Part I: Project Information

Name of Parent Program
Climate Resilient Urban Development in the Pacific

GEF ID
10742

Project Type
FSP

Type of Trust Fund
LDCF

CBIT/NGI
CBIT **No**
NGI **No**

Project Title
Funafuti Water and Sanitation Project

Countries
Tuvalu

Agency(ies)
ADB

Other Executing Partner(s)
Ministry of Finance (Tuvalu)

Executing Partner Type
Government

GEF Focal Area
Climate Change

Sector
Mixed & Others

Taxonomy

Focal Areas, Climate Change Adaptation, Climate Change, Community-based adaptation, Disaster risk management, Sea-level rise, Livelihoods, Climate resilience, Least Developed Countries, Private sector, Influencing models, Strengthen institutional capacity and decision-making, Convene multi-stakeholder alliances, Stakeholders, Type of Engagement, Consultation, Participation, Communications, Public Campaigns, Awareness Raising, Private Sector, Beneficiaries, Local Communities, Civil Society, Community Based Organization, Gender Equality, Gender Mainstreaming, Women groups, Gender results areas, Capacity Development

Rio Markers

Climate Change Mitigation

No Contribution 0

Climate Change Adaptation

Principal Objective 2

Biodiversity

No Contribution 0

Land Degradation

No Contribution 0

Submission Date

12/2/2020

Expected Implementation Start

3/1/2023

Expected Completion Date

2/28/2029

Duration

60In 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	4,244,156.00	6,387,000.00
CCA-1	2.1 Strengthened cross-sectoral mechanisms to mainstream climate adaptation and resilience	LDCF	343,000.00	1,938,000.00
		Total Project Cost($)	**4,587,156.00**	**8,325,000.00**

B. Project description summary

Project Objective

Provision of climate-adapted, resilient, and improved drinking water supply, drainage, and sanitation services improved in Funafuti.

Project Component	Financing Type	Expected Outcomes	Expected Outputs	Trust Fund	GEF Project Financing($)	Confirmed Co-Financing($)
Component 1	Technical Assistance	1. Strengthened WASH policy environment for adapting to climate change and the delivery of urban water supply and sanitation services.	1.1 Outreach, assessment, consultation and planning (ongoing, almost complete and financed entirely by co-finance). 1.2 Improved governance in WSS sector through performance contracts. 1.3 Key skills development for staff of MPWIELD, MOF, PWD and WSD. 1.4 Pilot tariff reforms (based on comprehensive social surveys).	LDCF	75,500.00	190,000.00

Project Component	Financing Type	Expected Outcomes	Expected Outputs	Trust Fund	GEF Project Financing($)	Confirmed Co-Financing($)
Component 2	Investment	2. Resilient, effective, efficient, and sustainable public piped water supply services in Funafuti. (As explained in the Project Description below, the water supply system requires a complete renewal in part due to climate change risks. Hence there is an **LDCF contribution to all outputs**. Further, each output is designed to be climate resilient, further increasing costs.)	2.1 Assessment, consultation, planning and detailed design (ongoing, and financed entirely by co-finance). 2.2 Two elevated ?climate resilient? storage reservoirs (total 400 m^3). 2.3 Climate resilient water pumping station and pipeline. 2.4 Refurbished, climate resilient desalination plant (180m^3/day) 2.5 Climate resilient distribution network (7 villages, 25km) 2.6 New, climate resilient desalination plant (200m^3/day). 2.7 Installed operating, monitoring and maintenance equipment. 2.8 At remote sites (3 islets) upgraded and expanded household rainwater harvesting (RWH) systems.	LDCF	2,452,156.00	4,584,500.00

Project Component	Financing Type	Expected Outcomes	Expected Outputs	Trust Fund	GEF Project Financing($)	Confirmed Co-Financing($)
Component 3	Investment	3. Adapted, resilient, sustainable, safely managed, sanitation services in Funafuti (As explained in the Project Description below, the sanitation system requires complete renewal due to climate change risks. Hence, **LDCF coverage of all costs for outputs is justified**. Further, each output is designed to be climate resilient, further increasing costs.)	3.1 Assessment, consultation, planning and detailed design (ongoing, and financed entirely by co-finance). 3.2 Ten septage drying beds (Climate resilient) 3.3 Climate resilient sewage treatment plant (5k/day). 3.4 Climate resilient ocean sewage outfall. 3.5 Refurbish sanitation infrastructure and make climate resilient at 60 government and public buildings. 3.6 Waste management, treatment, monitoring and maintenance equipment.	LDCF	1,792,000.00	1,852,500.00

Project Component	Financing Type	Expected Outcomes	Expected Outputs	Trust Fund	GEF Project Financing($)	Confirmed Co-Financing($)
Component 4	Technical Assistance	4. Raised community awareness of the health and economic benefits of improved urban, water supply and sanitation services, and of adapting to climate change.	4.1 Outreach, assessment, consultation and planning (ongoing, almost complete and financed entirely by co-finance). 4.2 Development of Core and customized messages to all stakeholders 4.3 Establish Communication Channels and two-way communications mechanisms including (i) radio (ii) social media(iii) printed products (iv) meetings etc. 4.4 Build capacity to implement the Communications Strategy. 4.5 Collaborate with NGOs on implementing Communications Strategy 4.6 Establish and maintain an effective Grievance Redress Mechanism.	LDCF	45,500.00	460,000.00

Project Component	Financing Type	Expected Outcomes	Expected Outputs	Trust Fund	GEF Project Financing($)	Confirmed Co-Financing($)
Component 5	Technical Assistance	5. Asset management and institutional capacity strengthened	5.1. Operations and maintenance of assets. 5.2 Training of key government technical and utility staff	LDCF		341,000.00
Component 6	Investment	6. Monitoring and Evaluation	Monitoring and Evaluation of GEF components	LDCF	50,000.00	
			Sub Total ($)		**4,415,156.00**	**7,428,000.00**

Project Management Cost (PMC)		
LDCF	172,000.00	897,000.00
Sub Total($)	**172,000.00**	**897,000.00**
Total Project Cost($)	**4,587,156.00**	**8,325,000.00**

Please provide justification

The project will address the pressing need for provision of climate resilient, safe drinking water and other water supply and sanitation services for people living in Funafuti. It forms part of the broader 4 country program on Climate Resilient Urban Development in the Pacific.

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($)
GEF Agency	Asian Development Bank	Grant	Investment mobilized	8,000,000.00
Recipient Country Government	Government of Tuvalu	In-kind	Recurrent expenditures	325,000.00
			Total Co-Financing($)	**8,325,000.00**

Describe how any "Investment Mobilized" was identified

The Co-financing to LDCF ratio is close to 2:1. This ratio has been limited due to the tight fiscal constraints that the government is facing following their response to the Covid Pandemic. However, ADB is actively mobilizing additional funds to undertake additional activities and is optimistic to secure these in the near future. It is also noted that the total climate change adaptation costs of this project are estimated at $8.67 million, and co-financing covers 47% of the adaptation costs. See Section 1A.5 for more details.

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($)	Fee($)	Total($)
ADB	LDCF	Tuvalu	Climate Change	NA	4,587,156	412,844	5,000,000.00
			Total Grant Resources($)		**4,587,156.00**	**412,844.00**	**5,000,000.00**

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 **true**

PPG Amount ($)

PPG Agency Fee ($)

Agency	Trust Fund	Country	Focal Area	Programming of Funds	Amount($)	Fee($)	Total($)
ADB	LDCF	Tuvalu	Climate Change	NA			**0.00**
			Total Project Costs($)		**0.00**	**0.00**	**0.00**

Meta Information - LDCF

LDCF true
SCCF-B (Window B) on technology transfer false
SCCF-A (Window-A) on climate Change adaptation false

Is this project LDCF SCCF challenge program?
false

This Project involves at least one small island developing State(SIDS). true

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This Project involves at least one fragile and conflict affected state. true

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This Project will provide direct adaptation benefits to the private sector. false

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This Project is explicitly related to the formulation and/or implementation of national adaptation plans (NAPs). false

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This Project has an urban focus. true

This Project covers the following sector(s)[the total should be 100%]:*

Agriculture	**0.00%**
Natural resources management	**0.00%**
Climate information services	**0.00%**
Coastal zone management	**0.00%**
Water resources management	**50.00%**
Disaster risk management	**0.00%**
Other infrastructure	**0.00%**
Health	**0.00%**
Other (Please specify:)	**50.00%**
Total	**100%**

This Project targets the following Climate change Exacerbated/introduced challenges:*
Sea level rise true
Change in mean temperature false
Increased climatic variability true
Natural hazards true
Land degradation false
Coastal and/or Coral reef degradation true
Groundwater quality/quantity false

To calculate the core indicators, please refer to Results Guidance

Core Indicators - LDCF

CORE INDICATOR 1	Total	Male	Female	% for Women
Total number of direct beneficiaries	11,840	6,204	5,636	47.60%

CORE INDICATOR 2	
Area of land managed for climate resilience (ha)	0.00

CORE INDICATOR 3	
Total no. of policies/plans that will mainstream climate resilience	2

CORE INDICATOR 4		Male	Female	% for Women
Total number of people trained	150	90	60	40.00%

OUTPUT 1.1.1

Physical and natural assets made more resilient to climate variability and change

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		Male	Female
Total number of direct beneficiaries from more resilient physical assets	**11,840**	**6,204**	**5,636**

Ha of agriculture land	Ha of urban landscape	Ha of rural landscape	No. of residential houses **0**
No. of public buildings **0**	No. of irrigation or water structures **0**	No. of fishery or aquaculture ponds **0**	No. of ports or landing sites **0**
Km of road	Km of riverban	Km of coast	Km of storm water drainage
Other	Other(unit)	Comments	

69	Water supply - Output 2.2 Two reinforced concrete (RC) tower tanks/reservoirs will be constructed Output 2. 3 A supply pumping station AND mains pipeline?. will be constructed. Output 2.4 The existing Government operated reverse osmosis plant will be refurbished Output 2.5. Construct a climate resilient piped distribution network Output 2.6 Additional Government operated RO Desalination Plant (PWD 2) will be constructed Sanitation - Output 3.2 Construct ten septage drying beds (counted as 1) Output 3.3 Construct a climate proof sewage treatment plant Output 3.4 Construct a climate and sea level rise proof ocean sewage outfall Output 3.5 Refurbish the sanitation infrastructure (waste collection and storage and where

OUTPUT 1.1.2

Livelihoods and sources of income of vulnerable populations diversified and strengthened

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		Male	Female
Total number of direct beneficiaries with diversified and strengthened livelihoods and sources of income	**0**	**0**	**0**

Livelihoods and sources of incomes strengthened / introduced			
Agriculture	Agro-Processing	Pastoralism/diary	Enhanced access to markets
false	**false**	**false**	**false**
Fisheries /aquaculture	Tourism /ecotourism	Cottage industry	Reduced supply chain
false	**false**	**false**	**false**
Beekeeping	Enhanced opportunity to employment	Other	Comments
false	**false**	**false**	

OUTPUT 1.1.3

New/improved climate information systems deployed to reduce vulnerability to climatic hazards/variability

		Male	Female
Total number of direct beneficiaries from the new/improved climatic information systems	**0**	**0**	**0**

Climate hazards addressed

Flood	Storm	Heatwave	Drought
false	**false**	**false**	**false**

Other	Comments
false	

Climate information system developed/strengthened

Downscaled Climate model	Weather/Hydromet station	Early warning system	Other
false	**false**	**false**	**false**

Comments

Climate related information collected

Temperature	Rainfall	Crop pest or disease	Human disease vectors
false	**false**	**false**	**false**

Other	Comments
false	

Mode of climate information disemination

Mobile phone apps	Community radio	Extension services	Televisions
false	**false**	**false**	**false**

Leaflets	Other	Comments
false	**false**	

OUTPUT 1.1.4

Vulnerable natural ecosystems strengthened in response to climate change impacts

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Types of natural ecosystem

Desert	Coastal	Mountainous	Grassland
false	**false**	**false**	**false**

Forest	Inland water	Other	Comments
false	**false**	**false**	

OUTPUT 1.2.1

Incubators and accelerators introduced

	Male	Female
Total no. of entrepreneurs supported	**0**	

	Comments
No. of incubators and accelerators supported	
No. of adaptation technologies supported	

OUTPUT 1.2.2

Financial instruments or models to enhance climate resilienced developed

Financial instruments or models			
PPP models **false**	Cooperatives **false**	Microfinance **false**	Risk insurance **false**
Equity **false**	Loan **false**	Other **false**	Comments

OUTPUT 2.1.1

Cross-sectoral policies and plans incorporate adaptation considerations

Will mainstream climate resilience	Of which no. of regional policies/plans	Of which no. of national policies/plan
0		

Sectors

Agriculture	Fishery	Industry	Urban
false	**false**	**false**	**false**

Rural	Health	Water	Other
false	**false**	**false**	**false**

Comments

OUTPUT 2.1.2

Cross sectoral institutional partnerships established or expanded

No. of institutional partnerships established or strengthened

Comments

OUTPUT 2.1.3

Systems and frameworks established for continuous monitoring, reporting and review of adaptation

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No. of systems and frameworks

Comments

OUTPUT 2.1.4

Systems and frameworks established for continuous monitoring, reporting and review of adaptation

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No. of systems and frameworks

Comments

OUTPUT 2.2.1

No. of institutions with increased ability to access and/or manage climate finance

---

No. of institution(s)

Comments

OUTPUT 2.2.2

Institutional coordination mechanism created or strengthened to access and/or manage climate finance

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No. of mechanism(s)

Comments

OUTPUT 2.2.3

Global/regional/national initiatives demonstrated and tested early concepts with high adaptation potential

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No. of initiatives or technologies

Comments

OUTPUT 2.2.4
Public investment mobilized

Amount of investment (US$)

Comments

OUTPUT 2.2.5
Private investment mobilized

Amount of investment (US$)

Comments

OUTPUT 2.3.1

No. of people trained regarding climate change impacts and appropriate adaptation responses

		Male	Female
Total no. of people trained	**0**	**0**	**0**
		Male	Female
Of which total no. of people at line ministries	**0**		
		Male	Female
Of which total no. of community/association	**0**		
		Male	Female
Of which total no. of extension service officers	**0**		
		Male	Female
Of which total no. of hydromet and disaster risk management agency staff	**0**		
		Male	Female
Of which total no. of small private business owners	**0**		
		Male	Female

Of which total no. school children, university students or teachers	**0**

Other	Comments

OUTPUT 2.3.2

No. of people made aware of climate change impacts and appropriate adaptation responses

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		Male	Female
No. of people with raised awareness	**0**		
Please describe how their awareness was raised			

OUTPUT 3.1.1

National climate policies and plans enabled including NAP processes by stronger climate information decision-support services

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No. of national climate policies and plans **2**

Comments
Water supply master plan, sanitation master plan

OUTPUT 3.1.2

Systems and frameworks established for continuous monitoring, reporting and review of adaptation

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No. of systems and frameworks **0**

Comments

OUTPUT 3.1.3

Vulnerability assessments conducted

No. of assessments conducted **0**

Comments

OUTPUT 3.2.1

No. of institutions with increased ability to access and/or manage climate finance

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No. of institution(s) **0**

Comments

OUTPUT 3.2.2

Institutional coordination mechanism(s) created or strengthened to access and/or manage climate finance

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No. of mechanism(s) **0**

Comments

OUTPUT 3.2.3

Global/regional/national initiative(s) demonstrated and tested early concepts with high adaptation potential

No. of initiative(s) or technology(ies)	**0**
Comments	

OUTPUT 3.3.1

No. of people trained regarding climate change impacts and appropriate adaptation responses

		Male	Female
Total no. of people trained	**150**	**90**	**60**

		Male	Female
Of which total no. of people at line ministries	**150**	**90**	**60**

		Male	Female
Of which total no. of community/association	**0**	**0**	**0**
Of which total no. of extension service officers	**0**	**0**	**0**
Of which total no. of hydromet and disaster risk management agency staff	**0**	**0**	**0**
Of which total no. of small private business owners	**0**	**0**	**0**
Of which total no. school children, university students or teachers	**0**	**0**	**0**

Other	Comments

OUTPUT 3.3.2

No. of people made aware of climate change impacts and appropriate adaptation responses

---

		Male	Female
No. of people with raised awareness	**0**	**0**	**0**

Please describe how their awareness was raised

Part II. Project Justification

1a. Project Description

Scope: The original child project was based on a preliminary scoping - as Tuvalu was integrated somewhat late into the regional program and at that time ADB had no directly related ongoing activities. Subsequently, several scoping and planning and consultation exercises led to a re-scoping of the project, as directed by government. The project now includes covers water supply and sanitation sub-sectors. The principal reasons for this are:

- The strategic linking of the two sub-sectors: i.e. reaching objectives in either of the two sub-sectors contributes in a small way to progress in the other sub-sector;

- The institutional linkages: i.e. the same government agencies are responsible for regulating/implementation of both sub-sectors, and many laws/regulations pertain to both sub-sectors. Hence, if designed carefully, many activities and inputs will contribute to both sub-sectors;

- The physical linkages ? the actual civil works required to install infrastructure for both sub-sectors are closely related and efficiencies can be made by addressing both sub-sectors simultaneously.

It is recognized that this leads to an increase in scope, potentially significant. To address this, and to avoid ?overreach? by the project: (i) a thorough and strategic approach to both sub-sectors has been developed, with inputs and activities set across three realistic time phases ? as set out in the related master plans (see Appendices1 and 2). This project realistically addresses phase 1 of both sub-sector master plans; and (ii) additional co-financing is being sought ? although the impacts of the Covid pandemic have made this more challenging, the government and ADB remain confident that co-financing will be mobilized over the medium term.

As this is a child project under a Program, the original Program Framework Document did not provide details of the project design. Hence details are provided here.

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

Introduction

Tuvalu is an archipelago of atolls and raised limestone reefs located in the western Pacific Ocean between 5 to 11 ?S Latitude and 176 to 180 ?E Longitude. It has a total land area of 26 km2 spread over an oceanic area of 1.3 million km2. Tuvalu is one of the smallest and most remote countries on Earth, it is a small island developing state, a least-developed country and is on the list of fragile and conflict

affected states. According to United Nations data, the resident population of Tuvalu is projected to be 11,931 as of July 1, 2021[1][1], and is projected to reach 13,164 in 2030.[2][2]

Tuvalu?s economy is very small, fragmented, lacks diversity and is highly dependent on imports and highly reliant on revenue from overseas sources. It is remote from major markets with a narrow production base, has a weak banking subsector that constrains credit availability and a very narrow human resources pool. Growth is mainly driven by public expenditure. The economy, and society in general, is highly vulnerable to climate change impacts, especially loss of land and potable water because of sea-level rise and saltwater intrusion.

Funafuti is an atoll island and is the capital of Tuvalu. It is the most populated island of Tuvalu, having over 50% of the nation's population, and is the only true urban area in Tuvalu. The resident population increased from 3,962 in 2002 to 5,436 in 2012 and 6,630 people in 2017. The population density is over 2,200/km2. These population trends are driven by migration from the outer Islands to Funafuti, along with migration from Funafuti to overseas.

