United Nations Development Programme
Country: Solomon Islands
PROJECT DOCUMENT[1]

Project Title: Solomon Islands Water Sector Adaptation Project (SIWSAP)

UNDAF Outcome(s): Improved resilience of PICTs, with particular focus on communities, through integrated implementation of sustainable environmental management, climate change adaptation/mitigation, and disaster risk management

UNDP Strategic Plan Environment and Sustainable Development Primary Outcome: Growth is inclusive and sustainable, incorporating productive capacities that create employment and livelihoods for the poor and excluded (Outcome 1)

UNDP Strategic Plan Secondary Outcome: Countries have strengthened institutions to progressively deliver universal access to basic services (Outcome 3)

Expected UNDAF Outputs: 1.1.1 - Strengthened capacity to integrate and implement policies/strategies for environmental sustainability, disaster risk reduction/management and climate change adaptation and mitigation at national level

1.1.3 - Strengthened national capacity for effective management of natural and water resources, renewable energy, waste, land and land rehabilitation that promote good agricultural practices for conservation of the environment and biodiversity.

Executing Entity/Implementing Partner: Government of the Solomon Islands, Ministry of Mines, Energy and Rural Electrification, Water Resources Division (MMERE-WRD)

Implementing Entity/Responsible Partners: Ministry of Environment, Climate Change, Disaster Management and Meteorology (MECDM); Ministry of Health and Medical Services – Environmental Health Division, Ministry of Development, Planning, and Aid Coordination, UNDP

Programme Period:	4 years
Atlas Award ID:	00078275
Project ID (UNDP):	00088631
PIMS #	4568
Start date:	July 2014
End Date:	June 2018
Management Arrangements:	NIM
PAC Meeting Date:	12 December 2013

Total resources required	$ 50,472,462
Total allocated resources:	$ 50,472,462
• LDCF (GEF):	$ 6,850,000
• Co-financing:	
o Government parallel:	$ 37,222,462
o UNDP parallel:	$ 6,400,000
Total Co-financing:	$ 43,622,462

Agreed by (Government): _____ Date/Month/Year

Agreed by (Executing Entity/Implementing Partner): _____ 17/6/2014 Date/Month/Year

Agreed by (UNDP): _____ 11/06/14 Date/Month/Year

[1] For UNDP supported GEF funded projects as this includes GEF-specific requirements

Brief Description

The impacts of climate change, particularly sea-level rise (SLR) and pronounced droughts have severe consequences on water and sanitation in the Solomon Islands. Due to SLR, low-lying islands, atolls and flat deltaic regions are faced with salt water intrusion, affecting the groundwater resources and limiting access to freshwater supply. Droughts have severely affected water supplies; during the 1997/1998 droughts that resulted in reduction of freshwater availability in Honiara by around 30-40%. Droughts have also damaged crops and livelihoods. Likewise, climate-related impacts on the quality and quantity of water has a gender dimension; in the context of the ethnic tensions, the safety and security of women and girls are compromised as they need to travel further to collect water, also leading to less time for other activities.

In this context, Government of the Solomon Islands, Ministries of Mines, Energy, and Rural Electrification (MMERE), in partnership with Ministry of Environment, Climate Change, Disaster Management and Meteorology (MECDM), Ministry of Health and Medical Services – Environmental Health Division, and UNDP is embarking on the Solomon Islands Water Sector Adaptation Project (SIWSAP) through support from GEF LDCF. The project objective is to improve the resilience of water resources to the impacts climate change and improve health, sanitation and quality of life, so that livelihoods can be enhanced and sustained in the targeted vulnerable areas. SIWSAP will work with partners to achieve this objective through 1) formulating, integrating, and mainstreaming water sector-climate change adaptation response plans in the water-related sectors as well as broader policy and development frameworks, 2) increasing the reliability and improving the quality of water supply in targeted areas, 3) investing in cost-effective and adaptive water management interventions and technology transfer, and 4) improving governance and knowledge management for climate change adaptation in the water sector at the local and national levels.

At the end of the four years implementation of the project, the Government of Solomon Island will have enhanced systems, tools, and knowledge for water resource resilience at the national and local levels, which will contribute to the implementation and achievement of national priorities outlined in various policies and strategies, including the National Adaptation Program of Action (NAPA) 2008, National Development Strategy (NDS) 2011 – 2020, National Water and Sanitation Sector Plan (2007).

TABLE OF CONTENTS

LIST OF ANNEXES

LIST OF ACRONYMS

ADRA	Adventist Development & Relief Agency
ADB	Asian Development Bank
APR/PIR	Annual Project Review/Project Implementation Reports
ALM	Asia-Pacific Adaptation Learning Network and the Adaptation Learning Mechanism
AMAT	Adaptation Monitoring Assessment Tool
AOGCMs	Atmosphere-Ocean Coupled General Circulation Models
AR4	The IPCC Fourth Assessment Report
ATLAS QPR	Quarterly Progress Report
AusAID	Australian Aid
AVI	Australia Volunteers International
BPoA+10	Mauritius Strategy for the Further Implementation of the Barbados Programme of Action
CBEWS	Community Based Early Warning System at Pilot Sites
CCA	Climate Change Adaptation
CCD	Climate Change Division
CCWG	National Climate Change Working Group
CHICHAP	Choiseul Integrated Climate Change Programme
CRISP	Community Resilience to Climate and Disaster Risk in Solomon Islands Project
CROP	Council of Regional Organisations of the Pacific
CT	Composting Toilet
CRiSTAL	Community-based Risk Screening Tool – Adaptation and Livelihoods
CBA	Cost-Benefit Analysis
DRR	Disaster Risk Reduction
DRM	Disaster Risk Management
EbA	Ecosystem-based Adaptation
ENSO	El Nino-Southern Oscillation
ERC	Evaluation Resource Center
EU	European Union
GCOS	Global Climate Observing System
GDP	Gross Domestic Product
GEF	Global Environment Facility
INaF	The Integrated National Framework for Resilient Development
IPCC	Intergovernmental Panel on Climate Change
IWRM	Integrated Water Resources Management
IW:LEARN	Global Environment Facility's (GEF) International Waters Learning Exchange and Resource Network
IWCAM	Integrated Coastal Area and Watershed Management Project
IW-ECO	Global Environment Facility's (GEF) Integrating Water, Land, Resources and Ecosystems Management in Caribbean Small Island Developing States
JPfA	Joint SIDS Programme for Action on Water and Climate
KGA	Kastom Gaden Association
LDC	Least Developed Country
LDCF/SCCF-	Least Develop Country Fund /Special Climate Change Fund
LLEE	Live and Learn Environmental Education
MDGs	Millennium Development Goals
MDPAC	Ministry of Development Planning and aid Coordination
MECDM	Ministry of Environment, Climate Change, Disaster Management and Meteorology
MHMS	Ministry of Health and Medical Services
MMERE	Government of the Solomon Islands, Ministry of Mines, Energy and Rural Electrification
MMERE-WRD	Government of the Solomon Islands, Ministry of Mines, Energy and Rural Electrification - Water Resources Division
MUS	Multiple-use Water Services
NAPA	The Solomon Islands National Adaptation Programme for Action
NAP	UNCCD National Action Programme

NBSAP	National Biodiversity Strategic Action Plan
NEMS	The National Environment Management Strategy
NDMO	National Disaster Management Office
NDS	National Development Strategy
NGOs	Non Governmental Organisations
NIWCC	National Intersectoral Water Coordination Committee
O&M	Operation and maintenance
PACC	Pacific Adaptation to Climate Change Programme
PACTAM	Pacific Technical Assistance Mission
Pacific RAP	Pacific Regional Action Plan on Sustainable Water Management
PCCSP	Pacific Climate Change Science Programme
PEHD	Provincial Government Staff from Public Works, Environmental Health Divisions
PGSP	Provincial Governance Strengthening Project
PIC	Pacific Island Countries
PIFACC	Pacific Islands Framework for Action on Climate Change
PPG	Project Preparation Grant
PIC/PICTs	Pacific Islands Countries
PIF	Project Identification Form
PMU	Project Management Unit
PPCs	Pilot Project Committees
RDP	Rural Development Programme (World Bank)
RIDA	Demand and Access framework
RWSS	Rural Water Supply and Sanitation Programme
RWSSU	Rural Water Supply and Sanitation Unit
SINU	Solomon Islands National University
RTC	Rural Training Centres
SEMRICC	Strengthening Environmental Management and Reducing the Impact of Climate Change in Solomon Islands
SIDS	Small Islands Developing State
SITSAP	Solomon Islands - Tuvalu Sanitation and Adaptation Partnership
SIWSAP	Solomon Islands Water Sector Adaptation Project
SNC	Solomon Islands Second National Communication
SIMS	Solomon Islands Meteorological Services
SMS	Short Message Service
SOPAC	Pacific Islands Applied GeoScience Commission, Applied Geoscience and Technology Division of Secretariat of the Pacific Community
SPREP	South Pacific Regional Environment Programme
SPC	Secretariat of the Pacific Community
SIACWSI	Solomon Islands Access to Clean Water &Sanitation Initiative
SIDT	Solomon Islands Development Trust
SWoCK	Strogem Woka lo Community fo Kaikai Project
TB	Tuberculosis
UNDAF	United National Development Assistance Framework
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
USD	United States Dollars
USD PPP	United States Dollars Purchasing Power Parity
UNCCD	The United Nations Convention to Combat Desertification
UNCDF	The United Nations Capital Development Fund
UNICEF	United Nations Children's Fund
UN	United Nations
VCA	Vulnerability Capacity Assessment
WASH	Water supply, Sanitation and Hygiene
WATSAN	Water and Sanitation
WMO	World Meteorological Organization
WRD	The Water Resource Division

WS-CCAR	Water Sector Climate Change Adaptation Response
WSG	WASH Stakeholders Group
WSP	Water Safety Plans
WRD	Water Resources Division
3WWF	3rd World Water Forum

I. SITUATIONAL ANALYSIS

1. Lying east of Papua New Guinea and northeast of Australia in the South West Pacific Ocean, between latitudes 50° and 120° south of the equator and longitude 1550° and 1700° east, the archipelago of Solomon Islands is comprised of about 1000 very scattered islands of diverse sizes.
2. The archipelago is comprised of the larger mountainous islands of volcanic origin rising up to 2,500 metres, as well as small low lying islands less than 3m above sea level in atoll settings, uplifted coral islands and man-made artificial islands of rock which are home to thousands of inhabitants. The island chains together measure some 1500 kilometres in total length and experience regular seismic activity. More recently in 2007, a devastating earthquake and tsunami was experienced in the western province with dozens of lives being lost and thousands being dislocated. The impact of the tsunami is still evident in the livelihoods of those who lost family and friends, and their homes and possessions.
3. The Solomon Islands have a total land area of 28,370 square kilometres and include the large high islands of Guadalcanal, Malaita, Santa Isabel, San Cristóbal, Choiseul, New Georgia, and the Santa Cruz Group with many diverse smaller islands (Figure 1). The country is divided into 9 provinces with a diverse population of approximately 549,574 (2010 estimate) speaking more than 95 languages who are almost exclusively of Melanesian decent (apart from some small communities in the northern provinces relocated from the Gilbert Islands in the 1950's).Most of the population lives in small rural communities dispersed over the nine largest islands (Solomon Islands Country Statistics, SOPAC, 2010). The capital, Honiara, is located on the island of Guadalcanal.

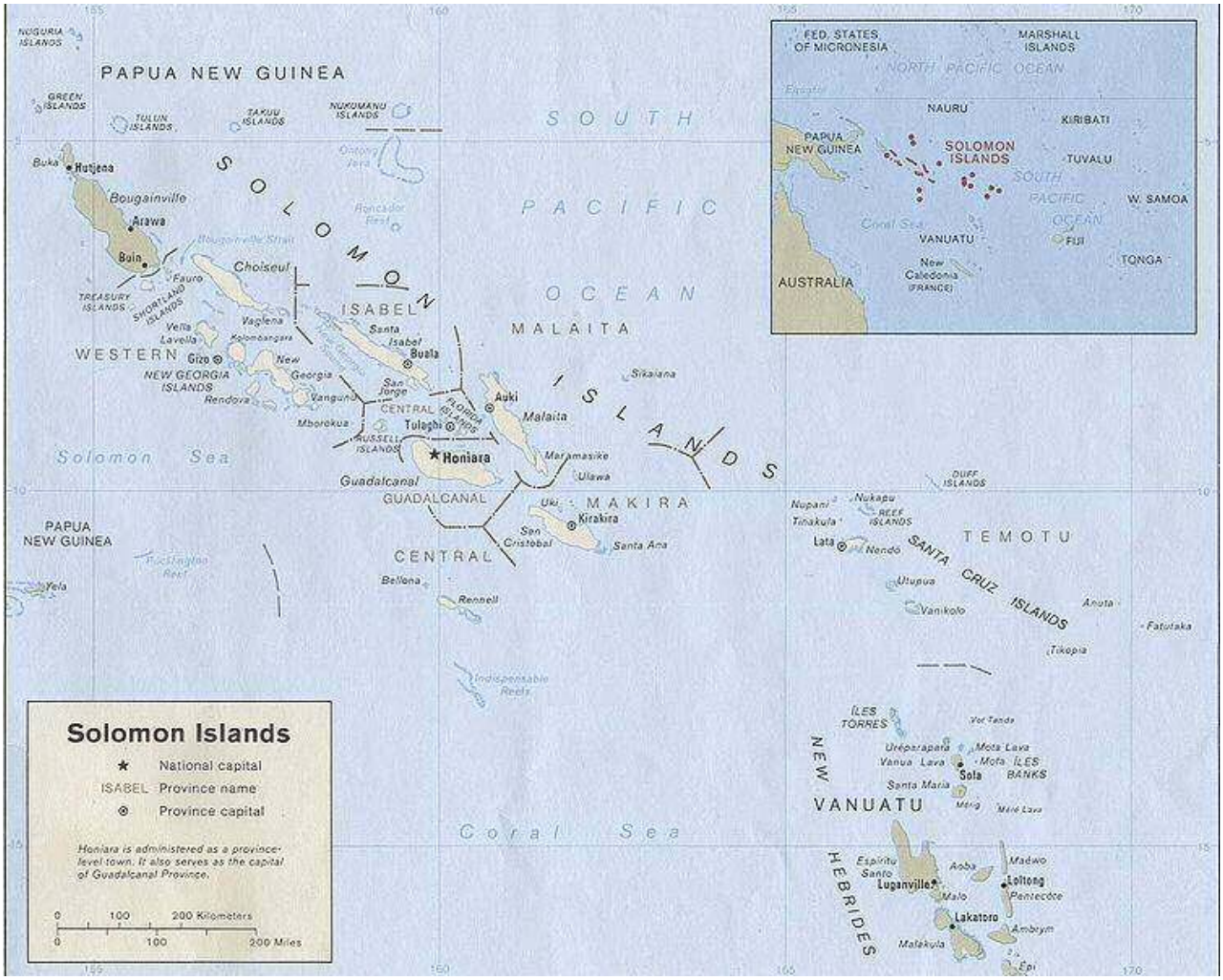


Figure 1: Map of the Solomon Islands (Source: Wikipedia)

4. The economy consists of mixed subsistence agriculture, fishing, and forestry on which over 80% of the population depend, and a small monetised sector dominated by large-scale commercial enterprises. These populations rely mainly on their traditional food production systems, traditional knowledge, strong communal systems and on agriculture, fishing and small business activities to support livelihoods. The Solomon Islands per-capita GDP of $600 ranks it as a lesser developed nation, and more than 75% of its labour force is engaged in subsistence agriculture and fishing.
5. Key agricultural exports include cocoa, palm oil and coconut products (Solomon Islands First National Communication under the UNFCCC, 2001). Cocoa and copra production, the mainstay of rural incomes, was resilient to the negative impact of the recent ethnic crises experienced by the country. Production of these commodities continued to increase despite inadequacies of transportation and infrastructure in rural areas, and lack of access to working capital by copra and cocoa exporters and traders (National Diagnostic Report - Water Resources Management Situation in Solomon Islands, 2007).
6. Log exports and fisheries remain the major foreign exchange earner for the country, though over-reliance on single commodities magnifies the country's susceptibility to external shocks. The islands are rich in mineral resources but these are comparatively under developed apart from the Gold Ridge mine, which was reopened in early 2011 (Catalogue of Rivers for Pacific Islands).
7. Water resource management in the Solomon Islands is below regional standards, and likely to be significantly further undermined due to climate change. The Solomon Islands Water, Sanitation and Climate Outlook (Low, 2011) highlights that water and sanitation are in a state of neglect with significant gaps in governance and institutional arrangements and very limited human and financial capacity. The MDG Progress Report for Solomon Islands (2010) finds that the country is severely off-track to reach its targets for MDG 7.c. With respect to access to improved drinking water sources, the proportion of population having access has remained constant both for urban (at 94%) and rural areas (at 65%) from the 1990 baseline to the assessments in 2004 and 2010. There is also a deteriorating use of sanitation facilities during the same period for both urban areas (from 98% to 77%) and rural communities (from 18% to 7.8%). It is usually the case for small islands that poor sanitation facilities affect groundwater water quality and therefore access to improved drinking water sources.
8. The impacts of climate change, particularly sea-level rise (SLR) and pronounced droughts have severe consequences on water and sanitation in the country. The areas, which are most vulnerable to SLR are low-lying coastal areas and atoll islands. Intrusion of salt water from rise in sea level has affected groundwater resources, especially freshwater aquifers in small atolls and low-lying islands that rely on rainfall or groundwater for their freshwater supply. Droughts have severely affected water supplies; during the 1997/1998 droughts that resulted in reduction of freshwater availability in Honiara by around 30-40%. Droughts have also damaged crops and livelihoods. Likewise, climate-related impacts on the quality and quantity of water has a gender dimension; in the context of the ethnic tensions, the safety and security of women and girls are compromised as they need to travel further to collect water, also leading to less time for other activities.
9. Climate-induced impacts on the water sector in the Solomon Islands will have economy-wide implications considering the closer (statistical) links between human development and Water and Sanitation (WatSan) than many other variables, including health, education, gender equality and access to modern energy services (Human Development Report 2006). Addressing climate-related vulnerabilities in this sector will therefore have co-benefits in terms of overall quality of life and contribute to sustainable development and in turn, to improve national resilience to climate change.

1.1 Climate change - induced problem

Climate Change Context in the Solomon Islands

10. The Solomon Islands has a climate typical of many tropical areas, characterized by moderately high and uniform temperature and humidity, with abundant rainfall in all months, in most areas, especially in the mountains. The range of average maximum temperature deviation is approximately 20°C throughout the year. Rainfall is the least uniform of the climatic elements, as topographical effects cause significant variations between locations. The average annual rainfall is mostly within the range of 3,000 to 5,000 millimetres with the majority of monthly rainfall amounts in excess of 200 millimetres, with the exception of Honiara which experiences a distinct dry period from May to November. The wettest months are during the Northwest monsoon season, with reduced rainfall during February when the equatorial trough is normally

furthest south. Locations on the southern sides of the larger islands also tend to have a rainfall maximum between June and September.

11. As there are no rainfalls stations at altitude (with long-term averages) the effect of increasing rainfall with height above mean sea level is unrecorded[2]. Depending on the local topography, rainfall will increase with elevation, with maximum rainfall expected at between 600 to 1,000 metres above sea level on windward slopes. It is possible that the heaviest average yearly rainfall could reach up to 9,000mm at some elevated sites. The extreme falls seem to be confined to the transition months of December and April when the equatorial trough is migrating across the islands. The islands, because of their proximity to the equator, are less subject to the damaging effects of tropical cyclones than elsewhere in the southwest Pacific, though cyclones still pose a serious threat each year. Additionally, due to the low latitudes of the Solomon's, atmospheric pressure has only a small variation from month to month, recording little change from day to day except when a tropical cyclone is in the area (SOPAC, 2012).
12. A robust assessment of potential climate changes in Solomon Islands has recently been undertaken through the Pacific Climate Change Science Programme (PCCSP)[3], led by the Australian Government in collaboration with the regional meteorological services including the Solomon Islands Meteorological Service. This study has analysed up to 24 different global models of future climate based on three IPCC scenarios: Low (B1), Medium (A1B) and High (A2). The scenarios are linked to trends in global green house gas emissions and potential global mitigation actions. The following is a summary of the projected changes over the course of the 21st century as in the "*Climate Change in the Pacific: Scientific Assessment and New Research | Volume 2: Country Reports | Chapter 13: Solomon Islands*":
    - Surface air and sea surface temperature are projected to continue to increase (very high confidence);
    - Annual and seasonal mean rainfall is projected to increase (high confidence);
    - The intensity and frequency of days of extreme heat are projected to increase (very high confidence);
    - The intensity and frequency of days of extreme rainfall are projected to increase (high confidence);
    - The incidence of drought is projected to decrease (moderate confidence);
    - Tropical cyclone numbers are projected to decline in the south-west Pacific Ocean basin (0–40ºS, 130ºE–170ºE) (moderate confidence);
    - Ocean acidification is projected to continue (very high confidence). Mean sea-level rise is projected to continue (very high confidence).
13. These projections do not represent a value specific to any actual location, such as a town or atoll in the Solomon Islands – this level of downscaling is yet to occur. Instead, they refer to an average change over the broad geographic region encompassing the Solomon Islands and the surrounding ocean. With good reason, there are currently no projected climate change scenarios downscaled to the national or island level for the country. The IPCC Fourth Assessment Report (AR4) is limited in its projected climate change scenarios for the Melanesian region as AOGCMs[4] do not have adequate resolution. The complex topography of Melanesia which the Solomon Islands is part of is a further complicating factor in climate change scenario generation and analysis.
14. Figure 2 shows the projected changes in the annual and seasonal mean climate for the Solomon Islands, under the B1 (low; blue), A1B (medium; green), and A2 (high; purple) emissions scenarios. These projections represent three 20-year periods centred on 2030 (2020-2039), 2055 (2045-2065), and 2090 (2080-2099), relative to 1990 (1980-1999). Values represent approximately 95% the range of model predictions (apart from sea-level rise where the mean and the 5 to 95% range are both given taken directly from the IPCC 4th Assessment Report).
15. The manifestation of climatic extreme events and the consequential damage has already been felt. For example, Cyclone Namu which struck in 1986 destroyed the rice industry resulting in heavy reliance on imports, increasing poverty and slowing a number of development indicators. Over 130 people were killed, 90,000 lost their homes (one third of the population at that time) and property and infrastructure damages cost more than USD 25 million. In 2003 the category five cyclone Zoe with maximum wind speeds of 285 km/hour hit the small outer island of Tikopia. This was the most intense cyclone ever recorded in the Pacific. These types of events are increasingly becoming the annual norm, and are indicative of the damages and therefore costs likely to be caused by increasing climate variability and extremes. Without the

[2]Although some work has been done on rainfall intensity with elevation for Guadalcanal. See ADB (2011). Guidelines for climate proofing investment in the transport sector: road infrastructure projects. Manila. Asian Development Bank.
[3]Included as Annex 1.
[4]Atmosphere-Ocean Coupled General Circulation Models.

introduction of sufficient measures to support the Solomon Islands to adapt to a range of climate contingencies, the scale of damages will be larger, and the toll of opportunities lost will unfortunately be longer-lasting.

Variable	Season	2030	2055	2090	Confidence
Surface air temperature (°C)	Annual	+0.6 ± 0.4 +0.8 ± 0.4 +0.7 ± 0.3	+1.1 ± 0.4 +1.4 ± 0.5 +1.4 ± 0.4	+1.5 ± 0.6 +2.3 ± 0.8 +2.7 ± 0.6	High
Maximum temperature (°C)	1-in-20-year event	N/A	+1.0 ± 0.5 +1.4 ± 0.6 +1.5 ± 0.4	+1.3 ± 0.6 +2.1 ± 1.0 +2.7± 1.2	Low
Minimum temperature (°C)	1-in-20-year event	N/A	+1.2 ± 1.8 +1.5 ± 1.9 +1.6 ± 1.7	+1.7 ± 1.6 +2.2 ± 1.9 +2.5 ± 1.8	Low
Total rainfall (%)*	Annual	+1 ± 9 +2 ± 9 +2 ± 6	+4 ± 8 +5 ± 10 +4 ± 9	+6 ± 9 +9 ± 11 +9 ± 12	Moderate
Wet season rainfall (%)*	November-April	+2 ± 9 +2 ± 9 +2 ± 7	+5 ± 8 +6 ± 11 +4 ± 7	+6 ± 7 +9 ± 11 +9 ± 11	Moderate
Dry season rainfall (%)*	May-October	0 ± 11 +2 ± 13 +2 ± 9	+3 ± 11 +4 ± 12 +5 ± 15	+6 ± 14 +9 ± 16 +10 ± 18	Moderate
Sea-surface temperature (°C)	Annual	+0.6 ± 0.4 +0.7 ± 0.3 +0.7 ± 0.4	+0.9 ± 0.3 +1.2 ± 0.3 +1.3 ± 0.5	+1.3 ± 0.5 +2.0 ± 0.6 +2.5 ± 0.6	High
Aragonite saturation state (Ω_{ar})	Annual maximum	+3.6 ± 0.1 +3.5 ± 0.1 +3.5 ± 0.1	+3.3 ± 0.1 +3.1 ± 0.1 +3.1 ± 0.1	+3.1 ± 0.1 +2.7 ± 0.2 +2.5 ± 0.1	Moderate
Mean sea level (cm)	Annual	+9 (4–14) +9 (5–14) +9 (4–15)	+18 (10–26) +19 (8–30) +19 (8–30)	+31 (17–45) +38 (19–58) +40 (20–60)	Moderate

Figure 2: Project Changes in the Annual and Seasonal Mean Climate for the Solomon Islands

(Source: Australian Bureau of Meteorology and CSIRO, 2011. Climate Change in the Pacific: Scientific Assessment and New Research, Vol.2)

16. Over the past few years flooding, king tides, excessive rainfall and storm surges have rendered rural locations and communities officially 'disaster areas'. The frequency of calls for disaster relief assistance from the national government is reaching levels never before experienced in the country since it attained political independence in 1978. A typical example is the flooding incident that occurred on west Guadalcanal in early 2010 that devastated several villages, killing 9 people. The rainfall recorded for Honiara weather station within 12 hours during the night of the flooding was the highest daily rainfall ever recorded for Honiara in its 30 years record (standing at 251.8mm).
17. According to recent models and predictions on sea temperature increases, the Melanesian sub-region may be the most affected area in the Pacific with potentially significant losses in marine biodiversity due to likely future occurrences of coral bleaching (Coles, 2008). Studies on the effects of climate change on disease incidence in the Pacific have predicted that cases of malaria and dengue are expected to increase significantly in the coming years in Fiji, PNG, Vanuatu, and the Solomon Islands (Potter, S. 2008). This is

already being observed in the Solomon Islands by use of the SCOPIC software that has modelled the strong correlation between high rainfall and high incidences of malaria.

18. It is clear that water resource management in the Solomon Islands requires significant improvement, and the current management and wider water governance structures are likely to be undermined significantly due to climate change. The Solomon Islands Water, Sanitation and Climate Outlook (Low, 2011) provides scale resolution to the problems, highlighting that water and sanitation are in a state of neglect with significant gaps in governance and institutional arrangements and very limited human and financial capacity. The MDG Progress Report for Solomon Islands (2010) finds that the country is severely off-track to reach its targets for MDG 7.c. With respect to access to improved drinking water sources, the proportion of population having access has remained constant both for urban (at 94%) and rural areas (at 65%) from the 1990 baseline to the assessments in 2004 and 2010. On the other hand, there has been a deteriorating use of sanitation facilities during the same period for both urban areas (from 98% to 77%) and rural communities (from 18% to a possible 7.8%). It is usually the case for small islands that poor sanitation facilities affect groundwater water quality and therefore access to improved drinking water sources.
19. Present scenarios for Solomon Islands suggest little change in future annual mean rainfall and thus imply that climate change would have minimal effect on water resources. However, in the past, events such as El Nino have had significant impacts on water sources in some parts of the country. The worst was during the 1997/98 El Nino phase where many areas of South Guadalcanal, Malaita and Western Province, including Gizo Town (the second largest urban area in the country)suffered water crises. Thus, any decrease in average future rainfall or increase in drought frequency or length will adversely affect water supply in such areas, including for human consumption and health, sanitation, and food production.
20. The region highly vulnerable to general climate factors such as the El Nino-Southern Oscillation (ENSO) event. This affects the inter-annual climate variability in the Solomon Islands, causing distinct oceanographic, temperature, rainfall and cyclonic conditions (Figure 3). Two known phases of ENSO are El Nino and La Nina. During the El Nino phase, ocean surface waters are warmer than normal and the equatorial divergence is located well to the east of the Pacific. By contrast, during a La Nina phase, the temperatures are cooler and equatorial divergence occurs across much of the region. Cyclones and high rainfall events are associated with the La Nina periods. Although the El Nino and La Nina cycles can be considered natural climate variability, it is not well known as to how ENSO will change under future climate change.
21. It has been predicted that LDC's such as Solomon Islands will be amongst the most vulnerable countries to the impacts of climate change and that the costs of addressing climate change may be as high as 5% of GDP (Stern Report, 2006). Efforts to begin addressing climate change are already impacting on the limited capacity of the country. This places extra load on limited human and technical resources. The Solomon Islands Government will simply not be able to deploy more resources to provinces and rural locations given the very limited growth, if any, in allocation to government ministries and subventions to the provincial governments.

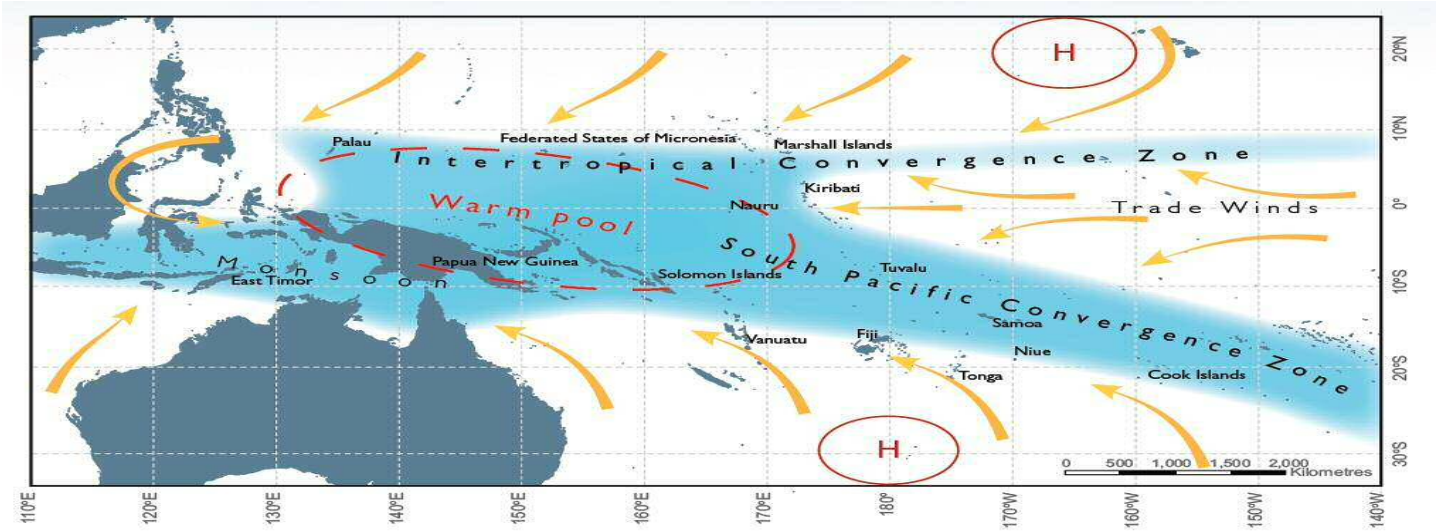


Figure 3: The average annual positions of the major climate features November to April

(Source: PCCSP Project, 2011)

Climate chanced induced problems on Water Resources and Ecosystems

22. The RIDA (Resources, Infrastructure, Demand and Access) approach (Moriarty et al., 2004) is a conceptual framework that examines the linkages between demand, access, infrastructure and resources to examine the root cause of problems related to water access lie, and identify potential solutions. Utilizing this framework, both direct and indirect problems induced by climate change on the water sector in the Solomon Islands are analyzed in this section.
23. The examination of the water resources and ecosystems in the Solomon Islands through the RIDA approach points to the following key findings in regard to the nexus of climate change and water issues in the Solomon Islands:

    - Climate change has the potential to impact to all the components of a water supply system (resources, infrastructure, demand and access) and these potential impacts can be varied in nature;
    - Some potential impacts are likely to be direct (e.g. increased incidence of extreme floods that damage WASH infrastructure as already experienced in the Solomon Islands), whereas others are likely to be indirect and more uncertain in the nature and severity of impacts (e.g. sea level rise leading to migration away from coastal areas, or salinization of shallow groundwater);
    - Given the range and uncertainty of climate impacts, developing a stand-alone climate change adaptation and/or mitigation interventions in the water sector may not be cost-efficient or strategic. Instead, the effective way forward will be to develop improved water governance systems that ensure that adaptation strategies are based on a solid understanding of the impacts of climate change on the different components of individual WASH services delivery systems.

24. Summary of the RIDA analysis is presented in below Table 1.

Table 1: Impacts of Climate Change on Water Resources and Ecosystems	
Direct	**Indirect**
• Rainfall increases and decreases in the same years • Increased precipitation intensity and variability increases the risks of flooding and drought in many areas. • Higher water temperatures affect water quality and exacerbate many forms of existing water pollution. • Sea level rises contributes to saline intrusion into shallow coastal aquifers, particularly atolls • An increase in temperature for the Solomon Islands, affecting evaporation and transpiration rates from ecosystems. This may impact groundwater availability and surface flows.	• Land use change, agricultural intensification particularly deforestation leads to changes in hydrology at local island scales. • In areas of lower rainfall, water quality of rivers and groundwater decreases as a result of reduced dilution of pollutants, especially in townships and peri-urban areas. • Risk increases unsustainable use of surface and groundwater resources (already demonstrated in the Solomon's through unsustainable groundwater pumping rates contributing to salinization of shallow groundwater). • Warmer and damper conditions increase the incidence of many water-borne diseases (as discussed above in narrative.
Impacts on 'Infrastructure'	
Direct	**Indirect**
• Investments are needed to protect villages, communities and townships from flooding. • Investments are needed to increase the capacity of water storage, supply and treatment systems where necessary across the country. • Major investments are needed to supply WASH services to people in general, as highlighted in the new rural WASH policy (draft). • Destruction of WASH infrastructure and contamination of groundwater occur as a result of localized flooding – is key learning from the World Bank supported rural	• Conflicts over access to water and land use (especially for land needed as watershed areas, or for groundwater storage) • High levels of expenditure on WASH services are not accompanied by training and capacity development to maintain systems, or for financial accountability of WASH services investments. This has historically been a common problem in the Solomon's.

Table 1: Impacts of Climate Change on Water Resources and Ecosystems	
Development Programme.	
Impacts on the Demand for Water	
Direct	**Indirect**
• Contribution of increased demand for safe water results from prolonged drought, increasing temperatures etc. • Demand increases for Multiple-use Water Services (MUS) activities using water from WASH developed small-scale infrastructure and ecosystem services e.g. deforestation leading to use of land for livestock and diffuse pollution of water resources – breakdown of traditional water sources and governance of land and water systems. • Food security concerns, mining and hydropower development may lead to competition between water for ecosystems, services, and other economic needs – as climate change will impact the availability of water and the timing of that availability.	• Interest increases in all types of demand management, regulatory instruments etc, and access and equity issues over water services, with an increasing push for individual families to provide water services domestically. • Increased demand and pollution concerns due to changes in precipitation patterns leads to increased concerns over maintenance of ecological flows and protection of rare habitats. • Increased demand leads to increased challenges of water treatment and sewage sludge disposal in areas with septic tank systems. Where water flows are reduced due to climate change, there are concerns over pollution dissipation in surface waters from humans and animals (pigs) – a common problem across the Pacific.
Impacts on Water Access	
Direct	**Indirect**
• Increasing challenge of ensuring access to WASH services is consistent with established norms during periods of drought. • WASH service provision to poorer social groups, especially in areas affected by flooding or sea-level rise is a major challenge where behaviours do not maintain existing systems • Allocation of water for aquatic ecosystems and maintenance of important habitat and watersheds is less than required to service the coastal populations – especially for growing townships.	• Many kinds of livelihood problems result from rapid climatic change to which adaptation may be difficult or even impossible • Possible increased risk of capture of water resources by elite social groups • There is a possibility failure on the part of regulatory systems and/or legislation aimed at protecting rights of individuals or community to access water for different uses. • Although national level policies are developed, application at the Provincial level is weak due to limited resources and capacities, high costs, and lack of information on water flow, quality, precipitation, and pollution concerns.

1.2 Underlying causes

25. The impacts of the climate change projections presented above will interact with the underlying causes of the problem, which are inherently climate and non-climate related. These causes presented below, inherently interconnected with one another, and in combination provide significant development challenges for the Solomon Islands. The analysis presented below follows an analytical framework developed by UNDP – "Designing Climate Change Adaptation Initiatives (2010)".
26. These underlying causes can be largely classified into three interrelated categories: (i) agriculture dependence; (ii) geographical and socio-political characteristics (the remoteness of most human settlements in the Solomon Islands as a whole – and particularly its outer islands); and (iii) the extreme physical exposure and sensitivity of the population of the Solomon Islands, especially in terms of access to safe and reliable water and sanitation and the impact unreliable sources have on human health; and finally (iv) vulnerability of water resources and services. Each of these four categories is described in turn below.

Agriculture Dependence

27. The Solomon Islands is an agriculturally based society. Agriculture commodities have been the major exports from the Solomon Islands since the country attained its independence. In 2003 the agriculture sector contributed a GDP value of SI$39.3 million or 14.5% to the economy and a sectoral growth of 24.2%. Agriculture will continue to form the basis of the economy. A survey conducted in the 1970s identified 338,100 hectares or 12% of the total land area as having the potential for agriculture development, but only

21,500 ha or 6.4% have been presently developed based on the Ministry of Agriculture and Livestock records.

28. The agriculture sub-sector comprises three distinctive components; (i) the small holder subsistence sector, (ii) small holder cash agriculture and the (iii) commercial sector which was greatly affected by ethnic unrest recently experienced in the country. While in the context of the agriculture sector the household unit is the predominant economic or production unit whereby individuals or families operate from. A vast majority of Solomon Islanders are engaged in agriculture activities. The census of 1999 shows 111,905 people participating in some kind of unpaid activity; 78.3% engaged in agriculture activities while fishing accounted for 5.3%. The agriculture industry is the largest single employment sector in the country with 20.6% or 11,859 paid workers employed in the agriculture sector (SIG 1999).
29. Past assessments of a number of vulnerable areas in the country reveal how agricultural practices that rural populations rely on, including associated business activities, are being placed under increasing pressure from a growing population and emerging climate change hazards and risks. The Solomon Islands' NAPA outlines the effects of climate change on a number of sectors, most notably agriculture. The implications of changes in long-term temperature and rainfall patterns, as well as the changing frequency of incidences of extreme weather (such as tropical cyclones) are expected to have long-term effects on food production systems, thereby undermining development and economic growth activities. The traditional practice of shifting cultivation that allowed for regeneration through fallowing for extended periods is no longer possible in most areas due to increasing population pressure on land and there is mounting evidence, supported by a number of assessments and surveys that the fast growing population of rural families and communities are struggling to cope with the effects of changing weather patterns. (Source: National Agriculture and Livestock Sector Policy 2009-2014). Increasing intensity of rainfall disrupting planting times and lowering crop yields and loss of soil fertility due to leaching, soil erosion and on-going cultivation is impacting productivity per unit area (Kastom Gaden survey of South Guadalcanal 2006).
30. The informal agriculture smallholder sector has always been the foundation of food security in Solomon Islands. With a heavy reliance on ecosystem services such as soil conditions, water resources and forests this system has provided food and shelter for most of the national population and has been the main safety net during difficult times such as the ethnic unrest during 1999-2003 when law and order broke down and the main formal economic activities in the country came to a grinding halt. Extrapolating from the work carried out by Bourke (2004) on calorific values and amounts of root crops consumed by people in neighboring Papua New Guinea a local firm has estimated that the production of root crops in Solomon Islands, using the national population and the equivalent calorific values, quantities and price for imported rice, is a conservative 1.189 billion Solomon Dollars (USD 148,625 million) per annum (Solomon Islands State of Environment Report, 2008). Disturbances to the smallholder system by unsustainable land use practices and climate change will reduce the capacity of this system to feed the country and will place significant cost burdens on the government to invest in the agricultural sector, or seek alternative solutions to this problem.

Geographical and socio-political characteristics

31. Some sectors are more sensitive to the impacts of climate change and sea level rise and are regarded as having high exposure risks due to a number of dimensions which are mainly determined by the geographical and the socio economic and political context of the country. Some locations and islands are located at areas that are not geographically protected hence their high vulnerability to the adverse effects of natural activities such as king tides and high swells. This level of exposure also impacts on the status of soil fertility and land use not only in the low lying atolls (salinisation of the soil and shallow freshwater lenses) but also in some of the coastal communities on the larger islands. The pressure from a rapidly increasing population exacerbates the situation as speed of resource exploitation and landuse increases. In rural areas, especially remote islands such as Ontong Java, access to basic services such as health and medical services, water and sanitation, education, telecommunication, technology and transportation is difficult. Lack of access increases the degree of vulnerability and sensitivity (Vulnerability and Adaptation Assessment Report for Low-Lying Atolls – Ontong Java, 2011).
32. The economy of Solomon Islands, like its geography, is also fragmented. Economic growth remained strong in 2012, driven by growing mining activities. Further moderation in growth is expected over the next 2 years as forestry resources dwindle (ADB, date). Of the total land area, 77% comprises non commercial forest and cleared land, 13% is unlogged commercial natural forest and 10% logged over natural forests. Much of the forested areas are on slopes greater than 30 degrees and above the 400 meter contour. Log exports have

been the main source of government revenue over the past years rising to as much as 60% of total national income. Unfortunately, this has been at a serious cost to the environment with a lot of land area now compacted and difficult for use and re-growth by pioneer forest species and for cultivation by local communities.

33. The national population is also growing at an annual rate of 2.8% making it one of the highest in the world (SIG Population Report, 2000). At this rate the population will double around 2025 placing extreme pressures on national resources and budgets, with the economic growth rate currently below the population growth rate. Approximately 41% of the total population is under the age of 14 years, indicating a very high youth dependency ratio. The rate of population growth over the past 20 years now places the country in a situation where this rate is now higher than the economic growth rate, causing serious concern about the future country capacity to cater for the increasing population.
34. About 85% of the population lives in rural villages comprising approximately 65,000 households averaging six people (SIG Population Report, 2000). In 2008 the country had an overall HDI value (2012) of .530 and a GDP per capita (USD PPP) of $2,301 (UNDP, 2008). The agricultural sector absorbs 75% of the labour force and accounts for 42% of GDP. The majority of rural dwellers reside on hilly and mountainous areas or along very low lying coastal areas. Both locations are highly exposed to abnormal and extreme weather. Strong communal systems define organization and management regimes for land and other resources, including livelihood systems in agriculture, fishing and small business ventures.
35. Above all, in many occasions it is the lack of capacity of government and partners to assist when required the most that intensifies the sensitivity and vulnerability of many of the economic sectors. When the State is incapacitated to intervene, communities and populations are left exposed to the insecurities brought about by the impacts of climate change and sea level rise (Vulnerability and Adaptation Assessment Report for Low-Lying Atolls – Ontong Java, 2011).
36. For example, there are no clear-cut regulations applicable to the protection and management of watersheds. In the Solomon Islands the responsibility for water resources is shared amongst three organisations: the Ministry of Mines and Energy with provision to provide national coverage on water resource assessment, management and development of groundwater, the Solomon Islands Water Authority for provision of safe water and wastewater services to urban populations, and the Ministry of Health and Medical Services, Environmental Health Division for provision of safe water and sanitation for rural populations.

Physical exposure and sensitivity

37. Water resources availability ranges from sizeable rivers to small streams, from high mountainous and dense rainforest islands to rainwater harvesting and thin freshwater lens of underground aquifers of the small low-lying atolls and islets. Mountainous islands have fragile and small watersheds dissected by rivers and streams while low lying atolls and islets depend on rainfall and aquifers as the main sources of water. On the bigger and higher islands the quality of water is deteriorating as a result of logging, mining and slash and burn agriculture while pollution and salt water inundation are the biggest threats to water quality and availability on low lying islands. Bigger islands have low coastal areas that are already experiencing inundation and loss of coastal vegetation. Much of the country has abundant though very fragile water resources.
38. There is an increasing demand for water which requires proper management and development. The demand relates to both quality and quantity. In urban areas population has drastically increased over the years with limited expansion in the water supply sector. Similarly, rural populations have experienced deterioration in freshwater quality due to land-use changes (logging and agricultural practices).Urgent and decisive action must begin now to address water resource management issues in the country. Evidence exists that the quality and quantity of fresh water is reducing; although the rate of reduction is not very well understood because of inadequate hydrological data and limited knowledge of local hydrology and water resources.
39. Although most parts of the Solomon Islands enjoy high average rainfall this does not mean that water resources can be taken for granted. Rainfall and river flows are highly variable in certain areas; drinking water supplies may be short at some stage, yet a few months' later roads and gardens may be threatened by floods. There are particular problems in the outlying atolls, where there are only limited supplies of groundwater. Even where water resources are abundant they may not be suitable for a particular use, such as human consumption (National Diagnostic Report - Water Resources Management Situation in Solomon Islands, 2007). In addition, cyclones, flooding and drought periodically affect the country. Sea level rise also poses a threat to the smaller low lying islands, and the quality of any shallow freshwater lenses.

40. The soils of the Solomon Islands make up one of the country's most important resources, although they are also very fragile and require careful management and protection. A nation-wide reconnaissance level assessment of soil types in 1976 (Hansell and Wall 1976) classified soil types and found that most have good structure but are generally deficient in potassium which is needed for production of root crops. Soils on sloping land are very prone to leaching and erosion and are vulnerable to rapid degradation if located in areas of high rainfall and high population density (Pacific Horizon, 2009). The National Disaster Management Office (NDMO) has had to respond to emergency food deficit situations where communities in the windward side of the main islands cannot produce sweet potato (*Ipomeabatatas*) due to abnormally prolonged periods of high rainfall causing excessive vegetative growth and very minimal tuber formation.
41. Unsustainable land management through poorly designed and uncontrolled and unsustainable timber extraction methods, intensive agriculture on converted forest land and the extension of subsistence farming as a result of increasing population all place extreme pressures on the land and soil resources. Most of the accessible soils have fertility and/or micronutrient deficiencies and increased exposure results in soil leaching and erosion. Quantitative data on the soil erosion rate and extent of land degradation are limited and to date there is no systematic and planned approach to investigating and documenting alternative sustainable cropping and agriculture land use systems in the country. However, soil erosion and increased sediment load in rivers can be attributed to human activities such as large scale clearing from mining and logging activities, as well as impacts from traditional subsistence slash and burn agriculture, increasing urban development and residential housing (Catalogue of Rivers for Pacific Islands).
42. Direct impacts on people include health problems induced by increasing incidences of salt water intrusion which affects groundwater wells for drinking water supply. When there is a drought period people resort to shallow wells for drinking water in the absence of other sources such as green coconuts. The incidence of diarrhea is exacerbated by the contamination of wells (Vulnerability and Adaptation Assessment Report for Low-Lying Atolls – Ontong Java, 2011). Potential pollution and contamination of water resources have been identified from untreated domestic sewage, small industry discharges (e.g. fish processing), hydrocarbons from oil storage tanks, mine drainage and leaching discharges from mine waste, and residues of agricultural fertilizers and pesticides. The extent of this contamination is currently not well understood due to a lack of recent data (Catalogue of Rivers for Pacific Islands).
43. Coverage of rural water supply and sanitation is poor across the Solomon Islands. This has been mainly due to delays in projects, damage to infrastructure during the tensions between 2003 and 2008, and a growing population. The majority of the 300 registered health facilities and approximately 1,000 schools across the country do not have sufficient sanitation facilities. Nationwide, 71% of households do not have improved sanitation facilities, and nearly 30% do not have access to safe water. The reality is that at the rural level, where 80% of the population lives, it is practical to assume that only 10% have access to improved sanitation facilities, and only 65% of households having access to water supply[5].
44. The impacts of water borne diseases and hygiene related illnesses are a leading cause of infant mortality, child mortality, and post natal complications and maternal mortality. Lack of water and sanitation in schools contributes to early dropout rates for girls (79% of boys to girls in secondary school). Equally, it is anticipated that the projected increases in temperature will increase the incidence of malaria in areas already affected. Furthermore, it is likely that mountain areas of islands like Guadalcanal and Makira where malaria incidence is known to be relatively low would likely experience an increase in incidence. Higher temperatures may also favour an increase in incidence of the more dangerous falciparum malaria. Clearly, climate change is going to affect the quality and availability of freshwater, and the knock-on effects of this on human health are multiple, from vector borne diseases to possible increases in cholera and diarrhoea disease.
45. The pollution of drinking water and the resulting health hazards may be one of the biggest watershed issues in the Pacific Island countries. The main source of drinking water in the Solomon Islands comes from surface water in the form of streams, springs or rivers. Some small atoll islands collect rainwater for drinking and utilise brackish water from shallow hand dug wells for most of their other domestic needs. Some communities on the higher volcanic islands also use groundwater for domestic purposes. The major users of groundwater resources are Honiara city and the Guadalcanal Plain area. The Guadalcanal Plains on the northeast coast of Guadalcanal have abundant potential for groundwater use. However, with increasing agricultural developments in the area there is an urgent need for proper planning and management of the resources and their sustainable use.

46. As far as the diet of the people is concerned, much of the food intake is energy foods and protein foods. Protective foods are almost absent. According to household surveys there are incidences of high blood pressure, diabetes, diarrhoea, TB, and yaws. Protective foods are not grown in the islands because of poor soil conditions. However, this is attributed by land degradation caused by salt water intrusion in the garden areas as a result of sea level rise on atoll islands only (Vulnerability and Adaptation Assessment Report for Low-Lying Atolls – Ontong Java, 2011). In reality, some of this may also be due to poor groundwater management, where shallow freshwater lenses are used to the point where replenishment of freshwater (linked to rainfall and soil material conductivity) cannot keep up with extraction rates. This combination of overuse or unmanaged extraction, combined with changes in precipitation needs to be taken into account in trying to develop more robust groundwater management practices for communities reliant on groundwater for at least some of their livelihood needs.

1.3 Long-term solution and barriers to achieving the solution

Long-term solution

47. The National Development Strategy (NDS) is the national planning framework for Solomon Islands for 2011-2020. The strategy highlights, under Theme 7 'Creating and Maintaining an Enabling Environment', the following two objectives related to building resilience to climate change impacts:
    1. Effectively respond to climate change and manage the environment and risks of natural disasters
    2. Improve governance and order at national, provincial and community levels and strengthen links as all levels.

    This project will support the development of sector plans and policies, as mandated under the NDS, by 1) mainstreaming adaptation in broader development frameworks, and 2) building water resource resilience. Long-term solutions for each approach are elaborated below.

Mainstreaming adaptation in broader development frameworks

48. Combined with the Solomon Islands National Climate Change Policy, the NAPA, the Pacific Regional Action Plan on Sustainable Water and Wastewater Management, and the Pacific Islands Climate Change Framework 2006-2015, these policy frameworks and objectives firmly support both the improvement in identifying climate change impacts, but also how to better adapt to them through improving resilience to, focusing on water resources, water supply, sanitation and hygiene.
49. The Integrated National Framework for Resilient Development (INaF)[6] proposes the integration of disaster risk management and climate change adaptation to sustainably address both challenges. The INaF identifies the need for systemic changes in the way risk is identified to strengthen national resilience, articulating the need to focus on what works already and to focus on strengthening existing structures and systems and institutional relationships, and to only develop new ones where the demonstrated need arises. This is important for small countries where transaction costs are high, and where change can often move key personnel out of 'active' implementation roles for long periods of time. Solutions do therefore exist at the national level but the implementation of cross-sectoral approaches requires improved coordination between agencies, and particularly at the Provincial level through targeted support and capacity development.
50. Mainstreaming and integration in turn requires that island communities and government staff are exposed to various adaptation options that are available in the region or globally, including livelihood resilience building measures, engineering measures to protect physical assets, and behavioral changes that are required to accommodate the climate-induced changes in the surrounding physical and environmental settings. As a small island developing state, which comprises of many small outer islands, a certain level of physical exposure to extreme weather events is unavoidable. In light of this, the only pathway to a sustainable, climate-resilient Solomon Islands is to increase the preparedness of Solomon Islands, especially in outer islands, to such events. The most fundamental prerequisite to enhanced preparedness is access to information and awareness. Outer island communities need to be provided with timely and accurate information of imminent hydro-meteorological risks. Once such information is received, all community members need to react appropriately based on the nature of the information, e.g., no fishing activity, stay indoors, evacuate to designated evacuation site, etc. Greater access to existing information and the need to

[6]Establishing an 'Integrated National Framework for Resilient Development' (INaF), Draft Concept Note, 2013.

interpret climate related risks to Provincial, and to individual islands, and then community levels is a key solution to help communities build resilience at scales that affect them.

51. It is proposed that the new INaF framework for mainstreaming disaster risk management and climate change into development should strengthen existing development processes by providing a resilience focus. The aim is to have in place a framework which gives guidance to the different ministries in their work. Rather than looking into how other Government agencies can support the implementation of the work plan of the Ministry of Environment, Climate Change, Disaster Management and Meteorology (MECDM), the framework will look at how MECDM can better support other Ministries to do their work in a way that supports greater resilience.
52. By 2013 Pacific Island Countries will have raised the baseline in managing and coping with water resources management, pollution and environmental stress and climate vulnerability. This will lead to a more sustainable use of water resources, a reduction in water related health problems, supporting watershed protection, improving biodiversity, and reducing land degradation. PICs have already identified the priority needs for the region through the Pacific RAP (Annex 4), allowing national governments and donors to focus investments on priority concerns and to highlight capacity development needs. For adaptation activities there is a need to move beyond business-as-usual in sectoral silos and integrate climate change information and understanding into water resource planning and management across sectors.
53. IWRM is a valuable framework to build climate resilience. It is a useful entry point for capacity development, helping to foster inter-disciplinary skills through utilizing local knowledge and integrating this into monitoring to ensure that cause and effect are understood by all stakeholders. The Pacific IWRM Programme has moved the wider Pacific Island Countries far in this respect, yet there is an urgent need to move the Pacific forward in this respect – and IWRM offers a long term solution this – through integration of sectoral understanding, marrying water supply and sanitation with wider water resources management and source protection, and focusing on improving the governance of water management through the development of Committees to exchange information, the development of frameworks and plans for improved water resource management, improving legislation and policy. IWRM provides a wide ranging set of tools as solutions, such as payment protection schemes for water source protection, rehabilitation and land restoration approaches to preserve fresh and groundwater systems, and at the same time bring wider ecosystem and biodiversity benefits.
54. PICs recognize the need to integrate disaster risk management (DRM), climate change policies and natural resource management strategies to increase the resilience of societies and communities to hazards by reducing risk and improving the ability to better anticipate, resist and recover from the impacts of disasters. The underlying causes of climate and disaster risk in PICs are not only linked to exogenous factors, but determined to a large extent by home grown development decisions on public investments and land-use planning. It also includes similar traditional development instruments such as public investment planning and social protection, which need to be used in innovative ways to address existing vulnerabilities and upscale disaster risk management efforts.

Solutions for building water sector resilience to climate change

55. Water, sanitation and hygiene have been focused on target delivery, the number of 'people served' for many years. In doing so, the roll-out approach often focuses on short term immediate concerns and impact, but not on medium to longer term challenges[78]. Clearly, a first step is for the WASH sector to engage more effectively with climate change researchers and in relevant national research and data collection activities. The benefits of this approach are twofold: (i) firstly, this will ensure that discussions on the potential impacts of climate change on the WASH sector avoid the shortcoming of considering these impacts in isolation of all the other challenges currently facing the sector. National statistics are low for rural WASH services, but in part this is connected to investment failures of the past where inadequate attention was paid to operation and maintenance responsibilities, community capacity developing and financing; and (ii) this will also ensure that development of new recommendations for the rural WASH sector draws upon lessons (both positive and negative) learnt through past and ongoing attempts to meet existing WASH challenges. This will

[7] http://www.worldwatercouncil.org/fileadmin/world_water_council/documents_old/Library/Publications_and_reports/Climate_Change/PersPap_14._WASH_Services_Delivery.pdf
[8] http://www.worldwatercouncil.org/fileadmin/world_water_council/documents_old/Library/Publications_and_reports/Towards_a_Framework_for_Climate-Proofing.pdf

increase the likelihood that investments in WASH will be more successful through both reducing the risk of mistakes being repeated, but also through taking a more medium to longer term perspective on the resilience of water systems and services to climate change impacts.

56. Adaptation options proposed more specifically fall into the category of best practices and 'no regret'. The upgrading and integration of watershed and coastal areas management is flagged as top adaptation priority, and is a key element to supporting the application of wider social services such as water supply and sanitation provision. From this perspective, solutions this project will implement include:
    - the strengthening of hydrological services in their capacity to develop and apply responsive water monitoring and forecasting systems;
    - the development of a risk-based adaptation response process for water supply and sanitation services in rural locations (although this will be tailored for the sites with townships);
    - the mainstreaming of climate information and knowledge, and a greater connection with disaster risk reduction strategies will be linked to the national water and sanitation agenda, and IWRM approach the government is applying;
    - increasing resilience-building investment through enhanced political awareness, advocacy, capacity development and a national platform to share, analyze lessons, and learn throughout the project cycle.
57. Review of climate change literature also suggests that there is a two step approach to integrating adaptation approaches with the water sector. The majority of the proposed solutions to climate change focus on improving failing water governance approaches, and building the resilience of the wider water system through diversity of sources, improved storage and management, wise-use approaches, etc. This project will implement actions, which provide these solutions.
58. The potential impacts of climate change may require an increased emphasis on certain actions or interventions to the disaster risk management agencies, such as improved coordination greater sharing of resources and information, better emergency preparedness and response, and greater mobilization of funding during drought periods. Equally, other governance interventions will include improving building regulations to ensure rainwater harvesting is adequately considered, and the potential is there for new buildings to include tanks, rather than put additional strain on other community and public water services where they exist. Planning also needs to improve to ensure water infrastructure is not placed in areas of flood risk, and at the community level this requires working with the traditional governance structures to build their capacity on these issues of sitting of WASH services.
59. Solutions to develop innovative approaches for the water sector to deal with climate change impacts therefore will focus on:
    - improving WASH governance so that they are better able to take account of the increased uncertainty that can be attributed to climate change. Also governance systems are required that explicitly match actions and interventions to specific contexts and take explicit account of potential externalities – and not get caught in the cycle of planning (Outcomes 1 and 4);
    - adopting and implementing IWRM so that there is better alignment of approaches across the water resources and WASH 'divide' and to other sectors and planning, including specifically to other sectors and processes that have an influence on water supply and demand for WASH services (Outcomes 2 and 3);
    - through adopting principles of adaptive management. Adaptive management is based on the recognition that in a complex and rapidly changing situation there can never be sufficient information to reach a settled 'optimum' decision. Hence, the WASH sector should put effort into planning approaches that are and supported by strong monitoring and information management systems, which allow for constant adaptation and the upgrading of plans and activities – the revised Rural WASH policy (draft, June 2013) will reform the way the MHMS-ERD will do business going forward (Outcome 1, 2, and 3); and
    - a strong focus on strengthening capacity within the WASH and water resources sector, meteorological services, planning, Provincial Government, and disaster risk sectors, particularly at the intermediate and local levels (all Outcomes).

Barriers to achieving the solution

Awareness about climate risks and response measures in the water sector

60. At present there is limited understanding of the economic and public health importance of safe water at the political level, except during extreme periods such as droughts and flooding when disaster responses are mobilised. As water is critically important to every sector, no one agency or sector has responsibility, the issue has no political champion, and the issue does not get the political support, be it budgetary, institutional or as a priority that it requires. Similarly, whilst the public generally understands the value of water to their daily lives, it is either assumed to be always available or given insufficient priority over other issues (e.g. health, education, income), despite being implicitly important to achieving these more valued family goals. The understanding of water collection, storage, treatment (as necessary), and availability is not well understood within communities.
61. With only 37% effective coverage of rural water supply and sanitation, and real figures expected to be much less as reported by AusAID in their Audit and Capacity Assessment[9], the capacity of government, working together with partners plays an important role in providing rural water supply, sanitation and hygiene (WASH) services. Despite this, there is a serious gap in providing services to people, at the pace required given population growth, and the catalytic effects of climate change. Climate change impacts are already occurring on water resource availability, affecting the intensity of rainfall, and thereby affecting the practical ability to capture water, and to store it safely for human consumption. Equally, rainfall intensity often leads to flash flooding, especially on islands with short rivers and streams and high-sided valley and steep slopes. Rapid flooding can occur which can destroy existing WASH infrastructure, and mobilize pollution, including of fragile groundwater that many rely on in coastal communities and atoll environments.
62. With these challenges it is also clear that the link between climate change and water services is not well understood. Driven by targets and indicators, water supply and sanitation approaches are focused on more immediate concerns – relief 'in-action' on a daily basis to provide basic services to people. Unfortunately, the supporting capacities required around infrastructure and the physical works has suffered from poor investment. Community engagement, operation and maintenance training, sourcing of parts, training in repair works, collecting finance for repairs maintaining small funds and re-investing in systems where they require expansion or modification has not occurred at the scale required.
63. The National Rural Water Supply, Sanitation and Hygiene Policy (v.11, July, 2013, draft), clearly articulates that the high failure rate of water supply systems (estimates of only 35-40% of systems working). This high failure rate is attributed to lack of resources for maintenance, but also agencies involved often do not have the capacities (and resources) to work with communities on awareness raising, and to work on developing approaches to 'hand over' systems both technically, for maintenance and repair needs, and financially, in order to establish a funding system to keep systems working. Unfortunately, training with communities on these issues has not historically been provided. For sanitation, there is a serious lack of understanding around the importance of sanitation and improved hygiene practices. The poor status of understanding sanitation is further compounded by the historical promotion of inappropriate technologies, poor designs, and systems with high maintenance and financial requirements.
64. Consequently providing rural WASH services is already difficult. Logistical and communication challenges in a region with scattered islands and frequent storms and poor weather make access to sites difficult. This was experienced during the PPG. Combine this challenge of providing services with a disconnect between water resource management, and water services provision and the impact of changes in the hydrology due to climate change add further stresses to the water system. The Water Resource Division (WRD) in the Ministry of Mines and Rural Electrification was historically established to provide water assessments for the development of small scale hydropower. Capacity has consistently expanded within the WRD with a far wider understanding of water resource management, but the resources, and influence they have to better manage water across the country, and especially at the Provincial level remains low.
65. Furthermore, the National Water and Sanitation Sector Plan (draft June 2013) highlights how, through integrated water resource management, adaptation approaches can be implemented and strengthened. The Plan makes use of a recent report that highlights[10] climate and non-climate risks to 2020. Certain high

[9]Joint Audit and Capacity Assessment of Solomon Islands Access to Clean Water &Sanitation Initiative: Final Report. February 2013. AusAID, Health Resource Facility.

[10]Falkland, A. Report on water Security and Vulnerability to Climate change and Other Impacts in Pacific Island Countries and East

'risks' were common across countries. These included the challenges with providing clean water supply and sanitation services to a region with an increasing population, where demands for water are predicted to increase between 70-240%, especially in urban and growth town areas. Leakage of water – water use efficiency concerns and system management, together with pollution of water sources including groundwater are considered high risk. Further high risks included salinization of groundwater, poor water governance, capacity and resource limitations, and the lack of engagement with communities.

66. These high risks are 'vulnerabilities' to national and also regional development. This highlights that one of the major challenge is improvement in water governance, and engagement, especially to localize, mobilize, and invest in capacity development. Getting water management improved now – will not only lead to greater economic opportunities and therefore growth and better human health, but also better 'readiness' and preparation for the impacts of climate change to impact on water resource availability and quality.
67. Yet clearly, education, awareness and capacity building are essential components of minimizing risks and vulnerabilities and adapting to climate change. Capacity building actions can take place at the systemic (enabling environment), institutional and individual levels and should have the ownership of target beneficiaries to ensure effective implementation of adaptation and mitigation actions. The rural WASH sector has never before considered the climate change implication on the water services investments they provide, and therefore how this will affect, short to medium term the longevity of the systems they provide with partners to communities. Increasing populations reliant on a few water points, combined with precipitation changes is likely to put additional stress of rural WASH provision. Accelerating rural WASH investments now urgently need to consider climate change impacts on their interventions, to avoid further investment providing reduce results by 2020.
68. Equally, Disaster Risk Reduction (DRR) strategies and actions contribute to reducing vulnerability. A nation, community or system is likely to be less vulnerable and more adaptive if it reduces its risks to disasters such as extreme events. On the other hand, the greater the risk from disasters the greater the vulnerability. The close relationship between the DRR and climate change adaptation agendas requires good coordination and integration to minimize duplication and maximize synergies. Solomon Islanders have coped with climate variability and extreme events historically. Traditional knowledge developed and refined over the years has been a feature of Solomon Islanders resilience and coping capacity but is now eroding due to increasing reliance on an inadequate network and range of modern technology and practices. Reviving and promoting traditional coping strategies and technologies is an essential part of adaptation. The importance of mainstreaming disaster risk management and climate change into development still remains to be a challenge.

Limited infrastructure for timely and accurate dissemination of imminent hydro-meteorological risks

69. Systematic observation refers to having a systematic approach to measuring and analysing changes in weather, climate, water cycles, biological systems and ocean systems. The capacities of national agencies and partners need to be strengthened in the Solomon Islands to systematically observe changes in weather, hydrological and ocean systems over time and to use information and technology now available. This is required to more accurately predict, and therefore plan risk reduction and adaptation actions. The scattered geography and weather systems experienced by the Solomon Islands affects both the ability to accurately record rainfall and other climate variables, but also to communicate them in different ways. There is a lack of telemetry data recording across the country. Analysis of information and other variables requires an increase in capacity – limited in part by the number of scientifically qualified people coming into the sector. Furthermore, communicating this information, in a way that is relevant to all sectors, and taking this information out of the capital and across Provinces for sharing and communicating with people affected does not happen. Land tenure issues related to access to sites, installation, maintenance and protection of equipment is also a problem, limiting the ability to establish a broader network of monitoring sites.
70. Although the Solomon Islands Government has been cooperating in the Global Climate Observing System (GCOS), programs of the World Meteorological Organization (WMO) and other agencies' participating in WMO's climate agenda, there is a need to invest in equipment and capacity activities to help build data collection and analysis for the country. Equally, there is a real opportunity to develop an approach to

Timor. For the Pacific Adaptation Strategy Assistance Program, Department of Climate change and Energy efficiency, GHD Pty, Ltd. August, 2011.

capture the traditional and anecdotal experiences and information present in communities who often explain historical trends and changes through stories and through community discussion.

