC)	
	Kiribati Police Service and Prison	

[1] Source: STWSP Inception Report,

Please provide the Stakeholder Engagement Plan or equivalent assessment.

Stakeholder Engagement Plan (during project implementation)

Based on the stakeholder assessment, the stakeholder engagement plan (Appendix II) established the following objectives: increasing ownership and acceptance of project; increasing awareness and changing behavior, notably on climate change and hygiene, generating multi-level support for necessary transformations in the sector. The stakeholder engagement plan has the following specific goals:

· Enable stakeholders to understand what the STWSP is about and what its scope will and will not include;

· Enable stakeholders to stay informed on the progress of the Project;

· Enable stakeholders to understand, and discuss, the outcomes of the Project process (including water treatment/desalination and quality across different locations);

· Enable stakeholders to express their ideas and concerns about water demand and supply in South Tarawa and to provide input to the development of the project;

· Enable stakeholders to find out ways they can help the project and make it a success;

· Enable stakeholders to understand likely environmental and social safeguard issues of the Project;

· Enable stakeholders to understand the likely impacts of the Project, particularly during the construction phase and to seek their tolerance and cooperation;

· Reintroduce the concept of user-pays system where customers will pay for the water using a stepped block tariff *(i.e. the more water is used the more expensive the water becomes);*

· Enable ALL stakeholders to understand their relationship with the service provider (PUB) and each party's obligations and limit of responsibilities.

In order to achieve these goals, for each goal, the Stakeholder Management Engagement Plan in Appendix II sets out the concerned strategies, tools, concerned stakeholders and the workplan.

In addition, provide a summary on how stakeholders will be consulted in project execution, the means and timing of engagement, how information will be disseminated, and an explanation of any resource requirements throughout the project/program cycle to ensure proper and meaningful stakeholder engagement.

Select what role civil society will play in the project:

Consulted only; Yes

Member of Advisory Body; Contractor;

Co-financier;

Member of project steering committee or equivalent decision-making body;

Executor or co-executor;

Other (Please explain) Yes

Under the baseline project, the 5-year WASH program (see project Activity 3.1) is likely to be implemented by an international NGO supported by local Civil Society Organizations (CSOs) at the community level. Engagement of NGOs during the design stage of the baseline project is also described in the Stakeholder Assessment (see relevant section). NGOs will also be consulted through the LDCF-funded activities (see description of Activity 2.2).

3. Gender Equality and Women's Empowerment

Provide the gender analysis or equivalent socio-economic assesment.

The project is classified by ADB as an 'effective gender mainstreaming' (EGM) project and consequently a gender assessment was undertaken during project development and a Gender Action Plan (GAP) prepared (see Appendix IV). The GAP identify strategies, mechanisms, project components, budget provisions and other measures for addressing gender concerns.

The gender assessment confirmed that gender plays a significant role in determining interactions with water and the impact of waterborne disease. Women's roles in water and sanitation include: water collection from wells and communal rainwater harvesting systems; responsibility for household (HH) hygiene and sanitation; decision making on use of household resources; care for HHs members whose illnesses are a result of waterborne diseases such as diarrhea; mobilizing communities and disseminating information on the impacts of poor water and sanitation attitudes and practices; and the management and monitoring of water collection, distribution and use. Caring for ill family members also is generally a female responsibility. Men's main role related to water is fetching water (in pales or other receptacles), and the purchase of rainwater for HH consumption. Given the above, by ensuring that households have access to safe water, the project can positively affect women's time and options for income generating and other activities.

The GAP addresses potential gender inequality risks and promotes women as project beneficiaries through the provision of targets for female participation in community discussions and in consultations on the design and implementation of water supply improvements. It also supports female participation in MISE and other project related capacity building activities; the employment of females in constructing/operationalizing project related infrastructure; training on GAP implementation and gender awareness for the PMU consultants and MISE/PUB staff. Due to I-Kiribati roles both in carrying water as well as in undertaking general household work, the GAP also requires that males are adequately represented in the project.

The GAP in Appendix IV provides, for each project output, specific gender indicators, targets, activities and related roles/responsibilities.

Does the project expect to include any gender-responsive measures to address gender gaps or promote gender equality and women empowerment?

Yes

Closing gender gaps in access to and control over natural resources; Yes

Improving women's participation and decision making Yes

Generating socio-economic benefits or services or women Yes

Does the project's results framework or logical framework include gender-sensitive indicators?

Yes

4. Private sector engagement

Elaborate on the private sector's engagement in the project, if any.

The economy of Kiribati is highly vulnerable to external shocks and income volatility due to its exposure to climate change, geographical remoteness, dependence on imports and reliance on revenue from overseas. Private sector growth is constrained by the small-scale of the economy; the high costs of doing business; and the country's widely dispersed population. Hence, the public sector dominates and accounts for half of the country's population in permanent employment.

Working within these constraints, the project takes several measures to specifically promote the private sector:

Through the project, private sector operators will be engaged in the provision of water supply services and in the capacity building of PUB, MISE and other key government agencies. The aim is to transfer private sector modalities and values to Kiribati public sector stakeholders. Specifically, the use of long-term performance-based O&M contracts for the desalination plants and water supply network will ensure the strong performance of these key assets for at least 5 years following project completion. These contracts will be designed to include enhanced on-the-job training for PUB staff. Based on skills transfer during the 5 years following commissioning, the Government can review whether outsourced maintenance should continue and/or to shape the design of future private sector support.

The Government is committed to exploring measures to attract future private sector co-financing to water sector development, and the project will support this.

A key project objective is to make water supply financially viable, which can lay a basis for private sector involvement in the sector in the future. The project efforts to improve management and governance will also contribute to these strategies.

5. Risks to Achieving Project Objectives

Elaborate on indicated risks, including climate change, potential social and environmental risks that might prevent the project objectives from being achieved, and, if possible, the proposed measures that address these risks at the time of project implementation.(table format acceptable):

Key risks have been identified throughout the project preparation phase and measures have been developed to minimize or alleviate these risks so that the probability of them occurring and having a significant impact is low. These risks relate to long-term financial sustainability, risk of plant failure, management and O&M capacity, water sector coordination, community behavior change, health and safety, wastewater disposal. The risks and the mitigation measures are summarized in the following table.

Risk Description	Rating	Mitigation measure(s)	Responsibility
Limited capacity of PUB to undertake O&M of key assets.	High	The project includes 5-year O&M contract with strong emphasis on capacity transfer.	Government, ADB and World Bank
The government does not allocate sufficient funds for O&M after the project.	Medium	The project significantly reduces the costs of the desalination plant O&M by including renewable energy in the Project outputs. Financial sustainability is also addressed through support to tariff reforms (through World Bank parallel financing) and community awareness campaigns on the need to pay for water. The government has committed to long-term subsidies to the water sector, if required.	Government, ADB and World Bank
Extreme weather events outside of climate change projections occur	Me	The infrastructure design and the technology adopted are climate resilient. This will be constantly monitored, as will climate change projections	Gov ern

tions occur.	e d i u m	constantly monitored, as will climate change projections.	ern me nt, AD B
The population growth rate is higher than that used in the infrastructure design.	L o w	The desalination plants are designed with scope for modularized expansion.	Gov ern me nt, AD B
The price of diesel fuel collapses	L o w	The solar photovoltaic system is designed for 100% offset of the desalination plants' e nergy consumption.	Gov ern me nt, AD B
Lack of private sector interest or lack of suitable candidat es for participating in the project.	M e d i u m	Where possible, packages are designed to enhance attractiveness to bidders. The proje ct will use universal procurement. Contingencies (i.e. for cost overruns) are built into the baseline project cost estimates.	Gov ern me nt, AD B a nd Wor ld B ank
The implementing agency lacks procurement capacity an d expertise in the delivery of complex projects.	H i g h	(i) Additional procurement expertise will be developed in the PMU; (ii) continued used o f the KFSU, which has experience in the delivery of high-value, ADB-funded projects; an d (iii) design of procurement packages in a manner that will allow the most efficient us e of the limited resources.	Gov ern me nt, AD B
The financial management capacity of the implementing and executing agencies is limited.	H i g h	(i) KFSU and PMU project staff have been trained in ADB procedures and in monitoring progress against the design and monitoring framework; (ii) the KFSU and PMU will hav e a qualified and experienced project accountant responsible for preparing project fina ncial statements and familiar with use of accounting software – supported by the base	Gov ern me nt

	H	ncial statements and familiar with use of accounting software – supported by the baseline project; and (iii) training on ADB's financial reporting and auditing requirements will be provided, as needed.	nt, ADB
Efforts towards groundwater reserve catchment management result in the government's displacement of households living near project infrastructure (but outside the project's area of influence) at the water reserves, without proper consultation and compensation, presenting a potential reputational risk to the project.	Low	Government has agreed not to displace the informal settlers at the water reserves. World Bank is providing parallel financing support which will address conservation of groundwater sources via the implementation of Water Reserves Sustainable Management Plans. In addition, regional TA support from ADB on urban development in the context of fragility is being explored, including sustainable land use planning, managing informal settlers and assistance to vulnerable persons.	Government, ADB and World Bank
Impact of COVID-19 may cause implementation delays or increased costs[a]	High.	Structure TORs to allow selected activities to be conducted remotely where possible. Review impact of any travel restrictions regularly. Contingencies built into cost estimates. Buffer to be built into project schedule.	Government, ADB

[a] Additional risk identified in 2020 and thus not captured in approved (baseline) project risk assessment and risk management plan at https://www.adb.org/sites/default/files/linked-documents/49453-002-ra.pdf. To be discussed and refined during ADB project processing.

6. Institutional Arrangement and Coordination

Describe the institutional arrangement for project implementation. Elaborate on the planned coordination with other relevant GEF-financed projects and other initiatives.