Tuvalu's location in the Pacific | Funafuti in Tuvalu | Funafuti

As described by Wikipedia, Funafuti is ?*a narrow sweep of land between 20 and 400 meters wide encircling a large lagoon (Te Namo) 18 km long and 14 km wide*?. The land is made up of 33 islets with an aggregated area of 2.4 km2. The average elevation is under 2m and the highest point is under 6m.

Sanitation on Funafuti ? current situation

For full details refer to Appendix 1, the draft Funafuti Sanitation Master Plan (2022-2042).

Sanitation on Funafuti consists entirely of on-site treatment and disposal ? there is no centralized collection system nor centralized treatment system. The water sanitation system on Funafuti consists of approximately 800-900 simple septic systems. Ideally, each individual system would consist of a septic tank and a soil absorption field that would effectively break down and treat human excreta. However, due to limited land space, very few systems include an absorption field. The septic systems serve individual households, government buildings, public buildings (e.g. toilets, schools, churches, etc) and commercial buildings. The sewage is regularly collected (known as de-sludging) from the septic tanks by a specialized government truck and transported to a disposal site at the northern end of the Atoll (at the northern end of the Fongafale Islet).

According to the WHO/UNICEF Joint Monitoring Programme (JMP), sanitation levels of service can be ranked into five levels as follows: open defecation; unimproved; limited (improved); basic (improved) and safely managed (improved). On Funafuti, during most periods, sanitation service levels for most of Funafuti would normally be considered as basic (improved) with some villages/household clusters considered as limited (improved). However, during extended dry spell/drought situations, due to the scarcity of water, sanitation service levels drop, and a significant number of households experience ?unimproved? levels of sanitation for significant periods of time ? up to several months. In these situations, there can often be a return to open defecation practices using the lagoon.

Septic tanks should be constructed with a watertight structure to avoid escape and leakage to local ground. However, on Funafuti, due to financial constraints, in the past it has often been common to construct septic tanks with poor materials and even without a floor ? leading to a risk of leakage into urban areas during floods. This risk is somewhat exacerbated by the shallow installation of the septic tanks ? the top of septic tanks constructed in Funafuti are usually finished with the top at ground level - and this for many properties may be only 1 to 2 metres above mean sea level (MSL), and for many lower properties may even be slightly below mean sea level.

In recent years, due to rising sea levels, increased storm surges and increased intensive rainfall events, there has been an increasing occurrence of tidal intrusion and floods. This has led to important health risks. Further, the saltwater in particular, and the flooding in general, can damage the structure of septic tanks and interrupt the degradation process in the tanks. This clearly impacts the service level

classifications (on the JMP scale) ? with the population starting to move backwards on this scale (more details of climate change impacts provided below).

Finally, as mentioned above, a specialized desludging truck transports the semi-processed and raw septage to a disposal site that is situated approximately 800m from the northern end of Fongafale Islet. The waste is then emptied it into old excavation pits (a former source of construction rocks) and left to drain to the ocean. This disposal point is approximately 10 meters from the high-tide mark on the ocean side and approximately 30 meters from the lagoon. With climate change, this site will be increasingly overrun by storm surge as there is no natural barrier. There is some evidence to suggest that this is contributing to pollution of the lagoon and impacting the lagoon?s ecosystem. In addition, the dumping site itself is an environmental hazard.

Water supply on Funafuti ? current situation

For full details refer to Appendix 2, the draft Funafuti Water Supply Master Plan (2022-2042).

Water capture and storage. Traditionally, people mostly depended on groundwater wells for drinking, cooking and washing. These practices started changing after the arrival of missionaries when churches were constructed often together with large water storage catchments.[3][3] Since the 1980?s, these storage reservoirs have been progressively complemented by government, community and individual household rainwater storage tanks. This process has notably been supported and partly financed by international development partners. Currently, on Funafuti, groundwater is considered too polluted to be of use. Current water harvesting storage capacity is spread at many sites across the island and the estimated storage volumes are provided in Table 1.

Table 1: current water storage facilities and capacity

Source	Total Storage capacity in 22 (litres) (estimates)	Notes
Government storage	8,318,000	This includes national government sites and local government (Kaupule) sites

Community storage	3,426,000	
Household tanks	13,058,000	This is spread across households in the 8 villages of Funafuti Anecdotal evidence suggests that 30-35% of the collection equipment is in poor condition
Total	28,802,000	

Water production. There are two sizable reverse osmosis (RO) desalination plants on Funafuti located at the headquarters of the Public Works Department (PWD). The larger unit (180 m3/day) is in good condition. It is located in a purpose-built plant building and the potable water produced is then piped to a tank storage farm behind the building. The smaller unit (100 m3/day) is considered operational but in poor condition.

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Water distribution. There is no centralized or piped water distribution system on Funafuti. PWD currently operates two (2) water tanker trucks (1 x 10,000 L capacity and 1 x 5,000 L capacity) to transport/deliver water from the RO desalination unit and from water storage facilities to other storage sites, to commercial businesses, to ships/vessels and, during drought periods, to households in Funafuti.

Hence the government?s approach has been: (i) encourage the maximization of individual household storage, with households responsible for tank management, in order to create a degree of household autonomy, and; (ii) complement with government driven storage, which is used to (a) provide to households without functioning tanks and (b) supply all consumers during times of drought when community and household reserves run dry.

According to a WHO classification system[4][4], clean water access levels can be classified into the following: inadequate (below 5.3 litres per person per day, lpd); basic (below 20lpd), intermediate (around 50 lpd) and optimal (over 100 lpd). Table 2 gives an indication of the days of water supply that can be currently provided from the various storages.

Table 2: days of water supply if no rain on Funafuti

Source	Total storage (litres)	Days of water supply available at:		
		10 lpd	50 lpd	80lpd
Government storage	8,318,000	95	19	12
Community storage	3,426,000	39	8	5
Household tanks	13,058,000	150	30	19
Total		**284**	**57**	**36**

In addition, the larger RO plant can provide 12lpd to domestic users and 8lpd to commercial users. Note, also, that provisions have to be made to supply water to marine vessels.

If we consider the ?intermediate? access level, i.e. around 50 lpd, current systems can provide approximately 50-60 days of service if there is a sustained drought.

The current water supply system faces the following challenges:

? Storage capacity remains limited, both at household and national level. After short dry periods, households run dry very quickly. Longer dry periods can lead to government and community storages running runs dry (see more details below);

? Significant parts of the infrastructure are exposed to climate damage hazards ? from storm surge, flooding, strong winds, intensive rains etc (see more details below);

? The system relies on household ability to manage and maintain household infrastructure. However, for many households, it is simply not possible to maintain rainwater storage systems. On Funafuti, there have been many previous awareness raising programs on household RWH, covering the importance of RWH, its maintenance, and how to maintain. This also includes recent efforts by PWD to encourage/promote household RWH. However, the results have been incomplete, particularly with regards to maintenance, and many household RWH systems are not performing well. Hence, even during rain plentiful times, these households depend on the ability to purchase water from PWD in a timely manner. In summary, household RWH can be considered a good strategy to lower consumer costs for some consumers outside of dry periods. It should not be

considered a poverty targeting strategy, and it should not be considered a good strategy to improve water security during dry periods - as the storage capacity is insufficient and they can run dry ;

? The distribution system depends on a single tanker. Clearly, the system is vulnerable to the tanker breaking down. This is also a highly constraining factor at times when there is a need to distribute large amounts of water.

Funafuti - geography, geology and hydrology

There is no surface water on any of Tuvalu?s islands. Further, the coarse sediments generally do not sustain fresh groundwater lenses to the extent of other atoll countries in the region. Hence, all the islands lack quality groundwater resources and rely on rainwater collection for drinking and food preparation.

There are four inhabited islands of the Funafuti atoll: the main island of Fongafale and the three islets of Amatuku located to the north of Fongafale, and Papaelise and Funafala located to the south. Fongafale, where the national capital of Funafuti is located, is divided into seven village groups, named from north to south, - Lofeagai, Teone, Fakaifou, Senala, Alapi, Vaiaku and Tekavatoetoe. All villages are under the Funafuti Kaupule (local government). (See Maps in Annex E).

On Funafuti, the environment is characterised by small coral atoll islets, where the groundwater table is generally within 1?1.3 metres (m) of the surface, and even higher in some parts. Only in very limited areas of the Funafuti islets can groundwater be found at depths greater than 2 m and it most of these locations it is being steadily infiltrated by seawater. Hence the groundwater resources are naturally exposed.

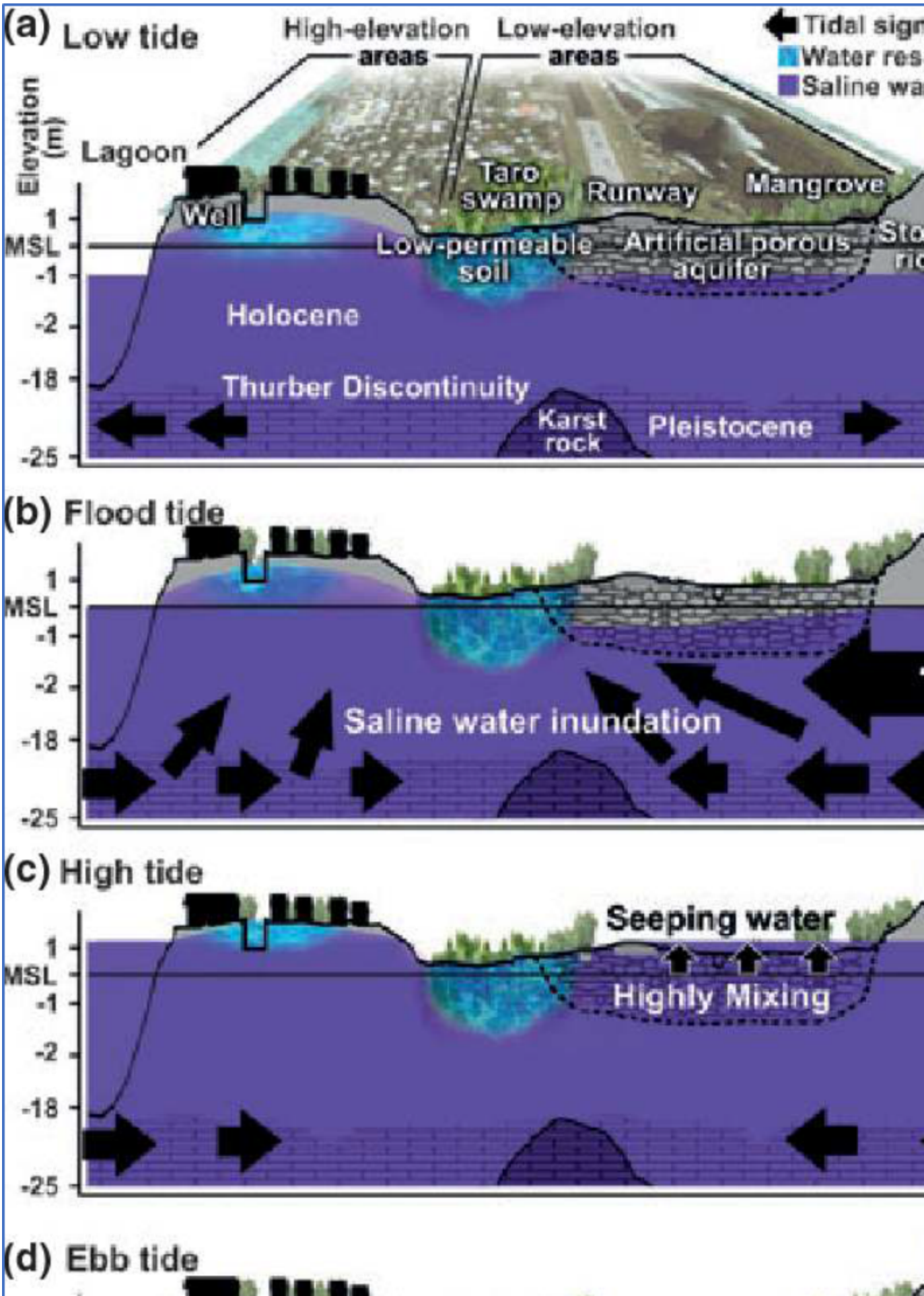
(a) Low tide
High-elevation areas
Low-elevation areas
Tidal sign
Water res
Saline wa
Elevation (m)
Lagoon
Well
Taro swamp
Runway
Mangrove
1
MSL
-1
-2
-18
-25
Low-permeable soil
Artificial porous aquifer
Holocene
Thurber Discontinuity
Karst rock
Pleistocene
(b) Flood tide
Saline water inundation
(c) High tide
Seeping water
Highly Mixing
(d) Ebb tide

Figure 1: Illustrating changes in conductivity in ground waters as a function of the tidal cycle.

Previous geoelectric and hydrologic surveys on Fongafale have revealed that saline water is largely immersed in the surficial Holocene aquifer, indicating that there is no thick freshwater lens Islet, unlike in other atoll islands of comparable size. Further, half of Fongafale islet was constructed by reclaiming the original swamps using porous, highly permeable coral blocks - these reclaimed areas should not be considered as part of the islet width for calculation of the expected thickness of the freshwater lens (see diagrams in Figure 1).

The surveys revealed large changes in bulk resistivity and the electrical conductivity of groundwater from well samples. This indicates a periodic salinization in phase with the semidiurnal tides, especially in areas at lower elevation than the high-tide level and in reclaimed areas with high permeability. This is a regular tidal incursion of groundwaters.

The thin and fragile lens and the regular tidal incursion mean that even under normal circumstances water supply and sanitation infrastructure is at risk of leakage and contamination. Further, storm and tidal surges, progressively exacerbated by climate change, mean there may be even more regular contact between sea water and infrastructure.

In addition, pollution of the lens and groundwater through the land is thought to discharge into Te Namo lagoon, and this is thought to have contributed to the collapse of the near-shore reef marine systems. These coastal areas are a major source of livelihood and contain marine biodiversity of conservation value.

Water supply and sanitation (WSS) - institutional setting

Figure 2 shows the institutional structure of Tuvalu?s WSS sector.

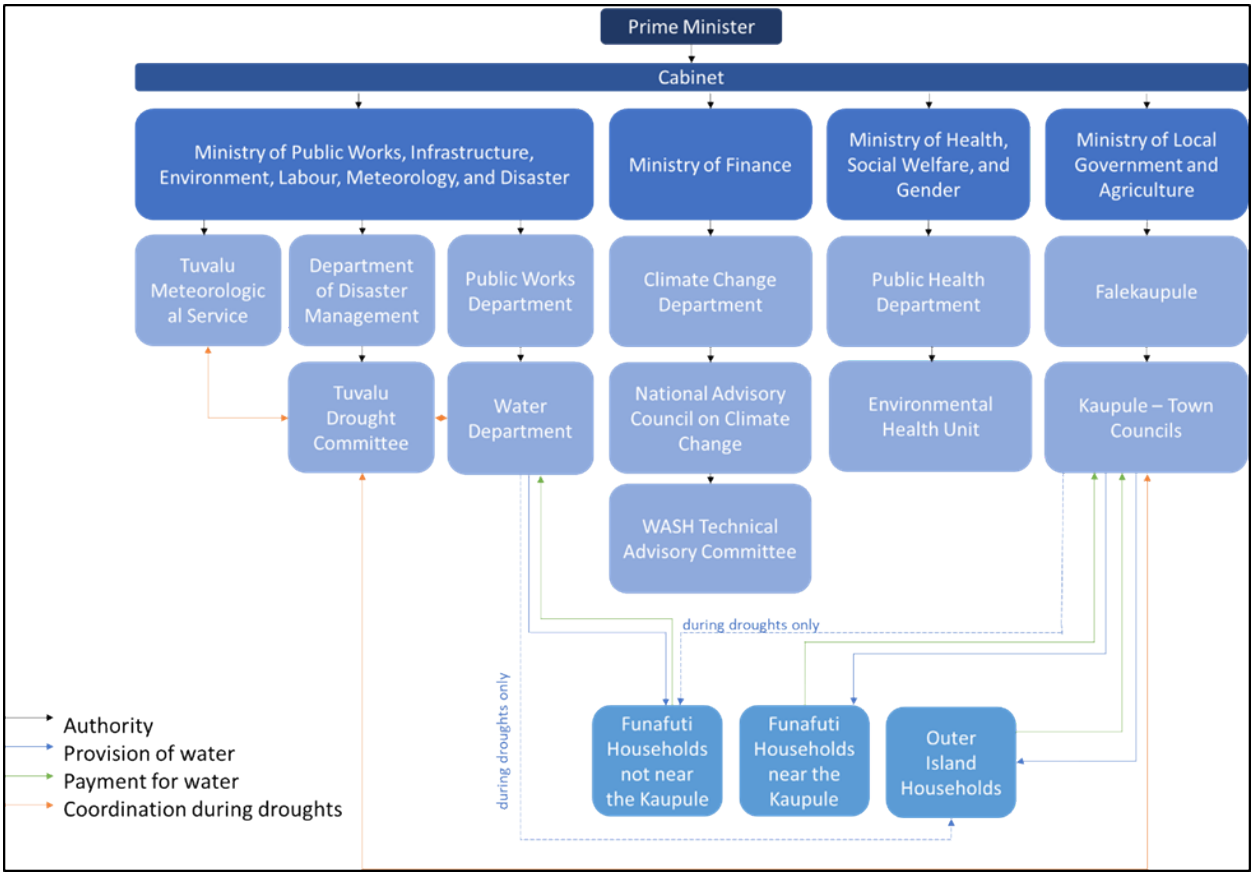

Figure 2: Institutional structure of the water supply and sanitation sector in Tuvalu

The range of institutions involved in water supply and sanitation covers Government committees, ministries and departments, regulatory bodies, local government, churches, schools and private sector. Appendix 4, t*he Tuvalu Water, Wastewater, and Sanitation Sector Institutional Framework & Capacity Development Plan*, provides further details.

Key governance roles are provided by the following:

The Ministry of Public Works, Infrastructure, Environment, Labour, Meteorology, and Disaster (MPWIELMD) is responsible for the provision of public infrastructure; for environmental protection and resource conservation; for weather and climate forecasting; and for disaster mitigation. The ministry is also responsible for water and sanitation policy, construction and maintenance of water infrastructure/assets, water production, and distribution.

The **Public Works Department** (PWD) under the MPWIELMD is responsible for implementing the Water Supply Act. The Water Department of the PWD acts as the Water Authority (as described in the Water Supply Act), which is the governing agency of water management at the national level. Responsibilities include tariff setting; water storage and distribution from Government cisterns; collection of water fees; construction and maintenance of Government building water supply and septic; operation and maintenance of Government desalination units (this is reliant on donor grant funding, which the PWD writes proposals for); providing the public with technical advice on WSS (including ads on radio/TV); setting building codes that include sanitation, rainwater harvesting, and inspection of Government building wastewater systems; supervision of plumbing works; and coordinating the National Water and Sanitation Steering Committee. The PWD prioritizes provision of water to the Government (including Government offices/departments, the Minister, and civil servant homes) and consumption needs of the boats which serve the outer islands. It makes daily delivery of water to households in Funafuti (those not served by the Kaupule) but also reserves some water for times of drought (determined by both rainfall and demand). The department is governed by the Sustainable and Integrated Water and Sanitation Policy and the Water and Sanitation Action Plans (which it developed). The PWD also has a Water Quality Officer, who makes sure water is clean before delivery and instructs households to boil the water if it has not been tested.