71. Pacific Islands Countries suffer from a lack of water resources expertise and baseline knowledge, key basics for water management. This is classed as being a fundamental barrier to any informed decision-making on water resources management and protection, including for integrated water resource management (IWRM). However, there is progress in some community led approaches. Box 1 describes work in Choiseul Province which illustrates the unique connection communities have with the ecosystems they rely upon – the 'natural infrastructure' of water provision, and the more immediate effects that can be seen on small islands from poor land use and water management practices. These effects are more quickly felt by communities, through food supply and quality, to human health. Capacity to cope is most limited, and consequently sensitivity highest, where livelihoods and the economy are based on a narrow range of assets that are easily damaged by climate hazards, with few alternate options or means of managing risk. This 'lack of diversity' maybe due to historical climate, practices and beliefs. But the shifting climate will impact this historical narrowing of options into livelihoods approaches that may not be able to cope with the future climate scenarios.

BOX 1: Lessons from Ecosystem-based Adaptation (EbA) in Choiseul Province

Choiseul contains globally significant natural resources. These are essential in supporting the economies, lives and livelihoods of the people. Ecosystem based adaptation aims to maintain these resources and keep ecosystems healthy to meet the primary goal of reducing vulnerability. Landslide risk can be reduced by keeping intact forest on steep slopes. Mangroves and coastal vegetation can be replanted for coastal protection. These activities also then provide firewood, fish habitat, building materials and food for local communities. Previous studies found that households in the village of Nukiki in Choiseul benefit to the value of SBD$49,533 every year from forest products. This value comes from building materials, firewood, medicine, nuts, fruit and food from the forest that are used by families, but not actually sold.

Specific adaptation options identified by the communities in Choiseul for the protection of water resources, inter tidal and coastal areas as well as for increasing food security and livelihoods management include: a) protection and/or restoration of water catchment areas, riparian and freshwater ecosystem management, increasing water storage capacity, sediment control of fresh water streams and water quality testing; b) planting coastal trees/shrubs for protection, mangrove reforestation, creating vegetation buffers on river banks and maintaining existing ecosystem functions; and ; c) technical agricultural assistance (crop rotation, crop diversity, agricultural techniques), agro-forestry of cash crops and fruit trees, reforestation of previously logged areas with valuable timber species, contour planting and terracing and improved pest and disease control.

Most communities in Choiseul are located in narrow low-lying coastal areas, which are often bordered on the landward side by creeks, swamps and hills, and bisected or adjacent to rivers and streams. The terrestrial, freshwater and marine ecosystems they depend on are therefore closely linked by the relatively small catchment areas that connect the mountains, coastline and reefs. Ridge to reef planning integrates multiple sectors including agriculture, environment, forestry and fisheries in order to protect community livelihoods. Since communities are the resource owners, a ridge to reef approach must focus on the community as the central point for adaptation action.

Tribal leaders of Choiseul have already decided to work towards a network of protected areas by agreeing to the Ridge to Reef Protected Area Network plan. Protected areas on land, on the coastline and in the sea ensure that intact catchments provide a clean water supply, the sea continues to provide a reliable source of fish and decrease the risk of damage from natural disasters. (Source: Lacovino, Carlo, et. al. 2013. Ecosystem-based adaptation and climate change vulnerability for Choiseul Province, Solomon Islands – a synthesis report– Apia, Samoa)

Capacity for climate-resilient planning, budgeting and monitoring both at local and national levels

72. Climate change will affect all development sectors of the country. This requires an effective institutional arrangement and enabling environment in place to address it as an integrated and cross-cutting development issue. The enabling environment is slowly developing through policy reform and development, and changes to how institutions will work in the future, such as the rural WASH work through the MHMS-EHD. However, the integration of climate change information, and understanding this through interpretation of the impacts on different sectors for improved planning, and especially budgeting is low. For rural WASH,

this has not occurred. For water resources, although understandings regarding the potential impacts of climate change are known, lack of data and capacity limits the application of knowledge.

73. As water is critically important to every sector, no one agency or sector has responsibility; the issue has no political champion. Similarly, whilst the public generally understands the value of water to their daily lives, it is either assumed to be always available or given insufficient priority over other issues (e.g. health, education, income), despite being implicitly important to achieving these more valued family goals, and underpinning to the Millennium Development Goals broader than Goal 7 alone[11].
74. The capacities of Provincial Administrations are also limited in understanding the impacts of climate change due to lack of information, and also to objectively look at more medium to longer term planning for water resource protection for the provision of WASH services long term. The lack of information, downscaled to a Provincial level, limits the claims about the impact of climate change – as people are more concerned with immediate stresses. Influencing Provincial Plans will be key to embed a greater understanding of the vulnerabilities of water resources and services (water supply and sanitation, interventions requiring institutional support) to climate change impacts, and the knock on effects this could have on Provincial Health Services and the ability to respond to disasters and other shocks, including slow onset events such as droughts.
75. In conjunction with this, although on paper the Climate Change Policy and NAPA provide a solid framework for the Government to mobilize resources, the capacity to implement adaptation approaches remains weak. The integration of climate change into wider development planning, and to build resilience in the water sector is understood at some levels, but the practical implementation of this through line ministries is limited. Development partners, focused on providing WASH services have also not paid adequate attention to climate change impacts. The World Bank Rural Development Programme has rehabilitated water supply scheme, which have been repeatedly damaged due to flooding in coastal areas, both freshwater and storm surge causing pollution of the system with saline water.
76. Consequently, with limited analysis, partly due to lack of data, regarding the impacts of climate change, investment in rural WASH services will remain limited in their lifetime without a change in the practice of providing these services. The business-as-usual scenario needs to change regarding potable water provision, and the protection of watersheds and conservation of limited freshwater groundwater is urgently required. The restoration and protection of watersheds is expected to contribute to these objectives by conserving soil moisture, preventing erosion, reducing runoff and through the reduction of variability in supply during dry and longer term drought periods. In some cases, restoration activities may need to take place in the watershed to channel and conserve water in depressions as recharge zones.
77. Integrated Water Resource Management (IWRM) as an overarching national governance approach to water has not been widely used in the Solomon Islands until recently. Investment in IWRM through both demonstration activities on the ground, and the development of new policy framework has made significant gains. However, despite making advances in the water sector generally[12], there are still challenges to implementation of IWRM – as there are globally. One challenge is the different situations faced within each Province regarding land access, openness, main to outer island perspectives, capacity limitations outside the capital, and indeed policy relevance and the ability to implement outside the capital and the main island of Guadalcanal. IWRM and adaptation initiatives need to work at local (community) and Provincial to address some of the main challenges faced by the majority of the population.
78. A lack of sufficient drinking water quality monitoring often fails to ensure these problems are resolved quickly. Water treatment plants, where they exist, are often unable to cope with the demand due to poor infrastructure, lack of financial and human resources, and expanding population pressure. There is also a lack of water resources expertise and baseline knowledge – this lack of baseline information is a fundamental barrier to any informed decision-making on water resources management and protection, and limits the ability to strategically plan for water supply and sanitation needs, including risk reduction on water systems, both built and natural. Without this information and capacity, adaptation is difficult. Improved capacity is required to implement and sustain integration and coordination between sectors and this role is often an additional part of existing staff workloads.

[11] MDG 7: Ensure Environmental Sustainability.

[12] Carpenter, C., and Jones, P. 2004. *An Overview of Integrated Water Resource Management in Pacific Island Countries: A National and Regional Assessment.* Status Report for GWP – Integrated Water Resource Management (IWRM).SOPAC Miscellaneous Report 554.

79. Based on nationally identified needs for improved water resources management, building on consultations and actions evident in the country, and national commitments to climate change adaptation and improved water resource management through IWRM, this project is designed to support the Solomon Islands in both removing the barriers which limit the country from integrating water resources, water supply, sanitation and hygiene, with adaptation understanding and planning. It will also help understand disaster risk concerns and look at ways to better support national policy implementation on disaster risk reduction through water and adaptation response. The key strategy for doing this is IWRM[13].
80. The size of the country, the complex spread of the islands and the logistical costs, and windows of opportunity to reach some islands, prevents 'economies of scale' being available, as they are in larger countries. The costs of operating water service providers, a regulator, an environmental health department or a water resources agency, are higher per capita, thus resulting in limited human and financial resources available to fulfill these functions. Insufficient cost-recovery mechanisms due to cultural, political or technical reasons, by water and wastewater service providers contributes to under staffing, inadequate maintenance levels and ensuing water losses, water and wastewater treatment failures and pollution. Often at community levels, no support or service provision exists for water supply. For sanitation, there is none outside of some towns.

81. As part of the project design activities the baseline for the Solomon Islands on water has been established based on material from the Pacific IWRM Programme. The baseline, using an earlier national Country Diagnostic Analysis for the Solomon Islands identifies that:
    1. Often there are limited and/or fragile water resources available, and that these may be susceptible to over-exploitation and pollution. At certain 'scales' within the country there is often little technical management capacity to exploit and protect water resources or to work at different spatial management levels; there is also often high vulnerability to climate variability resulting in rapid onset of flooding and droughts and follow on effects (threats to public health, damage to infrastructure, reduction in quality of existing fragile water resources);
    2. Insufficient political and public awareness of the critical role of water in supporting economic development, public health and environmental protection, and the lack of support in rural locations for community/village water supply and especially sanitation facilities. Recent policy commitments and action are changing this however;
    3. Excessive urban water demand due to high water losses and poor water conservation, combined with inadequate drinking water treatment due to limited technical resources;
    4. Inadequate wastewater management resulting in widespread freshwater and coastal water pollution due to minimal reliance upon on-site septic tanks, poorly maintained septic tanks, lack of septage emptying and treatment options, very limited sewerage systems, and in rural areas the widespread continued practice of open defecation.
    5. Conflicts between national versus traditional rights, especially balancing the needs of land and water resources planning with customary land ownership;
    6. Inadequate financing of water and sanitation provision due to poor cost-recovery but also a lack of 'economies of scale' for funding resources, health and environmental protection; partly due to a limited tax base, and,
    7. Weak linkages to other stakeholders both within the water sector but particularly to other economic sectors, public health and the environment – across the island landscape. However, despite fragmented national water governance approaches due to little formal communication and coordination between government departments, this situation is rapidly changing with new policy development, project resources and an overall improvement in capacities. However, this change pathway needs to be maintained. Nationally there are not enough key institutions that can fulfil both the role of implementer, and broker between different sectoral beliefs and needs.
82. The lack of disaggregated data on issues relating to climate change and disaster risk management undermines the ability to address the impact on the poor, especially women, youth and children. Capacity development is needed to better equip key development sectors with the awareness and skills to identify

[13]The multiple nature of water resources and their uses needs to be reflected in a move away from traditional sector approaches to what has become known as integrated water resources management. At its most complex level IWRM involves cohesive decision-making concerning the development and management of water resources for various uses, with all decisions made and agreed upon by relevant stakeholders.

and prepare for the harmful consequences of climate change, including slow onset and more immediate disasters. This also includes the ability to incorporate climate and natural hazard information into decision making, especially for rural communities and at the Provincial town level.

1.4 Stakeholder Baseline Analysis

83. The focus of the baseline analysis during the PPG phase was to capture enough information regarding ongoing and planned projects in the water resources, WASH, and climate change areas to better understand the project and programme landscape. Pilot site missions also allowed for not only the identification of possible investment sites based on a vulnerability assessment, but to also understand the perceptions and understanding of climate change in the communities and agencies concerned. Care was taken to manage project expectations, both in terms of 'when' project interventions may take place, and 'how' they would be delivered in detail. This was to avoid adding the expectation of project responsibility and delivery on communities and agencies. During the inception phase of full project implementation the proposed pilot site designs would need to be reviewed more closely with the communities and agencies concerned to ensure that project delivery and expectations are well managed.
84. Extensive consultation took place between April and October 2013. The PIF provided the framework for these consultations, and assumptions were checked, verified, or adjusted based on consultations during this period. The PPG Team was led by an International Project Development Specialist, and consisted of local experts in water supply and sanitation, institutional development and social issues, and climate change[14]. The PPG Team visited all the sites proposed under Outcome 2 of the project, and the Project Development Specialist visit the Gizo and Malaita site with the rest of the team. The aim of the PPG phase was to, (i) deliver preliminary technical assessments on the sites, (ii) conduct stakeholder dialogue and capacity assessments as far as was possible, as the specific pilot site and Provincial levels; and, (iii) to develop the required reporting on the sites and other national level issues concerning adaptation and water necessary to design the project. The PPG process was led by the Water Resources Division of the Ministry of Mines, Energy, and Rural Electrification (MMERE-WRD), together with counterpart organizations the Rural Water Supply and Sanitation programme (RWSS) within the Ministry of Health and Medical Services (MHMS) and the Ministry of Environment, Climate Change, Disaster Management and Meteorology(MECDM).
85. The methodology adopted during the PPG phase was:
    - Hosting a national Inception Workshop to start the PPG phase held in Honiara 16-17 April 2013. This meeting was attended by different stakeholder agencies[15].
    - Numerous bilateral consultations in May with stakeholders from national government agencies, NGO's, development partners, target group beneficiaries, local experts, regional CROP agencies, other donor project staff. These consultations were held during country visits in April and May, and then with ongoing consultation via phone and email through June to August (specifically with CROP agencies and AusAID).
    - Consultations during the pilot site visits by the PPG Team (eight sites in total were visited across six Provinces). Sites visited represented a total population of 11,100 people, representing 52% men and 48% women, 20% of which were youths or children. Discussions were held with Provincial Government during the site visits, and survey were conducted by the PPG Team to better understand the water supply and sanitation requirements of people and their perceptions of climate change and the impacts they had experienced.
    - A PPG validation workshop on 24 October in Honiara to present the proposed design of the project to stakeholders[16]. The project governance structure was presented and discussed, as well as pilot site selection, the implementation model using SIWSAP Provincial Officers, the structure of the Project Management Unit, suggestions for capacity development needs, and discussion concerning project risks and logistical challenges that needed to be considered for full project implementation.
86. Combined, these consultations, together with background material collection and review, discussions with donors and government, provide the foundations for assessing the current situation regarding water resources and WASH, and the vulnerability of these to sustain livelihoods and economic growth needs due to climate change. The pilot site reports produced also provide a valuable snapshot of the situation at each

[14]Additional support provided by the USAID funded ADAPT Asia-Pacific programme.
[15]Recorded in the Inception Report from the Meeting.
[16]A brief report of this meeting is available for the project record.

location and can therefore be considered a useful baseline for the sites, and a valid monitoring tool therefore during full project implementation.

87. In December 2012, an AusAID funded independent audit and institutional capacity assessment was conducted to review existing implementation modalities and to identify constraints in the rural water supply and sanitation sector. The assessment helped the Ministry of Health and Medical Services (MHMS) to scope out its capacity development strategy – a strategy aimed at changing the function of MHMS in delivering these services, and with the clear objective of scaling up service delivery across the now defined area of water, sanitation and hygiene (WASH) service areas. This assessment led to the development of a Transition Plan to assist the Solomon Islands Government in mobilizing their reform of the rural water supply, sanitation and hygiene vision – to help address the lack of progress in rolling out national water supply and sanitation services. The Transition Plan outlines the actions stakeholders will take to mobilize and transform the delivery of rural WASH services. In part this is also due to an expected tripling of donor funds for rural WASH, mainly from the EU and AusAID (approximately US$37m). The Transition Plan describes how the existing organizations will absorb this funding and mobilize to improve the rural WASH situation.
88. The implications of this transition on SIWSAP are; (i) the opportunity to influence large scale rural WASH mobilization with adaptation designs and learning to improve the resilience of interventions, (ii) the possible co-finance support, and technical learning that can take place between the MHMS-EHD, and other partners involved in SIWSAP; and (iii) the complexity, and therefore risks to be managed with large scale funding arriving at a time when it is desperately needed, but when the institutions and agencies responsible to deliver the services are going through reform, as describe by the rural WASH Policy (draft, June, 2013).
89. During the PPG phase, specific discussions were had with a range of locally based organizations to describe the project to them, and to identify possible roles in supporting full implementation. Further information regarding the institutional and current project and programme baselines and engagement possibilities for SIWSAP are described in Section 2.8, and appropriately included in the Project Objective, Outcomes and Outputs section.

II. STRATEGY

2.1 Country Ownership: Country Eligibility and Country Drivenness

90. The proposed project is consistent with national strategies and plans in the Solomon Islands, and is aligned with LDCF/SCCF focal area objectives 1, 2, and 3. The project will asses vulnerabilities of the water sector, and through this build adaptation approaches for the water sector to improve the resilience of the country to water related shocks and climate change impact trends. As part of the Solomon Island Governments commitments to the UNFCCC a National Adaptation Programme of Action was completed in 2009 with the water sector included as one of the priority vulnerability and adaptation issues.
91. The focus of the project on improving the resilience of water resources impacts of climate change is within the priorities of the LDCF programming strategy which recognizes the special challenges in the water sector in the context of climate change. More specifically, it is stated in the strategy that '*the linked impacts of climate change pose very complex adaptation challenges that are additional to the existing policy and management failures facing (amongst others),…water supply, irrigation, ... and wider water resources management, including commonly ignored areas of groundwater and coast*". Climate-related stresses exacerbate long standing pressures on water resources but need to be jointly addressed if drinking water supplies and food from irrigation are to be sustained. In fragile SIDS, the improved management of water resources, and adoption of no regrets approaches into water management practices at the local level will also contribute to achieving other MDGs such as reducing poverty, eradicating hunger, ensuring environmental sustainability.

COUNTRY ELIGIBILITY

92. The Solomon Islands is a Non-Annex 1 Party, as well as a Small Islands Developing State (SIDS) grouped under the Least Developed Country (LDC) category. The Government of the Solomon Islands ratified the United Framework Convention on Climate Change (UNFCCC) on 28 December 1994. In September 2004 the Government submitted its Initial National Communication to the UNFCCC. The country is now finalising its Second National Communication to report on greenhouse gas emissions, mitigation measures, vulnerability status and options for adaptation and capacity development. This second communication highlights the vulnerability of water resources and their potential for renewable energy as well as the range of technology needs and technology transfer opportunities for adaptation and mitigation in the water sector.
93. The SIWSAP project is aligned with the Climate Change Focal Area of the GEF. The project is aligned with the Least Developed Countries Fund/Special Climate Change Fund focal area objective 1 (GEF/LDCF.SCCF.9/4/Rev.1) – to 'reduce vulnerability to the adverse impacts of climate change, including variability at local, national regional and global level', objective 2 – to 'increase adaptive capacity to respond to the impacts of CC, including variability', and objective 3 – to 'promote transfer and adoption of adaptation technology'.
94. The project will start with the assessment of vulnerabilities in the water sector which will provide the context for Water Sector Climate Change Adaptation Response (WS-CCAR) plans. The WS-CCAR plans will be formulated within an integrated water resource management approach, based on the principles of IWRM, and will be mainstreamed in broader development frameworks, particularly at the relevant Provincial unit of the project sites and appropriately up-scaled to the national level.

COUNTRY DRIVENNESS

95. The project is compatible with the National Development Strategy (see paragraph 115), and the NAPA, and as a catalyst is supported by a new Water and Sanitation Sector Policy and Implementation Plan, and a new rural WASH policy. The National Climate Change Policy was approved in 2012 – to 2017. The project will be situated within the Ministry of Mines, Energy, and Rural Electrification (MMERE), and specifically the Water Resources Division (WRD). The Project Board also contains the Ministry of Environment, Climate Change and Disaster Management Meteorology, the lead agency for climate change and disaster risk management in the country.
96. The project will work with lead national agencies and Provincial Government across six Provinces to identify specific vulnerabilities to the water 'system' at six specific sites, and then development adaptation response plans for those sites, followed by investment into improving the resilience of the water supply systems, both natural and built options. The implementation of the adaptation response, specifically through investments

and improved provision and access to clean drinking water and sanitation, better water management practices and institutions, and improved integrated disaster response measures to extreme climate events. New technologies to improve community-level water sector resilience in the context of climate change will be employed and transferred to the beneficiaries and the private sector, as appropriate to facilitate replication. The sites where the project will work have been selected in a transparent process. These sites will provide learning opportunities at the Provincial to National level, and from these strategic investment options will be considered at other locations identified through improved vulnerability identification and consultation.

97. This project proposal is compatible with the following International and Regional Multilateral Agreements to which the Solomon Islands is a signatory:
    1) UN Framework Convention on Climate Change (1992);
    2) Convention for the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (1972) [London Dumping Convention];
    3) Conventional on Biological Diversity;
    4) Convention for the Protection of Natural Resources and Environment of the South Pacific Region (1986) and related Protocols [SPREP Convention], and
    5) The United Nations Convention to Combat Desertification (UNCCD)
    6) Pacific Regional Action Plan on Sustainable Water Management (Pacific RAP)

2.2Project Rationale and Policy Conformity

98. The National Development Strategy for 2011-2020 highlights, under Theme 7 'Creating and Maintaining an Enabling Environment', the following two objectives:
    1. Effectively respond to climate change and manage the environment and risks of natural disasters
    2. Improve governance and order at national, provincial and community levels and strengthen links as all levels.
99. Climate change will be a major impediment to the achievement of sustainable development in small islands, as all economic and social sectors are likely to be adversely affected, and the cost of adaptation will be disproportionately high relative to GDP. In attempting to mainstream adaptation strategies into their sustainable development agendas, small islands will be confronted by many challenges including insufficient resources, equity considerations, prioritization of adaptation measures and uncertainties over climate change projections and the most appropriate and 'no regret' adaptation strategies (Pacific Adaptation to Climate Change: Solomon Islands – Report of In-Country Consultations).
100. The first formal description of the Solomon Islands national vulnerabilities to climate change was presented in the country's Initial National Communication to the UNFCCC in 2004. The report recognized the limited understanding on the vulnerability of the country to climate change and sea level rise and the need to put in place 'suitable plans, policies and measures'. Initial priority vulnerable areas identified included; 1) Subsistence and commercial agriculture, 2) **Human health**, 4) Coastal environments and systems, 4) **Water resources**, 5) Marine resources.
101. In 2008 the Solomon Islands started the development of a National Adaptation Program of Action (NAPA) with funding assistance from the GEF and UNDP. The NAPA presents the Solomon Islands immediate and urgent national priority adaptation needs based on a rapid Vulnerability and Adaptation assessment in selected parts of the country. The NAPA describes and prioritizes the country's vulnerable sectors together with potential project profiles. Further information is provided in Box 3. Combined with the regional Pacific Islands Climate Change Framework 2006-2015, these policy frameworks and objectives firmly support both the improvement in identifying climate change impacts, but also how to better adapt to them through improving resilience to, focusing on water resources, water supply, sanitation and hygiene.
102. As part of the national commitment to the UNFCCC the NAPA was completed in 2009. Within the NAPA the water 'sector' was included as one of the priority vulnerability and adaptation issues, along with forestry, agriculture, health and wider environmental concerns over projected climate changes. It was also recognised that water, as a resource, underpins the health and vitality of people, especially in rural areas, and their ability to provide for their families, and to maintain good health and the ability to sustain their livelihoods. Equally, appropriate sanitation services to protect both human and wider environmental health, such as reef health, are important for rural communities, and will likely be affected by climate change impacts on freshwater supplies.

BOX 2: The Solomon Islands National Adaptation Programme of Action, 2009 (NAPA)

Nine priority sectors where adaptation actions are urgently needed were identified through synthesis of existing information on vulnerability and adaptation, community consultations and from vulnerability analysis conducted by the NAPA Team. A multi-criteria analysis and ranking was used to prioritize the sectors. Based on the high ranking of the priority sectors (i.e. sectors with importance factor of 10 and above) and the greater likelihood of accessing

103. The NAPA identified initial water resources programmes to address climate change impacts. These included activities to improve water management practices to address current stresses on water supplies, and to build greater flexibility and robustness into water management systems to be able to better cope with variability, and predict through improved forecasting changes to hydrology. The NAPA suggested:

- Improving water management and water use efficiency to reduce vulnerability to water shortages
- Encouraging agricultural and wider land management practices to improve productivity and protect soil and water resources
- Engaging in forest management and watershed protection to improve yields, provide habitat and reduce flood hazards, and
- The implementation of programmes and projects to enhance capacity building at the national level with functions related to the management of water resources.

SIWSAP will adopt an IWRM approach to mobilise these NAPA identified objectives to reduce vulnerability to water shortages and protect the natural 'ecosystem' infrastructure islands are so reliant upon for water capture, purification and storage, thereby supporting multi-sectoral development and resilience.

104. The NAPA goes further to describe a series of programme and projects to help improve the resilience of water resources management to the impacts of climate change and sea-level rise. Key activities that need support include the promotion of operational hydrology through the collection, processing, storage, retrieval and publication of hydrological data. Improvements in hydro-climatological monitoring will provide better information for decision making, to ensure the most appropriate technologies are used relative to the operational and maintenance abilities of the institutions and communities concerned, including the main water supply utility for Honiara, Solomon Water. Under Component 2 of the NAPA Priority Actions, water supply and sanitation are specifically highlighted under four outcomes:

- Outcome 1: Integrate water conservation and sustainable water resources management in all sectors and communities
- Outcome 2: Incorporate climate change adaptation strategies into the guidelines and criteria for design and construction of appropriate water infrastructure in vulnerable areas
- Outcome 3: Increased reliability and quality of water supply to all sectors and communities
- Outcome 4: Enhanced institutional and legal framework for water resources management.

SIWSAP will specifically invest in improvements to hydro-climate monitoring, and cross-sectoral learning and application of adaptation response approaches to ensure that water is not a limiting factor in maintaining livelihoods and economic growth.

105. The key to sustainable and climate-resilient development in the Solomon Islands, as described in the National Climate Change Policy: 2012 - 2017 as a "a resilient, secure and sustainable Solomon Islands responding to climate change" is integrating climate considerations into the implementation and achievement of the Solomon Islands National Development Strategy (NDS) and other regional and international policies and frameworks.

106. Whilst the scale and impact of disaster events in PICs is often not significant enough to feature at the global level and in international disaster databases, they are substantial relative to the region's economic, social and environmental context – with losses often in the realm of 25-100% of GDP. Initial research indicates that PICs are more prone to extensive risk (relatively small but frequent events affecting poverty and livelihoods, such as landslides, flash floods, coastal storm surges, water scarcity issues) rather than intensive risk – those events such as earthquakes, cyclones and tsunamis that can devastate countries and completely overwhelm national response approaches.

107. In addition to being a Party to the UNFCCC and its Kyoto Protocol which together make up the core of the international policy response to climate change, the Solomon Islands is also a signatory to the Hyogo Framework on Disaster Risk Management and has been involved in the European Union Global Climate Change Alliance programmes. At the Pacific Regional level, the Government of the Solomon Islands is a signatory to the Pacific Plan, the Pacific Islands Framework for Action on Climate Change (PIFACC), and the Regional Framework on Disaster Risk Reduction and Disaster Management. As a commitment to the Hyogo Framework for Action on Disaster Risk Management a National Disaster Risk Management Plan was developed in 2009 setting out the institutional arrangements for disaster risk management (DRM) and disaster risk reduction (DRR) measures[17]. National Progress Reporting on the status of implementation of the Hyogo Framework for Action (2011) showed some progress in implementing the Framework for Action. SIWSAP will support implementation of Area 1 and Area 2[18]of the Hyogo Framework.

108. The Solomon Islands has agreed to develop an integrated risk planning approach. Instead of choosing the conventional way used in the region for developing a Joint National Action Plan, the Solomon Islands are exploring a strategic approach in the development context. The ongoing integration initiative seeks to develop a joint framework for resilient development which would be used to embed climate change and disaster risk considerations into development planning processes. SIWSAP will assist in the development of resilience approaches for national planning and policy development across sectors. The project will develop tools and approaches that focus on ensuring water availability and water quality, but also improved planning and water resource governance practices, including risk reduction from disasters.

109. The project falls within the priorities of the LDCF programming strategy that recognizes the special challenges for water resources and services within the context of climate change. The LDCF programming strategy states that "the linked impacts of climate change pose very complex adaptation challenges that are additional to the existing policy and management failures facing …, water supply, irrigation, and water resources management, including commonly ignored areas of groundwater and coasts". Climate-related stresses exacerbate long standing pressures on water resources, and also highlight existing management challenges and failures for water resources, and the water supply and sanitation services that water resources provide.

110. The LDCF strategy also indicates that "projections show billions of people will suffer from water and food shortages resulting in deepening poverty, further political instability, and forced migration" as a consequence of predicted climate changes. SIWSAP is designed to respond to these challenges and mobilize(and strengthen) the existing national policy frameworks developed to address climate change through appropriate adaptation approaches. SIWSAP will help address the call to improve 'resilience' – by improving adaptive capacity to respond to identified impacts of climate change on the water supply, sanitation and water resources of the Solomon Islands.

111. SIWSAP will help the country address some of these possible climate futures through improving water resource management, water supply and sanitation, and disaster risk concerns. An active policy environment within the national government institutions will support the implementation of SIWSAP. Equally, SIWSAP will aid in the implementation of activities designed to inform policy in a learning environment, and to strengthen the use of adaptation principles and approaches across national policy.

112. The link between the need for water resources, the benefits that water provides through a range of ecosystem 'services', including for water supply and sanitation, and the impact therefore of changes in precipitation and temperature are concerning in a country struggling to keep pace with population growth,

17 National Disaster Risk Management Plan: For Disaster Management Arrangements and Disaster Risk Reduction including for Climate Change. October, 2009. National Disaster Council, Solomon Islands Government.

18 Area 1: the more effective integration of disaster risk considerations into sustainable development policies, planning and programming at all levels, with a special emphasis on disaster prevention, mitigation, preparedness and vulnerability reduction. Area 2: the development and strengthening of institutions, mechanisms and capacities at all levels, in particular at the community level, that can systematically contribute to building resilience to hazards.

and a complex geography for logistical support, little economy of scale, and limited technical capacities. Although there is a need to focus on rolling out further service delivery for water supply and sanitation services, as defined in the new Rural Water Supply and Sanitation Policy (draft, July 2013)[19], there is a concern that the sector will struggle to cope with climate change impacts unless adaptation planning becomes more central to water resource management and water supply and sanitation design, construction, management and operation. SIWSAP will specifically work with the Rural WASH providers to increase the resilience of their activities and interventions, to mobilize current learning that is not getting picked up and integrated into policy discussions and activities on the ground.

113. The National Environment Management Strategy (NEMS) of the Solomon Islands was developed in 1991. Building on this, the National Biodiversity Strategic Action Plan (NBSAP) provides for the establishment of protected areas including around catchments and watersheds and the recently completed UNCCD National Action Programme (NAP) to Combat Land Degradation and Mitigate the Effects of Drought includes actions aimed at strengthening early warning and weather observation systems which SIWSAP will specifically support under Outcome 3.The National Waste Management Strategy and Action Plan (2009-2014) has identified pollution of underground water resources as an issue and includes actions to minimize pollution into water systems. SIWSAP will help support this strategy through protecting shallow coastal groundwater lenses and wider surface catchments.

2.3Design Principles and Strategic Consideration

114. The key design principle for the SIWSAP project is to deliver on existing Government's national and subnational development priorities, as well as build on existing efforts that tackles the water resources in the region, the concerns over sanitation, hygiene and health related benefits, and the impacts of climate change on water resources. In this effect, the project will mobilize the new Rural Water Supply and Sanitation Policy (draft, July 2013) by uniquely taking the policy straight to implementation at the Provincial level. Often policy processes can get 'stuck' in national level dialogue and institutional delivery discussions. SIWSAP will mobilize this policy and strengthen rural WASH interventions medium term through targeted additional activities designed to improve strategic rural WASH services.

115. The project outputs are designed to fundamentally improve resilience of the water sector, from resources to the main daily interaction that people have with freshwater, namely through water supply and sanitation services. The focus will be on geographic areas, which are most vulnerable, and once identified, at the most vulnerable elements of the water 'system'. Pilot sites, identified during the PPG phase[20]will be used as demonstrations to both create and implement a water sector vulnerability assessment process, and from this develop Adaptation Response Plans. These will guide investments at the six sites. In turn, over the course of the project these sites will be used as 'demonstrations' to improve the resilience of the communities to climate impacts on their water systems, and for others from communities to Provincial to National level government to learn from through the use of learning practices, and 'strategic investment' opportunities – through the development of a competitive process for community driven adaptation interventions for project support (under Outcome 2).

116. Pilot sites were selected using national agreed criteria developed at the stakeholder Inception Workshop. These included that the sites were located in Provinces that were particularly mentioned for action and support in water management plans and in the NAPA because of significant climate change 'threats and vulnerabilities'. Furthermore, one baseline criteria was that the locations were included in existing priority water supply and sanitation interventions, through either donor projects, such as through AusAID, EU; UNICEF programmes or those of NGOs, and the Rural Water Supply and Sanitation Unit of the Ministry of Health and Medical Services. The sites were also chosen based on their known vulnerabilities to climate change impact on water resources. From discussions at the Inception workshop it was clear that sites were known to regularly run out of water, and had written specifically to government in the past to ask for support during periods of no rainfall. Equally, sites with Provinces able to provide technical and logistical support and willing, and sites with at least some element of baseline information were included within the overall selection criteria. Below Table indicates the pilot sites that were selected through the Project Preparation period. Details of the site selection criteria and methodology are included in Annex 3.

Table 2: SIWSAP Pilot Sites

[19]The Solomon Islands Rural Water supply, Sanitation, and Hygiene (Rural WASH) Policy, July 2013.DRAFT, v.11.
[20]SIWSAP Inception Workshop, 16-17 April 2013, Honiara.

Site	Province	Rural/Township
Taro Township	Choiseul	Township
Gizo	Western	Township
*Ferafalu (Manaaoba island)	Malaita (NE)	Rural
Santa Catalina	Makira/Ulawa	Rural
Tiggoa	Rennel and Bellona	Township
*Tuwo (Fenualoa island)	Temotu	Rural

*Note that from September through to March these sites are harder to get to due to weather changes.

117. Furthermore, the strategy the project will adopt is focused on better understanding and applying 'resilience in practice'. Resilience is defined by different agencies, including by the IPCC (2008) as '…*the ability of a social or ecological system to absorb disturbances while retaining the same basic structure and ways of functioning, the capacity of self-organization, and the capacity to adapt to stress and change'*. It describes a process whereby both natural, and human systems are able to both withstand shocks, and where and when necessary, rebuild appropriately.

118. SIWSAP will be guided by a structure, which will aim to build resilience, in alignment with national policy objectives for the Solomon Islands, regional objectives as a PIC, and the overall project objective to '*improve the resilience of water resources to climate change….'*. The resilience framework used to guide the project interventions is detailed in Annex 16.

Gender Issues to Consider during Implementation

119. Incorporating an understanding of social relations and power dynamics and adjusting projects accordingly, rather than simply targeting women specifically is a key step during project implementation. Changing human behaviors needs an understanding of different existing priorities, knowledge and constraints. Conducting appropriate levels of gender analysis at the individual Pilot Site level will help each Province to better understand the role of women and men in the use and management of water resources, and the roles they play in protecting the environment and reducing stress in the particular areas of an intervention21, and indeed how they are affected, and respond to the impacts of climate change on their roles in society. Gender issues have been mainstreamed into the project design and approaches and training available will be further developed and discussed with the Pilot Project Committees during the Inception period of the project. IWRM Community Mobilization Guidelines developed in the Pacific by the regional Pacific IWRM Programme will be used to foster support and action for the pilot site interventions. These guidelines include gender mainstreaming components for use and development throughout the project. These guidelines were developed by Live and Learn Environmental Education, a key partners in the implementation of SIWSAP. Despite this, the following gender aspects will be included, monitored and considered during project implementation:

- Establishing sex disaggregated data and include in project information systems for the pilot and replication sites
- Choice of action to promote gender equality should be made on the basis of clear gender analytical information and sex disaggregated data, and on the basis of women's own priorities and concerns
- Developing staff gender-related skills, knowledge and commitment through training workshops, consultancy support, provision of guidelines, financing schemes
- Policy dialogue, ensuring disadvantaged groups, women, the young and the old are represented – provision of information to women – especially at the National Water and Adaptation Forum – with specific sessions on gender.
- Women and different age groups represented in Pilot Project Committees - promoting women's and men's equal participation in community level decision-making institutions and in community representation

[21]Ensure Environmental Sustainability: Halve by 2015 the proportion of people without sustainable access to safe drinking water and basic sanitation. Sub-goal 3: to promote gender equality and empower women.

- Development of procedures to promote equality in recruitment and career development – at least 50% of the SIWSAP Provincial Officers should be women
- Activities to link together individuals and groups working for gender equality
- Recognizing and addressing practical needs/problems identified by and particular to either women or men
- Promoting greater gender equality in relation to resources, services, opportunities and benefits, e.g. increasing women's access to previously male dominated employment opportunities
- Addressing inappropriate gender stereotypes, and gender challenges for example, women and children are more likely to fall victim of natural disasters (the 2007 tsunami in Gizo is an example of this when women fishing and the elderly were those who predominantly lost their lives).
- In developing capacity, and in their role as stewards of domestic water needs and sanitation concerns, especially regarding children, women, and women's groups and networks are key stakeholders in the SIWSAP project. They will be a key resource to the project during the development of the national Sanitation and Adaptation campaigns and participatory video and video diary activities.

UNDP Comparative Advantage

120. UNDP is well placed to partner with MMERE-WRD of the Government of Solomon Islands to enhance water resources resilience at national and community levels through the SIWSAP project. At the national level, UNDP through its presence in the Solomon Islands have worked on water resource management, climate change adaptation, and environmental equity and governance for many years through providing policy development and capacity building support. For example, the Human Security Initiative for Tensions 'Reduction', Reconciliation and Rehabilitation in the Solomon Islands, which seeks to enhance human security for selected communities and ex-combatants by reducing tensions and promoting peaceful and sustainable measures for their survival and dignity. Specific activities include objective 2-2 in component 2 that will enhance by up to 80% of the functional capacity of target communities to deal with conflict-affected water and sanitation management problems. The target coverage is 10 communities and for each community, the project will: a) establish and self-manage fully functioning water and sanitation committees; b) train local water and sanitation technicians in basic skills for installation of WatSan facilities; c) install water supply facilities; d) develop guidelines and manuals on operation and maintenance of community water supply; and e) install local monitoring mechanism. The total cost of this component is $555,000 over a 2-year period until early 2014. Total project cost is $2.71 million. The target beneficiaries are former combatants and communities affected by the civil unrest in 1998-2003, which are concentrated in the capital city of Honiara and the provinces of Guadalcanal and Malaita. The proposed LDCF project will cover some of the communities included in this baseline project to build climate resilience for the baseline activities.

121. Another related project that UNDP, supports in the Solomon Islands is the "Strengthening Environmental Management and Reducing the Impact of Climate Change in Solomon Islands" (SEMRICC) project. The objective of SEMRICC is to assist the Government of Solomon Islands in developing capacity for environmental management. It will focus on strengthening the executing capacity of national government agencies, provincial government and community institutions to address climate change and other environmental issues and challenges, and to mainstream natural resource conservation and environmental management. The project concentrates on the following areas: 1) strengthening capacity to develop and implement national environment policy and plan; 2) establishing information management and scientific/technical knowledge base, 3) promoting community-based environment management and disaster risk reduction, 4) institutionalizing human resource capacities development and awareness raising; and 5) gender mainstreaming across all environment activities. SEMRICC is considered as a baseline project with respect to the policy and capacity building components for SIWSAP. The assistance provided to the government by SEMRICC is in the general areas of environmental and climate change policy and capacity building with limited consideration for sectoral policies (in the water and sanitation sector). These are important baselines upon which this project intends to build on by focusing on the water/sanitation policies and capacity building to build resilience in the context of climate change.

122. The commitment for UNDP to continue its strong partnership with the Government of Solomon Island in this area is also highlighted within the recently completed United National Development Assistance Framework (UNDAF) for the Pacific Region (2013-2017). The UNDAF recognizes that the general challenge for the Pacific Island Countries (PICs) is to ensure the sustainable management of their terrestrial

and marine natural resources and heritage, from the regional to the local level, and the adaptation of individuals, communities and states to climate and environmental change and natural hazards, as well as to be well prepared to respond to natural disaster events and population related consequences. This is outlined within UNDAF Outcome 1, which states "Improved resilience of PICTs, with particular focus on communities, through integrated implementation of sustainable environmental management, climate change adaptation/mitigation, and disaster risk management."

123. At a broader scale, UNDP supports governments and communities in the Asia Pacific Region, and globally, in their efforts to enhance their resilience to climate change impacts. Through the years of enhancing adaptation and resilience capacities, the organization now have developed tools, lessons learned, and know-how which are widely shared through online platforms such as the Adaptation Learning Mechanisms (ALM) and through the support provided through the various centres and technical advisors working with UNDP country offices, projects, and its partners. The SIWSAP project has also allocated significant resources to learn from and contribute to this knowledge network through its knowledge management component (Outcome 4).

124. Furthermore, the SIWSAP's objective to enhance water resource resilience in light of climate change aligns with the UNDP Strategic framework aims to ensure that "Growth is inclusive and sustainable, incorporating productive capacities that create employment and livelihoods for the poor and excluded (Outcome 1)." In addition, under the strategic framework UNDP works toward supporting countries, such as Solomon Islands to "have strengthened institutions to progressively deliver universal access to basic services (Outcome 3)" through making strategic project investments to enhancing the water and sanitation sectors' adaptive capacities to climate change.

2.4Project Objective, Outcomes and Outputs/Activities

125. The overall project objective is to improve the resilience of water resources to the impacts of climate change in order to improve health, sanitation and quality of life, and sustain livelihoods in targeted vulnerable areas of the Solomon Islands. The project will achieve this objective through four outcomes:

1. Water Sector – Climate Change Adaptation Response (WS-CCAR) plans formulated, integrated and mainstreamed in water sector-related and in broader policy and development frameworks – using action at the Provincial level to mobilize national level policy frameworks;
2. The increased reliability and improved quality of water supply in targeted areas;
3. Investments in cost-effective and adaptive water management interventions and technology transfer, and
4. Improved governance and knowledge management for Climate Change Adaptation in the water sector at both the local and national levels.

126. The project structure consists of four Outcomes. Outcome 1 will focus on Water Sector Climate Change Adaptation Response Planning, using the framework of Integrated Water Resources Management (IWRM) to guide adaptation in the overall water sector through the development of Water Sector Climate Change Adaptation Response (WS-CCAR) Plans in six pilot provinces and communities as well as replication sites. Outcome 2 will implement these WS-CCAR plans at a series of Pilot sites focusing on increasing reliability and improved quality of water supply in target sites. Outcome 2 will support interventions that enhance existing water resilience such as diversification of water sources; protection and restoration of ecosystems that protect critical water resources; improvements in water-use efficiency and overall demand-side management; use of innovative instruments; building on traditional knowledge; protection of freshwater lens through better sanitation practices in small islands (e.g., composting toilets). In addition, community-based Climate Early Warning and Disaster Preparedness Information System tailored for water resources management will be designed and implemented through a participatory process in the pilot sites. Outcome 3 will also support the implementation of WS-CCAR Plans in pilot sites, but focusing on investing in additional cost-effective adaptive water management and technology transfer. Strategic investments will be made in water infrastructure in target areas, including but not limited to: new household and communal water storage systems and infrastructure; design and construction of applicable small-scale climate-resilient reservoir in at least 1 site; provision of up to 4 portable water filtration and/or desalination systems for sharing across communities in times of extreme water scarcity. These interventions will be coupled with training and learning activities at the pilot sites to facilitate good maintenance and system sustainability, which is a crucial aspect of successful implementation and use of the climate adaptive water investments.

Outcome 4 focuses on improving governance and knowledge management for CCA in the water sector at the local and national levels.

127. The activities proposed for each of the outcomes are described below.

Outcome 1: Water Sector – Climate Change Adaptation Response Plans formulated, integrated and mainstreamed in water sector-related and in broader policy and development frameworks

Co-financing for Outcome 1*:

Government of the Solomon Islands:	$	250,000
MDPAC (EU EDF10 Sector Support)	$	50,000
MDPAC (AusAID Sector Support)	$	50,000
UNDP (PGSP)	$	2,750,000
Total Co-financing:	$	3,100,000
LDCF Project Grant Requested:	**$**	**855,130**
Total for Outcome 1:	$	3.955,130

** Government: Malaita Provinces' Rural Development Programme and Choiseul Province's provincial budget for water and sanitation sector, with National Government multiyear development budget for Water Resources Sector*
EU EDF10 Sector Support: Improving Governance and Access to WASH for Rural People
AusAID Sector Support: Solomon Islands Access to Clean Water &Sanitation Initiative (SIACWSI)

Baseline (Without LDCF):

128. The National Water and Sanitation Sector Plan (draft, September 2013) states that while global evidence of climate change is increasing, there remain uncertainties regarding the magnitude and timing of climate change. This makes it difficult to fully understand and therefore predict the impacts of climate change on ecosystems across the Solomon Islands. Anecdotal evidence from communities already suggests that rainfall patterns are changing. Overall annual amounts may remain stable, but the intensity of rainfall, and the longer dry periods in between rainfall events has implications on water supply and sanitation needs, and the needs of the watersheds which provide water for people and nature, and the knock on livelihoods requirements for food production.

129. The Solomon Islands Government recognizes the need for a sector-wide approach to water resources management through its commitment to integrated water resource management (IWRM) development utilizing learning from the GEF/UNDP/UNEP Pacific IWRM Programme executed by SOPAC-SPC. The Pacific IWRM Demonstration Project for the Solomon Islands focuses on water management approaches for Honiara city water and wastewater services[22].Although the project is only focused on Honiara, the understanding of IWRM as an approach has increased across the national level institutions involved. The project has also supported the development of the National Integrated Water Resources Coordinating Committee, and in the development of the national strategy and action plan (currently draft). Critical to the project, greater understanding has developed from local projects – in this case the Kovi/Kongulai Catchment and the water needs of Honiara, a growing city with an increasing need for water. Water Safety Planning, leakage detection, and other technical approaches, working jointly with the development of stronger community engagement in watershed management through the Kovi/Kongulai Catchment Group has improved the management of water for the city, and improved the protection of the catchment as a water source, and a source of income for the local communities.

130. Yet, although vital at the project level, taking this experience, the learning, and the tools wider across the water sector and across the country remains a challenge. IWRM is also very much a new approach nationally, with only a small-scale demonstration approach in place but with success demonstrated through ongoing policy development. Mobilizing the policy, securing resources, and making strategic climate resilience investments in the water sector however, remains to be seen given failing statistics and sheer lack of data and information on water resources. In all government agencies, capacity is already limited to dispense basic functions and even worse, to address emerging issues such as climate change. Both supply

[22]'Managing Honiara City Water Supply and Reducing Pollution via IWRM'. www.pacific-iwrm.org

and demand side management approaches do not yet integrate climate change impacts and IWRM approaches.

131. Projects such as this highlight the ongoing need for assistance with integrating climate change into policies, strategies and programmes. Planned engineering and quality standards for water supply systems still need to be developed and climate-proofed, and there is a pressing need to establish a more accurate understanding of the rural water supply, sanitation and hygiene situation across the country. Water resources assessments are not carried out to guide the planning of water supply systems and it is therefore not known how robust approaches are to climate changes. For example, anecdotal evidence from the World Bank Rural Development Programme suggests that, although some community systems are maintained by villagers with some technical knowledge, the location of the source can often be inappropriate, introducing contaminants into drinking water, or equipment that suffers from repeated flood damage, requiring frequent repair, and the costly sourcing of replacement parts. These simplistic impact specific point solutions are temporary in nature, and often expensive due to replacement and maintenance costs. Furthermore, project related interventions which fail are often 'picked-up' and repaired by the Provincial Government, who may have had no involvement in the project and so keep investing in a project driven intervention that may be inappropriate and actually weakens resilience.

132. At present, integrating adaptation into water resources and water supply and sanitation projects is absent. Newly mentioned in the draft rural WASH and National Water and Sanitation Sector Plan the recognition of climate change with evidence based learning, and projects designed to collect information and monitor the impacts are few in number. Where they do exist they have focused on collecting information at the national level to better understanding overall vulnerability. Yet it remains unclear how relevant these are for specific sectors or for water as a cross-cutting resource as information is not shared well, and the way climate change can impact different sectors not well understood or articulated. It is also not clear how action to adapt to climate change can be mobilized in such a decentralized country, but with the majority of capacity in the capital, Honiara, when the majority of social capital exists in community networks, and local institutions.

133. Water shortages, droughts, polluted groundwater due to coastal surges and erosion, together with increased storm impacts and flooding all contribute as hazards to rural and township development (National IWRM Diagnostic Report, 2007).Some of the pilot sites are certainly limited in their opportunities due to lack of water and fragile water resource situations. There is an absence of understanding as well as facilities to deal with extreme water scarcity events (Annex 5).

134. Existing projects working on water such as those supported by development partners (i.e. SIACWSI) and the UNICEF implemented Improving WASH in the Solomon Islands project focus on delivering WASH services, but not on the risks to these services from climate change. The longevity of interventions therefore, despite historical failures in governance and a lack of support and capacity development activities around WASH interventions, is at risk from lack of clean water, lack of storage, water quality concerns, equity of use, and flood and storm damage – many lessons exist from the World Bank rural Development Programme that has experienced exactly these types of risks.

Adaptation Alternative:

135. The overall aim of Outcome 1 is to develop Water Sector – Climate Change Adaptation Response Plans (WS-CCAR) at the provincial and community levels (six Provinces and six communities). Based on the National Water and Sanitation Sector Policy, Provincial governments as well as communities are now tasked to translate the national policy into their local contexts and SIWSAP will support the pilot provinces and communities to ensure that climate change adaptation considerations are mainstreamed within this process.

136. Within the timeline of the SIWSAP project these provincial and community plans will guide investments at sites. These local-level plans will also be shared at the national level (National Water Forum in Outcome 4) through the project lifetime, and will inform ongoing Ward Profiling, Constituency Development Planning, and Provincial Development Plans.

137. The water sector adaptation response plans will be designed in conjunction with the Provincial and community-level planning and budgeting process so that climate-resilient water sector initiatives can be mainstreamed and sustained after the lifespan of the project.

138. The provincial and community-level Water Sector – Climate Change Adaptation Response Plans will be developed based on: 1) Vulnerability assessments in communities/provinces that have yet to assess vulnerabilities of their water sector due to climate change impacts (Output 1.1), 2) policy formulation and/or integration at the community, provincial, and national level (Output 1.2), and 3) allocation of government budget based on Cost-Benefit Analysis (CBA) of proposed measures to reduce vulnerability climate change through enhancing water resource resilience.
139. A SIWSAP Project Pilot Committee (PPC) established at the provincial and community levels will lead the development of the Water Sector – Climate Change Adaptation Response Plans. The PPC will build upon existing institutions and mandates by placing a one officer within the Provincial Office RWSS in the six pilot provinces, as well as engage the Community Water Committee as the key SIWSAP focal points at the community level. The structure of the PPC is illustrated within the Management Arrangement Chapter V of the Project Document.

Output1.1. *Vulnerability assessments of water supplies (in terms of quantity and quality) to climate change in targeted critical areas refined or formulated*

140. *Vulnerability assessment* at the community level in the six pilot sites has been completed during the PPG phase (Annex 5). Based on these assessments, each of the six pilot provinces will go through a detailed local participatory vulnerability assessments to guide the identification of predicted climate change challenges to the Water Sector. Different tools are available for this process, and it is recommended that tools such as CRiSTAL, CEDRA, VCA (Red Cross) or others are used[23] and modified appropriately.
141. The Provincial Vulnerability Assessment will be kicked off with an Inception Workshop in the six pilot provinces with PPC members and relevant stakeholders. During the Inception Workshop, the appropriate vulnerability assessment framework will be discussed and design, with inputs from the Community Water Committee members that have already conducted their vulnerability assessments in the PPG phase.
142. Based on the framework developed through a participatory process, vulnerability assessment will be conducted through partnership by a team of external experts and key local stakeholders. The vulnerability assessment will highlight key current and future vulnerabilities of the water sector at the Provincial level due to impacts of climate change. The assessment will also inform suggested approaches that can reduce vulnerability and/or enhance water resource resilience, which will be key inputs to the provincial level Water Sector – Climate Change Adaptation Response Plans.

Output 1.2. *WS-CCAR plans prepared in the context of IWRM and in line with and integrated into existing local and national policy and development planning processes*

143. *Water Sector – Climate Change Adaptation Response Plans* will not only demonstrate adaptation planning and response needs (actions-on-the-ground) at the pilot site level, but will also need to demonstrate how 'additional' activities in the water sector are required to future proof natural and built water storage and reserves for many different sectoral needs. This will have valuable lessons for the water agencies and wider sectors at the national level following the principles of IWRM. Through identifying the vulnerabilities of water supply systems at the pilot sites (both water quantity, and quality), the source of water, and the sink[24] (especially from sanitation), Water-Sector Adaptation Response Plans will be developed in the Provincial and community levels.
144. In accordance with the national level IWRM commitments, these plans will also take into account uses of water beyond drinking and sanitation needs, and include food production, preparation, and cooking, and other domestic needs such as washing. For township sites the range of water needs and uses will be much wider and will need to include a broader range of sanitation options, water supply options from strategic community and individual household water storage to standpipe development[25], watershed management and source protection concerns, and water for food production needs.

[23] Rather than specify the exact tools to use, options are presented here. The actual final tool used will be selected by the Project Management Office based on their experience of using different tools and appropriateness for the Solomon Islands, guided by experience from the relevant Government Agencies and the Climate Change Working Group. This is to ensure SIWSAP is building on existing capacity and knowledge, and not producing yet new external methodologies for the country to re-learn.
[24] Meaning the drainage area, - where does water used drain to – mangroves, ground near well, beach, etc.
[25] Guided by the new Rural Water Supply and Sanitation policy to ensure appropriate and 'policy aligned' interventions.

145. The Response Plans will also be guided by the Resilience Principles (Annex 14) to define the response needs on the ground, namely (i) diversity of water supply and storage options to ensure project beneficiaries have options available to them in the future; (ii) the project provides appropriate capital to ensure interventions are designed appropriately, using both built and natural solutions, and that interventions are designed to be sustainable through close involvement of the communities concerned; (iii) self-organization (governance at different scales) – to ensure not only community engagement and decision making, but to also raise awareness and knowledge to allow communities to manage their own water supply and sanitation schemes long term, and; (iv) learning – to raise community awareness about water scheme management, the impact of climate change on their water resources and services, and the impact of their actions on water sources, especially concerning the quality of the water they rely on to maintain healthy lives.

146. Both the provincial and community-level Water Sector – Climate Change Adaptation Response Plans will be developed through consultation and participation of key stakeholders. Participatory design workshops will be held with key stakeholders including government officials, technicians, farmers, fishermen, women's groups and children where key findings from the vulnerability assessment will be shared, and based on that, needed and sustainable solutions will be identified to build long-term resilience to current and future climate change impacts to the water-sector. In some cases, it may be appropriate to take material and equipment suppliers to the pilot sites so they can better understand the technical needs and then identify the best options for the sites. Provincial Government Staff from Public Works, Environmental Health Divisions (PEHD), and other relevant agencies will also be involved in the development of the response plans to ensure they can be integrated, as easily as possible, into local planning processes. Current Ward mapping/profiling socio-economic assessments will help inform the development of the Adaptation Response Plans.

147. The design workshops will not only serve as a forum to obtain inputs to the Water Sector-Climate Change Adaptation Response Plans, but also as a forum for information sharing and awareness raising. Consultations during the PPG phase strongly indicate that maintenance and behavioural change is a key challenge to the effective adoption and sustainability of water-sector interventions from water storage to sanitation. Therefore, SIWSAP will engage not only the suppliers but also the users of the water systems will be engaged in designing the Response Plans, which will guide investments at the Provincial and community levels. All interventions proposed in the plan will include a maintenance strategy.

148. Furthermore, the Response Plans will be informed by the national information available from other projects and programmes focusing on assessing vulnerability including the EU Solomon Islands Climate Change Assistance Programme supported through budget support. These plans will provide information for more informed decision making within the project – as a demonstration through working with Provincial Government of the changes in information requirements and decision-making required to reduce the potential risks of business-as-usual approaches.

Output 1.3.*Government budgets allocated to support implementation of key components of WS-CCAR plans*

Cost Benefit Analysis of Proposed Water Sector Adaptation Options

149. In order to make informed and realistic decisions on which water sector adaptation options suggested by the Vulnerability Assessment and stakeholder consultations that the provinces and communities can commit to implement, a Cost-Benefit Analysis (CBA) will be conducted. A CBA will not only assist the provinces and communities to understand how much may need to be budgeted within their Water Sector Plans, development plans, and annual budgets, but will also provide useful information to understand which interventions may allow them to achieve maximum water resource resilience with the least cost. Linkages may be made to the Pacific Cost-Benefit Analysis (P-CBA) where tools, lessons, and expertise from other Pacific Island Countries can be derived for application to the context of the six pilot Provinces and communities of SIWSAP.

150. Based on the vulnerability assessment, community consultation and CBA, the Water Sector-Climate Change Adaptation Response Plans for the six pilot provinces and communities will be finalized, validated, and adopted. Local-level Water Sector-Climate change Adaptation Response manuals (both text and audio-visual forms if appropriate)that captures the processes, good practices, and lessons learned in the six pilot provinces and communities will be developed and disseminated at the national Water and Adaptation Forum as part of Outcome 4. At this Forum, key principles identified through the provincial and community WS-CCAR planning process will be shared for integration within the national policy context.

Replication

151. Utilizing the experiences, know-how, and knowledge materials produced through the process of developing provincial and community-level Water Sector-Climate Change Adaptation Response Plans, this effort will be replicated to 6 more provinces and communities. Provincial and community leaders from the six pilot provinces and communities will be deployed as trainers and facilitators to guide the additional provinces and communities to undergo the necessary vulnerability assessment, community consultations, and CBA to develop the Water Sector-Climate Change Adaptation Response Plans.

Table 3: Summary of Main Activities for Outcome 1

Output 1.1. *Vulnerability assessments of water supplies (in terms of quantity and quality) to climate change in targeted critical areas refined or formulated*

1.1.1 Establish Pilot Project Committees (recruit staff to be placed within the RWSS/EHD of the pilot provinces as well as mobilize Community Water Committees in the pilot communities)
1.1.2 Design Water Vulnerability Assessment Framework through Inception workshops in pilot sites
1.1.3 Establishment of Water Vulnerability Assessment team
1.1.4 Conduct water vulnerability assessments in 6 pilot provinces
1.1.5 Propose measures to reduce priority Water Vulnerability in 6 pilot provinces and communities
1.1.6 Develop training package in development and use of the water vulnerability assessment process

Output 1.2. *WS-CCAR plans prepared in the context of IWRM and in line with and integrated into existing local and national policy and development planning processes*

1.2.1 Host participatory design workshops at 6 pilot province and communities, to get inputs to the WS-CCAR based on an enhanced awareness of water sector vulnerabilities within the respective provinces and communities
1.2.2 Develop training package for participatory WS-CCAR design methods that engages various stakeholders including government officials, technicians, women, and children, etc.

Output 1.3. *Government budgets allocated to support implementation of key components of WS-CCAR plans*

1.3.1 Conduct cost-benefit assessment of interventions proposed through vulnerability assessment and participatory design workshop to select most appropriate activities, in consultation with the PPC's and other beneficiaries
1.3.2 Develop proposed budgets for selected water resource resilience measures to be integrated into the WS-CCAR, development policies and/or annual budgets
1.3.3 Finalize costed WS-CCAR plans in the six pilot provinces and communities
1.3.4 Validation and adoption of the WS-CCAR plans
1.3.5 Develop training package in development and use of the CBA approaches applied to water sector
1.3.6 Conduct replication site assessments and selection of 6 provincial and 6 community replication sites
1.3.7 Training and facilitation of WS-CCAR plans in replication sites led by 6 pilot provinces and communities
1.3.8 Finalization of WS-CCAR plans in replication sties

Outcome 2. Increased reliability and improved quality of water supply in targeted areas

Co-financing for Outcome 2*:

Government of the Solomon Islands:	$	1,400,000
MDPAC (EU EDF10 Sector Support)	$	14,600,000
MDPAC (AusAID Sector Support)	$	3,800,000
UNDP (PGSP)	$	1,000,000
Total Co-financing:	$	20,800,000
LDCF Project Grant Requested:	**$**	**1,790,430**
Total for Outcome 2:	$	22,590,430

** Government: National Government multiyear development budget for Water Resources Sector*
EU EDF10 Sector Support: Improving Governance and Access to WASH for Rural People
AusAID Sector Support: Solomon Islands Access to Clean Water &Sanitation Initiative (SIACWSI)

Baseline (Without LDCF):

152. Rural water supply, sanitation, and hygiene is now recognized as a priority for the government. Improved WASH cuts disease, especially for children, reduces healthcare costs, decreases violence against women, and can increase school attendance, particularly for girls. Many rural communities across the country spend large amounts of time collecting freshwater, and with open defecation and other sources of pollution there is concern that unprotected freshwater sources are becoming increasingly polluted. However a lack of data for monitoring these issues is a clear problem to mobilize action in solving the WASH problems. With the population increasing at an average of over 2%, finding the resources and providing clean water services to a wide range of rural communities is a challenge.

153. High failure rates of water supply systems, with around half failing or underperforming are due to many factors. Lack of ownership by communities, inadequate social involvement and capital building, poor or no training of communities in their roles and responsibilities, and in particular for operation and maintenance and financing is not improving the situation. The statistics for sanitation are worse, with an estimated 18% of the rural population of 404,072 people having access to a toilet. This is the lowest in the Pacific region and one of the lowest rates globally. Poor technical designs, subsidies, discouragement, and lack of community involvement and awareness have limited the development of the sanitation sector, and interest in providing sanitation services.

154. It is estimated that the government has the capacity to deal with around 6,000 rural people a year, according to UNICEF, but at a population growth rate of over 2% (in some cases over 4% for particular islands) addressing these issues requires development partner support. The complexity of climate change has not been considered in the water sector until now. Driven by the need for data and information collection, and focusing so far on food security and crop production, especially on outer islands, adaptation approaches have bypassed the water supply, sanitation and hygiene sector, including the wider impact on water resources, in particular groundwater. No consideration is made regarding diversity of water sources, or protection of surface and groundwater to climate change impacts, and stresses put upon the water resources as a consequence of people responding to other climate impacts, such as coastal erosion. The policy environment is currently going through a phase of addressing the lack of recognition of climate change for water resources, but it is some way off mobilizing this policy given the challenges in the sector already.

155. The Solomon Islands Access to Clean Water &Sanitation Initiative (SIACWSI) is an ongoing initiative started in 2008 with development partners and the MHMS. AusAID is a lead donor to the Health Sector, providing around AUD $20m a year, and has supported the development of the National Health Strategic Plan 2011-2015 which prioritizes rural WASH. Support for SIACWSI is provided through sector health support. SIACSWI is designed to mobilize rural WASH activities with other development partners, such as the EU improved governance and access to WASH for rural people sector support to MHMS. SIACWSI aims to (i) increase coverage of WASH in rural areas, (ii) improve sector coordination, capacity and equity, (iii) establish sustainable and inclusive operation and maintenance models, and (iv) establish sustainable systems for improved hygiene awareness and to create demand for socially inclusive sanitation. Building Human Development: Improving WASH in the Solomon Islands is an initiative funded by the EU Water Initiative and implemented by UNICEF. It focuses on Choiseul, Isabel, Renbel, Makira, and Temotu Provinces – and in some towns in those provinces. This project will focus on improving water supply and sanitation facilities to communities and schools, and to help mobilise sector reform for improved WASH and to mobilise the new rural WASH policy. This project will be a key co-financing partner for SIWSAP, in particular for the delivery of this outcome.

156. Improved governance and access to WASH for rural people – is a sector reform contract to the Solomon Islands government from the EU focusing on improving the living conditions of rural populations through implementation of the rural WASH policy and in scheme design and construction across the Provinces. MHMS-EHD – are already a key partner in SIWSAP as a co-implementer. The expected funding for this is in the region of €17m. The actual implementation of these funds is due to start in 2014, in line with this proposed project.

Adaptation Alternative:

157. SIWSAP will mobilize action in the water and sanitation sector to include adaptation planning in rural WASH and water resource interventions funded by the Government and development partner funds. The

primary focus on this component is to use the WSCCAR plans and mobilize them through target interventions designed to improve the resilience of water supply and wider water resource protection and management at selected sites. The sites are dispersed, and although face different vulnerability challenges, the interventions are similar.

158. A number of activities are envisaged – the critical element to them is building sustainability in the interventions through the development of operation and maintenance plans and community funds. The costs of adaptation need to be recognised and understood, as the pilots sites are critical to feed into the Provincial adaptation planning process, and realistic figures need to be used for scaling up in the planning process.

159. Both Outcomes 2 and 3aims to implement the WS-CCAR in a way that is sustainable and replicable. In doing so, the focus of Outcome 2 is on enhancing existing capacities and awareness of climate resilient water management, such as rehabilitation and protection of existing water sources, as well as catalyzing institutional and behavioral changes to practice water conservation, especially in light of water-scarce situations. Pilot site communities need to become future advocates for the water and adaptation planning approach, protecting sources of water, and mobilizing adoption of water conservation practices within the selected sites and beyond. This component has substantial synergies with Outcome1, and the strategic investment process. Sites will become demonstrations for people to learn from, and replicate using SIWSAP support. Uniquely, this approach combines water supply and sanitation approaches with wider water resources, including groundwater management. The multiple nature of water resources and their uses needs to be reflected in a move away from traditional sector approaches to what has become known as integrated water resources management, and lately has incorporated a greater understanding of ecosystems and the services they provide. At its most complex level IWRM involves cohesive decision-making concerning the development and management of water resources for various uses, with all decisions made and agreed upon by relevant stakeholders. This project will use and strengthen this approach through integrating adaptation into project implementation to improve the resilience of communities to climate change impacts and disasters. IWRM is already used in some cases as a valid framework for managing disaster risks and responding to disasters because it is cross-sectoral in nature, and involves multi-stakeholder participation at different levels[26].

160. Project interventions are expected to significantly improve the water provision situation, and develop and protect strategic water reserves, and will also initiate a process for community identification of disaster risk and costed response plans. Pilot sites will provide information on the cost of adaptation for Provincial planning purposes, to ensure that interventions can be sustainable accounted for in national budgets by the end of the project, through demonstrating the value of the process. Including Gizo and Taro, as the Provincial Capitals is key to show decision makers the advantages of project interventions.

161. Beyond pilot projects and active demonstrations, the project will support policy development through improving climate change information and knowledge, and interpreting this for policy through communicating lessons from field projects – targeted at the water sector, including rural WASH, but relevant across many sectors where water has relevance (for example, agriculture and irrigation investments, hydropower which also fall sunder the mandate of MMERE).

Output 2.1.*2.1.1 Community-level WS-CCA soft and concrete measures implemented to improve sanitation and water supply in times of scarcity, that may include, but not limited to: diversification of water sources; protection and restoration of ecosystems that protect critical water resources; improvements in water-use efficiency and overall demand-side management; use of innovative instruments; building on traditional knowledge; protection of freshwater lens through better sanitation practices in small islands (e.g., composting toilets) (in about 6 sites)*

162. The assessment for vulnerability of water assets to climate change threats and adaptation interventions at the pilot site locations was conducted based on secondary data and information, and supplemented by rapid on-site field inspections during PPG Implementation (Annex 5). In addition to existing but limited

[26]Dalton, J., Murti, R., and A. Chandra. 2013. *UtilizingIntegrated Water Resource Management Approaches to Support Disaster Risk Reduction*. In Renaud, F.G., Sudmeier-Rieux, K., and Estrella (Eds) The Role of Ecosystems in Disaster Risk Reduction. United Nations University, Tokyo.

scientific information, the process built on local knowledge and information and emphasized an expert judgment and stakeholder experience and opinion approach.