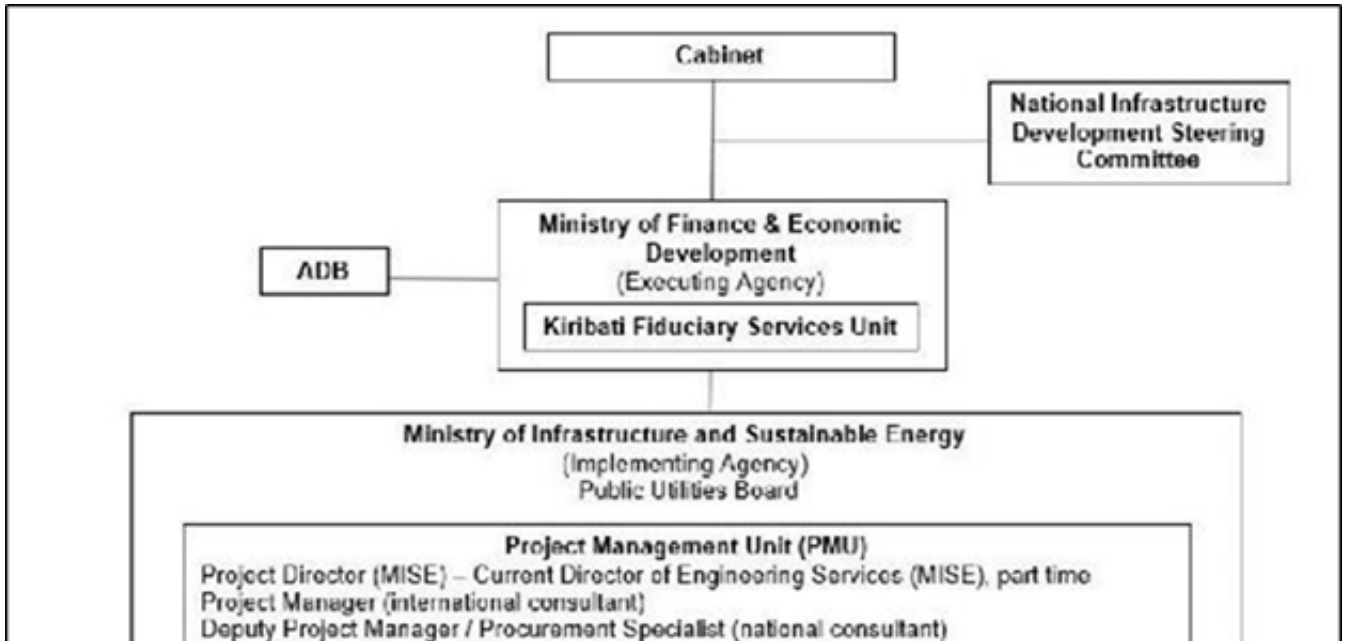
The baseline STWSP project includes financing from the ADB, World Bank, the GCF and the Government. ADB is the designated lead cofinancier and, consequently, all works, goods, and services (including those financed by the World Bank and GCF) under the project will be procured by the recipient in accordance with ADB's Procurement Guidelines (2015, as amended from time to time) and ADB's Guidelines on the Use of Consultants (2013, as amended from time to time).

The implementation arrangements for LDCF funds are as for the baseline STWSP project. See Figure below and Annex I for a full description of the roles and responsibility of each agency involved in project implementation. These are summarized below.

The Government has established the National Infrastructure Development Steering Committee (NIDSC) which will provide project oversight, strategic direction and ensure the project is fully integrated with other development initiatives. This includes oversight and guidance of LDCF financed activities. NIDSC is chaired by the Secretary to the Cabinet, with the Secretary of Finance as Vice-Chair. Key NIDSC members are MISE, MFED, MHMS, MELAD and OB. For the purposes of this project, as GEF Focal Point, ECD will temporarily sit on the NIDSC.

In ADB terminology, the project executing agency (EA) is the Ministry of Finance and Economic Development (MFED). As EA, MFED is responsible for all interactions with the ADB, for ultimate reporting, and for ensuring government counterparts funds are provided.

In ADB terminology, the Ministry of Infrastructure and Sustainable Energy (MISE) is the implementing agency (IA). As IA, MISE is responsible for day to day management of the project activities and monitoring/evaluation. MISE has appointed a senior official as Project Director to manage project development and implementation. MISE has established a Project Management Unit to oversee management.



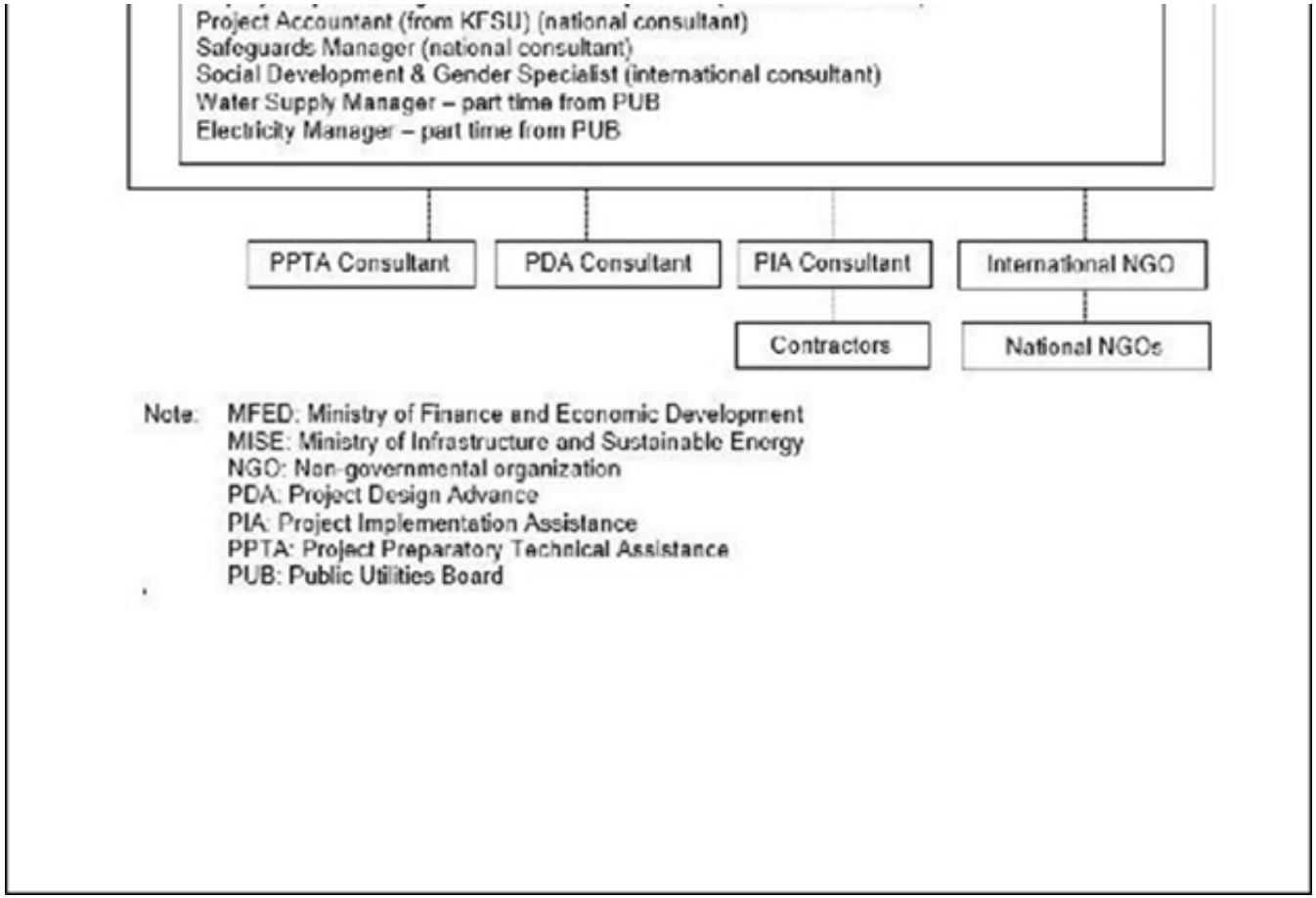


Figure: Project implementation arrangements.

The Environmental Conservation Division under MELAD will coordinate with MISE PMU on Activity 2.2. For LDCF funds allocated to Activity 2.2, ECD and MISE will coordinate on workplans, all TOR for all inputs, and will report on all activities and inputs. Technically, ECD will take the lead in designing and coordinating all activities under Activity 2.2. MISE PMU will be responsible for procurement and contracting under Activity 2.2.

ADB staff are responsible to support implementation, including compliance with obligations and responsibilities for Project implementation in accordance with ADB's policies and procedures.

See Annex I for full details.

Terms of Reference for all LDCF/GEF financed positions are included in Annex J.

Budget for all LDCF/GEF financed inputs are included in Annex K.

Coordination with ongoing and planned projects, including GEF projects

The NIDSC, and its members, which oversees and guides this project, will take the lead in coordinating with all related activities in Kiribati. MISE will ensure coordination with all water sector related initiatives (institutional, capacity building and infrastructure), whereas OB and MELAD will ensure coordination with all climate change related initiatives.

ADB will support the NIDSC with coordination, notably by working with international partners to ensure coordination and synergy, including working with WB, DFAT, MFAT, the UN agencies and international NGOs. ADB coordination will be led through the ADB Kiribati Country office, with support from ADB technical staff in Fiji and in Manila.

On a day to day basis, the STWSP PMU will ensure coordination in the implementation of shared and complementary activities. There has already been precedents for this, for example in the recently shared approach to World Environment Day and World Water Day (both jointly supported by MELAD with support from UN agencies).

There have been several studies in the past decade on the South Tarawa water supply situation, on climate change, and on the feasibility of desalination and renewable energy supply. These notably led to the *Tarawa Water Master Plan* and the *South Tarawa Water and Sanitation Roadmap 2011 to 2030* (both in 2011). The current project responds to these, and these Plans act, to some extent, as coordination drivers.

A recent review of related activities identified 25 ongoing and recently completed initiatives in the water, health and sanitation sector. The largest ones are the Kiribati Adaptation Program (KAP) and the South Tarawa Sanitation Infrastructure Sector Project (STSISP) – both are now complete.

KAP – with support from the World Bank and LDCF - had been the major sector initiative over the past two decades. KAP has supported the reduction of Kiribati's vulnerability to climate change, climate variability and sea level rise by raising awareness of climate change, by assessing and protecting available water resources and by managing inundation risks. KAP was implemented in three phases, running from 2003 to 2016. Key activities in the final phase (KAP III) were:

· Construction of three Non-Revenue Water management pilot areas on South Tarawa, including a total mains replacement and the provision of new metered customer connections. These provide 24/7 water supply to these pilot areas (completed in early 2018);

· Water tank restoration and repair works; and,

· Preparing detailed designs for selected zones in South Tarawa's water supply network, which are the basis for interventions to be supported by the baseline STWSP project.

STSISP – with support from ADB – successfully improved health and reduced chronic water-borne illness and disease among South Tarawa communities. Actions included: the rehabilitation of the sewer system and saltwater system in Betio, Bairiki and Bikenibeu; community engagement, working with 80 mother health committees and 250 communities on South Tarawa; establishing the sanitation maintenance fund - with an initial $1.4 million in grant funds and a phased tariff structure; and, an onsite sanitation pilot project.

Other important partners are the Kiribati Education Improvement Program (KEIP), supported by DFAT, and UNICEF. These partners support various environmental health projects related to water supply and sanitation in schools and hospitals.

As mentioned above, KAP III was supported by LDCF and played an important role in water supply and climate change adaptation, notably running pilot projects, undertaking community outreach and testing technologies. The STWSP involves many of the same individuals and stakeholders as KAP III and there has been a significant transfer of knowledge from KAP III to STWSP. Key lessons learnt from KAP III are:

· There is willingness to pay for piped water in South Tarawa, if the tariff is right;

· The main obstacle to financial sustainability is lack of confidence in PUB as a water service provider;

· The provision of reliable piped water leads to great reduction in use of wood and kerosene to boil water, and so to related reductions in health challenges;

· The existing capacity of MISE and PUB to implement their full mandate is a major constraint to ensuring a fully resilient water supply;

· Rooftop rainwater harvesting, although popular and a well-established technology, cannot be a major player in providing a climate resilient water supply on South Tarawa, because, at times of low rain, when water is needed, the tanks run dry.