The **National Water Steering Committee** (WSC), under the MPWIELMD is responsible for policy guidance on project implementation and management, such as institutional strengthening; and for ensuring that project outcomes align with the Government?s priorities and objectives. This committee was founded by an International Waters Programme project to advise the Government on priority WSS issues, but was reported as mostly inactive following the end of that program.[5][5] While active, the committee members included representatives from the Office of the Prime Minister, Ministry of Natural Resources, Ministry of Home Affairs, Ministry of Foreign Affairs, the Treasury Department, the Ministry of Education, the Office of the Prime Minister, the Ministry of Health, several Island community leaders, several compost toilet owners, and several program coordinators.

Policy, Legal and Regulatory Framework

Tuvalu?s WSS sector is guided by the following strategies, laws, and regulations.

? National Sector Strategies and Plans. Tuvalu has national strategies that directly and tangentially guide the WSS sector development. In addition to strategies specific to the water and sanitation sectors, Tuvalu also has strategies on sustainability, climate change, environmental management, and health; and a national investment plan, which address water and sanitation challenges.

? Laws. The existing laws define some responsibilities within the sector and provide a legal basis for potable water, adequate sanitation, and protection of water resources.

? Regulations. The existing regulations set water tariffs and standards for safe drinking water and proper sanitation facilities.

? Funafuti-Specific Strategies, Laws, Regulations. Funafuti has a strategic plan with some objectives for the WSS sector.

Appendix 4 provides information on these.

Notably, the management of water supply and of sanitation in Tuvalu is governed by the *Public Health Act, the Water Supply Act, the National Building Code of Tuvalu (Draft 2021)* and various other regulations. These are also considered in detail in Appendices 1 and 2.

Pricing and cost recovery

Sanitation: Currently, infrastructure costs are covered by either the user, donor projects or a combination of both. Customers requesting a service from the PWD septage pump-out truck are required to pay for this service. The cost is AU$60 for households and government agencies, AU$180 for commercial entities. In 2021, the PWD collected AU$30,000 through this charge. This is paid to Treasury into the national budget.

Water supply: Customers utilizing the water distribution service operated by PWD from Government tanks/cisterns and the desalination plants are required to pay for this service. The Unit cost depends on the volume purchased and the consumer status, and ranges from AU$0.35/liter for households to up to AU$1.34/liter for commercial users and ships. Although in many cases this may cover unit production/delivery costs, it is unlikely that this leads to full cost recovery. For further details refer to Appendices 1 and 2.

Notably, with regards to water supply, overall current tariffs are well below the cost of service, and even well below the cost of operating and maintaining the desalination units. Government does provide subsidies to the sector, but the subsidies are not sufficient to cover the cost of new capital expenditure.

Climate and climate change on Funafuti

Tuvalu?s climate is hot and humid with very little variation in temperature. The minimum air temperature is 25?26?C and the maximum temperature is 31?32?C all year round. The average annual rainfall ranges from 2,900 mm in the northern islands to 3,400 mm for the southern part of Tuvalu, including Funafuti.

Rainfall patterns are characterized by a dry season from May to October and a wet season from November to April (see Figure 3).

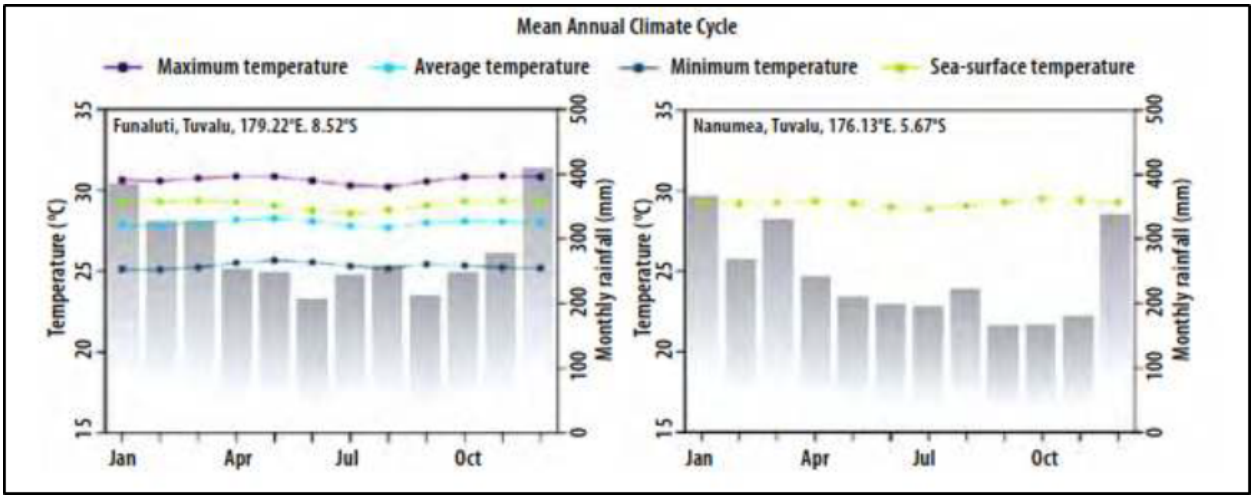

Figure 3: Mean climate parameters - Funafuti

Tuvalu lies within the trade winds zone but on the edge of the South-west Pacific equatorial doldrum zone. Wind speeds are typically in the order of 10 knots. Although tropical cyclones occasionally develop in the vicinity of Tuvalu, hurricane force winds are rare in Tuvalu. However, although rare, destructive cyclones have been experienced in Tuvalu.

Like other Pacific Islands, inter-annual rainfall variability is high in Tuvalu and influenced by El Ni?o Southern Oscillation (ENSO) events. The El Ni?o phase generally brings wetter conditions, whereas La Ni?a generally brings dryer conditions. The northern islands such as Nanumea are more affected by the El Ni?o cycle. During an El Ni?o phase, rainfall can be five times the average (twice as much for Funafuti). La Ni?a years, in contrast, can bring severe droughts.

Tuvalu is vulnerable to several extreme hazard events: (i) tropical cyclones (TC); (ii) spring (or king) tides; (iii) drought; and (iv) intensive rainfall ? often associated with tropical cyclones.

In late 2021, CSIRO and SPREP published ??*NextGen? Projections for the Western Tropical Pacific: Current and Future Climate for Tuvalu*? [6][6] (CSIRO, SPREP, 2021). This is the most up to date and complete review of recent climate change and projected climate change. Although much of the underlying data is not new (the report uses much of the same underlying datasets and information from the earlier Pacific-Australia Climate Change Science and Adaptation Planning (PACCSAP) reports[7][7]), it presents the information in new ways and with more context and detail. It also analyses and presents new findings with regards to sea level rise (SLR) and TCs.

Observed Trends

Climate change is underway and evidenced by observations made on Funafuti. According to CSIRO, SPREP (2021):

? Compared to the period 1850-1900, Tuvalu likely experienced around 0.6?C warming up to the period the 1986-2005 and, due to warm years since 2000, around 0.8?C warming up to the 2011-2020 baseline period;

? Step-like changes in temperature through time have occurred in the past, including an apparent step increase since 2000. Further step-like changes should be expected in the future;

? Historical rainfall trends are unclear given poor data coverage and very high variability. Also, the projected direction and magnitude of rainfall change is less clear than for temperature;

? Importantly, for warming, the observed warming trends from the period 1986-2005 until today are ?tracking? within the range of the 2030 temperature projections described in the earlier PACCSAP reports (2014), suggesting that the PACCSAP projections are a reliable guide to the ongoing temperature trend.

The PACCSAP (2014) report had not established clear trends with regards to droughts and intense rain.

Sea level rise. The Pacific country report ?Sea level and climate: their present state? [8][8] describes the current context regarding SLR for the island. As of December 2009, based on the short-term sea level trend analyses performed by the National Tidal Centre using the Tuvalu SEAFRAME data, a rise rate of +5.1 mm per year had been observed. Accounting for the inverted barometric pressure effect and vertical movements in the observing platform, the net sea level trend was +4.7 mm per year.

As can be seen in Figure 4[9][9] (provided by TCAP), for the given representative cross-section of Funafuti, significant areas of land already lie below the level of the highest recorded sea level. The combination of climate induced sea level rise, increased storm surges, low elevations and geology have contributed to the growing phenomena of tidal intrusion flooding. This can act in combination with rain-induced flooding ? also occurring at increasing rates and affecting ever larger areas. The tidal flooding often occurs from underground in the middle of the islands. This is further exacerbated by high and spring (king) tides events.

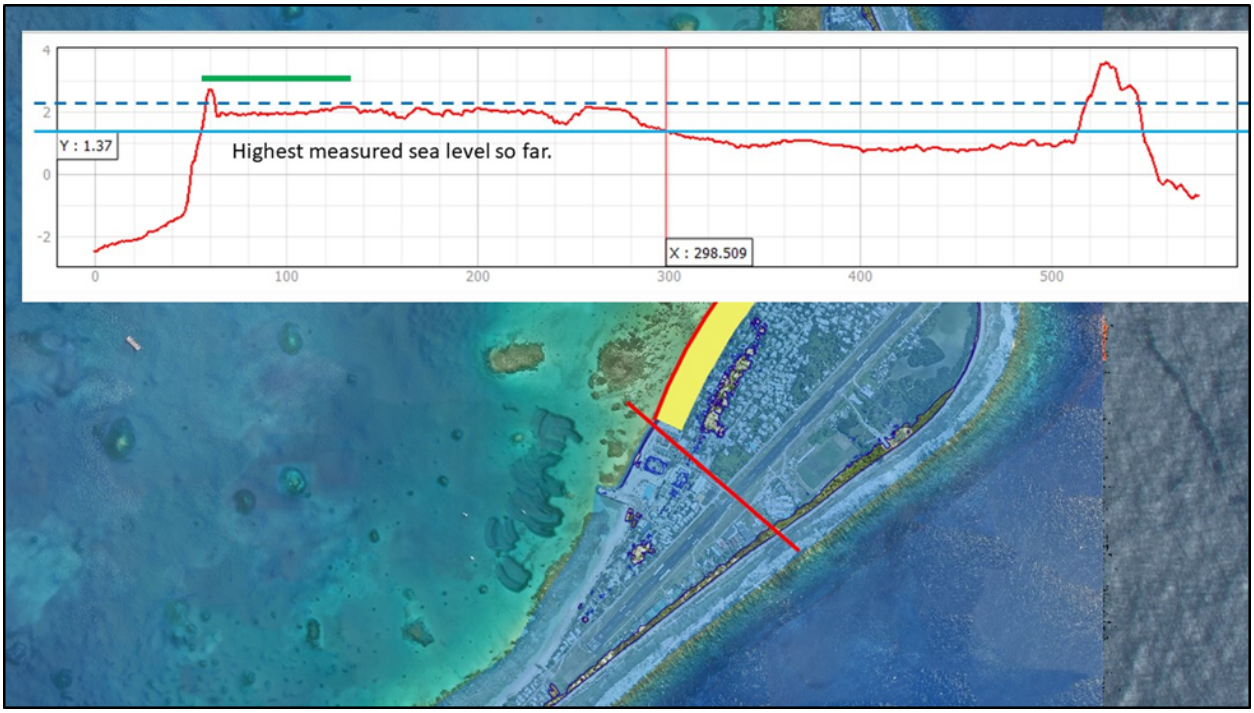

Figure 4: Illustrating how sea level is superior to land height at certain points on Funafuti.

Projected Climate Change

For the year 2050 (which corresponds approximately to the end of the current project?s impacts), CSIRO, SPREP (2021) prepared four standardized scenarios for climate changes compared to the baseline period around 2000. These are summarized in Table 3.

Table 3: Standardized climate change scenarios for 2050

	Scenario 1 SPCZ moves south Weaker equatorial warming	Scenario 2 SPCZ moves north Stronger equatorial warming
Low emissions (RCP2.6)	***Warmer & drier*** • Annual temperature: +0.6°C • Annual rainfall: -5% • More heatwaves • Less humidity • More solar radiation • Heavier rainfall events • Greater tropical cyclone impacts • Sea level rise: 17-29 cm	***Much warmer & wetter*** • Annual temperature: +0.9°C • Annual rainfall: +20% • More heatwaves • More humidity • Less solar radiation • Much heavier rainfall events • Greater tropical cyclone impacts • Sea level rise: 17-29 cm
High emissions (RCP8.5)	***Much warmer & much drier*** • Annual temperature: +1.1°C • Annual rainfall: -20% • More heatwaves • Less humidity • More solar radiation • Heavier rainfall events • Greater tropical cyclone impacts • Sea level rise: 19-37 cm	***Hotter & wetter*** • Annual temperature: +1.9°C • Annual rainfall: +15% • Many more heatwaves • More humidity • Less solar radiation • Much heavier rainfall events • Greater tropical cyclone impacts • Sea level rise: 19-37 cm

Notes on Table 3:

? These are indicative scenarios based an initial scan of climate change impacts. Detailed impact/risk assessments are needed in order to consider a more comprehensive range of scenarios tailored for specific regions, sectors or systems;

? The main uncertainties affecting the ultimate climate change destination, in addition to global emissions, are: (i) climate sensitivity for the Pacific region and (ii) the response of the South Pacific Convergence Zone (SPCZ) to global warming.

Accordingly, when planning future development and investments until the year 2050, the following possibilities should be accounted for:

- Annual average temperature increases up to 1.9?C, and many more hot days and heatwaves;
- Greater TC impacts in terms of storms and winds;
- Much heavier rainfall events;
- Sea level rise up to 37cm.

Drought

Historically, Tuvalu experiences dry weather for up to 3-4 months of the year, as well as extended periods of drought (SOPAC, 2007). PACCSAP (2014) found that for Tuvalu the overall proportion of time spent in drought is expected to decrease under all scenarios. However, there was low confidence in this projection. CSIRO, SPREP (2021) provided no additional insights on droughts.

Cascading and compounding impacts

The key cascading and compounding pathways pertinent to Tuvalu are relate to sea level rise, storm surge, increased TCP intensity and increased extreme rainfall. These can combine to lead to more regular sea flooding, more regular tidal incursion, and more regular rain flooding. These in turn can lead to more coastal erosion and more damage to the natural coastal defences provided by coral reefs and mangroves, thereby increasing exposure of assets on Tuvalu.

Climate and climate change challenges to water supply and sanitation on Funafuti

Sanitation

As described previously, the existing wastewater treatment system is based on on-site storage (in septic tanks), with limited on-site treatment (in the tanks or in adjacent fields), then collection and transport (by specialized truck) and disposal without further treatment at a single site at the northern end of Fongafale islet. As a result, wastewater is held next to almost all households, in a state of natural decomposition, for some time, in shallow septic tanks.

This system is beginning to show serious failings, in great part due to ongoing climate change. These failings are going to increase with climate change, notably as sea level rise continues. The key pathways through which climate change is undermining the current sanitation system is illustrated in

Figure 5. As seen from the Figure, increased rainfall, sea level rise and increased storm surges act independently but mostly in combination on this septic system. Each of these three climate factors is increasingly causing physical damage to the septic tanks. Also, each is increasingly leading to a more regular and un-controlled flushing of waste water out of tanks into public areas. Further, increased saline infiltration into tanks can slow or stop the natural decomposition of wastewater, thereby rendering the process less efficient. These impacts are significant.

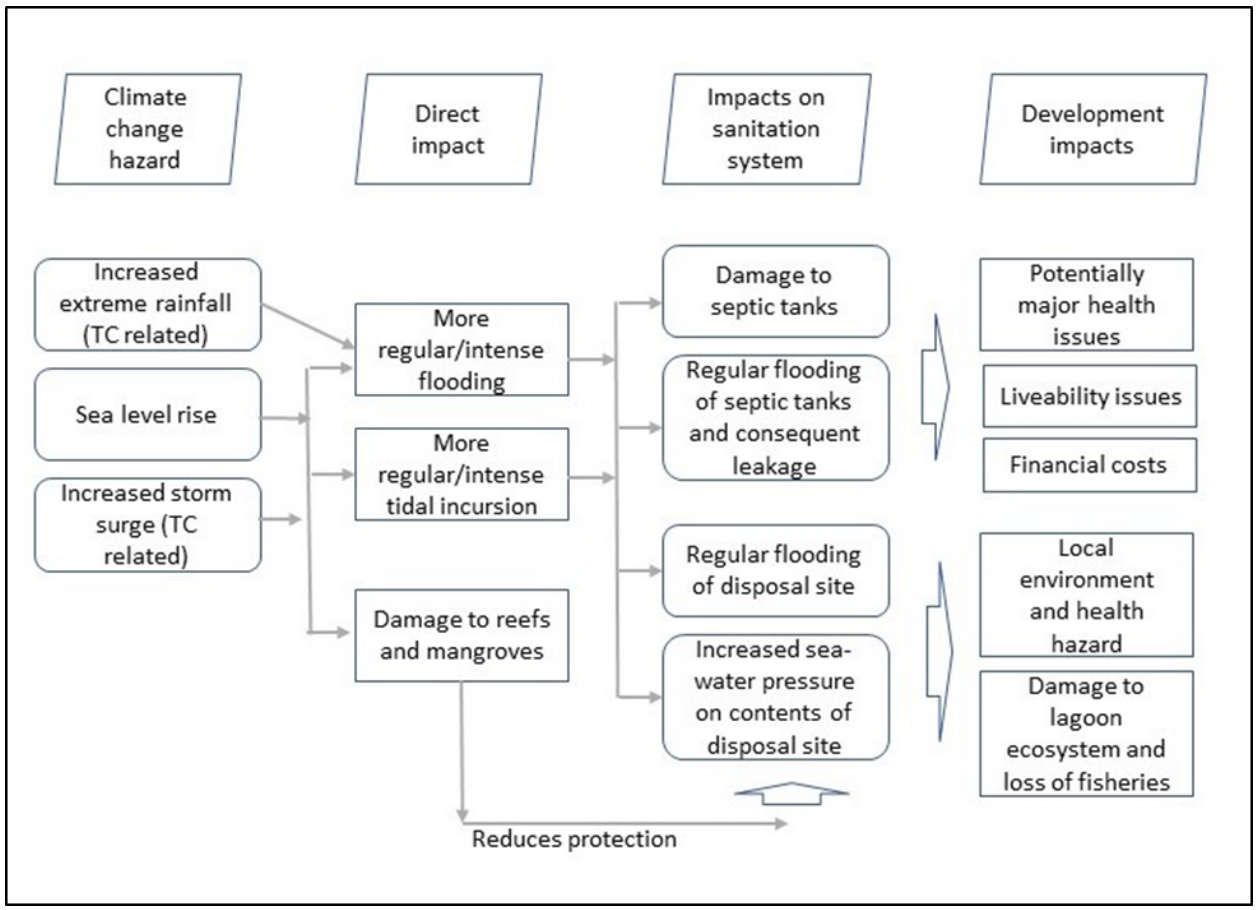

Figure 5: illustrating pathways through which climate change is undermining existing sanitation system

Note: in addition, drought is a climate hazard that undermines the functioning of the sanitation system. This is, however, considered a water supply issue and is addressed through the section below.