163. Secondary data and information included those derived from systematic observations and assessments of climatic and non-climatic variables. The major climate variables being temperature, rainfall, sea surface temperature, sea level rise, tropical cyclones, flooding, etc., which are assessed by the Solomon Islands Meteorological Services (SIMS), and the Natural Disasters Management Office. The non-climatic information included natural systems, and prevailing socio-economic conditions that were researched and documented. Following the need to collect further relevant information, workshops and discussions were also conducted with different stakeholders during the PPG missions.

164. The vulnerability of water resources on site were subsequently analysed based on a matrix system (Annex 5). The first column of the matrix presents the assets being identified under water resources and systems, while column two identifies the threats to these assets. Columns three and four give rating for the exposure of the assets to the threat and a measure of sensitivity of the assets to the threats. The fifth column presents the rating of impact (risk) based on expert assessment of the exposure and sensitivity of the assets to the threats.

165. A Matrix approach was used for assessing vulnerability as it is a thorough process and operates in a logical manner, which allows the project to take into consideration a number of dimensions for considerations. For example, the climate change threats and their effects were defined, and the exposure of these threats and how sensitive they are to the different water resources and systems are analysed with qualifying criteria that were developed for exposure and sensitivity, respectively. The table was then used to assess the impact of the threats to the assets as a product of the two events. The determination of the vulnerability of the assets to the threats was also guided by a vulnerability matrix table.

166. However, one exception was the pilot site at Tuwo, in Temotu Province. The same process could not fully take place due to difficulties in planning the PPG and logistical issues with poor weather late in the season. A scoping study was however used that gathered the necessary information in terms of the most recent impacts of sea level rise on land mass, crops and socio-economic conditions of the Reef islands in Temotu province. Further information, including the vulnerability matrices for the pilot sites are in the pilot site reports in Annex 5.

167. As explained under Outcome 1, an inception and awareness raising workshop will be held with the communities involved to explain the project and verify the project interventions, and adjust as necessary based on changing circumstances. Critical to the sustainability of the project, and learning from other regional GEF projects such as the International Waters and PACC project executed by SPREP, and the Pacific IWRM Programme executed by SPC/SOPAC, is the development of a learning approach to the project. This is embedded in all the activities under each Outcome, but it is also a core element to build resilience. In this case there are two learning needs, (i) to learn from communities about local resilience, and to ensure adequate consultation and discussion before decisions are made in order to not invest at sites that could weaken resilience, and (ii) learning within the PMU for the correct project approach and application of activities, so that interventions at replication sites and beyond are efficient in roll-out.

168. Based on the desktop and field-level preparation work conducted during the PPG phase, SIWSAP project will utilize four main categories of interventions to enhance existing resilient water management capacities in the pilot sites. These approaches include: ***1) enhancing strategic rainwater storage***, ***2) sourcing/rehabilitating sustainable water source***, ***3) developing groundwater management protocols***, and ***4) improving sanitation conditions***. Each of the Pilot sites is discussed below, with a summary outline of activities per site. These designs will be revisited at project start as outlined above to ensure they remain appropriate and to maximize the investment opportunity. Further details are provided in the Pilot site reports in Annex 5.

169. **Pilot #1: Taro Township, Choiseul Province** - Taro township is an island with limited space. A large portion of this limited land is allocated to industrial use, where almost 40% of the island is used as runway for the airport. Its population is estimated at 1,423 where 760 (53%) are male and 663 (47%) are female and 408 (28%) are youth and children. Solutions to meet the water demand in a small island with a high population growth rate and density are therefore limited. The predicted impacts of climate change on the existing water resources as well as institutional assessments were conducted at the site during the PPG. Based on these assessments, SIWSAP will support the following interventions to enhance existing water resilience capacities in Taro Township:

1. Enhancing strategic rainwater storage

Construction of additional rainwater storage, in households, community and government buildings as strategic storage during dry periods are required. Therefore, roof catchments of residential and public buildings, such as Sport Centre, government building, and churches, will be rehabilitated through the support of SIWSAP. This will require a detailed assessment of roof sizes, suitability, materials required such as guttering, etc, and the development of a clear management policy for the maintenance of community water reserves and their use. Estimated budget of this intervention is $45,000 with the entire 300 people of Taro benefiting from the interventions. Detailed project interventions are provided in the Annex 5.

2. Sourcing/rehabilitating sustainable water source

As a strategic reserve, effort is required to locate an alternative water source. A spring located 8km away on the main island of Choiseul could provide an alternative safe water supply for Taro town. The spring was visited during the PPG phase and rapid discharge and quality tests were conducted. The flow was found to be 2lts/sec, but it is not known if this supply is constant. With increasing climate variability, the community has become, at times, vulnerable to severe water shortages. Under this component the following activities will be undertaken:

- Feasibility study for the use of the spring as an adaptation response for use as a strategic reserve – using the appropriate technical capacities to assess the flow rate, reliability of supply, water quality testing, and possible pollution sources affecting the water quality.
- An assessment will need to be made regarding the governance issues surrounding land tenure and ownership of the spring, the land it drains from, and flows over. If the spring is found to be a stable and clean resource, ideally the project should attempt to secure the resource as a strategic reserve, in negotiation with the Provincial Government and land owners and communities concerned.
- The project may also consider minor development of the source including some small-scale headworks to protect the source, and initial piping to a collector tank.
- Development of an operation and maintenance schedule, including financing and stakeholder/institutional responsibilities for the spring, should even minor development of the source (as described above) take place. This is important to ensure the source, if viable, does not become polluted or 'forgotten'.
- If the source is developed, it is advisable for the Provincial Government to develop a protocol for the use of this water during periods of drought or other 'emergencies'. This includes collection, of water, shipping and logistical issues concerning distributing the water around the town and communities, responsibilities, equity of distribution (not to just government workers). The project will help with this is requested.

Furthermore, SIWSAP will support rehabilitation of hand-dug wells in Taro Township so that water quality can be improved. Currently, water inside the hand-dug wells are mostly brackish, therefore not suitable for drinking but suitable for washing and bathing. During the project, an earth sensitivity survey will be conducted to determine the water layer structure and water lens volume as well as inform appropriate and effective technologies for water pumps. Based on this analysis, rehabilitation of 15 wells will be implemented with estimated cost of $55,000.

3. Developing Groundwater Management Protocols

13 out of 15 wells (87%) contain water that is suitable for washing and bathing, but which is unsuitable for cooking with or drinking. Most of the wells have been hand dug and are lined with concrete. The following activities will be undertaken.

- A groundwater survey. Estimated cost of $75,000. This would require equipment necessary for an earth resistivity survey to better understand the groundwater characteristics, and to take samples for water quality testing to determine if, under a certain collective management regime, groundwater could be considered a source of freshwater. The management regime would be based on a sustainable pumping rate for the groundwater to ensure sustainable yield of potable water. However, this also requires protection of the water resource as an underground water catchment. For this approach to work, maintaining the quality is also determined by preventing pollution into the groundwater from surface sources. In line with the Rural WASH policy, wells are a useful and if well managed correctly, sustainable secondary source of water.
- During the PPG phase it was apparent that a shallow wetland area in the middle of the island may also be a key groundwater recharge area. Despite this, the wetland area is used for the disposal of solid

waste, containing plastic, food, metal and other waste. The project will look at options to clean up this site, remove the waste safely and dispose of it appropriately following the National Waste Management Policy. Options will be discussed with the communities and town to look at how this site can be better protected as a freshwater recharge area. Investigations will need to take place into the quality, and actual recharge value of this area, and if this is indeed important for the resilience of freshwater supply, the project will look at options to protect the site, and will implement them with the appropriate stakeholders.

Leaving this potential freshwater source to degrade is a missed opportunity to help the island adapt to climate change. Degradation and pollution puts pressure on existing sources of freshwater. This requires additional investments to be made to source freshwater, when better management, recognition, knowledge and information can lead to the better management and utilization of existing resources as an adaptation response.

4. Improving sanitation conditions

As there is no way to empty the septic tanks in Taro safely, or anywhere to dispose of the waste, it is recommended that a change to sanitation approaches, including open defecation is mobilised through implementation of the new Rural Water Supply, Sanitation and Hygiene Policy.

Groundwater is a resource that needs to be protected for three reasons: (i) it is a useful resource for bathing and washing, and some small scale irrigation uses. Polluting the water further would render it unsafe for these uses, and people would therefore use potable water from rainwater tanks for non-potable uses, thereby using strategic reserves; (ii) depending on the investigations into the groundwater, reducing pollution and better management of the resource may yield a safe potable water supply. Polluting this further will effectively narrow down water supply options for the town into the future; and finally (iii) in order to maintain the resource, it needs to be protected from pollution, especially sanitation waste from poorly designed sanitation interventions. The project will take a four year strategic approach to sanitation marketing in Taro town.

The aim of these sanitation interventions is behaviour change through community awareness, knowledge generation and self-empowerment, rather than project 'hand-out' approaches which often do not lead to sustainable change. Using Taro as a key 'demonstration' site for sanitation change for the wider Choiseul Province is critical and the project would provide additional resources for promotion of sanitation across the Province in local languages. Sanitation Champions, identified during the project will be supported by the project to lead and grow Provincial Campaigns for sanitation development under the national 'Our Sanitation Future' Campaign.

170. **Pilot #2: Tigoa Township, Renbel Province** - Tigoa has the advantage of being relatively small in size, but still a Provincial Administration and an area of economic growth for the Government to focus on. The population of Tigoa is around 543 with adult males 95 or 17% and females 100 or 19%. The population of the entire province is estimated at around 3,000. It has a serious shortage of available climate data, information, and therefore knowledge over the years to understand changes in rainfall and temperature, and other factors to really assess the status of its water resources. Many options exist to secure more strategic water resources, and diversity of sources, but it is unknown how sustainable these sources are, what the quality of them is (on a consistent basis), and what the threats are to these sources from pollutants. Polluting the groundwater sources would significantly reduce the resilience of the town. Furthermore, it appears that good sources of water, such as a well near the Provincial Administration building has not been properly looked after and protected. An existing water supply scheme has been damaged, and incorrectly established and rehabilitation of this scheme may be considered. Utilising the proposed project strategy of developing the WS-CCAR Plans to identify the adaptation needs for site water management, the following proposed activities will be reviewed and improved during the inception phase of the project, and then implemented.

1. Strategic Rainwater Storage

Although not large in population, Tigoa is a township geographically spread out; essentially a collection of communities that are linked together through different roads and paths as communication routes. Water also binds them together, given their collective location close to groundwater wells in caves. Enhancing

storage capacity especially at the community and household levels are crucial during dry periods. This includes women's resource centre building, provincial building, churches, rest houses, and residential buildings. Detailed project interventions are provided in Annex 5.

To complement the groundwater which is subject to other risks, and partly because of the distributed community, a reticulated network would be challenging to implement because of ownership, operation and maintenance, and financing costs medium term and beyond, it is recommend that a detailed rainwater harvesting survey is conducted. This will need to assess the possible rainwater capture areas, and therefore the current tank capacities required relative to population needs. The project should then invest in rainwater tanks, roofing materials and guttering to improve individual household storage (because of the decentralised nature of the town). In consultation with the community and Provincial Administration, strategic storage options such as tanks and community reservoirs should also be considered a suitable option, particularly using large roof areas such as community buildings, Churches, etc. Training in maintenance of the rainwater harvesting technologies will also be required, including hygiene practices to preserve the quality of the water in tanks.

2. Groundwater Wells and Caves

The use of groundwater in shallow wells, or from caves is a historical practice, especially during drier periods. However, this water can sometimes be contaminated from birds and/or bats in caves. Furthermore, as a raised coral atoll, pollutants can rapidly move through the porous rocks due to the high hydraulic conductivity. Consequently, there is a need to protect these sources of water from surface pollution. It is recommended that a selection of sites are identified (Hutuna was visited during the PPG phase) as strategic Provincial reserves, and a process is initiated with landowners to discuss the options for protecting and preserving these unique habitats and natural water wells. Land ownership is however complicated in Renbell, focusing on patrilineal kinship and the transfer of land through the male side of the family.

Consequently, a long term process of discussion needs to be initiated, led by the SIWSAP Provincial officer and supported by the PMU to enter into open and collaborative discussion with the landowners to look at sustainable long term protection options of the freshwater caves – such as the establishment of a payment schemes for ecosystem services approach or water fund as a key element of ecosystem based approaches within an IWRM strategy – to focus on preservation of the source for the wellbeing of the wider community during dry and drought periods.

3. Source Protection, Rehabilitation, and Expansion Options

The well at the Provincial Administration will be cleaned and rehabilitated as a developed source of potable water. During the PPG mission it was found to contain hospital waste and was slightly acidic, although the acidity is normal in limestone and should not be a concern. This source should be rehabilitated if the water is of adequate quality, and large tank supply installed as a community reserve for dry periods, provided the well sustainable pumping rate and quality is acceptable.

In discussions with the UNICEF[27] project working in Tigoa, and with the Provincial Administration, SIWSAP will consider a feasibility study to assess the rehabilitation options of the current gravity fed water system that has been damaged. Rehabilitation of this system should however, not be fully funded by the project, but with Government support. Any feasibility study should also take into consideration development of other sources (such as at Hutuna which was recommended by the community during the PPG).

4. Improving sanitation conditions

The PPG phase highlighted that there are a few septic tank systems in Tigoa, combined with some personal pit latrines, and wide use of the bush. With no ability to empty the septic tanks waste will be leaking into the groundwater. As with other sites, polluting a pristine source of groundwater due to poor sanitation practices is a poor water management practice, but also harmful to water reserves during dry periods, when water may exist but cannot be used due to pollution. Sanitation, given the lack of coverage in Tigoa, is therefore a major concern, given the population growth rate at over 2% per annum, and the existing dry periods of up to

[27]UNICEF implemented the EU Water Initiative '*Building Human Development: Improving WASH in the Solomon Islands*'.

3 months that the community experiences, with inadequate tank storage. Groundwater may become an increasingly used resource for drinking, cooking and other domestic needs.

The project will build on the UNICEF project 'Building Human Development: Improving WASH in the Solomon Islands'. This project will work in Tiggoa and is looking to develop some water supply provision, and to focus on sanitation and participatory hygiene development, sanitation marketing, water quality monitoring and capacity building. In this particular case, SIWSAP interventions will expand on the UNICEF sanitation interventions through ensuring adequate consideration has been given to medium term water storage and water quality issues, particularly in relation to an increased sanitation options. The hydrogeology of Rennell makes sanitation a particular concern to maintain groundwater quality, and this process will be supported by the SIWSAP project to ensure that an increase in sanitation provision does not negatively impact current water resources. Further activities by SIWSAP will include:

1. Creation of a local hygiene campaign to alert people to the risks around common WASH disease, etc – working with UNICEF, MHMS-EHD and the relevant Health Promotion Unit.
2. Through consultation, and with UNICEF, selection of willing families to trial new latrines, including composting or dry toilets, funded by the project, as 'demonstrations' of households willing to 'try' latrines. This will include a series of monitoring activities with the families and communities involved where pros and cons of the latrines are openly discussed within the communities. The aim is to use these pioneering families and households (including government offices and small businesses) to be 'live' monitors for toilet use, who report back on a regular basis to the wider community and town on their perspectives regarding latrine use relative to open defecation on the beach/mangroves. This way, transparent perspectives are presented to the town and communities- and they can therefore make the choice about what they want to do for their 'sanitation future'.

171. **Pilot #3: Santa Catalina, Makira Province** – Santa Catalina is a small raised coral atoll approximately 3.2km long and 2km wide. It has an estimated population of 1,304 people where 293 or 22% are adult males and 321 females (25%). The children and youth are 690 or 53%. There are 253 houses of which 15 service houses such as a clinic, primary school, and churches. Residents of Santa Catalina suffer frequently from severe water shortages due to climate-induced droughts. It is also frequently affected by cyclones and earthquakes. It is considered to be highly vulnerable to cyclones, coastal and river flooding, tsunami risk due to its proximity to a fault line. There are no climate recording stations on the island, and nearby information was used to assess the site. The island has three villages on it which divide themselves into 8 zones for administrative purposes. The island has benefitted from a variety of different donor interventions over the years, with these still evident including rainwater harvesting tanks, a fuel power pumped reticulate system , and both naturally occurring and some shallow hang dug wells which are traditionally used for bathing and washing. Sanitation practices are open defecation on the beach. A few small septic systems exist, but there is no ability to empty them or safely dispose of the waste, and no running water. Utilising the proposed project strategy of developing the WS-CCAR Plans to identify the adaptation needs for site water management, the following proposed activities will be reviewed and improved during the inception phase of the project, and then implemented. Four main areas of intervention will be undertaken in this pilot project site.

172. Climate change threats at the site include the challenge of dealing with sea level rise, and increased storminess, and extremes of precipitation and dry periods. This has affected the quality of the shallow groundwater, which reduces in quality and quantity during dry periods, in part due to its nature as a raised coral atoll. The island is strongly affected by ENSO, with long dry periods during El Nino and intense rainfall during La Nina periods. The strategy for the site based on the PPG assessment is as follows.

173. Increase storage capacity to provide a reasonable supply of freshwater for all the population during dry periods through the following interventions.

1. Strategic Rainwater Storage

- *Rainwater harvesting* - there are rainwater tanks in abundance, but no way to connect them to existing roofs. The roofs themselves need rehabilitating, with the provision of guttering and training in maintaining clean safe water. SIWSAP project will support rehabilitation of 10 water storage tanks connect to small roofs purpusefully built in the 8 zones within the districts.
- Further rainwater harvesting tanks with their own roofs are also required for small household level supply – the current distribution is based on zones, and not on number of households. Consequently, some

households only have storage for a few days, others of a few weeks. The distribution of storage needs to be made more equitable. In order to address this issue, SIWSAP will allocate 4 additional tanks for more equitable distribution of water. The estimated beneficiaries of this intervention is 500 people costed at $ 70,000.

2. Sourcing/rehabilitating sustainable water source

- *Re-development of the natural water sources*, including protecting the existing source and looking at other options to expand supply using a reticulated system of small bore pipe. However, this will not build reliance on pumping, in line with the new rural WASH policy, and also based on past experience of the communities with pumping and sourcing fuel. According to the rural WASH policy the main choice of systems should be gravity fed, and excessive costs such as fuel for pumps are not sustainable options.
- *Restoration of shallow hand dug wells,*which are used for bathing and washing, but during dry periods are used for drinking. Despite this the water quality is poor and saline, and is used by roaming village animals as well. These hand dug wells will be protected with correct simple technologies such as culvert and concrete slabs. They will be rehabilitated with hand pump systems to protect the water, and community rules established regarding their use to try and avoid them being used for drinking – contingent on provision ofalternative sources of safe freshwater.

3. Developing Groundwater Management Protocols

- *A groundwater assessment*will be conducted to assist with the identification of a new safe freshwater source. The hydrogeology of raised atolls often results in safe clean water stores underground, but also a high propensity for mixing of fresh and saline water in cases of excessive extraction. As the island is in a frequent earthquake zone, and experiences regular cyclones it poses challenges with choosing permanent or semi-permanent solutions. If a source is located that can be sustainably developed the project will invest in this to help build resilience into the communities supply options.

4. Improving sanitation conditions

- *Sanitation* – is a challenge on Makira. The traditional practice of using the beach needs to be addressed in order to improve sanitaiton conditions, although. it is also not clear if the use of the beach is affecting the water quality, when they rely on rainwater safely stored in tanks. To support and build adaptation into the UNICEF project 'Building Human Development: Improving WASH in the Solomon Islands' which will also support WASH interventions in Makira focussing on health clinics and schools. As with other sites, SIWSAP will provide additional support to try and improve sanitation provision and protect what freshwater resources do exist. The project will support UNICEF sanitation interventions through supporting the:
    1. Creation of a local hygiene campaign to alert people to the risks around common WASH disease, etc – working with UNICEF, MHMS-EHD and the relevant Health Promotion Unit from the main island.
    2. Through consultation, and with UNICEF, selection of willing families to trial new latrines, including composting toilets, funded by the project, as 'demonstrations' of households willing to 'try' latrines. This will include a series of monitoring activities with the families and communities involved where pros and cons of the latrines are openly discussed within the communities. The aim is to use these pioneering families and households (including government offices and small businesses) to be 'live' monitors for toilet use, who report back on a regular basis to the wider community and town on their perspectives regarding latrine use relative to open defecation on the beach/mangroves. This way, transparent perspectives are presented to the town and communities- and they can therefore make the choice about what they want to do for their 'sanitation future'. The actual design of the latrines will be developed during the WSCAAR planning process.

174. **Pilot #4: Maanaoba, Malaita Province**– The PPG focused on the pilot site selected during the Inception workshop at Ferafula village within Maanaoba Island. The population of Ferafa'alu community in Manaoba Island is 213 where adult females are 32 (15%) and males (13%) whilst youths is 153 (72%).The island has a similar geology to the previous site Santa Catalina, as a raised coral atoll. Consequently the adaptation challenges are similar in terms of adequate rainwater storage, very little surface water availability apart from some hand dug wells close to the coastline which are saline, and only used for batching and washing. The village of Ferafula also suffers from heavy coastal erosion due to storms and frequent cyclone damage during the season. Sanitation practices are open defecation on the beach. Two pour flush latrines do exist and one pit latrine. Utilising the proposed project strategy of developing the WS-CCAR Plans to identify the adaptation needs for site water management, the following proposed activities will be reviewed

and improved during the inception phase of the project, and then implemented. Five main areas are to be considered under this pilot project. During full implementation of the project it is proposed that a WSCAAR Plan is develop not just for Ferafula, but also for the entire island of Maanaoba..

175. Interventions at Ferafula would therefore be limited to:

1. Strategic Rainwater Storage

- *Rainwater harvesting restoration and development*- there is sensible use of rainwater tanks in the village. The project will restore the sensible gravity fed rainwater harvesting system that needs restoring and technical upgrading to provide easier free flow abundance. Given the small population, rainwater tanks will be provided to all families including strategic community or shared storage tanks, with their own roof catchments. Correct sizing of roof equipment and other materials and distribution will take place under the development of the WSCCAR plans. The school roofing should also be assessed for capturing water and tanks fitted as freshwater storage for the school. The estimated cost of servicing and provision of tanks is $ 90,000.

2. Sourcing/rehabilitating sustainable water source

- *Development of the natural spring (Faisafa),* including assessing the yield and water quality of the spring/sink hole, and securing access with landowners to use the source for the village. The source would then need to be developed for use using small bore pipe, with the aim of gravity supply. According to the rural WASH policy the main choice of systems should be gravity fed, and excessive costs such as fuel for pumps are not sustainable options.
- *Restoration of shallow hand dug wells* are used for bathing and washing. Despite this the water quality is poor and saline, and is used by roaming village animals as well. These hand dug wells will be protected with correct simple technologies such as culvert and concrete slabs. They will be rehabilitated with hand pump systems to protect the water, and community rules established regarding their use to try and avoid them being used for drinking.

3.Developing Groundwater Management Protocols

- *A groundwater assessment* is required for the entire island of Maanaoba using the correct technical interventions to assist with the identification of new safe freshwater sources. The size of the island, and the WSCAAR planning process will be useful to better understand how climate change is affecting the entire island system. From this a better understanding of the need to protect the watershed and natural wells/sink holes are key water resources for the island can be better understood. A hydrogeological survey would be required for the entire island, but if the sink holes are a valid resource, some form of protection zone and fund would need to be established

4. Improving sanitation conditions

- *Sanitation* –The traditional practice of using the beach will be addressed.As with other sites, SIWSAP will provide additional support to try and improve sanitation provision and protect what freshwater resources do exist. The project will support sanitation interventions through supporting the:
    1. Creation of a local hygiene campaign to alert people to the risks around common WASH disease, etc – working with UNICEF, MHMS-EHD and the relevant Health Promotion Unit from the main island.
    2. Through consultation, and with selection of willing families to trial new latrines, including dry composting toilets funded by the project, as ‘demonstrations’ of households willing to ‘try’ latrines. This will include a series of monitoring activities with the families and communities involved where pros and cons of the latrines are openly discussed within the communities. The aim is to use these pioneering families and households (including government offices and small businesses) to be ‘live’ monitors for toilet use, who report back on a regular basis to the wider community and town on their perspectives regarding latrine use relative to open defecation on the beach/mangroves. This way, transparent perspectives are presented to the town and communities- and they can therefore make the choice about what they want to do for their ‘sanitation future’. The actual design of the latrines will be developed during the WSCAAR planning process.

3. Given the small scale of Ferafula Village within the Manamba Island, it is also recommended that the sanitation campaign is targeted at the entire island of 3,000 people, using interventions at Ferafula and other sites to mobilise behaviour change.

176. **Pilot #5: Tuwo, Temotu Province**– The entire Province of Temotu only has 5.600 people, and the Tuwo community is estimate to have a population of 1,016 people of which 162 (16%) are adult males and 172 (17%) are adult females. Youth's population is 682 or 67% of the total population. It is an atoll island, and therefore has limited options in water collection and storage, and faces other vulnerabilities from sea level rise, storms, and cyclones. Most of the water resources are rainwater collected in tanks, with some shallow freshwater available but overuse of this renders the wells saline, and therefore unfit for drinking water, but suitable for washing and bathing. Sanitation consists of 7 pour flush latrines, or the beach for the majority of the population Interventions at this pilot site will consist of:

1. Strategic Rainwater Storage

- *Rainwater harvesting restoration and development*- there is sensible use of rainwater tanks are widely used in the village, and previous support has been offered by the rural Development Programme. However, there is community tension over the allocation of tanks, which suggests they were not distributed equitably. SIWSAP will assess this situation and based on the WSCAAR plans, invest in tanks to ensure equitable distribution and access to water resources. Furthermore, the project will invest in strategic shared storage for the entire community, using tanks with their own roofs. The reason for this is that some of the communities use traditional housing with sago leaves, which are not effective at collecting rainwater. Correct sizing of roof equipment and other materials and distribution will take place under the development of the WSCCAR plans. The school roofing will also be assessed for capturing water and tanks fitted as freshwater storage for the school. The estimated cost of ranwater harvesting restoration and development in Tuwo is $83,000.

2. Sourcing/rehabilitating sustainable water source

- *Restoration of shallow hand dug wells* are used for bathing and washing. Despite this the water quality is poor and saline, and is used by roaming village animals as well. These hand dug wells need protecting with correct simple technologies such as culvert and concrete slabs. They will be rehabilitated with hand pump systems to protect the water, and community rules established regarding their use to try and avoid them being used for drinking.

3. Developing of Groundwater Management Protocols

- *A groundwater assessment* is required for the entire island of Temotu using the correct technical interventions to assist with the identification of a new safe freshwater source – or at least to see if one can be developed with a sustainable pumping rate. The size of the island, and the WSCAAR planning process will be useful to better understand how climate change is affecting the entire island system. From this a better understanding of the need to protect the watershed and natural wells/sink holes are key water resources for the island can be better understood and shared across the province, informing the development of the overall Provincial Plan on water and adaptation.

4. Improving sanitation conditions

- *Sanitation* –As with other sites, SIWSAP will provide additional support to improve sanitation provision and protect what freshwater resources do exist. The project will support sanitation interventions through supporting the
    1. Creation of a local hygiene campaign to alert people to the risks around common WASH disease, etc – working with UNICEF, MHMS-EHD and the relevant Health Promotion Unit from the main island.
    2. Through consultation, and with selection of willing families to trial new latrines, funded by the project, as 'demonstrations' of households willing to 'try' latrines. This will include a series of monitoring activities with the families and communities involved where pros and cons of the latrines are openly discussed within the communities. The aim is to use these pioneering families and households (including government offices and small businesses) to be 'live' monitors for toilet use, who report back on a regular basis to the wider community and town on their perspectives regarding latrine use

relative to open defecation on the beach/mangroves. This way, transparent perspectives are presented to the town and communities- and they can therefore make the choice about what they want to do for their 'sanitation future'. The actual design of the latrines will be developed during the WSCAAR planning process.

177. **Pilot #6: Gizo Township, Western Province**–Gizo is the capital of the Western Province. It is a relatively small when compared to the surrounding islands; the island is 11 km long and 5 km wide, with a summit elevation of 180m (Maringe Hill). With a population of approximately 7,177 (2009 census), it is the second largest town in the country with an urban population of 3,547 [2009 census]. The number of males is approximately 3,802 (53%) and females are estimated at 3,375 (47%).

178. Gizo Water Supply system is one of the old systems that was established during the colonial government. There had been several studies commissioned to assess various sources and option including ground water. Gizo Island also has several streams and springs. Leoko Stream situated on the western part of the island was also studied and was included with an automatic water level monitoring recorder. The mean flow was measured to be 6 litres per second, although there is no weather monitoring station in Gizo, but there is a monitoring station in Munda on New Georgia Island with annual rainfall of 4230 mm in 2012.

179. In terms of vulnerability, the watersheds of Gizo Island are highly vulnerable to extreme drought periods. The island is well known for running short of water. Gizo water supply is problematic and had been affected by the climatic variation and conditions. Residents have had to resort to using hand dug wells at times. However, almost all houses with roofing iron collect water from rainfall using tanks. Rainwater harvesting is a common practice in Gizo Township because the actual water supply system does not work very well as it runs dry during dry periods, and illegal off takes and other challenges, such as rural urban challenges over water, and vandalism, have left a good water system not fully functioning. SIWSAP activities at Gizo will include:

1. Strategic Rainwater Storage

- A *rainwater harvesting survey* of the entire town is required. Some tanks will not contain clean water, and there is a need for some additional storage.Communal back-up storage will be developed in communal buildings, and extended in areas with large roofs, such as churches. In many places guttering is required, and training in maintaining tanks for clean water provision. An estimated budget of $50,000 will be utilzed to rehabilitate existing rainwater tanks and roofing systems.

2. Sourcing/rehabilitating sustainable water source

- *Survvey of water supply system* - Utilising the proposed project strategy of developing the WS-CCAR Plans to identify the adaptation needs for the town. This will incorporate a survey of the water supply system. As a core growth area of the country, and an annual population growth rate nearing 4%, Gizo town is a key showcase pilot location for the SIWSAP project to demonstrate the adaptation response approach.
- *Protection of existing source and development of a new additional water source* at Leoko and Tirokogu - a payment for ecosystem services scheme, or similar mechanism needs to be developed to protect the existing watershed above the sources located in the foersted vallies of Gizo Island. A new source, close to the existing one also needs to be surveyed and assessed as a suitable source of water. A feasibility study will be prepared with the Provincial governments support to develop the other source at Tirokogu.
- *Repairs and monitoring: of the existing system*. Vandalised pipes will be replaced to expand capacity to the existing network system, and the old reservoir will be rehabilitated, including the development of a protection zone around the reservoir to improve the resilience of the system through providing additional storage and capacity. Sand filters and other water quality equipment will need to be replaced.
- To match the possible development of a new source, the project will look to partner with Solomon Water (formerly SIWA) in developing sustainable water sources for Gizo. The cost of sourcing and/or rehabilitating sustainable water sources in Gizo is estimated at $ 90,000.

3. Developing Groundwater Management Protocols

- Protocols in which water can be managed and accessed more equitably, particularly during water shortage situations will be discussed and designed through community consultation processes. The consultations will take place with the Gilbertese villages thatcurrently experiencing governance issues related to water access. Equitable access of water is particularly important in ensuring that marginal groups of the community such

as women, children, and the ederly may access water even during periods of water scarcity. Therefore, a detailed survey of who uses what water, and can they be connected properly before the water pipes enter the town (and become a municipal responsibility) will be conducted to strengthen water resilience through improved governance..

4. Improving sanitation conditions

In line with other pilot sites, SIWSAP will build upon the WASH awareness campaign implemented by UNICEF and MHMS-EHD to mobilize a *Province wide sanitation and hygiene 'campaign'* based in Gizo for all the Western Province. Through working with UNICEF, MHMS-EHD and the relevant Health Promotion Unit the project will alert people to the risks around common WASH disease.

Output 2.2. *Community-based Climate Early Warning and Disaster Preparedness Information System tailored for water resources management developed and implemented in targeted areas*

180. An Early Warning System (EWS) represents the set of capacities needed to generate and disseminate timely and meaningful warning information that enables at-risk individuals, communities and organizations to prepare and act appropriately; most importantly in sufficient time to reduce harm or loss[28]. Early, to signify 'prior' to the arrival of a 'hazard or threat' — while there is still time to respond and therefore reduce potential harm or loss, or prevent a disaster. In this case, a warning is the message (using signs, words, sounds or images) that announces an imminent danger. This 'trigger' initiates an ordered and often standardized compilation of elements – at its most complex, an end-to-end warning system is designed to connect those who need to hear messages, to others who compile and track hazard information and compile warning messages or other triggers.

181. Water Resource assessments conducted in the pilot sites during the PPG phase(Annex 5) indicate that the major "hazard" to water resilience in the SIWSAP project sites is the lack of rain for a prolonged period (normally for more than two months). As most community-level water resources depend on rainwater, an early warning system that informs communities of projected dry spells (lack of rain) so that they can prepare well in advance through water conservation efforts has been identified as an effective approach to deal with existing water resource constraints, which would pose even further limitations to communities in the future due to climate change. An institutional analysis water sector resilience conducted in the PPG phase indicates that while some communities may already have community level water management rules that are enacted during periods of water scarcity. Building on existing local systems and knowledge, the SIWSAP project intends to develop both an effective community-based climate early warning and disaster preparedness information system for water resource management that is both "top-down" and "bottom-up".

182. *Participatory Water Resource EWS Design* process will be undertaken to develop both "top-down" and "bottom-up" EWS in the 6 pilot sites engaging all relevant stakeholders who will be receiving and sending information related to water resource scarcity. The "top-down" EWS will focus on transmitting information related to dry spells and prolong period without lack of rainfall from the National Meteorological Service to the Provinces (i.e. Provincial Secretary), sub-provincial authorities (i.e. Provincial Ward Members), communities, and eventually to households and individuals. Water resource assessment conducted during the PPG phase found that provinces and communities regard period of more than 2 months without rain as a "disaster/drought" as communities try to develop water sources and storage facilities with capacities to supply water to their communities for 2 months(Annex 5).Based on the final assessment of water resource vulnerabilities and capacities, sufficient lead time that is required for the National Meteorological Service to release climate projection information related to rainfall and/or water scarcity will be discussed in the design phase[29].

183. Similarly a "bottom-up" EWS will be designed through a participatory approach. While rainfall information from National Meteorological Service would provide a scientific bases to trigger the water resource EWS, not all drought can be predicted accurately and timely. Furthermore, with climate change, extreme events will most likely be more frequent and less predictable. Therefore, in order to enhance water resource resilience, in addition to the "top-down" EWS based on scientific information, an alternative "bottom-up" water resource EWS would also be effective, which will be based on community-level monitoring of water storage levels. Once water storage levels goes below a certain threshold, this too may

[28] UNISDR, 2009.

[29] The project will build upon existing efforts in the Solomon Island on disaster early warning such as the support from JICA provided to the NDMO.

trigger a water resource EWS that would enact certain water management rules agreed upon by the community groups and/or group of households sharing the water resources.

184. After participatory community designs of both the "top-down" and "bottom-up" water resource EWS are conducted in the 6 pilot sites, ***detail designs*** will be developed that would inform the specific technologies and sites required for the EWS hardware software. Based on the detail design, the ***EWS systems will be procured, installed and tested***. Simultaneously ***training***s of those responsible to manage the EWS at the national, provincial, and community levels will be conducted. This will also be coupled with a broader training of EWS users (i.e. community members) who are required to respond appropriately after receiving the water resource early warning messages. Therefore, training at the pilot sites will engage various stakeholders including appropriate disaster (extreme water shortage) management officers and other agencies including the Solomon Islands Red Cross and importantly Church networks30, PEHD officers, and MHMS. Community-level water resource conservation techniques such as the community water management rules will be introduced and established through these trainings.

185. ***Communicating and Replication*** – Water management EWS systems will be mobilized at replication sites by the Provincial Officers. Tools to facilitate replication may include a radio programme that explains the development process of the Water management EWS. The programme will focus on water risks and hazards, both hazards such as floods and storms, but also slower onset problems such as drought and pollution of water sources. This programme will be shared nationwide over the course of the project. A critical element of disaster risk planning is communication, between formal and increasingly informal 'agencies' involved – relying solely on national response mechanism is costly and a lengthy process, and cripples government temporarily as all resources are re-allocated to response mechanisms. This has an immediate impact on GDP and other sectors. The National Development Strategy highlights the need for better 'models of good practice for disaster preparedness and response…and the need to improve communications and coordination with outer island communities'31. Communicating how communities identified the hazards, and then what they did to mitigate against them and better prepare will be the core focus of the radio programme

186. Processes, data, and information collected over the course of developing the EWS and mobilizing it at the pilot sites will be captured and documented by the PMU (including through the use of video). This information will be shared with the Red Cross and NDMO for disaster risk reduction and preparedness learning purposes, but also with RWSS and MMEME-WRD to better understand community hazards and their response approaches. This information will be used to guide more appropriate interventions in villages and towns in the future, including the impacts on surface and groundwater resources.

Table 4: Summary of Main Activities for Outcome 2

Output 2.1.*Community-level WS-CCA soft and concrete measures implemented to improve sanitation and water supply in times of scarcity, that may include, but not limited to: diversification of water sources; protection and restoration of ecosystems that protect critical water resources; improvements in water-use efficiency and overall demand-side management; use of innovative instruments; building on traditional knowledge; protection of freshwater lens through better sanitation practices in small islands (e.g., composting toilets) (in about 6 sites)*

2.1.1 Six pilots sites across the country to enhance the capacity to adopt/ maintain a variety of different interventions, guided by the WSCCAR plans to frame water adaptation interventions, including:

- Strategic rainwater storage options
- Sourcing/development of new water sources
- Protecting existing sources, include ecosystem/watersheds using payment protection schemes (i.e. payment for ecosystem services)
- Groundwater management improvement and training, including protocol development
- Groundwater surveys/assessments
- Rehabilitation of existing water sources

[30]Identified as an invaluable network, often overlooked and not adequately integrated into risk reduction planning and response. See Gero, A, Fletcher, S, Rumsey, M, Thiessen, J, Kuruppu, N, Buchan, J, Daly, J, Willetts, J (2013) .*Disaster response and climate change in the Pacific,* National Climate Change Adaptation Research Facility, Gold Coast, pp. 202.

[31]National Development Strategy, Objective 7: Effectively Respond to Climate Change and Manage the Environment and Risks of Natural Disasters.

- Rehabilitation of existing systems, including reservoirs and filters
- Sanitation campaigns and introduction of trial latrines for community assessment and review (Province wide campaigns for Western, and Temotu)
- Rehabilitation of existing systems, including reservoirs and filters

Output 2.2. *Community-based Climate Early Warning (EWS) and Disaster Preparedness Information System tailored for water resources management developed and implemented in targeted areas*

2.2.1 Participatory design of top-down and bottom-up Water Resource EWS in 6 pilot sites
2.2.2 Development of detail design of the EWS in 6 pilot sites
2.2.3 Procurement, installation, and system testing of EWS in 6 pilot sites
2.2.4 Development and dissemination of communication materials (i.e. radio programme and videos) of how to establish water resource EWS
2.2.5 Replication of EWS establishment efforts in selected sites

Outcome 3.Investments in cost-effective and adaptive water management interventions and technology transfer

Co-financing for Outcome 3*:

Government of the Solomon Islands:	$	1,592,462
MDPAC (EU EDF10 Sector Support)	$	7,770,000
MDPAC (AusAID Sector Support)	$	5,910,000
Total Co-financing:	$	15,272,462
LDCF Project Grant Requested:	**$**	**3,112,359**
Total for Outcome 3:	$	18,384,821

** Government: National Government multiyear development budget for Water Resources Sector*
EU EDF10 Sector Support: Improving Governance and Access to WASH for Rural People
AusAID Sector Support: Solomon Islands Access to Clean Water &Sanitation Initiative (SIACWSI)

Baseline (Without LDCF):

187. Water, Sanitation, and Hygiene (WASH) statistics for the overall Solomon Islands indicate there is a wide and relatively good coverage of water supply (although this could be improved), but sanitation remains very low when compared regionally and internationally. Progress towards reaching the Millennium Development Goals (MDGs) overall shows good progress for primary education and maternal and child mortality. However, coverage for rural water supply and sanitation remains low. Previous tensions, weather conditions, and an expanding population have put pressure of the water supply and sanitation services across the country. 71% of the households across the country do not have improved sanitation facilities, and around 30% do not have improved access to safe drinking water. For rural areas these numbers are lower with over 80% having no access to improved sanitation facilities, and almost 40% of people do not have improved access to safe drinking water. For a country where 80% of the populations are classed as rural these are sobering statistics.
188. Equally, the Rural Water Supply and Sanitation Policy (draft, July 2013) vision states that: 'All Solomon Islanders with easy access to sufficient quantity and quality of water, appropriate sanitation, and living in a safe and hygienic environment', and recognizes that the conservation and protection of water resources is of great importance to the Solomon Islands. This is due to increasing population pressures, logging and other activities that threaten water catchment areas, with knock-on detrimental effects on livelihoods and health. The policy also recognizes the ongoing Integrated Water Resource Management approach, requiring collaboration and coordination with all sectors including the rural water supply, sanitation and hygiene agencies.
189. Furthermore, the policy specifically recognizes climate change impacts, and the need for close institutional collaboration, to adopt a flexible approach to technical design and construction standards, to make wider use of the opportunity to work with and engage community capacities to better understand and leverage local climate change knowledge and disaster events and impacts, and to 'build-in' greater understanding of climate change in providing rural WASH services. However, without support for this

process, and the development of greater adaptive capacity, there is a risk that many of the water interventions will continue along the business-as-usual model. This is critically important, given there are already suggestions that the Government has not paid enough attention to water supply and sanitation requirements, and the integration with wider water resource management historically. These findings are documented in the AusAID Rural WASH Transition Plan, which focuses on the need to adjust the way water is managed in country and the need to improve governance of the resource, and sanitation. The Plan provides key baseline information regarding the need for improved leadership, planning, monitoring of interventions, and the urgent need for advocacy and sanitation and hygiene campaigns across the country. The lack of capacity for community engagement is a major hindrance to development progress. The plan also highlights climate threats to interventions, but does not provide a further analysis.

Adaptation Alternative:

190. Building on the efforts under Outcome 2 to enhance existing water facilities and management capacities to implement provincial and community-level WS-CCAR plans developed under Outcome 1, Outcome 3 will focus on building additional facilities' capacities and awareness to further strengthen climate resilience in six pilot sites. This will be done through four types of interventions, including ***1) provision of additional rainwater storage***, ***2) developing new surface water sources such as from river systems***, ***3) development of new water sources, such as from wells***, and ***4) preparing for extreme water scarcity events through provision of specialized equipment such as desalination and water treatment systems.*** Project's targeted investments will mobilise changes in the way water is managed nationally. Through investing in sites driven by community design, implementation, and maintenance and supporting MHMS-RWSS in their interventions, the project will change the approach taken to develop water resources. The NAPA has identified that better information is needed to help understand the risks to different sectors – for water this is critical as both a lifeline resource, but also for other sectors. The lack of data and information hinders the ability to adequately cost, resource and plan responses. SIWSAP aims to adjust that through providing climate information, and using this to influence water and other sectoral investments.
191. Interventions designed and implemented through the pilots will be integrated into partner projects to improve the sustainability of interventions. Many water projects, as discovered during the PPG, do not take into account adaptation, and suffer from poor sustainability and operation and maintenance. SIWSAP interventions aim to change that, and through national and Provincial communications share information on effective adaptation responses to feed into sectoral reform and budget development.
192. Within the Solomon Islands moves are currently underway to provide for a National Water and Sanitation Sector Plan, driven forward by the Cabinet approved National Inter-sectoral Water Coordination Committee (June, 2013). This process has been supported by the GEF funded Regional Pacific IWRM Project, initially co-financed by the EU Water Initiative IWRM National Planning Programme. The proposed project interventions will feed valuable lessons into the application of this plan, which does primarily take note of climate change impacts due to the influence of SIWSAP during the PPG phase.
193. SIWSAP will provide pilot site lessons to inform the policy revision process and the implementation of the National Water and Sanitation Sector plan. Uniquely, compared to other projects focused on WATSAN targets, and impact-specific interventions, this project will provide for lesson learning on the ground, the development of unique support and interventions to existing projects for adaptation needs, working with co-financing support from the EU, AusAID, and UNICEF, and the collection of further knowledge and information, including investment in data collection and capacity development.

Output 3.1.*Strategic investments in water infrastructure in target areas, including but not limited to: new household and communal water storage systems and infrastructure provision of up to 4 portable water filtration and/or desalination systems for sharing across communities in times of extreme water scarcity.*

194. Outcome 3 will further engage community stakeholders to design and implement a total of 20 new sustainable and effective climate-resilient water management approaches that build additional water facilities and management capacities across the 6 pilot sites. Similar to interventions under Outcome 2, Outcome 3 will deliver on provincial and community-level priorities highlighted within the WS CCAR Plans through active demonstration of measures and approaches in the Plans.

195. Based on data collected and assessments conducted during the PPG phase, the SIWSAP will implement interventions categorized in the following four broad categories including: ***1) increasing rainwater storage***, ***2) cultivating new river water sources***, ***3) development of new water sources including small-scale reservoirs and wells***, and ***4) preparing for extreme water scarcity events***.

196. Below Table illustrates the proposed interventions to be supported through SIWSAP in each of the pilot sites that have been identified as measures to build additional water management capacities.

Table 5: Proposed Outcome 3 Interventions in Pilot Sites

Province	Community	Intervention Type	Proposed Intervention	Estimated Cost US$	Estimated Beneficiaries
Choiseul	Taro	1) Rain	Construct a Rainwater storage using roof catchment	70,000	1423
		2) River	Feasibility Study of Water supply from Mainland River	55,000	
		4) Disaster preparedness	Purchase of portable water system	160,000	
Renbel	Tingoa	3) Well	Development of Natural Wells	90,000	543
		4) Disaster preparedness	Purchase of portable water system	160,000	
Makira Ulawa	Santa Catalina	3) Well	Development of the identified natural well	50,000	1304
		1) Rain	Provision of additional storage tanks with roof catchment	55,000	
		4) Disaster preparedness	Purchase of portable water system	160,000	
Malaita	Manaoba	3) Well	Development of Natural Wells	120,000	213
		4) Disaster preparedness	Purchase of portable water system	160,000	
Temotu	Tuwo	3) Well	Redevelopment and development of Wells	80,000	1016
		1) Rain	Additional Storage Tanks and Shed for Roof Catchment	90,000	
		4) Disaster preparedness	Installation of portable water system	160,000	
Western	Gizo	2) River	Construction of Storage Tanks at Government Building	60,000	3802
		2) River	Development of Tirokogu stream	80,000	
		2) River	Feasibility study of reticulation system	60,000	
		2) River	Construction of water reticulation system	400,000	
		4) Disaster preparedness	Installation of portable water system	160,000	
			TOTAL	**2,170,000**	

197. Although proposed interventions are based on stakeholder consultations and assessments conducted in pilot sites during the PPG phase, during the project inception phase, all pilot level interventions will be discussed and be approved by the Provincial Administrations, to ensure that project interventions are effective and sustainable and do not duplicate existing efforts or become an additional burden to the Provincial Government. One aim of the project is to influence Provincial budgets to mobilize the Provincial Water Adaptation Plans. However, it is not to add additional burden to budgets for water supply and sanitation schemes where communities have not accepted responsibilities for maintenance of SIWSAP investments. This is in line with the rural WASH policy (June, 2013).

198. Further investments will be made with the national water sector: the rural WASH programme in MHMS-EHD, and MMERE-WRD. A joint review of their workplans will start at the end of year 1 of the project to identify where SIWSAP can add adaptation value. With EU and AusAID funds (under SIACSWI) not programmed at the time of the PPG, lessons from SIWSAP pilot sites, and from other programmes such as the World Bank funded Rural Development Program will be used to support a joint planning process where service providers, such as NGOs and private businesses, under contract to the MHMS-RWSS will work with SIWSAP to mainstream adaptation interventions into the projects proposed. Adaptation interventions will be financed by this project. This approach will help (i) to operationalise priorities identified in the NAPA and NDS from national, to Provincial – to community level; (ii) strengthen the planning of interventions for water supply and sanitation in-line with new national policies and plans; and iii) raise awareness concerning the need to include adaptation approaches in infrastructure and water supply projects to help maintain the lifetime of investments and build resilience at community level. These interventions will become a core baseline of adaptation interventions for future investments to learn from.

199. The project contains a strong learning structure, and similar to Outcome 2, interventions will be coupled by participatory design as well as trainings to develop effective community-management and maintenance mechanisms.

200. Equally, reviewing the regional UNDP-GEF Pacific IWRM 'lesson learning' and other Pacific IWRM project Steering Committee documents[32], (which is a project that already builds on many regional lessons learned over the last ten years as part of its project design), stakeholder engagement and technical support stand out as key areas requiring constant support across national demonstration project management units Pacific wide. Despite this, the lessons learned stories from the regional IWRM project indicate great success when focusing and engaging with stakeholders, but that project management remains a constant challenge. This project will build capacity throughout the project with the addition of a series of Provincial Officers – embedded at the Provincial scale to work with the government and communities, NGOs and networks, to support project interventions, and to support MHMS-RWSS in looking at adaptation options when developing new sites.

201. Project outcomes are designed to build incremental learning and capacity, from demonstration and replication to strategic investments, based on initial project learning, and assessment of gaps in knowledge and understanding by the PMU. This learning will be taken to planning and policy levels at the Provincial to National level, feeding in vital lessons from Provincial on-the-ground demonstration, directly opposite to nationally determined and rolled out project approaches.

202. The November 2013 draft of the National Water and Sanitation Implementation Plan identified seven challenges for the plan to address. All of these seven areas will be supported by SIWSAP interventions, notably number 7 which focuses on climate extremes, disasters and climate change. SIWSAP will mobilize the plan and support the mainstreaming of adaptation across the multiple sectors. Under Outcome 4, many of the governance challenges will be tackled including the lack of information flow between national government agencies, and the lack of coordination and monitoring.

203. Capacity support will be required to support the roll-out of projects. The PMU will, with MMERE-WRD and MHMS-RWSS, develop appropriate partnerships with CROP Agencies and other regionally based organizations with the necessary skill base to provide training services for government staff and communities on different technical subjects such as: rainwater harvesting assessments, groundwater assessments, ecosystem based adaptation, watershed protection, water source management and development, monitoring systems, rainwater tank construction and maintenance, water quality testing, development of operation and maintenance contracts for communities to follow, with O&M monitoring developed to improve reporting on systems status, water quality testing,

204. **Procurement of Relief and Communications Equipment**. There is a lack of available water security equipment at the Provincial level. The Solomon Islands Red Cross have highlighted the need for further portable water filtration units, the need for additional strategic freshwater storage options at certain locations during disaster relief periods, and improved communications on Provincial situations and needs during disasters. The project will therefore establish a procurement plan with the NDMO for the following equipment, locally available in the Pacific region, scoped out during the PPG phase:

205. Trunz Water System 300. A mobile solar water treatment system complete and ready to deploy. It provides approx. 1,200 Liter of potable water per hour from any non saline water source. Based on

[32]SOPAC/GEF/IWRM/RSC.5/7, October, 2013.

radiation levels in the Pacific, this can deliver approximately 12,000 liters of water a day. Six of these systems will be purchased at a cost of $61,275 each (quote valid 2013).

206. Trunz Brackish System 300. The Brackish Water System is designed to use brackish water to generate freshwater. The filtration and power system is different to the freshwater system, and therefore only 4'500 Liter of clean drinking water can be produced per day. Six of these systems will be purchased by the project at a cost of $96,490 each (quote valid 2013)

207. These systems have been selected during the design phase because they are cost-effective, with only low operation and lifecycle costs. They are a far less expensive solution compared to diesel powered equipment or bottled water. They are relatively simple to operate with low technical skill requirements, and have low operational costs and maintenance requirements (there are no consumables). The automatic backwashing filters are highly reliable and automatic. Costs for this equipment will include specifically designed trailers to make the systems more maneuverable. In addition to this hardware, satellite phones will be purchased under the project for distribution to Provincial Administrations. Maintenance costs will be covered by the project up to the end of year 3. From year 4 of the project maintenance costs will be integrated into the budget of the communities, Provincial Government. Although these systems are to be placed in the pilot sites, as they are mobile systems, they will also benefit surrounding communities and people during times of water scarcity and disasters as they can be deployed to nearby locations depending on the needs on the ground.

Output 3.2. *Compilation of best practices on applicable technologies for dissemination and replication by project partners with support from the project*

208. The PMU will recruit a local team during the project to specifically deliver knowledge management activities. These activities will include digesting and documenting technical reports and other project related information, including the collected climate change and adaptation relevant information, and 'translating' this into national and provincial relevant outputs – tailored communications products. Service providers could be local NGO's, or for example, journalists and independent communications experts. These will be communication experts and not technical specialists, who often find it difficult to communicate technical issues into common language and therefore communication products designed to influence behavior change. This activity is concerned with taking technical outputs and nationalizing them for a wider range of stakeholders, and to influence wider society. This will include developing news stories for national broadcasting on television. These tasks are often left until the end of projects, and are often time consuming (and therefore not cost-effective) for technical staff to implement.

209. With the support of AusAID co-financing under sector reform support to the rural WASH sector (SIACWSI), the project will also mobilize the use of volunteers under the Australia Volunteers International (AVI) or Pacific Technical Assistance Mission (PACTAM) to bring in additional capacity to the PMU. AusAID already provide support of a similar nature to MHMS-RWSS. Additional support, for a defined timeline (2 years), specifically on climate change adaptation and response measures will be needed to support the PMU in analyzing lessons from the pilot and replication sites. These lessons need to be absorbed, and best practices identified, both at the sites that SIWSAP has direct control over with partners and communities, and at the sites were the project will invest in adaptation responses in addition to other ongoing rural WASH projects (supported by the EU, AusAID, and UNICEF).

210. The skills needed include the ability to technically understand the adaptation elements – the technical challenges, and the difficulties, for example, of sourcing additional surface water over long distances, and to provide recommendations to the use and management of water in this respect. This will take into account rural water supply, sanitation and hygiene interventions but also those associated with irrigation needs, the use of water for farm plots and gardens at the pilot sites. Further outputs will include a better understanding of the implications of the changing climate on surface water flows for irrigation and hydropower generation needs, to support MMERE with their energy mandate, including the opportunity additional flows could present for sustainable hydropower development, particularly at the Provincial level where small hydropower sites could reduce the costs and reliance of fossil fuels.

211. Best Practices will be developed as a series of guidance documents, supported with training videos in English and Pidgin for sharing across Provinces and national agencies. Videos which focus on practical level issues such as looking at alternative water storage options, or developing a community based early

warning approach will use pilot and replication sites in the videos – using the Pilot Project Committees to showcase project examples and communities identifying and solving local problems themselves.

212. The adaptation community-of-practice is often distanced from the wider water community at the regional and international level. Yet, it can be argued, the most immediate, and equally long term effects of climate change will be on water supply, either through changes in precipitation or temperature. More examples of dealing with adaptation are required to improve national and global learning and for the design of water and adaptation interventions. SIWSAP will help develop some of this information and experience for sharing at the regional and international level through platforms such as the Adaptation Learning Mechanism, and IW: LEARN. Equally, material such as training courses, training videos, project briefings and experience notes, case studies, science related information of publication standard, will be showcased within the region with the **Pacific IWRM** programme, and the regional **Pacific Adaptation to Climate Change** (PACC) programme. Guidelines on climate proofing water supply and sanitation interventions will be valid for other globally projects such as **the African-Indian Ocean IWRM SIDS** project (http://www.aio-iwrm.org/), and the **Integrated Coastal Area and Watershed Management Project (IWCAM)** and its follow on project IW-ECO (http://iwcam.org/).

213. Best practices from the project will also be shared at the World Water Forum in South Korea (2015), with high Pacific relevance, and at the Forum in 2018 (venue tbc). In particular, outcomes from the National Water and Adaptation Forum, and the Sanitation Futures camping will be documented and shared with partners to influence future project and programme design. MDPAC will be specifically involved in this process as a member of the Project Board.

Table 6: Summary of Main Activities for Outcome 3

Output 3.1. Strategic investments in water infrastructure in target areas, including but not limited to: new household and communal water storage systems and infrastructure; provision of up to 4 portable water filtration and/or desalination systems for sharing across communities in times of extreme water scarcity.	
3.1.1	20 water and adaptation interventions identified and designed through a participatory process in the 6 pilot sites
3.1.2	Technical design and planning for 20 water and adaptation interventions
3.1.3	Procurement, installation, and testing and training
3.1.4	Develop and test creative maintenance mechanisms through a participatory process
3.1.5	Enhance intervention performance through community-based/indigenous knowledge
3.1.6	Adaptation interventions designed and integrated into national and development partner projects focussing on rural WASH
3.1.7	Regional partnerships with CROP Agencies and others for training communities and government in relevant subjects specifically at the 20 sites (3.1.1) (i.e. adaptation planning, new WASH approaches, water resource assessments, catchment hydrology and meteorology, DRR, communications)
Output 3.2. Compilation of best practices on applicable technologies for dissemination and replication by project partners with support from the project	
3.2.1	Recruitment of local communications specialists to develop national products explaining the project, tailoring outputs, developing communications materials to influence behaviour change, and raise awareness (advocacy outputs)
3.2.2	Mobilise volunteer(s) and/or civil society organization to support to develop best practice material and guidance – taking technical responses into guidance notes, briefing materials, training videos, national, regional, and international outputs to be developed that build on lessons and experience from SIWSAP and co-financing partner projects

Outcome: 4.Improved governance and knowledge management for CCA in the water sector at the local and national levels

Co-financing for Outcome 4*:

Government of the Solomon Islands:	$	250,000
MDPAC (EU EDF10 Sector Support)	$	850,000
MDPAC (AusAID Sector Support)	$	400,000
UNDP (PGSP)		250,000
Total Co-financing:	$	1,750,000
LDCF Project Grant Requested:	**$**	**750,213**
Total for Outcome 4:	$	2,500,213

** Government: National Government multiyear development budget for Water Resources Sector*
EU EDF10 Sector Support: Improving Governance and Access to WASH for Rural People
AusAID Sector Support: Solomon Islands Access to Clean Water &Sanitation Initiative (SIACWSI)

Baseline (Without LDCF):

214. There is a lack of understanding, awareness and information regarding the likely impacts of climate change on different sectors, and where there is information it is not well understood how this will manifest. The quality and supply of water resources in the Solomon Islands is increasingly becoming threatened by development activities such as logging, agriculture and land clearance for subsistence agriculture (which may require irrigation at certain times of the year). Some Provinces find clean surface water, but others suffer from saline intrusion, land use practices that pollute freshwater, inappropriate sitting of tanks and sanitation, and lack of operation and maintenance on freshwater systems, such as rainwater tanks but also more technical solutions. Certainly, Makira, Malaita, and Temotu provinces, as discovered during the PPG phase real and concerning water challenges, often running out of water and having to live off coconuts. Yet assessments of water resources and availability are mainly lacking, and have been driven by other economic needs, such as the development of hydropower, or flood warning.

215. Advocacy material on climate change and the impacts on the Solomon Islands is limited at the national level. There is very little sharing of existing information and knowledge beyond those directly involved in collecting information as either development projects or development partner supported interventions through Government agencies. At the Provincial level, anecdotal information exists, but codification and capturing of this knowledge is infrequent. During the PPG Phase it became clear that one of the proposed pilot sites was already experiencing the impacts of climate change through sea level rise and shoreline erosion, compounded by poor land use approaches due to a lack of information and capacity to build resilience. (This site will no longer be included in the project as 90% of the population has relocated.) There is a high possibility

216. The stakeholder analysis also indicates the sporadic nature of climate change interventions, through development partner projects, NGO activities, disaster response approaches and government activities. An attempt to coordinate climate change interventions at the Provincial level is the Choiseul (Province) Integrated Climate Change Programme (CHICHAP). This Programme aims to encourage development partners and national agencies to coordinate and collaborate programmatically across Choiseul the Province to improve efficiency and effectiveness. The programme will focus on food security, although some water interventions are proposed.

217. The new Rural Water Supply and Sanitation Policy (draft, July 2013)[33] defines the development, coordination, management, monitoring, evaluation and implementation of sustainable rural water supply, sanitation and hygiene development activities in the Solomon Islands. This policy changes the institutional architecture designed to respond to water supply and sanitation challenges. It defines new criteria for project interventions, and defines the focus on basic, low-tech solutions – appropriately designed to the local situation and capacities. Where necessary, higher technical interventions should only be provided where the recipients are made aware of, and are able to cover the financial costs of operating and maintaining more complex solutions, noting that this also requires improved technical capacities. The policy provides guidance on appropriate rural water supply approaches, and also for sanitation. This guidance will be used to define some of the activities that SIWSAP will invest in, yet it remains to be seen how the rapid change to the sector will manifest in delivering existing services, let alone take into account climate change complexities, and learn from interventions at the same time. The AusAID Transition Plan raises these

[33]The Solomon Islands Rural Water supply, Sanitation, and Hygiene (Rural WASH) Policy, July 2013.DRAFT, v.11.

issues as key risks to future water sector delivery during the period where institutional change is required, at the same as maintaining delivery of existing, and rapid expansion of water sector interventions.

218. Resilience in practice requires capacity development that allows people to cope with vulnerability and shocks, but which also allows them to move beyond just 'coping'. Adaptation provides the opportunity to support a range of approaches to reduce the impacts of climate change on poverty, health and livelihoods. To build resilience, adaptation to climate change should go beyond planning. Adaptation based on discrete actions that are prioritized, for example on water resources and infrastructure for water supply and sanitation services may miss the often critical need to sustain the institutions and ecosystems which protect and provide water. Focusing on community level water supply infrastructure, without linking this back to water source protection and monitoring may jeopardize the infrastructure investment, and the capacity of the source for future use, especially under a changing climate with longer dry periods, for example. As most impacts of climate change occur primarily through water – in terms of drought, floods, storms, melting glaciers and sea-level rise – water management and water governance provide key entry points for building resilience to climate change[34].

219. Equally, donor driven programmes need to better align with national programmes across 'sectors' on water (both resources and watsan), adaptation, disaster risk reduction, and wider governance activities. Integration at the national level or at individual Provincial level only immediately provides boundaries around project activities and interventions, and therefore often limits learning at the wider multi-Provincial or national scale. Leveraging experience into, from, and within Provinces is required to help address the capacity and resource gaps which are clear, and which manifest themselves in, for example, the national water supply and sanitation statistics.

Adaptation Alternative:

220. New rapid policy developed in the water and sanitation sector is welcome. However, although note is made of climate change it is still a difficult concept to channel into programmes and institutions that have clear mandates on water supply provision for example. The ability to see around the bend - to better understand the possible impacts of climate change is important for future planning and economic growth. The project will develop guidelines, and scientific outputs to help provide government and partners with the evidence base to inform changing practices, including better recognition of climate change impacts at the policy level. Expanding and improving the climate monitoring network and investing in a national diploma in water and adaptation at the national university will build local skills and understanding of climate change.

221. Interventions are expected to significantly improve the water provision situation, and develop and protect strategic water reserves, and will also initiate a process for community identification of disaster risk and costed response plans. A sanitation and adaptation partnership with Tuvalu, a regional leader in eco-sanitation will catalyze action desperately needed in reversing the sanitation trend of increasing numbers of unserved rural people. Tuvalu also lives with sea level rise, salinized shallow groundwater, and the threat of 'king tides'. Large amounts of donor support to Tuvalu over the years, and their recent drought experiences will bring much needed perspectives and knowledge to the Solomon Islands under a collaborative partnership.

222. Mobilising innovative communication approaches, building on national cultural beliefs and networks will help to push the climate change impacts and water resource protection and management message wider than conventional approaches. The use of theatre, radio, television, participatory video and video diaries (focusing on women), rural training centres will provide a catalogue of communication products, tailored for different groups, designed to gather information and share experience on adaptation - mobilizing discussions from the national institutional level to the Provinces and communities, and vice-versa.

223. The project will contribute and learn from national interventions, and those at the Provincial level such as the CHICHAP programme, to gather lessons on governance for climate change adaptation across sectors, and from this look at improving the IWRM approach and mainstreaming of IWRM policy principles across sectors, using project learning to influence sectoral policy development and programme implementation. IWRM is a multi-sector approach, and therefore a valuable entry point to raise awareness concerning the climate change impacts on water resources, and the impacts therefore on food security, health services, industrial needs and natural resource management.

[34]Smith, D.M., and S. Barchiesi. 2009. Environment as infrastructure – resilience to climate change impacts on water through investments in nature. Perspectives Paper prepared for the 5th World Water Forum, Istanbul, Turkey.

224. The project will therefore explicitly add value to ongoing interventions that do not have the capacity to absorb climate change perspectives, for example the transition the rural WASH sector is going through needs greater adaptive capacity support to identify innovative approaches, improve more flexible and forward thinking decision making for water and sanitation solutions, and to ensure lessons are learned to dramatically improve the current water governance approaches and improve resilience.

Output 4.1.*Overarching policy and legislation for the water sector that integrates CCA components in IWRM plans drafted and advocated, including guidelines for climate resilient water supply development in vulnerable areas*

225. With the advent of the new National Water Resources and Sanitation Policy for the Solomon Islands a policy window is open for SIWSAP to make significant impact to ensure that climate change is integrated within national and local level water sector policies. With Cabinet commitment to improve water resource and sanitation management through the endorsement of the policy, and the development of a National Water and Sanitation Sector Plan, there is a clear opportunity to influence the mobilization of the policy through using the current plan as the entry point. The policy states that climate extremes, disasters and climate change are a challenge to safe water supply and sanitation expansion in the Solomon Islands, and that it also poses a threat to the ecosystems people rely on to capture, store, clean and convey water. The policy classes climate extremes, disasters and climate change as a high priority policy area which will challenge the mobilization of the sector plan. According to the National Development Strategy, adaptation, and halting ecosystem deterioration are high priority concerns, and restoration of these systems is required to integrate national environmental issues and climate change and vulnerability across all sectors. National Communications to UNFCCC highlight conservation of water systems and identification of alternative ground and surface water sources as adaptation actions.

226. In parallel to the development of the Provincial Water Adaptation Plans, the PMU will collect the current vulnerability mapping, information data, and climate change impacts knowledge (data, reports, project understanding) from partners and agencies. There is a wide range of information available, but in different formats and granularities – some of it funded through development partners and budget/sector support, some of it through project and programmatic funding, and some of it directly with NGO's with no or little overlap with Government. Although the Climate Change Working Group is designed to coordinate the climate change activities at the national level, many of the impacts, learning, and anecdotal evidence occurs at the Provincial level.

227. A knowledge 'clearing house' will be developed with MECDM, NDMO, and MMERE-WRD to better understand the current and predicted climate change impacts on the water resources of the Solomon Islands. A key output under this Outcome will be a scientific published study that, as accurately as possible, predicts the climate change impacts on the water resources of the Solomon Islands. The study will also, moving beyond business-as-usual, make predictions of climate change impacts on water supplies for domestic households in towns, and rural water supply provision. The project will source regional expertise[35] to assist with the study, and will inform the implementation of the National Development Strategy through providing information to all sectors.