The following table summarizes the related GEF supported projects in Kiribati and details how this proposed project will complement the existing portfolio.

Project Title and GEF Agency	Brief Description of the Project	Status of the Project and proposed coordination with STWSP
Promoting Outer Island Development through the Integrated Energy Roadmap (POIDIER) (UNDP/now MISE)	The project aims to enable and enhance outer island development through the achievement of the renewable energy and energy efficiency targets of Kiribati.	Status: Proposed. This project is to focus on climate change mitigation, and generally on the outer islands. It is not to address water supply. There is limited scope for coordination.
Enhancing Whole of Islands Approach to Strengthen Community Resilience to Climate and Disaster Risks in Kiribati (UNDP/OB)	The project aims to address urgent and immediate adaptation priorities, and kick-start the medium to long-term adaptation planning process to ensure that the development efforts are durable and sustainable.	Status: Proposed. This project is to focus on building community based resilience and on disaster risk management. It also focuses on the outer islands rather than South Tarawa. It is not to not focus on the water sector. There is limited scope for coordination.
Enhancing National Food Security in the Context of Global Climate Change (UNDP/MELAD)	The project aims to increase the resilience of communities to climate change induced hazards through integration of climate smart policies and actions into rural development planning and budgeting.	Status: Ongoing. This project is focused on institutional planning and stre

(UNDP/MELAD)	The project has undertaken a broad range of community resilience a ctivities on many islands.	ngthening for food security at the national level, and on community based adaptation on selected atolls. It is not focused on the water sector. There is limited scope for c oordination.
Increasing Resilience to Cli mate Variability and Hazard s (WB/OB)	The project aimed to improve the resilience of Kiribati to the impacts of climate change on freshwater supply and coastal infrastructure. T he objective was to be achieved by strengthening the government ca pacity and improving the management and governance of water reso urces and infrastructure.	Status: Complete. This is the LDCF contribution to KAP III. The proposed S TWSP will build on and learn from KAP III, as described i n the main text.
Resilient Islands, Resilient C ommunities (FAO/MELAD)	The project aimed to improve biodiversity conservation and landscap e level management to enhance socio-environmental resilience to cli mate variability and change.	Status: ongoing The project focused on forest management, land mana gement and protected areas. It did not address the wate r sector. There is limited scope for coordination.
International Waters Ridge t o Reef project (UNDP/SPC/MELAD)	The project aims to trial dry litter pig pens at Buota and Bonriki water reserves and to undertake water quality monitoring at the water reser ves	Status: Ongoing Fill in the gap in water quality data.
Support to Alignment of Kiri bati's National Action Progr amme to the UNCCD Ten-Ye ar Strategy and Reporting P rocess (UNEP)	The project aims to build capacity of Kiribati to align its NAP with the 10-year UNCCD Strategy and prepare the national report on UNCCD i mplementation in the country following the PRAIS format, including r eporting on the impact indicators.	Status: Project operationally closed. The project supported enabling activities to build capaci ty and to support preparation of the UNCCD NAP. There was no support to the water sector, and limited support to capacity building, and no support for implementing a daptation measures.

As can be seen from the table, the current project complements the previous GEF and LDCF supported projects, notably because none of the previous projects – except KAP III – covered the water sector. Given that water supply is a key constraint and is highly vulnerable to climate change, the present project addresses an important sector with outstanding needs.

SPREP/Adaptation Fund are initiating the project "*Enhancing the resilience of the outer islands of Kiribati*". Consultations were held with SPREP during the preparation of this project. Primarily, the SPREP project will focus on the outer islands, and will complement this LDCF proposal geographically. It is possible, during implementation, some capacity development activities will be closely complementary – the project management office will ensure this complementarity, working directly with the SPREP project office.

Annex I: Project Implementation Roles and Responsibilities

Implementing organization	Management Roles and responsibilities
Ministry of Finance and Economic Development, MFED (EA)	(i) The representative of the Government as a grant recipient. (ii) Facilitate negotiation, signing, and execution of the grant agreements with ADB. (iii) Through the Kiribati Fiduciary Support Unit, lead the project's procurement actions in coordination with the MISE. (iv) Responsible for financial management through KFSU. (v) Submit approved withdrawal applications to ADB (vi) Expedite implementation and minimize cost by: • ensuring the timely availability of necessary counterpart funds; • review invoices and payments to contractors, consultants, and service providers; • monitor project progress and instruct MISE to take corrective action to prevent significant variations and deviations from schedules and budgets; (vii) Ensure sufficient counterpart budget is provided for the project; (viii) Signatory to contracts via Minister (MFED) .
NIDSC	(i) provide strategic direction and guidance for the project; (ii) chaired by the Secretary to Cabinet, with Secretary of Finance as Vicechair; (iii) Members include but are not limited to representatives from MISE, MFED, MHMS, MELAD, OB; (iv) Provide policy guidance on project implementation and management, such as institutional strengthening. (v) Make important decisions on the project preparation and implementation such as determining of project scope, procurement (selection of a civil work contractor) and consultant selection decisions and seek approval of Cabinet as necessary according the relevant acts. (vi) Oversees project management of MISE and PMU, monitoring progress of project preparation and implementation and suggest remedial actions when any indication of delay is identified.
MISE (IA)	(i) Ensure that PMU is fully staffed and functional during the entire period of Project implementation (ii) Provide technical advice on the project scope, facility designs, procurement or others, from the viewpoints of the government agency in charge of maintenance of project facilities, and procurement matters (iii) Act as a secretariat to the NIDSC. (iv) Ensure that PMU is fully staffed and functional during the entire period of implementation (v) Review consultant reports and ensure the outputs are suitable to the project objectives and the government policies and regulations. (vi) Provide technical inputs to consultant and works contracts, in coordination with MFED. (vii) Ensure compliance with grant covenants, ADB's guidelines, procedures, and policies. (viii) As the main user of the project facilities, provide inputs to the project scope and facility designs.
PUB	(i) Provide one or more representatives to PMU. (ii) Provide feedback to the project design and implementation from the view points of the end user of project deliverables. (iii) provide technical advice on the project scope, facility designs, procurement or others, from the viewpoints of the government agency which will take over the assets after the project; (iv) Participate in the project management.
Environment Conservation Divi	(i) Provide [illegible] to PMU

Environment Conservation Division (MELAD)	(i) Provide one or more representatives to PMU. (ii) Provide feedback to the project design and implementation from the view points of the environment and GEF. (iii) provide technical advice on the project scope, facility designs, procurement or others; (iv) for Activity 2.2, in coordination with the PMU: • Draft ToR for the Joint information management unit to be established under activity 2.2.1. • Prepare quarterly and annual workplans, including budget forecasts; • Prepare TOR for all activities and inputs, including equipment specifications; • Provide assistance, as requested, to PMU in the procurement and contracting processes; • Prepare quarterly and annual progress reports and financial reports.
Kiribati fiduciary services unit (MFED)	(i) In coordination with MISE, PUB, the PDA consultant and ADB, lead financial management, procurement and consultant selection under the Project. (ii) Review bidding documents and request for proposal. (iii) Advertise the request for expression of interest and the invitation to bid. (iv) Organize a pre-bid meeting. (v) Organize a public opening of consultant proposals and bids. (vi) Lead evaluating consultant proposals and bids. (vii) Coordinate the government approval of procurement milestones. (viii) Lead communication with proposers and bidders (ix) Administer advance accounts
Project Director (Director, MISE)	(i) Coordinate with ADB for consultant recruitment. (ii) With the support of the Project Management Unit, manage the activities of project preparation and implementation and ensure that all project activities comply with the government and ADB's requirements. (iii) Regularly monitor the progress of project preparation and implementation including the achievement of the gender action plan activities and targets and, through KFSU, initiate the NIDSC meeting as necessary and at least quarterly. (iv) Review the monthly progress report that PMU prepares and endorse to the task force. (v) Supervise the Project Management Unit. (vi) Instruct the PMU to provide government counterpart assistance to the PDA and PIA consultants. (vii) With the support of the PMU, supervise the PDA and PIA consultants. (viii) Facilitate coordination with government agencies necessary to prepare and implement the project. (ix) Oversee reporting and monitoring of project performance including preparation of monthly and quarterly project progress reports, gender action plan progress report. (x) Review the recommendations from the PMU on the contract administration matters including claims and contract variations and recommend approval to the higher authorities when the recommendations are found to be in order. (xi) Regularly communicate with ADB staff for any matters related to project management and progress of consulting services. (xii) Assist ADB project review missions
Project Management Unit	(i) Assist Project Director in project management. (ii) Monitor and evaluate project activities and outputs and report the findings to Project Director by monthly progress reports. (iii) Review and verify documents submitted by consultants. (iv) Review the consultant's invoices and advise Project Director of its findings. (v) Supervise the PDA and PIA consultants. (vi) Provide day-to-day support for the consultant's project preparation activities. (vii) Actively participate in the project preparation activities aiming at early completion of preparation works. (viii) Facilitate implementation of the project's communication and consultation plan (CCP). (ix) Implement the safeguards requirements and plans and monitor effectiveness of the same. Prepare and submit semi-annual safeguards monitoring reports. (x) Supervise PDA consultant to carry out surveys. (xi) Assist PDA consultant to develop detailed engineering design where required

	(xi) Assist PDA consultant to develop detailed engineering design where required. (xii) Consult with the public and disclose project information with ADB.
ADB	Assist all government agencies involved in preparing and implementing the project by: (i) Guiding the government agencies for smooth decision making on project preparation and implementation. (ii) Assist in consultant recruitment where requested by the Government. (iii) Fielding review missions and participate in key workshops. (iv) Advise PMU on various project management matters. (v) Disclosing project information to the public.

Annex J: Terms of Reference for all LDCF/GEF financed positions

Output 1

LDCF funded inputs are all works/investments. No technical advisory or consultant positions are funded.

For the works/investments, two options are to be considered:

i) strengthening the Stewart Causeway, Anderson Causeway and the Nanikai – Bairiki Causeway. Details are provided in Annex H, and;

(ii) contributing to the upgrading of the water supply network, notably in the eastern areas of Buota, Bikenibeu and Bangantebure. Details are provided in Annex H

A detailed options analysis under activity 1.4.1 will lead to the selection of option and be followed by detailed design of activities.

Output 2

International Expert on Information Management (Activity 2.2) (4 months) will:

(i) Review existing government initiatives on information management;
(ii) Prepare an inventory and description of existing, related databases on Kiribati amongst government agencies and international agencies;
(iii) Review management information systems of Pacific island countries;
(iv) Analyse information needs of pertinent information users on Kiribati;
(v) Facilitate a national workshop on joint approaches to management information systems for climate resilience;
(vi) As appropriate, provide training to Kiribati nationals on management information systems;
(vii) Under guidance from ECD/MELAD, propose the TOR for the joint MFED/MISE/ECD climate resilience management information system, ensuring strong linkages with to the existing ECD database and all work of the Environment Information and Database Management Section of ECD;
(viii) Propose a common data/information platform to support management and decision making support to OB, MFED, MISE, MELAD and other government agencies on all issues related to water resources, water sector infrastructure, environment, climate change, coastal ecosystems and disaster risks, with timelines, equipment needs and estimated budget, and a roadmap outlining next steps;
(ix) In discussion with ECD/MELAD, consideration will be given to data generation and collection, CEPA (communication, education, and public awareness), and Institutional, Programme and Human Resources Capacity Building Needs. Efforts will be coordinated with the Asset Management Expert.