Examples of failings that are already, and increasingly, observed on Funafuti are: (i) wastewater escaping septic tanks during flooding events and impacting the local community; (ii) saline water entering septic tanks through floors causing infrastructure damage; (iii) the slowing or stopping of

excreta degradation processes in tanks due to salinization; and (iv) pollution and ecosystem loss at Te Namo lagoon. These can all become extremely serious public health issues.

Hence, due in great part to climate change, it is necessary to replace the current sanitation system with a system that is adapted to climate change and climate proof. For further details, see Appendix 1.

Water Supply

The situation with water supply is somewhat different. Although the water supply system is failing, this is due to a combination of development challenges and climate change impacts.

The pathways through which development and climate change are undermining the current sanitation system are illustrated in Figure 6.

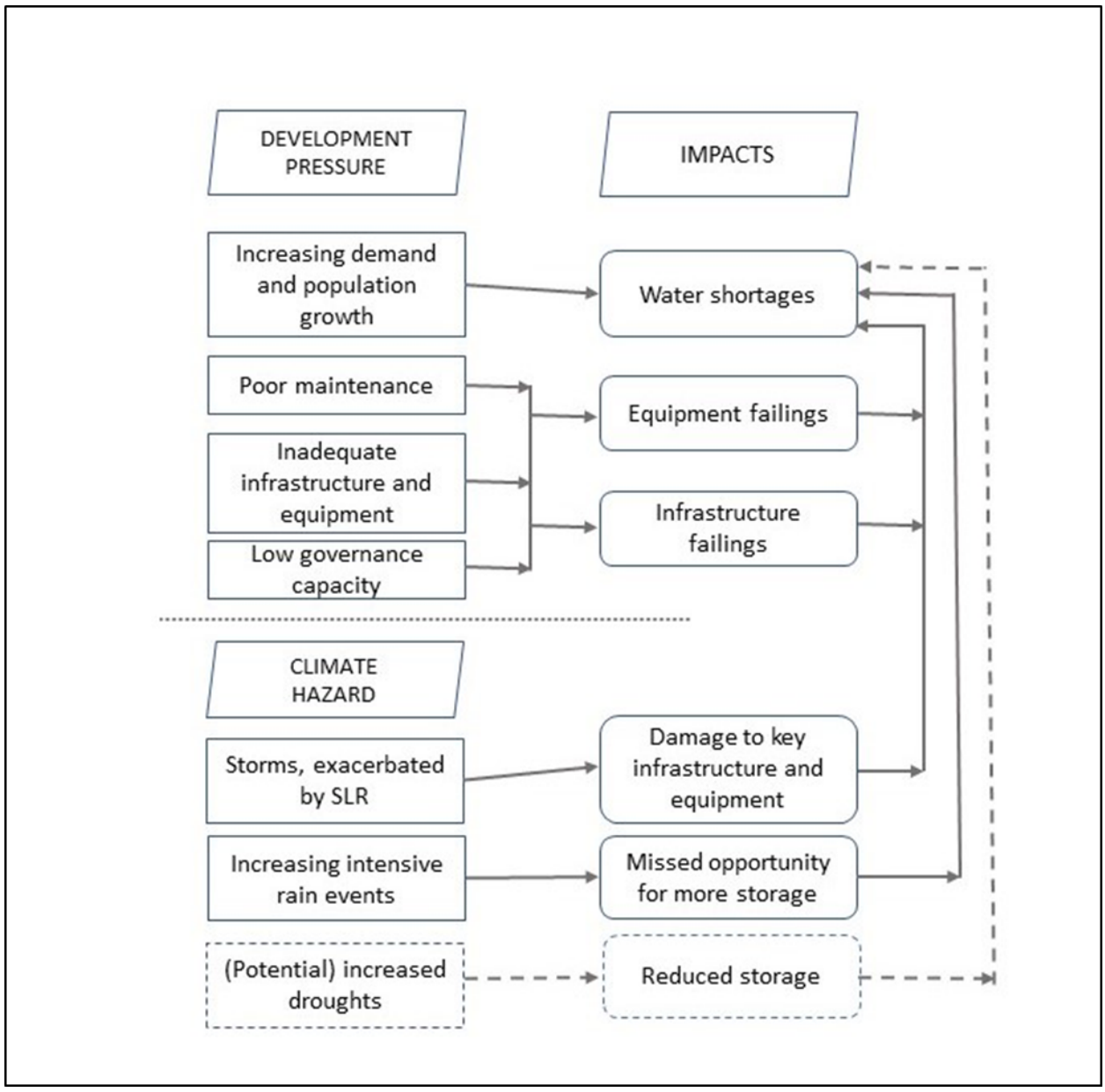

Figure 6: Illustrating pathways through which development pressures and climate change are undermining existing water supply system

As illustrated in the diagram, growing development pressures challenge the water supply system. As described in the previous sections, there is no centralised water supply, water storage depends on a large number of stakeholders, and water transport equipment is very limited. Much of the water storage facilities are poorly maintained or managed, meaning water important losses in terms of quality and quantity. As population pressure grows, the system will fail increasingly.

However, as also illustrated in the diagram, climate change is also contributing to undermining the current system. Firstly, all equipment and infrastructure are constructed upon sites that are no more than 1.5 to 2.5 metres above the sea level. This includes storage reservoirs, desalination plants and the wells to supply the plants. They are already being impacted upon by king tides, high tides and storm surge wave actions, which result in erosion and overtopping of protection infrastructure, particularly along the foreshore on the lagoon side of Fongafale Islet. These impacts also caused direct damage to equipment and infrastructure. Of particular note are the desalination plants that are the only source of water that is drought proof. The wells providing the plants with sea water are increasingly vulnerable to damage and blocking from climate events.

As a result of climate change impacts and development pressures, there are increasing water storage issues, and infrastructure and equipment failings. The solution is a modern, centralized water production/collection, storage and distribution system. Further, this system must be climate proofed ? resilient to sea incursion, rain floods, and increasing storms. And, due to climate change, duplicate wells are necessary to ensure there is a fully climate proofed source of sea water for desalination during droughts.

Further, increased variability in rainfall, and notably the increased intensity of rainfall events, mean that rainfall collection could be more efficient. This should be seen as an *opportunity*: increased guttering size is needed to collect existing rainfall.

For further details, see Appendix 2.

Drought

Historically, Tuvalu experiences dry weather for up to 3-4 months of the year, as well as extended periods of drought[10][10]. Even shorter droughts have an impact on many households. The poorer and more marginal households, those unable to properly maintain their rainwater tanks, experience water shortages after just a few days of no rain. As the dry period becomes more extended, more and more households are affected, and ultimate the entire island is affected, as happened in 1999 and 2011 when emergency measures were required. Such water shortages immediately have an impact on the life quality, economic opportunities and health risks for the affected communities.

In the second half of 2011, the country was hit by a prolonged period of dry weather, which was ultimately attributed to La Nina. Households were quickly rationed to two buckets per day (40 liters). Emergency water supplies were airlifted in from New Zealand and Australia, and Korea provided shipments of emergency bottled drinking water. This had a major impact on life quality and economic activities, and clearly left the population extremely concerned over future drought events. Amongst the first victims of such droughts are hand washing and toilet flushing. Hence there can be an immediate impact on sanitation, with a knock-on impact on health. In September 2011, the Pacific Syndromic Surveillance System (PSSS) detected a large outbreak of diarrheal illness on the main island of Funafuti. A subsequent scientific investigation[11][11] determined ?*the severe drought on Funafuti in 2011 led to an outbreak of diarrheal illness in September 2011 due to low home water tank availability, which likely decreased the frequency of hand washing*.?

This clearly illustrates the linkages between water supply, sanitation and health. The decreased water supply (drought), led to change sanitation practices (less flushing and even open defecation), which led in turn to a diarrheal outbreak.

However, climate change projections for drought are unclear, with most models suggesting drought will be *less* significant in the future. However, not all models agree, and there remains a possibility of more severe droughts in the future. For this reason, drought is included on the water supply climate impacts pathway diagram, but the drought pathway is indicated by dashed lines.

Barriers

The normative solution is to design, construct and operate a modern, adaptive, climate resilient sanitation system and water supply that can address all economic, ecological and climatic threats. However, there are several barriers to reaching this normative solution:

Information. The government of Tuvalu has insufficient data and information to accurately plan and design interventions in the water supply and sanitation sector. It lacks information on climate and climate change. It lacks information on the demand for water, and how this will develop, and how it will vary from place to place, time to time and season to season. It lacks information on the sources of water, in addition to rain being notably groundwater and desalination. It lacks information on sanitation needs and how this is likely to evolve. It lacks information on climate threats to sanitation. Most

importantly, the Government of Tuvalu lacks information on alternatively technologies to provide water and sanitation, and on their technical and economic efficiency.

Sector governance, management and planning capacity. Government has very little capacity to update and improve its water and sanitation sectors. National policy and legislation related to water and sanitation is considered incomplete and outdated. The government agencies, their interlinkages, and their connections non-governmental and private sector are considered weak and dependent on international partners. The ability to prepare strategic and action plans is considered inadequate. The ability to conceive, plan and operationalize projects is insufficient to meet the challenges posed by climate change. Government project management capacity, including procurement, financial administration, monitoring and reporting are considered weak. The public health supportive and regulatory services are under-resourced.

Capacity to deal with climate events. Within the framework of this project preparation, the capacity of Tuvalu officials ? with a focus on the sanitation and supply sector ? to deal with the impacts of climate hazards and climate change was assessed. The assessment covered six factors. The findings are presented in Table 4 (see Appendix 3 for more details).

Table 4: capacity of key governance organizations

Capacity factor	**assessment**	**Description**
Economic wealth	Medium	Resources limited to assistance for priority areas only. Most people in the area have limited access to resources. Reliant on international aid for flood recovery.
Technology	Medium-low	Limited equipment and facilities for assistance and limited Communication. Not adequate for extreme events. Some limitations due to technical capacity.

Institutional	Medium-low	Few officials and village leaders are aware and management set-up to respond to a hazard is non-existent. Relevant processes, procedures and legislations are passed at the national level but implementing guidelines still have to be formulate.
Infrastructure	Medium-low	There is some infrastructure, transport facilities and necessary equipment that can be used to respond to a hazard but not enough to accommodate a projected impact of a hazard. Infrastructure and facilities still must be retrofitted to ensure its safety and strength during a hazard.
Information	Medium-low	Limited awareness due to lack of sensibilization on climate change program.
Social capital	Medium-low	Officials still must be convinced to allocate resources to build adaptive capacity. There are limited number of agencies and NGOs with mandate and skills to assists occurrence of hazards. Team for emergency response still to be organized.

As can be seen from the table, Tuvalu has only medium to medium-low capacity to respond to extreme events. As a result, any impacts to infrastructure that result from warming, cyclone and storm surges, droughts and sea level rise events will be exacerbated by a limited capacity to respond to the impacts.

Infrastructure and finance. The construction and operation of a modern, adaptive, climate resilient water supply and sanitation system will require considerable infrastructure, which will, in turn, require considerable finance. Tuvalu does not have access to such financing at the required concessional rates. In particular the capacity to competitively procure is limited, in part due to the remoteness and limited scale.

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1A.2 BASELINE SCENARIO AND ASSOCIATED BASELINE PROJECTS

The baseline scenario is a continuation of past practices.

In the past, Tuvalu, on Funafuti and outer islands, has relied heavily on international governmental and non-governmental partners to support development of the water supply and sanitation sector. Notably, Australia, New Zealand, Japan, and EU institutions have been prominent supporters of the water supply and sanitation sector during the past five years. In summary, this support has included: New Zealand (water security consolidation/better management of fresh water resources, increased water storage, and borrow pit rehabilitation; Japan International Cooperation Agency (JICA) (capacity building in waste management); Australia (improved water resilience); EU (reducing waste related environmental degradation); the World Bank (increased underground water storage facilities) and Taiwan (green waste composting).

Although highly appreciated and effective at the local scale over the short-medium term, these projects have lacked scale and they have lacked a strategic approach and long-term vision. Further, they have not been designed to respond to the climate change challenge and are not necessarily providing inputs that will be fully resilient to the upper end of projected climate change.

The baseline would be a continuation of this past approach. For example, the *Scaling Up Pacific Adaptation* (SUPA) program, supported by the EU through the Global Climate Change Alliance Plus initiative (GCCA+), supports the ?*Strengthening water security in Tuvalu?* project. Over the time period 2019 ? 2023, in Tuvalu, this project aims to expand previous water security interventions to establish backup water supply and access across Funafuti. In addition to assessments, capacity building and training, this project will provide a 20m3/day mobile desalinization plant, it will refurbish water systems in some schools, and it will provide a water truck for transporting water around the island.

In the baseline, these projects and interventions are most likely to be generally sufficient to maintain the status quo, with some improvements from time to time, and some degradation over time. However, they are not sufficiently scaled or coordinated to address the climate change challenge nor to deliver sustainable improvements.

1A.3 PROPOSED ALTERNATIVE SCENARIO ? AND DESCRIPTION OF PROJECT OUTCOMES AND COMPONENTS

Theory of Change

The Theory of Change is presented in Figure 7.

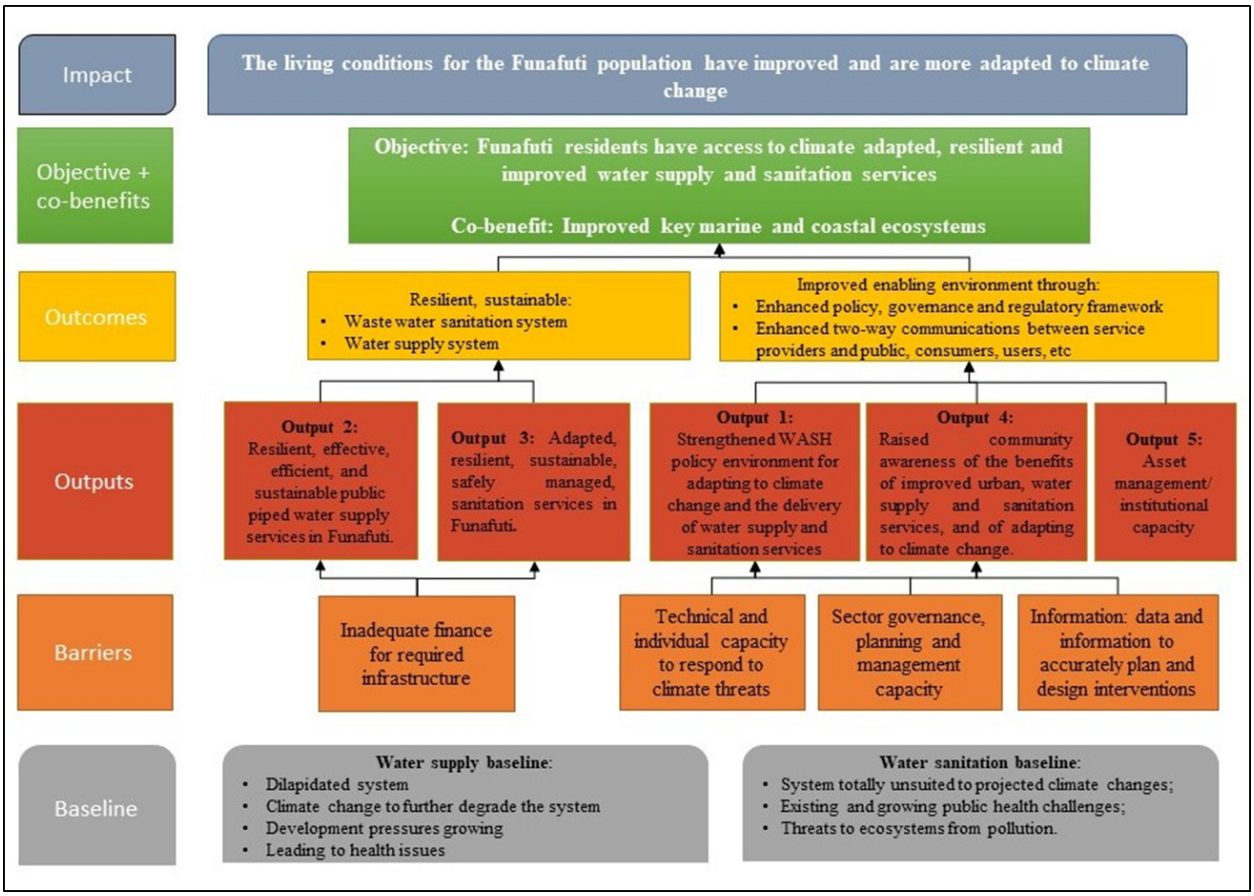

Impact
The living conditions for the Funafuti population have improved and are more adapted to climate change
Objective + co-benefits
Objective: Funafuti residents have access to climate adapted, resilient and improved water supply and sanitation services
Co-benefit: Improved key marine and coastal ecosystems
Outcomes
Resilient, sustainable:
• Waste water sanitation system
• Water supply system
Improved enabling environment through:
• Enhanced policy, governance and regulatory framework
• Enhanced two-way communications between service providers and public, consumers, users, etc
Outputs
Output 2: Resilient, effective, efficient, and sustainable public piped water supply services in Funafuti.
Output 3: Adapted, resilient, sustainable, safely managed, sanitation services in Funafuti.
Output 1: Strengthened WASH policy environment for adapting to climate change and the delivery of water supply and sanitation services
Output 4: Raised community awareness of the benefits of improved urban, water supply and sanitation services, and of adapting to climate change.
Output 5: Asset management/ institutional capacity
Barriers
Inadequate finance for required infrastructure
Technical and individual capacity to respond to climate threats
Sector governance, planning and management capacity
Information: data and information to accurately plan and design interventions
Baseline
Water supply baseline:
• Dilapidated system
• Climate change to further degrade the system
• Development pressures growing
• Leading to health issues
Water sanitation baseline:
• System totally unsuited to projected climate changes;
• Existing and growing public health challenges;
• Threats to ecosystems from pollution.

Figure 7: Theory of change

Introduction to Alternative Scenario and Description of Project

Following various consultation amongst GEF, ADB and Government, Tuvalu was included in the ?*Climate Resilient Urban Development in the* Pacific? regional program., with a focus on addressing climate adapted, sustainable, resilient water supply and sanitation urban service issues. Subsequently, the Government and ADB launched (now mostly complete) a thorough, strategic, participatory planning process covering all aspects of water supply and sanitation on Funafuti. Delays ? due to the Covid pandemic - in the planning process have meant it has benefited from updated and more comprehensive understanding of climate change, the impacts of climate change on Tuvalu, and the likely impacts on water supply and sanitation.