228. Through the development of collective information on the most vulnerable areas to climate change (which will need to be extracted from those areas vulnerable to disasters alone), and in line with requests in the NAPA, guidelines for climate resilient water supply and sanitation development in vulnerable areas will be developed. Lessons learned from the pilot sites will inform the development of the guidelines, and they will be trialed at the replication sites to ensure they work in practice. The resilience framework will be used to guide the development of the guidance around diversity of options, capital (including human) and innovation required, self-organization and learning – to mobilize the rural WASH policy, and to support the transition of the MHMS-RWSS Unit from a 'construction and implementing' and into an agency focused on monitoring, capacity development and support. The guidelines should not be a large cumbersome academic document, but a series of smaller briefing documents prepared with the target audience and users of the guidance in mind, and which refer to the national guidance, standards, and other information under development by MHMS-RWSS. The guidelines will also specifically take into account the need to modify building codes to improve the ability to capture and store clean water, and sanitation requirements.

[35]Including SPC (SOPAC), SPREP, AusAID, and USAID, who are collaborating with NOAA in extending their climate services program, the Pacific Climate Information System.

229. To leverage adaptation thinking into overarching water management approaches, and more integrated water management approaches using IWRM principles the following scaling-up approach will be implemented by the project:

Discourse: A national level **Water and Adaptation Forum** will take place at the beginning of Year 2 of the project (therefore implemented for 3 years). This will involve all relevant agencies, the communities and townships involved in the pilot projects, current replication sites identified, relevant Provincial agencies and stakeholders, including private sector suppliers, and National government agencies. External support and participants will also be invited where identified. Brief Terms of Reference for this Forum are provided in Annex 7.

Consensus Building: One of the aims of the National Forum, and a key output from the Forum will be the development of guiding adaptation principles, agreed between different sectors, based on learning from the UNDP-GEF PACC project, and the vulnerability assessments from the pilot sites. The aim is to use the Forum to help raise awareness to adaptation needs and vulnerability concerns, and to promote the mobilisation of the National Climate Change Policy across multiple sectors. Working closely with the Climate Change Working Group (CCWG) the Forum will galvanise support for SIWSAP and wider adaptation approaches. The project will demonstrate its initial vulnerability findings at the Forum.

Policy Framing: With the development of a new Rural Water Supply and Sanitation Policy and a new Water Sector and Sanitation Plan, there is an official opportunity to review these policies, together with the National Climate Change Policy (2012-2017), and Provincial Plans to ensure that there is alignment in approaches and recommendations, and that learning is included in the cycle of policy formulation, implementation, and review. SIWSAP will end during 2018, so the lessons from the project on vulnerability and response action are vital to feed into any future National Climate Change Policy update[36]

Joint Action: Designed to meet water and climate change policy goals, SIWSAP will develop a series of guidelines targeted at improving the resilience of rural water supply and sanitation interventions (working with MHMS-EHD), wider water management interventions such as flood protection, watershed management and water source protection including groundwater (working with MMERE-WRD), and other relevant agencies to provide recommendations for building codes, town planning, community and village level information (on rainwater harvesting experience for example).

230. The national level Water and Adaptation Forum will also provide the opportunity for training – and to train trainers to roll out learning gained from across projects presented at the Forum. At the end of the project, the final Forum funded by SIWSAP, a participatory evaluation of the Forum for the previous years will decide on the usefulness of the event, and make a decision about holding further events in the future funded through the national budget. In preparation for the final Forum a climate expenditure review and assessment will also be presented to indicate progress at influencing sectors and in sourcing funds to mobilize the NAPA, and to identify where there are still gaps and what further actions are required.

Output 4.2.*Institutional and community capacities strengthened toward water-sector CCA formulation, implementation and monitoring at the national and local levels*

231. Regional technical capacity will be sourced to assist the Water Resources Division of MMERE to establish **further hydrological monitoring sites** in Makira, Choiseul, and Guadalcanal, and to assist with maintenance of existing sites in Malaita and Isabel. Hydrological monitoring will be expanded to include relevant climatic/meteorological parameters to widen the network of sites used by the Meteorology Division[37]. Specific skills will be sourced for this, and to assess the current number and range of sites, and

[36]The current Climate Change Policy timeline runs to 2017. The Policy itself is broad and all-encompassing and is therefore incredibly ambitious for a country the size of the Solomon Islands, given logistical challenges and the absence of data and information for decision making.

[37]The increasing variability associated with climate change as well as extreme weather events require increased **meteorological** capacity to monitor and predict such events. Accurate predictions are needed to provide reliable early warning of impending natural disasters. The present lack of meteorological equipment, coverage of stations, communications equipment and early warning systems and expertise limits the forecasting capacity for disaster management as well as warnings for maritime and air transport. Solomon Islands: National Development Strategy 2011-2020.

type of equipment used by the Solomon Islands Government. CROP agencies and others in the region such as NIWA in New Zealand will be contacted. Sites will be chosen, equipment selected and procured. Installation of equipment will be undertaken with concurrent training and capacity development in installation, operation and maintenance, data collection, interpretation and assimilation.

232. **Sanitation and Adaptation Partnership** established with Pacific Island Countries participating in IWRM including. For example, the Pacific IWRM demonstration project in Tuvalu focuses on sanitation technologies and practices; how they can provide not only a sanitation service, but also protect primary and secondary sources of freshwater from contamination, and are the most appropriate form of sanitation approach on atolls and other islands with limited and unpredictable water supplies (mainly relying on rainfall). Tuvalu has adopted innovative approaches to garner interest, and now support for composting toilets and their use is increasing. It is critical that the Solomon Islands start to address the serious sanitation shortfall, particularly in some specific locations such as the atoll Province of Temotu and other sandy coastal areas. The work in Tuvalu has generated a lot of interest with Tonga constructing demonstration toilets, and Nauru installing composting toilets in schools. Most recently the Tuvalu IWRM team was in the Marshall Islands to trial how effective composting toilets are at reducing septic leakage into Majuro's main groundwater source, the Laura Lens. With increased climate variability and the possibility of more intense droughts there is an urgent need to protect existing freshwater reserves.

233. Using composting toilets will, however, require significant behaviour change – one of the ambitions of the new rural WASH policy (June, 2013). Many Pacific Island countries such as Tuvalu have experience of doing this, with a strong focus on community and engagement, the inclusion of schools, a 'roadshow' and targeted media campaigns good progress has been made[38]. SIWSAP will mobilise this experience for the Solomon Islands to learn from, adapt as appropriate for Melanesia, and apply over the four years of the project. The partnership will be structured around three areas:

1. ***Exchange and Learning*** – Pacific IWRM staff selected from the participating Pacific island Country (most likely in Tuvalu) will be supported by SIWSAP for two exchange visits to the Solomon Islands to share sanitation and adaptation experiences. This will include missions to the pilot site in Temotu Province (Tuwo), and other relevant sites in Temotu. The focus of the first visit will be an assessment of the situation to allow the PMU to develop a better baseline understanding of the behaviour change needs, and to identify with communities and Provincial and National stakeholders the most appropriate solutions and activities. Bringing Tuvalu experience to the Solomon Islands will also aid the PMU in developing a broader National Sanitation Campaign in collaboration with national partners (such as UNICEF, MHMS-EHD, etc).
2. ***Active Demonstration with Partners*** – Through the Kastom Gaden Association (KGA) the Solomon Islands does have experience of using composting toilets, including appropriate designs and construction. There are two composting toilets just outside of Honiara in the KGA nursery which have been in consistent use for over 10 years[39]. Working with KGA, the Tuvalu sanitation experts, and other relevant partners, the PMU will not only design and mobilise a national campaign, but also establish demonstration sites at schools for composting toilets in the most appropriate locations. There are two main challenges to overcome: (i) using a toilet instead of open defecation in the mangroves or beach; and the (ii) choice of composting toilets as the technology. As part of the national campaign, active demonstration and explanation with communities is vital to start the process of triggering change in behaviour. The successes of Tuvalu need to be leveraged into the Solomon Islands.
3. ***Monitoring and Scaling-up*** – the National Sanitation Campaign will provide the opportunity for dialogue and exchange with individuals, communities and their leaders, and government. The PMU will work with local partners to use these consultations to collect as much information as possible regarding sanitation usage. There is still little information on the use of sanitation and what demands there are for it – or how to most appropriately create the demand for it. In line with the rural WASH policy, SIWSAP will work with the Rural Water Supply and Sanitation Unit in the MHMS, and the

[38]The film "*Falevatia: A toilet for our future*" shows how composting toilets can help conserve water and minimise threats to the environment, food security and human health in Tuvalu. Tuvalu recently experienced a devastating drought, which resulted in a national emergency and millions of dollars spent on an international relief effort to get water to the small isolated country. The current flush and septic systems used in the atolls are ill suited to Tuvalu's geography and scarce water supplies – often using up to a third of a family's fresh water supply. Furthermore, septic systems are often poorly constructed and much of the waste seeps out polluting fresh shallow groundwater.

[39]These were constructed by the current World Bank Rural Development Program engineer.

Provincial Environmental Health Divisions (PEHD) to mobilise the rural WASH policy using participatory and innovative approaches – which may require tailoring[40], including using the consultations as a way to collect information for monitoring purposes. This approach will be designed with the RWSS-MHMS to ensure that it supports and informs the rural WASH policy, and supports the development and implementation of the new Strategic Plan for the rural WASH sector 2014-2018.

234. **Peer-to-Peer Learning Network** – a network will be developed that links the PPG identified pilot sites, and the replication sites together across Provinces. Sites at the Provincial level will be 'twinned' in an approach designed to allow communities to work closer together. Resources will be made available through the project and with the Provincial Officers guiding this process, to allow sharing of experience and local skill building directly between sites per Province. They will provide valuable practical experience to inform Provincial authorities. Across the Provinces, communities involved in the project (together with Provincial Authorities) will also be twinned, depending on their activities, to enable them to learn from each other in developing their Water Vulnerability Assessment Plans, and in addressing those vulnerabilities through the Adaptation Response plans and pilot site investments. SIWSAP will actively support this national learning and exchange opportunity – demonstration sites are only valid if they can be learned from, and provide learning to others.

235. **Development of a National Diploma Course/Program**. Building on previous approaches at both the national level (SEMRICC) and at the regional level (Pacific IWRM, PACC) the project will develop partnerships with different national and regional organisations to support capacity development. At the national level, the project will develop a partnership with the Solomon Islands National University (SINU) to develop a national diploma on 'Water and Adaptation'. This is designed to 'formalise' the capacity development process and encourage future government staff and others looking at options in NGOs and the private sector to better understand adaptation and the impact of climate change on water resources. At the regional level, collaboration will be made with the Regional Pacific IWRM Project Coordination Unit based in SPC/SOPAC in Suva, Fiji and the PACC PMU based in Apia, Samoa. The Pacific IWRM project has over the years delivered a variety of training and capacity development courses including courses on hydrology and IWRM in partnership with the Australian based International Water Centre[41]. The opportunity for SIWSAP is to look at building a higher level course beyond the diploma level with the involvement of SINU, International Water Centre staff, and regional experience in SPC/SOPAC[42] and SPREP; a nationally developed and consistent course that can train future professionals.

Output 4.3.*Multi-media knowledge products on CC, CCA, IWRM, lessons learned and best practices developed and disseminated extensively to communities, schools and the general population and through ALM*

236. A critical element of adaptation is communication – of the baseline (and what this actually is, and is based upon), the identified vulnerabilities and impacts, and the solutions to implement. Consultations during the PPG highlighted the surprising afterthought of climate change, despite work under the UNDP PACC project, and the development of the national Climate Change policy. There is clearly a need to better articulate climate change, adaptation, and wider water management challenges across the country. Building on the use of partnerships and learning networks the following activities will be implemented:

1. **Participatory video and video diaries**. The PMU will use, and will provide participatory video services at the identified pilot sites, replication sites, and as part of the national Sanitation Campaign. Participatory video 'kits' will be procured by the project and training will take place with the PMU and partners, including the Provincial Officers for application at the pilot sites. Videos will professionally edited and prepared into knowledge products for sharing nationally and regionally. Professional services will be contracted in as needed to support this process, building on learning from other projects in the region that have used similar approaches. Video diaries will be developed with key

[40]The rural WASH policy specifically states use of the Community Led total Sanitation (CLTS) and Participatory Hygiene and Sanitation Transformation (PHAST) methodologies. It is not clear how well these methods will work in practice in the Solomon Islands. Off-the-shelf transferred approaches often do not work so well in application in the Pacific.

[41]http://www.watercentre.org/

[42]For example, SOPAC developed a Hydrological Training Programme for Small Islands Countries in the Pacific 2004-2006 with NIWA and supported by NZAID. See SOPAC Training Report #126.

Champions identified throughout project implementation – the focus of these videos will be on behaviour change, for example, changing the way groundwater is used or pumped, changing approaches and attitudes to rainwater and hygiene, changing sanitation practices and beliefs.

2. **Theatre and Stories.** Pacific culture in general is very much oral/aural; related to stories and the passing on of knowledge and experience through discussion and learning-by-doing. Many elderly people in villages are valuable sources of information in understanding historical trends in weather patterns, tree growth, coastal erosion, dry periods, storms and cyclones etc. This has been used to good effect in Kiribati where knowledge in villages has helped to confirm changes in lagoon shape, shifting sand dunes, etc. Building on this history of storytelling and dialogue, Melanesian theatre groups are well renowned for their approach and the project will commission theatre groups to support the communication needs of SIWSAP. Local, and regional Melanesian groups[43] will work together to develop a programme that is aimed at schools, rural training centres (RTC's), Churches (and their networks) and communities on climate change, adaptation, water resource protection and pollution, and sanitation.
3. **Communication Sharing.** All materials will be made available nationally and regionally. National materials will be focused on the oral/aural – using video and radio, although these will be appropriately documented. Other considerations include the development of the project 'brand', and the development of a project logo. These activities will be discussed during the inception phase of the project. Knowledge products will be shared with national and regional adaptation networks such as the Asia-Pacific Adaptation Learning Network and the Adaptation Learning Mechanism (ALM). Communications is key to this project. The Mid-Term Evaluation of the PACC project[44] highlighted the importance of communications for capacity development and the critical area of sharing experiences and knowledge to learn and shape behaviors change approaches together with communities. This is critical for SIWSAP to have success on-the-ground at pilot and replication sites, and in influencing the wider Province to National level. The PMU must focus on communications as a core and often overlooked element of project implementation.

Table 7: Summary of Main Activities for Outcome 4

Output 4.1. *Overarching policy and legislation for the water sector that integrates CCA components in IWRM plans drafted and advocated, including guidelines for climate resilient water supply development in vulnerable areas*	
4.1.1	Development of a Climate Change Knowledge Clearing House with partners
4.1.2	Develop scientific and/or policy paper codifying knowledge developed through SIWSAP on climate change impacts on the water resources of the Solomon Islands
4.1.3	Development of guidelines and toolkits that can reach various stakeholders (including vulnerable groups including women and children)for climate resilient water supply and sanitation development in vulnerable areas of the Solomon Islands
4.1.4	With Partners, design and host annual National Water and Adaptation Forums
4.1.5	Dissemination and awareness raising of national level policies (i.e. the new Rural Water Resources and Sanitation Policy) at the provincial and community levels
Output 4.2. *Institutional and community capacities strengthened toward water-sector CCA formulation, implementation and monitoring at the national and local levels*	
4.2.1	Improvements in current, and expansion of national hydrological monitoring sites to include climatic/meteorological parameters
4.2.2	Development of the Sanitation and Adaptation Partnership with Tuvalu, including exchange visits, assessments, active demonstrations with partners
4.2.3	Design and implementation of a National Sanitation Campaign, including demonstrations and consultations
4.2.4	Peer-to-Peer Learning Network established, including site exchange visits within and between

[43]For example, Won Smolbag based in Port Vila, Vanuatu are a highly experienced Melanesian theatre group who also have experience with radio stories and shows. They also have Solomon Island performers and can conduct shows in English and Pidgin.
[44]PACC Solomon Islands MTE Report 23.Oct.2012 draft

Provinces

4.2.5 Development of a national diploma on Water and Adaptation with the Solomon Islands National University, including higher course development

4.2.6 Community and provincial level training of climate adaptive water management infrastructure maintenance and sustainability (in conjunction with Output 2.1 and 3.1)

Output 4.3.*Multi-media knowledge products on CC, CCA, IWRM, lessons learned and best practices developed and disseminated extensively to communities, schools and the general population and through ALM*

1.3.1 Participatory video and video diary 'kits' and training procured and implemented across communities

1.3.2 Commissioning of theatre and radio communication products and roll-out across schools, Churches, rural training centres and communities on climate change impacts, vulnerabilities, impacts on water resources, protection and pollution and sanitation.

1.3.3 Project communication branding development, and open source sharing of all materials

2.5Key Indicators, Risks and Assumptions

237. The project results framework in Section III detail indicators, the baseline, targets, and sources of verification at the Objective and Outcome levels. Project indicators are aligned with the LDCF Adaptation Monitoring and Assessment Tool (AMAT).

238. At the level of *Project Objective* the indicators are:

- At least 6 Water Sector Climate Adaptation Response Plans developed and implemented by national agencies and Provincial Authorities to improve adaptation response.(aligned with AMAT 1.1, 2.1 & 2.3)
- Resilient and safe water supplies to climate change impacts for 50,000 people (10% of national population), and improved sanitation for 25,000 people.(aligned with AMAT 3.1)

239. At the four Outcome levels, the indicators are:

Outcome 1: Water Sector – Climate Change Adaptation Response plans formulated, integrated and mainstreamed in water sector-related and in broader policy and development frameworks (AMAT 1.1, 2.1)

Indicators:

- Vulnerability assessment and Climate Adaptation Response Plans for the Water Sector inform the development of (i) SIG Provincial Plans incorporating water adaptation, (ii) budget allocations, and (iii) institutional capacity development for adaptation

Outcome 2: Increased reliability and improved quality of water supply in targeted areas

Indicators:

- Number of people provided with access to safe water supply and basic sanitation services given existing and projected climate change (AMAT 1.2)
- No. of accurate warnings disseminated resulting appropriate adaptive responses ad community and household levels

Outcome 3: Investments in cost-effective and adaptive water management interventions and technology transfer

Indicators:

- No. of pilot sites adopting cost-effective and adaptive water management technologies based on community driven Water and Adaptation Response Projects at > 20 sites aligned with (AMAT 3.1)
- National Water investments include adaptation interventions to maintain medium to long term sustainability and provide resilience to community water needs and requirements (aligned with AMAT 1.1 & 3.1)

Outcome 4: Improved governance and knowledge management for Climate Change Adaptation in the water sector at the local and national levels

Indicators:

- An annual National Water Forum where key stakeholders generate and exchange knowledge generation, and develop policies that facilitate climate change mainstreaming in the water sector
- Number of awareness materials on climate change risks and vulnerability of water sector, and appropriate adaptation and response measures produced through the SIWSAP project with national partners providing cross-sector adaptation relevant information (aligned with AMAT 2.1 & 2.3)

Risks and Assumptions

240. A Risk Log has been prepared that also describes mitigation actions (Annex 11). The primary risk is constraints in capacity, which is common across Pacific Island Countries. However, further risks to deliver the project include the weather and travel limitations due to cyclones, storms, and rough seas. Many communities are on outer islands of the main Provincial capital island, and travel to them is sometime difficult. Furthermore, as a country that experiences cyclones, volcanic eruptions, earthquakes and tsunamis, extreme natural events have also been considered in the risk log as a possible threat to project implementation.

241. Other risks, although less severe, include limited community ownership and interest. However, during the PPG phase it was clear that there is interest in the project and demand for improved water and sanitation needs, where communities are faced with limited options and already suffer from climate induced problems. This was clear with the proposed site that could not be include in the project as 95% of the population had already relocated from the island due to sea level rise and lack of freshwater. The project will therefore work closely with communities, investing in staff at the Provincial level to work directly with communities and networks at the most appropriate level to support ownership of interventions. The aim is to also work with Provincial Administrations to help them understand the adaptation needs and costs, and over four years work with them to integrated adaptation costs into Provincial budgets.

242. Other risks include weak coordination between agencies and one of the key activities fo the PMU is to improve this coordination function, so that at project end there is a clearer, more dynamic sharing of information between central government in Honiara, Provincial Authorities, different line Ministries, and development partners. Land ownership and rights of access are always difficult in the Pacific. Rather than avoid this, the PMU will specifically work at how land tenure systems can be improved to bring adaptation benefits for all, including land owners through the use of water source protection schemes and innovative financing mechanisms.

243. One major assumption is that the country remains peaceful. The risks and assumptions are clearly defined in the Strategic Results Framework.

2.6 Cost Effectiveness

244. As an alternative, moving 'backwards' into single sectoral solutions for water management are no longer valid options. Integrated Water Resources Management has become the global standard approach to water resource management, and increasingly the recognition globally is that this approach itself is in need of upgrading to better introduce the complications between sectors, the 'nexus' where the greatest challenges, often triggered through existing and increasing climate variabilities are exposed. One 'sector' of the water community-of-practice that has suffered from a singular approach has been the water supply and sanitation community. Driven by MDG targets and other concerns, quite rightly, the WASH sector has focused on service delivery. Despite this, sustainability of WASH interventions is often poor, ranging from between 30-70% globally after 3 to 5 yrs. Engineering and 'relief' agency thinking has dominated the need to provide a service, but has not paid adequate attention to the community and social side of WASH – gender, capacity development, operation and maintenance training, community responsibility, establishing funds for maintenance and expansion, protecting surface and groundwater sources, conserving watersheds, etc.

245. The reality, starkly explained in the Solomon Island Government rural WASH policy (draft, June 2013) explains that inadequate attention has been paid to the softer side of provide rural WASH services – and that the capacity development and monitoring needed to deliver these services needs to come from external service providers – changing the way Government works on these issues. Consequently, this approach,

this admittance of the need to change, and the development of a policy to change the process, after a period of change and 'bedding in' the new role, will allow the government to become much more cost effective at delivering rural WASH services. This project is designed to aid that process, and to build capacity to reduce historically failed WASH and water resource management investments.

246. The project is based on a resilience framework to structure the interventions, and for self-monitoring purposes by the Project Management Unit to ensure that project interventions contribute to building resilience, using the Water Sector Climate Adaptation Reponses plans are entry points into pilots sites, replication sites, and wider across Provinces. Cost effectiveness is a key element of water resource management following IWRM principles. IWRM is a cost effective mechanism because of the cross cutting and multi-sectoral issues, reducing transaction costs and improving communication and influence. This project is not just dealing with water, but will help understand the water and climate linkages and the impacts of climate and the island ecosystems that capture, store, clean, convey, and provide water. Building capacity in IWRM approaches and the necessary planning and management skills so critical in the delivery of IWRM will not only improve the collaboration between sectors (and therefore GEF Focal Areas: Biodiversity, Climate Change, IW) leading to global environmental benefits, through for example prevention of land degradation, protection of international waters, and adapting to climate change, but it will also increase the efficiency and effectiveness of GEF support to PICs as a nationally implemented project, thereby enhancing the cost-effective achievement of both global environmental and national sustainable development goals. For example:

- Focusing at the Provincial level, and investing in the development of Provincial Water Plans is where changes are desperately needed in mobilizing IWRM approaches, improved rural WASH delivery, and a greater understanding of adaptation impacts and responses, including reducing risks from disasters and other climate related threats. Centralized Government responses are not the most cost effective or efficient approaches in moving forward rapid learning, and often come with high transaction costs. This project will improve this process over a four year period using pilot sites to demonstrate change, at the same time using a twin-track strategy to also focus on policy development, mobilization and learning on new policies to build in understanding of how new policies perform in practice, and actually embed staff at the Provincial level.
- More collection and analysis of hydrological and meteorological data and information, including community based information and anecdotal records. This information is needed to help build national understanding of climate and hydrological sciences, and to ensure that this is taken to Provincial level to inform decision making, rather than staying 'held' in central departments in Honiara. Investments in hydrological and climatic data collection and the development of a clearer national picture, through other projects, Government and improved scientific understanding will improve the overall knowledge of the country to climate risks and hazards. Adding to the existing hydro-climatic monitoring network is cost effective in terms of providing better information across sectors using the current network (and not developing parallel processes), and across Government and society to better prepare for climate change, cyclones, and other weather events.
- SIWSAP Provincial Officers will be key communicators between the pilot sites, the Provincial Administration and provincial stakeholders and partners including the water initiatives funded by other donors as co-financing support to this project. The PMU will therefore be cost effectively networked across almost the entire country, saving logistical time and costs, reducing the risk of travel delays due to weather hazards, and placing the Provinces at the heart of the project.

247. By feeding information and lessons learned into appropriate networks, especially by sharing lessons nationally, this project will step outside of conventional and costly project silo approaches and develop a national dialogue on water and climate change. This also has relevance wider across the Pacific, and into other islands such as Caribbean and African SIDS. There is a real cost effective opportunity to widen the scope of the initial investment at pilot sites and support the Solomon Islands in capacity development to increase resources and abilities to continue approaches initiated under this project. Lessons learned will add value to national, regional, inter-regional learning and will help inform the GEF International Waters and Climate Change Adaptation portfolio using endemic and new evidence based national knowledge. This will be shared with the UNDP ALM and the IW:LEARN knowledge platforms.

248. Equally, taking WASH promoters and working with them on wider water resource management issues, especially the need to focus on medium to longer term water and adaptation concerns, using the WSCCAR plans to identify options builds resilience into other programmers, such as supporting the EU funded Building Human Development: Improving WASH in the Solomon Islands project, the EU sector reform

funded Improved governance and access to WASH for rural people programme, CHICHAP, and the ongoing AusAID funded (SIACWSI) programme. As a project, SIWSAP has multiple entry points into other project and programmes using IWRM concerns[45]as a mechanism to raise adaptation awareness and interventions is a cost effective entry point into multiple sectors.

2.7Sustainability

249. Sustainability of the investments made by the LCDF are critical to avoid the common problem of poor operation and maintenance – an all too common problem with investments and projects associated with rural water supply, sanitation and hygiene projects. This is evident in the statistics for rural WASH coverage, and the honest explanation of poor sustainability for the sector explained in the draft rural WASH Policy (June, 2013).

250. In order to ensure sustainability, the project was designed based on extensive consultation with partners and co-financing organizations and other project stakeholders. Extensive visits were made during the PPG Phase to identify sites, develop initial vulnerability and adaptation assessments, and to review the water supply, sanitation, and wider water resource issues at each of the six sites. A key element of this was to understand the concerns of the communities visited, at times the difficulties in getting to the sites, and to better understands the fragility of water supply at some of the locations.

251. General information and studies across the country and wider region confirm that predicted climate changes and general impacts can be derived – yet visiting a variety of sites makes it clear that the majority of this information and understanding is not 'translated' into local island realities. This is not about down scaling the GCM's into reports at Provincial level, but taking the overall predicted range of climate change impacts and grounding them in the reality of communities and those who are or will be further affected by impacts on their water resources. The PPG highlighted concerning trends in water shortages, polluted freshwater, failed project interventions, a lack of governance in the sector, and a lack of capacity and resources.

252. **Institutional sustainability.** Capacity development of communities, Provincial Administrations and RWWS/PEHD officers in the regions, will ensure that every opportunity is provided to train, learn, and share from project activities. Constant support, offered by the PMU to the national level agencies, MMERE, MECDM, NDMO, MHMS-RWSS who work on the complete range of issues that SIWSAP has to deal with, will allow for dialogue and exchange between agencies and the sharing of information on climate change and adaptation issues. At present the project mentality tends to divide and split this information across many organizations. IWRM provides a collaborative framework to share information across many sectors. Using the project to test the new policies on rural WASH and water and sanitation allow for learning from SIWSAP, and the co-financing partner projects, to feed rapidly back into policy review processes, to allow for changes to be taken into account, and for the project to support national decision making in doing this.

253. The development of Provincial Adaptation Plans essentially grounds the NAPA at the Provincial level. This is critical to mobilize adaptation support at the Provincial level where many climate change impacts and ongoing vulnerabilities exist. This will establish clearer communications and sharing of adaptation needs across and between Provinces, and to the national level through the establishment of National Water and Adaptation Forum. This Forum will be the annual learning point for adaptation across Government, and will catalyze action to mobilize annual learning into activities on-the-ground. It will strengthen understanding in the nascent Climate Change Working Group (CCWG) at the national level, and will focus on fostering far greater linkages between the CCWG, the National Disaster Management Council, and the newly established National IWRM Coordinating Committee. This learning network will become the new institutional model for sharing information on water and climate change, cemented in the annual National Water and Adaptation Forum – the first of its kind across the region.

254. **Financial sustainability.** This is a core element of the design of the project. Through applying interventions as demonstrations of behaviour change rather than one-off interventions and with a strong element of capacity development, support, confidence building approaches. The objective is for project interventions, and learning during the project will demonstrate and affect changes in behaviours long term. Furthermore the development of the WSCARR plans – actually demonstrate the range of issues to be considered with water and sanitation management, and provide a better understanding to discuss with other

[45]'*Concerns'* meaning the impact of climate change on water resources, and the knock-on effects on this on human health, sustaining livelihoods, food security, national development.

development partners and across central Government to adjust future investments and practices, and leverage additional resources to ensure adequate water adaptation interventions in the future.

255. **Environmental sustainability.** Water resources are provided as a key ecosystems service, and provide other ecosystem services 'downstream'. Managing water resources is an often delicate combination of developing and exploiting a resource within defined limits of sustainability, to maximise the benefits of the water. In small island environments, these water resources can be very fragile, either as shallow groundwater, or surface water flows. The small scale of islands and the closer interactions of island ecosystems often mean that bad practices can manifest quickly as impacts when compared to larger continental ecosystems. The causal links are often very rapid – for example, sewage and other toxic waste and the impact this can have on near-shore waters and coral reefs. SIWSAP is designed to manage these risks, and to build sustainability into water sector developments, and sanitation. Adaptation requires interventions that not only 'add value' to the process through taking into account the potential climate change impacts, but which also have to prepare for the future, building sustainable approaches into interventions. With the continued demand for water resources, and high population growth rates in the Solomon Islands, existing fragile water resources are likely to come under increasing pressure from climate impacts, pollution and over-use. The Pilot projects are designed to hold national 'appeal' – sites that many Solomon Islanders can recognise as places where they grew up, or where family still lives. Keeping the sites relevant to people will help to foster the behavior change needed to build better water management practices in the future.

2.8Replicability

256. Ensuring the replicability of project resources is a key design consideration of the SIWSAP project. The project is designed to collect information at both the National and Provincial levels to aid the design, investment and implementation of future adaptation related projects. Systematic reporting, collection of information, the National Water and Adaptation Forum and other project events are designed to share experiences and provide a platform for replication of the approach and re-design of interventions in a continual learning process. The process of assisting existing and programmed projects working on rural WASH and other water interventions through adaptation interventions immediately takes the project to scale through replication.

257. In Outcome 1, the process of developing provincial and community Water Sector Climate Change Adaptation Response (WS-CCAR) Plans will be replicated in further sites where the provincial and community members leading the planning process in the pilot sites will in turn train and facilitate the planning process in the replication sites. In Outcome 2, similar replication approach is applied to the Water Resource EWS development, which will be replicated in selected sites through the development of training materials and know-how through the EWS establishment process in the pilot sites.

258. The project contains a strong learning structure, as a core component of the resilience framework the project is structured around. Equally, reviewing the regional UNDP-GEF Pacific IWRM 'lesson learning' and other Pacific IWRM project Steering Committee documents[46], (which is a project that already builds on many regional lessons learned over the last ten years as part of its project design), stakeholder engagement and technical support stand out as key areas requiring constant support across national demonstration project management units Pacific wide. Despite this, the lessons learned stories from the regional IWRM project indicate great success when focusing and engaging with stakeholders, but that project management remains a constant challenge. This project will build capacity throughout the project with the addition of a series of Provincial Officers – embedded at the Provincial scale to work with the government and communities, NGOs and networks, to support project interventions, and to support MHMS-RWSS in looking at adaptation options when developing new sites.

259. Another key lesson is also the validity of establishing a learning and capacity development programme formally. SIWSAP will aim to do this with the Solomon Islands National University (SINU) and look at a national level Diploma, and at international academic support to take this further. This key confidence building element, locally available to people (SINU is based in Honiara) will help build national capacity.

260. Project outcomes are designed to build incremental learning and capacity, from demonstration and replication to strategic investments, based on initial project learning, and assessment of gaps in knowledge and understanding by the PMU. This learning will be taken to planning and policy levels at the Provincial to

[46]SOPAC/GEF/IWRM/RSC.5/7, October, 2013.

National level, feeding in vital lessons from Provincial on-the-ground demonstration, directly opposite to nationally determined and rolled out project approaches.

261. Furthermore, networks and platforms will utilized and established for both tacit and codified knowledge generated through the SIWSAP project is captured and shared. For example, the project website will be the central knowledge hub for information sharing, which will also be linked to the Adaptation Learning Mechanism (ALM) which is a global web platform for information exchange for professionals working on climate change adaptation. Through consistent and real-time output of knowledge and information from the Project on the web, information and lessons learned from the Project can be consumed and utilized to support similar efforts not only in the country but also around the world.

262. Replication of project interventions will also be through policy reform. The new rural WASH policy is clear in its mandate, and equally, the national water and sanitation sector plan will provide the conduit for SIWSAP to enter into discussions concerning adaptation considerations with multiple sectors – where before these discussions never occurred.

2.9 Stakeholder Engagement Plan

263. Annex 8 details the stakeholders identified during the PPG phase, including both institutions and projects/programmes that are relevant to the project. A wide range of stakeholders will be involved in the implementation of this project. Specific roles of some are described in Section V, Management Arrangements. AusAID and the EU as the primary financers of rural WASH work through SIACSWI and the EU Sector Reform contract will be regularly involved in supporting and guiding the project through their role in the Project Advisory Group, as well as relevant Government Ministries.

264. Key activities regarding the involvement of stakeholders are different levels will be to guide project advocacy and communications work to ensure it is socially relevant to the culture of the Solomon Islands, and to also develop more innovative approaches than standard, and often not very inspiring communications material. The National Water and Adaptation Forum for example will be developed jointly with stakeholders as the primary annual event, but they will also be consulted for specific advice relevant at the Provincial level, for example for Choiseul Province using the CHICHAP Partners Advisory and Implementation Group. Meetings and discussions with stakeholders during the PPG Phase highlighted the recognition of adaptation concerns and lack of information, but also the lack of direction in terms fo where to go for advice, information, data, and what platforms for discussion existed. Stakeholders will help guide the project to answer these questions.

265. A wide range of stakeholders will be involved in the project, tailored to the specific needs of the four project outcomes. A crucial component of PPG activities was to consult on the detailed design for stakeholder engagement. Key stakeholders to be engaged include a range of government line ministries to implement and support the project implementation, NGOs, project site-specific Provincial Governments and local communities including some of their interest/community groups. In general, stakeholder engagement will build on the PPG Phase, and initially begin at the inception workshop which will be held within the first twelve months of project start. However, recruitment of the PMU positions, specifically the Project Manager will start the stakeholder engagement process, through meetings and initial discussions as the PMU establishes it's own 'network' of contacts across institutions and projects/programmes.

266. The Inception Workshop should address a number of key issues, starting with assisting all development partners to fully understand and take ownership of the project, detail the roles, support services and complementary responsibilities of all delivery/implementation agencies included in the project organization structure, and discuss the roles, functions, and responsibilities within the project's decision-making structures, including reporting and communication lines, and conflict resolution mechanisms. A stakeholder engagement process will also be initiated at the inception workshop. This will go through a process, per project Outcome to identify:

- Who are the key stakeholders (in addition to those already extensively identified)
- What role(s) do they play and what contribution can they make to the project (are they interested in contributing to the project?)
- What capacities are available to assist in supporting the project
- What type of engagement does the project need that they can offer (and if support is needed, what approaches are needed to generate interest in the project)

267. One aim of this process is to identify where current adaptive capacity exists, for example where is the knowledge and information, which stakeholders have key assets the project requires, which institutions have

information and capital (social as well as resource capital), and where innovative approaches require a stronger enabling environment to bring them into application. The Solomon Islands is a small country, therefore key stakeholders are already involved in the project through different roles, including the Project Advisory Group. NGO's will provide a lot of on-the-ground capacity to assist in delivering activities at the pilot site level, and for the strategic investments under Outcome 3. Specifically,

268. Outcome 1: Pilot Project Committees – representing communities at the Pilot sites, Provincial Government and other projects and NGO's working in the area will be involved in reviewing pilot site activities and supporting implementation. The Provincial Government, through its different agencies ('Works', and the Provincial Environmental Health officers for example) will support the implementation of Outcome 1. MMERE – WRD, MHMS-RWSS, and MECDM will all be involved in supporting the development of the WSCCAR Plans.

269. Outcome 2: where sites can be supported by MHMS-RWSS and the UNICEF Team working on the Building Human Development project focusing on WASH at different sites across Choiseul, Isabel, Renbel, Makira and Temotu, as well as the NGO service providers including World Vision, LLEE, SIDT, ADRA; amongst others. Annex 8 provides further details on different stakeholders able to support on-the-ground rural WASH activities. Including them in the project is key to working with the communities-of-practice that SIWSAP is aiming to change standard WASH practices with. NDMO and the Red Cross will also be important to advise and support the development of community based early warning approaches, and for the support to the project in building capacity on disaster risk reduction.

270. Outcome 3, in addition to national stakeholders who will support the development of the competitive process, and those who will support the delivery of interventions, will require regional stakeholder involvement with CROP Agencies able to support capacity development activities, and NDMO with MMERE-WRD to assist in the procurement of state-of the art equipment for disaster response in the future. Development partners with volunteer schemes (such as AusAID) will also be expected to engage in this Outcome to assist in securing volunteer support to the project.

271. Outcome 4 will require stakeholders previously identified to share climate change related information from project and programmes, including development partners, MMERE-WRD specifically, with consultant/CROP Agency support to select, procure and install hydro-meteorological equipment. Under this Outcome, regional stakeholders will be include in the project from Tuvalu under the proposed Sanitation and Adaptation Partnership. Church Groups and networks, rural training centres, communications experts, and the National University will all be involved in supporting the delivery of Outcome4. The below table illustrates the various roles of key stakeholders that will be engaged in the SIWASP implementation process.

Table 8: Stakeholder Involvement During PPG and Expected Full Implementation Role

Stakeholder	Involvement During PPG and Expected Full Implementation Role
Water Resources Division of the Ministry of Mines, Energy and Rural Electrification	• Main SIWSAP Executing Agency for the entire project • Part of the PPG Team for pilot missions • In-kind and co-finance support to the project through budget • Coordinate policy and legislation development • Hydrological monitoring and water resource assessments • Water quality monitoring • Coordinate access and partnership arrangements with customary landowners • Take lead in seeking public-private partnerships • Support to community engagement and development of project best practice materials
Rural Water Supply and Sanitation Programme of the Ministry of Health and Medical Services	• Secondary SIWSAP Executing Agency • Coordinate and implement rural water supply projects • In-kind support to the project working with PMU on pilot site and investment designs and interventions • Development of standards and guidelines for RWSS projects • Implementation agency for Outcomes 2 and 3, working closely with MMERE-WRD and Provincial Authorities • Support to community engagement and development of project best practice materials
Climate Change Division – Ministry of Environment, Climate Change, Disaster Management and Meteorology	• Assist with mainstreaming of climate change activities • Further Development of climate change policy through review and learning • Provide guidelines and training in V&A assessments to develop WS-CCAR framework and plans • Support the National Water and Adaptation Forum

Stakeholder	Involvement During PPG and Expected Full Implementation Role
	• Provide vulnerability information and climate relevant information to the project • Guide the implementation of Environment Impact Assessment for water projects (where required by law) • Support to community engagement and development of project best practice materials
National Disaster Management Office	• Assist with mainstreaming of DRR and provide training • Assist provincial governments with disaster preparedness and coordination of village disaster committees • Assist PMU with pilot site interventions • Support the National Water and Adaptation Forum • Support key community activities under Outcome 2 related to community based early warning • Support to community engagement and development of project best practice materials
Ministry of Lands and Housing	• Provide guidance on land owner identification, consultations and partnership building, community consultations
Ministry of Forests and Research	• Support with catchment management activities where necessary
Ministry of Infrastructure Development	• Design and construction of water supply infrastructure – at the Provincial level Works
Provincial Governments	• Mainstreaming of climate change adaptation • Identification of project sites • Monitoring of project activities, in-kind support to project delivery • Review of pilot site designs and interventions, and sign off with the SIWSAP Provincial Officer and SIWSAP PMU • Management and implementation of provincial urban water supply system in partnership with Solomon Islands Water Authority • Support to community engagement and development of project best practice materials
Solomon Islands Water Authority	• Provide guidance on supply and demand management approaches – especially for township sites
School of Industrial Development of the Solomon Islands College of Higher Education	• Development of training materials and provide training for community based water technicians • Assist in training and learning and formal training during implementation
Community organizations	• Implement WS-CCA projects as major partner in the project • Establish governance arrangements for IWRM • Contribute labor and materials, and ideas, and energy, and enthusiasm for project activities
Solomon Islands Meteorological Services	• Develop and assist communities and provincial governments with early warning systems and information for community based disaster preparedness • In-kind provision of information and data to the project
Ministry of Finance and Treasury	• Mainstreaming of Climate Change into national and provincial budgets, through the Province to National process of learning from project pilots
Ministry of Development Planning and Aid Coordination	• Coordinate donor support towards the water sector • Mainstream climate change into development budgets • Coordinate national-level resource mobilization strategies for the water sector • Learning from the project to help guide future investments
Ministry of Rural Development	• Mainstreaming of IWRM and CCA into water supply and protection projects funded under the Constituency Development Fund
Solomon Islands National University	• Support Outcome 4 of the project relating to capacity development support through development of a national diploma
Solomon Islands Red Cross; World Vision; Adventist Development and Relief Agency; Caritas; other NGOs and church-based organizations working on water and sanitation	• Plan and implement community based water supply and sanitation projects using IWRM and CCA approaches • Plan and implement community based early warning work • Invest in-kind support in networks and learning
Private Sector Companies	• Design and provision of water supply materials and equipment; public-private partnerships in provision of services and infrastructure • Better understand challenges to implements projects and supply chain risks for material and supplies for Provincial Governments and communities

III. PROJECT RESULTS FRAMEWORK

This project will contribute to achieving the following Country Programme Outcome as defined in UNDAF: Improved national, provincial and community preparedness and responsiveness to climate change and disaster risks and sustainable management of natural resources
UNDAF Outcome Indicators: **1.1.1 –** Strengthened capacity to integrate and implement policies/strategies for environmental sustainability, disaster risk reduction/management and climate change adaptation and mitigation at national level **1.1.3 –** Strengthened national capacity for effective management of natural and water resources, renewable energy, waste, land and land rehabilitation that promote good agricultural practices for conservation of the environment and biodiversity.
Primary applicable Key Environment and Sustainable Development Key Result Area (same as that on the cover page, circle one): 3. Promote climate change adaptation
Applicable GEF Strategic Objective and Program: CCA-1: 'Reduce vulnerability to the adverse impacts of climate change, including variability, at local, national, regional and global levels' CCA-2: 'Increase adaptive capacity to respond to the impacts of climate change, including variability, at local, national, regional and global levels' CCA-3: 'Promote transfer and adoption of adaptation technology'
Applicable GEF Expected Outcomes: Outcome 1.1: Mainstreamed adaptation in broader development frameworks at country level and in targeted vulnerable areas Outcome 1.2: Reduced vulnerability in development sectors Outcome 2.1: Increased knowledge and understanding of climate vulnerability and change – induced risks at country level and in targeted vulnerable areas Outcome 2.2: Strengthened adaptive capacity to reduce risks to climate-induced economic losses Outcome 2.3: Strengthened awareness and ownership adaptation and climate risk reduction processes at local level Outcome 3.1: Successful demonstration, deployment and transfer of relevant adaptation technology in targeted areas
Applicable GEF Outcome Indicators: Outcome 1.1: Outcome Indicator 1.1.1: Adaptation actions implemented in national/sub-regional development frameworks (no. and type) Outcome 1.2: Outcome Indicator 1.2.3 Number of additional people provided with access to safe water supply and basic sanitation services given existing and projected climate change (disaggregated by gender) Output 1.2.1: Output Indicator 1.2.1.4: Sustainable drinking water management practices introduced to increase access to clean drinking water (type and level) Examples: Tube wells • Rainwater harvesting • Purification • Water storage • Other Outcome 2.1: Output Indicator 2.1.1.2: Risk and vulnerability assessments conducted and updated Outcome 2.2: Output Indicator 2.2.2.1: % of population covered by climate change risk measures (disaggregated by gender) Outcome 2.3: Outcome Indicator 2.3.1: % of targeted population awareness of predicted adverse impacts of climate change and appropriate responses (Score) – Disaggregated by gender. The score ranges from 1 to 3 and below are the explanations of the rankings based on survey results - 1. No awareness level (<50% correct)2. Moderate awareness level (50- 75%) 3. high awareness level (>75% correct) Outcome 3.1: Outcome Indicator 3.1.1: % of targeted groups adopting adaptation technologies by technology type (disaggregated by gender)

	Indicator	Baseline	Targets End of Project	Source of verification	Risks and Assumptions
Project Objective[47] To improve the resilience of water resources to the impacts of climate change in order to improve	• At least 6 Water Sector Climate Adaptation Response Plans developed and implemented (aligned with AMAT 1.1, 2.1, & 2.3) • Resilient and safe water supplies to climate change	• Water and adaptation responses are not integrated into national policy or on the ground actions • Rural water supply and sanitation is focused on service delivery and not medium to long term sustainability of water resources and supplies	• Water Sector Climate Change Adaptation Response Plans inform and guide policy implementation for multi-sector adaptation response investments • At least 6 sites across 6 Provinces have resilient water supply options and improved sanitation with sustainable financing and operation and maintenance plans for over	• Assessments of National Water and Sanitation Policy and Implementation Plan • Mid-term and terminal evaluation reports • Annual multi-sector policies and plans at the national levels to check whether they include water adaptation	**Assumptions** • Willingness amongst stakeholders and projects to share climate related information • Pilot Site Communities and Stakeholders remain willing to be involved in the project • Adequate support from all the Provincial Administrations to implement project activities

[47] *Objective (Atlas output) monitored quarterly ERBM and annually in APR/PIR*

health, sanitation and quality of life, and sustain livelihoods in targeted vulnerable areas	impacts for 50,000 people and improvised sanitation for 25,000 people (disaggregated by gender) (aligned with AMAT 3.1)	• Little attention is paid to protection / restoration of natural infrastructure capturing, storing, cleaning and conveying water • NAPA is implemented mainly through development partner projects – no national learning mechanism in place	12,000 people (at least 5,760 women) • At pilot sites, watersheds, including groundwater are better managed and protected (confirmed by water quality testing and flow/yield measurements) • Multi-sectoral understanding and integrated use of climate information, including budget allocations	solutions with associated budgets • Assessment of whether and how watershed, including groundwater, are better managed and protected • Assessment of the quality and effectiveness of operation and maintenance plans • Questionnaires (repeated and modified for survey of key informants, women, to assess understanding and use of climate information) • Project reports and technical outputs • Meeting minutes, outputs from National Water and Adaptation Forum • Water quality testing in pilot and one non-pilot (control) site	(sometimes jointly) • Climate and natural disasters do not hinder project activities and logistics • National Security situation remains stable and improving • Rural WASH and Climate Change Adaptation remain a priority for Government **Risks** • Weather impedes travel to some Provinces • Insufficient ownership and collaboration with Pilot Site communities and other beneficiaries • National economic situation is not able to allocate adaptation related components in budgets at end of project • Sectoral uptake of water adaptation planning is low
Outcome 1[48] Water Sector – Climate Change Adaptation Response plans formulated, integrated and mainstreamed in water sector-related and in broader policy and development frameworks	• Vulnerability assessment and Climate Change Adaptation Response Plans for the Water Sector inform the development of (i) SIG Provincial Plans incorporating water adaptation, (ii) budget allocations, and (iii) institutional capacity development for aadaptation (aligned with AMAT 1.1, 2.1)	• No adaptation plans or adaptation guidance exists for the water sector at the National or Provincial levels (including both for water resources and water supply, sanitation and hygiene) • Sporadic and anecdotal data and lessons on adaptation at Provincial level • Lack of downscaled details from national assessments across a wide area	• At least 6 Water Sector Climate Change Adaptation Response Plans at Pilot Site level developed • At least 6 Provincial Water Adaptation Plans developed and budgets allocated • At least 6 additional Water Sector Climate Change Adaptation Response Plans at replication sites developed (1 per Province) • Training of relevant Provincial and National Staff in the Water Vulnerability Framework and Adaptation Response Plan • Provincial 'package' of	• Project Annual Progress Reports • Water Adaptation Response Plans • Water Vulnerability Framework and Assessments • Guidance documents on Water Vulnerability across Provinces • Provincial Water Adaptation Plans and Provincial budget allocations • Pre and post workshops/capacity building training survives/questionnaires • Training Packages • Mid-Term and Terminal	**Assumptions** • Willingness amongst stakeholders and projects to share climate related information • Pilot Site Communities and Stakeholders remain willing to be involved in the project • Adequate support from all the Provincial Administrations to implement project activities (sometimes jointly) • Climate and natural disasters do not hinder project activities and logistics • National Security situation remains stable and improving **Risks** • Weather impedes travel to some Provinces

[48] *All outcomes monitored annually in the APR/PIR. It is highly recommended not to have more than 4 outcomes.*

			relevant information to guide adaptation investments for the water sector • Replication sites mirror the process at pilot sites – implemented by SIG	Evaluation reports	• Insufficient ownership and collaboration with Pilot Site communities and other beneficiaries • Capacity at Provincial level is unable to adequately perform tasks (lack of service providers) • Provincial Administration are unable to secure budget allocations at the end of the project to improve adaptation responses
Outputs to deliver Outcome 1: 1.1. Vulnerability assessments of water supplies (in terms of quantity and quality) to climate change in targeted critical areas refined or formulated 1.2. WS-CCAR plans prepared in the context of IWRM and in line with and integrated into existing local and national policy and development planning processes 1.3. Government budgets allocated to support implementation of key components of WS-CCAR plans					
Outcome 2 Increased reliability and improved quality of water supply in targeted areas	• Number of people provided with access to safe water supply and basic sanitation services given existing and projected climate change (AMAT 1.2) • No. of accurate warnings disseminated resulting appropriate adaptive responses ad community and household levels	• **Tuwo:** 100% of community have no water >5 times per annum. • **Gizo:** reticulated system operates at 70% supply, with a further 70% leakage rate. • **Manaaoba:** 90% of community has no RW supply >5 times per annum. • **Taro:** 73% of community have no access to a toilet and no alternative safe water supply than existing RW tank system covering only 70% of community (empty >5 times per annum.) • **Santa Catalina:** 94% of community have inadequate roofing to capture water, with 79% of tanks empty >5 times per annum. • **Tiggoa:**55% of the community have no water supply >5 times per annum.	• Increased Water Storage at six sites provides a diversified approach to capturing and storing freshwater safely through island appropriate technologies (100% of communities have regular annual supply) • Strategic freshwater reserves are rehabilitated and protected (where necessary) for pilot site locations (at least 1 site) • Construction of appropriate sanitation technologies (e.g., composting toilets) at pilot sites (at least 4) to protect groundwater and other sources of water supply • Trial sites for sanitation options – working with local and national campaign on 'sanitation futures' (>6 campaigns) to facilitate adoption and maintenance of sanitation technologies • Clean up and protection of key groundwater recharge areas (i.e. Taro wetland – for >3 sties) • Community based Early Warning 'Systems' (CBEWS) in place at more than 6 sites	• Technical pilot site reports: rainwater harvesting surveys, sanitation surveys, revised building codes, feasibility studies (for new water sources or system rehabilitation) • Operation and maintenance manuals • Health and sanitation statistics by Government and/or international/research institutions • Protocols and appropriate Ordinances for sustainable use of water sources, especially groundwater • Water quality testing in pilot and one non-pilot (control) site • Mock EWS testing/drill in pilot and one non-pilot (control) site • Community surveys/interview of informants on risk perception in pilot and one non-pilot (control) site • Mid-Term and Terminal	**Assumptions** • Willingness amongst stakeholders and projects to share climate related information • Pilot Site Communities and Stakeholders remain willing to be involved in the project • Adequate support from all the Provincial Administrations to implement project activities (sometimes jointly) • Climate and natural disasters do not hinder project activities and logistics • National Security situation remains stable and improving **Risks** • Weather impedes travel to some Provinces • Insufficient ownership and collaboration with Pilot Site communities and other beneficiaries • Capacity at Provincial level is unable to adequately perform tasks (lack of service providers) • Provincial Administration are unable to secure budget allocations at the end of the project to improve adaptation

				Evaluation reports	responses • Inappropriate use of additional sanitation facilities intensifies point source pollution of fresh and marine waters
Outputs to deliver Outcome 2: 2.1. Community-level WS-CCA soft and concrete measures implemented to improve sanitation and water supply in times of scarcity, that may include, but not limited to: diversification of water sources; protection and restoration of ecosystems that protect critical water resources; improvements in water-use efficiency and overall demand-side management; use of innovative instruments; building on traditional knowledge; protection of freshwater lens through better sanitation practices in small islands (e.g., composting toilets) (in about 6 sites) 2.2. Community-based Climate Early Warning and Disaster Preparedness Information System tailored for water resources management developed and implemented in targeted areas					
Outcome 3 Investments in cost-effective and adaptive water management interventions and technology transfer	• No. of pilot sites adopting cost-effective and adaptive water management technologies based on community driven Water and Adaptation Response Projects at >20 sites aligned with (AMAT 3.1) • National Water investments include adaptation interventions to maintain medium to long term sustainability and provide resilience to community water needs and requirements (aligned with AMAT 1.1 & 3.1)	• No current direct access to funding for community projects focusing on adaptation and water risks • Development partner and national interventions focused on rural WASH provision do not include adaptation response in project delivery-investments or in climate proofing projects • Only 1 publicly owned portable water filter/desalination unit exists for the entire country	• At least 20 community driven, designed and developed Water and Adaptation Response Projects (aligned with co-financer interventions) • National Water investments to adaptation investments doubled by fourth year of project implementation • Appropriate water supply equipment successfully procured and delivered to pilot sites and key disaster stakeholders such as NDMO for enhanced preparation and response to water scarcity • Maintenance and operational guidelines developed and budgeted at the provincial and/or community levels	• Quarterly reports (both visual and in writing) from participating communities and provinces • Mid-Term and Terminal Evaluation reports • Project site Operation and Maintenance plans, including at co-financer project sites • Sector budget reporting • Minutes of NCWG, WASH group, and NIWRMCC, NDMOC • Water supply equipment for emergencies successfully in Honiara and tested • Assessment and system testing of NDMO's state-of-the-art water supply technology • Training courses in disaster relief equipment use • Communication an learning products and outputs (from print to TV)	**Assumptions** • Willingness amongst stakeholders and projects to share climate related information • Communities and Stakeholders remain willing to be involved in the project • Adequate support from all the Provincial Administrations to implement project activities (sometimes jointly) • Climate and natural disasters do not hinder project activities and logistics • National Security situation remains stable and improving • Volunteers are available • Communications specialists and journalists are interested in working on the project **Risks** • Weather impedes travel to some Provinces • Insufficient ownership and collaboration with communities and other beneficiaries • Capacity at Provincial level is unable to adequately perform tasks (lack of service providers) • Provincial Administration are unable to secure budget allocations at the end of the project to improve adaptation responses • Inappropriate use of additional

					sanitation facilities intensifies point source pollution of fresh and marine waters
Outputs to deliver Outcome 3: 3.1. Strategic investments in water infrastructure in target areas, including but not limited to: new household and communal water storage systems and infrastructure; provision of up to 4 portable water filtration and/or desalination systems for sharing across communities in times of extreme water scarcity. 3.2. Compilation of best practices on applicable technologies for dissemination and replication by project partners with support from the project					
Outcome 4 Improved governance and knowledge management for Climate Change Adaptation in the water sector at the local and national levels	• An annual National Water Forum where key stakeholders generate and exchange knowledge generation, and develop policies that facilitate climate change mainstreaming in the water sector • Number of awareness materials on climate change risks and vulnerability of water sector, and appropriate adaptation and response measures produced through the SIWSAP project with national partners providing cross-sector adaptation relevant information (aligned with AMAT 2.1 & 2.3)	• No specific guidelines exist for water resources, supply, and sanitation relative to climate change impacts and how to plan for these • No national forum exists for sharing, discussing, and learning from adaptation and water management programmes • Rural sanitation coverage is at best only 18% of the population. Composting toilets are not well understood, and sanitation is not considered a viable option for rural communities • Until recently, very little national advocacy for sanitation or understanding of climate change impacts • Existing hydrological monitoring systems is not adequate for existing climate variability, or for predicted (and often very localized) climate changes	• 1 academic/scientific and/or policy publication on the climate change impacts on the water resources of the Solomon Islands • Guidelines produced for climate resilient water supply and sanitation development in vulnerable areas of the Solomon Islands • A total of 3 Annual National Water and Adaptation Forum are held (in years 2, 3, & 4 of project implementation) • Improvement in, and expansion of current national hydrological monitoring network with 4 more sites installed • Sanitation and Adaptation Partnership with IWRM participating countries (i.e. Tuvalu) in place • Designed and Implemented National Sanitation Campaign with partners reach more than 20% of national population. • Peer-to-Peer Learning Network established across Pilot and Replication Sites (Outcome 2) • National Diploma on Water and Adaptation with Solomon Islands National University in place • At least two creative and/or audiovisual products are produced utilizing participatory communications approaches to communicate, train, influence and provide learning from the project (participatory video, video diaries, theatre, music,etc)	• National Water and Adaptation Forum Report and Outputs • Scientific and policy reports and publication • Assessment of guidelines on climate resilient water supply and sanitation development • Data from new hydrological monitoring sites • Survey of teachers/students on quality of National Diploma curriculum • Survey/assessment on use of composting toilets and other new improved sanitation practices through site reporting • Survey/ dissemination records of communication outputs • Mid-Term and Terminal Evaluation reports • Assessment of increased no. of people with access to drinking water through SIG	**Assumptions** • Willingness amongst stakeholders and projects to share climate related information and to support the National Water and Adaptation Forum and Sanitation Campaign • Willingness of IWRM participating countries (i.e. Tuvalu) to join the Partnership • Adequate support from all the Provincial Administrations to implement project activities (sometimes jointly) • National University has capacity and willingness to actively support the development of a Diploma • Climate and natural disasters do not hinder project activities and logistics • National Security situation remains stable and improving **Risks** • Weather impedes travel to some Provinces • Insufficient ownership and collaboration with Pilot Site communities and other beneficiaries • Capacity at Provincial level is unable to adequately perform tasks (lack of service providers) • Provincial Administration are unable to secure budget allocations at the end of the project to improve adaptation responses
Outputs to deliver Outcome 4: 4.1. Overarching policy and legislation for the water sector that integrates CCA components in IWRM plans drafted and advocated, including guidelines for climate resilient water					

supply development in vulnerable areas
4.2. Institutional and community capacities strengthened toward water-sector CCA formulation, implementation and monitoring at the national and local levels
4.3. Multi-media knowledge products on CC, CCA, IWRM, lessons learned and best practices developed and disseminated extensively to communities, schools and the general population and through ALM

IV. TOTAL BUDGET AND WORKPLAN

Award ID:	00078275	**Project ID(s):**	00078275
Award Title:	SOI PIMS4568 FSP: Solomon Islands Water Sector Adaptation Project		
Business Unit:	FJI10		
Project Title:	**Solomon Islands Water Sector Adaptation Project (SIWSAP)**		
PIMS no:	4568		
Implementing Partner (Executing Agency)	Government of the Solomon Islands, Ministry of Mines, Energy and Rural Electrification (MMERE)		

GEF Outcome/Atlas Activity	Responsible Party / Implementing Agency	Fund ID	Donor Name	Atlas Budgetary Account Code	ATLAS Budget Description	Amount Year 1 (USD)	Amount Year 2 (USD)	Amount Year 3 (USD)	Amount Year 4 (USD)	Total (USD)	Budget Note
OUTCOME 1 Water Sector – Climate Change Adaptation Response Plans formulated, integrated and mainstreamed in water sector-related and in broader policy and development frameworks	MMERE-WRD / UNDP										
		62160	LDCF	71200	International consultants	78,000	26,000	-	-	104,000	1A
				71300	Local consultants	109,620	109,620	82,152	82,152	383,544	1B
				72300	Material & goods	-	-	-	-	-	1C
				74200	Audiovisual& Print Production Costs	10,000	10,000	10,000	5,000	35,000	1D
				72100	Contractual services - Companies	22,000	22,000	-	-	44,000	1E
				75700	Training, Workshops and Conferences	18,000	15,000	15,000	10,000	58,000	1F
				71600	Travel	89,874	50,271	51,408	-	191,553	1G
				72400	Communication & Audio Visual Equip	19,560	-	-	-	19,560	1H
				73400	Rental & Maintain of Other Equipment	6,000	2,000	2,000	1,000	11,000	1I
				74500	Miscellaneous Expenses	2,746	1,831	2,093	1,803	8,473	1J
					Sub-total LDCF	**355,800**	**236,722**	**162,653**	**99,955**	**855,130**	
					Sub-total Outcome 1	**355,800**	**236,722**	**162,653**	**99,955**	**855,130**	
OUTCOME 2 Increased reliability and improved quality of water	MMERE-WRD / UNDP										
		62160	LDCF	71200	International consultants	13,000	62,833	69,333	36,834	182,000	2A
				71300	Local consultants	4,578	19,578	54,546	50,991	129,693	2B

GEF Outcome/Atlas Activity	Responsible Party / Implementing Agency	Fund ID	Donor Name	Atlas Budgetary Account Code	ATLAS Budget Description	Amount Year 1 (USD)	Amount Year 2 (USD)	Amount Year 3 (USD)	Amount Year 4 (USD)	Total (USD)	Budget Note
supply in targeted areas				72300	Material & goods	8,000	238,500	237,400	38,000	521,900	2C
				74200	Audiovisual& Print Production Costs	-	6,000	6,000	7,600	19,600	2D
				72100	Contractual services - Companies	25,000	146,500	150,500	85,000	407,000	2E
				75700	Training, Workshops and Conferences	27,500	69,000	83,600	79,000	259,100	2F
				71600	Travel	32,900	64,946	70,840	47,918	216,604	2G
				72200	Equipment and furniture	1,000	-	6,000	6,000	13,000	2H
				73400	Rental & Maintain of Other Equipment	2,000	6,000	6,000	6,000	20,000	2I
				74500	Miscellaneous Expenses	1,710	8,200	8,263	3,360	21,533	2J
					Sub-total LDCF	**115,688**	**621,557**	**692,482**	**360,703**	**1,790,430**	
					Sub-total Outcome 2	**115,688**	**621,557**	**692,482**	**360,703**	**1,790,430**	
OUTCOME 3 Investments in cost-effective and adaptive water management interventions and technology transfer	MMERE-WRD / UNDP										
		62160	LDCF	71200	International consultants	-	58,500	32,500	19,500	110,500	3A
				71300	Local consultants	60,936	60,936	60,936	60,936	243,744	3B
				72300	Material & goods	217,000	1,085,000	434,000	434,000	2,170,000	3C
				72100	Contractual services - Companies	6,000	106,000	90,000	10,000	212,000	3D
				75700	Training, Workshops and Conferences	-	45,800	52,500	2,500	100,800	3E
				71600	Travel	2,200	59,910	91,700	66,690	220,500	3F
				73400	Rental & Maintain of Other Equipment	6,000	6,000	6,000	6,000	24,000	3G
				74500	Miscellaneous Expenses	2,921	14,221	7,676	5,997	30,815	3H
					Sub-total LDCF	**295,057**	**1,436,367**	**775,312**	**605,623**	**3,112,359**	
					Sub-total Outcome 3	**295,057**	**1,436,367**	**775,312**	**605,623**	**3,112,359**	

GEF Outcome/Atlas Activity	Responsible Party / Implementing Agency	Fund ID	Donor Name	Atlas Budgetary Account Code	ATLAS Budget Description	Amount Year 1 (USD)	Amount Year 2 (USD)	Amount Year 3 (USD)	Amount Year 4 (USD)	Total (USD)	Budget Note
OUTCOME 4 Improved governance and knowledge management for CCA in the water sector at the local and national levels	MMERE-WRD / UNDP										
		62160	LDCF	71200	International consultants	-	39,000	18,200	-	57,200	4A
				71300	Local consultants	30,285	30,285	30,285	30,285	121,140	4B
				72200	Equipment and furniture	-	41,000	-	-	41,000	4C
				74200	Audiovisual& Print Production Costs	-	8,000	11,000	10,000	29,000	4D
				72100	Contractual services - Companies	-	94,000	58,000	15,500	167,500	4E
				75700	Training, Workshops and Conferences	-	69,900	73,900	72,400	216,200	4F
				71600	Travel	8,275	47,618	28,418	8,275	92,586	4G
				72200	Equipment and furniture	-	-	8,500	6,000	14,500	4H
				74500	Miscellaneous Expenses	578	4,947	3,425	2,137	11,087	4I
					Sub-total LDCF	**39,138**	**334,750**	**231,728**	**144,597**	**750,213**	
					Sub-total Outcome 4	**39,138**	**334,750**	**231,728**	**144,597**	**750,213**	
PROJECT MANAGEMENT	MMERE-WRD / UNDP										
		62160	LDCF	71200	International consultants	-	-	-	-	-	
				71300	Local consultants	35,700	66,752	56,752	76,752	235,956	PMA
				72500	Supplies	4,500	5,000	4,500	4,000	18,000	PMB
				74100	Professional services	3,000	3,000	3,000	3,000	12,000	PMC
				75700	Training, Workshops and Conferences	6,500	1,500	1,500	1,500	11,000	PMD
				71600	Travel	5,148	17,738	4,538	11,988	39,412	PME
				72200	Equipment and furniture	9,500	-	-	-	9,500	PMF
				73400	Rental & Maintenance of Other Equipment	-	-	-	-	-	

GEF Outcome/Atlas Activity	Responsible Party / Implementing Agency	Fund ID	Donor Name	Atlas Budgetary Account Code	ATLAS Budget Description	Amount Year 1 (USD)	Amount Year 2 (USD)	Amount Year 3 (USD)	Amount Year 4 (USD)	Total (USD)	Budget Note
				74500	Miscellaneous (DPC)	4,000	4,000	4,000	4,000	16,000	PMH
										-	
					Sub-total LDCF	**68,348**	**97,990**	**74,290**	**101,240**	**341,868**	
					Sub-total Outcome PM	**68,348**	**97,990**	**74,290**	**101,240**	**341,868**	
					Total	**874,031**	**2,727,386**	**1,936,465**	**1,312,118**	**6,850,000**	

Summary of Funds:[49]

	Amount Year 1	Amount Year 2	Amount Year 3	Amount Year 4	Total
GEF	**874,031**	**2,727,386**	**1,936,465**	**1,312,118**	**6,850,000**
TOTAL	**874,031**	**2,727,386**	**1,936,465**	**1,312,118**	**6,850,000**

[49] *Summary table should include all financing of all kinds: GEF financing, cofinancing, cash, in-kind, etc...*

BUDGET NOTES

Budget Note	Description of cost item
Outcome 1	
1A	International Consultant A Support to support PMU, International Consultant B supporting cost benefit analysis. Total for Outcome 1 over 4 years: $104,000
1B	Technical Adviser (CCA/DRR) @24 months for Years 1, 2, Full time SIWSAP Provincial Officers (x 6): 12 months per years 1, 2 3, and 4, for 6 Provinces Total Outcome 1: $383,544
1C	n/a
1D	Includes collection of climate change information across Provinces, analysis and summary reporting, translation costs where necessary. Production of Response Plans and promotion through radio and media, guidance documents preparation and printing on water sector vulnerabilities, and guidance documentation and translation on adaptation needs for Provincial Planning. Total cost $35,000
1E	Local contractor support to establish the Pilot Project Committees, collection of local climate related information, including through participatory community workshops (for vulnerability assessment), support culturally appropriate workshop design and delivery, training of communities with PMU. Additional consultation support for replication site sourcing, community consultations, information and data collection. Regional water contractor to mobilise water safety planning including site visits, monitoring, source and water quality testing, pumping of groundwater where required to complete adaptation response planning. Total cost $44,000
1F	Preparation, venue hiring and catering for community consultations, Provincial government consultations, including Gizo and Taro township municipalities for training events, training of trainers in the water vulnerability assessment framework and implementation.
1G	*Local Travel* National flights/boats costs: Year 1: Flights of provincial officers to travel to Honiara and sites by project team DSA & terminals in Provinces:: PMU staff to travel to 6 sites in Year 1 and Year 2, and provincial officers to attend inception workshop
1H	Communications and audio visual equipment for the delivery of Outcome 1 – but which also is required for delivering all other Outcomes: digital hand held still/video camera x 3, external microphones x 4, tripods x 2, waterproof housing (and carry cases) x 3, software, cabling as required, back up data storage, 9 x memory cards, 3 x extra batteries, 3 x GoPro Hero waterproof cameras. Water quality testing equipment, water flow monitoring equipment (for surface water stream gauging), and calibration. Total $19,560.
1I	Vehicle hire & fuel as necessary over 4 years.
1J	Approximately 1% of the total Outcome 1 budget for Y1-Y4 is allocated for contingencies related to inflation, current exchange fluctuations and other external shocks and contingencies. These may increase the cost of travel and materials.
Outcome 2	
2A	International Consultant Support for 60 days – groundwater expert (Years 2 and 3) International Consultant Support ($650/day) for 50 days – hydrologist support (split across Years 2 and 3, and 4). Mainly to work with MHMS-RWSS to better understand climate and hydrology impacts on their interventions. International Consultant Support for 60 days – sanitation expert (Year 2, 3, 4) International Consultant Support for 30 days – early warning specialist Year 2 only. To work with communities of establishing CBEWS, working with NDMO. Year 2 only. International Consultant Support for 40 days – watershed management and protection zones for

	townships and other exposed sites (e.g. Manaoba, Santa Catalina). Years 3 and 4 only International Consultant Support for 40 days – Rainwater Harvesting expert support to evaluate the use of tanks and support and train the PMU. Year 1 and Year 3.
2B	Technical Adviser (CCA/DRR) @2 months for Years 1, 2, and 3, and @7 months for Year 4 Local consultant support for: Rural hygiene/WASH specialist for 30 days Yr, 60 days Yr 3, 30 days Yr 4 Urban/rural water supply expert for 30 days Yr 2, 40 days Yr 3
2C	Rainwater tanks for all pilot sites, including townships of Gizo and Taro, 6 replication sites, and investment at MHMS-RWSS site to improve resilience of water supply to climate change for Years 2 and 3. Building materials – roofing, timber, guttering, downpipes, taps, for rainwater harvesting in Years 2, 3, and 4. Aggregate material for base plate construction under strategic RWH tanks (as in some locations this is difficult to source): in Years 2 and 3 Logistics and shipping costs for materials in 4 years. Fencing and tools in years 2 and 3 Piping and other materials for water source rehabilitation PES/water fund seed funding (to start the process off and demonstrate the approaching Year 2 Hydroclimate monitoring equipment: simple raingauges and other equipment mainly to be used at pilot site and replication location with communities for demonstration sand training purposes with Provincial Officers and Provincial Administrations – for looking at rainfall documentation relative to rainwater catchment etc – to allow calculation of approximate tanks sizes for years 2 and 3.
2D	Provincial guidance documents and radio programme development during Years 3 and 4. Development of radio programme, airtime, interviews, and preparation of guidance material, printing.
2E	Local/Regional contractor for groundwater surveys at pilot sites, replication sites and other sites determined with partners for surveys into size and reliability of water sources, quality of water, establish pumping regimes and management plans. Includes all materials, logistics. Local contractor for solid waste removal at Taro – logistics, boat hire, safe removal and disposal. Local/Regional contractor for sanitation surveys, community engagement, latrine construction, latrine trials, appropriate latrine design and construction, minor community campaigns at pilot sites, active ad continuous engagement with communities for sanitation behavioural change (including documentation, development of training material). Local contractor for feasibility studies for source rehabilitation at different pilot sites, including additional sites requested by Provincial Government and MHMS-RWSS and MMERE-WRD. Local contractors at provincial level for RWH installations. Local contractor for rehabilitation of reservoir and sand filters at Gizo, including upgrades to the reservoir and protection zone.
2F	Training for Rainwater harvesting construction and maintenance and water quality testing across Provinces. Sanitation promotion workshops and training across Provinces and administrations. National Sanitation Campaign Development and Promotion. Climate change budgeting development for 6 sites, including MHMS-RWSS sites – costing adaptation needs. Plumbing, basic maintenance training for communities with Government partners and MHMS-RWSS and MMERE-WRD and for follow-up training across Provinces. Community consultation costs : catering, logistics, venue hire, communications costs: Community Based Early Warning System training across pilot sites and wider across Provinces with Provincial Government and NDMO. Provincial Administration training costs (for all project aspects, specific training with administration and authorities through the project on adaptation , vulnerability assessment, groundwater risks, water quality management, disaster risk reduction, CBEWS, etc.:
2G	Travel cost and DSA for consultants over 4 years.
2H	2 x GPS units for Rainwater Harvesting survey recording and Equipment.