Outputs:
(i) X hours of training/mentoring provided to counterpart staff, with at least 70% satisfaction rate (based on staff surveys);
(ii) Proposal for common information platform for climate resilience.

International Expert on Asset Management (Activity 2.3 (5 months) will:

Review existing government initiatives on asset management;
Propose design of a national asset centre that will contribute to climate resilience. This design should cover location, staffing, costing, resource needs, modalities, communications modalities, etc;
Undertake stakeholder analysis of asset management sub-sector on Kiribati;
Provide training to Kiribati nationals on climate resilient, asset management systems;
Design a series of actions to *pilot* asset management as a means to achieve increased efficiency and climate resilience;
Develop a road map for the upscaling and rolling out of a one government, climate resilient asset management system.
Efforts will be coordinated with the Information Management Expert.

Outputs:
(i) X hours of training/mentoring provided to counterpart staff, with at least 70% satisfaction rate (based on staff surveys);
(ii) Road map to a one government asset management system.

National Expert on Asset Management (Activity 2.3) (2 months) will:

The national expert will act in support of the international expert on asset management, notably to:
Assist undertaking the stakeholder analysis of asset management sub-sector on Kiribati;
Assist development of a road map for the upscaling and rolling out of a one government, climate resilient asset management system.

Output 3

No funding from LDCF.

Project Management/Output 4

Global Climate Reporting Officer, one international (three months) and one national (three months).

The STWSP has a strong management office and strong management and monitoring system. The role of the Global Climate Reporting Officers will be to ensure the baseline management and monitoring system fully addresses and covers climate change and climate change adaptation efforts. The national and international and climate reporting officers will work together to:

(i) Review all TOR for all consultants hired under the project, and, as appropriate, suggest additions to cover climate change and adaptation;
(ii) Review the project data collection and monitoring system, ensure it covers adequately climate change and adaptation, and propose additions/modifications as necessary;
(iii) Review all project monitoring and progress reports and, as appropriate, ensure they cover adequately climate change and adaptation, and propose additions/modifications as necessary;
(iv) Prepare monitoring reports to LDCF on an annual basis;
(v) As appropriate, prepare LDCF Mid Term Review (MTR, Year 2) and Terminal Evaluation Report/Project Completion Report (TER/PCR, towards completion);
(vi) Support the monitoring, evaluation and reporting of broader project activities with climate change financing to ensure an integrated and streamlined approach;
(vii) Ensure project evaluation missions appropriately cover climate change and climate change adaptation.

7. Consistency with National Priorities

Describe the consistency of the project with national strategies and plans or reports and assesments under relevant conventions from below:

NAPAs, NAPs, ASGM NAPs, MIAs, NBSAPs, NCs, TNAs, NCSAs, NIPs, PRSPs, NPFE, BURs, INDCs, etc.

The project contributes directly to meeting national priority objectives, in terms of water supply, climate change adaptation and development in general.

With regards to water supply, providing quality water to the population is a priority and a challenge to the Government of Kiribati. The Government is committed to providing a climate resilient potable water supply to its people. In 2008, Government adopted the *National Water Resources Policy* and the *National Water Resources Implementation Plan*. As a demonstration of the importance attached to this sector and reflecting the specific issues in South Tarawa, the Government then developed the *Tarawa Water Master Plan 2010-2030* and the *Tarawa Water and Sanitation Roadmap 2011-2030*. This project contributes directly to the implementation of these plans, notably by creating a climate resilient, modern water source and supply.

With regards to climate change adaptation, the *Kiribati National Adaptation Program of Action* (NAPA, 2007) recognized the importance of the potential impacts of climate change on Kiribati water resources, and established the need for projects to address the risks. Many of the projects have now been implemented. Subsequently, *Kiribati Nationally Determined Contributions* (NDC, 2015), although primarily targeting the reduction of the country's GHG emissions, also assessed Kiribati's vulnerability to climate change, its low adaptive capacity and the need to adapt key sectors of the economy. Amongst the vulnerabilities identified in the NDC, the vulnerability of the water supply and of the groundwater lenses to climate events such as inundation and droughts was highlighted as a priority. This project responds to this vulnerability.

Further, this proposed project is fully aligned with the *Kiribati Joint Implementation Plan for Climate Change and Disaster Risk Management (KJIP) 2019-2028*, especially the following strategies in the KJIP: '*Increasing water and food security with integrated and sector-specific approaches and promoting healthy and resilient ecosystems*'; '*Promoting sound and reliable infrastructure development and land management*'; and '*Promoting the use of sustainable, renewable sources of energy and energy efficiency*'.

Finally, the proposed project will fully support the (latest) *Kiribati Development Plan 2016-2019*, which is committed to improving access to quality water and sanitation infrastructure, and to developing and promoting the use of renewable energy in all sectors of the economy.

8. Knowledge Management

Elaborate the "Knowledge Management Approach" for the project, including a budget, key deliverables and a timeline, and explain how it will contribute to the project's overall impact.

As part of the regional program, ADB will ensure that the knowledge and lessons generated through this Child Project are captured and disseminated through direct and indirect measures throughout the Pacific. As appropriate, some lessons will be disseminated more broadly across Asia and to the Indian Ocean.

In-country, the Project PMU will take the lead in collecting information, documenting the project's success, and sharing knowledge. This will include:

- Collecting information on weather and extreme weather events;
- Collecting and documenting information on climate related impacts on water sector assets;
- Collecting and documenting information on the impact of the project on climate resilience;
- Analysing, interpreting and documenting the project's success in developing innovative information management and asset management systems;
- Publishing a lessons learnt document, or more, as appropriate.

Together with MISE and PMU, the NIDSC will take the lead in sharing knowledge to all stakeholders in Kiribati.

At the regional level, ADB will take the lead in knowledge management and sharing. ADB's operations in the Pacific began in 1969 and have since expanded progressively to now cover 14 countries with ADB presence in 13 developing member countries. ADB's Pacific Department presence includes multi country coordination and implementation offices in Sydney and Fiji, a resident mission in Papua New Guinea, and country offices in 11 small island developing states. The Pacific Department's staff resource comprise of about 120 sector and thematic experts and staff supporting project processing and implementation.

ADB's *Pacific Approach* (2016 – 2020) includes a major focus on overcoming the constraints imposed by geographical remoteness and vulnerability to climate change and disasters, with major capacity building and infrastructure interventions in all countries. Looking forward, ADB's technical assistance will continue to strengthen knowledge and capacities for Pacific DMCs to plan and prepare for climate change. A priority is to help integrate climate change and disaster risk management considerations into national development plans and programs. Doing so will strengthen pre-emptive measures and improve local capacities for responding to disasters. Engaging communities and local governments in resilience building activities is increasingly important. ADB will continue to mobilize concessional financing for climate change and disaster risk management, while working with development partners to pool resources across the region. These are all mechanisms through which the ADB can replicate the successes of this project across the Pacific region

ADB directly shares knowledge with development partners, governments, academics, utilities and CSOs through formal and informal consultations and discussions. ADB offices in Fiji, Sydney and Manila will ensure the measures are taken to share knowledge with the other child projects in Solomon Islands, Tuvalu and Vanuatu. Three ongoing ADB regional Technical Assistance projects are expected to directly support knowledge sharing across the region. These are: (i) *Strengthening Climate and Disaster Resilience of Investments in the Pacific*). This commenced in 2015, and currently has a total project budget of $3.95 million; (ii) *Pacific Disaster Resilience Program*, starting in 2019 with a $6 million budget; and (iii) *Implementing a Differentiated Approach to Urban Development in the Pacific*, which started in 2018, with an overall budget of $3.5 million. ADB is an active member of the Asia Pacific Adaptation Network (APAN), hosting the 6th APAN conference in 2018. ADB will support Kiribati stakeholdes in sharing the project lessons and experiences across APAN.

ADB and the project will exploit several pathways for knowledge sharing, including: (i) through the Pacific Water and Wastewater Association annual conference, to which ADB has provided long-term support; (ii) through Pacific-based events such as the 2019 ADB Annual General Meeting in Fiji or the Asia Pacific Adaptation Network Forum – the 2018 meeting was held at ADB HQ; (iii) through sharing information with Pacific policy makers, e.g. through ADB's knowledge MOU with the University of the South Pacific; and (iv) other ad-hoc sharing events and knowledge products via ADB's Urban, Water and Climate Change Sector and Thematic Groups.

The Project is connected to the Pacific Region Investment Facility (PRIF) - a multi-agency coordination mechanism aimed at improving the delivery of development assistance from donors and development partners to the infrastructure sector in the Pacific region. The Project will share all knowledge that is gained through Project activities with PRIF. This will facilitate upscaling to relevant places across the Pacific. Further, in seeking expertise and experience, through ADB, the project can call upon PRIF for support.

9. Monitoring and Evaluation

Describe the budgeted M and E plan

For both the baseline and LCDF activities, M&E is conducted in line with ADB's project administration instructions (further details available online at https://www.adb.org/sites/default/files/institutional-document/33431/pai-5-08.pdf). The following provisions for monitoring, evaluation and reporting are described in the Project Administration Manual for the Baseline project.

Monitoring

Project performance monitoring. The PMU will establish a project performance and monitoring system during the PDA phase. The ADB and the government will agree on a set of indicators for monitoring project progress and performance on a quarterly basis. This will include, but not be limited to, the targets and indicators in the design and monitoring framework (DMF), contributions to ADB results framework and the implementation schedule. The PIA consultants will provide hands-on training to PMU, MISE and PUB staff in data collection, monitoring, and evaluation. The PMU shall monitor and evaluate the indicators according to the agreed framework on a quarterly basis to determine the efficiency and effectiveness of the project. These quarterly reports will provide information necessary to update ADB's project performance reporting system. Beneficiaries will be involved in project monitoring and evaluation. In addition, the project steering committee (PSC) will oversee and monitor the overall implementation.

Compliance monitoring. Compliance monitoring will be provided through regular quarterly progress reports and during regular ADB review missions.

Safeguards monitoring. Implementation of the approved CEMP will be monitored and reported. Monitoring for social safeguards will include reporting on progress of activities in the resettlement plan with particular focus on public consultations, timeliness of payment of compensation, and level of satisfaction including grievance resolution among the affected households.

Semi-annual safeguards monitoring reports (SMR) will be prepared by the PMU and submitted to MISE and ADB and will be disclosed. The SMR will cover all aspects of safeguards implementation including training and capacity building, consultations and information disclosure and grievance redress.

Gender and social dimensions monitoring. The PMU's International Social Development and Gender Specialist with support from the NGO under WASH component and PIA, will monitor specific activities and targets set out in the GAP. Sex-disaggregated baseline data will be collected and used to monitor GAP implementation and impact, and reported semi-annually to MISE and ADB.