The main outcome of the planning process is two strategic, comprehensive Master Plans for Tuvalu, one covering sanitation and one covering water supply. The Master Plans cover the period up to 2043 and are attached as Appendices 1 and 2. With regards to climate change, the master plans respond as follows:

? Sanitation. The plan identifies that the current sanitation system is failing and unreliable, in large part due to ongoing and growing climate change. Hence, the plan sets out a phased road map to a modern sanitation system. This will ultimately include comprehensive collection and storage and transportation to a modern, off-site treatment facility. This new system can be considered an adaptation to climate change in itself. In addition, much of required infrastructure/equipment will be more expensive due to the need to be climate proof;

? Water supply. The plan responds jointly to the development challenges and the challenges associated with ongoing and growing climate change. In response to these challenges, the plan sets out an upgraded and expanded water supply system. Specifically, the plan sets out a phased road map to a system of collection, storage, treatment and distribution to households, communities, offices and private sector entities. In addition, due to the climate change threats, much of required infrastructure and equipment will be more expensive due to the need to climate proof ? with cost increases often in the 40% range.

The **alternative scenario** is the long-term, strategic implementation of these two Master Plans. The phased approaches in the Master Plans are summarized in Table 5.

Table 5: Phased approach to implementing the sanitation and water supply master plans

Timeline	**Plan Outline**
SANITATION	

2025 to 2030	**Construct** primary treatment facilities consisting of 10 septage drying beds and 10 KL/day capacity, primary treatment package plant to ensure safe disposal for human excreta liquids, dried septage and compost products for agriculture. **Construct** piped sewage effluent ocean outfall manifold pipe Ensure timely, safe and secure **transportation** of both septage and compost waste from source to treatment/safe disposal sites with new septage pump-out truck (5,000 L capacity). **Repair and renovate** sanitation infrastructure for all education and health buildings and Government ministries/departmental buildings in Funafuti. **Provide treatment and management** equipment, including: (i) truck mounted septage vacuum pump-out tanker; (ii) green waste processing equipment; (iii) household septic tank replacement pilot scheme for water-tight septage containers, through GoT/MoF managed community loan fund. Technical assistance project support to implementation, governance, regulation, capacity building, etc, as needed. Appropriate efforts to complement above with improved household RWH are to take place, in order to lower overall costs.

2030 to 2040	Expand primary treatment facilities with 10 additional septage drying beds also utilising the existing 10 KL/day capacity, primary treatment package plant to ensure safe disposal for human excreta, both septage and compost, and strengthen disposal methods. Continue community/householder support fund and programme for the replacement of household septic tanks with septage holding or containment tanks utilising truck pump-out. Ensure timely, safe and secure transportation of both septage and compost waste from source to treatment/safe disposal sites with new septage pump-out truck (5,000 L capacity). Assist repair and upgrade of sanitation infrastructure for all education and health buildings and Government ministries/departmental buildings in Funafuti. Technical assistance project support to implementation, governance, regulation, capacity building, etc, as needed.
2040 to 2050	Upgrade primary treatment facilities with an upgrade of the existing 10 KL/day capacity up to 20 KL/day, primary treatment package plant to ensure safe disposal for human excreta, both septage and compost, and strengthen disposal methods. Complete community/householder support fund and programme for the replacement of household septic tanks with septage holding or containment tanks utilising truck pump-out. Ensure timely, safe and secure transportation of both septage and compost waste from source to treatment/safe disposal sites with new septage pump-out truck (5,000 L capacity). Assist repair and upgrade of sanitation infrastructure for all education and health buildings and Government ministries/departmental buildings in Funafuti. Technical assistance project support to implementation, governance, regulation, capacity building, etc, as needed.
WATER SUPPLY	

2025 to 2030	The existing Government operated rainwater catchment and storage systems can provide 50 L/person/per day for 17 days, OR 9.5 L/p/day for a full 90-day dry period OR 4.8 L/p/day for a full 180-day dry period. **These will be connected into a piped network system**. The existing Government operated reverse osmosis (RO) Desalination Plant (PWD 1) provides 180 m3/day capacity with current storage, equivalent to 18.6 L/p/day (Assume: 10 L/p/day directed to drinking water purposes and 8.6 L/p/day directed to commercial consumers). **This will be refurbished.** An additional Government operated RO Desalination Plant (PWD 2) **will be constructed to** provide 200 m3/day capacity with a secure 5-day storage capacity, existing at PWD. This plant to provide 20.6 L/p/day directed to domestic water purposes. Two reinforced concrete (RC) tower tanks/reservoirs **will be constructed**, each 200 m3 capacity, to service the water supply piped network using predominantly RO seawater desalination sourced water mixed with water drawn from existing rainwater catchment and storage systems. A supply pumping station to transfer RO water to elevated tower tanks/reservoirs **will be constructed.** A piped network system (approximately 25km) connecting cisterns, elevated reservoirs and at least seven (7) villages and at least 300 metered connections to households **will be constructed**. Management and maintenance equipment will be provided. Technical assistance on implementation, O&M, public hygiene, demand side management, pricing, capacity building etc..

2030 to 2040	Existing Government operated rainwater catchment and storage systems will continue to operate, but the per capita production is reduced due to the additional population. These water sources will provide the 2040 population with 50 L/person/per day for 21 days, OR 11.6 L/p/day for a full 90-day dry period OR 5.8 L/p/day for a full 180-day dry period. The Government operated rainwater catchment and storage systems are expanded with two (2) new RWH site and cistern (2,000 m3 capacity each) to provide an additional 3.8 L/p/day for a full 90-day dry period OR 2.0 L/p/day for a full 180-day dry period. Total capacity of the Government rainwater systems is now increased to 16,320,000 litres providing 15.4 L/p/d for a full 90 days OR 7.8 L/p/d for a full 180 days. Original Government operated RO Desalination Plant (180 m3/day capacity ? PWD 1) is replaced with a new unit (new PWD 1) of 200 m3/day capacity utilising the current tank/storage farm with upgrade. This unit provides, 17.0 L/p/day (Assume: 7.0 L/p/day for drinking water and 10.0 L/p/day directed to commercial consumers). Additional Government operated RO Desalination Plant Village 1 provides 250 m3/day capacity with a secure 5-day storage capacity. This plant to provide 21.2 L/p/day directed to domestic water purposes. Extend piped network system connecting cisterns, elevated reservoirs and all Funafuti villages? households ? allow 20 km. Construct an additional one (1) tower tank/reservoir (capacity 240 m3) to maintain operational pressures and meet demand in the piped network. Meter connections ? 500 commercial/ household. Technical assistance as needed.

2040 to 2050	Existing Government operated rainwater catchment and storage systems, as of 2040 will continue to operate, but their per capita production is reduced due to the additional population. These water sources will provide the 2050 population with 50 L/person/per day for almost 20 days, OR 10.9 L/p/day for a full 90-day dry period OR 5.5 L/p/day for a full 180-day dry period. The Government operated rainwater catchment and storage systems will be expanded with one (1) new RWH site and cistern (3,000 m3 capacity) to provide an additional 2.2 L/p/day for a full 90- day dry period OR 1.1 L/p/day for a full 180-day dry period. Total capacity of the Government rainwater systems is now increased to 17,320,000 litres providing 13.1 L/p/d for a full 90 days OR 6.6 L/p/d for a full 180 days. The Government operated RO Desalination Plant (200 m3/day capacity ? new PWD 1) is assumed to be operating and utilising the upgraded tank/storage farm. In 2050, this unit will provide, 13.7 L/p/day for the higher population, (Assume: 3.7 L/p/day for drinking water and 10.0 L/p/day directed to commercial consumers). The Government operated RO Desalination Plant - (200 m3/day capacity ? PWD 2) is replaced with a new unit with a capacity of 250 m3/day ? PWD 2 utilising the current tank/storage farm with upgrade. The new unit will provide, 17.1 L/p/day for domestic consumption. An additional Government operated RO Desalination Plant ? Village 2 will provide a further 250 m3/day capacity with a secure 5-day storage capacity. This plant provides 17.1 L/p/day directed to domestic water purposes. Upgrade piped network system connecting cisterns, elevated reservoirs and all Funafuti villages? households ? allow 10 km Upgrade/renew/refurbish fittings and ancillaries for two (2) elevated reservoirs to maintain operational safety. Meter connections ? 200 commercial/ household. Technical assistance as needed.

In this alternative scenario, this current proposed project consists of implementing the first phase, 2025 ? 2030, of both the sanitation and the water supply Master Plans.

Editorial note for the following sections

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	ADB Activity

The following sections of this proposal use ADB terminology.

The proposed, alternative project has the following outcome, outputs and activities (for the results framework, see Annex A).

The Project Outcome is:

?Provision of climate-adapted, resilient, and improved drinking water supply, drainage, and sanitation services improved in Funafuti?.

Outputs

To reach this Outcome there are five Outputs, as follows.

Output 1. Strengthened WASH policy environment for adapting to climate change and the delivery of urban water supply and sanitation services.

Output 2. Resilient, effective, efficient, and sustainable public piped water supply services in Funafuti.

Output 3. Adapted, resilient, sustainable, safely managed, sanitation services in Funafuti.

Output 4. Raised community awareness of the health and economic benefits of improved urban, water supply and sanitation services, and of adapting to climate change;

Output 5. Asset management and institutional capacity strengthened.

These Outputs are to be delivered by the activities described below.

Prior to the identification of this issue as a potential priority for support from ADB and GEF, in recent years, there had been little related data collection, assessment, consultation and planning for water supply and sanitation on Tuvalu. Accordingly, the process commenced with a comprehensive assessment, consultation and planning exercise - co-financed by ADB. This exercise is mostly complete at the time of submission and is to be completed during the summer/autumn of 2022. This exercise, entirely financed by ADB, constitutes the first activity under each Output below.

Activities

Full details of the activities, required inputs, costing and design are provided in Appendix 3 ? ***The Funafuti Water and Sanitation Project Feasibility Report.***

Output 1 - Strengthened WASH policy environment for adapting to climate change and the delivery of urban water supply and sanitation services.

Output 1 consists of a series of activities to improve the governance and policy climate of water supply and sanitation in Tuvalu. Climate change mitigation and adaptation will be appropriately integrated into all activities.

1.1 Outreach, assessment, consultation and planning (almost complete and financed by ADB).

Subsequently, the following activities under Output 1 are considered tentative, and subject to final design and validation. See Appendix 4 ? *the Tuvalu Water, Wastewater, and Sanitation Sector Institutional Framework & Capacity Development Plan* ? for further justification, explanation and details.

1.2 Design and implement *performance contracts* with main service providers (PWD, PSD) in order to improve WSS sector governance.

Appendix 4 provides an analysis of the key sector governance issues, it sets out options for reform and it recommends the short-term actions.[13]. As set out in Appendix 4, the desired characteristics for the governance framework are: (i) Make service providers accountable; (ii) Set clear performance targets;

(iii) Give incentives to meet performance targets, and; (iv) Give service providers autonomy to meet the performance targets.

Based on in-country consultations/considerations and drawing from international experience, a phased approach of first strengthening some of the *basics* of utility operation and regulation before later moving on to *structural* reforms is to be adopted. This Output (and Outputs 1.1 and 1.3) focus on these *basics*. The steps to be specifically supported through the project are through establishing performance contracts and performance agreements. This will notably be between the Ministry (MPWIELD) and Public Works Department (PWD), and in turn between PWD and Water Services Division (WSD).

It is also noted that Output 1.3 includes a comprehensive training program that complements Output 1.2.

1.3 Undertake a comprehensive training program to develop skills of key staff of MPWIELD, MOF, PWD and WSD. This will include training on climate change adaptation and mitigation, and how to mainstream into workplans and work practices.

1.4 Design and implement a program to pilot reforms of water tariffs.tariffs (based on findings of comprehensive social surveys).

Current tariffs for both water and sanitation services are well below the costs (see Appendix 4). Further, it is considered probable that most customers in Funafuti could conceivably pay more for water and sanitation services without impacting affordability thresholds. Hence, in theory, there is room to increase tariffs without violating the affordability threshold. Yet, it is recognized that there are challenges, notably: (i) water tariffs may become unaffordable at some point; (ii) if households have to make one large water delivery payment there may be cashflow problems; (iii) potential social/political problems from a *rapid* increase of tariffs to cost recovery; and (iv) tariff increases have to be incremental and take more vulnerable groups into consideration.

Ongoing consultations and analysis are determining the optimal approach to increasing tariffs and cost recovery.Notably, the project will consider helping vulnerable groups with a lifeline affordable tariff for basic water supply.[14]

Output 2: Resilient, effective, efficient, and sustainable public piped water supply services in Funafuti

Output 2 consists of a series of interventions, civil works and equipment provision in order to adapt the water supply system on Funafuti to the ongoing climate and to development challenges. Key components will be increased water production capacity (from desalination plants), increased storage and distribution capacity ? ensuring collected and produced water can be flexibly stored in large-scale reservoirs, a new network of pipes to priority villages, and a general overhaul of priority equipment and infrastructure.

In order to design Output 2, several investment options papers were prepared based on scientific and economic assessment and consultations[15]. Based on these options papers, the Master Plan (in

Appendix) was prepared. Investments are strategically set out systematically over 3 phases - see Table 5 above.

This project represents implementation of the first of the 3 phases of the Master Plan. This project, Phase 1, includes both rainwater harvesting (RWH) and desalination (RO) measures. RWH is from existing government and communal harvesting infrastructure ? not from household harvesting systems. RWH measures supported by this project notably include connecting existing storage tanks to a piped network to ensure the continued operation of this institutional RWH infrastructure for emergency use and to maintain the potable water quality of this resource, as well as constructing two large new storage tanks that will store collected rainwater as available (although they are likely to cater more for RO water).

It is noted that individual household RWH was not retained as part of the strategic plan, because experience shows that household level O+M is typically challenging, and more vulnerable households tend to suffer from poor service and high costs.

LDCF contribution: As explained in the Project Description above, the Funafuti water supply system has to be completely renewed, and this is in significant part due to the growing climate change risks associated with sea level rise and increased intensive rainfall events, and potential droughts. In addition, the cost of each infrastructure output is significantly higher in order to be climate resilient. Hence, **LDCF contributes to all the activities and outputs**.

2.1 Assessment, consultation, planning and detailed design (almost complete and financed by ADB).

2.2 Construct two climate resilient, elevated, fully resilient, reinforced concrete (RC) storage reservoirs (total 400 m^3).

2.3 Establish a fully resilient water pumping station and a climate resilient mains pipeline connecting key storage infrastructure.

2.4 Modernize and refurbish, and climate proof, the existing, reverse osmosis (RO), desalination plant (capacity 180m^3/day), including installation of a second sourcing well to protect source from sea level rise.

2.5 Construct a climate resilient piped distribution network to distribute clean water to 7 priority villages and households. In total 25km of pipeline will be installed. This includes the installation of village community water tanks and tap manifolds - for water distribution to local households.

2.6 Construct a new, fully climate proofed, RO desalination plant (200m^3/day).

2.7 Install the required operating, monitoring and maintenance equipment. This will include climate resilient equipment, and management equipment to increase strategic capacity to manage resources through climate change.

2.8. At remote (3 small islets) sites that cannot be connected to piped sources and cannot receive truck water deliveries, the project will assist households with RWH upgrading/rehabilitation and possibly provide some further storage tanks. The target is at least one 10,000L tank per household.

Output 3: Adapted, resilient, sustainable, safely managed, sanitation services in Funafuti

Output 3 consists of a series of interventions, civil works and equipment provision in order to start creation of a modern, climate adapted sanitation system.

In order to design Output 3, several investment options papers were prepared based on scientific and economic assessment and consultations[16]. Based on these options papers, the Master Plan (in Appendix) was prepared. Investments are strategically set out systematically over 3 phases - see Table 5 above.

This project represents implementation of the first of the 3 phases. The option selected for sanitation was the only viable option. In addition to addressing waste water issues, it also provides sought benefits of waste product re-use and the availability of a soil enhancement source and fertilizer for agriculture and emerging household vegetable production.

A full assessment of environment, climate change and land issues has been taken. It is found that environmental and climate change risks are greatly lowered through this approach (with appropriately designed measures) ? notably because the site is far from households, and the centralized site adjacent to the recently established solid waste dumpsite allows for a centralized waste management and processing site. The land necessary is available and provided for lease to government by the Funafuti Land Council.

LDCF contribution: As explained in the Project Description above, the Funafuti sanitation system has to be completely replaced due to the growing climate change risks associated with sea level rise and increased intensive rainfall events, and potential droughts. Hence, **LDCF covers most costs of all the activities and outputs**.

Key components will be:

3.1 Assessment, consultation, planning and detailed design (almost complete and financed by ADB).

3.2 Construct ten septage drying beds, located in a climate proof location, designed in order to produce biological fertilizers for Tuvalu?s agriculture sector.

3.3 Construct a climate proof sewage treatment plant capable of treating 5000 liters per day. Treated water will be sufficiently treated to be disposed of at sea and not create pollution or ecosystem degradation challenges. One bi-product will be the conservation of key ecosystems (reefs) that are vital to protect the island from climate change.

3.4 Construct a climate and sea level rise proof ocean sewage outfall. The treated sewage from activity 3.3 will be safely carried to a suitable ocean depository spot.

3.5 Refurbish the sanitation infrastructure (waste collection and storage and where appropriate, initial treatment) at 60 government and public buildings. Full climate proofing will be a key aspect of this infrastructure.

3.6 Install the operating, monitoring and maintenance equipment. This will include climate resilient equipment, and management equipment to increase strategic capacity to manage waste water through climate change.

Output 4: Raised community awareness of the health and economic benefits of improved urban, water supply and sanitation services, and of adapting to climate change.

The following activities under Output 4 are considered tentative, and subject to final design and validation. See Appendix 5 ? *the Stakeholder Assessment and Stakeholder Communication Strategy (SCS*) ? for further details.

4.1 Outreach, assessment, consultation and planning ((almost complete and financed by ADB).

4.2 Develop the core, general and customized messages to all stakeholders. This will include messages on climate change, adaptation and mitigation.

4.3 Establish communication channels. This will include both one-way and two-way communications. The mechanisms to be used will include: (i) radio messaging; (ii) messaging through social media such as Facebook, Twitter; (iii) printed products such as posters, leaflets, etc, and (iv) face-face meetings with key stakeholder groups to obtain feedback.

4.4 Build capacity in the PWD and other government agencies and, if necessary, local NGOs to implement the communications strategy. This will include training on both message development and communication methodology, and also on monitoring and reporting.

4.5 Collaborate with, as appropriate, local NGOs on implementing the communications strategy.

4.6 Establish and maintain an effective Grievance Redress Mechanism (GRM).

Output 5. Asset management and institutional capacity strengthened

Output 5 is entirely covered by co-financing (no LDCF contribution). This includes the two following activities:

5.1. Operations and maintenance of assets. As a result, PWD will be able to finance the O&M, costs for urban utility services in the medium to long term.