2I	Vehicle hire & fuel includes boats and access and support logistics to MHMS-RWSS sites and other sites supported through EU and AusAID funding.
2J	Approximately 1% of the total Outcome 2 budget for Y1-Y4 is allocated for contingencies related to inflation, current exchange fluctuations and other external shocks and contingencies. These may increase the cost of travel and materials.
Outcome 3	
3A	International Consultant Support for 40 days – groundwater expert. International Consultant Support for 40 days – hydrologist support. International Consultant Support for 30 days – watershed management expert International Consultant Support for 60 days – watershed management expert
3B	Technical Adviser (Water) @3 months for Years 1, 2, 3 and 4 Local consultant support at Provincial level with community engagement: 3 months/year for 4 years
3C	See Table 5, page 58
3D	Local contractor support to source materials for 20 investment sites, provide logistics and transport to mobilise equipment. Construction costs for over 20 sites, erosion control, toilet construction, water tank installation, rainwater catchments, fencing. Contractor for groundwater assessments at 20 sites, pumping tests, groundwater surveys and quality testing, working with Government. (equipment logistics, travel, staffing costs) Local Sub-contract for materials at baseline sites across Provinces under implementation from co-financers, and to support MHMS-RWSS specifically at their sites funded by sector support funding (EU and AusAID). This will include construction costs, instalment of equipment (labour, carpentry), travel costs associated, shipping, minor construction costs.
3E	Preparation, hiring and catering for community consultations at the 20 investment sites. Provincial workshops on year 3, per Province, to highlight investment site interventions, bring communities together to share lessons and experience. Mobilisation of Guidance documents and Provincial Planning on Adaptation include cost analysis training. Rainwater harvesting training in rainwater calculation assessments, GPS location of tanks, sizing, development of RWH database. Training costs with Regional Partner:
3F	Travel cost and DSA for consultants over 4 years.
3G	Provincial Officer establishment, securing accommodation, laptops (x 6), printers (x6), telephone connections, software, licences, minor furniture to support office establishment with Provincial Administration.
3H	Approximately 1% of the total Outcome 1 budget for Y1-Y4 is allocated for contingencies related to inflation, current exchange fluctuations and other external shocks and contingencies. These may increase the cost of travel and materials.
Outcome 4	
4A	International Consultant Support for Sanitation 20 days: International Consultant Support to assist in the development of the National output on climate change impacts on the water resources of the Solomon Islands. International Consultant Support for Hydro-meteorological monitoring/sitting/.
4B	Project Manager @ 2 months per year for 4 years specifically associated with the National Water and Adaptation Forum, and the Sanitation and Adaptation Partnership Technical Adviser (Water) @2 months for 4 Years Technical Adviser (CCA/DRR) @1 months for 4 Years Procurement Assistant: 2 months per year for 4 years Full time SIWSAP Provincial Officers (x 6): 2 months per years 1, 2 3, and 4, for 6 Provinces Total Outcome 4: $121,140
4C	Campbell Scientific Hydro-Meteorological monitoring sites for 4 sites. Loggers, and other communication options: Cabling and access costs (to land): All costs for Year 2.

	Note the equipment will be specified by MMERE-WRD and MECDM, with consultant and partnership agency support.
4D	Guideline development and publication/printing costs, including preparation of materials for the National Water and Adaptation Forum.
4E	Contractor support to: Develop a series of SIWSAP training videos in mobilising and using the adaptation response plans, and technical videos on topics such as rainwater harvesting, groundwater protection, compost toilet construction etc. based on video filming, working with and supporting communities in gathering video material, working with contractors to film, developing scripts, editing, final preparation. Promotion of videos. These costs are based on regionally applicable costs from other project. Contracting in of specialist advocacy services for theatre and radio communications (regionally available). (including travel to and around the Solomon Islands as necessary); Develop of a national sanitation advocacy campaign. It is anticipated that this may require international support and this is covered under the international consultant element of the budget for Outcome 4. Local contractor support will be required for the production of materials, printing, messaging, and other campaign activities including supporting the branding of the project, preparation of material suitable for radio and television (stories, messaging, speeches for World Water Day for example), posters, leaflets, etc – the development of a critical mass of information from and for the project. Local Contractor support to establish demonstrations of new sanitation approaches such as eco-sanitation/composting toilets (including materials, construction costs, and associated travel and transport costs. (including materials, construction costs, and associated travel and transport costs). Contractor support to install hydro-meteorological equipment at 4 sites, and for maintenance and monitoring visits of existing sites to support MMERE-WRD. This will include getting the services in-country and costs incurred during the work (local travel costs, DSA, hiring of equipment, purchase of local equipment needs and small construction services for installation, including labour).
4F	Preparation, hiring and catering for the National Water and Adaptation Forum during Years 2, 3, and 4 of project implementation for approximately 120 people. This will include venue hire, catering, technical equipment hire, and logistics specifically for Forum preparation i.e. (PA system), miscellaneous costs. The Forum will run for 3 days, but will have meetings and training sessions around the Forum for a further 2 days for specific SIWSAP implementation as detailed under Outcome 4. Training costs under Outcome 4 will include: Facilitation support for the National Water and Adaptation forum Training of trainers with local consultant support following material presented at the Forum for Years 3 and 4 only (rolling out specific project outputs in support of the training videos using practical demonstrations) Scholarship costs for the course to be developed with the National University including travel for students in Provinces)
4G	Travel cost and DSA for consultants over 4 years.
4H	Equipment and some minor furniture costs for the development of the National Diploma course/program with the National University. This includes minor computing costs and some equipment for the university to develop a host the course.
4I	Approximately 1% of the total Outcome 1 budget for Y1-Y4 is allocated for contingencies related to inflation, current exchange fluctuations and other external shocks and contingencies. These may increase the cost of travel and materials.
Project Management Cost	
PMA	Project Manager full time salary for 4 years covering 30 months – as other costs are included under technical delivery Financial/Administrative Assistant Full time salary for over 4 years (45 months taking into consideration hiring):

	Procurement Assistant Full time salary for over 4 years (42 months considering hiring): MT and Final Evaluation: (co-financing may need to be identified) Total Project Management: $235,956
PMB	Office supplies
PMC	Professional Services: audit
PMD	Inception workshop. Board meeting costs.
PME	Travel cost and DSA for consultants over 4 years.
PMF	PMU office establishment, including laptops (x 5), printer, telephone and fax, projector, screen, software, licences,
PMG	Approximately 1% of the total Outcome 1 budget for Y1-Y4 is allocated for contingencies related to inflation, current exchange fluctuations and other external shocks and contingencies. These may increase the cost of travel and materials.
PMH	Direct Project Services (DPS) refers to project 'execution services' which UNDP provides at the request of government to support the procurement of goods and services, recruitments, payments, etc. The services are charged on an item by item basis against UNDP's Universal Price List (UPL). The estimated items that will be costed under the DPS include: • Recruitment, HR management and administration, and salary payments of project management staff • Approximately recruitment of 20 short-term positions envisaged in the four components of the project as well as M&E related consultants • Travel authorization • Procurement of equipment/materials • Procurement of equipment/materials

V. MANAGEMENT ARRANGEMENTS

272. The Solomon Islands Government will execute the project with the support of UNDP under **the National Implementation Modality (NIM)**.

Implementing Partner (IP)

273. The Ministry of Mines, Energy and Rural Electrification (MMERE), and specifically the Water Resources Division, will be the Implementing Partner and the main executing institution responsible for ensuring that the objectives and components of the project are delivered as it is detailed in this project document.

Responsible Party (RP)

274. Upon request from the Solomon Island Government through a Letter of Agreement (LoA), UNDP, as one of the Responsible Party to the project, will provide the necessary support to the project in order to maximize its reach and impact as well as the quality of its products. Moreover, UNDP will assist MMERE to disburse funds through the Project Management Unit (PMU), which will be dedicated to the Project in keeping with its key principles of transparency, competitiveness, efficiency and economy. The financial management and accountability for the resources allocated, as well as other activities related to the execution of Project activities, will be undertaken by the PMU in close consultation with MMERE and under the supervision of the UNDP Honiara Sub-Office and Fiji Multi-Country Office. UNDP will undertake the monitoring of the Project and of evaluation activities, taking into account from the outset local capacities for administering the project, capacity limitations and requirements, as well as the effectiveness and efficiency of communications between ministries and other institutions that are relevant to the project. The specific areas of support and its costs will be outlined in the LoA between MMERE and UNDP prior to project start.

Project Board (PB)

275. A **Project Board** will be established consisting of MMERE (Executive/Implementing Partner), UNDP (Senior Supplier/Managing Entity/Responsible Party), MECDM, MHMS-EHD, and MDPAC (Beneficiaries). These four agencies will be permanent members of the Project Board, but will be assisted by representation from the National Climate Change Working Group (CCWG), and the National Intersectoral Water Coordination Committee (NIWCC) as invited members. The Project Board will be responsible for making management decisions and strategic guidance to the project, and will support the Project Director and Project Manager in decision making where required. The Board will approve the Annual Workplan and Budget for the project, set different tolerances for the work, and will approve any necessary deviations from the original approval plans. In order to ensure UNDP's ultimate accountability for the project results, Project Board decisions will be made in accordance to standards that shall ensure management for development results, best value for money, fairness, integrity, transparency and effective international competition.

276. The Project Board plays a critical role in project monitoring and evaluations by quality assurance of the project processes, procedures and outputs, and will use any project evaluations for performance improvement, accountability and learning. The Board will ensure that resources are committed to ensure the project can function, and will arbitrate any conflicts within the project or negotiates a solution to any problems with external bodies and project partners. A Terms of Reference for the Project Board are provided in Annex 7.

An Executive

277. An Executive is an individual who will chair the PB group and represent the project ownership. This will be the most senior official from the ministerial level of MMERE Solomon Islands.

Senior Supplier

278. The Project **Senior Supplier i**s an individual or group representing the interest of the parties concerned which provide funding for specific cost sharing projects and/or technical expertise to the project. The

Senior Supplier's primary function within the PB is to provide guidance regarding the technical feasibility of the project. The Senior Supplier for this project will be represented by UNDP, who is held accountable for fiduciary oversight of LDCF resources in this initiative. The UNDP Deputy Resident Representative based in the Solomon Islands will represent UNDP.

Senior Beneficiary

279. The Project **Senior Beneficiary** is an individual or group of individuals representing the interest of those who will ultimately benefit from the project. The Senior Beneficiary's primary function within the PB is to ensure the realization of project results from the perspective of the project beneficiaries. The Senior Beneficiary for this project will be represented by MECDM, MHMS-EHD, and MDPAC.

Project Advisory Group

280. The Project Board will be guided by a **Project Advisory Group**. The Advisory Group will consist of key relevant national stakeholders including the National Disaster Management Office (NDMO), the Ministry of Development Planning and Aid Coordination (MDPAC), and relevant donors[50] who provide co-financing and support to the project, together with Provincial Government Representative(s) as project partners and beneficiaries. It is also recommended that national representatives from the World Bank funded Rural Development Programme are part of the Advisory Group. The experience of the Rural Development Programme concerning infrastructure investments, working with communities on different projects, including rural water supply and sanitation and floor risk assessment is valuable expertise to support and advise the SIWSAP PMU. They will be joined by the National Climate Change Working Group (CCWG) and the National Intersectoral Water Coordination Committee (NIWCC) if CCWG and NIWCC are not already, through invitation, members of the Project Board. The newly developed Water Supply, Sanitation and Hygiene (WASH) Stakeholder Group will also be invited to sit in the Advisory Group, with their key experience in rural WASH[51]. A Key role for MDPAC in the Advisory Group is to learn positive and negative lessons from the project to improve project planning in the future, but to also identify new areas requiring project and sector wide investment to ensure SIWSAP interventions and results feed into national level sustainability planning. The Advisory Group will provide information and recommendations to the PB. A Terms of Reference for the Project Advisory Group are provided in Annex 7.

Project Director

281. A **Project Director** will be appointed to oversee overall project implementation on a regular basis, and to ensure that where institutional support is required within MMERE it is adequately provided for the project to fulfil the objectives set. The Project Director will be the Permanent Secretary (or person designated by him/her) of MMERE, who will act as the Chair of the Project Board. The Project Director will be responsible for raising project awareness and ownership across the Solomon Island Government institutions, and where necessary will represent the project at the national level. The Project Director will be responsible for ensuring the achievement of results and transfer of knowledge and project learning from the project to the Project Board, most particularly to the national and provincial government entities.

Project Management Unit (PMU)

1. A **Project Management Unit** (PMU) will be established within the Water Resources Division of MMERE in Honiara. The PMU will provide technical, administrative, and management functions to coordinate and implement the project on a day-to-day basis, in collaboration with MMERE-WRD, MHMS-EHD, and the Provincial Officers and Provincial Administration[52]. The PMU will administer the project in accordance with

[50]Specifically AusAID and the EU as the main funders of rural water supply and sanitation work at present through the AusAID Solomon Islands Access to Water and Sanitation Initiative (SIACWSI), and the EU Sector Reform contract on Improving Governance and Access to WASH for Rural People. UNICEF will also provide assistance as an Advisory Group through their project Building Human Development: Improving WASH in the Solomon Islands, funded by the EU Water Initiative.

[51]The purpose of this group is to coordinate activities for the rural WASH sector across the country, and to gather knowledge and experience from across the sector as part of a learning agenda.

[52]Learning from previous projects, the PMU will be required to provide project guidance, support and administrative assistance. To actively do this it must have technical capabilities to facilitate supporting the pilot projects, and also the correct management abilities to

the rules, policies, and procedures of UNDP, GEF, LDCF, and the Solomon Islands Government as agreed to by the Project Board. In situations where conflicting/or mutually exclusive rules and procedures arise, the Project Board will provide solutions worked out on a case-by-case basis, to ensure project implementation continues. The Project Director will ensure that matters are dealt with quickly and efficiently working as the bridge between the Solomon Islands Government and UNDP. It is envisaged that the CCWG and NIWCC will liaise closely with the PMU to support project implementation. The PMU will, among other tasks, 1) develop Standard Operating Procedures (SIWSAP PMU Guidance Manual[53]) for project implementation, 2) develop Quarterly and Annual Work Plans and Reports, 3) provide financial and administrative management support, 4) prepare Quarterly and Annual Financial and Technical Progress Reports to be submitted to MMERE and the PB, and 5) ensure compliance with applicable UNDP/GEF/LDCF/Government rules and regulations.

282. The PMU will receive required training in UNDP procedures from the UN Joint Presence office in Honiara, upon the establishment of the PMU. Sufficient office space for PMU members and project consultants will be provided by MMERE-WRD. Terms of Reference for the PMU are included in Annex 7.

Project Manager (PM)

283. The PMU will be headed by a nationally recruited **Project Manager**, where s/he will have the authority to run the project on a day-to-day basis on behalf of the Implementing Partner within the constraints laid down by the PB. Among others, the PM's prime responsibility is to ensure that the project produces the results specified in the Project Document, to the required standard of quality and within the specified constraints of time and cost. The PM will report directly to the Project Board, and will manage four (4) other staff that are part of the PMU. S/he will be hired through a competitive selection process. Terms of Reference for the PMU is included in Annex 7.

Technical Advisors (TA)

284. The project will hire the following two national technical advisors to provide technical expertise to the project:

- ***Technical Adviser – Water Specialist*** [Professional Adviser - International Position]
  The Water Specialist will assume direct responsibility for the rural water supply and sanitation technical interventions and wider water (and ground water) management aspects. They will work closely with the other technical adviser to the deliver the project Outcomes. (ToR included in Annex 7)
- ***Technical Adviser – Climate Change Adaptation and Disaster Risk Reduction Specialist*** [Professional Adviser position]
  The Climate Change Adaptation and Disaster Risk Reduction Specialist (ADRM) Specialist will assume direct responsibility for the adaptation aspects of the project, and elements concerned with disaster risk reduction. They will work closely with the other technical adviser to the deliver the project Outcomes. (ToR included in Annex 7)

Project Assistants

285. The project will hire the following two national project assistants to provide effective administrative and operational support to the project:

- ***Finance and Administrative Assistant*** [Technical/Administrative Support position]
  The Finance and Administration Assistant will assume direct responsibility for the day-to-day financial management of the project, under the supervision of the Project Manager. S/he will also perform

---

administer the project financially and technically.

[53] A project SOP or Guidance Manual will be developed within the inception period by the PMU supported by UNDP. The manual will contain specific guidance on Procurement of both technical consultancy services and equipment, building on lessons from the SWoCK Project (Strogem Woka lo Community fo Kaikai) implemented by UNDP. A mechanism will be explored within the SOP/manual development process so that expert support can be contracted in from regional CROP Agencies and other organisations across the region who can advise the PMU on equipment needs, technical equipment Terms of Reference development and Bill of Quantities as required.

project administrative duties, travel logistics national, regional, and international where required. The officer will support the delivery of the project Outcomes, and will also support the development of project technical and financial reports, and the annual workplans. This officer will also need to support procurement procedures, including for equipment and professional consulting services.

- ***Procurement Assistant*** [Technical/Administrative Support position]
  The Procurement Assistant will provide support to the PMU in all procurement matters including the implementation of sourcing strategies, control of project assets, assisting in logistical services and support to knowledge sharing within the PMU and MMERE on UNDP Procurement guidelines. The Procurement Assistant will also be responsible for performing key Atlas functions to ensure that goods and services are delivered in an effective and efficient manner to realise project goals.

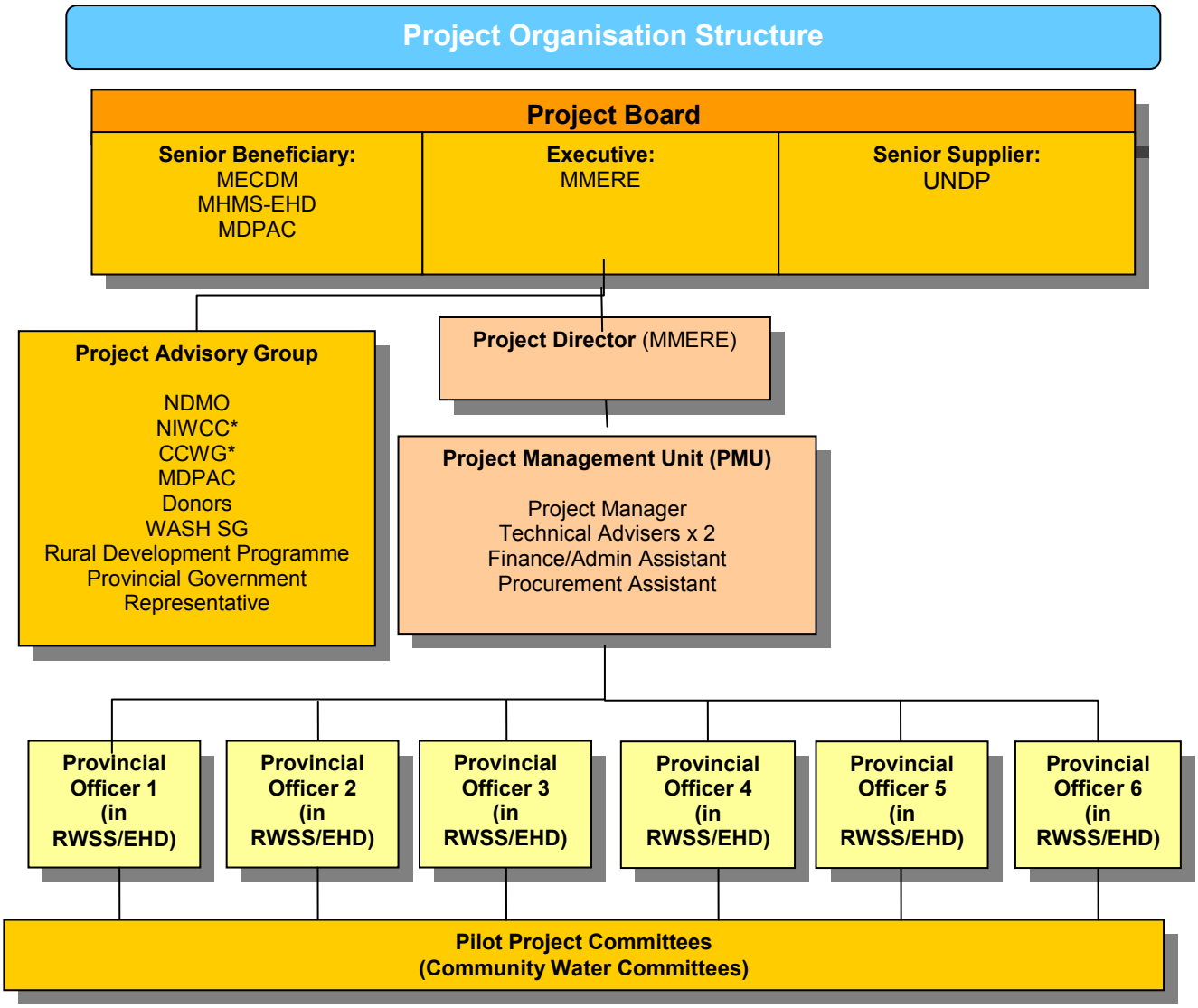
SIWSAP Provincial Officers

286. Although not part of the PMU in Honiara, the PMU will recruit technical officers within each of the pilot Provinces involved in the project. These officers have a multi-functional role. They will coordinate and implement activities at pilot site level, possible replication site levels, and at any strategic investment sites. They must work closely with beneficiary communities and the Provincial Government and Agencies to ensure the interventions are appropriate, and that the project activities are signed-off by MHMS-EHD to ensure policy and technical compliance. These positions are key roles, needing skills in working with agencies and communities, and management of project interventions. These positions will report directly to the PMU, but will also report to the Provincial Government to ensure clear communications and transparency54. A generic Terms of Reference is provided for this role in Annex 7. It is envisaged that these individuals will be highly valuable resources to the Solomon Islands Government at the end of the project.

Pilot Project Committees

287. Where appropriate, Pilot Project Committees (PPC) will be established at the level of the pilot projects. The committee will be constituted building on existing Provincial and community level water management mandate and institutions, such as the RWSS/EHD in the provinces as well as the Community Water Communities at the community level). The PPC will help guide activities within each pilot project, and where possible help implement the activities through provision of materials, labour, etc. In reality, due to the strong sense of community and kinship in the country, formal 'committee establishment' may be unlikely. The communities are the ultimate beneficiaries, and it is critical that they are involved in helping to scope out intervention needs, capacity needs and to also provide their knowledge and experience of dealing with water shortages, floods, storms, and other impacts captured in community history and stories. In some cases it is expected that local partners (NGO's for example) and Provincial Government will coordinate with the community beneficiaries and the SIWSAP Provincial Officer(s) for project activities and logistical support where needed. These groups, as 'Committees' will guide and coordinate, with the SIWSAP Provincial Officer(s) pilot site interventions. A generic Terms of Reference is provided for the PPCs in Annex 7.

[54]Project SOP/SIWSAP PMU Guidance Manual will indicate reporting lines and the frequency of reporting.



** The Project Organizational Structure, including institutional representatives, reporting lines, and reporting tools/mechanisms will be detailed during the project inception workshop. Furthermore, lessons learned from the past projects (including the Adaptation Fund project) will be taken into account in the final composition and institutional arrangements for effective project management and oversight.*

Contractors

288. The implementation of the components of the project will be supported by contractors, selected according to UNDP procurement rules. The Implementing Partner may contract other entities, defined as Responsible Parties, to undertake specific project tasks through a process of competitive bidding. In the case of community based organisations supplying implementation support, they would need to be registered as per national requirements with the appropriate Ministry. However, if the Responsible Party is another government institution, Inter-Governmental Organisation (e.g. a CROP Agency) or a United Nations agency, competitive bidding will not be necessary and direct contracting will be applied. Direct contracting to be processed by UNDP will follow UNDP financial rules and regulations as it needs to comply with certain criteria, such as comparative advantage, timing, threshold, budgeting and quality. If direct contracting criteria cannot be met the activity will be open to competitive bidding.

Project assurance

289. Project Assurance is the responsibility of each Project Board member, namely MMERE, UNDP, the Ministry of Environment, Climate Change and Disaster Management Meteorology (MECDM), and MHMS-

EHD. The Project Assurance role supports the Project Board by carrying out objective and independent project oversight and monitoring function. This role ensures appropriate project management milestones are managed and completed. Project Assurance has to be independent of the Project Manager; therefore the Project Board cannot delegate any of its assurance responsibilities to the Project Manager. A UNDP Programme Officer typically also holds the Project Assurance role. The following list includes the key aspects of project assurance to be performed throughout the project as part of ensuring that the project remains relevant, follows the approved plans and continues to meet the planned targets with quality:

a) Maintenance of thorough liaison throughout the project between the members of the Project Board to ensure that the beneficiary needs and expectations are being met or managed, that the identified project risks are being controlled, and that the project remains justified and the business case is sound.

b) Furthermore, the assurance responsibilities must also ensure that the project continues to 'fit' within the overall Country Programme, that the project works with the most appropriate people, and that activities are sensible and the most appropriate for the tasks. 'Mission' creep of the project must be checked should it appear to be happening, and internal (within the project) and external to the project communications must be monitored to ensure the project actively engages with partners and stakeholders and lessons learned are shared as early as viable.

c) Finally, the assurance process must ensure at all times that national legislation and applicable UNDP rules and regulations are observed at all times, and agreed quality assurance procedures and 'sign-off' is occurring as specified in the SIWSAP PMU Guidance Manual.

290. Specifically for UNDP, the assurance responsibilities include advising on the strategy implementation for the project, including the design and methods of the project activities, to monitor potential changes to the project and their impact on the quality of deliverables from a supplier perspective, to monitor any risks in the implementation of the project, to monitor progress against the Annual Workplan and Quarterly and Annual Budget reporting, and to ensure that the mid-term and terminal evaluations are conducted in a timely and professional manner. UNDP must also ensure that, given the logistical challenges in the Solomon Islands, in implementing the project, full due care and attention is paid to health and safety concerns of project staff.

291. The assurance responsibilities of the MECDM and MHMS-EHD as the Project Beneficiaries are to check that the needs of the beneficiary's are accurate, complete and unambiguous in the project outcomes and outputs, and through the implementation of activities. They must also ensure that the project is adequately monitored, and the results of this are regularly reported to the Project Board. Any changes to the project must be viewed from the potential impact on project beneficiaries, and any risks to them that may arise must be identified, monitored, and mitigated as far as possible.

Audit arrangements

292. Audit arrangements will be conducted in accordance with the UNDP NIM Audit policies and procedures, and based on the UN Harmonized Approach to Cash Transfer (HACT) policy framework. Annual audit of the financial statements relating to the status of UNDP (including GEF) funds will be undertaken according to the established procedures set out in the Programming and Finance manuals. The Audit will be conducted by a special and certified audit firm. UNDP will be responsible for making audit arrangements for the project in communication with the Project Implementing Partner. UNDP and the project Implementing Partner will provide audit management responses and the Project Manager and PMU will address audit recommendations. As a part of its oversight function, UNDP will conduct audit spot checks at least two times a year.

UNDP Country Support Services

293. As per the standard agreement between UNDP and the Solomon Islands Government, and upon request from the Implementing Partner (IP), the UNDP Country Office may provide the following support services for the activities of this project, and recover the actual direct and indirect costs incurred by the Country Office in delivering such services as stipulated in the LOA:

a. Payments, disbursements and other financial transactions
b. Recruitment of staff, project personnel, and consultants

c. Procurement of services and equipment, including disposals
d. Organization of training activities, conferences, and workshops, including fellowships
e. Travel authorization, Government clearances ticketing, and travel arrangements
f. Shipment, custom clearance, and vehicle registration.

Intellectual Property Rights

294. Intellectual Property Rights will be retained by the employing organization of the personnel who develops intellectual products, either Government, or UN/UNDP in accordance with respectively national and UN/UNDP policies and procedures.

VI. MONITORING FRAMEWORK AND EVALUATION

295. The project will be monitored through the following Monitoring and Evaluation (M&E) activities. The estimated M&E budget is provided in the table below. The M&E framework set out in the Project Results Framework in Part III of this project document is aligned with the AMAT and UNDP M&E Frameworks.

296. **Project start**: A Project Inception Workshop will be held within the first 2 months of project start with those with assigned roles in the project organization structure, UNDP country office and where appropriate/feasible regional technical policy and programme advisors as well as other stakeholders. The Inception Workshop is crucial to building ownership for the project results and to plan the first year annual work plan.

297. The **Inception Workshop** should address a number of key issues including:

a) Assist all partners to fully understand and take ownership of the project. Detail the roles, support services and complementary responsibilities of UNDP CO and UNDP-GEF/Regional Coordination Unit (RCU) staff vis à vis the project team. Discuss the roles, functions, and responsibilities within the project's decision-making structures, including reporting and communication lines, and conflict resolution mechanisms. The Terms of Reference for project staff will be discussed again as needed.

b) Based on the project results framework and the relevant GEF Tracking Tool (AMAT) if appropriate, finalize the first annual work plan. Review and agree on the indicators, targets and their means of verification, and recheck assumptions and risks.

c) Provide a detailed overview of reporting, M&E requirements. The Monitoring and Evaluation work plan and budget should be agreed and scheduled.

d) Discuss financial reporting procedures and obligations, and arrangements for annual audit.

e) Plan and schedule Project Board meetings. Roles and responsibilities of all project organisation structures should be clarified and meetings planned. The first Project Board meeting should be held within the first 12 months following the inception workshop.

298. An **Inception Workshop report** is a key reference document and must be prepared and shared with participants to formalize various agreements and plans decided during the meeting.

299. Quarterly:

- Progress made shall be monitored in the UNDP Enhanced Results Based Management Platform.
- Based on the initial risk analysis submitted, the risk log shall be regularly updated in ATLAS. Risks become critical when the impact and probability are high. Note that for UNDP GEF projects, all financial risks associated with financial instruments such as revolving funds, microfinance schemes, or capitalization of ESCOs are automatically classified as critical on the basis of their innovative nature (high impact and uncertainty due to no previous experience justifies classification as critical).
- Based on the information recorded in Atlas, a Project Progress Reports (PPR) can be generated in the Executive Snapshot.
- Other ATLAS logs can be used to monitor issues, lessons learned etc... The use of these functions is a key indicator in the UNDP Executive Balanced Scorecard.

300. **Annually: Annual Project Review/Project Implementation Reports (APR/PIR)**: This key report is prepared to monitor progress made since project start and in particular for the previous reporting period (30 June to 1 July). The APR/PIR combines both UNDP and SOF (e.g. GEF) reporting requirements.

301. The APR/PIR includes, but is not limited to, reporting on the following:

- Progress made toward project objective and project outcomes - each with indicators, baseline data and end-of-project targets (cumulative)
- Project outputs delivered per project outcome (annual).
- Lesson learned/good practice (reported in narrative, photographic, and/or audiovisual formats)
- AWP and other expenditure reports
- Risk and adaptive management
- ATLAS QPR
- Portfolio level indicators (i.e. GEF focal area tracking tools)

302. **Periodic Monitoring through site visits:** UNDP CO and the UNDP GEF region-based staff will conduct visits to project sites based on the agreed schedule in the project's Inception Report/Annual Work Plan to assess first hand project progress. Other members of the Project Board may also join these visits. A Field Visit Report/BTOR (combining various formats including narrative, photographic, and/or audio-visual i.e. video BTOR) will be prepared by the CO and UNDP RCU and will be circulated no less than one month after the visit to the project team and Project Board members. Wherever possible and if appropriate, innovative M&E approaches such as those outlined in the UNDP discussion paper on "Innovations in Monitoring and Evaluating Results[55] (UNDP, 2013)" will be utilized.

303. **Mid-term of project cycle:** The project will undergo an independent **Mid-Term Evaluation** at the mid-point of project implementation (end of 2nd year of the project). The Mid-Term Evaluation will determine progress being made toward the achievement of outcomes and will identify course correction if needed. It will focus on the effectiveness, efficiency and timeliness of project implementation; will highlight issues requiring decisions and actions; and will present initial lessons learned about project design, implementation and management. Findings of this review will be incorporated as recommendations for enhanced implementation during the final half of the project's term. The organization, terms of reference and timing of the mid-term evaluation will be decided after consultation between the parties to the project document. The Terms of Reference for this Mid-term evaluation will be prepared by the UNDP CO based on guidance from the Regional Coordinating Unit and UNDP-GEF. The management response and the evaluation will be uploaded to UNDP corporate systems, in particular the UNDP Evaluation Office Evaluation Resource Center (ERC). Wherever possible and if appropriate, innovative M&E approaches such as those outlined in the UNDP discussion paper on "Innovations in Monitoring and Evaluating Results (UNDP, 2013)* will be utilized. The LDCF/SCCF AMAT as set out in the Project Results Framework (in Section III of this Project Document) will also be completed during the mid-term evaluation cycle. .

304. **End of Project:** An independent Final Terminal Evaluation will take place three months prior to the final Project Board meeting and will be undertaken in accordance with UNDP and SOF (e.g. GEF) guidance. The final evaluation will focus on the delivery of the project's results as initially planned (and as corrected after the mid-term evaluation, if any such correction took place). The final evaluation will look at impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental benefits/goals. The Terms of Reference for this evaluation will be prepared by the UNDP CO based on guidance from the Regional Coordinating Unit and UNDP-GEF. Wherever possible and if appropriate, innovative M&E approaches such as those outlined in the UNDP discussion paper on "Innovations in Monitoring and Evaluating Results (UNDP, 2013)* will be utilized.

305. The **Final Evaluation** should also provide recommendations for follow-up activities and requires a management response, which should be uploaded to PIMS and to the UNDP Evaluation Office Evaluation Resource Center (ERC). The LDCF/SCCF AMAT as set out in the Project Results Framework (in Section III of this Project Document) will also be completed during the terminal evaluation cycle.

306. During the last three months, the project team will prepare the **Project Terminal Report**. This comprehensive report will summarize the results achieved (objectives, outcomes, outputs), lessons learned, problems met and areas where results may not have been achieved. It will also lay out recommendations for any further steps that may need to be taken to ensure sustainability and replicability of the project's results.

307. Learning and knowledge sharing: Results from the project will be disseminated within and beyond the project intervention zone through existing information sharing networks and forums, including but not limited to UNDP Adaptation Learning Mechanism (www.undp-alm.org/.(

308. The project will identify and participate, as relevant and appropriate, in scientific, policy-based and/or any other networks, which may be of benefit to project implementation though lessons learned. The project will identify, analyze, and share lessons learned that might be beneficial in the design and implementation of similar future projects.

309. Furthermore, two-way flow of information between this project and other projects of a similar focus will be encouraged and facilitated throughout the lifespan of the Project implementation.

[55] https://undp.unteamworks.org/file/370238/download/403529

310. **Audit**: The Project will be audited in accordance with UNDP Financial Regulations, Rules, and applicable policies.

M&E workplan and budget:

Type of M&E Activity	Responsible Parties	Budget US$ *Excluding project team staff time*	Time Frame
Inception Workshop and Report	▪ Project Manager ▪ UNDP CO, UNDP CCA	**10,000**	Within first two months of project start up
Measurement of Means of Verification of project results.	▪ UNDP CCA RTA/Project Manager will oversee the hiring of specific studies and institutions, and delegate responsibilities to relevant team members.	To be finalized in Inception Phase and Workshop**.**	Start, mid and end of project (during evaluation cycle) and annually when required.
Measurement of Means of Verification for Project Progress on *output and implementation*	▪ Oversight by Project Manager ▪ Project team	To be determined as part of the Annual Work Plan's preparation**.**	Annually prior to ARR/PIR and to the definition of annual work plans
ARR/PIR	▪ Project manager and team ▪ UNDP CO ▪ UNDP RTA ▪ UNDP EEG	**None**	Annually
Periodic status/ progress reports	▪ Project manager and team	**None**	Quarterly
Mid-term Evaluation	▪ Project manager and team ▪ UNDP CO ▪ UNDP RCU ▪ External Consultants (i.e. evaluation team)	Indicative cost:**40,000**	At the mid-point of project implementation.
Final Evaluation	▪ Project manager and team, ▪ UNDP CO ▪ UNDP RCU ▪ External Consultants (i.e. evaluation team)	Indicative cost:**40,000**	At least three months before the end of project implementation
Project Terminal Report	▪ Project manager and team ▪ UNDP CO ▪ Local consultant	**0**	At least three months before the end of the project
Audit	▪ UNDP CO ▪ Project manager and team	Indicative cost per year: **3,000 (12,000 total)**	Yearly
Visits to field sites	▪ UNDP CO ▪ UNDP RCU (as appropriate) ▪ Government representatives	For GEF supported projects, paid from IA fees and operational budget	Yearly
TOTAL indicative COST Excluding project team staff time and UNDP staff and travel expenses		**US$ 102,000 (+/- 5% of total budget)**	

311. **Communications and visibility requirements:** Full compliance is required with UNDP's Branding Guidelines. These can be accessed at http://intra.undp.org/coa/branding.shtml, and specific guidelines on UNDP logo use can be accessed at: http://intra.undp.org/branding/useOfLogo.html. Amongst other things, these guidelines describe when and how the UNDP logo needs to be used, as well as how the logos of donors to UNDP projects needs to be used. For the avoidance of any doubt, when logo use is required, the UNDP logo needs to be used alongside the GEF logo. The GEF logo can be accessed at:

http://www.thegef.org/gef/GEF_logo. The UNDP logo can be accessed at http://intra.undp.org/coa/branding.shtml.

312. Full compliance is also required with the GEF's Communication and Visibility Guidelines (the "GEF Guidelines"), which be accessed at: http://www.thegef.org/gef/sites/thegef.org/files/documents/C.40.08_Branding_the_GEF%20final_0.pdf. Amongst other things, the GEF Guidelines describe when and how the GEF logo needs to be used in project publications, vehicles, supplies and other project equipment. The GEF Guidelines also describe other GEF promotional requirements regarding press releases, press conferences, press visits, visits by Government officials, productions and other promotional items.

313. Where other agencies and project partners have provided support through co-financing, their branding policies and requirements should be similarly applied.

VII. LEGAL CONTEXT

314. This document together with the CPAP signed by the Government and UNDP which is incorporated by reference constitute together a Project Document as referred to in the SBAA [or other appropriate governing agreement] and all CPAP provisions apply to this document.

315. Consistent with the Article III of the Standard Basic Assistance Agreement, the responsibility for the safety and security of the implementing partner and its personnel and property, and of UNDP's property in the implementing partner's custody, rests with the implementing partner.

316. The implementing partner shall:

- put in place an appropriate security plan and maintain the security plan, taking into account the security situation in the country where the project is being carried;
- assume all risks and liabilities related to the implementing partner's security, and the full implementation of the security plan.

317. UNDP reserves the right to verify whether such a plan is in place, and to suggest modifications to the plan when necessary. Failure to maintain and implement an appropriate security plan as required hereunder shall be deemed a breach of this agreement.

318. The implementing partner agrees to undertake all reasonable efforts to ensure that none of the UNDP funds received pursuant to the Project Document are used to provide support to individuals or entities associated with terrorism and that the recipients of any amounts provided by UNDP hereunder do not appear on the list maintained by the Security Council Committee established pursuant to resolution 1267 (1999). The list can be accessed via http://www.un.org/Docs/sc/committees/1267/1267ListEng.htm. This provision must be included in all sub-contracts or sub-agreements entered into under this Project Document.

319. The UNDP Deputy Resident Representative in Solomon Islands is authorized to effect in writing the following types of revisions to this Project Document, provided that s/he has verified the agreement thereto by the UNDP Regional Coordinating Unit and is assured that other signatories to the Project Document have no objections to the proposed changes:

- Revision of, or addition to, any of the Annexes to the Project Document;
- Revision which do not involve significant changes in the immediate objectives, outputs or activities of the project, but are caused by the rearrangement of the inputs already agreed to or by cost increases due to inflation;
- Mandatory annual revisions which re-phase the delivery of agreed project inputs or increased expert or other costs due to inflation or take into account agency expenditure flexibility; and
- Inclusion of additional attachments only as set out here in the Project Document

VIII. ANNEXES

Annex 1: Climate Change in the Pacific: Scientific Assessment and New Research - Volume 2: Country Reports - Chapter 13: Solomon Islands
Annex 2: PPG Inception Workshop Report
Annex 3: Criteria for Pilot Site Selection
Annex 4: Summary of Key Thematic Messages Linked to the Pacific Regional Action Plan
Annex 5: Pilot Site Reports
Annex 6: Communications Approach for SIWSAP
Annex 7: Terms of Reference for Project Governance, Management Arrangements, and Key Project Staff
Annex 8: Stakeholder Engagement Plan
Annex 9: Project Implementation Schedule
Annex 10: Adaptation Monitoring and Assessment Tool
Annex 11: UNDP Risk Log
Annex 12: References
Annex 13: Co-finance Letters of Support
Annex 14: UNDP Environmental and Social Screening
Annex 15: Responses to Project Reviews
Annex 16: Resilience Framework

Village, Central Province

Chapter 13
Solomon Islands

The contributions of David Hiriasia and Lloyd Tahani from the Solomon Islands Meteorological Service are gratefully acknowledged

Introduction

This chapter provides a brief description of the Solomon Islands, its past and present climate as well as projections for the future. The climate observation network and the availability of atmospheric and oceanic data records are outlined. The annual mean climate, seasonal cycles and the influences of large-scale climate features such as the West Pacific Monsoon and patterns of climate variability (e.g. the El Niño-Southern Oscillation) are analysed and discussed. Observed trends and analysis of air temperature, rainfall, extreme events (including tropical cyclones), sea-surface temperature, ocean acidification, mean and extreme sea levels are presented. Projections for air and sea-surface temperature, rainfall, sea level, ocean acidification and extreme events for the 21st century are provided. These projections are presented along with confidence levels based on expert judgement by Pacific Climate Change Science Program (PCCSP) scientists. The chapter concludes with a summary table of projections (Table 13.4). Important background information, including an explanation of methods and models, is provided in Chapter 1. For definitions of other terms refer to the Glossary.

13.1 Climate Summary

13.1.1 Current Climate

- Air temperatures in the Solomon Islands show very little seasonal variation, and are closely linked to sea-surface temperatures.
- In the west there is a marked wet season from November to April, while rainfall is more constant year-round in the east. Rainfall in the Solomon Islands is affected by the West Pacific Monsoon, the South Pacific Convergence Zone and the Intertropical Convergence Zone.
- Rainfall in the Solomon Islands varies greatly from year-to-year, due mainly to the influence of the El Niño-Southern Oscillation.
- Warming trends are evident in both annual and seasonal mean air temperatures at Honiara for the period 1951–2009.
- Annual and seasonal rainfall trends for Honiara for the period 1950–2009 are not statistically significant.
- The sea-level rise near Solomon Islands measured by satellite altimeters since 1993 is mostly over 8 mm per year.
- On average, Honiara experiences 13 tropical cyclones per decade, with most occurring between November and April. The high variability in tropical cyclone numbers makes it difficult to identify any long-term trends in frequency.

13.1.2 Future Climate

Over the course of the 21st century:

- Surface air temperature and sea-surface temperature are projected to continue to increase (*very high* confidence).
- Annual and seasonal mean rainfall is projected to increase (*high* confidence).
- The intensity and frequency of days of extreme heat are projected to increase (*very high* confidence).
- The intensity and frequency of days of extreme rainfall are projected to increase (*high* confidence).
- The incidence of drought is projected to decrease (*moderate* confidence).
- Tropical cyclone numbers are projected to decline in the south-west Pacific Ocean basin (0–40ºS, 130ºE–170ºE) (*moderate* confidence).
- Ocean acidification is projected to continue (*very high* confidence).
- Mean sea-level rise is projected to continue (*very high* confidence).

13.2 Country Description

The Solomon Islands consist of two chains of volcanic islands that lie between 5ºS–13ºS and 155ºE–169ºE. There are 992 islands with a total land area of 28 785 km^2. The islands range from small low-lying atolls to large, volcanic islands with high peaks (Solomon Islands Country Profile, SOPAC, 2000).

Most of the population, which was estimated at 549 574 in 2010, live in small rural communities dispersed over the nine largest islands (Solomon Islands Country Statistics, SOPAC, 2010). The capital, Honiara, is located on the island Guadalcanal.

Timber has long been a mainstay of the Solomon Islands economy and gold deposits may provide an additional source of revenue for the country. Local agriculture consists of both subsistence and commercial components. Key agricultural exports include cocoa, palm oil and coconut products (Solomon Islands First National Communication under the UNFCCC, 2001).

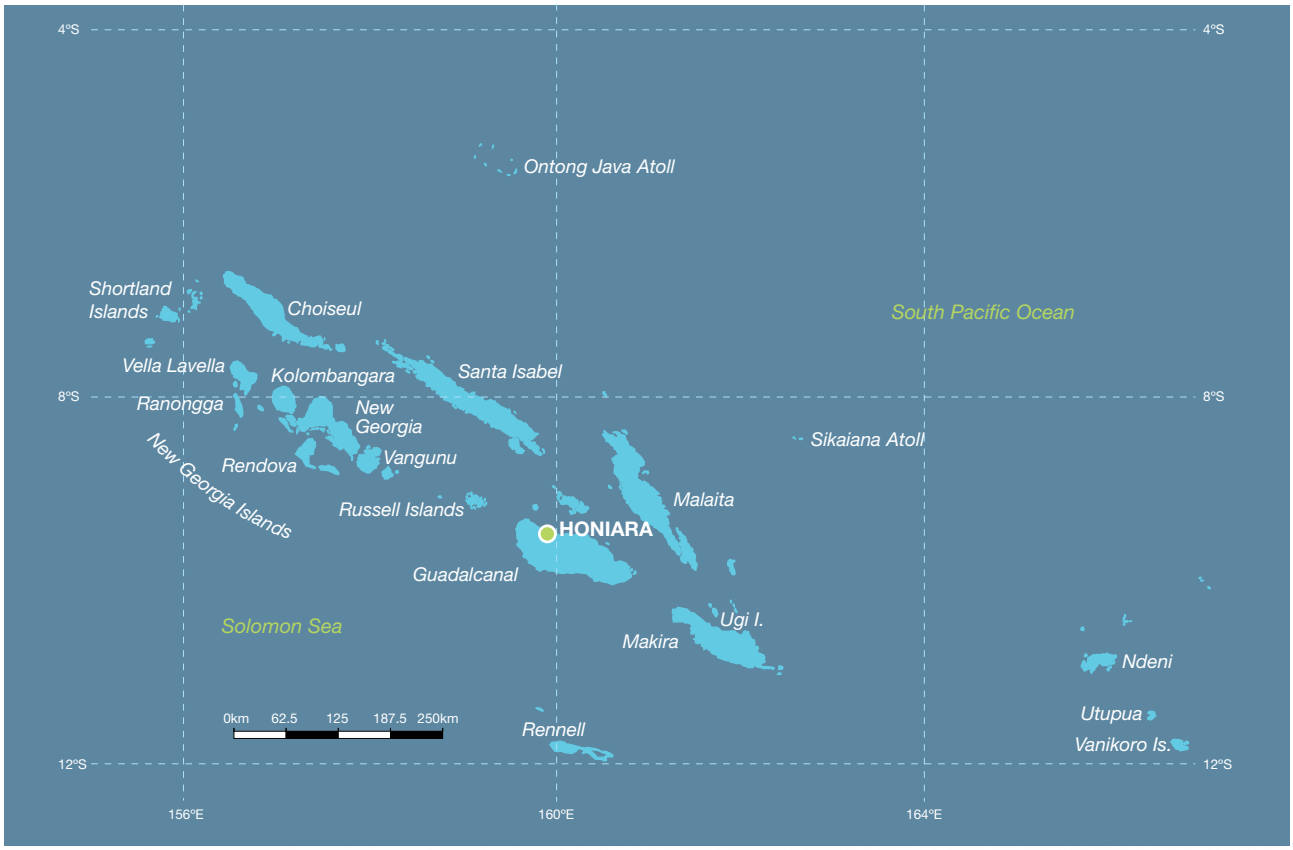


Figure 13.1: Solomon Islands

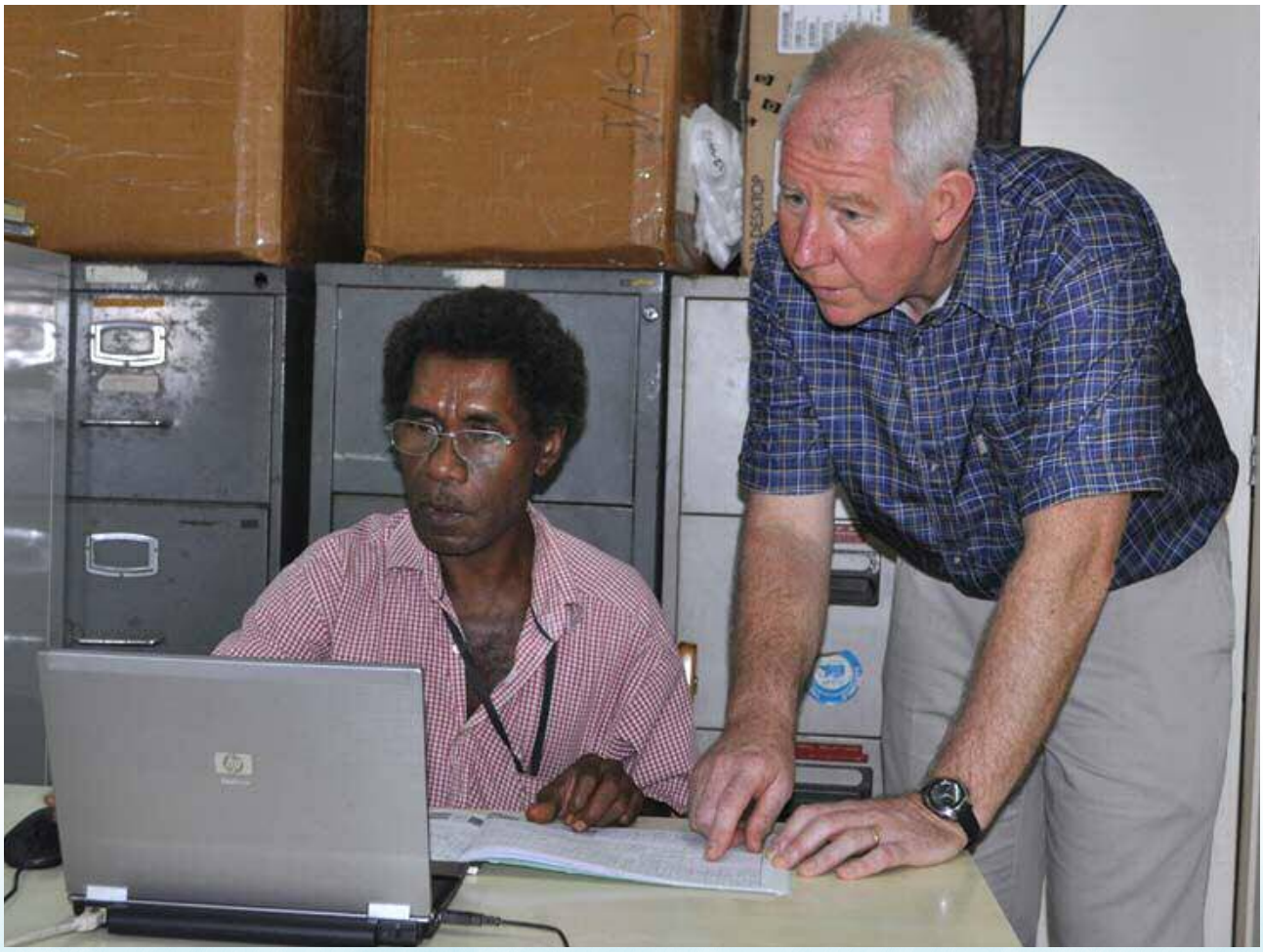
13.3 Data Availability

There are currently six operational meteorological stations in the Solomon Islands. Multiple observations within a 24-hour period are taken at Taro, Munda, Auki, Honiara, Henderson and Santa Cruz (also known as Lata). A single rainfall observation per day is taken at Kirakira (previously multiple observations). More than 60 volunteer single observation rainfall-only stations have closed in recent years. The primary climate station is located in Honiara on the northern side of Guadalcanal Island (Figure 13.1). Several stations, including Auki and Kirakira, have rainfall data from late the 1910s. Honiara has air temperature data from the early 1950s.

Climate records for a Henderson-Honiara composite (1950–2009) and Santa Cruz (1970–2009) have been used. The Henderson-Honiara and Santa Cruz records are homogeneous and more than 95% and 85% complete respectively.

Monthly-averaged sea-level data are available from 1974 at Honiara (1974–1994 and 1994–present). A global positioning system instrument to estimate vertical land motion was deployed in the Solomon Islands in 2008 and will provide valuable direct estimates of local vertical land motion in future years. Both satellite (from 1993) and in situ sea-level data (1950–2009; termed reconstructed sea level; Volume 1, Section 2.2.2.2) are available on a global 1° x 1° grid.

Long-term locally-monitored sea-surface temperature data are unavailable for the Solomon Islands, so large-scale gridded sea-surface temperature datasets have been used (HadISST, HadSST2, ERSST and Kaplan Extended SST V2; Volume 1, Table 2.3).



Climate data management training, Solomon Islands Meteorological Service

13.4 Seasonal Cycles

The climate in the Solomon Islands is tropical with two seasons: the wet season from November to April and the dry season from May to October. The local names for these seasons, *Komburu* and *Ara*, are based on the prevailing direction of the trade winds.

Air temperatures in the Solomon Islands are fairly constant throughout the year with very weak seasonal variations (Figure 13.2). The most significant variation is from July to August when cooler air blows in from the south. In Honiara a slight decrease in temperature is also evident in January, February and March due to increased cloud cover during the wet season. Monthly air temperatures at both sites are closely linked to sea-surface temperatures in the region.

Many climate features influence rainfall in the Solomon Islands. Honiara has a very marked wet season from November to April (Figure 13.2) when on average almost 70% of the yearly total rain falls. In the dry season (May-October) on average about 600 mm falls compared with upwards of 1800 mm in the wet season. Most rain falls from January to March when the West Pacific Monsoon (WPM) is most active in the region. This feeds moisture into the South Pacific Convergence Zone (SPCZ), which is most active in the wet season, and Intertropical Convergence Zone (ITCZ), which lies closest to the Solomon Islands in the wet season. Being further to the east, Santa Cruz sits in a region where the SPCZ is active year-round and it receives more constant rainfall during the year, averaging between 280 mm and 420 mm per month.

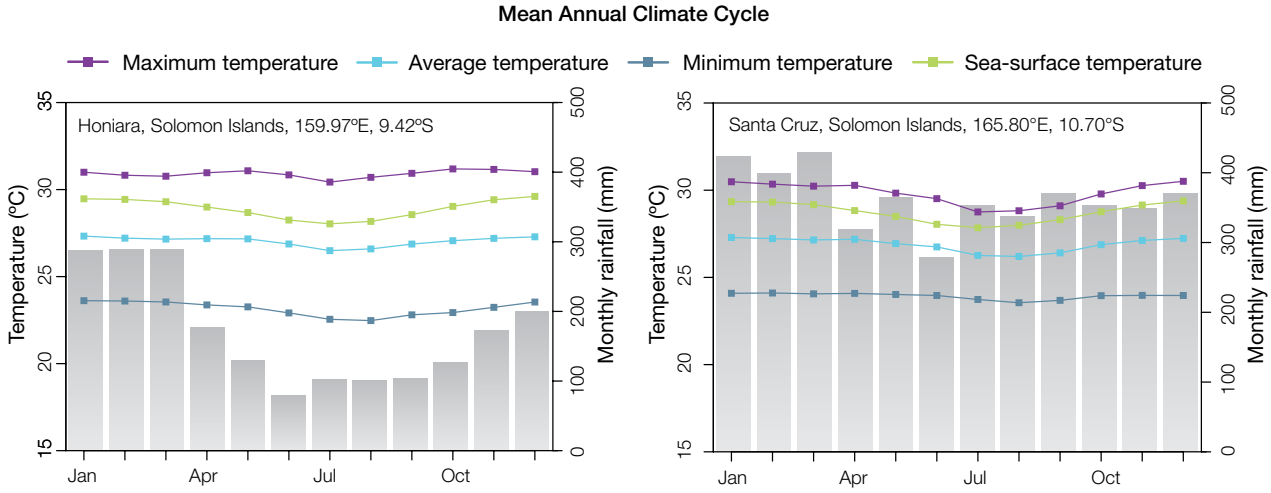


Figure 13.2: Mean annual cycle of rainfall (grey bars) and daily maximum, minimum and mean air temperatures at Honiara (left) and at Santa Cruz (right), and local sea-surface temperatures derived from the HadISST dataset (Volume 1, Table 2.3).

13.5 Climate Variability

Rainfall in the Solomon Islands varies strongly from year-to-year. Annual rainfall in the wettest years can be twice that in the driest years. The El Niño-Southern Oscillation (ENSO) has a strong influence on this year-to-year variability, particularly in the wet season, as seen by the significant correlations between wet season rainfall and ENSO indices in Tables 13.1 and 13.2. The impact of ENSO is stronger in Santa Cruz than Honiara. El Niño events tend to bring drier conditions in the wet season through a delayed onset of the WPM, often until late January or February, and a weaker or displaced SPCZ and ITCZ. During El Niño events wet-season maximum and minimum air temperatures are above normal due to increased solar radiation as a result of reduced cloud cover. During La Niña years wet season rainfall is usually above normal and temperatures are usually lower. ENSO Modoki events (Volume1, Section 3.4.1) also have significant impacts on wet season rainfall and temperatures but the influence is slightly weaker than canonical El Niño and La Niña events. In the dry season canonical ENSO and ENSO Modoki affect only maximum air temperatures. Both types of El Niño bring cooler maximum air temperatures in the dry season, in contrast to them bringing warmer temperatures in the wet season. The effect is due to cooler ocean waters in the region of the Solomon Islands during El Niño events and warmer waters during La Niña events.

Table 13.1: Correlation coefficients between indices of key large-scale patterns of climate variability and minimum and maximum temperatures (Tmin and Tmax) and rainfall at Honiara. Only correlation coefficients that are statistically significant at the 95% level are shown.

Climate feature/index		Dry season (May-October)			Wet season (November-April)		
		Tmin	Tmax	Rain	Tmin	Tmax	Rain
ENSO	Niño3.4		-0.56		0.41	0.55	-0.62
	Southern Oscillation Index		0.68		-0.35	-0.53	0.63
Interdecadal Pacific Oscillation Index							
ENSO Modoki Index			-0.33		0.36	0.45	-0.50
Number of years of data		56	55	58	53	53	58

Table 13.2: Correlation coefficients between indices of key large-scale patterns of climate variability and minimum and maximum temperatures (Tmin and Tmax) and rainfall at Santa Cruz. Only correlation coefficients that are statistically significant at the 95% level are shown.

Climate feature/index		Dry season (May-October)			Wet season (November-April)		
		Tmin	Tmax	Rain	Tmin	Tmax	Rain
ENSO	Niño3.4		-0.73		0.51	0.62	-0.70
	Southern Oscillation Index		0.68		-0.36	-0.56	0.70
Interdecadal Pacific Oscillation Index							
ENSO Modoki Index					0.55	0.70	-0.64
Number of years of data		34	35	39	34	34	39

13.6 Observed Trends

13.6.1 Air Temperature

Warming trends are evident in both annual and seasonal mean air temperatures at Honiara for the period 1951–2009 (Figure 13.3). Annual and seasonal maximum air temperature trends are comparable to those for minimum air temperatures (Table 13.3).

13.6.2 Rainfall

Annual and seasonal rainfall trends for Honiara for the period 1950–2009 are not statistically significant (Table 13.3; Figure 13.4).

13.6.3 Extreme Events

The tropical cyclone season in the Solomon Islands is between November and April. Occurrences outside this period are rare. The tropical cyclone archive for the Southern Hemisphere indicates that between the 1969/70 and 2009/10 cyclone seasons, the centre of 41 tropical cyclones passed within approximately 400 km of Honiara. This represents an average of 10 cyclones per decade. Tropical cyclones were most frequent in El Niño years (13 cyclones per decade) and least frequent in La Niña years (six cyclones per decade). The ENSO-neutral average is nine cyclones per decade. The interannual variability in the number of tropical cyclones in the vicinity of Honiara is large, ranging from zero in some seasons to five in the 1971/72 season (Figure 13.5). This high variability makes it difficult to identify any long-term trends in frequency.

Tropical cyclones result in flooding and wind damage in the Solomon Islands. There have been severe floods on Guadalcanal, Malaita, Makira and Santa Isabel in recent years with a number of lives lost, and severe damage to agriculture and infrastructure.