Evaluation

Review missions will be fielded twice a year in coordination with co-financiers. A mid-term review mission will also be held during the 3rd year. Within 6 months of physical completion of the project, the Ministry of Finance and Economic Development will submit a project completion report to ADB.

Reporting

The Ministry of Finance and Economic Development will provide ADB with (i) quarterly progress reports in a format consistent with ADB's project performance reporting system; (ii) consolidated annual reports including (a) progress achieved by output as measured through the indicator's performance targets, (b) key implementation issues and solutions, (c) updated procurement plan, and (d) updated implementation plan for the next 12 months; and (iii) a project completion report within 6 months of physical completion of the project. To ensure that projects will continue to be both viable and sustainable, project accounts and the executing agency audited financial statement together with the associated auditor's report, should be adequately reviewed.

The Government is familiar with ADB's processes with respect to M&E and reporting, having worked with ADB on several projects including recent projects involving the same agencies.

Monitoring and evaluation will also be aligned to GEF Monitoring Policy[1] and GEF Evaluation Policy[2].

On a day-to-day basis, overall responsibility for the PMU's project monitoring and implementation rests with the project manager. The project manager will inform the implementing agency and the ADB of any delays or difficulties during implementation, including M&E activities, so that the appropriate support and corrective measures can be adopted. The project manager will also ensure that all project staff maintain a high level of transparency, responsibility and accountability in monitoring and reporting project results.

The project results framework (*design and monitoring framework)* in the relevant Annex will guide monitoring at the overall project level. Specifically, the following steps/measures will be taken to monitor specific activities and outputs:

Output 1 - Water supply infrastructure:

· Desalination plants - field verification will be undertaken to monitor the installation and operation of the desalination plants, and the completion certificate submitted to the contractor will be used for verification;

· Water supply network - field verification will be undertaken to monitor the installation and operation of infrastructure (e.g. pipes, pumps), and the completion certificate submitted to the contractor will be used for verification. Reports on non-revenue water submitted to PUB will be reviewed;

· Solar plant - field verification will be undertaken to monitor the installation of infrastructure (solar panels etc.), and the completion certificate submitted to the contractor will be used for verification. Power metering data from PUB will also be reviewed.

Output 2 – Water Supply management:

· O&M contract desalination - operations reports produced by the design-build-operate contractor and submitted to PUB will be reviewed. These will contain data on production rates and output water quality;

· Compliance of water quality – Samples taken at critical control points in the network will be tested by the network O&M contractor and submitted to PUB. Results will be reviewed;

· Number of complaints per 1000 connections – verification will be based on PUB data obtained and supported through the water conservation and WASH awareness program;

· Contract disbursements – verification will be based on PMU reported data on contract award and disbursements.

For Output 3 - Outreach and awareness raising:

· Communities reached through program outreach – verification will be based on reports submitted by the NGO to the PMU;

· Attendance rate of members at regular working group meetings (cumulative) – as above from reports of NGO to PMU;

· Total (cumulative) number of visits to Visitor education centre – the number of visitors will be tracked by PUB and reported to the PMU.

M&E Budget

M&E will be led by the project management unit and consultants, and supported by the PIA consultants, among their other roles and responsibilities. The approximate M&E budget is described in the table below. Inputs for data and reporting will be obtained from consultants and contractors engaged across the project.

Specifically for preparing GEF monitoring products (e.g. collection of data related to LDCF core indicators, preparing annual PIR, undertaking LDCF Mid Term Review and undertaking LDCF Terminal Evaluation), an allocation of $54,000 has been made per the Table below and also the Table in the Budget section.

<table>
<tr><th colspan="3">M + E Plan (Costed)</th></tr>
<tr><th>Item</th><th>Cost</th><th>Financing</th></tr>
<tr>
<td>Overall Project Monitoring of (e.g.)
· Project performance
· Compliance
· Safeguards
· Gender and social dimensions
· Climate change and global environment
Evaluation
Reporting</td>
<td>Cost estimates for consultant packages which will contribute to M&E activities (based on Procurement plan available at https://www.adb.org/sites/default/files/project-documents/49453/49453-002-pp-en.pdf, accessed 16 July 2020). Consultants will cover a range of activities including but not limited to M&E. For further details, refer to consultant TORs in the Project Administration Manual disclosed at https://www.adb.org/projects/49453-002/main#project-documents (accessed 16 July 2020)
<table>
<tr><td>PMU consultants</td><td>$</td></tr>
<tr><td>Project Manager</td><td>$1.1m</td></tr>
<tr><td>Deputy Project Manager / Procurement Specialist</td><td>$0.15m</td></tr>
<tr><td>Project Accountant</td><td>$0.35m</td></tr>
<tr><td>Safeguards Manager</td><td>$0.18m</td></tr>
<tr><td>Social Development and Gender Specialist</td><td>$0.33m</td></tr>
<tr><td>Communications, operations, other costs, etc</td><td>$0.4m</td></tr>
<tr><td>Total PMU</td><td>$2.5m</td></tr>
<tr><td></td><td></td></tr>
</table>
</td>
<td>Baseline ADB and GCF Funded for activities which include M&E components.</td>
</tr>
</table>

<table>
<tr>
<td>GEF/LDCF Monitoring and Evaluation:

· Collect data related to LDCF Core Indicators

· Prepare annual PIR

· Undertake an LDCF Mid Term Review;

· Undertake LDCF Terminal Evaluation</td>
<td>Cost estimates based on Global Climate Reporting Office (TORs included included in relevant Annex):

<table>
<tr><th>Global Climate reporting</th><th>Cost estimate (approx.)</th></tr>
<tr><td>International Consultant</td><td>$50,000</td></tr>
<tr><td>National Consultant</td><td>$4,000</td></tr>
<tr><td>Total</td><td>$54,000</td></tr>
</table>

Cost estimates per activity:

<table>
<tr><th>Item</th><th>GEF/LDCF Contribution (initial estimate)</th></tr>
<tr><td>Mid-term review</td><td>20,000</td></tr>
<tr><td>Terminal evaluation</td><td>25,000</td></tr>
<tr><td>Other</td><td>9,000</td></tr>
<tr><td>Total</td><td>54,000</td></tr>
</table>
</td>
<td>LDCF (under PMC)</td>
</tr>
</table>

[1] GEF: “GEF/C.56/03/Rev.01”, 2019.

[2] GEF: “GEF/ME/C.56/02/Rev.01”, 2019.

10. Benefits

Describe the socioeconomic benefits to be delivered by the project at the national and local levels, as appropriate. How do these benefits translate in supporting the achievement of global environment benefits (GEF Trust Fund) or adaptation benefits (LDCF/SCCF)?

The STWSP Project, with support from LDCF, in addition to providing a high resilience to climate change in the water sector, will also generate the following sustainable development benefit streams:

Health benefits The key beneficial impact of the STWSP in South Tarawa is on people's health. This is because the project will eliminate the current high dependence of residents on contaminated water supplies for drinking water and basic hygiene, and therefore the significant negative impact this has on people's health and wellbeing. Water quality tests have shown that essentially all sources of water in South Tarawa are contaminated. As a result, most households boil water before using it, regardless of its source. In a recent survey of 200 households, it was found that 85% of interviewed households boil water at least once per day. Despite these efforts to treat water at the household level, the incidence of water-borne disease throughout South Tarawa, with associated health treatment costs, loss of productivity, and fatalities, is very high. South Tarawa has amongst the highest levels of water-borne diseases of all Pacific Islands. Water-borne diseases most commonly afflicting the residents of South Tarawa are diarrhea, dysentery, conjunctivitis, tinea corpis, and ringworm, including tinea vesicolor. Of these, diarrhea and dysentery are the most serious and life threatening, but the others also incur substantial treatment costs and personal downtime (causing loss of productivity for both patients and caregivers). The number of sickness cases have grown at approximately three times the rate of population growth in South Tarawa, notably affecting young children.

Socio-economic benefits Women, children, the elderly, and the most disadvantaged households bear a disproportionate share of the burden of inadequate water services in South Tarawa and will all benefit from the improvements to the current situation to be undertaken by the project. Water supply projects have impacts on people's lives that extend far beyond the expected improvements to health and reduction in time spent collecting water. There are cascading social benefits, and these are expected to include: significant improvements in household income levels and security of livelihoods; increased school attendance along with better child care; and wider social and cultural benefits such as reductions in stress levels, increased status and self-esteem, better family and community relations and increased ability to observe religious rites and customs.

Environmental benefits Current water losses from the South Tarawa water supply system are high, due to leakage during distribution, spillage due to customers modifying the reticulation system, wastage from the misuse of water, etc. The project will greatly reduce these leakages. Non-revenue water is projected to decline from 65% of all clean water produced to 27% by project end.

GHG emissions Three pathways will lead to reduced/avoided GHG emissions from the project: (i) households will no longer need to burn wood and kerosene to boil water; and (ii) PUB will use less energy to pump and treat water – as there will be much fewer losses from the network; (iii) and the solar PV plant installed under the project will reduce the need for the diesel generators. A conservative estimate of (i) and (ii) suggests the reduced emissions resulting from the project will total 111,323 tons CO_2eq over the 20 year lifetime of the project (see Appendix I).

11. Environmental and Social Safeguard (ESS) Risks

Provide information on the identified environmental and social risks and potential impacts associated with the project/program based on your organization's ESS systems and procedures

Overall Project/Program Risk Classification*

PIF	CEO Endorsement/Approval	MTR	TE
	Low		

Measures to address identified risks and impacts

Elaborate on the types and risk classifications/ratings of any identified environmental and social risks and impacts (considering the GEF ESS Minimum Standards) and any measures undertaken as well as planned management measures to address these risks during implementation.

Environmental and social safeguards

Environmental and social safeguards are a cornerstone of ADB's support to inclusive economic growth and environmentally sustainable growth. Accordingly, ADB's safeguard policy[1] aims to help developing member countries (DMCs) address environmental and social risks in development projects and minimize and mitigate, if not avoid, adverse project impacts on people and the environment.

The Safeguard Policy Statement (2009, amended from time to time) covers environment, involuntary resettlement, and indigenous peoples in a consolidated policy framework. It applies to all ADB-financed projects, including ADB-administered cofinancing. The statement also provides a platform for participation by affected people and other stakeholders in project design and implementation.

ADB has classified the approved (baseline) project as category 'B' for environment safeguards. An environmental and social impact assessment—equivalent to an initial environmental examination and appropriate for the category B project—was undertaken and includes an environmental management plan that will be updated based on the detailed design.

ADB has classified the approved (baseline) project as category B for involuntary resettlement. Due diligence was undertaken to assess potential involuntary resettlement impacts on all the proposed sites. It found that the proposed water supply infrastructure will not have significant involuntary resettlement impacts. A resettlement framework was prepared to guide the preparation of necessary safeguard documents for the water supply network upon confirmation

of the exact route, and a resettlement plan for assets where sites are confirmed. Consultations were held with affected persons and included the disclosure of draft safeguard documents; they will continue during project implementation.