5.2 Training of key government technical and utility staff. At least 150 government officials, of whom at least 40% are women, trained in project development, implementation, and monitoring

1A.4 ALIGNMENT WITH GEF FOCAL AREA

The project principally supports LDCF Climate Change Adaptation Objective 1 (?*Reduce vulnerability and increase resilience through innovation and technology transfer for climate change adaptation*?). It also makes a contribution under Objective 2 (?*Mainstream climate change adaptation and resilience for systemic impact*?) as follows:

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

The project helps provide Funafuti with a climate adapted and resilient sanitation and water supply system. The sanitation system will be replaced with infrastructure that is conceived and designed to overcome the growing climate change impacts. Waste water collection and storage will be suitably above-ground or highly resilient. The waste water will be sustainably treated. This will ensure that future sea level rise, king tides, rain-fed flooding will never lead to overflowing waste water and thereby reduce risk of health events and risk of contagion.

The water supply system will be upgraded and expanded through improved rainwater harvesting, improved long-term storage, and improved sources of freshwater (desalination plants), and constructing a reliable system to pipe and distribute freshwater. This will ensure that during times of drought, the households have access to a reliable and sufficient water supply, for domestic use and small-scale economic activities. It will also ensure that the infrastructure to produce, store and distribute freshwater is resilient to storm and flood damage.

The entire population of Funafuti, currently over 6,000 and likely to rise beyond 11,000 by project end. will benefit from this protection in terms of resilient water supply and sanitation.

Key indicators	Target
No. of sanitation and water structures	Nine: ? water supply: 2 storage reservoirs, 1 water pump, 2 desalination plants (1 new, 1 refurbished), 1 piped network. ? Sanitation: 1x 10 septage drying beds, 1 treatment plant, 1 ocean outfall.

Total no. of beneficiaries, male/female	11, 840 by 2040. Of which, 6204 male and 5636 female.[17][12]

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

This will be done through institutional strengthening and capacity building programs to strengthen the financial, technical and operational sustainability of water supply and sanitation services in Funafuti, and the support to updating the national water and sanitation associated policies, legislation and regulations. The communications strategy will also support this.

Key indicators	Target
Total no. of policies or plans that will mainstream climate resilience	2 (Master plans)
No. of institutional partnerships established or strengthened	1 (National Water and Sanitation Committee, WSC, operationalized and strengthened)

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

The allocation of co-finance and LDCF funds to the Outputs is presented in Table 6.

Table 6: Climate change costs and ldcf/co-financing contribution to climate change costs

Project Output	Total cost (US$ thousands)	Climate change count (US$ thousands)	LDCF (US$ thousands)	Cofinance of climate change (US$ thousands)
Output 1	265.5	178.25	75.5	102.75

Output 2	6989.5	3494.75	2455	1039.75
Output 3	3644.5	3644.50	1792	1852.50
Output 4	505.5	339.37	45.5	293.87
Output 5	341	228.93	0	228.93
PMC	1169	784.82	222	562.82
Total	**12,915**	**8,670.62**	**4,590.00**	**4,080.62**

For Table 6, the climate change count was determined as follows:

(i) Output 3 is considered 100% climate change, as the sanitation system is being upgraded and replaced entirely in order for it to be adapted to climate change;

(ii) Output 2 is considered 50% climate change, as the water supply system is being upgraded and replaced due to two driving factors: the need to adapt to climate change and the need to meet growing development pressures. Attribution is considered equal to the two driving factors.

(iii) The ratio, R, of climate change count to total costs for outputs 2 and 3 is calculated and equal to 0.67;

(iv) Outputs 1, 4, 5 and PMC are supportive and enabling environment activities required in order to ensure the water supply and sanitation from Outputs 2 and 3 functions effectively. Hence, for Outputs 1, 4, 5 and PMC, the climate change count should be in the same proportion as for Outputs 2 and 3. Hence, the ratio R is applied to outputs 1, 4 and to PMC.

Notably (and for example) for Output 1, the total cost is $265.5 K. Output 1 supports and provides the enabling environment activities required in order to ensure the water supply and sanitation. I.e., Output 1 is supporting and necessary for Outputs 2 and 3 to function effectively. Hence the climate change costs of Output 1 are determined by applying the overall ratio of climate costs from Outputs 2 and 3 to Output 1. Hence, the total climate costs of Output 1 are $178.25 K. LDCF is requested to cover only $75.5 K - ADB co-financing covers the other $102.75 K of climate change costs.

The total project costs are therefore $12.915 million. The total climate change costs are $8.671 million. LDCF covers $4.59 million or 53% of the climate change costs. Co-finance covers $4.09 million, or 47%. of the climate changes costs.

The Co-financing to LDCF ratio is roughly 2:1. This ratio has been limited due to tight fiscal constraints within the government of Tuvalu following Covid Pandemic. ADB is currently actively

mobilizing additional funds from both internal and external sources. If and when secured, these will be to undertake additional activities. ADB is optimistic to secure these in the near future, especially as Pacific SIDS economies are slowly opening up.

Note that all non-climate change costs are covered by co-finance.

1A.6 ADAPTATION BENEFITS

Without the project, climate change will affect the sanitation and water supply systems on Funafuti. In effect, as climate change and sea level rise increases:

- The sanitation system will become increasingly unfit for purpose;

- The water supply system, in part due to the development pressures, will become increasingly unfit for purpose.

Without the project, the water supply and sanitation systems of the entire Funafuti population will be in jeopardy.

As a result of the project intervention, the entire Funafuti population will have a climate resilient water supply and sanitation system.

Specific population projections were rolled out for the preparation of the Master Plans and the design of this project - see Appendices 1 and 2. These projected a total population of 11,840 on Funafuti by 2040, with 5,636 women.

Hence the total population of Funafuti in 2040, or a projected 11,840 persons, or over 75% of the population of Tuvalu, will benefit from the project.

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

Innovativeness

The project is innovative for Pacific atolls as it will:

? Introduce new technology for waste water treatment, including the piloting of technology to prepare agricultural fertilizer, contribute to food production and food security;

? Introduce state-of-the-art water production (desalinization) technology;

? Strengthen institutional and financial management capacity, including important steps towards full cost recovery in a part of the world where this is typically challenging.

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[18][13] 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 project as category ?B? for environment safeguards. An initial environmental examination (IEE) is underway and draft an environmental management plan prepared. This finds that there are no major anticipated environmental impact during construction or upon completion. Required environmental management actions have been determined and costed to address minor impacts. This is attached as Appendix 7.

ADB has classified the project as category B for involuntary resettlement. Due diligence is being undertaken to assess potential involuntary resettlement impacts on all the proposed sites. Consultations were held with affected persons and this included the disclosure of draft safeguard documents; they will continue during project implementation. Very limited impacts are identified for the water supply component. Limited impacts are expected for the sanitation component. A corresponding resettlement framework is being prepared to guide the preparation of necessary safeguard documents, and a resettlement plan (RP) being prepared. This is expected to be available for review during August 2022.

All relevant safeguards documents, including above mentioned IEE and RP, when finalized, will be publicly disclosed and available through ADB websites.

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, which includes the necessary expertise to cover environmental safeguards, resettlement, gender and stakeholder consultations.

Institutional and financial sustainability.

The project has been designed to focus on sustainability and will assure sustainability of project impacts and outcomes. In particular, the following aspects of the 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, and are climate-proofed and are to be built with high quality, durable materials. Both the water supply and sanitation infrastructure has been designed to function under all reasonable 50-year growth scenarios. The desalination plants have been designed to be easily scalable and, when necessary, increase production;

? Institutional strengthening of the sanitation and water sector (including governance, management, O&M) is a priority of the project, addressed primarily through Outputs 1 and 5. Capacity transfer is a key tool for this. The project has been designed to transfer capacity to PWD and other stakeholders via (i) exposure to specialists in the PMU (contracted through the project); (ii) Tuvalu 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 PWD on key central functions (e.g. billing, asset management). Outputs 1, 5 and the PMC cover these costs;

? The incorporation of 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 comprehensive stakeholder consultation strategy, including significant awareness raising activities (under Output 4) has been designed to achieve long-term and sustained behavioral change of the general public, so enable PWD to meet objectives;

? The piloting of activities related to the water tariff. The assessment indicates a willingness to pay greater than current tariffs. This may increase further after awareness raising and improved quality of service. Also, the Government is committed to meeting the balance of financial resources needed for ongoing operation of the water supply system through subsidies. This project will pilot tariff modifications and determine the optimal long-term strategy on pricing.

Scaling-up Potential

Much of the hard and soft solutions developed by the project can be replicated to other small and remote islands, some specifically to atolls and archipelagos, 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 sanitation supply infrastructure projects in 12 countries in the Pacific. ADB is also developing urban resilience and/or WSS 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.

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) Support to Climate Resilient Investment Pathways in the Pacific. This commenced in 2021 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) Promoting Innovations in Regional Cooperation and Integration (RCI) in the Aftermath of COVID-19 ($3.5 million); (iv) 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 Tuvalu stakeholders in sharing the project lessons and experiences across APAN. The above projects provide pathways and mechanism through which ADB can directly support the replication of project successes across the region, thereby contributing to regional adaptation benefits.

[1] United Nations, Department of Economic and Social Affairs (UNDESA), ?World Population Prospects 2019?, data ?high? population

growth rate, 23 August 2021

[2] Note: these population figures are provided by UNDESA. For the preparation of this project, population projections were rolled out (see Appendices 1 and 2). These projected a total population of 11,840 on Funafuti by 2040.

[3] See, for example, National Integrated Water Resource Management Diagnostic Report for Tuvalu, SOPAC, 2007

[4] Howard G, Bartram J, Williams A, Overbo A, Fuente D, Geere J; ?Domestic Water Quantity, Service Level and Health?, WHO, 2020

[5] GEF, ?GEF Pacific IWRM Demonstration Project: Integrated Sustainable Wastewater Management (EcoSan) for Tuvalu,? (2014) GEF-Pacific-IWRM-Final Report-Tuvalu.pdf (pacific-r2r.org).

[6] CSIRO and SPREP (2021). ?NextGen? Projections for the Western Tropical Pacific: Current and Future Climate for Tuvalu. Final report to the Australia-Pacific Climate Partnership for the Next Generation Climate Projections for the Western Tropical Pacific project.

[7] Climate Variability, Extremes and Change in the Western Tropical Pacific: New Science and Updated Country Reports Tuvalu (PACCSAP, 2014)

[8] AusAID. 2009. Pacific Country report. Sea level & Climate: Their present state. Tuvalu. Quoted from Appendix 1.

[9] Provided by the Tuvalu Coastal Adaptation Project, TCAP.

[10] National Integrated Water Resource Management Diagnostic Report, Tuvalu. SOPAC, 2007.

[11] Drought As A Climatic Driver Of An Outbreak Of Diarrhea In Tuvalu, South Pacific. Emont, J. 2015.

[12] Initially scheduled to be completed by mid-2021, the planning and consultation process has been delayed due to the global covid pandemic and is coming to a conclusion during summer 2022.

[13] It is noted that Appendix 4 is in draft form, and details of the actions to be implemented are subject to further validation

[14] Note: vulnerable groups are to be identified through planned comprehensive social surveys.

[15] These are available for sharing with LDCF, if required.

[16] These are available for sharing with LDCF, if required.

[17] Source: Funafuti population projections in Appendix 1, Appendix 2.

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

1b. Project Map and Coordinates

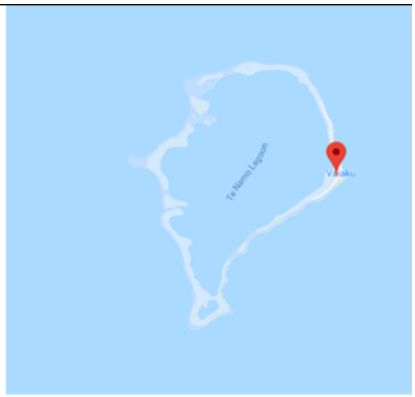
Please provide geo-referenced information and map where the project interventions will take place.

The project site is Funafuti, Tuvalu, located in the South, Central Pacific.

1. Map showing approximate location in the Pacific

Tuvalu's location in the Pacific

Funafuti in Tuvalu



Funafuti

Coordinates:

The project activities and outputs are all on the island of Funafuti which lies between 8?27' South and 8? 32' South, and between 179?10' East and 179?12' East.

2. Map showing villages and atolls of Funafuti

3. Map showing main villages on Funafuti, to benefit from project water supply and sanitation interventions.

4. Map showing:

- site of current waste water treatment (and approximate location of proposed new treatment facilities).

- PWD office. This is also the siting of the current desalination plant (to be refurbished under the project).

- QE II building, site of proposed new water storage facilities.

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.	Ongoing activities supported by co-finance have already contributed majorly to this component, with the participatory development of the two Master Plans (see Appendices 1 and 2). This will be a rolling process, with ongoing support to government counterparts in the governance, including planning, of water supply and sanitation. This is covered in Output 1, and activities 2.1, 3.1 and 4.1
(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.	All activities under the Project contribute to this. The project is simply about the deployment and demonstration of climate resilient sanitation and water supply services.

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

If none of the above, please explain why:

Please provide the Stakeholder Engagement Plan or equivalent assessment.

A comprehensive stakeholder assessment has been undertaken and a comprehensive stakeholder communication strategy (SCS) prepared ? see Appendix 5.

The overall objective of the SCS is ?to foster stakeholders? support for the FWSP, through transparent interactive communication approaches that seek to build trust between stakeholders and project management and nurture behavioral change contributing to enhanced project outcomes?. The specific objectives are:

? To provide relevant information to different stakeholder groups, through appropriate communication channels in a regular and timely manner;

? To establish effective two-way information sharing mechanisms between the project management and different groups of stakeholders;

? To facilitate meaningful dialogue through systematic engagement with different groups of stakeholders throughout the lifetime of the project;

? To foster demand for, and adoption of, improved health and hygiene practices.

The SCS is to be implemented through Output 4, and has adequate budgetary allocations.

Engagement with Civil Society

The completed stakeholder analysis, leading to the SCS, included an assessment of civil society, capacity and needs, and the potential roles in the project.

A comprehensive Community Outreach Program is to be prepared. Meanwhile, the approach to civil society engagement is set out in the SCS in Appendix 5. The SCS notably includes the following objectives: To provide relevant information to different stakeholder groups; and to facilitate meaningful dialogue through systematic engagement with different groups and to ensure the views and concerns of more vulnerable groups are heard and taken account. The implementation matrix includes specific

objectives, risks, messages, activities and channels for many diverse groups including: local government; households; vulnerable groups; children, schools and youth; church leaders and NGOs/CSOs.

For NGOs and CSOs:

? The key information messages include: overview of the project; GRM; and environment and health issues, etc;

? The activities are to be: the provision of easily understandable, accessible and culturally appropriate information on FWSP, and; the dissemination of core messages on available improved water and sanitation supply and services; improved sanitation and hygiene practices;

? The communication channels will be fact sheets, the project website, facebook, and other social media platforms, and frequent face to face meetings;

The overall the aim is to have a collaborative working relationship and improved outreach.

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

See Annex 5: STAKEHOLDER ASSESSMENT AND STAKEHOLDER COMMUNICATION STRATEGY (SCS)

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)

3. Gender Equality and Women's Empowerment

Provide the gender analysis or equivalent socio-economic assesment.

Context and design

Initial consultations have been held with the Department of Gender Affairs (DGA). Initial findings suggest that gender plays a significant role in determining interactions with water supply and sanitation. On Funafuti, women?s roles in water and sanitation include: water collection from 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 typically maintenance of water storage and wastewater storage facilities, and the purchase of rainwater for HH consumption. Given the above, by ensuring that households have access to safe water and sanitation, the project can positively affect women?s time and options for income generating and other activities.

The project planning phase has involved several gender experts and several gender activities. As a result, gender issues have been fully integrated into the Master Plans (Appendices 1 and 2) and the SCS, and so through all project activities. A gender assessment has been undertaken and is included in Appendix 6.

Project approach to gender

The project is classified by ADB as effective gender mainstreaming (EGM) and consequently a gender assessment has been undertaken and a (draft) Gender Action Plan (GAP) prepared. This was undertaken in accordance with guidelines provided in ADB?s Handbook on Poverty and Social Analysis (2012) and the checklist[1] for gender mainstreaming in water and sanitation projects. See Appendix 6.

The GAP identifies strategies, mechanisms, project components, budget provisions and other measures for addressing gender concerns. The GAP sets out, for each project output, specific gender indicators, targets, activities and related roles/responsibilities.

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[1] see https://www.adb.org/publications/gender-checklist-water-supply-and-sanitation.

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.

Tuvalu?s economy 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 dispersed population. Hence, the public sector dominates and accounts for over 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 MPWIELMD, PWD and the Water Department (WD) and other key government agencies. The aim is to transfer private sector modalities and values to Tuvalu public sector stakeholders. Specifically, the use of long-term performance-based O&M contracts for the desalination plants and water supply network will be considered as a way to 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 PWD staff (under Output 5). 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.

ADB will explore joint procurement across several Pacific nations in order to facilitate more private sector engagement in the project activities.

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):

Climate Risks and Challenges

The project responds to the climate change challenge. With regards to the project suitability and design, a full assessment of climate risks and challenges as well as vulnerability assessment is contained in Sections 5 and 6 of the Appendix 1: Funafuti Sanitation Master Plan 2022-2042. Climate change risks during *implementation* are set out in the table below.

Project-Related Risks

As part of the ongoing assessment and planning process, ADB has undertaken a thorough risk assessment and prepared appropriate risk mitigation strategies. This is summarized in Table 7.

Table 7: Risks and mitigation measures

Risk scope	**Risk Assessment**	**Risk Description**	**Mitigation Measure**
Country-specific	Substantial	PEFA identified risks associated with segregation of duties, FMIS implementation and regular reconciliations to facilitate good internal control. OAG has issued disclaimers of opinion for the TWOG statements mainly due to converting cash basis to accrual basis.	All payments are initiated and approved by the Line Ministries and payments are centralized at Treasury Division, MOF. Reconciliations are done on a monthly basis by MOF.