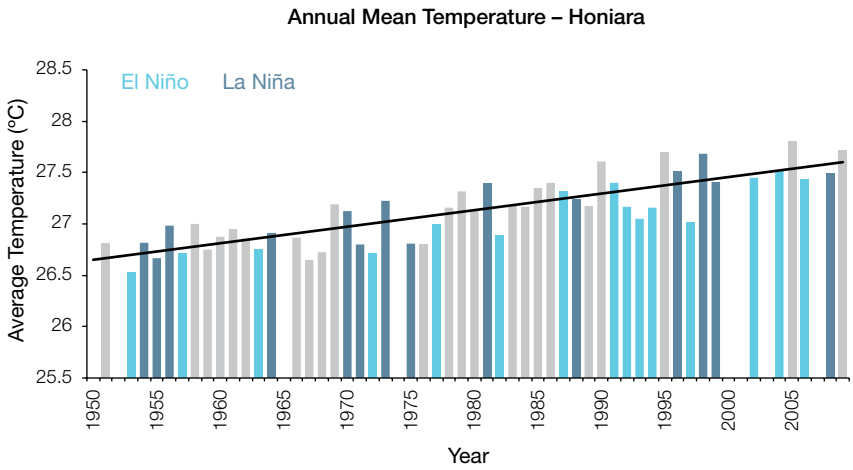


Figure 13.3: Annual mean air temperature for Honiara. Light blue, dark blue and grey bars denote El Niño, La Niña and neutral years respectively.

Table 13.3: Annual and seasonal trends in maximum, minimum and mean air temperature (Tmax, Tmin and Tmean; 1951–2009) and rainfall (1950–2009) at Honiara. Asterisks indicate significance at the 95% level. Persistence is taken into account in the assessment of significance as in Power and Kociuba (in press). The statistical significance of the air temperature trends is not assessed.

	Honiara Tmax (°C per 10 yrs)	Honiara Tmin (°C per 10 yrs)	Honiara Tmean (°C per 10 yrs)	Honiara Rain (mm per 10 yrs)
Annual	+0.16	+0.18	+0.17	-40
Wet season	+0.19	+0.18	+0.18	-32
Dry season	+0.15	+0.18	+0.17	-5

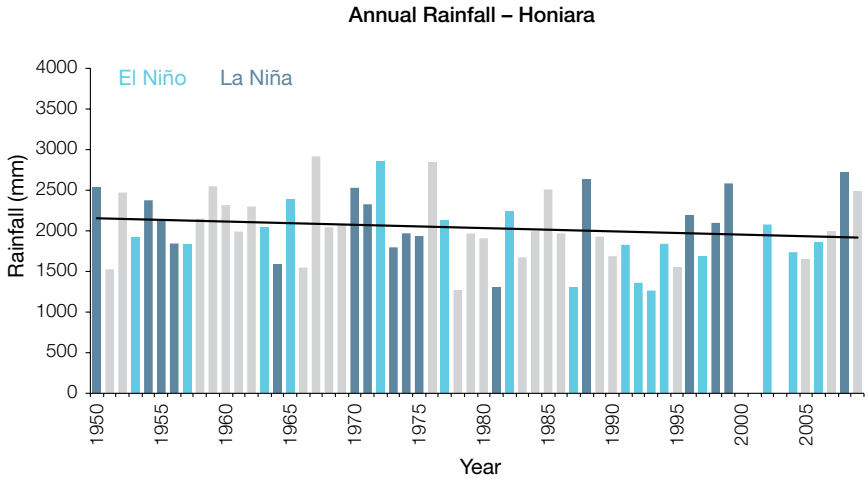


Figure 13.4: Annual rainfall at Honiara. Light blue, dark blue and grey bars denote El Niño, La Niña and neutral years respectively.

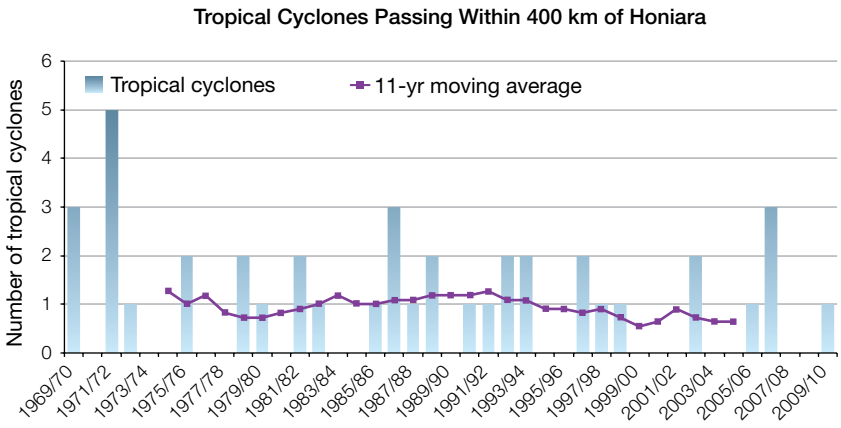


Figure 13.5: Tropical cyclones passing within 400 km of Honiara per season. The 11-year moving average is in purple.

13.6.4 Sea-Surface Temperature

Water temperatures around the Solomon Islands have risen gradually since the 1950s. Since the 1970s the rate of warming has been approximately 0.12°C per decade. Figure 13.7 shows the 1950–2000 sea-surface temperature changes (relative to a reference year of 1990) from three different large-scale sea-surface temperature gridded datasets (HadSST2, ERSST and Kaplan Extended SST V2; Volume 1, Table 2.3). At these regional scales, natural variability may play a large role determining sea-surface temperature in the region making it difficult to identify any long-term trends.

13.6.5 Ocean Acidification

Based the large-scale distribution of coral reefs across the Pacific and the seawater chemistry, Guinotte et al. (2003) suggested that seawater aragonite saturation states above 4 were optimal for coral growth and for the development of healthy reef ecosystems, with values from 3.5 to 4 adequate for coral growth, and values between 3 and 3.5, marginal. Coral reef ecosystems were not found at seawater aragonite saturation states below 3 and these conditions were classified as extremely marginal for supporting coral growth.

In the Solomon Islands region, the aragonite saturation state has declined from about 4.5 in the late 18th century to an observed value of about 3.9 ± 0.1 by 2000.

13.6.6 Sea Level

Monthly averages of the historical tide gauge, satellite (since 1993) and gridded sea-level (since 1950) data agree well after 1993 and indicate interannual variability in sea levels of about 31 cm (estimated 5–95% range) after removal of the seasonal cycle (Figure 13.10). The sea-level rise near Solomon Islands measured by satellite altimeters (Figure 13.6) since 1993 is mostly over 8 mm per year, larger than the global average of 3.2 ± 0.4 mm per year. This rise is partly linked to a pattern related to climate variability from year to year and decade to decade (Figure 13.10).

13.6.7 Extreme Sea-Level Events

The annual climatology of the highest daily sea levels has been evaluated from hourly measurements by the tide gauge at Honiara (Figure 13.7). High tides are largest near the equinoxes, in April–May and November–December. The seasonal cycle curve is fairly flat throughout the year but sea levels in this time frame are strongly modified by ENSO with sea levels higher by around 0.1 m during La Niña seasons and lower by a similar amount during El Niño seasons. Short-term variations (due mainly to weather events) are fairly uniform throughout the year with little influence apparent due to ENSO. The top 10 sea-level events in the record cluster around the tidal maxima and mostly occur during La Niña years. This is further supported by the values of wind speed and pressure which indicate that severe weather was not the cause of the high sea-level events, further supporting the notion that the extremes are mainly the result of other factors such as tides and ENSO.

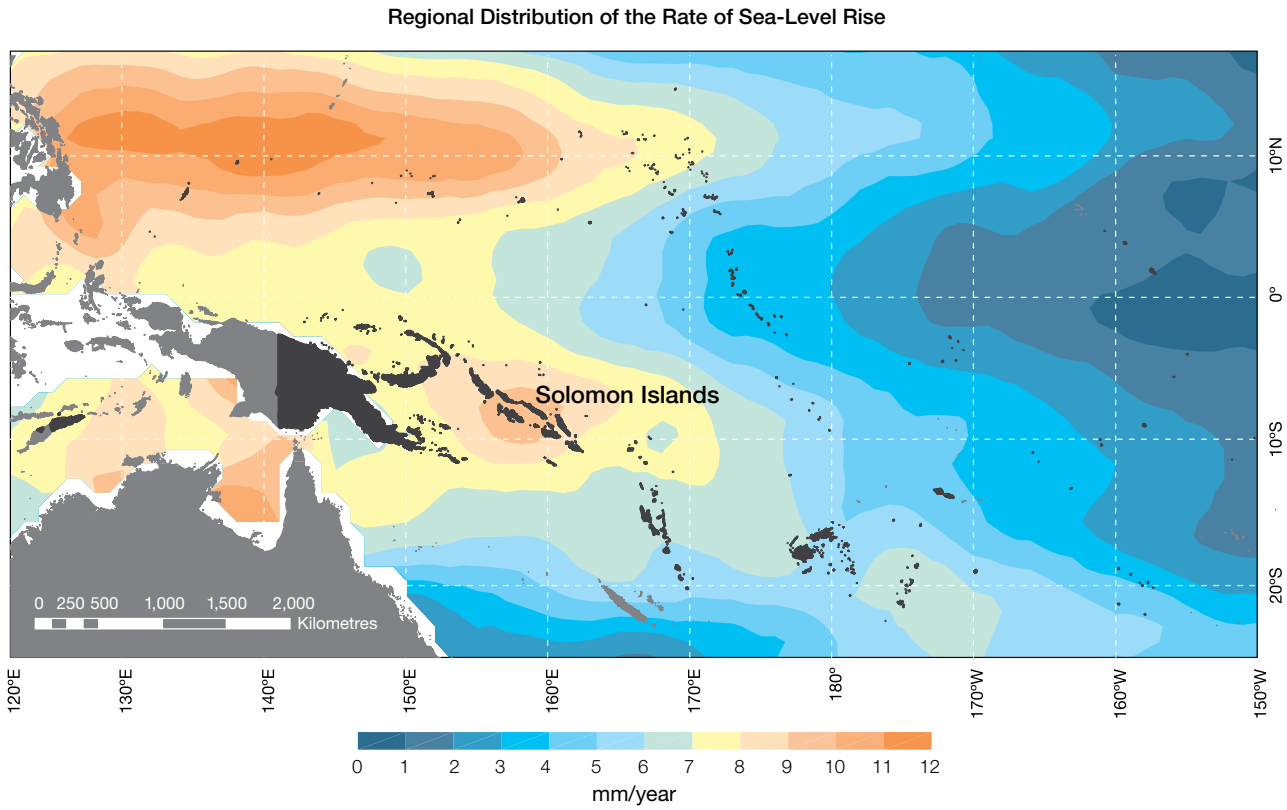


Figure 13.6: The regional distribution of the rate of sea-level rise measured by satellite altimeters from January 1993 to December 2010, with the location of Solomon Islands indicated. Further detail about regional distribution of sea-level rise is provided in Volume 1, Section 3.6.3.2.

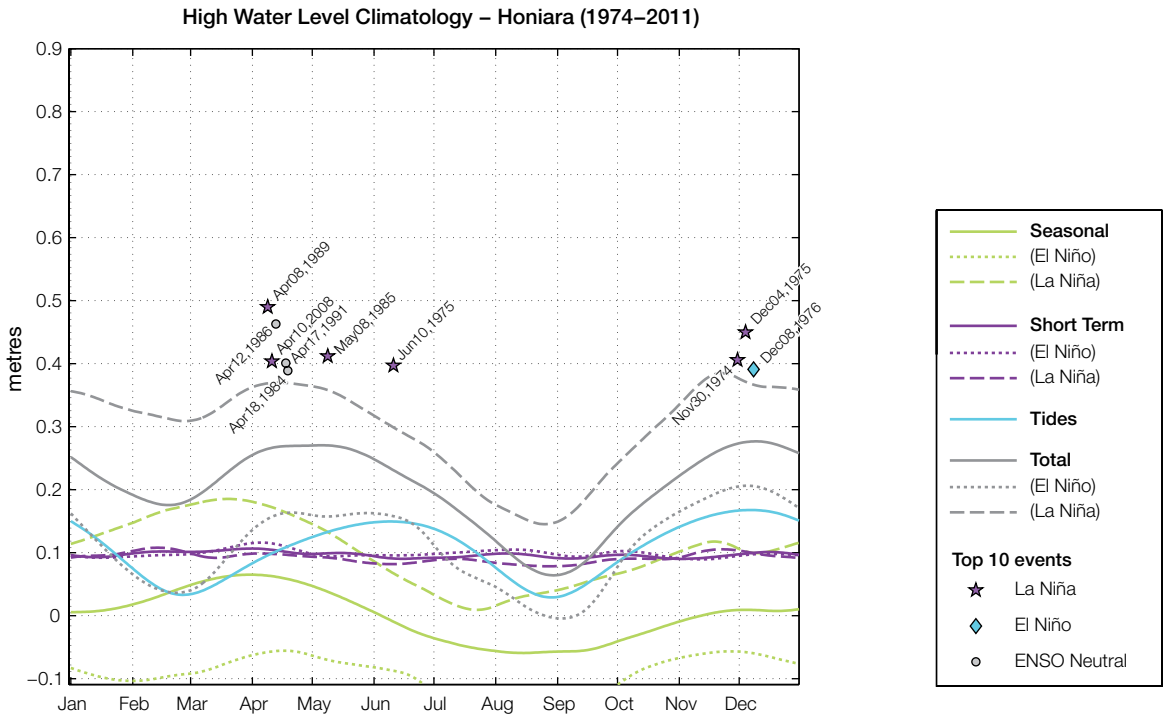


Figure 13.7: The annual cycle of high waters relative to Mean Higher High Water (MHHW) due to tides, short-term fluctuations (most likely associated with storms) and seasonal variations for Honiara. The tides and short-term fluctuations are respectively the 95% exceedence levels of the astronomical high tides relative to MHHW and short-term sea level fluctuations. Components computed only for El Niño and La Niña months are shown by dotted and dashed lines, and grey lines are the sum of the tide, short-term and seasonal components. The 10 highest sea level events in the record relative to MHHW are shown and coded to indicate the phase of ENSO at the time of the extreme event.

13.7 Climate Projections

Climate projections have been derived from up to 18 global climate models from the CMIP3 database, for up to three emissions scenarios (B1 (low), A1B (medium) and A2 (high)) and three 20-year periods (centred on 2030, 2055 and 2090, relative to 1990). These models were selected based on their ability to reproduce important features of the current climate (Volume 1, Section 5.2.3), so projections from each of the models are plausible representations of the future climate. This means there is not one single projected future for the Solomon Islands, but rather a range of possible futures. The full range of these futures is discussed in the following sections.

These projections do not represent a value specific to any actual location, such as a town or city in the Solomon Islands. Instead, they refer to an average change over the broad geographic region encompassing the Solomon Islands and the surrounding ocean (Figure 1.1 shows the regional boundaries). Some information regarding dynamical downscaling simulations from the CCAM model (Section 1.7.2) is also provided, in order to indicate how changes in the climate on an individual island-scale may differ from the broad-scale average.

Section 1.7 provides important information about understanding climate model projections.

13.7.1 Temperature

Surface air temperature and sea-surface temperature are projected to continue to increase over the course of the 21st century. There is *very high* confidence in this direction of change because:

- Warming is physically consistent with rising greenhouse gas concentrations.
- All CMIP3 models agree on this direction of change.

The majority of CMIP3 models simulate a slight increase (<1°C) in annual and seasonal mean temperature by 2030, however by 2090 under the A2 (high) emissions scenario temperature increases of greater than 2.5°C are simulated by almost all models (Table 13.4). Given the close relationship between surface air temperature and sea-surface temperature, a similar (or slightly weaker) rate of warming is projected for the surface ocean (Figure 13.8). There is *high* confidence in this range and distribution of possible futures because:

- There is generally close agreement between modelled and observed temperature trends over the past 50 years in the vicinity of the Solomon Islands, although observational records are limited (Figure 13.8).

The 8 km CCAM simulations suggest that projected changes in the average daily maximum air temperature over land can be up to 0.5°C greater than over the surrounding ocean. This suggests that the CMIP3 models may slightly underestimate future increases in daily maximum air temperature.

Interannual variability in surface air temperature and sea-surface temperature over the Solomon Islands is strongly influenced by ENSO in the current climate (Section 13.5). As there is no consistency in projections of future ENSO activity (Volume 1, Section 6.4.1) it is not possible to determine whether interannual variability in temperature will change in the future. However, ENSO is expected to continue to be an important source of variability for the region.

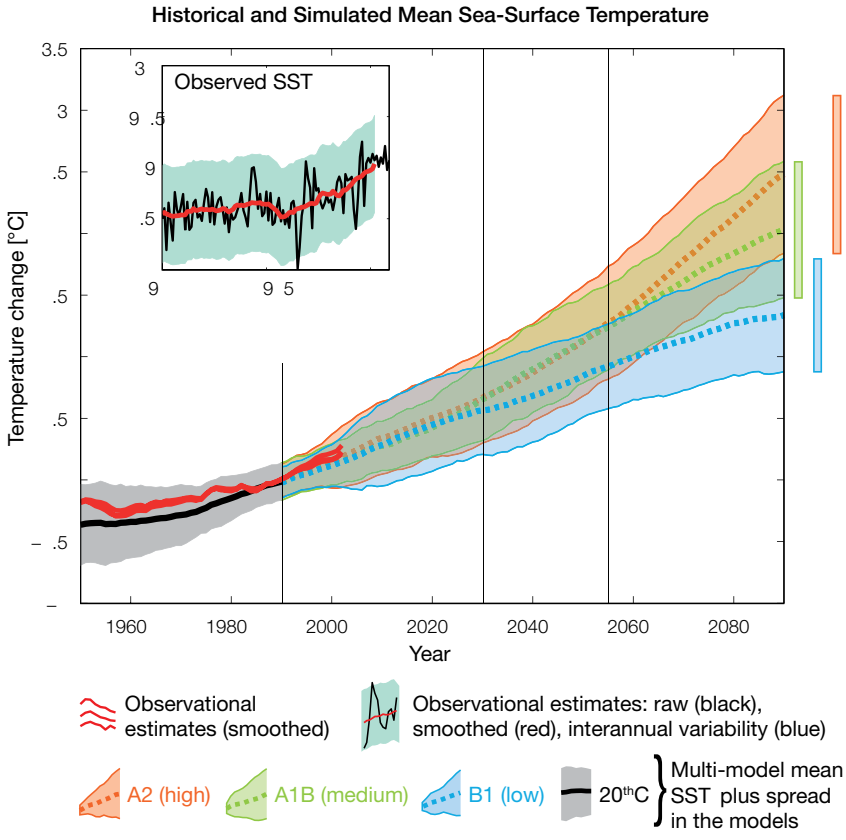


Figure 13.8: Historical climate (from 1950 onwards) and simulated historical and future climate for annual mean sea-surface temperature (SST) in the region surrounding Solomon Islands, for the CMIP3 models. Shading represents approximately 95% of the range of model projections (twice the inter-model standard deviation), while the solid lines represent the smoothed (20-year running average) multi-model mean temperature. Projections are calculated relative to the 1980–1999 period (which is why there is a decline in the inter-model standard deviation around 1990). Observational estimates in the main figure (red lines) are derived from the HadSST2, ERSST and Kaplan Extended SST V2 datasets (Volume 1, Section 2.2.2). Annual average (black) and 20-year running average (red) HadSST2 data is also shown inset.

13.7.2 Rainfall

Wet season (November-April), dry season (May-October) and annual average rainfall are projected to increase over the course of the 21st century. There is *high* confidence in this direction of change because:

- Physical arguments indicate that rainfall will increase in the equatorial Pacific in a warmer climate (IPCC, 2007; Volume 1, Section 6.4.3).
- Almost all of the CMIP3 models agree on this direction of change by 2090.

The majority of CMIP3 models simulate little change (-5% to 5%) in annual and seasonal rainfall by 2030, however by 2090 under the higher emissions scenarios (i.e. A2 (high) and A1B (medium)) the majority simulate an increase (>5%), with very few models simulating a decrease (<-5%) (Table 13.4). There is *moderate* confidence in this range and distribution of possible futures because:

- In simulations of the current climate, the CMIP3 models broadly capture the influence of the West Pacific Monsoon, Intertropical Convergence Zone and South Pacific Convergence Zone on the rainfall of the Solomon Islands (Volume 1, Section 5.2.3), although most models produce monsoon westerly winds that do not extend far enough east into the Pacific basin
- The CMIP3 models are unable to resolve many of the physical processes involved in producing rainfall. As a consequence, they do not simulate rainfall as well as other variables such as temperature (Volume 1, Chapter 5).

The inconsistency between the projected increase in annual rainfall and the recent declining trend observed for Honiara (Section 13.6.2) may be related to local factors not captured by the models (e.g. topography), or the fact that the projections presented here represent an average over a very large geographic region (Sections 1.7.1 and 1.7.2).

Interannual variability in rainfall over the Solomon Islands is strongly influenced by ENSO in the current climate (Section 13.5). As there is no consistency in projections of future ENSO activity (Volume 1, Section 6.4.1) it is not possible to determine whether interannual variability in rainfall will change in the future.

13.7.3 Extremes

Temperature

The intensity and frequency of days of extreme heat are projected to increase over the course of the 21st century. There is *very high* confidence in this direction of change because:

- An increase in the intensity and frequency of days of extreme heat is physically consistent with rising greenhouse gas concentrations.
- All CMIP3 models agree on the direction of change for both intensity and frequency.

The majority of CMIP3 models simulate an increase of approximately 1°C in the temperature experienced on the 1-in-20-year hot day by 2055 under the B1 (low) emissions scenario, with an increase of over 2.5°C simulated by the majority of models by 2090 under the A2 (high) emissions scenario (Table 13.4). There is *low* confidence in this range and distribution of possible futures because:

- In simulations of the current climate, the CMIP3 models tend to underestimate the intensity and frequency of days of extreme heat (Volume 1, Section 5.2.4).
- Smaller increases in the frequency of days of extreme heat are projected by the CCAM 60 km simulations.

Rainfall

The intensity and frequency of days of extreme rainfall are projected to increase over the course of the 21st century. There is *high* confidence in this direction of change because:

- An increase in the frequency and intensity of extreme rainfall is consistent with larger-scale projections, based on the physical argument that the atmosphere is able to hold more water vapour in a warmer climate (Allen and Ingram, 2002; IPCC, 2007). It is also consistent with physical arguments that rainfall will increase in the deep tropical Pacific in a warmer climate (IPCC, 2007; Volume 1, Section 6.4.3).
- Almost all of the CMIP3 models agree on this direction of change for both intensity and frequency.

The majority of CMIP3 models simulate an increase of at least 15 mm in the amount of rain received on the 1-in-20-year wet day by 2055 under the B1 (low) emissions scenario, with an increase of at least 30 mm simulated by 2090 under the A2 (high) emissions scenario. The majority of models project that the current 1-in-20-year event will occur, on average, three to four times every year by 2055 under the B1 (low) emissions scenario and five times every year by 2090 under the A2 (high) emissions scenario. There is *low* confidence in this range and distribution of possible futures because:

- In simulations of the current climate, the CMIP3 models tend to underestimate the intensity and frequency of extreme rainfall (Volume 1, Section 5.2.4).
- The CMIP3 models are unable to resolve many of the physical processes involved in producing extreme rainfall.

Drought

The incidence of drought is projected to decrease over the course of the 21st century. There is *moderate* confidence in this direction of change because:

- A decrease in drought is consistent with projections of increased rainfall (Section 13.7.2).
- The majority of models agree on this direction of change for most drought categories.

The majority of CMIP3 models project that mild drought will occur approximately seven to eight times

every 20 years in 2030 under all emissions scenarios, decreasing to six to seven times by 2090. The frequency of moderate and severe drought is projected to remain approximately stable, at once to twice and once every 20 years, respectively. There is *low* confidence in this range and distribution of possible futures because:

- There is only moderate confidence in the range of rainfall projections (Section 13.7.2), which directly influences projections of future drought conditions.

Tropical Cyclones

Tropical cyclone numbers are projected to decline in the south-west Pacific Ocean basin (0–40ºS, 130ºE–170ºE) over the course of the 21st century. There is *moderate* confidence in this direction of change because:

- Many studies suggest a decline in tropical cyclone frequency globally (Knutson et al., 2010).
- Tropical cyclone numbers decline in the south-west Pacific Ocean in the majority assessment techniques.

Based on the direct detection methodologies (Curvature Vorticity Parameter (CVP) and the CSIRO Direct Detection Scheme (CDD) described in Volume 1, Section 4.8.2), 55% of projections show no change or a decrease in tropical cyclone formation when applied to the CMIP3 climate models for which suitable output is available. When these techniques are applied to CCAM, 100% of projections show a decrease in tropical cyclone formation. In addition, the Genesis Potential Index (GPI) empirical technique suggests that conditions for tropical cyclone formation will become less favourable in the south-west Pacific Ocean basin, for the majority (80%) of analysed CMIP3 models. There is *moderate* confidence in this range and distribution of possible futures because in simulations of the current climate, the CVP, CDD and GPI methods capture the frequency of tropical cyclone activity reasonably well (Volume 1, Section 5.4).

Despite this projected reduction in total cyclone numbers, five of the six CCAM 60 km simulations show an increase in the proportion of the most severe cyclones. Most models also indicate a reduction in tropical cyclone wind hazard north of 20ºS latitude and regions of increased hazard south of 20ºS latitude. This increase in wind hazard coincides with a poleward shift in the latitude at which tropical cyclones are most intense.

13.7.4 Ocean Acidification

The acidification of the ocean will continue to increase over the course of the 21st century. There is *very high* confidence in this projection as the rate of ocean acidification is driven primarily by the increasing oceanic uptake of carbon dioxide, in response to rising atmospheric carbon dioxide concentrations.

Projections from all analysed CMIP3 models indicate that the annual maximum aragonite saturation state will reach values below 3.5 by about 2045 and continue to decline thereafter (Figure 13.9; Table 13.4). There is *moderate* confidence in this range and distribution of possible futures because the projections are based on climate models without an explicit representation of the carbon cycle and with relatively low resolution and known regional biases.

The impact of acidification change on the health of reef ecosystems is likely to be compounded by other stressors including coral bleaching, storm damage and fishing pressure.

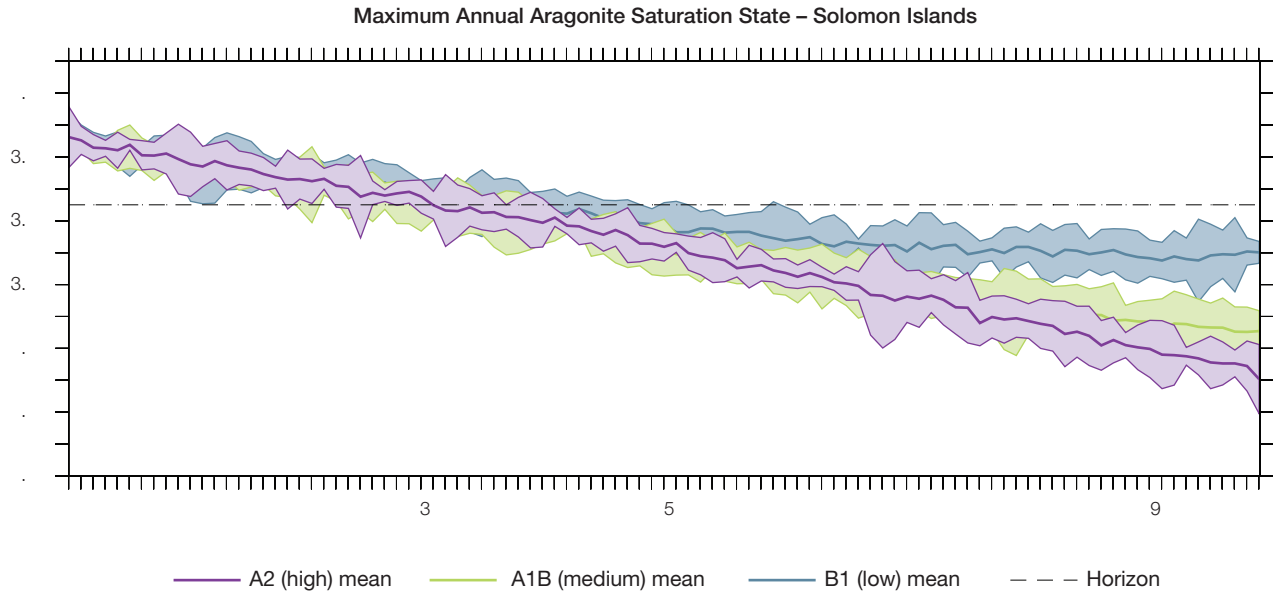


Figure 13.9: Multi-model projections, and their associated uncertainty (shaded area represents two standard deviations), of the maximum annual aragonite saturation state in the sea surface waters of the Solomon Islands region under the different emissions scenarios. The dashed black line represents an aragonite saturation state of 3.5.

13.7.5 Sea Level

Mean sea level is projected to continue to rise over the course of the 21st century. There is *very high* confidence in this direction of change because:

- Sea-level rise is a physically consistent response to increasing ocean and atmospheric temperatures, due to thermal expansion of the water and the melting of glaciers and ice caps.
- Projections arising from all CMIP3 models agree on this direction of change.

The CMIP3 models simulate a rise of between approximately 5–15 cm by 2030, with increases of 20–60 cm indicated by 2090 under the higher emissions scenarios (i.e. A2 (high) and A1B (medium); Figure 13.10; Table 13.4). There is *moderate* confidence in this range and distribution of possible futures because:

- There is significant uncertainty surrounding ice-sheet contributions to sea-level rise and a rise larger than projected above cannot be excluded (Meehl et al., 2007b). However, understanding of the processes is currently too limited to provide a best estimate or an upper bound (IPCC, 2007).
- Globally, since the early 1990s, sea level has been rising near the upper end of the above projections. During the 21st century, some studies (using semi-empirical models) project faster rates of sea-level rise.

Interannual variability of sea level will lead to periods of lower and higher regional sea levels. In the past, this interannual variability has been about 31 cm (5–95% range, after removal of the seasonal signal; dashed lines in Figure 13.10 (a)) and it is likely that a similar range will continue through the 21st century. In addition, winds and waves associated with weather phenomena will continue to lead to extreme sea-level events.

In addition to the regional variations in sea level associated with ocean and mass changes, there are ongoing changes in relative sea level associated with changes in surface loading over the last glacial cycle (glacial isostatic adjustment) and local tectonic motions. The glacial isostatic motions are relatively small for the PCCSP region.

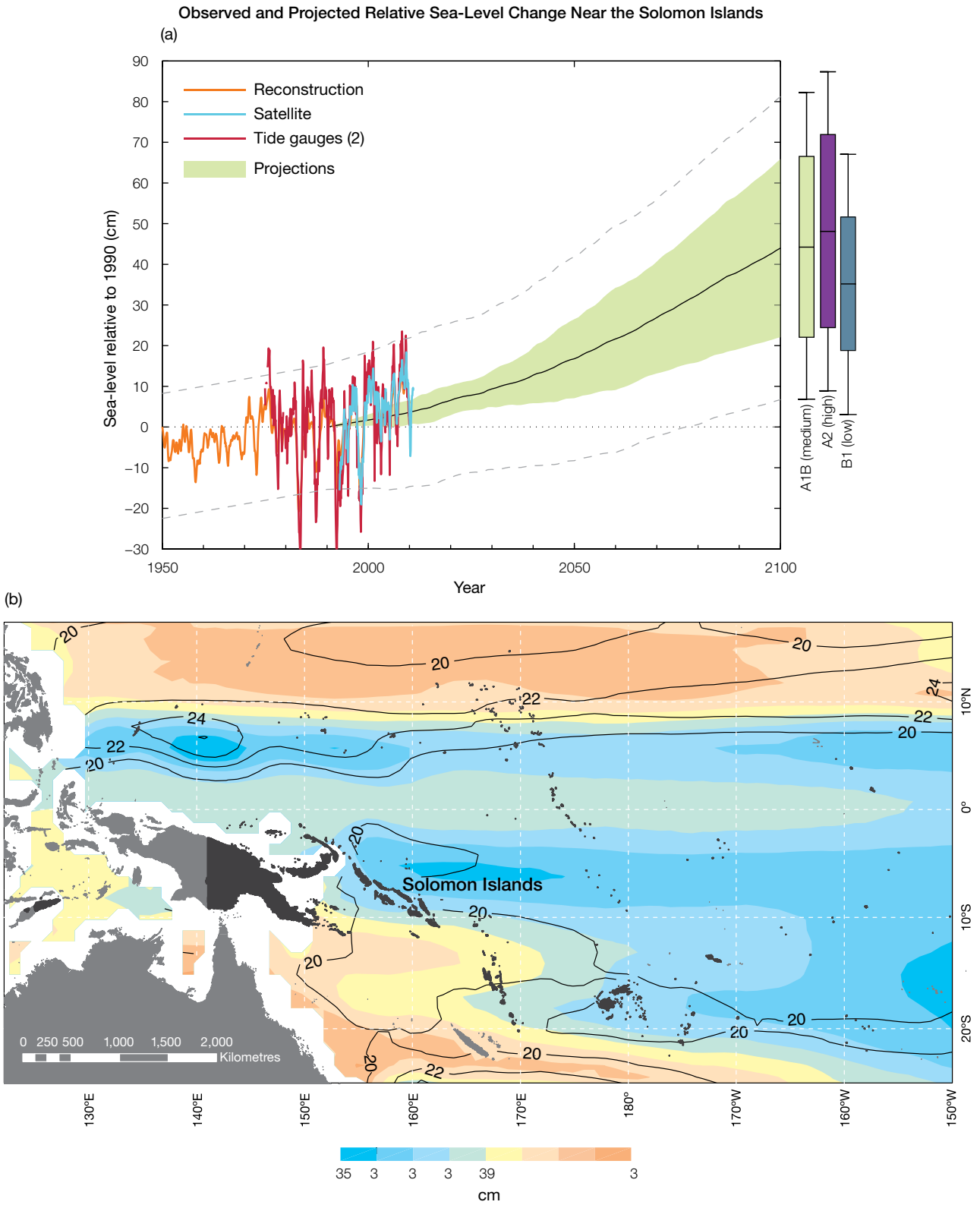


Figure 13.10: Observed and projected relative sea-level change near the Solomon Islands. (a) The observed in situ relative sea-level records are indicated in red, with the satellite record (since 1993) in light blue. The gridded sea level at the Solomon Islands (since 1950, from Church and White (in press)) is shown in orange. The projections for the A1B (medium) emissions scenario (5–95% uncertainty range) are shown by the green shaded region from 1990–2100. The range of projections for the B1 (low), A1B (medium) and A2 (high) emissions scenarios by 2100 are also shown by the bars on the right. The dashed lines are an estimate of interannual variability in sea level (5– 95% range about the long-term trends) and indicate that individual monthly averages of sea level can be above or below longer-term averages. (b) The projections (in cm) for the A1B (medium) emissions scenario in the Solomon Islands region for the average over 2081–2100 relative to 1981–2000 are indicated by the shading, with the estimated uncertainty in the projections indicated by the contours (in cm).

13.7.6 Projections Summary

The projections presented in Section 13.7 are summarised in Table 13.4. For detailed information regarding the various uncertainties associated with the table values, refer to the preceding text in Sections 13.7 and 1.7, in addition to Chapters 5 and 6 in Volume 1. When interpreting the differences between projections for the A2 (high), A1B (medium) and B1 (low) emissions scenarios, it is also important to consider the emissions pathways associated with each scenario (Volume 1, Figure 4.1) and the fact that a slightly different subset of models was available for each (Volume 1, Appendix 1).

Table 13.4: Projected change in the annual and seasonal mean climate for the Solomon Islands, under the B1 (low; blue), A1B (medium; green) and A2 (high; purple) emissions scenarios. Projections are given for three 20-year periods centred on 2030 (2020–2039), 2055 (2046–2065) and 2090 (2080–2099), relative to 1990 (1980–1999). Values represent the multi-model mean change ± twice the inter-model standard deviation (representing approximately 95% of the range of model projections), except for sea level where the estimated mean change and the 5–95% range are given (as they are derived directly from the Intergovernmental Panel on Climate Change Fourth Assessment Report values). The confidence (Section 1.7.2) associated with the range and distribution of the projections is also given (indicated by the standard deviation and multi-model mean, respectively). See Volume 1, Appendix 1 for a complete listing of CMIP3 models used to derive these projections.

Variable	Season	2030	2055	2090	Confidence
Surface air temperature (°C)	Annual	+0.6 ± 0.4 +0.8 ± 0.4 +0.7 ± 0.3	+1.1 ± 0.4 +1.4 ± 0.5 +1.4 ± 0.4	+1.5 ± 0.6 +2.3 ± 0.8 +2.7 ± 0.6	High
Maximum temperature (°C)	1-in-20-year event	N/A	+1.0 ± 0.5 +1.4 ± 0.6 +1.5 ± 0.4	+1.3 ± 0.6 +2.1 ± 1.0 +2.7± 1.2	Low
Minimum temperature (°C)	1-in-20-year event	N/A	+1.2 ± 1.8 +1.5 ± 1.9 +1.6 ± 1.7	+1.7 ± 1.6 +2.2 ± 1.9 +2.5 ± 1.8	Low
Total rainfall (%)*	Annual	+1 ± 9 +2 ± 9 +2 ± 6	+4 ± 8 +5 ± 10 +4 ± 9	+6 ± 9 +9 ± 11 +9 ± 12	Moderate
Wet season rainfall (%)*	November-April	+2 ± 9 +2 ± 9 +2 ± 7	+5 ± 8 +6 ± 11 +4 ± 7	+6 ± 7 +9 ± 11 +9 ± 11	Moderate
Dry season rainfall (%)*	May-October	0 ± 11 +2 ± 13 +2 ± 9	+3 ± 11 +4 ± 12 +5 ± 15	+6 ± 14 +9 ± 16 +10 ± 18	Moderate
Sea-surface temperature (°C)	Annual	+0.6 ± 0.4 +0.7 ± 0.3 +0.7 ± 0.4	+0.9 ± 0.3 +1.2 ± 0.3 +1.3 ± 0.5	+1.3 ± 0.5 +2.0 ± 0.6 +2.5 ± 0.6	High
Aragonite saturation state (Ωar)	Annual maximum	+3.6 ± 0.1 +3.5 ± 0.1 +3.5 ± 0.1	+3.3 ± 0.1 +3.1 ± 0.1 +3.1 ± 0.1	+3.1 ± 0.1 +2.7 ± 0.2 +2.5 ± 0.1	Moderate
Mean sea level (cm)	Annual	+9 (4–14) +9 (5–14) +9 (4–15)	+18 (10–26) +19 (8–30) +19 (8–30)	+31 (17–45) +38 (19–58) +40 (20–60)	Moderate

*The MIROC3.2(medres) and MIROC3.2(hires) models were eliminated in calculating the rainfall projections, due to their inability to accurately simulate one or more of the South Pacific Convergence Zone, Intertropical Convergence Zone and the West Pacific Monsoon (Volume 1, Section 5.5.1).

Annex 2: PPG Inception Workshop Report

Solomon Islands Water Sector Adaptation Project (SIWSAP)

PPG Inception Report
August 2013

James Dalton
IUCN Global Water Programme
Switzerland

TABLE OF CONTENTS

INTRODUCTION

Progress towards reaching the Millennium Development Goals (MDGs) in the Solomon Islands shows good progress for primary education and maternal and child mortality. However, coverage for rural water supply and sanitation remains low. Previous tensions, weather conditions, and an expanding population have put pressure of the water supply and sanitation services across the country. 71% of the households across the country do not have improved sanitation facilities, and around 30% do not have improved access to safe drinking water. For rural areas these numbers are lower with over 80% having no access to improved sanitation facilities, and almost 40% do not have improved access to safe drinking water. For a country where 80% of the population are classed as rural these are sobering statistics.

Climate change impacts are already being seen in the Solomon's. Sea level rise is predicted to be between 8-10 mm/yr, almost three times the global average. Equally, temperature records indicate a general warming in the region with rainfall records indicating a reduction in rainfall. The Solomon Islands are in a complex part of the Pacific Ocean, affected by the El Nino Southern Oscillation (ENSO), the South Pacific Convergence zone (SPCZ), the Inter-Tropical Convergence Zone (ITCZ) and the Western Pacific Monsoon (WPM). The complex climate changes affect rainfall patterns, evapotranspiration rates, and groundwater quality (due to sea level rise). Furthermore, the region has been affected most recently by earthquakes, tsunamis, and cyclones.

The link, therefore, between water resources, water supply and sanitation, and climate change is obvious. Although there is a need to focus on rolling out further service delivery for water supply and sanitation services, there is a concern than the sector will struggle to cope with climate change impacts unless adaptation planning becomes more central to water resource management and water supply and sanitation design, construction, management and operation.

BACKGROUND AND CONTEXT

The Project Identification Form (PIF) outlines the full scale of what the Solomon Islands Water Sector Adaptation Project (SIWSAP) is expected to do. Water and sanitation are falling behind as a service and resource to the people of the Solomon Islands. MDG Progress Reporting from 2010 shows that the country is off-track to achieve MDG 7 on water supply and sanitation (watsan). Furthermore, the population growth rate of the Solomon Islands suggests that even keeping at existing levels of coverage will become a challenge.

Assessments from the IPCC Fourth Assessment Report, together with newer and more regionally focussed science suggest that rainfall patterns will be affected in the Melanesian region, with the Western part becoming drier, and the Eastern part becoming wetter, whilst also facing greater variability between droughts and floods.

Combined with the predicted impacts of climate change, the water supply and sanitation sector has a major challenge to provide an existing level of coverage, and coverage in the future for an expanding population. Addressing the water supply and sanitation challenge through improving the resilience of water supply and sanitation services, through infrastructure improvements, water storage, governance and capacity development should provide co-benefits as well. Benefits such as improved human health, and through this access to education, greater gender equality, and greater productive output.

Following approval of the PIF by the GEF Secretariat, UNDP mobilised a team to prepare the SIWSAP project. This project development phase has three main objectives:

- To deliver preliminary technical assessments
- To conduct stakeholder dialogue and capacity assessments, and
- To develop the required documentation to secure the project.

The lead Solomon Island Government (SIG) Agency for this project development phase is the Ministry of Mines, Energy, and Rural Electrification (MMERE). They will work closely with SIG counterparts the Rural Water Supply and Sanitation programme (RWSS) within the Ministry of Health and Medical Services (MHMS).

THE SOLOMON ISLANDS WATER SECTOR ADAPTATION PROJECT (SIWSAP)

The project will be designed around three main components. These are briefly described below.

The project objective is *to improve the resilience of water resources to the impacts of climate change in order to improve health, sanitation and quality of life, and sustain livelihoods in targeted vulnerable areas.*

Component 1: Water Sector Climate Change Adaptation (WS-CCA) Plans in the Context of Integrated Water Resources Management (IWRM)

Outcome 1.1: WS –CCA plans formulated, integrated and mainstreamed in water sector-related and in broader policy and development frameworks

Through identifying the vulnerabilities of water supply systems at the pilot sites (water quantity and quality) using tools that can be adjusted to focus on adaptation concerns. From these is it possible to develop Adaptation Response Plans for the water sector. These plans will be framed within the context of integrated water resource management (IWRM) planning to ensure alignment with existing approaches within the SIG procedures. Note that IWRM itself is a fairly new concept to the Solomon Islands. The Government, through the Water Resources Division (MMERE), are currently implementing an IWRM demonstration project funded by the GEF and supported by a Project Coordination Unit based in SPC/SOPAC in Fiji. As part of any IWRM planning process, budget is required to ensure that integrated sectoral planning for water is maintained in the future.

Adaptation Response Plans will therefore need to not only demonstrate adaptation planning and response (action-on-the-ground) at the pilot site level, but will also need to demonstrate how 'additional' activities in the water sector are required to future proof natural and built water storage and reserves for many different sectoral needs. Budget requirements, and possible integrated budgeting for adaptation will need to be considered under the design phase for the full project to consider. Guidelines will need to be established which guide the water sector to better consider adaptation approaches, but which can also be used to influence other 'sectoral' approaches to do the same, such as modification of building codes (and not just to cope with seal level rise, but also rainfall changes).

Component 2: Implementation of Water Sector – Climate Change Adaptation (WS-CCA) plans

Outcome 2.1: Increased reliability and improved quality of water supply in targeted areas

Outcome 2.2: Investments in cost-effective and adaptive water and sanitation management and technology transfer

Closely linked to Component 1, implementation of the plans will follow developing them for each site under the full project. This will include not only the 'hard' or built options – such as additional storage needs (not necessarily to be funded under SIWSAP), but also the diversification of sources (such as additional springs, surface water options, groundwater and rainwater harvesting options). The project will need to consider ecosystem based approaches as well, such as watershed protection, recharge zones, slope stabilisation and catchment management.

Project investments will be made at the pilot sites to improve both household, and where possible, communal water storage. Decentralised, multi-purpose options will be considered, and guiding principles will be established by the project to help frame options for storage. In some cases, as specific in the PIF, the project will invest in

Water Use Efficiency will be a consideration where leakage and other management challenges contribute to reducing the sustainability and effectiveness of existing watsan schemes. Other instruments will be considered and developed through the lifetime of the project, including possible financial instruments to manage water supply and demand and invest in ecosystem (green) and built solutions.

Alongside the focus on water, clearly, attention needs to be paid to early warning and managing information to plan for the future, both from a water resource management perspective, and from understanding what can impact the water resources. Consequently, it is proposed that the project, at pilot site level, looks to establish the correct monitoring systems for water and climate related information, and then integrates this into the national system to help improve national monitoring. Innovative approaches to do this will also complement conventional monitoring. These include the use of mobile phone reporting and recording, capacity development activities, site based reporting and networking of information, improved communication channels (in terms of protocol and communication equipment required). Practical examples of activities include drill and response training at the community level, and capacity improvement and sharing across communities.

The project will make investments both household, and where applicable, community water storage systems and associated infrastructure and technology, where adaptation benefits can be clearly identified. This more 'decentralised' approach brings various benefits through improving resilience, but it also brings additional governance challenges. Although these challenges can often be met using local governance structures, combined with more national structured procedures, the combination of the two is often a difficult relationship. The project will look at integration of these approaches, building local, national and regional experience to improve water resource management and adaptation.

Different sites will require different technical approaches, and this will also include the provision of water treatment facilities and other disaster response equipment which can be mobilised following periods of disaster response, both slow onset (such as drought), and more immediate such as cyclones and tsunamis, building on national experience of having to deal with these challenges.

Updating sanitation is a challenge where many people prefer to use traditional toilet practices, or pit latrines. Where water is available, septic tanks are used in townships for the wealthier households and in government and business buildings. There is both national and regional experience at using

innovative approaches, and this needs to be leveraged into the RWSS approach and mainstreamed more effectively. With sanitation interventions come many social and economic improvements and the project will look at adaptation as the fulcrum to bring new approaches to sanitation practice at the pilot project level. From this scale the project will need to identify ways to mobilise wider action through peer to peer learning and sharing networks, and investments wider than the pilot sites alone.

Best practices from the country and the region will be compiled to help guide the project through implementation but these will be updated to also bring in additional experience gained under the pilots.

Component 3: CCA-orientated governance in the water sector
Outcome 3.1: Improved governance and knowledge management for CCA in the water sector at the local and national levels

Given the experience of the Water Resources Division (MMERE) with IWRM, this component will build upon, and not replicate, existing ongoing work on IWRM development with the SIG. IWRM approaches do need to be both upgraded, globally, in their approach, based on evidence of impact, but also linked much more closely to adaptation thinking and experience. The project will learn from existing IWRM in the country and regionally, and integrate adaptation approaches much more into IWRM strategies and water management down to the water supply and sanitation level.

Capacity development will be fundamental for SIWSAP to achieve its objective of improving resilience. This should include the development of a capacity building 'strategy' – that focuses on training, networking, empowerment driven by social learning, self-organisation, peer to peer learning, and other approaches. During the full project time will be required to assess exactly where the capacity development skills lie, across networks and institutions, to actively contribute to SIWSAP in a constructive and coordinated way. This is important because SIWSAP is looking to create transformational change in some cases, and this will require a combination of conventional and innovative approaches to capacity development.

To both communicate within the project network, and then external to the network a series of communication products will be developed which target different audiences. The challenge for the SIG is to find the correct balance between gaining enough knowledge on water resources to improve management of them, and to link this to water supply and sanitation service provision. At the same time, SIG has to consider the development of robust adaptation practices within water resource management approaches. It is recognised that large scale climate variability exists in the Solomon's under normal conditions, but that this variability is going to increase. For a sector traditionally reliant on built infrastructure to provide or enhance water service delivery it becomes harder to maximise investment in infrastructure where climate changes can affect the performance of it, or destroy it completely.

Policy development is active in certain sectors, and one of these is water. The draft Rural Water Supply and Sanitation policy proposed by the Ministry of Health has been through successful consultation and is expected to be endorsed later in 2013. This will change the institutional architecture of the Government in terms of how it delivers rural water supply and sanitation services. This is indeed a transformative policy and institutional change for the Solomon Island Government. It will require dedication to ensure this policy is rolled out appropriately, and there are some uncertainties about how this will affect a sector which is already struggling to cope with demand and limited capacity. However, the policy is

sensible in its approach, and the hope is that SIWSAP can support the roll out of the policy to ensure that is can be delivered as effectively as possible.

At the same time, with support from the EU National Integrated Water Resource Management Planning Programme implemented by SOPAC, MMERE through the WRD have started a process of developing a national Water and Sanitation Policy. Focussing on water resources as the entry point, and provider of water for drinking and sanitation services, the aim is to improve the wider policy environment for water, and to link this across relevant institutions through the formation of a national apex body – a National Integrated Water Resource Management coordinating Committee. This work will continue through 2013 and will be updated relative to SIWSAP during the second mission.

PROJECT PREPARATION GRANT TEAM

The Project Preparation Grant (PPG) Team consists of the following:

- *Project Development Specialist* - James Dalton (the author of this report)
- *Project Institutional/Technical Expert (Integrated Water Resource Management)* - Samson Maeniuta
- *Project Technical Expert (Water & Sanitation)* - Kenneth Bulehite
- *Climate Change Technical Expert* - Richard Pauku

The PPG Team were in contact via email prior to the PPG Inception workshop in April 2013, and have remained in contact via email since the mission of the Team Leader. During the mission of the Team Leader to the Solomon Islands a number of meetings were held as the PPG Team. These are described in the Mission Report (Annex 1), and also as brief separate minutes in Annexes 2 and 3 where actions are noted as necessary.

INCEPTION WORKSHOP

The Inception Workshop took place on the 16-17th April 2013 in Honiara. The minutes of the workshop can be found in Annex 4. Institutional roles were clarified at the workshop. Unfortunately, the Team Leader could not attend the workshop[1]. Key points to note from the minutes include:

- Deadline for submission of the PPG documents is 30th November 2013.
- The selection criteria for the pilot sites were presented to participants, which combine sites presented in the 2008 NAPA.
- That where climate change impacts are combined with disasters, these sites may be considered as possible pilot sites (but pilot missions will determine suitability)
- Early warning equipment (hydrological, meteorological) will be required under SIWSAP, and the SWoCK project also will install early warning equipment. There are possible overlaps and experiences to share – not least in selection and procurement of equipment.

[1] This was despite alternate dates provided, and a delayed contracting period by UNDP which limited attendance by the Team Leader at the Inception Workshop.

- Some sites could be combined together, where the cost of dealing with the identified adaptation challenges are not too high.
- For the sites presented at the workshop, RWSS does not have any overlapping sites. Some of them overlap with the UNICEF project funded by the EU Water Facility. Although clearly RWSS are required to help implement the project on the ground.
- In some cases, especially in the townships, community participation may require payment.
- Capacity for asset management is low.
- The meteorological services of the SIG need to be involved in the project to support the installation of sites for hydrological and meteorological equipment, along with the Water Resources Division of MMERE.
- Transport is a complex task and high cost to outer islands.
- Landownership, tenure and access, as always, are a constant challenge to project implementation.
- In some cases new sources of water at the pilot sites may need to be considered.
- There is no measurement ability for rainfall intensity, only amount of rainfall.

SELECTION OF SITES

As often occurs, site selection becomes an overly complex process because of the wide ranging interests from different stakeholder groups, and the need to 'distribute' funding based on certain requirements and agendas. The PIF states that:

'Four provincial townships and 6 regions comprising rural communities have been identified as potential project sites. These represent low lying, raised coral and highly mountainous islands that are water stressed'.

Five provinces were proposed to be covered, (Choiseul, Western, Rennel and Bellona, Temotu, and Makira), split across rural and urban locations. In total, 11 locations were proposed in the PIF, but it was also clearly stated in the PIF that:

'The project will cover at most two townships and four rural areas'.

During the Inception workshop and subsequent decisions it was decided, based on criteria developed for site selection (Annex 5) at a follow up meeting on the 18th April that the following **seven** sites would be included:

Table 1: Final Pilots Sites Selected

Site	Province	Rural (R)/ Township (T)	Notes
Taro Township	Choiseul	T	Inception Workshop minutes state that the township, and the community (T&R) are to be included as one site
Poroporo Community	Choiseul	R	
Gizo	Western	T	Large township of 7,000 people
Manaaoba	Malaita	R	On the same island, but at opposite ends. Both sites may experience similar conditions.
Taarutona	Malaita	R	
Santa Catalina	Makira/Ulawa	R	Is a group of communities, not just one
Tiggoa	Rennel and Bellona	T	Although classed as a township, this is a small community of around 500 people
Lata (Reef Islands, island of Nupanu)[2]	Temotu	T	Outer islands, atoll (but classed as a township?)

Based on the final pilot sites presented in Table 1, it is clear that there are in fact **eight** sites. These are classed as seven because of the proximity between Taro township and the Poroporo community in Choiseul, which, when combined are classed as one site. Based on the discrepancy between the sites presented in Table 1, and the requirements in the PIF for 4 rural sites and 2 townships (and reference to 6 sites in the Project Framework of the PIF), it is proposed that at least one of the sites is removed as a pilot site.

Combined with the delays in site visits it would be more appropriate to focus attention on six sites, namely Gizo, Taro, Poroporo, Tiggoa, Santa Catalina, and one of the sites in Malaita. The forthcoming mission to Malaita by the PPG team could, for example, visit both sites and determine which one of the sites is most appropriate for the project to specifically focus on. This would mean one site would be removed, and that the site in Temotu could also be removed from the list of pilot sites.

During full project implementation replication approaches could then be developed which allow all the pilot sites to share experience and funding with neighbouring sites that are interested and willing to participate. This approach would keep the 'core' pilot sites limited in number, as specified in the PIF to make project management as efficient as it can be, but which also develop these sites as 'hubs' for learning and sharing, rather than spreading sites further apart.

For consideration by the PPG Team, and UNDP, is removal of at least one of the proposed sites presented in Table 1. The most appropriate and equitable site selection would be a division of the six sites across the Provinces concerned. Therefore final site selection for consideration would look like this: Gizo (Western), Taro (Choiseul), Tiggoa (Renbel), Santa Catalina (Makira), Manaaoba (Malaita), and Tuwo village on Fenualoa Island (Temotu). This would provide six sites across six different Provinces.

[2] Based on site visits the island of Fenualoa in Temotu Province was selected as the actual proposed pilot location. The village/community of Tuwo was selected as the actual site location. This community has approximately 1,000 people living in it. Nupanu island only has approximately 20 families living on it, and is a low lying island with families leaving the island. Fenualoa is a higher priority for climate change and disaster risk reduction concerns.

Possible replication activities could then start at the two additional sites of Taarutona (Malaita) and Poroporo (Choiseul). This avoids the problem of having double sites in Provinces, but it clearly demonstrate the desire and demand to have more sites included in the project. Through an appropriate replication mechanism more sites can be added as project implementation progresses. Practically, the resources available, and some of the interventions proposed will determine the 'scale' of interventions and therefore the number of sites included in the final design. This number may increase over the course of the project as the replication of activities into other sites occurs.

GEF COMPLIANCE

The SIWSAP project is aligned to the Climate Change Focal Area of the GEF. The project is aligned with the Least Developed Countries Fund/Special Climate Change Fund focal area objective 1 (GEF/LDCF.SCCF.9/4/Rev.1) – to 'reduce vulnerability to the adverse impacts of climate change, including variability at local, national regional and global level', objective 2 – to 'increase adaptive capacity to respond to the impacts of CC, including variability', and objective 3 – to 'promote transfer and adoption of adaptation technology'. The outputs of the project will be designed to specifically address these objectives.

Predictions for climate change and impacts on the Solomon Islands include:

- High confidence that the surface air temperature and sea-surface temperature are projected to increase in the future (over the 21st century)
- There is high confidence that the annual average rainfall is projected to increase, with wet season in November to April, and dray season May to October
- There is very high confidence that the intensity and frequency of days of extreme heat are projected to increase
- There is high confidence that the intensity and frequency of daysof extreme rainfall are projected to increase in the future

Considering these projected impacts the project is aligned well to deal with climate change impacts on water resources, and the impact of water resources on livelihoods as a consequence of climate change.

PILOT PROJECT DESIGN

A series of Water Sector Adaptation Response pilot projects designed to deal with water sector challenges in both rural and urban contexts, and which can build a critical mass of experience both in reducing vulnerability of water supply and sanitation systems, but also in providing the opportunity for the water sector to recognise the adaptation needs required to sustain clean and healthy water services. This includes source and wider watershed protection, through a water safety planning process to the end users. Each pilot project will have an objective and a series out outcomes. These will feed into the overall project strategic results framework. Projects will initially include the following:

Taro Township, Choiseul

Extensive reporting is available for the two proposed sites in Choiseul. The predicted impact of climate change were assessed on the existing water resources a the two sites, including streams, rainwater harvesting options, hand-dug wells, and streams.

Suggests to improve the water situation at Taro include:

- Construction of additional rainwater storage, especially at community and government buildings for water for all the community, and not just government workers. This will require a detailed assessment of roof size, suitability, additional materials required, etc.

- Adjustments to local planning will also need to be considered to ensure that any new buildings integrate suitable rainwater harvesting approaches into building design and construction. This also needs to be considered for sanitation needs, although rainwater should not be used for toilets.

- Solid waste management activities to protect the swamp area in the middle of the island which is a key fresh groundwater recharge area. At present this is used as a solid waste dumping ground.

- Detailed hydrogeological studies should be conducted to determine the amount of fresh groundwater that exists, and determining a suitable pumping rate to avoid saline intrusion, and to provide a water sources for washing and irrigation where needed.

Poroporo Community, Choiseul

For Poroporo, the water challenges and how these can be made more suitable and sustainable going forward are different. A spring, 8km from the village would serve as a suitable freshwater source, but it is a long distance from the community. This could certainly be tapped as a more sustainable and clean source, but will require investment not only in the necessary small scale infrastructure required (small weir, piping etc), but also an understanding of the need to protect the catchment for the stream. The 'opening-up' of a water source may also encourage agriculture and more human activity around what is now a clean and untapped water source.

As for Taro, improvement in rainwater harvesting are also needed, although this approach needs to be balanced with acceptance of the approach and the ability of the community to look after rainwater

tanks, guttering, roofing etc, to keep the water safe. Not all the houses used metal for the roofs, for example.

At both sites, there is a clear need for advocacy, communications and learning materials, and time spent with the communities.

Gizo, Western
Under development. Pilot mission has just taken place and waiting for reports at time of drafting.

Manaaoba, Malaita
Under development. Pilot mission yet to take place

Taarutona, Malaita
Under development. Pilot mission yet to take place

Santa Catalina, Makira/Ulawa
Under development. Pilot mission yet to take place

Tiggoa, Rennel and Bellona
Under development. Pilot mission yet to take place

Fenualoa (Reef Islands), Temotu
Under development. Pilot mission yet to take place

PROPOSED IMPLEMENTATION STRATEGY AND GOVERNANCE STRUCTURE

Under this PPG the following components of the governance structure for SIWSAP need to be developed.

Project Steering Committee
The Project Steering Committee (PSC) will comprise the lead agencies responsible for executing the project, and key partners:

- Water Resources Division of MMERE (as lead executing entity)
- Rural Water Supply and Sanitation Division of MHMS (executing partner)
- Climate Change Working Group
- IWRM Apex body (National Intersectoral Water Coordination Committee – the NIWCC, which was under development June through September. More information is available on this for the second mission to Honiara)
- Key government partners (sectoral agencies, MDPAC, etc)
- Key NGO partners (in some cases, executing partners)
- Key donors providing co-financing and supporting SIWSAP
- Private sector partners where possible and applicable
- UNDP (executing partner)

Project Advisory Group
At the Project Management level, two position are proposed:
National Project Director – will be a seconded member of staff from the SIG, most likely from MMERE but this is yet to be decided. It is not clear if this position needs to be full-time on SIWSAP, as the function is an oversight role.

National Project Coordinator – will be the main functional position under this project. This individual will need to have experience of water management and water supply and sanitation, integrated water resources management experience, and understand climate change adaptation – ideally in the context of the Pacific Islands. Furthermore, a key skill factor in sourcing this individual is their project management skills, which should take precedence in any recruitment process. They would also ideally have knowledge of change management procedures, as SIWSAP is a project which will aim to start a 'programme of change' in the way adaptation is understood across the water sector in the Solomon's, and beyond into other sectors through waters key role throughout the economy and livelihoods.

Together, these two positions will form the Project Management Office (PMO). Given the reporting requirements of these projects, and the complexity of multiple sites, procurement, transactions, and various skill and capacity building activities it is also recommended that a Project Administrator is also included in the PMO. This position could equally be a secondee from SIG, but they would need to be aware of GEF-UNDP projects, or have the ability to quickly learn over a short period of time. Delays in these projects early on can have knock on effects throughout the lifetime of the project which can never fully be rectified. To iterate the need for experienced administrative support using examples:

- Travel in the Solomon's is complex and costly and requires active planning and monitoring like other project activities. Good, timely logistical management is required, including for shipping equipment and materials, and
- Good financial management and reporting. Given the investment SIWSAP will make over four years, quarterly spend for reporting purposes will be on average US$428,125.

The PIF states that the project will be implemented under a NIM/DIM modality, whereby national implementation is recognised through the lead executing agency of the Water Resources Division in MMERE, jointly with executing partners RWSS in MHMS, and UNDP. However, challenges in manpower, resources and capacity within the government agencies requires UNDP to adopt the role of principal contractor. This will require UNDP to:

- Sub-contract relevant project component activities to national, regional and international service providers
- Recruit project staff, and
- Procurement of equipment, and other various project requirements and services.

For consideration at this stage is the addition of an 'Implementation Support Contract' to support UNDP in this role. The reason for this is:

- To assist in the sourcing of the skills and capacities required from across the region and internationally to implement the project activities, supporting UNDP, WRD, and the Project Management Office where necessary, and importantly to act in a 'brokering' role between UNDP as the principal contractor, the Project Management Office, and the SIG agencies. This is

because recruitment delays always delay project start – and this project has only a four year timeline;

- To assist in the recruitment of staff through having an additional voice in the recruitment process, and[3]
- To assist in procurement of the correct, technically appropriate, cost-effective equipment required under SIWSAP, including installation, soft support services, follow-up support, help-desk facility support, operation and maintenance, and repair schedules. Some of the equipment is technical in nature and will require discussion with WRD and RWSS and the Climate Change Working Group to ensure that meteorological equipment brings value not just to SIWSAP, but to the SIG activities, and other projects. During the mission to Honiara by the Team Leader in May, it became clear that procurement of equipment, installation, correct system integration, and follow up support services are a challenge to procure through various SIG and agency systems. It may be easier to outsource this part of the SIWSAP through various Support Contracts.

Project Community Committees

The PIF states that Project Community Committees will be established at the level of the pilot projects. These will help guide activities within each pilot project, and will effectively report 'upwards' to the Project Management Office. The PIF also states that these Community Committees will be '*the forum for coordinating site-based project activities with all partners*'.

This brings in additional questions about the reason and functioning of the Community Committees:

- Who will decide the structure of the Committees?
- What opportunities exist to use current governance structures at the urban and rural levels (depending on each individual pilot project setting) to avoid creating overlapping and confusing approaches?
- Where will resources to fund the Committees come from? Experience shows that in most cases these Project Community Committees will require some form of resourcing and mentoring relative to the project needs and requirements? Any resources will need to be properly accounted for under UNDP financial requirements.
- Where will responsibility sit to monitor the implementation and quality assurance of activities at the pilot project level?
- Who will monitor the performance of the PSC's? Will this be a function of the PMO?
- Where any form of changes, modification, additions to infrastructure are concerned, a risk management approach needs to be in place to ensure that (i) there is no risk of maladaptation (making the situation worse in the medium to longer term); (ii) there is no risk to human health and safety; and (iii) there is a safety inspection to ensure correct construction/technical modification compliance. The responsibility of the PSC's, relative to these activities within each pilot project needs to be clarified.
- The assumption that forming the PSC will provide the legitimacy of this Committee to guide project based activities with all partners, including the EU and AusAID. This is particularly important because SIWSAP intends to work with the EU and AusAID to identify '*…suitable sites for the development and implementation of CC-A activities in priority rural communities*'. This

[3] Experience from the Pacific IWRM regional project and the recruitment of the Project Manager and establishing the Project Coordination Unit indicates that focussing on the technical background of project staff is not adequate for recruiting a project management team. In recruiting for the Pacific IWRM project SOPAC challenged the standard recruitment model and rhetoric and as a consequence developed a highly effective management unit for the Pacific IWRM Programme.

raises a number of questions such as what if the communities chosen by SIWSAP do not overlap at all with the EU and AusAID interventions[4]?

Terms of Reference for these different components of the overall project governance structure will be developed during the PPG. Terms of Reference for the individual positions proposed in the Project Management Office will also be developed.

Based on this structure above, a cost-effective approach to implement SIWSAP is envisaged. However, other considerations include the timing of other projects. This has been assumed to work in favour of SIWSAP's timeline. This includes both the EU and AusAID interventions which SIWSAP is supposed to support, and both of which are possible co-financers. However, delays, adjustments, changes of staff etc affect project interventions. The design of SIWSAP will therefore need to have built-in 'flexibility' for both the national level interventions, and the pilot projects.

INITIAL CO-FUNDING OPPORTUNITIES:

A number of different projects are ongoing, or under development which could be appropriate for co-funding opportunities. Many of these are already identified in the PIF. Using the principle that projects which conduct interventions and approaches which support the project objective, components, and outputs of SIWSAP, the following are possible co-financing opportunities. These will be secured as far as possible during the second mission to Honiara. A co-finance letter template has been developed.

- Enhancing the Resilience of Communities in Solomon Islands to the Adverse Effects of CC in Agriculture and Food Security Project implemented by UNDP
- Pacific Adaptation to Climate Change Project – a UNDP-GEF funded regional project is also working in Solomon Islands supporting communities in remote outer islands to enhance resilience of food security systems including support for water catchment and storage. This cannot be used as co-finance, but can support SIWSAP during implementation as a UNDP project executed by SPREP.
- Pacific Integrated Water Resources Management Project – Another UNDP-GEF regional project targets water supply and demand in the capital city of Honiara using the IWRM approach. This cannot be used as co-finance either, but it can and will support SIWSAP considerably with the experience this project has developed. This project is also supporting the development of national water and sanitation policy, with the support of SOPAC and the EU National IWRM Planning Programme.
- Community Resilience to Climate and Disaster Risk in Solomon Islands Project (CRISP). This is a project currently being developed by the World Bank that will seek funding from LDCF.
- Provincial Governance Strengthening Project (PGSP) – This project implemented by UNDP and funded by UNDP together with other donors (UNCDF, EU and AusAID) is strengthening the capacity of Provincial Governments to plan and implement development programmes as well as in administration of provincial affairs.

[4] The re-formatted AusAID programme was not in a position to identify priority sites of interventions during the mission to Honiara in May. Equally, the EU support for the water supply and sanitation sector was still under discussion at the time and actual interventions sites are not identified in the Action Fiche.