The relevant safeguards documents for the baseline project are disclosed and available at https://www.adb.org/projects/49453-002/main#project-documents. Should additional activities be approved under LDCF funding (e.g. after the Options Analysis in Activity 1.4.1) and which involve land acquisition, further safeguards due diligence will be conducted per ADB SPS. This is likely to be undertaken by the government with assistance from the project implementation assistance consultants, and with guidance from ADB.

Finally, the approved baseline project includes institutional arrangements to ensure effective implementation of safeguards, and includes a funding provision for project management and project implementation assistance. In addition, under activity 2.1.3. of the LDCF-funded project, there is a provision for funding project management support, which may (if required) include further support for oversight of safeguards

[1] https://www.adb.org/documents/safeguard-policy-statement

Supporting Documents

Upload available ESS supporting documents.

Title	Module	Submitted
Appendix VII Resettlement Framework	CEO Endorsement ESS	
Appendix VI Draft Resettlement Plan	CEO Endorsement ESS	
Appendix V Initial Environmental Examination	CEO Endorsement ESS	

ANNEX A: PROJECT RESULTS FRAMEWORK (either copy and paste here the framework from the Agency document, or provide reference to the page in the project document where the framework could be found).

The following reflects the Design and Monitoring Framework approved by ADB for the baseline project, and highlights the additional components related to LDCF funding

Impact the Project is Aligned with Current project
Health and climate change resilience of South Tarawa's population improved
Overall project
Unchanged

Results Chain	Performance Indicators with Targets and Baselines	Data Sources and Reporting Mechanisms	Risks
Outcome			
Access of South Tarawa's population to safe, climate -resilient water supplies increased[c]	By 2027, at least 95% of South Tarawa's population (51.5% of them women) has access to safe, climate-resilient water supplies (2019 baseline: <10%)	PUB reports	Government does not allocate sufficient funds for O&M after the project.
Outputs			
1.**Output 1** Climate resilient and low carbon water supply infrastructure	1a. By 2023, 6,000m^3/day desalination capacity is installed (2019 baseline: 0) 1b. By 2025, >95% of households have piped water connection, including 100% of households headed by women (2017 b	1a. PUB/DBO reports 1b. PUB reports	Extreme weather events outside of climate change projections occur.

	aseline: 62% of households have piped water connection).[d] 1c. By 2025, 173km of water supply pipes installed or upgraded (2019 baseline: 0). 1d. By 2022, additional 2500 kW solar capacity is installed (2019 baseline: 1630 kW capacity) 1e. By 2025, additional X km of pipeline installed, rehabilitated or protected through coastal protection measures (2020 baseline: 0) (**LDCF ADDED)**	1c. PUB reports 1d. PUB reports 1e. PUB reports	
Output 2 Capacity of MISE and PUB to effectively manage water supply infrastructure increased	2a. By 2024, private operator supporting PUB operations is in place and operational (2019 baseline: not applicable) 2b. By 2027, nonrevenue water declines to 25% (2017 baseline: 89%)[d] 2c. By 2027, PUB achieves 95% collection ratio (2017 baseline: 70%)[d]	2a. PUB reports 2b. PUB reports	

	2d. By 2027, MISE and PUB staff report positive outcomes from exposure to training and/or monitoring programs (2019 baseline: 0. At least 20% of program attendees are women). 2e. At least 20% of new technical recruits to MISE's Water and Sanitation Engineering Unit and PUB's Water Engineering Department are women (2019 baseline: 9% female staff)[e] 2f. By 2025, integrated management information system and strategic asset management system for climate resilience endorsed by government (2020 baseline: not applicable) (**LDCF ADDED**)	2c. PUB reports 2d. Post-training/mentoring program participant survey responses reported in MISE/PUB reports 2e. MISE reports 2f. MISE reports	Lack of private sector interest or lack of suitable candidates to participate in the project.
Output 3 - Awareness of WASH and climate change issues is raised	3a. By 2027, >95% of the population (51.5% of them women) is reached directly or indirectly by WASH and climate change	3a. PMU reports	

issues is raised.	awareness programs, which use gender-sensitive materials (2019 baseline: <10%) 3b. PUB customers (75% of them women) in 250 communities report improved financial literacy (2019 baseline: N/A) 3c. At least 50% of community mobilizers contracted through the WASH and climate change program are women (2019 baseline: 0) 3d. By 2027, 1,000 people have visited the WASH and climate change visitor education center (2019 baseline: 0)	3b. PMU reports 3c. PMU reports 3d. PMU reports	

Output 4 Project implementation is managed efficiently and effectively	4a. By 2027, PMU meets disbursement targets (2019 baseline: 0) 4b. PMU delivers project progress and semiannual gender action plan reports, including sex-disaggregated data (2019 baseline: not applicable) 4c. Using a variety of social science techniques, qualitative data is collected over the life of the project in 4-6 project areas to measure positive impacts on women's daily lives resulting from 24/7 access to safe water. These would include baseline, mid and end of project surveys. (2019 baseline: not applicable)	4a. PMU reports 4b. PMU reports 4c. PMU reports	

ANNEX B: RESPONSES TO PROJECT REVIEWS (from GEF Secretariat and GEF Agencies, and Responses to Comments from Council at work program inclusion and the Convention Secretariat and STAP at PIF).

COMMENTS ON THE PROGRAM FRAMEWORK DOCUMENT (April/May 2019)

COMMENTS ON THE PROGRAM FRAMEWORK DOCUMENT (April/May 2019)	
GEF Secretariat comments on Program Framework Document (review sheet 18/April/2019)	
1. Specific information on project sites and actions to be supported by the LDCF	Provided in full in Request for CEO Endorsement document, with map in Annex E.
2. A detailed knowledge management plan, including how successes, best practice and failures can be shared and learned from, for various stakeholders, across each country and across the region	Provided in full in Request for CEO Endorsement document, notably in Part II, Section 8.
3. Detailed information on how the private sector will be engaged	See Part II, Section 4. As noted, private sector growth is constrained by the small-scale of the economy, the high costs of doing business, and the country's widely dispersed population. Hence, the public sector does dominate. Working within these constraints, the project takes several measures to specifically promote the private sector.
4. Detailed information on stakeholder consultations and plans for continued engagement	Provided in full in Request for CEO Endorsement document. See Part II, Section 2 and Appendix II.
5. The Gender Action Plan	Provided in full in Request for CEO Endorsement document. See Part II, Section 3 and Appendix IV.
6. The CEO Endorsement stage CCA indicators for each child project	Provided in Request for CEO Endorsement document. See Part I, table F and Annex F.
STAP Comments on Program Framework Document (Review sheet dated 29 may 2019)	
A simple but well-conceived theory of change is presented, supported by a chart. More detailed theory of change could be provided for each country as the activities are rather different.	Theory of change for Kiribati provided in Request for CEO Endorsement document (Part II, Section 1.a.3).
(In response to whether baseline scenario provides a feasible basis for quantifying the project's benefits) Feasible basis, but no data for quantifying benefits.	Data is provided in Request for CEO Endorsement document. Full details provided in Part II, Section 1A.1 and Appendix I.

	Appendix I.
(referring to adaptations that may be required during project implementation) No such concerns are presented. They should be considered and proper fallbacks developed. The presented theory of change could serve as a useful framework for this kind of contingency planning.	No response needed
Some GEBs may well emerge, but the focus here is on local / regional resilience enhancement. Quantifying a few GEBs with core indicators would be desirable.	This is provided in Request for CEO Endorsement document. See Part II, Section 10.
Improving gender equality is repeatedly mentioned as an objective of the project. Gender risks and opportunities are identified, possible response measures mentioned, but not much information is provided about them.	Provided in full in Request for CEO Endorsement document. See Part II, Section 3 and Appendix IV.
an overarching KM concept and a systematic KM plan would be needed to maximize knowledge dissemination.	Provided in full in Request for CEO Endorsement document, notably in Part II, Section 8.
US Council Member comments on Program Framework Document (received from GEF Secretariat on 4 July 2019)	
(Urge ADB to) Continue to involve Pacific Region Infrastructure Facility (PRIF) as an institutional partner as PRIF has a strong working group in urban development and is a great repository of knowledge in this area;	ADB is a leading supporter for PRIF, and PRIF is an institutional partner of ADB in the Pacific. Specific partnership and collaboration arrangements will be developed on an activity basis during project implementation. See Part II, Section 8 of the Request for CEO Endorsement.
(Urge ADB to) Provide more specific details about activities being developed, including the activity to “enhance awareness of climate change issues”;	Provided in full in Request for CEO Endorsement document, notably in Part II, Section 1A.3 (See Output 3 for awareness interventions).
(Urge ADB to) Explain how you will work with Pacific countries who have already integrated climate change and disaster in both policy and institutional structures; and,	ADB is working with 15 Pacific nations, including working with climate change adaptation and disaster. This is just one of many project. This is explained further in Part II, Section
(Urge ADB to) Expand upon how ADB will cross-reference the work outlined in this PIF with similar or related programs and projects that are being carried out by other implementers and / or funding, and how ADB will adjust this project to make sure that it is complimentary and not duplicative of ongoing activities.	ADB’s role in the project, including in knowledge management and in coordination, is explained in the Request for CEO Endorsement, in Part II, Sections 6, 8 and Annex H
Provide more information on how beneficiaries, including women, have been involved in the development of the project proposal and will benefit from this project;	Provided in full in Request for CEO Endorsement document. See Part II, Sections 2 and 3, and

[illegible]	appendices II and IV.
Engage local stakeholders, including community-based organizations, environmental non-governmental organizations and the private sector in both the development and implementation of the program; and,	This is to occur, as explained in full in the Request for CEO Endorsement document. See Part II, Section 2 (and Appendix II).
Clarify on how the implementing agency and its partners will communicate results, lessons learned and best practices identified throughout the project to the various stakeholders both during and after the project.	Information is provided in the Request for CEO Endorsement document, notably in Part II, Section 8.
Germany Council Member comments on Program Framework Document (comments made on 28 June 2019)	
Germany would like to emphasize that the (GCF financed-) construction of a desalination plant on South Tarawa is perceived as a high-risk activity, based on the complexity of its nature. Germany would kindly ask that the environmental and social risks of direct or indirect LDCF support to the operation and maintenance of this desalination plant, as well as appropriate risk mitigation measures are included in the document.	The approach to dealing with environmental and social risks is set out in section 1.A.7, with further details provide in the ADB approval documentation (RRP and linked documents. Note there is also Project Output 2.1.3. (Ensuring safeguards and project implementation) that will address this issue during implementation.
Although the single components in section 1.a.4. are backed up by examples of activities and the LDCF intervention is thoroughly described, it is not completely clear which activities will be implemented and which organisation will carry out each single activity. Germany suggests shortening the general information with reference to what the LDCF will support and instead (or on top, if applicable) add more detailed information on the overall project design, including information on the activities' enablers, outputs and outcomes. Regarding the outputs described in 1.a.4. Germany considers it particularly important that these are backed up by thorough information for the Child PIFs.	Provided in full in Request for CEO Endorsement document, notably in Part II, Section 1A.3
Germany welcomes the list of the ADB projects in the region up to 2017 and the tentative time line of upcoming projects, yet asks for additional information on how project activities will be coordinated with other organisations working on the same topics and region.	Proposal full details on coordination and collaboration with partners and other projects, notably in the sections: Part II, Section 2 (Stakeholders, and related Stakeholder engagement plan) and Part II, Section 8 (Institutional arrangements and coordination).
Although the relation to crucial national strategies is well mentioned in the proposal, Germany welcomes the addition of contributions to other existing (international) conventions.	
In the proposal, private sector involvement in the project is mentioned, but mostly described in the form of ADB involvement in private sector development activities in the Pacific. Germany would appreciate if the	As explained in the proposal, private sector operators will be engaged in water supply services