Entity-specific	Moderate	MOF is the Borrower/ Recipient for all ADB-funded projects and has only been an EA for 2 ongoing ADB-funded projects, although some of their staff are authorized signatories for all ADB-funded projects. The roles of MOF as a whole, and the PMU, are to be clearly defined.	A new PMU has been set up in MOF to implement the project and an organization structure has been defined and will be implemented, with TORs developed for PMU staff. A new project accountant has been recruited and ADB will provide training for the project accountant, project manager and new MOF approvers on ADB?s disbursements, financial reporting and auditing requirements.
Executing Entity (EA)	Moderate	MOF is the Borrower/ Recipient of all ADB-funded projects and has only been an EA for 2 ongoing ADB-funded projects, although some of their staff are authorized signatories for all ADB-funded projects.	ADB will provide training to the new PMU staff and new MOF CPD approvers, on ADB?s disbursements, financial reporting and auditing requirements.
Funds Flow	Low	Payments to consultants/ contractors will not flow through EA/IA/PMU but will be paid directly by ADB. There may be small recurrent expenditure for the PMU which will be done on a reimbursement basis.	Reimbursement procedure will require complete documentation.
Staffing	Moderate	A new PMU will be established in MOF and a qualified and experienced project accountant will be recruited. Some MOF staff will be new CPD Approvers.	MOF to ensure that a qualified and experience project accountant is recruited. ADB will provide training to the new project accountant and new MOF CPD Approvers on ADB?s disbursements, financial reporting and auditing requirements.
Accounting Policies and Procedures	Substantial	After preparing the 2017 TWOG financial statements on an accrual basis in accordance with Tuvalu GAAP, MOF is preparing the 2018 TWOG financial statements on a modified cash basis in accordance with IPSAS.	PMU will apply accounting policies and procedures consistent with MOF.

Internal Audit	Low	A new Division (IAD) was established in MOF in December 2016 and staff do not have knowledge of ADB?s requirements	ADB to include IAD staff when training is conducted on ADB?s disbursements, financial reporting and auditing requirements.
External Audit	Substantial	OAG issued disclaimer of opinions for the 2016 and 2017 TWOG financial statements due to limitation of scope and some of OAG?s recommendations remain outstanding. OAG audit all ADB projects.	MOF are working towards clearing OAG?s outstanding recommendations. During project review missions, ADB will meet with OAG, to ensure that ADB?s auditing requirements are complied with.
Reporting and Monitoring	Substantial	New project accountant may not be familiar with ADB?s financial reporting requirements.	Training will be provided to PMU staff and relevant MOF staff on ADB?s disbursements, financial reporting, and auditing requirements.
Information System	Moderate	Only MOF uses Sage 300 software and other Ministries use Microsoft excel. MOF are looking into procuring a new software which TWOG, including development partner projects, can also use but this will take time.	The project will purchase the software to use, as is being successfully used under OIMIP-TUV (an ongoing ADB/LDCF project).
Climate Change (during project implementation period)			
	Low	Damage to equipment or civil works during project implementation	ADB and partners have experience implementing civil works projects in Tuvalu and are aware of the measures required and how to mitigate this risk. Full care through project management will be taken to ensure no damage occurs.

	Low	Delays to project activities due to storms or other climate impacts.	Climate events may lead to late deliveries or the need to halt works for short periods. ADB and partners have experience implementing civil works projects in Tuvalu and are aware of the measures required. Further, flexibility will be built into the implementation plan meaning: (i) short delays can be tolerated without leading to oval delays and (ii) flexible sequencing will allow non-affected activities to take place when affected activities are held up.
COVID Pandemic Related Risks: The global COVID Pandemic leads to a series of new risks to be monitored, and mitigated if necessary. These are summarized in the following:			
	Medium	Implementation delays due to COVID Pandemic.	It is anticipated that the impacts of the pandemic will be finished before the main project implementation period. Should the pandemic not be fully over at the time of project start-up, additional mitigation measures are: (i) Creating flexibility in the sequencing of project activities where possible; (ii) Through the strategic procurement plan, the project will explore the possibility of using national Tuvalan firms or international firms with local offices in Tuvalu. (ADB, GOV)
	Low	Limited availability of technical expertise - this may be increasing limited as currently travel to Tuvalu is not possible, as for most countries in the region.	Concerned project activities may be delayed, but this is not considered to be a risk to overall project success. (Project management)
	Low	Limits on stakeholder engagement process, as mobility and interactions may be limited by the pandemic.	Currently it is anticipated that this will lead to delays, not changes, in stakeholder engagement. And so this is not considered to be a risk to overall project success. (Project management)

	Low	Restricted enabling environment or finance, as government prioritises COVID response over energy sector development.	Government commitment to climate change adaptation and disaster risk management (and therefore the overall project goals) remains extremely high and immovable. (ADB, project management)
Abbreviations: MOF: Ministry of Finance; PMU: Project Management Unit; TWOG: Tuvalu whole of government; PEFA: public expenditure and financial accountability; CPD: Client Portal for Disbursements; OAG: Office of the Auditor General.			

However, the Covid pandemic, like all crises, may also provide opportunities for building back better. All such opportunities will be explored and assessed in line with ADB policy. The following table provides the initial opportunity assessment. This will be continually assessed by the ADB (in line with Asia-Pacific wide activities) and by the project management.

Opportunity Category	**Project Activities**
Social	The Covid-19 pandemic has served to underline the importance of health and sanitation services. Public understanding of the need for water supply and sanitation is higher. This is a good opportunity for investing in WSS with public support, and potentially for introducing tariff reforms. The project will explore potential opportunities.
Economic/Fiscal	The economic and fiscal impacts of the pandemic have been very significant, and negative, for Tuvalu. A comprehensive and united effort is required to get the economy and fiscal balances back on track. Initial signs are that communities are motivated to work collectively to achieve these goals. The project will explore potential opportunities.
Communication	The normalization of online conferencing and communication platforms since early 2020 means that online interaction, online teaching, online capacity building, online meetings and online conferences have become much more commonplace and accepted by a broad range of global stakeholders. This has paved the way for stakeholders to reach a much wider range and bigger number of participants through capacity building and network building activities. The project will optimize these possibilities. The Pacific region covers a very large area and traveling can be is expensive (both in terms of time, monetary and carbon costs). The switch to optimal digital communications can therefore decrease costs and increase overall communications.
Data sharing	The pandemic affected everyone in the world in one way or another; this has forced millions of people to re-evaluate the way they operate. Without a doubt, this is an opportunity to innovate and grow digitally (new technology, information display, among others). The project will be guided by this.

Table: Covid opportunities assessment.

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 existing Water Steering Committee (WSC) [1]will provide project oversight, strategic direction and ensure the project is fully integrated with other development initiatives. WSC membership includes the Secretaries of the Ministry of Finance (MOF), MPWIELMD, Ministry of Health, Social Welfare and Gender (MHSWG), and the Ministry of Local Government and Agriculture (MLGA).

In ADB terminology, the project executing agency (EA) is the Ministry of Finance, MOF. As EA, MOF 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 Public Works, Infrastructure, Environment,

Labour, Meteorology, and Disaster (MPWIELMD) is the implementing agency (IA). The MPWIELMD will serve as ?GEF Executing Partner?. MPWIELMD is responsible for day-to-day management of the project activities and monitoring/evaluation. Under MPWIELMD, the Public Works Department (PWD) has established a Project Management Unit (PMU) to oversee day-to-day implementation.

At a minimum, in addition to the Project Manager, the PMU will be staffed by (i) gender specialist; (ii) social/resettlement safeguards specialist; (iii) safeguards communications specialist; (iv) environment specialist; and (v) procurement specialist.

The Department of Climate Change (DCC) under MOF will act as an Advisory Agency.

Annex H provides details on the roles and responsibilities of the entities involved in implementation.

Coordination with ongoing and planned projects, including GEF projects

The WSC, and its members, which oversees and guides this project, will take the lead in coordinating with all related activities in Tuvalu. Notably, MPWIELMD, as the WSC chairperson, will ensure coordination with all water sector related initiatives (institutional, capacity building and infrastructure), whereas DCC will ensure coordination with all climate change related initiatives.

WSC will also lead coordination with and among international partners to ensure coordination and synergy, including working with the Tuvalu Coastal Adaptation Project (TCAP), The New Zealand Ministry of Foreign Affairs and Trade (MFAT), the UN agencies and international NGOs. Coordination between ADB and WSC will be facilitated by the ADB Tuvalu Country office, with support from ADB technical staff in Fiji and in Manila.

On a day-to-day basis, the PMU will ensure coordination in the implementation of shared and complementary activities.

GEF Projects

Table 8 summarizes the most pertinent GEF supported projects in Tuvalu and details how this proposed project will complement the existing portfolio.

Table 8: Related gef projects and coordination arrangements

Project Title and GEF Agency	Brief Description	Status of project and proposed coordination with IURP
Climate Resilience in the Outer Islands of Tuvalu (ADB)	The project aims to increase resilience to climate change of communities on the outer islands of Tuvalu through the provision of improved port and wharf facilities. Implemented by ADB.	Status: Ongoing As the project is also implemented by ADB, there will be lesson and learning, and possibly administrative advantages (e.g. joint monitoring, joint evaluation, joint knowledge products, sharing of experience on procurement, sharing best practices on capacity building. etc).
Improved Access to Renewable Energy in Tuvalu (ADB)	This project aims to greatly increase the installed renewable energy generation capacity, through the supply of innovative floating solar panels and related grid upgrading.	Status: Concept approved As the project is also to be implemented by ADB, and to start up at a similar time, there will be technical exchanges, lesson and learning, and possibly administrative advantages (as above).
Pacific I2I Regional Project: Ocean Health for Ocean Wealth - The Voyage to a Blue Economy for the Blue Pacific Continent (UNEP/ADB)	The project aims to preserve and safeguard the health of ocean ecosystems while catalyzing the development and growth of sustainable blue economies (SBE) in Pacific Island Countries. This will be done by creating in-country enabling environment and diverse demonstration of SBE at sites across the Pacific.	Status: Concept approved ADB is to support the implementation of a sub-project to demonstrate SBE on Tuvalu. Details are being determined, but this may include e-mobility, aqua-farming and/or reef regeneration. Accordingly, there will be technical exchanges, lesson and learning, and possibly administrative advantages

Blue Pacific Finance Hub (BPFH): Investing in Resilient Pacific SIDS Ecosystems and Economies (ADB)	The project aims to identify, prepare and finance investments that increase the resilience of Pacific coastal communities and ecosystems. This will be done by creating in-country enabling environment and actively mobilizing finance to SBE projects across the Pacific. Tuvalu is a priority country. diverse demonstration	Status: Concept approved Project design has just commenced. However, it is likely that the BPFH can help mobilize and initiate investments on Tuvalu, and there is a chance that these may be related to urban services, water supply or sanitation. ADB will ensure close linkages with the project.
Effective and Responsive Island-level Governance to Secure and Diversify Climate Resilient Marine-based Coastal Livelihoods and Enhance Climate Hazard Response Capacity Increasing Resilience of Coastal Areas and Community Settlements to Climate Change and Implementing a Ridge to Reef Approach to Protect Biodiversity and Ecosystem Functions (R2R)		These projects, implemented by UNDP, are now closed. Lessons have been learnt with regards to building capacity, ensuring sustainability, and technical approaches appropriate for the Tuvalu context. Contact has been established already with project participants and individuals involved in the projects. FWSP will build on any lessons learnt through direct contacts with agencies and individuals involved in these previous GEF projects.

As can be seen from Table 8, the current project complements the previous and ongoing GEF and LDCF supported projects, notably because none of the previous projects covered the water or sanitation sectors. Given that water supply and sanitation are key development constraints, and are highly vulnerable to climate change, the present project addresses an important sector with outstanding needs.

Other Projects

Table 9: projects and coordination arrangements

Project Title and Lead International Partner	Brief Description	Status of project and proposed coordination with FWSP
Tuvalu Coastal Adaptation Project (TCAP), financed by GCF and implemented by UNDP	The project implements measures that are urgently required to reduce the impact of increasingly intensive wave action on key infrastructure as a result of climate change induced sea-level rise and intensifying extreme events. Financial and capacity constraints at all levels ? from technical to community awareness ? are being addressed. Notably, high-value vulnerable coasts will be made more resilient to withstand the effects of increased wave intensity. Expected direct benefits are significant with 3,100 people or 29% of the total population in Tuvalu benefiting from the mitigated impact of future wave overtopping events. The project will also strengthen institutional and community capacities for sustaining and replicating project results.	Ongoing since 2016 TCAP is a major climate change project on Tuvalu, supporting many activities that could have widespread benefits. Contact has been established already with project participants and individuals involved in the projects. Coordination will be achieved by (i) the close physical proximity of the project PMUs and (ii) shared members of the SCs (iii) location of implementing agency offices in Fiji, from where additional coordination can be developed. This is likely to lead to shared activities, inputs and outputs (e.g. mapping, workshops, databases). Details to be determined during implementation.

MFAT	MFAT?s 20-year strategy is for a resilient Tuvalu. This includes growing Tuvalu?s sovereign wealth, ensuring Tuvalu?s infrastructure and services are climate resilient and well managed, and Tuvalu?s population are more skilled and qualified. One of four foci for the period 2019?2021 was improving access to safe and climate resilient public utilities and service ? this may have been extended due to the COVID pandemic.	Initial contacts have been made with decision-makers and practitioners under MFAT?s program. ADB has a strong record of cooperation with MFAT in the Pacific regions. Collaboration details are to be determined during implementation.
South Pacific Community and the Pacific Islands Applied Geoscience Commission (SOPAC)	SOPAC has been undertaking data collection, research and capacity building on Tuvalu for many years, particular on water supply and climate change issues. SOPAC has played a major role in implementing MFAT funded projects, including supporting preparation of the IWRM.	Initial contacts have been made with scientists and practitioners at SOPAC. SOPAC is currently preparing the scope of future activities on Tuvalu. Collaboration details are to be determined during implementation.

[1] NOTE: The Tuvalu Cabinet is currently reviewing a proposal to establish a Technical Advisory Committee Water, Sanitation, and Hygiene (TAC-WASH) which, if approved, would replace WSC in the current implementation arrangements. TAC-WASH would report directly to the National Advisory Council on Climate Change (NACCC). TAC-WASH would be comprised of the Head of the PWD Water Division, Director of Meteorology, Director of Disaster Management, Director of Public Health, Director of Climate Change, Funafuti Kaupule representative, and Secretary of the Tuvalu Red Cross Society. The Head of the PWD Water Division would act as the Chairperson, with Director of Climate Change acting as Deputy Chairperson. Until this arrangement is approved, the WSC will continue oversight.

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 national development, water supply and sanitation, and climate change and risk reduction. More information is provided in the following paragraphs.

Development

The *National Strategy for Sustainable Development, 2021 ? 2030 (?*Te Kete?). Te Kete is considered the platform upon which Tuvalu will overcome the socio-economic challenges and environmental crises in this period of the ?new normal?. This project is designed to contribute greatly to two of the 20 national outcomes in *Te Kete*, National Outcome no. 4, *Climate Change and Disaster Resilience Increased*, and National Outcome no. 20, *Access to Clean Water and Sanitation Achieved* (see results framework in Annex A).

Water and Sanitation

The project contributes to and builds on the *Sustainable and Integrated Water and Sanitation Policy, 2012-2021*. The Project contributes to several of the concerned goals. First, it contributes to Goal no. 1 ?T*o provide a safe, reliable, affordable and sustainable water supply*? for all Tuvalu, including Funafuti. It also contributes to the Policy?s general aims to ensure the people of Tuvalu have continued access to safe, reliable, affordable and sustainable water and sanitation facilities. This includes many strategies and activities to improve water treatment and roll out water treatment technologies and approaches.

The project also contributes to the *Tuvalu Infrastructure Strategy and Investment Plan, 2016 ? 2025* (TISIP). TISIP includes a priority focus on water supply and sanitation, in part in response to previous droughts. It also emphasizes the need to ensure all infrastructure is climate proofed and climate resilient. This project contributes directly to these objectives.

Further, in the preparatory phase of the project, assessment and consultation have led to the issuance of new, operational Master Plans for both water supply and sanitation (see Appendices 1 and2).

Climate Change and Disaster Management.

National Climate Change Policy, 2012?2021 (or *Te Kaniva).* The Te Kaniva vision is ?*to protect Tuvalu?s status as a nation and its cultural identity and to build its capacity to ensure a safe, resilient and prosperous future*.? Te Kaniva guides the country?s efforts in both climate change adaptation and mitigation. Accordingly, a key design principle that underlies this proposed project is commitment of support to the Government expressed commitment in Te Kaniva. This project contributes directly to Goal 4 (Developing and Maintaining Tuvalu?s Infrastructures to Withstand Climate Change Impacts, Climate Variability, Disaster Risks and Climate Change Projection) and notably to Strategy 4.2 Physical planning and development control for Funafuti and the Outer Islands.

Tuvalu National Strategic Action Plan for Climate Change and Disaster Risk Management 2012-2016 (NSAP). The current project makes a major contribution to NSAP Goal 1 **(***Strengthening Adaptation Actions to Address Current and Future Vulnerabilities*) and notably to Strategy 1.3 (*Integrated and coordinated water resources (including desalination) planning and management including preparedness and response plans for each island*). This strategy calls for infrastructure support in order to improve sustainable freshwater production and storage, awareness raising, and sanitation. The project contributes directly to this.

Strategic Roadmap for Emergency Management, 2021 ? 2023 (SREM). SREM has been developed to guide a whole-of-country approach to strengthening disaster management in Tuvalu. In part the SREM is borne from the recognition that there is not a cross-cutting disaster sector plan to guide ongoing strengthening of the sector. At the core of the SREM is an emphasis on the need for ongoing dialogue, collaborative planning and action involving stakeholders across all sectors and levels. This project is aligned to and will contribute the following goals under SREM:

? Goal 1: Disaster management plans, frameworks, policies, and standard operating procedures are established and mainstreamed, in particular the Output: Procedures and plans at all levels and across all sectors

? Goal 3: *All Tuvaluans are empowered to build resilience and help manage disasters*, in particular the Output: DRM community outreach and engagement strategy developed.

Regional Priorities.

Pacific island states collaborate on and coordinate responses to development and climate challenges. Tuvalu has participated actively in the preparation and implementation of regional frameworks. Notably, *the Pacific Disaster Risk Reduction and Disaster Management Framework for Action 2005 ? 2016* (RFA) is a regional framework that aimed to improve preparedness and resilience of Pacific Island nations and communities. The RFA built on the capacity of Pacific Island communities by accelerating the implementation of DRR and disaster management policies, planning and programmes through: development and strengthening of DRR and disaster management including mitigation, preparedness, response and recovery systems; integration of DRR and disaster management into sustainable development planning and decision-making processes at all levels; and strengthening partnerships between all stakeholders in DRR and disaster management.

More recently, the *Framework for Resilient Development in the Pacific: An integrated Approach to Address Climate Change and Disaster Risk Management 2017 ? 2030* was developed. This is a voluntary guideline for the Pacific Islands Region to provide support for building resilience to climate change and disasters in the region and a framework for the Pacific Islands Partnership.

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 sanitation and water sector assets;

? Collecting and documenting information on the impact of the project on climate resilience;

? Publishing or contributing to one or more lessons? learnt documents, such as ?best practices? or other guidance documents.

Together with MPWIELMD and the PMU, the WSC will take the lead in sharing knowledge to all stakeholders in Tuvalu.

At the regional level, ADB will take the lead in knowledge management and sharing. ADB directly shares knowledge with development partners, governments, academics, utilities and CSOs through formal and informal consultations and discussions. Several ongoing ADB regional Technical Assistance projects are expected to directly support related knowledge sharing across the region. These are notably:

? Building Coastal Resilience through Nature-Based and Integrated Approaches? ($1.925 million);

? Promoting Action on Plastic Pollution from Source to Sea in Asia and the Pacific ($6 million);

? Promoting Innovations in Regional Cooperation and Integration (RCI) in the Aftermath of COVID-19 ($3.5 million); and,

? Support to Climate Resilient Investment Pathways in the Pacific ($4 million).