- Provincial governments also fund water supply projects and there is the opportunity for SIWSAP to assist Provincial governments mainstream IWRM and CCA, which represents a concrete area for collaboration. Synergy will be sought to avoid any duplication of activities.
- Rural Constituency Development Funds – Each constituency is provided about S$2,000,000 (about US$256,000) to finance infrastructure, healthcare, water treatment, electricity, and sanitation and telecommunications projects. The funds are under the control of the Members of Parliament (MPs).
- Solomon Islands Red Cross Participatory Health and Sanitation Project and Climate Change Program – funded by AusAID.
- The Asian Development Bank is currently developing a regional LDCF adaptation program for some Pacific SIDS. The program entitled 'Climate Proofing Development in the Pacific' intends to climate-proof a small-scale hydro-power in the Solomon Islands. This may not be so relevant for SIWSAP, although other ADB work at the regional level (Pacific Strategic Program for Climate Resilience) implemented jointly with SPREP, SOPAC and the World Bank may be more relevant. Discussions are ongoing with SOPAC over this possible co-financing opportunity.
- The UNDP project Human Security Initiative for Tensions 'Reduction', Reconciliation and Rehabilitation in the Solomon Islands. This project seeks to enhance human security for selected communities and ex-combatants by reducing tensions and promoting peaceful and sustainable measures for their survival and dignity.
- UNDP has just initiated the project "Strengthening Environmental Management and Reducing the Impact of Climate Change in Solomon Islands" (SEMRICC). Of the total resource requirement of US$2,923,000, UNDP has allocated US$2,131,000 of its internal (TRAC) funds with the remainder to be raised from potential partners. Of this total, $1,200,000 is counted as co-financing based on project components that are relevant to SIWSAP. The objective of SEMRICC is to assist the Government of Solomon Islands in developing capacity for environmental management.
- Total UNDP co-financing from the two baseline initiatives is estimated at $1,755,000. In addition to the above baseline project, UNDP in the Solomon's will program internal (TRAC) funds to support additional baseline activities; details including amount and the expected outcomes/outputs will be provided during project preparation. In-kind support from UNDP will be assessed during project preparation and will be incorporated at CEO endorsement (according to the PIF).
- NGO possible co-financing also exists such as from SIDT, LLEE, TNC, Kastom Garden Association, etc. This was discussed during the first mission and will be followed up with during the 2nd mission to Honiara.
- Budget support provided by AusAID to the water supply and sanitation sector (AUD $11m)
- Improving Governance and Access to WASH for Rural People – EDF funds to the Solomon Islands Government as sector support totalling €17.4m.
- Also EU support to the Solomon Islands Climate Change Adaptation Project (SICCAP) which is provided through General Budget Support through the Ministry of Finance who allocated the funds to the Ministry of Environment, CC, Disaster Management and Meteorology. Work will include an overall V&A assessment of the Solomon Islands which is due end of July.
- World Bank Rural Development Programme which does invest in water supply and sanitation at village/community level in the Provinces.

PROJECT DESIGN (DRAFT) IDEAS

These represent initial ideas following the mission in May by the Team Leader. These ideas are draft, and are presented here for initial consideration and feedback. These will be progressed further and discussed during the second mission to Honiara, refined, and presented at a planned workshop in Honiara with stakeholders.

Component 1*: Reduce vulnerability to the adverse impacts of CC, including variability, at local, national, regional and global levels*

Outcome 1.1: Mainstreamed adaptation in broader development frameworks at country level and in targeted vulnerable areas
Output 1.1 Adaptation measures and necessary budget allocations included in relevant frameworks (6% budget)

Essentially each pilot project provides an opportunity to identify the adaptation challenges to water resources, supply and sanitation, and ways to mitigate those effects. The challenge is the absence of information, and conflicting perspectives on why there are water resource problems, how to deal with them, and whose responsibility it is to deal with them. Vulnerability assessments, taken to a technical on the ground level for water management will be conducted for the pilot sites. Climate Change Adaptation 'Response' Plans will be develop for each site, to guide the mitigation approaches with clear assigned leads for which agency should take responsibility. These plans need to be 'co-owned' by different institutions as they will provide wider learning not just across the pilot sites, but for the replication sites, and as feedback into the national climate change policy framework, informing the climate change policy.

During the time of writing, the country is going through reform processes for its rural Water Supply and Sanitation agenda, and wider for water resource management and integrated approaches to manage water resources. Therefore, adaptation response plans have to be relevant to the current policy environment of the country, and not propose 'standard' adaptation approaches 'off-the-shelf'.

Outcome 1.2: Reduced vulnerability in development sectors
Output: 1.2 Vulnerable physical, natural and social assets strengthened in response to climate change impacts, including variability (70% budget)

The majority of the project budget will be spent under this Outcome. This will focus on the implementation of the plans at the pilot sites. Consequently the funding is required for activities on the ground, equipment procurement and installation, travel and shipping costs, consultations, etc. Budget will be allocated to each site, and a fund will be created under this outcome to support replication into other sites over the course of the project implementation as 'strategic investments' (as defined in the PIF). SIWSAP provides a unique opportunity for learning across the sites and wider across the country, but must be guided by adaptation and water management principles, and not fall into the trap of multiple investment decisions for activities which provide no additional adaptation benefit (so little additionality), and which should be activities performed under the existing mandate of institutional plans.

Pilot projects will be the project footprint – it will be where the project is present on the ground and, following the principle of subsidiarity, will be able to feed lessons and recommendations directly into the Provincial Governments. Still to be considered, but one possible option would be to develop

Provincial Water and Adaptation plans. Not extensive consultancy documents, but practical lessons and guidance based on findings from SIWSAP, and other projects working on V&A and climate change related information (e.g. SICCAP etc). The development of a Provincial Plan would also help to guide where the possible strategic investments mentioned above could be best made in agreement from all relevant stakeholders, and not driven by 'capital' thinking only (in the sense of Honiara, and also finance).

Component 2: *Increase adaptive capacity to respond to the impacts of CC, including variability, at local, national, regional and global levels*

Outcome 2.1 Increased knowledge and understanding of climate vulnerability and change – induced risks at country level and in targeted vulnerable areas
Output: 2.1 Risk and vulnerability assessments conducted and updated (3% budget)

Incorporated into activities above.

Outcome 2.2 Strengthened adaptive capacity to reduce risks to climate-induced economic losses
Output: 2.2 Targeted population groups covered by adequate risk reduction measures (6% budget)

Through the development of community based early warning approaches, working in tandem with technical support through hydro-meteorological installations to improve the overall network coverage of hydrological and climate related information for a range of national and Provincial Agencies to us.

Outcome 2.3 Strengthened awareness and ownership adaptation and climate risk reduction processes at local level
Output: 2.3 Targeted population groups participating in adaptation and risk reduction awareness activities (4% budget)

Incorporated into activities above.

Component 3: *Promote transfer and adoption of adaptation technology*

Outcome 3.1 Successful demonstration, deployment and transfer of relevant adaptation technology in targeted areas
Output: 3.1 Relevant adaptation technology transferred to targeted groups (6% budget)

Through project pilots transferring both the most appropriate adaptation approaches, and also water supply and sanitation technologies, where technology refers to the most appropriate approach. For sanitation for example, this includes simple, low tech solutions which will last and which will be owned, operated and maintained by the communities, families, and individuals using them.

Project Management (5% budget)

See the governance section. According to the PIF a structure is proposed which will include a Project Steering Committee, a National Project Director, most likely the Permanent Secretary of the Executing Agency (MCDM, or MMERE), a Project Coordinator housed inside a Project Management Office (PMO). The PMO will most likely be located in the Water Resources Division of MMERE, and will also include a

technical support role, and an Administrative/Financial officer. An Advisory Group to help guide the project is also envisaged. This structure will be further developed and presented in the draft Prodoc.

What remains clear is the difficulty in both vertical and horizontal policy integration for the country. Arguably, horizontal integration of water elements is being dealt with through the development of national water and sanitation policy and a national integrated water resources management coordinating committee. But the vertical element, the roll-out of policy, and resources to apply the policies at the Provincial level is difficult due to the geography of the country, the complex land use issues locally, the politics of government, and the difficulty in dealing water and adaptation challenges in a country with a high population growth rate and an already turbulent climate.

It is also clear that a scaling-up – replication framework needs to be developed – as a draft going into the project. Draft because, this would need to be further tailored during year one of the project to ensure it will take effect, and is also tailored to particular pilot site and provincial peculiarities. One concept which is currently in 'vogue' would be to look at the concept of resilience. Resilience is a word often used and discussed, but not very well understood. In developing the full design, the concept of resilience could be used to structure the overall project using a framework developed by Smith and Barchiesi (2009). This framework will be considered in developing the project design further as it contains a structure of (i) diversity, (ii) capital and innovation, (iii) self-organisation, and (iv) learning. This would seem to speak well to the proposed of SIWSAP.

ACTIVITIES UNDERWAY

Since the first Mission in May the PPG team have been delayed in completing the missions to the project sites, as per the agreed workplan. This has been due to a number of different factors. However, as of the 5th October all the missions to the project sites have been completed and final reporting is now due from the PPG Team.

Document reviews, such as the National Action Plan for Adaptation, and SIG Climate Change Policy have been completed. The PPG site reports have been reviewed, and a template developed for structured individual documents per pilot site. These will contain information on the proposed activities, governance structure, budget, and implementation approach for each site. It is important that each site has as much relevant information as possible as delays in project approval, recruitment, and start-up at the national level often occur. This reduces momentum, and at times can hinder the initial implementation of project activities. The Project Management Team will need to consider this and experience shows that re-visiting the design, in the light of changes, new capacities and information, changes of individuals within the communities and institutors concerned, helps to build support for the project at site level, and provides more ownership of the activities. This approach should be encouraged under SIWSAP.

Documents received from AusAID, UNICEF, the European Union and RWSS have also been studied to ensure that site activities will actually 'add-value' – and therefore move beyond the baseline. One concern has been the actual capacity to implement, a recurring topic of conversation during the mission to Honiara. Secondly, with a new RWSS policy in development that changes the function of the SIG with regard to on-the-ground water supply system designs and implementation, the institutional architecture for RWSS will change in the Solomon Islands over the next 3-5 years.

In a push, partly matched to capacity and delivery approaches so far, the RWSS will become a contract management agency, responsible for fund management, procurement of RWSS services – including water supply system design and construction. However, it is not clear yet how gender, operation and maintenance, financial management and sustainable financing, catchment management/source protection, and other aspect including procurement will be handled. It appears that procurement is only going through the Government, yet the services are to be procured from the open market – a market that is nascent in the Solomon's. There are many assumptions at this point – some suggest that RWSS/Ministry of Works staff currently employed under the different Provincial Administrations will take the opportunity to set themselves up as private contractors. However, a risk analysis of this assumption does need to be undertaken. Without support from the SIG and donors, it is a large assumption to expect self-organisation, seed-funding and loan availability, design skills, etc. Naturally, those organisations working on these issues such as World Vision, ADRA, SIDT could employ these additional local staff as it is expected these three organisations will secure the majority of contracts offered from the RWSS.

However, it is not clear yet how the procurement will affect this contractual relationship – if the SIG is willing to 'release' procurement to contractors, and it is not clear if this approach will actually build local (private) skills for the future, or just keep the existing architecture for deliver at community level the same. Other questions include the capacity of RWSS to adequately review and monitor design and construction work at a multitude of sites. The funds from different donors, including budget and sector support could total a quarterly expenditure of up to US$2m (to fit within donor expected timelines). This is a large amount of financial resources to 'flood' into the RWSS 'market' at a time when the institutional architecture is rapidly changing and learning different roles.

There are however opportunities to make this situation work well for the Solomon Islands. This includes through improved sharing of information across the different stakeholders, and open and constructive dialogue across all stakeholder groups early in any technical interventions planned. Furthermore, although a variety of projects are underway in the country dealing with water and adaptation from different perspectives, there needs to be a central 'platform' where the learning can be pulled together, discussed, and accepted ways forward developed in terms of how the information is to be used.

Development of procurement guidance for the project will need to take place in discussion with UNDP and the SIG. This is because delays occurring in other projects in UNDP due to procurement (such as SWoCK for example) need to be learned from. There are also, not unsurprisingly, lessons to be learned from the location of the PACC Demonstration site on Ontong Java, and other practicalities that need to be considered for a project of only four years.

Drafting of the Project Document has started, focussing on the following sections:

- Situation Analysis
- Review of all the PPG Team Pilot sites reports – and structuring of pilot projects
- Replication strategy and sustainability of interventions
- Drafting of the Strategic Results Framework once further information is assessed
- Development of a framework for national adaptation learning to be developed further during the full project implementation

STRATEGIC RESULTS FRAMEWORK

This is under development and will be presented during the second mission to Honiara.

CONCERNS AND DELAYS – GETTING SIWSAP BACK ON TRACK

Some delays have occurred in the PPG phase from the beginning. This included the delay in the contracting of the PPG Team leader when time was available earlier on in 2013 for the first mission to the Solomon Islands, and additional time was available for further site visits for the Team Leader to accompany the PPG Team. Issue of contract delays moved the first visit by the Team Leader to May, with the possibility of visiting only one pilot site with the PPG Team. This was a missed opportunity.

However, during the first mission a wide range of consultations with different stakeholders did take place, including with the consultant developing the National Water and Sanitation Sector Plan for the Solomon Islands, and with those involved in the development and drafting of the Rural Water, Supply, Sanitation, and Hygiene Policy.

Initial budget ideas have also been developed to cascade down into project components and activities. These will be presented to stakeholders during the next mission.

NEXT STEPS

A number of key activities need to take place, these include:

- Completion of the pilot site missions, and submission of the reports from the PPG team before October at the absolute latest. The original and agreed plan with the PPG Team was for all the missions to be completed by mid-august to allow for reporting to be completed for early September. The safety of the site visits, given changes in the weather at this time was also a concern raised by the PPG team during the mission in May.
- Need further discussions with Kastom Garden over the use of composting toilets in the Solomon's. One major concern is the capacity of RWSS to design and manage contracts associated with sanitation. At present RWSS have only implemented 10 projects concerning sanitation, as 'build.-transfer' projects. In discussions with RWSS; it appears that little or no consideration appears to have been taken into account for gender, age, mobility, location, risk, suitability of site and technology, or indeed sustainability of the sanitation intervention (training, equipment, maintenance guidance, etc)
- Further discussions need to take place with the Rural Development Programme of the World Bank. More lessons need to be developed from their work, and to explore co-financing opportunities with them, depending on site locations.
- Quality-at-entry guidance for the project sites – and any water supply and/or sanitation intervention needs to be developed as a key project activity in year one.
- A mechanism needs to be developed, based on the latest draft of the RWSS Policy (July 2013) and the National IWRM Apex Body and policy under development, to support private sector development to ensure that the country, in 5-10 years, is building, and maintaining the capacity

needed in the water sector. What output based approaches can be learned from and developed under SIWSAP that could potentially work?

- Capacity development programme, with USP, Solomon Islands Institute for Higher Education, National university etc.
- Disaster Risk Reduction. Better understand the capacity and interest to implement community based DRR approaches, and the facilities that exist. Identify the issues at the sites based on the pilot site V&A assessments to determine the risks that would need t be monitored per site.
- Adaptation – take into account the implications of the climate change policy, and the rural water supply and sanitation policy currently under development. Also the national water and sanitation policy will have an impact on this project in relation to components 1 and 3.
- Peer 2 Peer learning from across the sites needs to be designed and adequately budgeted for. 'Pairing' sites, and individuals (akin to Bluetooth) is important to build confidence and a network of individuals, within different types of institutions (public, private, NGO's, communities)

ANNEXES :

- MISSION REPORT
- MINUTES OF MEETINGS WITH PPG TEAM
- INCEPTION WORKSHOP MINUTES
- CRITERIA FOR PILOT SELECTION

- PPG TEAM LEADER TOR
- WORKPLAN
- SELECTION OF PHOTOS FROM GIZO PILOT SITE MISSION
- LIST OF PEOPLE MET/CONSULTED
- LIST OF DOCUMENTS COLLECTED AND REVIEWED

Annex 1: Solomon Islands – SIWSAP PPG Mission Report

JAMES DALTON, TEAM LEADER

The Solomon Islands Government is being supported by UNDP to submit a national level LDCF/SCCF funded project focussing on adaptation in the water sector. This in-country mission forms part of the technical assistance and support being provided by UNDP through its consultants to prepare the grant documentation for submission in November 2013.

Pre-Mission

Project background reading based on information self sourced, via networks, or via UNDP. This included the PIF, other background material related to UNDP adaptation projects in the region, an update of the Pacific Adaptation to Climate change (PACC) project, and the Pacific IWRM project.

Initial email contact with the PPG Team and UNDP, and contacts in the region, such as Ian White, working with MMERE on the National IWRM policy (CHECK).

Mission Dates

Tuesday 7th May to Tuesday 20th May inclusive of travel

Mission Objectives

Working with the locally recruited PPG team (by UNDP) the first mission had a number of objectives. These are outlined below. Despite all efforts, it was not possible to attend the earlier Inception workshop which took place on 16-17 April 2013. The Minutes of that meeting can be found in Annex 4. A review of those minutes, and comments are provided in the mission report below.

1. The meet the team, agree to the draft workplan already presented including PPG milestones, and to review key material together where possible.
2. To join the local PPG team on a pilot project mission to Gizo town, including meeting local stakeholders and joining a local consultation meeting for Gizo town.
3. To join the team on the mission to better understand the adaptation challenges for the water sector, and to make an assessment of capacity as the pilot site level
4. To meet national level stakeholders and consult with them about the direction of the project, possible co-financing opportunities, and experience in the country the project could use going forward.
5. To gather as much information about the rural water supply and sanitation situation, and to understand the adaptation capacity of the agencies involved in providing watsan services
6. To identify where the adaptation knowledge and experience lies within national institutions and NGO's.
7. To identify pitfalls to full project implementation (capacity, procurement, access to sites, etc)

Schedule of Meetings and Observations

The following meetings were undertaken during the mission. This includes meetings in Honiara, and during the mission to the pilot site (Gizo town).

Tuesday 7th May 2013

Arrival at Mendana Hotel, Honiara, at 17.00.
Email contact made with UNDP, Isaac Lekelalu (WRD-MMERE), and Marc Overmars, UNICEF.

Wednesday 8th May 2013

Water Resource Division, Ministry of Mines and Rural Electrification (MMERE), Honiara
James Dalton, Isaac Lekelalu (MMERE-WRD), Charlie Bepapa (MMERE-WRD), Kenneth Bulehite, Samson Maeniuta Rihuoha, Joanne Aihunu (UNDP)

The meeting allowed team introductions to be made, although the Team Leader had already met Charlie Bepapa and Isaac Lekelalu in a previous capacity. A few key activities took place during this meeting:

- Review of the Inception Workshop Minutes (provided in Annex 4 of this overall Inception Report) facilitated by the Team Leader
- Review of the number of proposed sites – why seven (in fact eight) sites had been chosen. This is discussed more fully in this overall Inception Report
- Brief discussion about the recent field trip to Choiseul Province to look at the proposed sites of Taro and Poroporo. Groundwater was tested on this field trip and found to be too saline for people to drink (although people were drinking it). Rainwater harvesting tanks were being used, although Taro town had a small supply system. Some discussion has apparently previously taken place which included providing the Poroporo Community with piped water from the main island (the community is on a small island just offshore of the main island).
- Preparation for the field trip to Gizo
- Timing of future field trips given logistical challenges, existing work schedules, weather considerations, etc, including options for some PPG Team members to miss some trips where coordination for all to be available was not possible
- Agreement on activities required during the Team Leaders mission to the Solomon's
- Review of the reporting templates provided before the Team Leaders arrival
- Review of the PIF, include who authored the PIF, what discrepancies were in the PIF, what needed further clarification from UNDP, who did the PPG Team need to meet to discuss the PIF with
- What recommendations did UNDP have for consultations with key partners (Tom Naunau, Piter Visser, Frank Wickham)
- What was the expected role of SIWSAP in developing Early Warning Systems (EWS)? There is a general need for hydrological and meteorological monitoring systems across the country to cope with climate extremes for predictions and early warning, to forecasting, to actual water resource management and planning. Some community led interventions have occurred on EWS approaches for disaster risk reduction and community based flood warning (through NDMO). Need rainfall intensity information for example to better match rainfall tank size to expected rainfall, as for other reservoir systems and decentralised water storage
- We also discussed the arrival of Ian White, a consultant working with MMERE-WRD on IWRM planning, and the establishment of a National Intersectoral Water Organising Committee, as the Apex Body to manage the coordination water resources management for the SIG. Ian White is known by the PPG Team Leader

- Identification of co-financers was also discussed, based on those initially identified in the PIF, and any other possibilities that the TL needed to know about
- Identification of other relevant projects with experience, equipment, and other capacities relevant for SIWSAP, such as SWoCK
- Discussion on the usual land tenure challenges as experienced across the Pacific Island Countries, with the division between alienated (colonial) lands, and those owned by the communities (traditionally)
- Communications, how do people access information in the Solomon's, especially given the number of islands and small isolated communities long distances away from Provincial and the national capital. Discussion about theatre, radio, printed material, and organisations who could support SIWSAP with communications, learning and advocacy, such as the Solomon Islands Development Trust, Live and Learn, and the Development Exchange Services (umbrella organisation for NGO's)
- Identification of organisations to meet with: meteorological services, NDMO, MDPAC, SIDT, LLEE, Red Cross, Caritas, WorldVision, ADRA, MHMW-RWSS, EU Delegation, AusAID, GIZ, UNDP, UNICEF, ADB
- Discussion on inputs over the coming months for the team and the TL, including the next mission planning by the TL which would be in early October. Consequently, all the pilot missions need to be completed well in advance of this so that the reports can be analysed, and there is plenty of time for assimilation of the ideas into the draft project documentation. Milika Sobey, supporting the TL, who attended the Inception Workshop in April would also join one of the pilot missions, which ones and dates to be confirmed, but sometime between June, July, and at the latest August (as all pilot missions need to be completed by mid-August).

Discussion revolved around the selection of the sites and a description of what we were potentially visiting and the project would have to deal with from a logistical and population size perspective:

- Choiseul Bay – Taro township of around 1,000 people, and the Poroporo Community (around 600 people)
- Gizo town – with a water source around 5km from the town. The town is provided with water via a pipeline, and there are some 'reservoirs' distributed around the town. Population of around 7,000 people, hit by a tsunami six years ago.
- Malaita – two sites proposed: (i) Manaaonba in the North of the island, which is actually represented by a 'group of communities', population not known, and Taarutona, in the South west of the island, with a population of between 600-1,000 people.
- Makira – Santa Catalina – which is a 'group of communities' – population not known
- Rennel – Tiggoa, classed as a township, but due to land tenure problems the community would seem to be transient (almost pastoralist), population is a guess at only 200 people, and
- Temotu – the reef islands, Lata, maybe one of the far off islands, which would only have around 200 people on them.

Actions: Identification of co-financing available from the SIG is required. Support required from MMERE to complete this.

Thursday 9th May 2013

Solomon Islands Development Trust, (SIDT), Honiara
Longden West Manedika (Acting Director)

Meeting to discuss the role and work of SIDT. They focus on sustainable infrastructure and look at replicating successful approaches across communities. They look to villager participation, acceptance, and ultimately ownership, through focussing on capacity development. They strive to ensure that communities are always correctly informed prior to interventions, and that the communities themselves are part of the process for any external intervention. This is critical to ensure traditional governance is both respected, and learned from as part of the capacity development process.

Interestingly, SIDT work on communications across a range fo media, from print copy, to radio at community level, theatre, child centred approaches (they have a child centred project on adaptation), participation, village advocacy and networks.

Actions: no action required at this stage.

Pacific Department, Asian Development Bank, Manila
Robert Guild, Director, Transport, Energy and Infrastructure

Communications via email and with Marilou Drilon at the ADB regarding the Pacific Strategic Program for Climate Resilience. This program will be implemented through SPREP and SPC to mainstream CC adaptation. Further information is provided below for reference during the PPG Phase.

Pacific SPCR ($10 million) administered by ADB and the World Bank
The objectives of the Regional SPCR will be to improve participating countries' resilience to climate change and climate-related disasters through strengthened capacity, increased knowledge and information, and better access to finance and technical support to address CCA and DRR. Among other things, this will include (i) improved integration of resilience through mainstreaming consideration of integrated CCA and DRR into countries' development strategies, plans, policies, etc. (at the national and local level), including in regard to food security and critical infrastructure; (ii) increased capacity to integrate climate resilience through CCA and DRR into PICs' country or sector development strategies facilitated by regional institutions; (iii) increased knowledge & awareness of climate variability and climate change impacts (e.g. climate change modeling, climate variability impact, adaptation options) among government / private sector / civil society / education sector in PICs promoted by regional institutions; (iv) enhanced integration of learning through an enhanced body of local, national, and regional knowledge and information on CCA and DRR into climate resilient development in each PIC promoted by regional institutions; and (v) leveraging – new and additional resources for CCA/DRR sensitive investments in priority sectors vulnerable to CC and CV.

Component 1, *administered by ADB and implemented by SPREP. Mainstreaming CCA and related DRR into national and local development policies and plans enabled through the capacity of the countries to collect knowledge and analyze and evaluate it, and identify best models and methodologies for replication and scaling-up. The overall objective is to increase the climate resilience of Pacific island countries by strengthening their capacity to mainstream climate change and related disaster risks into development planning processes, policies, and plans.*

The outcome will be the transformation to a climate change resilient development path for all Pacific island countries. Outputs for Component 1 are (i) CCA and DRR are normal business activities of key development sectors and in community development, and contribute to integrated sector plans, national environment plans, national sustainable development strategies, and community development plans; (ii) sector policy and strategy are developed/amended with the inclusion of CCA and DRR considerations; (iii) sector mainstreaming is linked to the national mainstreaming through integrated sector plans, national environment plans, and national sustainable development strategies; (iv) CCA and DRR data and information are developed to inform tool development; (v) tailored tools for mainstreaming CCA and DRR are developed; (vi) CCA and DRR tools are trialed and applied; (vi) CCA and DRR tools are replicated and up-scaled; (vii) capacity building for mainstreaming CCA and DRR is completed in key sectors and vulnerable communities; (viii) capacity is built for CCA DRR at national, local, sector, and regional levels; (ix) improved understanding of CCA/DRR drivers, and CCA/DRR mainstreaming data and information needs; and (x) institutional and policy support for mainstreaming is provided.

Component 3, *administered by ADB and implemented by SPREP: Establishment of a network of experts under a regional technical support mechanism (RTSM) to provide on-demand advice and capacity building in CCA and DRR in all 14 Pacific island countries, while building and supporting PICs' capacity to respond to climate change risks. The objective is to develop a Regional Technical Support Mechanism (RTSM) that would support and strengthen capacities to effectively respond to climate change risks in the context of national development priorities and to improve their ability to access, manage, and utilize climate change resources.*

Component 3 *will increase the technical capacity of Pacific island countries for effectively responding to climate change across a range of areas by supplementing capacity on a needs basis. Component activities will improve the ability of Pacific island countries to respond to climate change and access funding opportunities as the RTSM will assist in the identification of funds, pooling of Pacific experience and knowledge, in country assistance to assist with the drafting of applications and the necessary advocacy and support required for these submissions.*

Component 3 *will generate the following outputs:*
Activity 1: RTSM is developed, established, and functioning well in facilitating links between needs expressed by countries and expertise available in the RTSM.

Activity 2: A rapid response fund is established, including guidelines and policies governing the use and accountability of funds. This should preferably build on an existing entities procurement, management and fiduciary policies instead of creating a new set of policies. Resources will be available to support deployment of TA requested by member countries.

Component 2, *administered by World Bank and implemented through SPC. Deployment of regional-level experts to guide the integration of CCA/DRR into sector plans, focusing on infrastructure development (coastal, including physical planning/water) and food security (food production/oceanic fisheries) and based on practical CCA and related DRR knowledge and experience. The overall objective is to improve the use of local, national, and regional knowledge and information on CCA and related DRR in order to strengthen the capacity of Pacific island countries to manage climate change risks to food security and critical infrastructure.*

The expected outcome of the Component as a whole will be a measurable increase in the availability of reliable information and effective knowledge products, and their practical application, implementation and piloting of management and climate change adaptation and risk management. The Component will be designed to enable improved decision-making and strengthened local and national climate change adaptation and disaster responses, and helping to change the management paradigm from one of response to one of hazard assessment and risk management.

Outputs
Outputs will be produced against the key risk areas of infrastructure and food security. Against each of these, the following specific outputs will be generated:

Infrastructure

I. *Improved shoreline mapping solutions and the use of GIS based information systems for effective identification of infrastructure at risk in coastal areas and appropriate adaptation responses to manage these risks; and*
II. *Effective use of water and climate information to manage and respond to the risks posed by climate change on water supplies in selected Pacific island countries.*

Food Security

I. *Strengthened capacity to identify and evaluate appropriate adaptation approaches and adoption of integrated, holistic and more resilient food production systems; and*
II. *Identification of climate-related risks and threats to oceanic fisheries and adoption of appropriate strategies to address priority risks.*

Actions: The institutional modality to deliver this project is complex as it will involve a number of different institutions. Clearly some of the outputs are particularly relevant for SIWSAP, #2 under Infrastructure for example. Further information to find out on this project, including possible activities in the Solomon Islands, and co-financing opportunities. It appears this is a regional proposal and is delivered through the World Bank and the ADB; in partnership with regional agencies (SPC, SPREP, and the PIFS). Component 1 is implemented by the ADB with SPREP. Component 2 is implemented by the World Bank with SPC. Component 3 will be implemented by ADB with the PIFS.

Live and Learn Environmental Education (LLEE), Honiara
Haikiu Baiabe, Climate Change and Food Security

Working on an AusAID funded WASH programme over 4 years, mainly focused on community level interventions for sanitation and water supply services (technical level interventions). LLEE also focus on livelihoods and gender.

Actions: recommended to contact Christian Nielsen (who is well known to the Team Leader).

Friday 10th May 2013
Personnel notes and reading

For the rural water supply and sanitation sector, sector budget support has been provided by AusAID and the EU, and this will continue under re-instigating SIACCSWI project (see AusAID review material),

and a new EU agreement for sector support (expected to be €17.4m). However, for RWSS; it is not clear what occurs at the Provincial level in terms of the roll-out of national project and policy agendas? In Gizo the Provincial Government was limited by capacity, with technical skills spread across a variety of different tasks (under the auspices of 'Works'). It is not clear, yet, what agenda operates at the Provincial level – are their Provincial Plans – and they specific to sectors, and is there one for RWSS for example?

It is also not clear how and indeed if operation and maintenance of RWSS systems and interventions are funded, given it is clear no community engagement beyond construction occurs? Indeed, the information directly from EHD-RWSS would suggest that they are aware of these challenges, and the draft RWSS policy is expected to both change the institutional architecture, and transform the RWSS approach nationals.

How will adaptation interventions in addition to normal watsan activities be operated and maintained? Who will be responsible for procurement? Who will be responsible for maintenance and management of any future assets? Who will be responsible for any ecosystem based interventions? Can we determine 'additionality' from RWSS interventions?

SIWSAP has a medium to long term intervention approach, because of the need to demonstrate adaptation in practice, but this is not easy to 'demonstrate' given reliance on climate changes occurring to show the 'benefit' of any project interventions. . Therefore, 'demonstrations' need to develop some quick win-win examples for the project to see more immediate progress, and to learn from going forward. This may be the entry point, given the national policy changes expected to take place June-September, to better understand social learning approaches for water sector adaptation and disaster risk reduction, and to identify where, and how resilience is understood in the national policy dialogue (see climate change policy, draft RWSS policy, national water and sanitation sector policy, NAPS, NDS, etc).

Actions: Review all relevant water, climate, development and disaster policy frameworks available at this time.

UNICEF, Honiara
Brooke Yamakoshi (Water, Sanitation & Hygiene Officer)

Meeting with UNICEF to get an understanding of the institutional landscape working on water supply and sanitation across the Solomon Islands. We were also able to discuss progress with current watsan project, and the current donor environment and attitude to watsan, and specifically the link to adaptation and climate impacts expected within the water cycle.

There is a need to upskill the sector, and the area of service provision going forward does need investment. Recently (for ODA programmes), technical support and implementation (design and construction) has been performed by World Vision. Softer implementation, on advocacy and capacity development has been perfume by Live and Learn. ADRA have provided technical support, in a similar way to World vision. This leaves the Rural Water Supply and Sanitation (RWSS) Unit under the Ministry of Health with individual contractors to provide services to the remaining geographic area not covered by ODA projects, through normal government budget and donor budget support programmes.

RWSS are moving, with AusAID and EU support, to a role which removes them from the technical service delivery role, and instead takes them into a service provision management agency. They will, over the coming years, move to a contract management and monitoring role.

Actions: Meet World Vision, ADRA, and Ministry of Health.

Ministry of Development Planning and Aid Coordination (MDPAC), Honiara
Permanent Secretary Jeremiah Manele (Permanent Secretary)

Meeting to introduce SIWSAP to MDPAC, and to better understand the role and function of MDPAC, especially in relation to identifying co-financing possibilities. Discussion concerned new projects focussing on water supply and sanitation, including the EU sectoral support under EDF 11 for €17.4m. We also looked at other projects that could be identified as co-financing including work under the government budget via the Ministry of Health, and work on rural and urban infrastructure in Honiara and the Provincial capitals (for example focusing on sanitation for hospitals and schools).

Actions: Meetings to arrange with Lotie Yates at NDMO, AusAID, EU, Ministry of Environment, Agriculture (Frank Wickham), Ministry of Public Services (manpower and training), and the Ministry of Health (RWSS).

Ministry of Health and Medical services (MHMS), Environmental Health Division (EHD)
Tom Naunau (EHD – RWSS)

Meeting to discuss the role of the Rural Water Supply and Sanitation (RWSS) Unit, and the proposed SIWSAP project. Tom provided more information about the new water and sanitation policy under development with support from AusAID. Discussion focused on the mix of software and hardware interventions required, especially going forward under the new policy which will bring water supply and sanitation much closer together. Historically, sanitation has not received the full attention it requires. Community Led Total Sanitation (CLTS) and a much clearer water, sanitation and hygiene (WASH) focus is part of the new policy which will help transform their activities, and their mode of working. The RWSS Unit will become, over time, a management unit, with a diminishing role in direct service delivery on the ground. Although the Environmental Division of MHMS always focussed on infrastructure provision, the mew policy relinquishes construction to various agencies such as: ADRA, SIDT, CARITAS, WorldVision, Rural Development Programme (a multi-donor funded infrastructure programme), and the Red Cross as non-state actors focussing on service delivery. RWSS will therefore take on a clearer contract management, and monitoring and evaluation function, including providing support to those non-state actors delivering on-the-ground services. This new role will also include managing the tender and procurement process for materials and equipment.

Discussion about the new proposed WASH Cluster Committee (NDMO, Red Cross, UNICEF, ADRA, RWSS) and institutional challenges to delivery of new programmes when capacity expectations are so high on a struggling non-state actor group. We also discussed the responsibility for Operation and Maintenance, and where this lies in current watsan approaches, and under those directed by the new policy. Responsibility for O&M is often handed directly to the communities, or to the Provincial Government. Community preparation for this is an issue – how to manage, repair, and pay for a 'system' is not something that has received enough attention to date. Often only brief on-the-job training is provided.

Actions: Meetings to arrange with Peter Visser in RWSS to discuss the development of the new policy and capacity limitations. Arrange meeting with Jack Filiomea in RWSS-EHD.

Saturday 11th May 2013

Applied Geoscience and Techology Division (SOPAC), Secretariat of the Pacific Community (SPC)
Rhonda Robinson (Deputy Director Water and Sanitation Programme)

Skype call to request documents and information that is not available in Honiara, and to find out about other possible project and programmes starting in the next few years that could be included as co-financing for SIWSAP. Information requested included an update on JNAPS, general climate change information for the Solomon's and relevant data sets and reports, an update on the EU Water initiative IWRM Planning and policy work, information available via the GEF PCU, Disaster Risk Reduction and Climate Change Adaptation policy guidelines for the Pacific, catchment risk assessment work from the Kongulai Catchment (undertaken by IWC), Water and Sanitation Outlook for the Solomon Islands.

Actions: Read documents. Follow-up call to arrange with Rhonda.

Sunday 12th May 2013

Reading documents collected. Reviewing notes from meetings, and background material. Follow-up emails and exchanges with: WorldVision, SOPAC/SPC, UNDP, PPG Team Members, UNICEF, Ian White, NIWRMC Consultant with MMERE.

Monday 13th May 2013

National Disaster Management Office, Meteorology Department, Climate Change Division
Hudson Kauhiona (Deputy Director, Climate Change Division)

Discussion focussed on the state of climate based information reporting for the Solomon Islands. We discussed the AusAID funded report (copy received from SOPAC/SPC), which provides the best current example of predicted climate change impacts for the country, including projected impacts on water availability for food security, and V&A studies that were available for different parts of the country.

We discussed existing adaptation projects including SWoCK, PACC, the climate proofing infrastructure project under the Ministry of Infrastructure Development (which seems to mainly focus on flood protection and some water storage), fisheries project with the Coral Triangle Initiative, EDF10 of settlements (and resettlement), and work funded by AusAID with TNC and SIDT, and GIZ work in Choiseul. Further discussion focussed on EDF 10 support for the SICCAP project. The PMU for this project was only established in early 2013. The project will look at establishing a framework for relocating settlements, and will outsource work to consultants to develop case studies. Other work includes an overall V&A assessment of the Solomon Islands which is due end of July. We also discussed the SEMRICC project, and the PHRD project (CCA & DRR) which is becoming the CRISP project (is this correct?).

Joint National Adaptation Programme (JNAP) are designed to link climate change adaptation and disaster risk reduction approaches together. They focus on community based disaster risk reduction approaches linked to climate change. We also discussed some of the practicalities of resources flows between Honiara and Central Government and the Provincial Government challenges to implement work on-the-ground. We also discussed the water source challenges for Gizo town and the need to evaluate the existing water source for possible upgrades.

Actions: Meet with Lotie Yates (unfortunately on long term sick leave). Meet with Joe Horoko. Contact Hudson in early August to find out how the V&A work for the entire Solomon Islands is getting on. Contact Suzanne Paisley at the World Bank RDP. Contact SOPAC about JNAPS. Speak to Gloria at UNDP about SWoCK. Speak to Caspar Supe the PACC National Coordinator. Contacts with Susanne Paisley (Rural Development Programme), and Erik Johnston following the first mission.

Environment and Conservation Division
Joe Horoko (SIG GEF Operational Focal Point, Ministry of Environment)

Not available at office prior to field trip to Gizo or on return (as the trip was delayed and the only day back in Honiara was a public holiday)

Followed up by email (date, 26th June, 2013)
No response.

The Nature Conservancy
Jimmy Keresere
Collin Gereniu

TNC work in Choiseul on Ridge to Reef implementation funded by GIZ. They are developing a Ridge to Reef management plan for the whole of the Province. TNC's main strength in the Solomons is on marine and community aspects. For the terrestrial side they often work with other partners. Some work has been done on community adaptation planning but regarding access to and use of marine resources only. This did involve looking at coastal erosion challenges and protection of water sources in Choiseul Province. This will be included in their Ridge to Reef plan. There also exists a Solomon Islands Locally Managed Marine Area (SILMMA) network. WorldFish and WWF are active on other marine work.

Actions: contact Joe Horoku in Ministry of Environment (done, many times, no reply). Contact GIZ regarding work supported in Choiseul.

EU Delegation
Marc Van Uytvanck, Attaché for the Governance Sector, EU Delegation to Solomon Islands

A meeting in the Mendana Hotel to better understand the investment that the EU is making into rural water supply and sanitation and climate change adaptation. Marc was able to explain the EU Budget Support and we briefly discussed the current Action Fiche for €17.4m on water supply and sanitation through budget support, and the Solomon Islands Adaptation Project (SICAP) which is supported by

General Budget Support through the Ministry of Finance who allocated the funds to the Ministry of Environment, CC, Disaster Management and Meteorology.

Actions: follow up email exchange with Marc to stay in contact as EU support vital for co-financing and to match interventions to help with adaptation through SIWSAP. Follow up email exchanges with Marc on 12th June.

Tuesday 14th May 2013

WorldVision International
Andrew Catford (Country Director)
Bryce McGowan (WASH Advisor)

Meeting to discuss the work of World Vision in the Solomon Islands and the SIWSAP project. They explained that the AusAID programme that had been supporting the Rural Water Supply and Sanitation Sector (SIACCWSI) is undergoing a re-design phase at present due to some concerns over previous performance and delivery, and a change of direction that may be required. The project was therefore being adaptive and undergoing a learning process. WorldVision worked under this project on the design and construction of watsan interventions. The majority of their work involved community consultation and a focus on water supply provision, not so much sanitation.-

Actions: Contact Piter Visser, AusAID PACTAM in RWSS. Contact AusAID for copies of the Capacity Assessment reports (speak to Dave Kelly).

Adventist Development & Relief Agency (ADRA) – Solomon Islands
Angele Nkou-Deemi (Country Director)

Meeting with ADRA as one of the WASH service delivery agencies (working on WASH for more than 15yrs in the Solomons). ADRA mainly focuses on the physical construction of water points, the provision of material for communities to build their own water points and toilets, and the rehabilitation of damaged or old sites. They do have a specific sanitation component that builds public latrines attached to clinics so that patients can be served (under a contract with the EU), and this also provides training with communities on installing water equipment and basic maintenance. They also focus on health and HIV. ADRA works across all the Provinces, and also works on DRR in Makira, funded by AusAID. Clearly, ADRA provides a range of services and different skills across sectoral interventions, given the breadth of work they do.

Actions: No immediate actions following this meeting.

Consultant working on Development of National Water and Sanitation Sector Policy
Ian White (contracted to MMERE through EU-SOPAC National IWRM Planning Programme)

A total of three evening meetings with Ian to discuss IWRM in the Solomon Islands, progress with the GEF Pacific IWRM project, and the appetite for policy reform, and the establishment of a national IWRM Apex body to better coordinate water sector interventions across the country. In June however, it

appears that Cabinet did appoint a National Integrated Water Resource Management Committee (NIWRMC).

Actions: to stay in contact with Ian and share documents and idea as necessary, etc. Ian has been a colleague with the Team Leader since 2007 with various pieces of work.

Rural Water Supply and Sanitation Unit, MHMS-EHD
Piter Visser (Rural WASH Technical Advisor)

Discussion focused on AusAID support to the water supply and sanitation sector (SIACWSI). This programme of support started in June 2010, and was original designed to last for four years with a budget of AUD11m. Following the MTR in 2012, the programme was halted for review and adjustment, with a new end date established in 2016.

In reality, RWSS has mainly focussed on rural water supply, and done very little or has very little experience on sanitation, and has no experience with hygiene interventions. RWSS has always been hardware focussed, and has not engaged in community level work other than local support for construction, labour, and sourcing of materials. The new RWSS policy will re-frame how the 'sector' does work, but it will take time to create the change required. At present a lot of work is required to develop new standards and guideline documents for schools, clinics, disabled access points to watsan services, etc. Bringing in climate change to the watsan 'sector' is a welcome addition, but capacity is low and stretched to deal with additional complexities. Although for DRR, landslides is a problem area for them, as it can often damage RWSS systems, and water source quality and quantity. Alternative options and guidelines in these situations do need to be developed.

Sanitation – apart from communal buildings, clinics, schools, etc, sanitation is left down to individual household choice, so most people either use the bush, the beach, or dig their own pits. Sanitation needs a re-think in the Solomon's, as the current approach does not seem to be having that much effect. Rural Training Centres do exists – these could be agencies where simple skill sets exist that could be used as service providers – people with basic plumbing skills, concrete, masonry skills etc. Equally, time is required to build these capacities, despite the new RWSS policy handing over the responsibility to the private sector which does not really exist, and NGO's.

In terms of governance the WASH Stakeholder Group has a Terms of Reference to describe the role of the Group, and it is responsible for the coordination of rural interventions for water, sanitation and hygiene. It contains NGO's, donors, and some Government Agencies. The WASH Steering Committee contains the major donors who invest in WASH and RWSS (MHMS-EHD). There is growing support for WASH across the country, but behaviour change is needed, with around 80% of people still using the bush (in rural areas one toilet for 65,000 people). Triggers are required to change behaviours, and a Health Promotion Unit in MHMS will work on advocacy activities as a national campaign to improve the focus on sanitation. RWSS does have a database which contains baseline data on systems, equipment, supplies etc. They are developing a nationwide study to better understand the existing RWSS systems that they know about.

Programmes funded by sector support will have to go through government tendering procedures. The Ministerial Tender Board looks at procurement for work over 100,000SBD, the Central Tender Board considers work over 500,000SBD (CTB is in the Ministry of Finance). Procurement is a challenge to get

what is needed via different channels to normal, for alternative, cost effective supplies. There is a strong feeling that NGO's do not do such a good job , and that RWSS do a better job (although the AusAID capacity review and review of SIACWSI clearly does not show this). However, this is not an unknown problem. In part NGO's, such as World Vision, had capable staff in place, but then had to cancel contracts because the sub-contracts from RWSS were so delayed.

Discussed the Rural Development Programme and their mode of intervention – whereby the community is provided with the finance to contract an engineer in to design and implement the project with them. The projects are limited in size, financially, and in the scope of works, but it seems to have traction for delivery on the ground.

As far as Piter knows, there are no Provincial Water Plans in existence – regarding Provincial priorities for RWSS and water resource management. In towns RWSS is not involved, so for example, in Gizo, the responsibility for the system in with the Works Department of the Provincial Government- and not RWSS (take note of comments in Gizo section of this Mission Report).

Actions: Speak to Peter Wopereis, Rural Development Programme. Contact Dave Kelly in AusAID. Verify some information with WorldVision.

Wednesday 15th May 2013

Rural Development Programme

Peter Wopereis (Engineer - on flight to Gizo and at the Gizo hotel)

Meeting with Peter in airport and on flight to Gizo, followed up in the afternoon in Hotel Gizo. Discussion about the Rural Development Programme, the work it does on water supply and sanitation, and the modalities it uses to engage communities. Discussions focussed on procurement of materials, adaptation planning and interventions, operation and maintenance and payments schemes. Key informants were identified in Gizo to talk to about the water supply and sanitation situation. Costs for equipment and materials were discussed (such as Rotamould tanks, approximately 7,000SBD for 12,000lt tanks, or around US$1,000).

Action: Contact Suzanne Paisley and Erik Johnston at the World Bank. Speak to Peter Lasa in RWSS, Works Unit, Gizo, and to Andrew Duncan in Gizo. Find out more about the Climate Change Working Group coordinated by MDPAC (?).

Provincial Government, Western Province, Gizo

Eric Kikolo (Deputy Provincial Secretary)

Meeting between the PPG Team and the Deputy Provincial Secretary. The purpose of the meeting was to thank the Provincial Government for their hospitality in accepting us to Gizo Town, and to discuss their concerns about water supply and sanitation and climate change adaptation needs. We focussed on understanding the concerns of the Provincial Government, in identifying key challenges and also key individuals and agency capacities to support the implementation of pilot activities under the implementation phase.

Some of the issues discussed included:

- Urban water supply Ordinance – many people are not complying with the regulations and consequently, many houses are not getting any water
- Water supply pipe has been cut from the source, despite the post tsunami upgrade by the ADB
- At times water has to be rationed, despite there being a good source of water at Leoko. Some groundwater supplements the main source water supply, but the groundwater supplies less than 2lts per second in total, and leakage rates are over 50%
- Almost 100% of homes now have rainwater tanks because they cannot guarantee supply via the network. In some cases, employers have provided staff with tanks, or people have invested in tanks themselves. People in Gizo are very conscious about water supply and wise use of the resource.
- When there is no rainfall, people pay extra for a water tanker to fill their tanks with freshwater, but this is taken from the same source as the town network. There is no septic tanker for pumping out septic tanks, where people have them. These effectively leak into the groundwater.
- There is another possible water source for the town at Malakerawa, but this is untapped at present.
- The town needs a more reliable water source that is able to cope with the changes to the climate that Gizo is already experiencing.

We also discussed other donors active in the town and surrounding areas to help identify possible co-financing support to the project.

Note that the Terms of Reference for the Mission and the explanatory letter to the Provincial government are provided at the end of this Mission Report.

Actions: Plan a final report back to the Provincial Government for Monday 20th May. This feedback will be given by the team as the TL will have left by then to connect to international flights.

PPG Team Meeting, Hotel Gizo
James Dalton, Isaac Lekelalu, Kenneth Bulehite, Samson Maeniuta Rihuoha, Richard Pauku

PPG Team meeting to discuss collective knowledge about Gizo town, the impact ofthe tsunami, the geography of the town looking at maps. We then took a walk around the town (approximate population 6-7,000 people, although this includes peri-urban areas) to take a look at use and condition of rainwater harvesting tanks, roof condition, and guttering.

Many homes appear to rely on rainwater harvesting (RWH) for drinkning, and possibly for some toilet flushing where septic tanks exist. Some parts of the town are connected to a mainline sewer system that flushes raw sewage off the reef. The number of houses actually connected is low however. A selection of photographs from Gizo town are provided in Annex 8. One challenge with Gizo is the driver of the water problems. In part this is due to climate change, the ongoing impact of the tsunami of water shed areas where people have moved as a consequence of the tsunami, illegal connection, theft of pipe and equipment (part of the water supply reticulated system), and lack of maintenance. There are also some challenges with the geography and layout of the site, reliant solely on gravity feed. Some buildings would appear to have more strategic storage water tanks, but not many, and it appears

opportunities have been missed, given the reliability of Gizo's water supply, to develop further strategic water storage.

Thursday 16th May 2013

Individual meetings with PPG Team members to discuss the previous field trip to Choiseul Province, and the sites at Taro township, and the Poroporo Community.

Detailed in the reports from the site, we discussed the sites from the perspective of the feasibility of bringing water from the mainland (Taro) to the community on the island (Poroporo). There is a source for Taro, but there are some concerns about the safety of this site with regard to water quality and salinisation, and solid waste pollution. At present the water is at the soil surface, as a shallow wetland area, and is used as a community rubbish dump, but this may also recharge the freshwater lens due to rainfall (this is highly probable). Rainwater Harvesting tanks are in use, so combined with the groundwater these are the 2 main sources of drinking water.

For Poroporo, the village is close to a small river. The village also has a well, but this smells saline and is muddy. There were 2 large RWH tanks, but one of them may not be in use. The river flows into coastal marsh areas and mangroves. People are receptive to the need to protect the river and the swamps as a possible water sources. If not, they have to walk far to other water sources.

As a team we also discussed the challenges of equipment procurement, and the need to develop a clear model, and a clear process to ensure procurement does not delay the entire SIWSAP project during implementation. For the SIWSAP Project Management Unit, staffing of the unit will need to be carefully considered, ideally with financial and procurement experience. Ecosystem based adaptation does appear to have some traction in Choiseul, (with CHICCHAP – a planning entity?), with The Nature Conservancy active in the Province. Information received from Melchior Mataki suggests that CHICCHAP will focus on long term water storage in Taro for 3 of 7 communities. This needs further clarification – see documentation from Wulf Killman.

Action: see information re: Choiseul from Wulf Killman at GIZ. Also, find out what we can about CHICCHAP.

Field Trip: Water Source of Gizo Town at Leoko

Kindly facilitated by the Works Department with the support of the Provincial Government, we visited:

1. The source of freshwater for Gizo Town at Leoko. This also allowed the team to see the original source pipe, and the second new pipe installed in 2009 with finance from the ADB as part of their Tsunami Emergency Response Work.

2. Visit to the Gilbertese communities living partly along the main freshwater supply pipes to Gizo Town. This allowed the team to understand the structure of the pipe network into town, and the location of stand pipes for villagers (although classed as 'rural' – these villages are all within a 5km distance of Gizo town, and many are within 1-3km). The Team also met with villagers and stopped to discuss water issues and changes in climate that people felt could be occurring.

3. Visit to the reservoirs located at the top of Gizo town, and to the water treatments works.

PPG Team Meeting, Hotel Gizo
James Dalton, Isaac Lekelalu, Kenneth Bulehite, Samson Maeniuta Rihuoha, Richard Pauku

Team meeting to discuss the format for the local stakeholder consultation to take place on Friday 17th (see notes below) We confirmed the numbers of expected participants and discussed some of the key challenge points for Gizo Town, such as:

- The lack of rainfall record for water resource planning, and to understand changes over time to plan for the future storage of the town. Although the local community generally have a good idea of the number of days since the last rainfall. The problems with the water supply in the town, and the increasing demands of the town with population growth at 4% means that the inhabitants of the town have had to invest in their own rainwater storage, and they have a good understanding of their water needs and the state of water reserves in their home tanks.

- Following the field trip we were also able to discuss what we considered to be possible entry points for the project to look at how the current watsan system for the town could be improved to make it more resilience to climate change impacts. Clearly, management challenges exist, and capacity is low due to limited resources and a lack of people able to deal with the challenges of serving the town. Demand versus supply must be managed better. The system has high leakage rates – essentially the system captures, cleans, stores, pumps water back into the ground with such high losses of over 50%. This is costly to the Government which spends approximately 35,000SBD/month on electricity costs for pumping. The system is also reliant on constant supply. If the intake reduce flow (for whatever reason) the system does not currently store large enough volumes of water, and then takes a long time to refill because of the relatively low discharge from the source, relative to the size of the population needing water, and the high leakage rates. One of the two main supply pipes to the village has been broken for 2 years.

- Communal water storage is provided, but only at the new hospital, and the new Provincial Government building (still under construction). The JFK Stadium and the market could also be used for communal storage in the future.

Actions: Corroborate some of this information during the consultation meeting the next day, and take this information forward for the Pilot Report.

Friday 17th May 2013
Stakeholder Consultation Meeting
Womens Resource Centre, National Council for Women, Gizo town
James Dalton, Isaac Lekelalu, Kenneth Bulehite, Samson Maeniuta Rihuoha, Richard Pauku

Present *(participants list is provided at the end of this Mission Report)*:
RWSS/Works, Agriculture and Livestock, environment, NDMO, Red Cross, South Seas Evangelical Church, Rural Development Programme, Education, Andrew Duncan

The Water source is for Gizo town, not for the rural communities. Although it is difficult to determine where the town boundary stops and the rural communities start due to the town growing and an increasing (although still quite small) peri-urban area. Participants felt that there is an increasing recognition around water management, and the weather is changing with the same rainfall occurring, but in a different way to how it used to fall (concentrated over different months, or missing months and coming in small periods.

The village of Titiana is taking water without permission by 'tapping' into one of the two main pipelines into the town. Despite stand points being put in place for community access to water, the system is being affected by 'unknown' offtakes. All participants agreed that there is, and therefore should be enough water for Gizo town, it is just it is not being managed well. This is quite concerning looking forward to the impacts of climate change. One key adaptation basic is getting water management right, and as this is clearly a challenge in Gizo at present, certain interventions will be required to improve the water security of the town.

Andrew Duncan provided an overview of the rehabilitation of Gizo water supply project funded by the ADB. The documentation, including final review was found through Steve Blaik and Daisuke Mizusawa from the Pacific Department in the ADB. Notes from meeting with Andrew Duncan following the Stakeholder consultation:

- Procurement is a big problem. SIWA has been up to look at the site, but it is going to cost them too much to rehabilitate relative to guaranteed cost recovery. However, SIWA are capacity that does exist that could help any pilot interventions in the town under SIWSAP (as well as Andrew).

- The leakage rates are around 70%, so essentially the system is supplying water to 10,000 people, and not 7,000.

- Estimates to restore the system functionality are between US$2-3m. The ADB, under post-tsunami reconstruction helped expand the source in inserted a new supply line. But, with more water flowing through the network down into the town, this has also provided opportunity for access to water for those in the rural and peri-urban areas. Following the tsunami, many people moved away from the cost and the hill. Now, with pipes transporting water past their temporary homes, people are tapping into this water, despite only having temporary approval to live on the land. Essentially, the rehabilitation of the water system by the ADB has helped with the encroachment into the area surrounding the town, expanding the peri-urban area. Where pipe water access is provided, or at least easier for people, this also allows them to stay settled in the area, and not move back to the coast through applying for a Temporary Occupation Licence.

- One option is to adjust the system to actually provide water to people on these temporary land areas but this may attract more people (although maybe this is one part of the solution, and thereby this avoids having to dig up and fix the network under the town with 70% leakage).

- There are springs close to the new prison and the old hospital site. These could be expanded. We visited these sites to see stand pipes constantly running with clean water. Standpipes are a social event, a place to gather, talk, for children to play. More cold be dome with the spring, and with the design of the standpoints for the town as an alternative source during times of drought, although the reliability of the source and quality is not so well known.

- Generally, people prefer having tanks, because they can then control their own usage and supply. They do not want to pay for the piped network supply when the water is not working, or when they get poor supply due to leaks and unknown offtakes. The Provincial Government have not made it clear about which they would prefer, to have the network fixed, or to invest in tanks. Tanks puts the risk back onto the household, and dissolves the Provincial Government of responsibility.-

- There is also a small dam which will hold 11,000 litres, built in 1982. This also has sand filters but they need backflushing and rehabilitating. The outtake is rusted and it needs some rehabilitation work to make it functional again. Since the tsunami people have moved into the catchment and this has caused erosion and pollution around the dam, as it relaies on the normal rainwater catchment.

- The primary school, Churches, police, hospital, and some housing are connected to a small septic system. This system has been over designed, with large septic pumps. These have larger capacity than the system needs, and so this could be expanded in the future. The outfall is 200m off the cost at 15m depth.

PPG Team Meeting, Hotel Gizo
James Dalton, Isaac Lekelalu, Kenneth Bulehite, Samson Maeniuta Rihuoha, Richard Pauku

Team meeting to review the feedback received during the consultation workshop and scope out initial ideas for the Gizo pilot, including presenting back to the Provincial Government on the 20/05.

Discussions focussed on:
- Finalising and agreeing the field trip schedule (updated in the workplan)
- Temotu – early June preferably, because of changes in the weather and the complex logistics.
- Makira – late June/early July
- Malaita – early July
- Rennel (with possible addition of Milika Sobey to the team) – late July/early August.

By the middle of August all field trips should be completed so that field trip reporting can be completed for early to mid September at the latest.

We also agreed the reporting schedule and the process for feedback, and reviewed the overall workplan to ensure everything was clear across the PPG Team.

Saturday 18th May 2013

PPG Team Meeting, Hotel Gizo
James Dalton, Isaac Lekelalu, Kenneth Bulehite, Samson Maeniuta Rihuoha, Richard Pauku
PPG Team meeting

PPG Team meeting to prepare for the Provincial Government meeting and feedback session on the 20th. Questions to the Provincial government included:

- What are their plans for the water supply of Gizo town – as the Government, ignoring donor support and possible interventions?
- If the system was improved, who would be responsible to manage it?

Sunday 19th May 2013
Return to Honiara from Gizo.

Solomon Islands Red Cross
Alex Wate (YOPP Team Leader)
Meeting in Hotel Mendana, Sunday evening.

Meeting to discuss the programme of the Red Cross to gauge their possible involvement in SIWSAP going forward. They have a Disaster Risk Reduction (DRR) programme that has identified the need to build adaptation skills in communities. They focus on 'attachment' programmes whereby they take one community to another around common issues so that the communities can act together and therefore learn together. They work in Malaita, Choiseul, Western provinces, Isabel, Guadalcanal and in the peri urban area around Honiara.

They also work on governance structures and provide small grants (up to 15,000SBD) to communities for water supply, sanitation and health (WASH) projects. Most of the activities have focussed on providing rainwater tanks, some composting toilet (CT) construction, although what often happens is the CT becomes a standard pit latrine. There are CT's in use just outside Honiara (Raintree Cafe, White River market). The Red Cross generally does not have trouble sourcing materials, which can be a problem for government agencies.

Actions: Contact Australian People for Health, Education and Development (APHEDA). They are trying to pull together information and learning on watsan for all NGO's.

Monday 20th May 2013
(Solomon Islands Public Holiday)

UNICEF
Brooke Yamakoshi (Water, Sanitation & Hygiene Officer)

Final meeting with UNICEF to discuss initial ideas and concerns regarding pilot project application given the capacity gaps, and the current lack of service providers for the RWSS sector. Further discussion around the use of community led total sanitation (CLTS) approaches in the Solomons, and using more innovative models for delivering the services, such as those promoted through Msabi. Msabi have recently been in the Solomon's.

Action:
Contact Dale young at MSABI.

Wednesday 22nd May 2013

Live and Learn Environmental Education (LLEE)
Christian Nielsen (Executive Director)
Consultation call via Skype from Malaysia

Meeting over Skype to discuss LLEE activities in the Solomons, and their work around Community Sanitation Cooperatives, which uses a private sector approach utilising the wontok system. Discussion focused on the role of decentralised service delivery for water supply and sanitation services in the Pacific, and how climate change adaptation knowledge needs to be shared and dispersed across sectors. The need for change agents using different community mechanisms, and accepted networks (such as the Church) is key to dispersing and sharing of information. Investment s therefore required in the informal and formal networks, both of which are key components to service delivery, but which are often missed by government (as networks are not highly valued, and informal are not subject to receiving finances from the public sector), and often fall under the radar of conventional development interventions, especially in the Pacific region.

NGO's need to also better recognise their role in this process. That funding is often provided to them to fill this 'gap' in service provision and knowledge sharing, but they often fall into the trap of not putting enough into these local systems, and instead develop continuous support processes or parallel networks. Innovation in adaptation for the rural watsan 'sector' should occur at the pilot sites and feed into national learning. The key is to ensure the interventions remain simple.

Actions: stay in touch with Christian regarding the LLEE model for sanitation roll-out, the decentralised option.

Friday 24th May 2013

Applied Geoscience and Techology Division (SOPAC), Secretariat of the Pacific Community (SPC)
Rhonda Robinson (Deputy Director Water and Sanitation Programme)
Consultation call via phone from Malaysia

Phone meeting to discuss regional activities of relevance to SIWSAP, including co-financing possibilities. From this a number of actions were identified.

Actions: Follow up with Paula Holland at SOPAC/SPC regarding cost benefit training performed under PACC. Follow up with USP regarding their climate change course. Follow up with gender experts in Fiji recently working in the Solomon's. Discuss the GIZ work in Choiseul with Wulf Killman. Follow up with USP and the PACC project on the climate change training work they do.

Thursday 4th July 2013

AusAID
Angellah Kingmele (Senior Program Manager, Bilateral Health Program) at the request of John Francis and Dave Kelly
Consultation, by phone from Switzerland

Call with AusAID to discuss the final reports from their work on updating AusAID support for rural water, sanitation and hygiene to the Solomon Islands, and the joint audit work on capacity assessment of the clean water and sanitation initiative, and the Solomon Islands Access to Clean Water and Sanitation Initiative (SIACWSI) evaluation. We discussed the possible 'risk' elements of the new institutional architecture proposed around delivery of RWSS services across the country, and the position the new draft RWSS policy puts service delivery in going forward. AusAID are familiar with the concerns around no or very little private sector capacity, the challenge of poor delivery actually reducing funding to the sector in the short to medium term, and the impact of these changes on current work and work planned for the next few years.

Actions: none at present, but to follow up with AusAID during the next mission.

Further email consultations also took place with

- Andrew Piper, URS, Melbourne – to discuss forestry carbon credit work in the Solomons.
- Clement Hadosaia (and Moses Pelemo), Manager, Kastom Gaden Association, Honiara – regarding composting toilets and their use in the Solomon's.

Mission Outcomes and Actions

The mission can be described as being mostly successful, although there remains work to be done by the local stakeholders to finalise the demonstration project detailed design and formalise co-funding.

All actions from the mission will be followed up with in preparation for the second mission to the Solomon's.

Annex 2: Terms of Reference, Gizo Field Trip, May 2013.

Project Name: Solomon Islands Water Adaptation Project (SIWSAP)
Activity Name: SIWSAP PPG Project Site Visit- Gizo, Western Province
Background:
The Solomon Islands Water Adaptation Project is an intervention to address water sector vulnerabilities as identified in the national plan of action (NAPA) for climate change adaptation. This project aims to improve the resilience of water resources to the impacts of climate change sequentially to improve health, sanitation and quality of life, and sustainable livelihoods in targeted vulnerable areas.
A Project Identification Form (PIF) was approved by the Global Environment Facility alongside the Project Preparation Grant (PPG) to conduct preliminary technical assessments; stakeholder dialogues and capacity assessments, and the development of a project document. A recent inception workshop has finalized the potential sites for the project and which includes3 provincial townships and 4 rural communities. These sites represent low lying, raised coral and highly mountainous islands that are water stressed .The first site that was visisted was Taro township in Choiseul Province.Gizo township of Western Province will be the next site to visit.. Therefore, a field visit will be conducted to these sites on from 12 May to 17 May 2013.
Objectives:

- Organize and facilitate consultative meetings with local governments and community stakeholders to assist with the project definition

- Undertake preliminary technical assessments including assessments of water resources and sanitation practices; and assessing the impacts of climate change on water quality and quantity.

- Prepare an indicative climate change adaptation plan to improve resilience of the water sector that specifies the activities and targets over the duration of the project, indicative costs, roles of various stakeholders, requirements for implementation and associated risks and mitigation measures

- Gather additional information that will be necessary for submission of project document and other requirements to LDCF, including the level of cofinancing from the local government and communities, baseline information, etc

General Activities

- Stakeholder consultative meetings : The PPG team will conduct stakeholder discussions at both the provincial and rural community level. At Taro, the team will make a courtesy visit to the provincial premier and his executive; and consulted with the Choiseul Province Climate Change Integrated Programme. In Choiseul Bay village, consultations will be conducted with community leaders, as well as women and youths. This is purposely to assist with the project definitions and to improve community perceptions to adapt to climate variability and change.

- Preliminary technical assessments: Assessments of current water supply management practices and assessments on water resources and vulnerability to climate change will be conducted within Taro and Choiseul Bay Village.