focus would be directed more precisely to the proposed project. In this context, Germany would suggest t o stress the interdependency of the proposed programme with the intervention fields of urban planning, i mproved housing design, incentives for private housing improvement, networked water management syst ems and provision of reticulated water to those most vulnerable.	and capacity building of key government agenc ies. The Government will explore measures to a ttract future private sector co-financing to wate r sector development, which will be supported by the project. A key project objective is to make water supply financially viable, which provides a basis for pri vate sector involvement in the sector in the fut ure. The project efforts to improve managemen t and governance will also contribute to private sector engagement.
The PIF outlines several barriers on p.15. However it is not evident, how all of these barriers (e.g. Barrier 2) are addressed by the project. Germany suggests adding some additional information about how to ove rcome the barriers within the project. Similarly, the risk analysis highlights that 3 out of 4 types of risks ar e rated as “medium”. In this context, Germany would welcome a more clear-cut explanation on how these risks are planned to be mitigated in the different country contexts.	Detailed information is provided in the proposa l, notably section a.1.A.1 and 1.A.3, with theory of change. Risk mitigation strategy is presented in Part II, Section 5.
With regard to the beneficiaries listed on p. 24, Germany suggests to include additional information on ho w the different types of beneficiaries are set to profit from project outcomes/ activities.	Detailed information is provided in the proposa l, notably in the Part II, Section 2 (Stakeholders, and related Stakeholder engagement plan) and in Part II, Section 3 (Gender Equality)
Germany asks for the inclusion of the date of the Operational Focal Point endorsement letter as it is not d isplayed in the proposal and is a requirement in the PIF.	Noted. Endorsement letter was submitted prio r to GEF Council approval of the PIF

ANNEX C: Status of Utilization of Project Preparation Grant (PPG). (Provide detailed funding amount of the PPG activities financing status in the table below:

- Not applicable

ANNEX D: CALENDAR OF EXPECTED REFLOWS (if non-grant instrument is used)

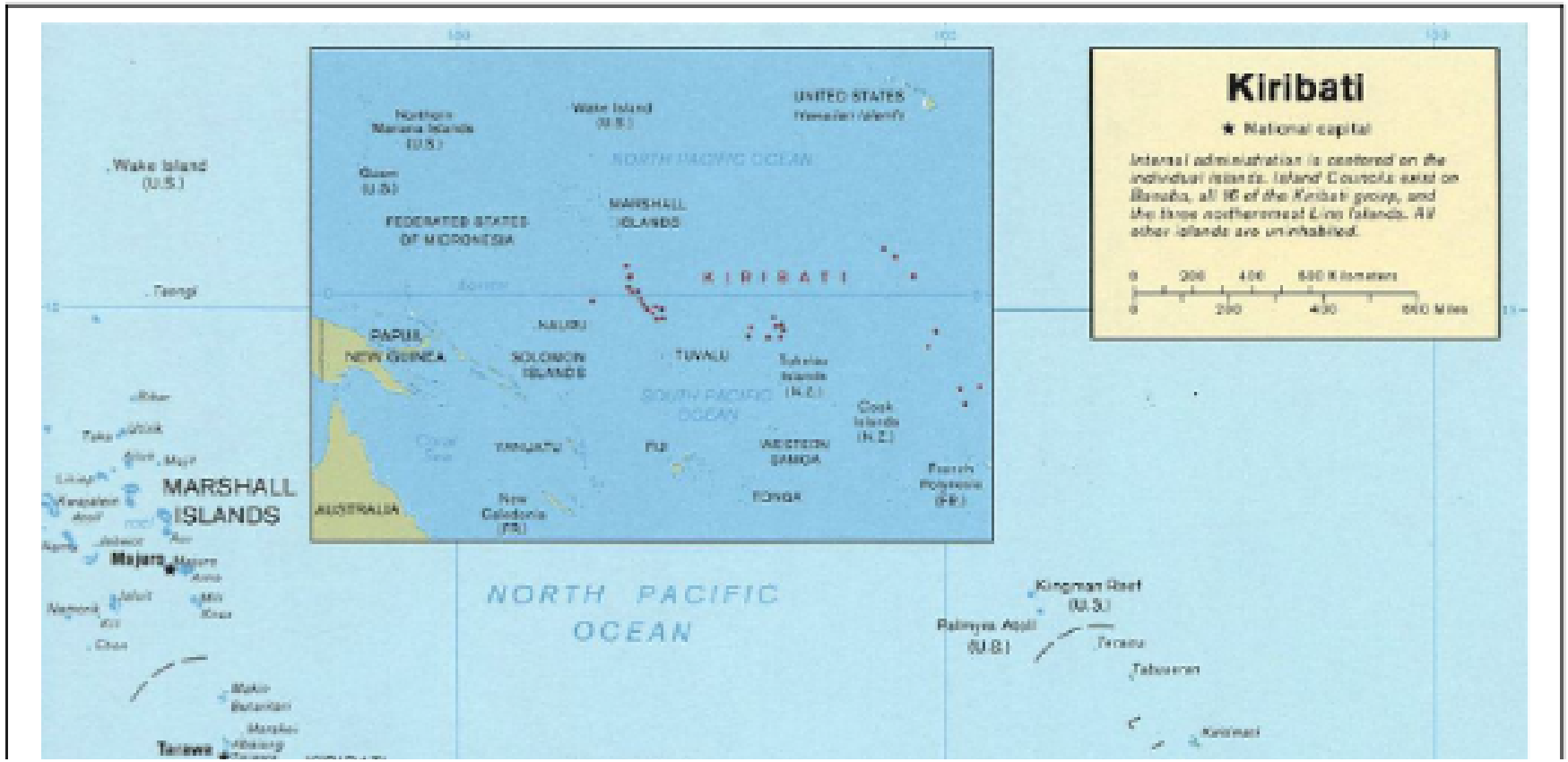
Provide a calendar of expected reflows to the GEF/LDCF/SCCF/CBIT Trust Funds or to your Agency (and/or revolving fund that will be set up)

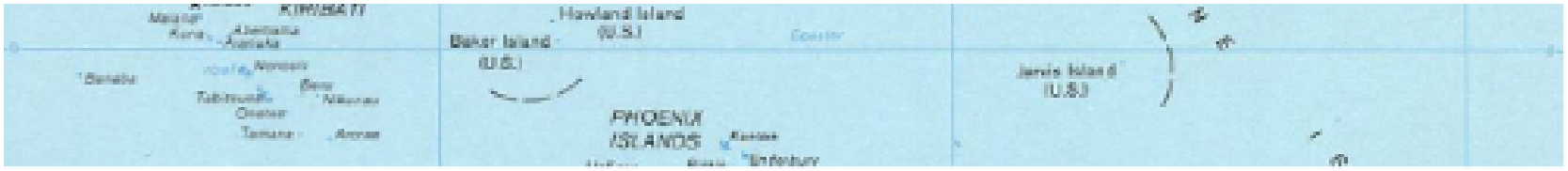
- Not applicable

ANNEX E: Project Map(s) and Coordinates

Please attach the geographical location of the project area, if possible.

The project site is South Tarawa, Republic of Kiribati, located in the South, Central Pacific. The project coordinates are: 1°26'N 173°00'E.