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.

Incorporation of lessons learnt into project design. The ADB has in recent years implemented water supply and sanitation infrastructure projects in 12 countries in the Pacific. ADB is also developing urban resilience and/or WSS projects in many other countries across Asia, outside of the Pacific. Hence, through its networks and partners, ADB is well placed to gather lessons, assess, and apply pertinent lessons to this

project. This can occur through several in-house and external mechanisms. In house, there are several ongoing regional Technical Assistance projects that share lessons across the Pacific. These are: (i) Support to Climate Resilient Investment Pathways in the Pacific. This commenced in 2021 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) Promoting Innovations in Regional Cooperation and Integration (RCI) in the Aftermath of COVID-19 ($3.5 million); (iv) Implementing a Differentiated Approach to Urban Development in the Pacific, which started in 2018, with an overall budget of $3.5 million. As an example of an *external mechanism,* ADB is an active member of the Asia Pacific Adaptation Network (APAN), hosting the 6th APAN conference in 2018. ADB can ensure Tuvalu learns from lessons and experiences across APAN. This is one of many mechanisms whereby Tuvalu can positively build on the experiences of other countries, across Asia and the Pacific.

9. Monitoring and Evaluation

Describe the budgeted M and E plan

Monitoring, evaluation and reporting for the project will follow ADB?s Evaluation Policy and align with the GEF policy and guidance for both monitoring and evaluation. The Government of Tuvalu is familiar with ADB and GEF processes with respect to M&E and reporting. As indicated in the budget, USD 50,000 has been allocated for GEF M&E costs.

The PMU will be responsible for project monitoring and reporting. The PMU will prepare biannual reports on progress, on the current status of all indicators, on the implementation challenges and on the financial status. The PMU will appoint one staff member as focal point for monitoring and evaluation (M&E).

On a day-to-day basis, overall responsibility for project monitoring and implementation rests with the project manager. The project manager will develop quarterly and annual work plans to ensure the efficient implementation of the project. The project manager will inform the implementing agency and the ADB of any delays or difficulties during implementation, including the implementation of the M&E plan, 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.

In line with GEF requirements, the PMU will organize (i) completion of annual review reports; (ii) independent mid-term review as needed; and (iii) independent final evaluation at the close of the program.

Monitoring activities will take place as follows:

? A detailed project administration manual (PAM) will be prepared setting out the reporting, monitoring and evaluation activities, responsibilities, and budget;

? ADB will undertake at least two project review missions per year to assess progress of project implementation, compliance with covenants and project agreements, and to monitor progress in achieving project outputs and agree on any required modifications;

? ADB will undertake a review midway through project implementation or at any time that ADB and the Government consider it necessary. The midterm review mission will (i) review institutional, administrative, organizational, technical, environmental, social, economic, and financial aspects of the project based on the assumptions and risks included in the design and monitoring framework; (ii) review covenants to assess whether they are still relevant or need to be changed, or waived due to changing circumstances; (iii) assess the need to restructure or reformulate the project and the effects of this on the immediate objectives (purpose) and long-term goals of the project; and (iv) update the project?s design and monitoring framework if restructuring or reformulation is necessary or its immediate objectives will change;

? Project implementation will be monitored on an ongoing basis by ADB staff in ADB HQ (Manila) and the South Pacific Subregional Office (SPSO, in Suva, Fiji), and the ADB representative in the Tuvalu national office;

? Within 6 months of the physical completion of the project, MoF will submit a project completion report to ADB.

In line with GEF requirements, the PMU will organize (i) completion of annual review reports; (ii) independent mid-term review as needed; and (iii) independent final evaluation at the close of the program. These will be undertaken fully integrated into ADB monitoring/reporting requirements in order to avoid any duplication. The budget allocates USD 50,000 for GEF-related M&E.

Throughout the life of the project, MoF, as executing entity, will provide ADB with (i) quarterly progress reports in a format consistent with ADB's project performance reporting system; and (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 coming 12 months.

The project results framework (*design and monitoring framework)* in Annex 1 will guide monitoring at the overall project level. The following table provides details of the GEF budget for M+E.

Input	**Mid-term evaluation (US$)**	**Final evaluation (US$)**	**Total covid(US$)**
International consultant	19,000	29,000	48,000
Reports, printing	1,000	1,000	2,000

Total	20,000	30,000	50,000

Table of M+E Budget (GEF inputs only)

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

Health benefits As set out in the Master Plans (Appendices 1 and 2), the health benefits of improved water supply and sanitation include:

? Reduced risk of diarrhoea;

? Reducing the spread of intestinal worms, schistosomiasis, and trachoma, which are neglected tropical diseases that cause suffering for millions;

? Reducing the severity and impact of malnutrition;

? Promoting dignity and boosting safety, particularly among women and girls;

? Promoting school attendance: girls? school attendance is particularly boosted by the provision of separate, clean, maintained sanitary facilities;

? Reducing the dissemination of viruses and bacteria through contaminated water (e.g. viruses like hepatitis A and E, and bacteria like E coli and diseases like cholera and typhoid fever);

? Reducing the spread of antimicrobial resistance; and,

? Potential recovery of water and nutrients from faecal waste.

Socio-economic benefits Women, children, the elderly, and the most disadvantaged households bear a disproportionate share of the burden of inadequate water supply and sanitation and will 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.

A major socio-economic benefit is expected from the production of fertilizer from the waste treatment plant. It is anticipated that by 2030 the site will be generating 888 tonnes of fertilizer per year. Several partners, including the Department of Agriculture, the Taiwanese Garden and the NGO Live ?n? Learn, have expressed in interest in purchasing this in order to improve food production. This will contribute to the overall food security of Tuvalu.

Environmental benefits

The main environmental benefits are:

(i) the reduced pollution around the current wastewater site. The current raw sewerage disposal site, some 50 to 60 metres north of the dumpsite, is a public health and safety risk as well as an environmental hazard. It is unfenced and unmarked, and there is a strong smell of sewage despite the high level of ventilation;

(ii) reduced pollution of the lagoon from the seepage of waste water. Currently, although the waste water is stored near the ocean side, several studies suggest that overtopping carries the waste and associated pollution to the lagoon where it negatively impacts the fragile ecosystems.

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
	Medium/Moderate		

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.

Please note that there will be no project level Grievance Redress Mechanism. Any grievance concerns will be addressed through the personnel contracting process, and if applicable through the ADB corporate level grievance system / mechanism.

Supporting Documents

Upload available ESS supporting documents.

Title	Module	Submitted
22-07-28 GEF ID 10742 DRAFT_Initial Environmental Examination Report (TUV) Appendix 7	**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).

Impacts the Project is Aligned with *Climate Change and Disaster Resilience Increased* - National Outcome no. 4. (National Strategy for Sustainable Development, 2021 ? 2030 *[Te Kete*]).a *Access to Clean Water and Sanitation Achieved* - National Outcome no. 20. (National Strategy for Sustainable Development, 2021 ? 2030 *[Te Kete*]).a			
Results Chain	**Performance Indicators**	**Data Sources and Reporting Mechanisms**	**Risks and Critical Assumptions**
Outcome Provision of climate-adapted, resilient, and improved drinking water supply, drainage, and sanitation services improved in Funafuti.	By 2030: a. At least 4,000 people in Funafuti receive continuous (24/7), climate resilient, and safe drinking water supply that meetings national quality standards. (2022 baseline: 0%) (OP 1.3; OP 3.2; OP 4.1) b. At least 1,800people in Funafuti urban areas gain access to safely managed sanitation services which are resilient to all climate and sea level conditions. (2022 baseline 10%) (OP 1.3; OP 3.2; OP 4.1)	a. WSD/PWD annual reports b. WSD/PWD annual reports	R: government does not maintain commitment to managing urban utility services and growth in Funafuti. A: The government maintains commitment to managing urban utility services and growth in Funafuti.
Outputs	By 2029:		

1. WASH policy environment for adapting to climate change and the delivery of urban water supply and sanitation services strengthened.	1. WASH sector advisory committee established and comprising at least 25% women (2022 baseline: 0%) (OP 2.3.2)	1. Technical Advisory Committee (TAC) annual reports.	A: WASH sector committee members and Funafuti Kaupule have sufficient water supply and sanitation services management and operations staff resources. A: The government maintains commitment to managing urbanization in Tuvalu and growth of Funafuti, and coordination among government ministries and agencies improves.
2. Resilient, effective, efficient, and sustainable public piped water supply services in Funafuti provided	2a. WSD/PWD finance 50% of their operation and maintenance costs from water sales (2022 baseline 20%) (OP 4.2.2) 2b. Losses from the Funafuti piped water supply network are less than 15% (2022 baseline: no piped system) (OP 4.2.1)	2a-2b: PWD annual reports.	R: Land acquisition is delayed. R: Implementation and cost overruns occur as a result of external freight cost and supply cost increases, limited capacity of local contractors and civil works interfaces with other, existing, underground, electricity and telecommunication services.
3. Adapted, resilient, sustainable, safely managed, sanitation services in Funafuti is provided	3a. WSD/PWD finance 75% of their operation and maintenance costs from solid waste services sales (2022 baseline 25%) (OP 4.3.1) 3b. The Lofeagai septage treatment and disposal facility is operated in accordance with the safely managed, WHO classification for sanitation, (2022 baseline: environmentally unsafe operating procedures) (OP 3.2.5; 4.3.1)	3a-b: PWD annual reports.	R: Poor quality maintenance and repairs caused by limited capacity of local staff and contractors.

4. Community awareness of the health and economic benefits of improved urban, water supply and sanitation services, and of adapting to climate change is increased.	4a. Average domestic water consumption from public system increases from minimal liters per capita per day to around 20 liters per capita per day by December 2028 (2022 baseline - nil). (OP 4.3.2) 4b. By 2026, women represent 35% of participants at community, public general meetings (2022 baseline: limited consultation and/or participation) (OP 2.3.2)	4. PWD annual reports		

5. Asset management and institutional capacity strengthened	5a. WSD/PWD are able to finance the O&M, costs for urban utility services in the medium to long term. (2022 baseline: full cost recovery is not achieved) (OP 6.2.2) 5b. By 2025: At least 150 government officials, of whom at least 40% are women, trained in project development, implementation, and monitoring (2020 baseline: 0) (OP 6.1.1)		

{A = assumption, ADB = Asian Development Bank, DMF = design and monitoring framework, OP = operational priority, R = risk.}

a Government of Tuvalu. 2020. *National Strategy for Sustainable Development 2021-2030 (Te Kete). Funafuti.*

Source: Asian Development Bank.

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)	
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 Request for CEO Endorsement, 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 5.
5. The Gender Action Plan	Provided in full in Request for CEO Endorsement document. See Part II, Section 3 (and Appendix 6).
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 Tuvalu 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 Appendices 1, 2 and 3.

(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. Notably there are implications for GHG emissions. 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 6.
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 4 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 projects. This is explained further in Part II, Section 6 (coordination with other projects) and Section 8

(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 referred annexes.
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 appendix 5.
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 to the extent feasibly, as explained in full in the Request for CEO Endorsement document. See Part II, Section 2 (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.	Not relevant to Tuvau
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 up-coming projects, yet asks for additional information on how project activities will be coordinated with other organisations working on the same topics and region.	The proposal provides 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 focus would be directed more precisely to the proposed project. In this context, Germany would suggest to stress the interdependency of the proposed programme with the intervention fields of urban planning, improved housing design, incentives for private housing improvement, networked water management systems and provision of reticulated water to those most vulnerable.	As explained in the proposal, private sector operators will be engaged in water supply services and capacity building of key government agencies. The Government will explore measures to attract future private sector co-financing to water sector development, which will be supported by the project. A key project objective is to make sanitation and water supply financially sustainable, which provides a basis for private sector involvement in the sector in the future. The project efforts to improve management 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 overcome the barriers within the project. Similarly, the risk analysis highlights that 3 out of 4 types of risks are 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 proposal, 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 how the different types of beneficiaries are set to profit from project outcomes/ activities.	Detailed information is provided in the proposal, 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 displayed in the proposal and is a requirement in the PIF.	Noted.
COMMENTS ON THE REQUEST FOR CEO ENDORSEMENT	
PENDING	

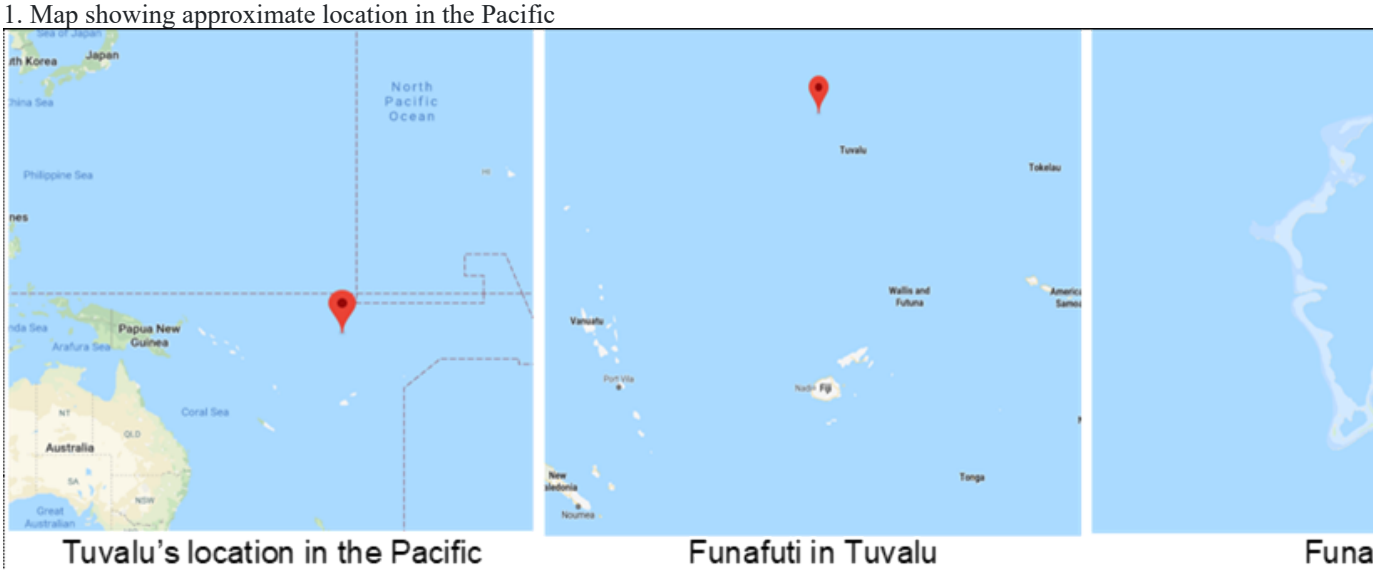
ANNEX C: Status of Utilization of Project Preparation Grant (PPG). (Provide detailed funding amount of the PPG activities financing status in the table below:

N/A

ANNEX D: Project Map(s) and Coordinates

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

1. Map showing approximate location in the Pacific



Tuvalu's location in the Pacific | Funafuti in Tuvalu | Funa

Coordinates:

The project activities and outputs are all on the island of Funafuti which lies between 8?27' South and 8? 32' South, and between 179?10' East and 179?12' East.

2. Map showing villages and atolls of Funafuti

3. Map showing main villages on Funafuti, to benefit from project water supply and sanitation interventions.

4. Map showing:

- site of current waste water treatment (and approximate location of proposed new treatment facilities).

- PWD office. This is also the siting of the current desalination plant (to be refurbished under the project).

- QE II building, site of proposed new water storage facilities.

ANNEX E: Project Budget Table

Please attach a project budget table.

						Output 1	Output 2	Output 3	Output 4	Output 5	PMC	M+E	Totals
International consultants													
	Water Supply and Sanitation Utility/Governance Specialist					75.5							75.5

	M+E (independent evaluation)									50	50
	Sub-total			75.5	0	0	0	0		50	125.5
National Consultants											
	Communications specialist						45.5				45.5
	Project Manager								172		172
	Sub-total			0	0	0	45.5		172		217.5
Equipment											
	water supply										
	Sanitation										
	Pump out truck[AA2] *					366					366
	Green waste chipper					72					72
	Septic tank replacement program (pilot)					44					44
	Sub-total					482					482
Civil works											0
	Water supply										0
	Two storage reservoirs				2452156						2455

	Sanitation												
	10 drying beds for septage						293						293
	Sewage treatment plant						770						770
	Ocean outfall						151						151
	Sanitation infrastructure for gov and public building						96						96
	Sub-total						2455	1310					3765
Other													0
TOTAL						**75.5**	**2,452,156**	**1792**	**45.5**	**0**	**172**	**50**	**4,587,156**

* As designed through the Feasibility report (Appendix 3). This is a specialized septage pump-out tanker truck with 5000liter capacity. The existing septage pump-out truck is no longer reliable due largely to the increased use, and the unavailability of service items and spare parts in nearby regional countries (i.e., Fiji, New Zealand, and Australia). Hence, it is now experiencing serious difficulties with the vacuum pump and can only be used intermittently. In order to ensure a competitive procurement process, a nine-month procurement program is planned for the bidding, negotiations, contracting, and supply schedule for delivery of the new truck. Further a regional supplier/agent holding stocks of service items and spare parts will be sought to supply this equipment. The cost includes service and maintenance spare parts.

ANNEX F: (For NGI only) Termsheet

Instructions. Please submit an finalized termsheet in this section. The NGI Program Call for Proposals provided a template in Annex A of the Call for Proposals that can be used by the Agency. Agencies can use their own termsheets but must add sections on Currency Risk, Co-financing Ratio and Financial Additionality as defined in the template provided in Annex A of the Call for proposals. Termsheets submitted at CEO endorsement stage should include final terms and conditions of the financing.

ANNEX G: (For NGI only) Reflows

Instructions. Please submit a reflows table as provided in Annex B of the NGI Program Call for Proposals and the Trustee excel sheet for reflows (as provided by the Secretariat or the Trustee) in the Document Section of the CEO endorsement. The Agencys is required to quantify any expected financial return/gains/interests earned on non-grant instruments that will be transferred to the GEF Trust Fund as noted in the Guidelines on the Project and Program Cycle Policy. Partner Agencies will be required to comply with the reflows procedures established in their respective Financial Procedures Agreement with the GEF Trustee. Agencies are welcomed to provide assumptions that explain expected financial reflow schedules.

ANNEX H: (For NGI only) Agency Capacity to generate reflows

Instructions. The GEF Agency submitting the CEO endorsement request is required to respond to any questions raised as part of the PIF review process that required clarifications on the Agency Capacity to manage reflows. This Annex seeks to demonstrate Agencies? capacity and eligibility to administer NGI resources as established in the Guidelines on the Project and Program Cycle Policy, GEF/C.52/Inf.06/Rev.01, June 9, 2017 (Annex 5).