KIRIBATI
Howland Island
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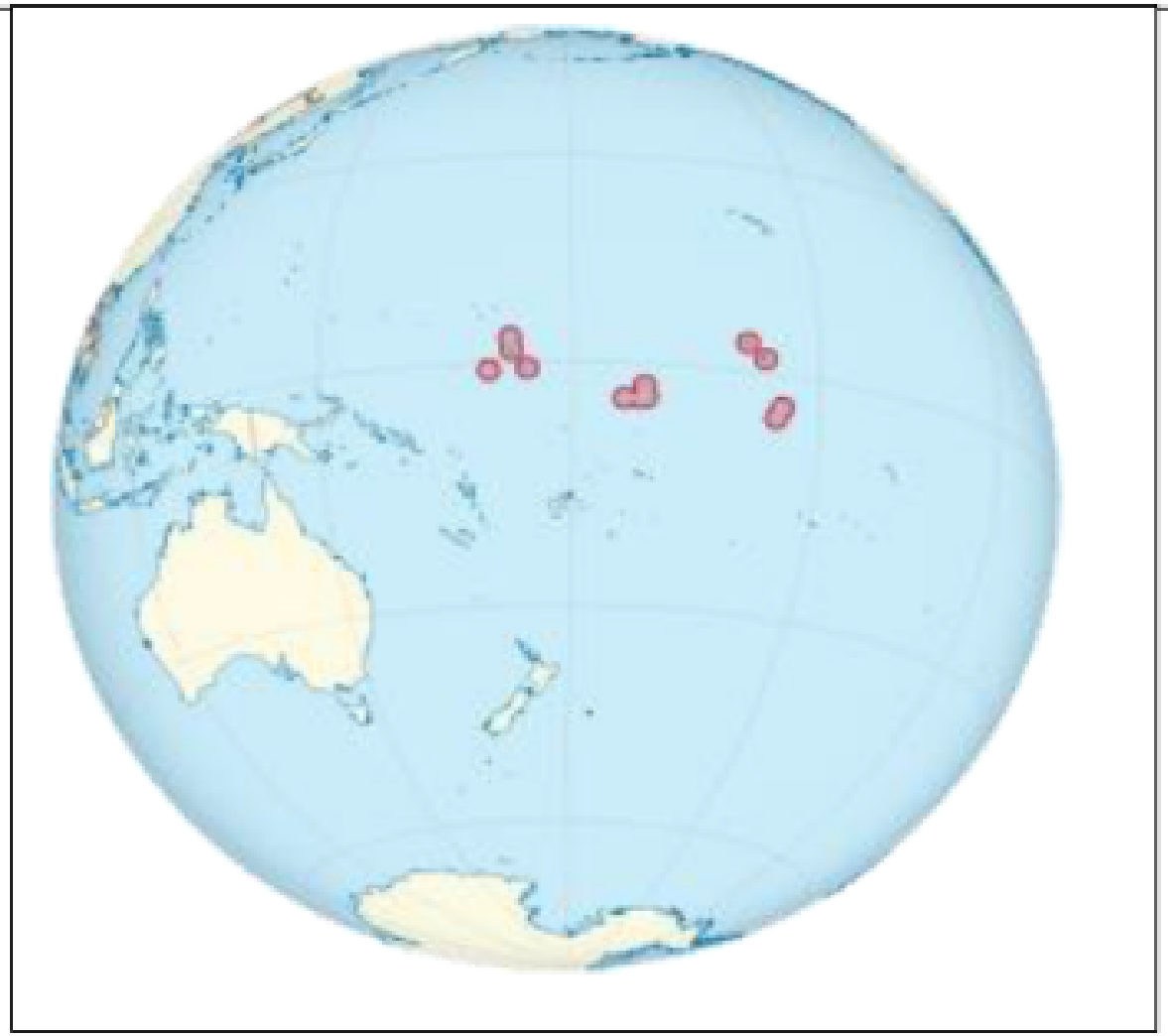
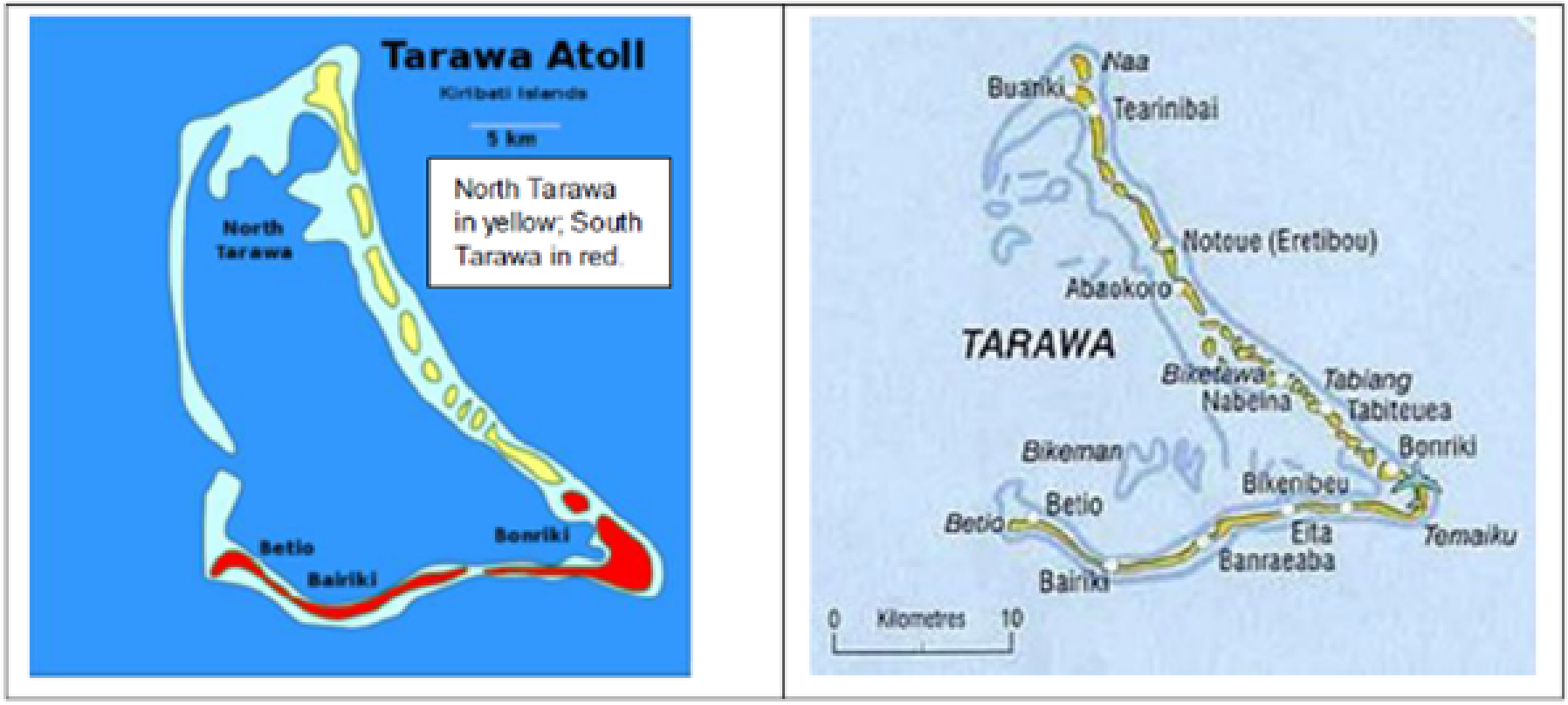
Baker Island
(U.S.)
Jarvis Island
(U.S.)
PHOENIX
ISLANDS





ANNEX F: Project Budget Table

Please attach a project budget table.

Budget for all LDCF/GEF financed inputs

Item	Output 1	Output 2	Output 3	Output 4 PMC	Total	Comment/note
Civil works	3.60	0	0	0	3.60	The options analysis, under activity 1.4.1 in the Alternative Scenario will provide a detailed cost estimates. For ease of reference these are reproduced below. It should be noted that these estimates are indicative as during project implementation, the options analysis will confirm which costs be incurred. Further, the $ 3.6 million from LDCF will be supplemented by the co-financing.
International Consultants	0	0.27	0	0.09	0.36	Includes travel costs.
National consultants	0	0.01	0	0.01	0.02	
Other	0	0.02	0	0	0.02	Includes workshops and light equipment
Contingency	0.53	0.04	0	0.01	0.58	
TOTALS	**4.13**	**0.34**	**0**	**0.11**	**4.59**	

All figures in US $ millions.
Note: Slight difference in PMC total between this budget and Part I of CER is due to rounding. PMC detailed budget is below.

Civil Works Estimates (Output 1 above):

Option # 1

a) Basic cost estimate of shoreline protection (**excluding** margins, contingencies)

Ref	Description	Unit	Quantity	Rate	Amount
	Stewart Causeway				

	Stewart Causeway				
A1	Allow for the installation and backstop concrete wall upstand	m	237	1500	355,500
A2	wall along edge of pathway to west of existing wall to prevent				
A3	overwashing, including all necessary preparations, providing				
A4	key to existing structure to receive new concrete works,				
A5	formworks and the like				
A6					
A7	Ditto but for concrete wave upstand / return wall along pavement	m	190	1500	285,000
A8	edge to minimise high tide wave overwashing to road during moderate				
A9	wave conditions				
A10					
A11	Anderson Causeway				
A12	Allow for the placement of precast concrete tetrapods or rock	m	555	3000	1,665,000
A13	revetment including all necessary preparations, craneage, and the like				
A14	along the entire length of ocean face of causeway to dissipate				
A15	wave energy before reaching the current local block / retaining wall				
A16					
A17	Allow for the installation and backstop concrete wall upstand	m	555	1500	832,500
A18	wall along edge of pathway to west of existing wall to prevent				
A19	overwashing, including all necessary preparations, providing				
A20	key to existing structure to receive new concrete works,				
A21	formworks and the like				
A22					
A23	Nanikai Bairiki Causeway				
A24	Allow for the placement of precast concrete tetrapods or rock	m	143	3000	429,000

A25	revetment including all necessary preparations, craneage, and the like				
A26	along the entire length of ocean face of causeway to dissipate				
A27	wave energy before reaching the current local block / retaining wall				
A28					
A29	Allow for the installation and backstop concrete wall upstand	m	143	1500	214,500
A30	wall along edge of pathway to west of existing wall to prevent				
A31	overwashing, including all necessary preparations, providing				
A32	key to existing structure to receive new concrete works,				
A33	formworks and the like				
		Sub Total 1			**3,781,500**
B1	**Preliminaries, Contingency**				
B2	Preliminaries and General	756,300.00			
B3	Contingencies	-			
B4	Margin	-			756,300
		Sub Total 2			**4,537,800**
C1	**Fees , VAT, Miscelleneous**				
C2	Add Vat	567,225.00			
C3	Structural Engineers and Consultant Fees (PC Sum)	30,000.00			
C4	Logistics, Handling, Freight, and insurance (PC Sum)	453,780.00			
		Sub Total 3			1,051,005
					5,588,805

					-
					5,588,805
		Budget Estimate (AUD) for whole scheme (SAY)			5,588,805
NOTES:	1) All figures are in AUD.				
	2) AUD / USD Exchange rate 31/01/2020				0.67212
		BUDGET ESTIMATE (USD)	**$**		**3,756,348**

Option #2

b) High end cost estimate of shoreline protection (**including** margins, contingencies)

Ref	Description	Unit	Quantity	Rate	Amount
	Stewart Causeway				
A1	Allow for the installation and backstop concrete wall upstand	m	237	1500	355,500
A2	wall along edge of pathway to west of existing wall to prevent				
A3	overwashing, including all necessary preparations, providing				
A4	key to existing structure to receive new concrete works,				
A5	formworks and the like				
A6					
A7	Ditto but for concrete wave upstand / return wall along pavement	m	190	1500	285,000
A8	edge to minimise high tide wave overwashing to road during moderate				

A9	wave conditions				
A10					
A11	Anderson Causeway				
A12	Allow for the placement of precast concrete tetrapods or rock	m	555	3000	1,665,000
A13	revetment including all necessary preparations, craneage, and the like				
A14	along the entire length of ocean face of causeway to dissipate				
A15	wave energy before reaching the current local block / retaining wall				
A16					
A17	Allow for the installation and backstop concrete wall upstand	m	555	1500	832,500
A18	wall along edge of pathway to west of existing wall to prevent				
A19	overwashing, including all necessary preparations, providing				
A20	key to existing structure to receive new concrete works,				
A21	formworks and the like				
A22					
A23	Nanikai Bairiki Causeway				
A24	Allow for the placement of precast concrete tetrapods or rock	m	143	3000	429,000
A25	revetment including all necessary preparations, craneage, and the like				
A26	along the entire length of ocean face of causeway to dissipate				
A27	wave energy before reaching the current local block / retaining wall				
A28					
A29	Allow for the installation and backstop concrete wall upstand	m	143	1500	214,500
A30	wall along edge of pathway to west of existing wall to prevent				
A31	overwashing, including all necessary preparations, providing				
A32	key to existing structure to receive new concrete works,				
A33	formworks and the like				

		Sub Total 1	**3,781,500**
B1	**Preliminaries, Contingency**		
B2	Preliminaries and General	756,300.00	
B3	Contingencies	1,491,032.00	
B4	Margin	1,134,450.00	3,381,782
		Sub Total 2	**7,163,282**
C1	**Fees , VAT, Miscelleneous**		
C2	Add Vat	879,198.75	
C3	Structural Engineers and Consultant Fees (PC Sum)	30,000.00	
C4	Logistics, Handling, Freight, and insurance (PC Sum)	703,359.00	
		Sub Total 3	1,612,558
			8,775,840
		Budget Estimate (AUD) for whole scheme (SAY) Rounded	**8,800,000**

NOTES:	1) All figures are in AUD.		
	2) AUD / USD Exchange rate 31/01/2020		0.67212
		BUDGET ESTIMATE (USD)	**$ 5,898,418**

PMC Costs (Output 4 above)

LDCF financed activity	LDCF financed input (US$)		Total
	National consultant	International consultant	
M + E	4,000	50,000	54,000
Knowledge management	3,000	30,000	33,000
Reporting	3,000	20,000	23,000
TOTALS	10,000	100,000	110,000