- Drafting of an indicative community-level climate adaptation plan

Mission Schedule: (to be finalized with inputs from IUCN and in

Date	Activity
Sunday 12 May	SIWSAP Team leaves for Gizo, Western Province
Monday 13 May	Courtesy visit to Western Provincial government Organise meetings with: RWSS EHD Office to organize consultations with Confirm participants & venue for consultation meeting
Tuesday 14 May	Official Stakeholder Consultations: Gizo township Introduce SIWSAP (PIF & PPG processes) Introduce Consultants & work plan/activities Discussions: CC VA Water & sanitation Issues Gizo to identify project intervention options Identify officers with RWSS-EHD for technical assessments
Wednesday 15th May	Technical assessments: Gizo township Assessment of options identified in consultation meeting Option 1, 2, 3, etc.
Thursday 16th May	Consultations continues: Technical assessments continues;
Friday 17th May	Feedback to Provincial government (morning).
Saturday 18th May	Team depart for Honiara

Budget:

Budget line	Description	Amount in SBD	Amount in USD
1	Airfares: 5 x people @2904/person airfare	 14,520.00	 2,013.87
2	DSAs: 4 x person@ 1270/day x 6 days 1x person @1270/day x 2 days	 30,480.00 2,540.00	 4,337.46 352.29
3	Terminal: 5 x persons @1095.92	 5,479.60	 760
4	Vehicle hire & fuel 2x days@1000/day	 2,000.00	277.39
5	Meetign venue hire: 2 x days venue hire@2,000/day	 4,000.00	 554,79
6	Meeting catering: 25 people x $80/person x 2 meetings	 4,000.00	 554.79
7			
	TOTAL	SBD63,019.60	USD8,740.58

SIWSAP PPG Team:

No	Name	Position	Ministry/Organization
1	Isaac Lekelalu	Deputy Director	Water Resources Division-MMERE
2	James Dalton	Project Development Specialist/Teamleader	SIWSAP International Consultant
3	Kenneth Bulehite	Project Technical Expert (WatSan)	SIWSAP PPG National Consultant
4	Samson Maeniuta	Project Institutional/Technical Expert (IWRM)	SIWSAP PPG National Consultant
5	Richard Pauku	Climate Change Technical Expert	SIWSAP PPG National Consultant (Funded by ADAPT Asia-Pacific)
6	Joanne Aihunu	Climate Change Policy Specialist	UNDP

SOLOMON ISLANDS GOVERNMENT

Ministry of Mines, Energy and Rural Electrification
Water Resources Management Division

P. O. Box G37, Honiara, SOLOMON ISLANDS, Tel: (677) 21521/21522 Fax: (677) 25811

Our Ref: W1/2/6 & W4/4/5 **Date**: 7th May 2013

Provincial Secretary
Western Provincial Government
Gizo
Western Province

Dear Sir,

Subject: Solomon Islands Water Sector Adaptation Project (SIWSAP) Preparation Site Visit – Gizo Island

This letter serves to inform your office that in line with the Solomon Islands Water Sector Adaptation Project Preparation workplan, a provincial site visit for Western Province is schedule for 14th to 22th May 2013.

The Solomon Islands Water Sector Adaptation Project (SIWSAP) will address water sector vulnerabilities as identified in the National Adaptation Programme of Actions (NAPA) for Climate Change adaptation. This project aims to improve the resilience of water resources to the impacts of climate change in order to improve health, sanitation and quality of life, and sustain livelihoods in targeted vulnerable areas.

A Project Identification Form (PIF) was approved by the Global Environment Facility (GEF) in 2012 alongside the Project Preparation Grant (PPG) to conduct preliminary technical assessments; stakeholder dialogues and capacity assessments, and the development of a project document. A total of 4 provincial townships and 6 regions of rural communities were identified in the PIF. These sites represent low lying, raised coral and highly mountainous islands that are water stressed .The provincial township of Gizo have being identified in the PIF as one of the potential project sites.

The purpose of the field visit is to:

- Organize and facilitate consultative meetings with the Province, NGOs, civil society and community stakeholders to assist with the project document preparations
- Undertake preliminary technical assessments (vulnerability and adaptation) including specific assessments of water resources and sanitation practices and management in the context of impacts of climate change on water resources and supply security.

The consultation team will comprise of officers from the Water Resource Management Division (WRMD), Ministry of Mines, Energy and Rural Electrification, Rural Water Supply and Sanitation

Programme (RWSS), Ministry of Health and Medical Services, and United Nation Development Programme (UNDP) and SIWSAP International and National Consultants.
The consultants are Merrs. James Dalton (Leader), Richard Pauku (Climate Change), Samson Maeniuta (Institutional/IWRM), Kenneth Bulehite (Water & Sanitation) experts.

Further to this the team would like to secure the involvement of Divisional Heads from the following during consultations: Works Division, Environmental Health (RWSS), Lands Division, Gizo Town Council, Finance Division, Fisheries Division, Business Houses Representative, Women's Development Div, Church Leaders and NGOs.

We look forward to meeting you and other key stakeholders and trust the information/data gathered during the site visit would contribute towards the success of the project preparation process. The final project sites for the SIWSAP would depend very much on the outcome of these site visits. On this note I wish to request the support of the Western Provincial Government towards undertaking the site visit for the SIWSAP preparation process in your Province.

Please contact Isaac Lekelalu email:i_lekelalu@hotmail.com or Richard Molea: rmolea123@gmail.com and on phone 21522 Ext: 204 or Charlie Bepapa on email: cbepapa@mines.gov.sb for further information about the field mission and consultations.

Your office will be updated on the consultation and assessments before or upon arrival.

Thank you in advance for your response to this sincere request.

Rence Sore
Permanent Secretary
Ministry of Mines, Energy and Rural Electrification

Cc: Premier, Western Province

Annex 3 PPG Project Team Meeting Minutes, Wednesday 15th May 2013

PPG Team Meeting, Hotel Gizo
James Dalton, Isaac Lekelalu, Kenneth Bulehite, Samson Maeniuta Rihuoha, Richard Pauku

PPG Team meeting to discuss collective knowledge about Gizo town, the impact ofthe tsunami, the geography of the town looking at maps. We then took a walk around the town (approximate population 6-7,000 people, although this includes peri-urban areas) to take a look at use and condition of rainwater harvesting tanks, roof condition, and guttering.

Many homes appear to rely on rainwater harvesting (RWH) for drinking, and possibly for some toilet flushing where septic tanks exist. Some parts of the town are connected to a mainline sewer system that flushes raw sewage off the reef. The number of houses actually connected is low however. A selection of photographs from Gizo town are provided in Annex 8. One challenge with Gizo is the driver of the water problems. In part this is due to climate change, the ongoing impact of the tsunami of water shed areas where people have moved as a consequence of the tsunami, illegal connection, theft of pipe and equipment (part of the water supply reticulated system), and lack of maintenance. There are also some challenges with the geography and layout of the site, reliant solely on gravity feed. Some buildings would appear to have more strategic storage water tanks, but not many, and it appears opportunities have been missed, given the reliability of Gizo's water supply, to develop further strategic water storage.

PPG Project Team Meeting Minutes, Thursday 16th May 2013

PPG Team Meeting, Hotel Gizo
James Dalton, Isaac Lekelalu, Kenneth Bulehite, Samson Maeniuta Rihuoha, Richard Pauku

Team meeting to discuss the format for the local stakeholder consultation to take place on Friday 17th (see notes below) We confirmed the numbers of expected participants and discussed some of the key challenge points for Gizo Town, such as:

- The lack of rainfall record for water resource planning, and to understand changes over time to plan for the future storage of the town. Although the local community generally have a good idea of the number of days since the last rainfall. The problems with the water supply in the town, and the increasing demands of the town with population growth at 4% means that the inhabitants of the town have had to invest in their own rainwater storage, and they have a good understanding of their water needs and the state of water reserves in their home tanks.

- Following the field trip we were also able to discuss what we considered to be possible entry points for the project to look at how the current watsan system for the town could be improved to make it more resilience to climate change impacts. Clearly, management challenges exist, and capacity is low due to limited resources and a lack of people able to deal with the challenges of serving the town. Demand versus supply must be managed better. The system has high leakage rates – essentially the system captures, cleans, stores, pumps water back into the ground with such high losses of over 50%. This is costly to the Government which spends approximately 35,000SBD/month on electricity costs for pumping. The system is also reliant on constant supply. If the intake reduce flow (for whatever reason) the system does not currently store large enough volumes of water, and then takes a long time to refill because of the relatively low discharge from the source, relative to the size of the population needing water, and the high leakage rates. One of the two main supply pipes to the village has been broken for 2 years.

- Communal water storage is provided, but only at the new hospital, and the new Provincial Government building (still under construction). The JFK Stadium and the market could also be used for communal storage in the future.

Actions: Corroborate some of this information during the consultation meeting the next day, and take this information forward for the Pilot Report.

GIZO TOWN SIWSAP CONSULTATION MEETING, WESTERN PROVINCE
WOMEN'S RESOURCES CENTRE CONFERENCE ROOM
DATE: 17/5/2013 TIME: 0930-1400
PARTICIPANT'S LIST

Name	Organisation	Title	Contact
Ogier Kiko	Sol. Is Red Cross	Branch Officer	60586
Silas Arukwai	NDMO	Prov. Disaster Officer	60445
Willieton Kazi	Tiroduke Village	Community Rep	7431414
Daniel Siosi	SSEC	Church Pastor	7417660
Nelson Puze	Suvania Village	Community Rep	
William Bako	Works Division	Works Officer	60581
John Kepas	Agriculture Division	Extension Officer	60464
Wilson Gina	Rural Dev. Program	Team Leader	60936
Willy Etupioh	Education Division	Prin. Ed. Officer	7471604
Andrew Duncan	Consultant	Civil Engineer	7466433

Annex 4 :Solomon Islands Integrated Water Adaptation Project, Minutes, Inception Workshop Program 16-17 April 2013, Rock Haven Conference Room

DAY ONE: Tuesday 16th April 2013

1. **Official Opening by Permanent Secretary**

Mr Rence Sore
Ministry of Mines, Energy and Rural Electrification

- In his opening remarks , PS highlighted water resources as critical issue in Solomon Islands. He further mentioned that Solomon Islands as a small island developing state and least developed country it is challenged by the impacts of climate change. It is also vulnerable to disasters and external shocks including aid dependency.
- He further explains that Solomon Islands is a party to the UNFCCC process and has ratiifed the Kyoto protocolmember of Kyoto Protocol and has ratified the convention. Through the National Adaptation Program of Actions (NAPA), the priority areas for Climate Change Adaptation have been highlighted and sites were selected upon wider consultation with the communities using a multi-criteria analysis and ranking was done.

- Water resources are sizable to small and are underground. Different communities have different situations and poses great need for proper water management. Although water is available, some are not suitable for human consumption and water is already stressed. The Climate Change further intensifies water stress and climate variability is having a major impact on Solomon Islands.

- As part of the implementation of NAPA, the Project Implementation Form (PIF) as a concept note was accepted. The Solomon Islands Water Sector Adaptation Project (SIWSAP) will promote short and long term programs and actions as adaptation to the Climate Change.

- The focus of this project is our resilience in water resources management and should be able be developed into full-sized Project Proposal by November 2013. The preparation will involve community consultation, data analysis, site visits before it is submitted for approval. It is important that all stakeholders work together for preparation of the project and its implementation.

2. **Speech by UNDP Deputy Resident Representative, Ms Akiko Suzaaki**

- The UN Deputy Resident Representative welcomed the participants to the SIWSAP Inception Workshop and informed participants that Solomon Islands has secured funding to building climate resilience
- She mentioned that climate change has severe impact of fresh water resources due to geography of the islandsThis affects Child mortality rate which is a major indicator of the MDG. Solomon Islands is mentioned as being ranked 137 out of 143.[5]

- She went on to highlight that recent Post 2015 survey[6] results revealed water and sanitation as priority area after education.

- She conclude with a recommendation on institutional set up is vital for the implementation of the project and thus the participation of all stakeholders. This needs an integrated manner and thus the Integrated Water Resource Management Process (IWRM). Therefore, UNDP and Water Resource Division and the other relevant Ministries and stakeholders are working together for the future generation.

3. **Role of GEF/UNDP Representative: Assistant Resident Representative, Jude Devesi**

- The Assistant DRR highlighted the completion of the UNDAF and expressed that Key Focus Areas are consistent with the National Development Strategy(NDS) including the Environmental Management, Climate Change and Disaster Risk Management

- These are consistent with Outcome 1.1 of having an improved national, provincial and community preparedness for disaster reduction in line with the NDS objective 7 which is to effectively respond to Climate Change and Manage the Environment and Risks of Natural Disasters.

- The project will provide vulnerability of water sector under Output 1.1.1 and formulate plans within the IWRM framework in accordance with Output 1.1.2 and mainstream the process in accordance with 1.1.3.

[5] Human Development Index
[6] Post 2015 survey asks more than 1000 Solomon Islanders on the future that they want

- He mentioned the current projects UNDP is engaged in with governments such as the SEMRICC, SWock, UN-REDD, Small Grant Programme (SGP), SEMRICC phase 2, SIWSAP, Pacific Adaptation Programme (Regional Programme) and IWRM (Regional Programme).

- The UNDP played an important coordinating role in the formulation of the PIF with technical advisory services from the UNDP Regional Center. The completion of the Project Preparation Grant will be done by UNDP and Adapt Asia (USAID).
- The implementation of the project could be done by the Water Resource Division of the Ministry of Mines, Energy through a full fledge project upon a HACT assessment.

4. **Role of SIG MMERE Director/Deputy WRD**

- The Deputy Director summarized the role SIG played in this project. The completion of the National Adaptation Programme of Action identified 13 sectors which would be vulnerable to the impacts of climate change and their susceptibility due to natural disaster occurrences.

- One of the areas identified is water and the WRD as leader for the sector with other stakeholders will participate in the project. This will be a follow on from the situational analysis prepared by the NAPA for the country.

- The WRD in working for the completion of the Project Preparation Grant will assist local consultants and the field visits will also need inputs from the established network of the RWSS which will be a major partner in the development.

- The IWRM approach considers all interactions within nature and humans from its route from raindrop to ocean and from community to cabinet. The IWRM as a process will be taken to look at the water situation in all sites and will result in consultation with all stakeholders and communities which will participate in the implementation of the project and those who will be beneficiaries. Information and inputs from RWSS and the CC will be vital for the PPG.

- The first site to visit will be Choiseul and has been slow to confirm due to difficulties to secure international consultants.

5. **Overview of SIWSAP PIF and PPG by Joanne Aihunu,UNDP**

- It was explained that the Project Implementation Form (PIF) is a concept note that was accepted by the GEF and the successful completion of the PPG would be the funding for the PIF.

- It was highlighted that water is reducing in quality and quantity. Water is highly vulnerable to the impacts of climate change. This was emphasized in NAPA and that would require a concerted effort from all stakeholders to address the issue.

- Looking at the project structure, the objective of the SIWSAP is to improve the resilience of water resources to the impacts of climate change in order to improve health, sanitation and quality of life, and sustain livelihoods in targeted vulnerable areas.

- Under its project framework, it has three project components; (i) Water Sector Climate Change Adaptation (WS-CCA) Planning in the context of Integrated Water Resources Management (IWRM), (ii) Implementation of the WS-CCA Plans and (iii) the CCA-oriented Governance in the Water Sector. It has four expected outcomes (i) 1.1 WS-CCA plans formulated, integrated and mainstreamed in the water sector-related and in broader policy and development frameworks, (ii) 2.1 Increased reliability and improved quality of water supply in targeted areas, (iii) 2.2 Investments in cost-effective and adaptive water and sanitation management and technology transfer and (iii) Improved governance and knowledge management for CCA in the water sector at the local and national levels.

- Potential Project sites include 4 township sites and 6 rural sites: Taro Island/ Choiseul Bay Village, Rennell Village; Bellona Village, Gizo, Tinggoa, Lata, Choiseul Bay Villages, Reef Islands Village, Santa Catalina village, Manaoba village and Taarutona village.

A brief of the timeline of the project is that:
July 2011 National Consultation held
Nov 2011 PIF submitted
Apr 2012 PIF revised
May 2012 PIF approved
Apr 2013 Inception Workshop
Apr- Nov 2013 PPG submitted to GEF

Discussions:

- It is expressed that PPG need to be completed and submitted to the GEF-LCDF by 30 November 2013 , otherwise Solomon Islands may lose the funding allocated under the PIF
- The criteria for site selection were clarified to participants. These include those pre-selected from NAPA 2008 and those from the July 2011 consultation that considers both rural and urban areas, representing low lying coral atolls and high islands and must be in a status of being stressed. It is of the understanding that these sites would be further exacerbated by impacts of Climate Change .Project sites would be discussed in detail during second day of the inception workshop.
- The SIWSAP is a CCA project although areas affected by CC are also susceptible to natural disaster. However, if address CC, it could also address disasters. The respond to such a situation points to the government's urgency to implement an appropriate project. However, this could be considered to be assessed during the PPG consultation with stakeholders. Thus, Temotu (Lata) could be considered.
- The possibilities of combining SWoCK and SIWSAP could be done for installation of automatic early warning systems for projects and uses could be both applied. However, the question of sites will be decided later.

- Combination of sites such as Taro, Supizae and Choiseul Bay village could be considered if the cost is not too high.
- Clariification is sought on issue co-financing that is not necessarily cash but can be considered as WatSan activities that can be used as baseline activities of the Provincial Governments or communities which would contribute to the successful completion of SIWSAP. What has been submitted in PIF is indicative of what to be done.

6. **WRM Approach/Concept, Isaac Lekelalu, IWRM Project Coordinator**

    - The WRD is hosting the project and will present the principles of IWRM. Water is vital for humans and in the context of CC, the vertical and horizontal integration of management approaches will be made. Land and water are inseparable and the quality of the catchment area or the river will determine the water quality and the water quantity.

    - The principles of IWRM are (i) social equity which is water for everyone, (ii) efficiency which is proper management of the systems and (iii) environment which is the whole eco-system through which water flows. Water has an economic value and so using water for an income is important.

- Women play a central role in providing management and safeguarding water and thus a participatory approach including all stakeholders is important. Water however is finite and is a valuable resource essential for life, development and environment.

- The IWRM is a process that promotes and coordinates development. It's pilot project is in Honiara and deals with catchment management, water use efficiency, water safety, stakeholder participation and mainstreaming of IWRM including strategies, policies and legislation into national developments.

- Water affects all sectors including fisheries, tourism, industry, utilities & energy, agriculture/forestry, environment & planning, mineral resources, education, finance and health. Water cuts across all sectors and all cycles.

- Thus, watersheds, coastal & marine life, water supply systems, groundwater, water health, rainwater and waste water has to be managed properly using the IWRM approach or process.

Discussions

(i) An application of IWRM to small atolls or low lying islands would be the identification a steering committee, project committee at the site levels to manage efficiency of the water resources and the system.
(ii) The land ownership or resource owners need to be consulted as they play an important role in the water system from the source to the tap.
(iii) Leakage and illegal connections play important roles in water efficiency. Upon the maintenance of water in Honiara, water availability increased reasonably.

7. Presentations and Updates from Project Partners

(i) Jack Filomea, RWSS

It was noted that RWSS has been involved in NAPA, under the Ministry of Health and Medical Services. Currently RWSS is engaged in construction of water supply and sanitation systems in the rural areas and other development in the water sector, CCA areas especially in key vulnerable areas. Donors include AusAID, UNICEF, EU and SIG.

Challenges:

- Financial crisis which reduces completion rates
- Weather changes slows down implementation
- Increasing population affects water resources
- Land use practices such as slash and burn also hamper water management and implementation of projects

Recommendations:

- Need to protect watershed/water catchment areas
- Vital to understand how to use the environment and survive
- Need to help landowners not to just build anywhere
- It would be helpful not to use incentives otherwise it would affect future translations or replications
- CC is a new subject and broad based but needs some explanation
- Questions of sustainability is a major issue and thus people must understand languages/terms used.
- The project in USD should be able to continue after completion.
- The soft part of the projects need clear explanations for people to understand it
- Proper awareness should help them sustain the project

Discussions

- RWSS currently does not have any project in any of the sites identified
- Under AusAID and UNICEF RWSS has been engaged in Choiseul, Makira, Temotu, Isabel, Renbel, Guadalcanal, Malaita and Western Province
- It was acknowledged that the presence of RWSS in the province would be very helpful for the implementation of the project.
- The CCA-water sources is still problematic and remains a challenge

(ii) Water Resource Division

It was explained that WRD administers Rivers Act but needs to be reviewed. It supports Solomon Water in advice and related issues. It further monitors river flows, and sets river flow stations and hydrological data for those who need it. It provides such services on water with regards to provision of data and information.

The WRD has also provided studies on water supplies and acted as counterpart to the JICA water project in Honiara. There is ongoing work through advisors in the areas of governance which has been usually neglected. A component of

SIWSAP targets governance and NAPA also mentioned the water resources management.

Another aspect SIWSAP is the institutional arrangement for the water resources. This was identified during the consultation. Need a strong institutional arrangement for water. RWSS is developing in rural areas, NGOs etc and is very hard to coordinate when own programs. It would be good to water manage resources in a well instituted mechanism.

Discussions

- It was reiterated that Land Issues and the institutional mechanism will still have to be considered for the successful implementation of the project.
- The community participation of projects need to be considered as some require payments especially those in urban centers
- Asset management of all water supplies is still difficult due to lack of capacity although there is now approval for the job to be done. There is need for donors to also cooperate with MDPAC for coordinated implementation of projects.
- Although water supply systems built for communities were originally operating due to demand and lack of maintenance, the system no longer meet the demands of the communities. There is need for proper education for people to manage their water.
- Maintenance and rehabilitation of water is difficult, and donors cannot do it, but the SIG need to systematically provide maintenance and have to involve NGOs, churches, donors and rotary. The figures for the percentage of maintenance are not available.
- The MDPAC which coordinates projects by donors, monitors only a third because most of their projects use their own systems. However, through the budget reforms, the upcoming costs from donor projects will be monitored. SIG need to know what projects they implement before it can be maintained.

(iii) Live & Learn

Live & Learn is an environmental organization which aims to reduce poverty though sustainable development. Its regional offices are in Vanuatu, Fiji, Africa, Asia. Currently L&L is implementing projects in Malaita, Choiseul, Western, Makira, Renbel, and Honiara. It is being funded by AusAID, EU, UNICEF and is currently working with government ministries, RWSS and other other NGOs in line with National Development Strategies (NDS) and the MDGs.

A CC-A project is being implemented in Malaita Province and REDD plus project is also implemented in Choiseul through forest conservation and a sanitation program as well.

Discussions

- L&L would collaborate with the SIWSAP through engagement in the hardware, Climate Change and knowledge management. This would include soft measures on climate change including multi-media knowledge products in 3.1.3.
- The RWSS informed everyone that it is currently working on policy document and should be passed on to stakeholders for comments.

(iv) Meteorology Service Director- David Hiriasia

- The Solomon Islands Meteorology Service is operating under SI Meteorology Act 1985 and its function is relevant to the work of Climate Change.

- Meteorology observation is being recorded in 5 provinces and other rainfall voluntary stations. The Met service does have early flood warning systems including severe weather warning and floods, and Tsunamis.

- The climate early warning system in 2.1.2 of the PIF document is also vital for the SIWSAP project. There are 12 automatic weather system and water automatic system.

- The MET office has data as early as the 1940s on rainfall or temperature which can indicate their variability due to climate change.

- The Met office can also make predictions into 20 to 30 or 90 years using climate data from the past forecasting into the future.

- However, it still lacks updated scientific equipment to automatically record intensity of rainfall and be placed in the highlands. This is vital to monitor renewable energy, early flood warning. The current equipment are placed along the coasts which are not representative of rainfall in the mountains.

(v) Provincial RWSS, Rennell and Bellona Province

Water sources are rainwater, underground and surface around Lake Tengano. A Climate Change Adaptation approach is rainwater harvesting as the sea level rises. Since 2009-2012, about 273 water tanks were supplied for the each household. By last week, further 43 tanks were sent to Rennell. Through the Climate Change Adaptation, tanks to Renbel will have to be increased to cope.

Challenges
During dry seasons, tanks could easily dry up within two weeks so its important to increase storage capacity, and engage in community adaptation awareness. There has to be ownership of facilities to encourage management.

Discussions:

- Volumes of the tanks is 600 gallons which manageable to hand
- The costs are around $5,000 and aluminum tanks do last a while.
- Rennell is a bit low and Bellona a bit higher but transportation is a major difficulty.
- Durability of handling tanks on arrival and sometimes weather conditions and lack of proper sea ports including the climate change remain major issues to address.
- The MET office is implementing an office in Renbel, but unfortunately transportation cost was not taken into account.
- It was also suggested that tanks can be built underground like Tuvalu although it should be noted that coral composition of Renbel could weaken the strength to hold the tank underground.
- The suggestion of ferro-cement tanks could be considered but movement of people would make them unusable. Further such construction would be difficult due to lack of sand and the transportation costs.
- Moving tanks difficult due to high cliffs which are dangerous.
- People use water tanks but most prefer using natural water.

(vi) Malaita Province: Peter Tofuola

- Community engagement during pre-construction period is important for sustainability of the project especially with the CCA in Manaoba or Ta'arutona. There is emphasis in health and would need the sulphite test but needs only 6 hours for it to be valid. Some water catchment/underground water were completed in Central Malaita. However, landownership and manpower needs were still issues to be considered.

- Due to high rainfall, quality of water was a bit low. However, we are slowly addressing quality of water especially the problem of water analysis, the issue of temperature and other gaps.

Discussions

- Some of the difficulties is getting the money from imprest to carry out work. The process delays work completion.

- The IWRM concept is a good idea and that the design team to look at the quality of water at the provincial level and see how it is to be addressed.
- The Renbel issue is being considered but should not confused with a CCA project
- In 1997-98, Rennell was declared a disaster zone due to the El Nino.
- The quality of water at Temotu has declined badly.

(vii) Choiseul: Bartholomew Hora

- The Choiseul Province follows the same process in other provinces.
- Taro township needs a water project.
- Despite the thought of relocation it has now became an expansion site of Choiseul. Choiseul Province would need township. Further, Taro needs to be engaged in the same process. However, it needs very technical areas to address

  The NGOs working together is 4 and does need additional 4???

  Challenges/Constraints
  Manpower is usual casual work
  There is need for ownership and sustainability.
  The expansion of Taro township would be a CCA project and is no longer a term consider as it unfolds.

  The expansion of Taro is due to the cost of relocation. Another issue is storage facilities, atoll islands, then reserve rainfall for diversify the resources. You can use ground water for washing and ablutions whilst rainwater can be taken from roof of the houses.

  The expansion can take the CCA angle, due to congestion of water supply. It would be good to cover Taro or mainland so that climate change would be climate proof. Under the ADB program, Taro is out from the hydro power.

DAY TWO: Wednesday 17th April

***(vii)* RWSS Temotu, Ini Vaike**

- Temotu is scattered and isolated. We are currently implementing two projects from last year. Our approach is to go to the sites before implementation and do small training for selected participants and give out information to have a sense of ownership, attract participation, and encourage water source management. However, some water sources are reducing in quality due to land use development.
- With regards to climate change, a lot of the islands in Temotu are low lying islands and are therefore, affected by the impacts of CC.

- The Reef Islands are low, and there are no gravitational water, and due to the rising sea level, no wells are dug, therefore, only tanks are being used. Currently, UNICEF is working on a program of supplying tanks to the villages.
- In Santa Cruz, Tsunami has affected the water supply system. There are three projects in Santa Cruz, but the earthquake has affected the water supply sources and has contaminated posing health risk to the people.
- Relocation of communities is an issue if they move to the mountains, because water sources would be an issue.

Challenges

The RWSS office is managed by only one person which is difficult to cover the whole province.

Selection sites, RWSS concentrate on one constituency before moving on to the next area for implementation. However, availability of materials affects implementation.

Discussions

(i) At Temotu, Climate Change is not the only issue, but having another source of water will have to be considered

(ii) The capacity of only one officer is critical similar to Renbel, but the workload following the Tsunami makes it more difficult.

(iii) It would be good to look at the Human Resources and should be considered under component 3 improve capacity of RWSS after dialogue with MoH

(iv) At Lata, there are several issues including institutional issues, sources for hydropower, the destruction of the water source by the Tsunami, recruitment of human resources to cover for lack of capacity.

(v) Whilst there is lack of capacity at the institutional level, there is also lack of capacity at the community level.

(vi) It should be noted that the RDP is also implementing water projects in Temotu.

(vii) It would be good to the water issue in the country. In 2013, there will be an establishment of a National Intersectoral Water Organization, with the help of an expert from Australia under EU-SOPAC. It should come up with a plan for the whole country and is expected to start next month.

(viii) Whilst there is lack of capacity, there is need to take stock of what each officer does and look for gaps to target real need.

(ix) It would be good to outsource water maintenance to a separate organization whilst RWSS concentrate on making water supplies/systems.

(x) A system put in place at the community level should take care of maintenance by the village committee.

(viii) Director Climate Change: Douglas Yee

The Climate Change Division is a new division that was used to be under the Meteorology Division. A national climate change policy document has been published in 2012, and within this policy are information on climate drivers, climate change and

climate variability. He emphasized that data from the national policy could be used to predict future climate of Solomon Islands. He went on to mention that there were also elements of institutional arrangements and mainstreaming of adaptation for vulnerability. Mitigation measures could also be determined snf designed from.Under the policy document, institutional arrangement and mainstreaming of adaptation of those who are vulnerable is mentioned. Through these, mitigation measures can be designed.

The REDD plus is an a mitigation approach including research and systematic observation of climatic condition. Further, technology transfer should be considered to reduce green house gas emissions and aid climate change adaptation efforts. However, there is need for more education and awareness about climate change and a greater need for mobilization of financial resources. There is also need to establish the National Climate Change Council and would be good to also establish the Climate Change mitigating working. The MDPAC has already recruited a Climate Change Officer to coordinate Climate Change related activities between government agencies.

(ix) David Hiriasia- Different Climate Drivers affecting Climate Change

The Climate drivers affecting climate in our region are:

(i) El Nino Southern Oscillation (El Nino rainfall below normal, neutral & La Nina where rainfall is above normal)
(ii) South Pacific Convergence Zone
(iii) Inter-tropical convergence zone
(iv) Western Pacific Moonsoon

In comparing rainfall from Honiara with other places, the trend for Honiara and Auki is decreasing whilst Lata and West are increasing due to the Western Pacific Moonsoon. The West is affected by the Western Pacific Moon soon, whilst Lata is affected by the South Pacific Convergence Zone. Honiara and Auki are a bit far from those two zones.

All temperatures are increasing pointing to the global warming. A report was done by Pacific Science Program and projected that there will be an increase in the intensity of the tropical cyclones, but not necessarily the regularity.

There is currently a drought monitoring, but outlook appears to be below average.

There is high confidence level that the sea level is rising as compared to the rise of temperature. There appears to be an increase in rising sea level and coastal erosion as well as storm surges.

Discussions

- The structural arrangement for implementation is vital and the Climate Change must be linked to the community level. Thus the CCWG should ensure there is connectivity to the community level.
- The sustainability of the project is vital for CCA.
- The rainfall data gathered now is inadequate because it does not measure the intensity of the rainfall. Thus instruments for automatic measurement of rainfall intensity are vital for the work.

8. Project Site Selection

The WRD went through the sites and criteria and was open discussion to finalize the sites.

- After a lengthy discussion on what sites to finally decide on, it is being suggested that it will be finalized between the WRD, RWSS and CCD-MECDM and to be endorsed by UNDP. 10 potential project sites has been identified , however due to resource limitations only 7 final sites would be covered during the .
- Water in urban areas are looked by Solomon Water, whilst the rural areas are looked after by RWSS.
- Lata's arrangement is different in that the urban area is getting water from Landowners.
- Sites must also be accessible for consultation to be completed in time.

9. SIWSAP Workplan ,Dr Milika Sobey

The participants were informed that James Daltron Team Leader of SIWSAP will arrive on May 8th -20th

- The inception phase will complete end of May and work plans should be finalized upon his arrival. Upon consultation with the TL the different milestones should become clearer.

- Before departure, a mission summary report should be given to the communities and combine the reports with Mission report as an outcome.

- There should be (i) Site Mission reports for every site in addition to the deliverables

- James would like to know the sites to visit but the team will finalize tomorrow.

- Some UNDP project like SWoCK and Ward Profiling would also engage some consultants or UNDP staff.

10. Decisions on final project sites

- The Solomon Islands Government through the Water Resource Division (WRD), Climate Change Division and Rural Water Supply and Sanitation(RWSS) finalized the sites in a follow-up meeting held at Pacific Casino Hotel on 18th April 2013. [7];
- The seven sites comprised of 3 township sites and 4 rural sites

[7] These sites are chosen from a set of 8 criteria's as outlined in site selection matrix

- Township sites are: Taro township inclusive of Poroporo Community in Choiseul Bay(Choiseul Province), Gizo (Western Province); and Tinngoa (Rennell and Bellona Province) .
- Rural sites include Manaoba , Tarutoona (both of Malaita Province), Santa Catalina (Makira/Ulawa Province) and Reef Islands (Temotu Province)
- Other sites would be considered a reserve sites as the preliminary consultations and assessments cannot occur at all identified 10 sites enlisted in the PIF document.

11. Site Selection Matrix (draft)

	Rural	rural	rural	rural	rural	rural	Towns	Towns	Towns	Towns
Villages/Provinces	Choi Bay (Choiseul) Poropor o	Bellona (Renbel) Matamoa na	Reef Is (Temotu) Glaciou sa Bay	Santa Catalina (Makira)	Taaruto na (Malaita)	Manaaoba (Malaita)	Taro Island (Choiseul)	Gizo (Western)	Tiggoa (Renbel)	Lata (Temotu)
Identified in govt policy & plans as a priority for action & support (i.e NAPA & Integrated Water Plans etc..)										
Faces significant CC threat & vulnerability										
Includes UNDP/UNICEF govt, other donor partners in pipeline project eg RWSS proj which will be climate proofed										
Include key rural village &atoll settlement/development node with concentration of water resource needs & beneficiaries										
Includes water infrastructure resources of strategic importance to the province/village										
Has potential as an accessible and representative demonstration project and										
Has been subject to past studiesand has reasonable depth of information to feed into the climate change impact and vulnerable assessment										
Provincial and community support and in-kind contribution										
TOTAL										

Annex 5: Final Site Selection Matrix.

	Rural	Rural	Rural	Rural	Township	Township	Township
Villages (Province)	**Reef Islands O/L (Temotu) Rural**	**Santa Catalina (Makira) Rural**	**Taarutona (Malaita) Rural**	**Manaoba (Malaita) Rural**	**Taro Island /Poroporo(Choiseul) Urban**	**Gizo (Western) Urban**	**Tinggoa (RenBel) Urban**
1. is identified in government policy and plans as a priority for action and support; (i:e NAPA and Integrated water plans etc…).	Y	Y	Y	Y	Y	Y	Y
2. faces a significant level of climate change threat and vulnerability;	Y	Y	Y	Y	Y	Y	Y
3. Includes UNDP/UNICEF, other partners, Government pipeline projects (e.g. RWSS projects which will need to be climate proofed).	Y	Y	Y	Y	Y	Y	Y
4. includes a key rural village and atoll settlement/development node with a concentration of water resource needs & beneficieries;	Y	Y	Y	Y	Y	Y	Y
5. includes water infrastructure/resources of strategic importance to the province/village;	Y	Y	Y	Y	Y	Y	Y
6. has potential as an accessible and representative demonstration project; and	Y	Y	Y	Y	Y	Y	Y
7. has been subject to past studies and has reasonable depth of information to feed into the climate change impact and vulnerability assessment;	Y	Y	Y	Y	Y	Y	Y
8. Provincial and/or community support and in-kind contribution	Y	Y	Y	Y	Y	Y	Y

12. Participants List

Day 1: Tuesday 16th April 2013

	NAME	ORGANISATIONS	EMAIL CONTACT	PHONE CONTACT
1	**Charlie Bepapa**	**MMERE-WRD**	**cbepapa@mines.gov.sb**	**21522/7475006**
2	**Peter Tofuola**	**RWSS-EHD**	**Pbtofuola@gmail.com**	**7557225**
3	**Jack Filiomea**	**RWSS-EHD**		
4	**Barth Hora**	**RWSS-EHD**		**7617422**
5	**Duddley Nixon Hirohavi**	**RWSS-EHD**		**7554100**
6	**Richard Molea**	**MMERE-WRD**	**rmolea@mines.gov.sb**	**21522/Ext 204**
7	**Andrew Auhere**	**RWSS-EHD**		**7677592**
8	**John Sele**	**RWSS-EHD**	**selejohnroy@gmail.com**	**7457050**
9	**Lovelyn Otalasi**	**MLHS**	**lavilee@gmail.com**	**21511**
10	**Douglas Yee**	**MECDM-CCD**	**d.yee@met.gov.sb**	**24074**
11	**Dr Richard Pauku**	**SIWSAP Consultant/MCS**	**maraghoto@solomon.com.sb**	**7655851**
12	**Chris Manu**	**USAID-Adapt Asia Pacific**	**cmanu@adaptasia.org**	
13	**Dr Jose Padilla**	**UNDP APRC**	**Jose.padilla@undp.org**	
14	**Wilson David**	**Live & Learn**	**Wilson.david@livelearn.org**	**23697**
15	**Abednigo Maeohu**	**RWSS**	**abedmaeohu@gmail.com**	**7498044**
16	**Joshua Toren**	**SIWA**	**torennj@gmail.com**	**7410499**
17	**Ray Anderson**	**SIWA**	**randerson@siwa.com.sb**	**7579542**
18	**Cindrella Mede**	**MLHS-PPD**	**ceekayemu@gmail.com**	**22511**
19	**Nichola Kaua**	**MDPAC**	**nkaua@mdpac.gov.sb**	**7472637**
20	**David Hiriasia**	**MECDM-Met**	**David.hiba@met.gov.sb**	**20332**
21	**Samson Maeniuta**	**SIWSAP Consultant/ODSI**	**smrihu@yahoo.com**	**7472784**
22	**Isaac Lekelalu**	**MMERE-WRD**	**i_lekelau@hotmail.com**	**21522**
23	**PS Rence Sore**	**MMERE**		
24	**Akiko Suzak DRR**	**UNDP**	**akiko.suzaki@undp.org**	
25	**Joanne Aihunu**	**UNDP**	**joanne.aihunu@undp.org**	
26	**Jude Devesi**	**UNDP**	**jude.devesi@undp.org**	
27	**Gloria Suluia**	**UNDP**	**Gloria.suluia@undp.org**	

Day 2: Wednesday 17th April 2013

	NAME	ORGANISATION	EMAIL	PHONE CONTACT
1	**Samson Maeniuta**	**SIWSAP Consultant/ODSI**	**smrihu@yahoo.com**	**7472784**
2	**David Hiriasia**	**MECDM-Met**	**David.hiba@met.gov.sb**	**20332**
3	**Richard Molea**	**MMERE-WRD**	**rmolea@mines.gov.sb**	**21522/Ext 204**
4	**Jack Filiomea**	**RWSS-EHD**	**jfilomea@moh.gov.sb**	**20665**
5	**Peter Tofuola**	**RWSS-EHD**	**Pbtofuola@gmail.com**	**7557225**
6	**Duddley Nixon Hirohavi**	**RWSS-EHD**		**7554100**
7	**Andrew Auhere**	**RWSS-EHD**		**7677592**
8	**Barth Hora**	**RWSS-EHD**		**7617422**
9	**Joshua Toren**	**SIWA**	**torennj@gmail.com**	**7410499**
10	**John Sele**	**RWSS-EHD**	**selejohnroy@gmail.com**	**7457050**
11	**Fred Patison**	**UNREDD**	**Fred.patision@undp.org**	**7498982**
12	**Douglas Yee**	**MECDM-CCD**	**d.yee@met.gov.sb**	**24074**
13	**Dr Richard Pauku**	**SIWSAP Consultant/MCS**	**maraghoto@solomon.com.sb**	**7655851**
14	**Chris Manu**	**USAID-Adapt Asia Pacific**	**cmanu@adaptasia.org**	
15	**Dr Jose Padilla**	**UNDP APRC**	**Jose.padilla@undp.org**	
16	**Jude Devesi**	**UNDP**	**jude.devesi@undp.org**	**7496655**
17	**Kenneth Bulehite**	**SIWSAP Consultant**		
18	**Dr Milika Sobey**	**IUCN**		
19	**Gloria Suluia**	**UNDP**	**gloria.suluia@undp.org**	
20	**Joanne Aihunu**	**UNDP**	**Joanne.aihunu@undp.org**	
21	**Ini Vaike**	**RWSS-EHD**		**7732582**

Annex 6: PPG Team Leader Terms of Reference

Annex 7: PPG Workplan (modified August 2013)

No.	Activities	April				May				June				July				August				September				October				November				December				Deliverables/ Outputs	Responsibility	Action
	Solomon Islands Water Sector Adaptation Project (SIWSAP)	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4			
1	**Inception Phase**																																							
	Pre-reading and familiarisation																																							
	Inception workshop (*Millika Sobey*)																																							
	Initial discussions with MMERE, UNDP, RWSS, and other partners																																							
	Mobilising local PPG team																																							
	Draft Inception Report and Agreed Project Workplan																																					Inception Report	James Dalton	
2	**For: FS Project Component 1: WS-CCA Planning in context of IWRM**																																							
	Identify vulnerability criteria for PPG phase with partners																																							
	Review IWRM activities, plans, and demonstration progress for Pacific IWRM to learn from national best practices and existing climate response approaches																																							
	Review NAPA and other relevant documents, projects, interventions, and pipeline plans for dealing with CCA																																							
	Discuss with UNFCCC FP, understand national budgeting process and climate change finance																																							
3	**For: FS Project Component 2: Implementation of WS-CCA Plans**																																							
	Develop rapid assessment framework to guide for each site visit, including templates and guidance notes																																							
	Scope the pilot projects with defined with clear objectives, outcomes, outputs and activities through national and local consultations																																							
	Visit pilot project sites to develop site assessment reports (per site) based on site rapid assessment process:																																							
	Choiseul: Taro town and the Poroporo community																																					Pilot site report	PPG team	
	Western: Gizo town																																					Pilot site report	PPG team	
	Makira: Santa Catalina																																					Pilot site report	PPG team	
	Temotu: Nupanu (proposed)																																					Pilot site report	PPG team	
	Malaita: Manaaonba and Taarutona (proposed)																																					Pilot site report	PPG team	
	Rennell: Tiggoa town (proposed)																																					Pilot site report	PPG team	
	Pilot projects designs reviewed by national specialists, UNDP and GEFSec (where possible)																																							
	A sub-project document for each demonstration project developed including budget, work plan and logframe. (M&E indicators and stakeholder participation plan will be adopted from M&E plan and S/H participation Plan developed regionally)																																							
	Capacity Development Program (for monitoring) developed.																																							
	Framework design of community based climate early warning and disaster preparadness information system																																							
4	**For: FS Project Component 3: CCA orientated governance in the water sector**																																							
	Policy, legislation and institutional rapid review																																							
	Assessment of capacity requirements and availability																																							
	Data and information gaps and key assessment requirements																																							
	Rapid Capacity Assessment (institutional as well as human resources) (conducted at each pilot site)																																							
	Potential partners identified for knowledge management and networks for CCA-IWRM implementation.																																							
	Detailed Stakeholder Engagement Plan for the full project developed, including detailed activities/TORs agreed (activities, implementation arrangements, budget and work-plan) for the networking for information sharing and learning																																							
	Stakeholder Involvement Plan reviewed by Gender specialists																																							
5	**Development of FSP Project Document and CEO Endorsement Form:**																																							
	Prodoc Section 1: Situation Analysis (root causes and barriers)																																							
	Prodoc Section 2:Strategy																																							
	Prodoc Section 3: Project Results Framework, Total Budget and Workplan for FSP																																							
	Prodoc Section 4: Management Arrangements																																							
	Prodoc Section 5: Monitoring Framework and Evaluation (incl budget)																																							
	Prodoc Section 6: Legal Context																																							
	Prodoc Appendices (tbc):																																							
	Budget by Component																																							
	Co-financing by Source																																							
	Incremental Cost Analysis																																							
	Results Framework (detailed)																																							
	Activities by Component																																							
	Workplan and Timetable																																							
	Key Deliverables and Milestones																																							
	Reporting requirements and Responsibilities																																							
	Terms of Reference for MTR and Final Evaluation																																							
	Terms of Reference for Project Staff and Technical Assistance																																							
	Co-finance letters																																							
	Stakeholder Engagement Plan																																							
	Communications Plan																																							
	ProDoc reviews from EA, UNDP and feedback from relevant stakeholders																																					ProDoc (draft)	James Dalton	
	Draft CEO Endorsement Form																																					CEO Endorsement (draft)	James Dalton	
	ProDoc revisions to UNDP (PAC)																																							
	Revised Prodoc and CEO Endorsement Form submitted to UNDP																																					ProDoc and CEO Endorsement	James Dalton	
6	**PPG Project Coordination Arrangement:**																																							
	PPG Team Established																																							
	PPG workplan developed and agreed																																							
	PPG Steering Committee established (participating agencies, UNDP, with potential co-funding agencies invited to join)																																							
	Coordination with other GEF national initiatives established																																							
	Coordination with other non- GEF national initiatives established																																							
	Partnerships established with potential co-financiers at both regional and national levels																																							
	PPG meeting to discuss: a). Project expected outputs, b). Pilot site reports, c). Preliminary diagnostics from first site visit d). Further design of the pilot projects																																							
	Presentation of the initial project design to PPG Steering Committee																																							
	PPG and partner appraisal of the full project document (clearly defined project goal, outcomes, outputs and detailed activities, sub-project documents for demonstration projects, stakeholder involvement plan, M&E plan and indicators, project governance structures, TORs for project staff, consultants national institutions etc) for the full scale project																																							
	Development of Inception Phase support note to guide project in initial implemention by PPG																																							
7	**PDS Schedule (James Dalton)**																																							
	Preparatory work																																							
	Mission 1 *(Millika Sobey*)																																							
	Project Inception Report and PPG Initiation Workshop																																							
	Mission 2 (*James Dalton*)																																							
	Mission 3 (*Millika Sobey*) - PROPOSED																																							
	Mission 4 (*James Dalton*)																																							

Annex 8: Gizo Town, Selection of Photos from Field Trip

Annex 9: List of People Met

- Marc Overmars (UNICEF)
- Joanne Aihunu (UNDP)
- Akiko
- Brooke Yamakoshi (UNICEF)
- Piter Visser (EHD-RWSS)
- Isaac Lekelalu (MMERE-WRD)
- Charlie Bepapa (MMERE-WRD),
- Kenneth Bulehite (PPG consultant)
- Samson Maeniuta Rihuoha (PPG consultant)
- Longden West Manedika (SIDT)
- Haikiu Baiabe, (LLEE)
- Jeremiah Manele (MDPAC))
- Tom Naunau (EHD – RWSS)
- Hudson Kauhiona (CCD)
- Jimmy Keresere (TNC)
- Collin Gereniu (TNC)
- Marc Van Uytvanck (EU Delegation to Solomon Islands)
- Andrew Catford (World Vision)
- Bryce McGowan (World Vision)
- Angele Nkou-Deemi (ADRA)
- Ian White (contracted to MMERE through EU-SOPAC National IWRM Planning Programme)
- Peter Wopereis (Rural Development Programme, World Bank)
- Eric Kikolo (Deputy Provincial Secretary, Western)
- Alex Wate (Solomon Islands Red Cross)

Annex 10: List of Documents Collected for Review

- Solomon Islands Climate Change Policy
- Solomon Islands NAPA
- SIG – Second National Communication to UNFCCC
- Establishing an Integrated National Framework for Resilient Development (INaF)

ANNEX 3: Criteria for Pilot Site Selection

- During the Project Preparation Phase, six pilot project sites have been selected for targeted support. These are presented in Table below:

SIWSAP Pilot Sites

Site	Province	Rural/Township
Taro Township	Choiseul	Township
Gizo	Western	Township
*Ferafalu (Manaaoba island)	Malaita (NE)	Rural
Santa Catalina	Makira/Ulawa	Rural
Tiggoa	Rennel and Bellona	Township
*Tuwo (Fenualoa island)	Temotu	Rural

- Each site went through a transparent selection process designed to encompass the geographical diversity of sites. Criteria for site selection are provided below:

	Rural	**Rural**	**Rural**	**Rural**	**Township**	**Township**	**Township**
Villages (Province)	**Reef Islands O/L (Temotu) Rural**	**Santa Catalina (Makira) Rural**	**Taarutona (Malaita) Rural**	**Manaoba (Malaita) Rural**	**Taro Island /Poroporo(Choiseul) Urban**	**Gizo (Western) Urban**	**Tinggoa (RenBel) Urban**
1. is identified in government policy and plans as a priority for action and support; (i:e NAPA and Integrated water plans etc…).	Y	Y	Y	Y	Y	Y	Y
2. faces a significant level of climate change threat and vulnerability;	Y	Y	Y	Y	Y	Y	Y
3. Includes UNDP/UNICEF, other partners, Government pipeline projects (e.g. RWSS projects which will need to be climate proofed).	Y	Y	Y	Y	Y	Y	Y
4. includes a key rural village and atoll settlement/development node with a concentration of water resource needs & beneficieries;	Y	Y	Y	Y	Y	Y	Y
5. includes water infrastructure/resources of strategic importance to the province/village;	Y	Y	Y	Y	Y	Y	Y
6. has potential as an accessible and representative demonstration project; and	Y	Y	Y	Y	Y	Y	Y
7. has been subject to past studies and has reasonable depth of information to feed into the climate change impact and vulnerability assessment;	Y	Y	Y	Y	Y	Y	Y
8. Provincial and/or community support and in-kind contribution	Y	Y	Y	Y	Y	Y	Y

- Sites cover low lying, raised coral and mountainous volcanic islands, across six Provinces (Choiseul, Western, Rennel and Bellona, Temotu, Malaita, and Makira), split across both rural and urban locations have been collectively selected.
- Because of the interest in the project, and the need to widely share the processes to be developed and the rapidly developing policy environment for water supply, sanitation, and wider water resource management, it was decided during the PPG phase that replication sites would be closely aligned to the pilot sites. Replication approaches could then be developed which allow all pilot sites to share experiences and resources, both human capacity and financial resources, with neighboring sites that are interested and willing to participate. This approach would keep the 'core' pilot sites to the number, as specified in the Project Identification Form (PIF), and therefore make the implementation of the project at the beginning more manageable. The original six 'core' sites, equitably distributed across Provinces, could then be considered project pilot 'hubs' for others to learn from. A 'menu' of different identified adaptation risks will then be prepared along with possible interventions to reduce these risks and therefore make the water 'system' (from resources to WASH interventions) more resilient. At these sites investments would be made in the water supply and sanitation systems along with other adaptation approaches, allowing neighbouring communities and individuals to see what the project was doing – a visual reminder and active demonstration of changes at each location.
- Based on discussions during the PPG Inception Workshop, two additional sites were identified as possible replication sites. These are Poroporo in Choiseul Province, and Taarutona in Malaita Province. Both sites are rural. However, during pilot site visits in the PPG phase it became clear that Taarutona is an island already feeling the impacts of climate change. Heavy coastal erosion, a combination of storms, past cyclones, king tides and sea-level rise, together with human activities have heavily impacted the shoreline of Taarutona island off the South East coast of Malaita. In response to this, the majority of the population have left the island and are now located on the main island of Malaita. Consequently, Taarutona is not considered a valid pilot site for SIWSAP investment. However, the communities who have already been forced to leave the island have been absorbed into different villages along the main coast on Malaita. During implementation, because of the PPG consultation, and the raising of expectations this has created, the project will consider providing some support to these communities.

Annex 4: Summary of Key Thematic Messages Linked to the Pacific Regional Action Plan

1. **Water Resources Management**

   1.1 Strengthen the capacity of small island countries to conduct water resources assessment and monitoring as a key component of sustainable water resources management.

   1.2 Implement strategies to utilize appropriate methods and technologies for water supply and sanitation systems and approaches for rural and peri-urban communities in small islands.

   1.3 Implement strategies to improve the management of water resources, and surface and groundwater catchments (watersheds) for the benefit of all sectors including local communities, development interests, and the environment.

2. **Island Vulnerability**

   2.1 There is a need for capacity development to enhance the application of climate information to cope with climate variability and change.

   2.2 Change the paradigm for dealing with Island Vulnerability from disaster response to hazard assessment and risk management, particularly in Integrated Water Resources Management.

3. **Awareness**

   3.1 A high quality participatory framework should be adopted at the national level to allow for open participation of communities in sustainable water and wastewater management.

   3.2 Access to, and availability of information on sustainable water and wastewater management should be provided to all levels of society.

   3.3 Water and sanitation education should be mainstreamed into the formal education system.

   3.4 Improve communication and coordination of all stakeholders in sustainable water and wastewater management including government, civil society, and the private sector.

4. **Technology**

   4.1 Appropriate institutions, infrastructure, and information will support sustainable water and wastewater management.

   4.2 Utility collaboration and regional partnership to reduce unaccounted-for water will significantly improve the sustainability of utilities and reduce the need for developing new water resources.

   4.3 Island specific regional training programmes should be developed, resulting in sustainable levels of skilled and knowledgeable people and communities within the water and wastewater sector.

5. **Institutional Arrangements**

   5.1 Work together through a comprehensive consultative process, encompassing good governance, to develop a shared national vision for managing water resources in a sustainable manner.

   5.2 Develop national instruments including national visions, policies, plans, and legislation appropriate to each island country taking into account the particular social, economic, environmental, and cultural needs of the citizens of each country.

5.3 Promote and establish appropriate institutional arrangements resourced sufficiently to enable effective management of water resources and the provision of appropriate water services.

5.4 Recognize and share the water resources management knowledge and skills of all stakeholders at a national and regional level in the process of developing and implementing the national vision.

5.5 National and regional leadership in water resources management should be recognized and encouraged.

6. **Finance**

6.1 Create a better and sustainable environment for investment by both the public and private sector, by developing and implementing national, sector, and strategic plans that identify the economic, environmental, and social costs of different services and develop pricing policies, which ensure the proper allocation of resources for the water sector.

6.2 Establish financially-viable enterprises for water and sanitation that result in improved performance by developing appropriate financial and cost-recovery policies, tariffs, billing and collection systems, and financial and operating systems.

6.3 Reduce costs through improved operational efficiency, using benchmarking, development of water loss reduction programmes, and improved work practices.

6.4 Ensure access for the poor to water and sanitation services by developing pro-poor policies that include tariffs with lifeline blocks and transparent and targeted subsidies.

SOLOMON ISLANDS

Area: 28,450sq. km (2004)	Highest Elevation: 2,447 m	Population: 523,617
GDP per capita: $1,700	Land Use: Arable: 1%	
GDP by sector:	Agriculture: 42%	Permanent Crop: 2%
Industry: 11%	Other: 97%	Services: 47%

Description: Scattered archipelago of about 1000 islands, mostly rugged and mountainous with some low-lying coral atolls

Natural Resources: Fish, forestry, gold, bauxite, phosphate, lead, zinc, nickel.

Economy: The bulk of the population are dependent on agriculture, fishing and forestry. The islands are rich in undeveloped mineral resources. Severe law-and-order problems in recent history.

Environmental Issues: Deforestation, soil erosion, majority of surrounding coral reefs are dead or dying.

The Solomon Islands support a coastline of 5,313 km. Severe ethnic violence, the closing of key business enterprises, and an empty government treasury have led to serious economic disarray, indeed near collapse. Tanker deliveries of crucial fuel supplies (including those for electrical generation) have become sporadic due to the government's inability to pay and attacks against ships. The disintegration of law and order left the economy in tatters by mid-2003.

Water resources availability in Solomon Islands varies considerably. It ranges from sizeable rivers to small streams from a high mountainous and dense rainforest islands to rainwater harvesting and thin fresh water lens of underground aquifers of the small low-lying atolls and islets. In 1986, flooding claimed about 100 lives. In 1995, drought severely affected most parts of the country causing severe food shortages. Bad development practices such as logging and the traditional slash-and-burn method of farming have gradually destroyed the quality and capacity of rivers and streams, threatening the availability water to many parts of the country. There are three main types of water source extraction methods employed; using gravity feed systems, the use of rain and roof catchments and hand-dug wells using hand pumps. Rural water supply is still provided by standpipe in most cases. With the increase in population, underground water source is also under threat due to human activities, saltwater intrusion and sea-level rise.

Leakage from water supply system is estimated to be around 70-80%. Water ownership and management is also a source of conflict in the country among social groups, clans, tribes and landowners. Water quality analysis in is a major problem. Most of the existing laboratories are incapable of undertaking the necessary analysis as specified in the International standards for water quality.

Four government ministries are directly involved in the assessment, planning, development and management of water resources; Ministry of Mines and Energy (MME), Ministry of Health and Medical Services (MHMS), Ministry of Culture, Tourism and Aviation (MCTA) and the Ministry of Transport, Works and Communication (MTWC). Other Non government organization are also involved with provision of safe water to the communities and villages, namely Adventist Development Relief Assistance (ADRA), World Vision (WV) and Solomon Islands Development Trust (SIDT). Among all these, there is a need for an appropriate coordination and strategic planning and management of water resources in the country.

The government's aim is to provide safe water to present and future generations, and to develop an appropriate understanding of the local hydrology and water resources. Actions already taken include the securing of appropriate equipment for hydrological data collection and limited assessment of water resources. Future actions needed at the national level include an increase in awareness programmes on the understanding of water resources and impacts of climate, the establishment of appropriate water regulations for the protection of water resources, and the development of water resource policy.

Annex 5: Pilot Site Reports

Note Pilot site budgets are estimates and the full budget and notes contain more specific information on costs.

Pilot site will be replicated under Outcome 2.

Under both Outcomes 2 and 3 support will be provided to improve adaptation planning and water adaptation response for sites under current and future investment by Government using sector support funds from the EU and AusAID, and in partnership with UNICEF at certain suites under their EU Water initiative funded project.

SOLOMON ISLANDS WATER SECTOR ADAPTATION PROJECT (SIWSAP)

WATER SECTOR-CLIMATE CHANGE ADAPTATION RESPONSE (WS-CCAR)

Taro, Choiseul Province

October 2013

PROJECT BACKGROUND, OBJECTIVES, ACTIVITIES AND OUTPUTS

Situations change, project supporter's move on, projects get delayed in starting. Based on experience, it is recommended that the design of this project is reviewed by the PMU prior to any implementation at the proposed site(s). The project needs to be presented and discussed with local stakeholders during the establishment of the Pilot Project Committee in the Inception Phase of SIWSAP. Expectations, confusions, further information and explanation can then be provided at project start – and the design of the project adjusted to fit new realities at the site in order to ensure project interventions are clear and understood by all – and stakeholder support is provided throughout implementation.

Project Context and Background

Choiseul Province is 3,294 km^2 and its provincial capital is Taro island situated at the northern end of Choiseul bordering Bougainville, Papua New Guinea and the Shortland Islands, which are also part of Western Province. The population of 26,372 people is growing quickly at a rate almost 0.5% higher than the national growth rate and is estimated to double by the mid 2030s.

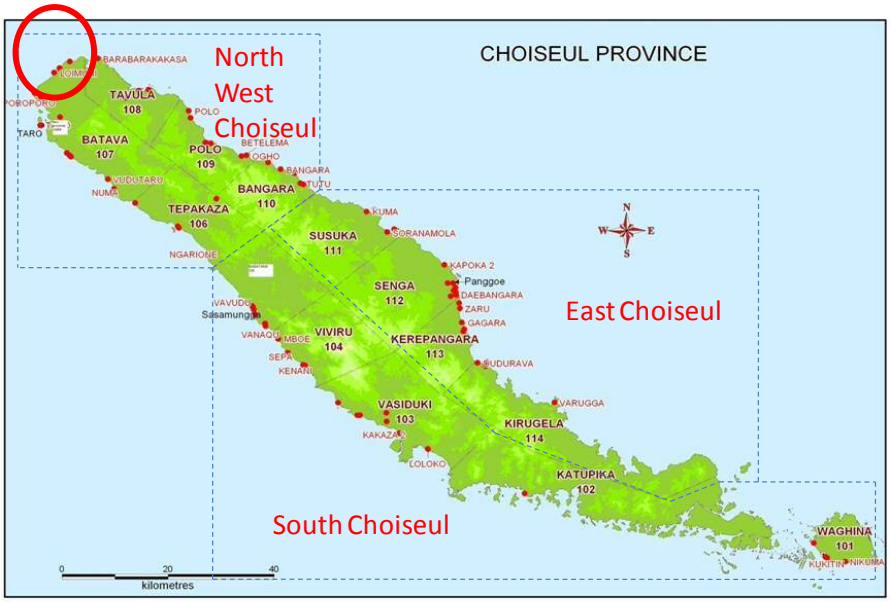


Figure 1 – Taro,Choiseul, Solomon Islands

Almost all communities in Choiseul live in coastal villages. The terrestrial, freshwater and marine ecosystems they depend on are closely linked by the relatively small catchment areas that connect the mountains, coastline and reefs. Sustainable livelihoods in Choiseul Province are closely linked to healthy terrestrial and coastal ecosystems, which are themselves reliant on the climate and freshwater availability. The majority of inhabitants earn their livelihood from natural resources such as copra, garden crops, seaweed and timber. Ecosystems also provide other essential services such as freshwater, healthy coral reefs, fertile soil, traditional medicines and protection from the threats of climate change and natural disasters. The continued ability to utilise natural resources and ecosystem services are essential to the people's resilience and ability to adapt to both localised human impacts and the predicted effects of global climate change.

Taro is itself an island approximately 1km from the mainland island of Choiseul, with a population of around 900 people. It covers an area of 6,000m^2 and hosts the provincial capital of Choiseul Province, including provincial government offices, hospital, school, and provincial airport. Choiseul Bay receives an average 3,559mm rainfall per year.

Water Supply and Sanitation

Taro has no water supply and groundwater supplies do not pass water quality tests carried out during the SIWSAP PPG. Looking at the number of private households by main source of drinking water in Choiseul, there are only 2 metered-Solomon Islands Water Authority (SIWA) pipe sources (taps), 1,416 communal standpipes, 1,137 household tanks, 840 communal tanks, 14 protected wells, 2 unprotected wells, and a further 1,184 households use rivers or streams for drinking. 20 households use bottled water. 100 households use communal tanks, 1,620 people use rivers or lakes and 1 household uses the sea[1]. There are 1,977 rainwater harvesting tanks in Choiseul and the capacity of tanks for storage during dry seasons is critically important to adapt to climate change impacts – both during drought periods, but also during storms and cyclones when potable water is in short supply.

Water supply is a serious issue in Taro and households often have to deal with empty rainwater tanks and not enough water. In this situation they often revert to polluted sources of water for drinking and cooking. Of the total communicable and other diseases recorded, incidences of diarrhoea are high and could be minimized if water was available for people's basic heath[2]. It is likely, based on site visits, that the groundwater is salinised due to its location close to the seashore, combined with poor management of the well through overpumping. Only 6 wells had salinity levels below 500ppm. It is not clear if a pumping rate has ever been properly assessed and implemented.

At present calculations during the PPG mission suggest that rainwater tank storage is adequate for normal rainfall, but not for changes in rainfall patterns, which are experienced at present. Based on an average of 100 litres of water per day per capita, and an average household size of 5.5 people, rainwater tanks of 6,000litres are expected to empty in 10-14 days. Larger families are expected to run out of water sooner without additional tanks. However, during El Nino period rainfall becomes far more unpredictable, and anecdotal evidence suggest that, although the same amount of rainfall occurs, it happens in more intense events, and therefore over a shorter period of time. This means that current storage capacities and options cannot store additional water.

Pit latrines are used in the town, together with some septic tanks. It is worthwhile noting that there are no facilities available to pump out the tanks, which will leak and overrun into groundwater. The majority of people practice open defecation in mangrove areas.

Institutional and policy context

Choiseul Province has a well-established institutional framework and policy to accommodate the SIWSAP project. This can be seen in the established institutions at the province including the (i) Provincial Government System, (ii) The Lauru Land Conference or cultural framework, (iii) The Church Structure, and (iv) NGO's. The Provincial Government passed a law regarding the protection and conservation of natural resources including the Fisheries and Marine Environment which designates a Marine Protected Area (MPA) close to Taro. According to the Provincial Medium Term Development Plan 2012-2014, there is a total of 7,913 hectares of Marine and Forest protected areas under the Lauru Protected Area Network.

Vulnerability assessment

[1] SIG Statistical Bulletin 06/2011 p37

[2] Ms Ba'akai Statistics Division Ministry of Health Management Information System 2011 MHMS.

Prevailing water resources and systems identified in Taro are: *Water sheds / catchments, Groundwater and Rainwater*. These water resources and systems are vulnerable to a number of climate change threats. Hence, the need to respond and intervene with improvements on existing adaptive measures practiced by the people, as well as, providing best alternative water supply for the people.

The table below shows a detailed analysis of current exposure and sensitivity to climate shocks and stresses while the following text summarises how these impacts interact with the individual adaptive capacities to determine the vulnerability of the different water resources and systems.

There are no rivers on Taro Island. However, the presence of swamps is apparently re-energizing underground water.The water shed or catchment of Taro Island is highly vulnerable to sea level rise and **storm surge**; inevitably giving rise to catastrophic submersion of the islands. **Coastal erosion** is evident throughout both islands, which renders the catchment highly vulnerable where fresh surface water or shallow groundwater close to the coast is relied on. Over time, these climate change threats will reduce the total land area of the watersheds as well as increasing contamination of these catchments. The catchments are also **drought** sensitive, and are very highly vulnerable particularly during the El Nino event, when the ocean surface waters are warmer than normal and the equatorial divergence is located well to the east of the Pacific. Furthermore, **increasing temperatures** will increase surface evaporation leading to increase stress on these catchments. These catchments are rated very highly vulnerable to the impacts of climate change.

Groundwater is vulnerable to sea level rise, **storm surge, coastal flooding and saline intrusion**. These climate change threats will negatively affect the underground water quality. Because the water table is low (1m – 1.5m deep), the ground water is expected to dry up during extreme **drought** events, and is therefore considered vulnerable. The prevailing geological characteristics of the islands as raised coral atolls renders the ground water vulnerable to extreme drought due to rapid drainage and the presence of submarine saline groundwater. The adaptive capacity to these impacts is generally low also because of the influence of some non-climate change issues affecting water resources. Proper sanitation is critical to maintain quality of underground water. A part from saline intrusion, the quality of underground water is potentially at risk of contamination by unmanaged solid waste disposal. Thus, there is need for designing an ideally sanitation facilities for all sites. A part from saline intrusion, the quality of underground water may be potentially at risk of contamination by unmanaged solid waste disposal.

Supply of rainwater is largely dependent upon rainfall. Equally important is the ability to capture or harvest the rainwater during rainfall. Observation on rainfall for the last 37 years varies significantly but shows a declining trend. Since rainfall is influenced by several events including the El Nino-Southern Oscillation, the vulnerability assessment is based on occurrences of two phases of ENSO, namely La Nina and El Nino. Hence, rainwater is expected to be in short supply during the **El Nino** event but is envisaged to be in abundance during the **La Nina** event. In both scenarios, rainwater is vulnerable particularly during the El Nino phase of ENSO. Concern during the La Nina phase is on the ability and capacity to maximize rainwater harvesting.

The vulnerability assessment confirms that the water resources and systems in Taro Island are vulnerable to climate change threats. Thus, the need to build the capacity of the township and the village to adapt to climate change impacts is warranted. The following recommendations are made:-

- That the provincial government must have a proactive response programme to address the impacts of climate change on water resources and systems assets in Taro Island.

- That the provincial government must have a waste management plan, and ensure to safeguard its water catchment and underground water resources and system.

- That villagers must be willing and committed to participate and take ownership of the adaptive interventions from the project.

Relevant stakeholders

- Western Provincial Government
- The Lauru Land Conference of Tribal Communities (LLCTC) have been working against logging activities and mining activities which could be detrimental to the watershed, water catchment and the natural resources.
- The Nature Conservation (TNC) works under the LLCTC to conserve environment and cultural heritage.
- Germany Agency for International Cooperation (GIZ)
- WPCW
- Women's Resource Center (WRC)
- Save the Children Australia (SCA).
- The Natural Resources Development Foundation (NRDF) - a good organization to coordinate work in both Western and Choiseul Provinces especially in the area of natural resources development.
- The Rural Development Project (RDP) - involved with various water supply projects

Current water supply management practices and weaknesses

The Provincial Government has a policy that when the town of Taro does not have any water, they assist government staff to get freshwater from the mainland by allowing them to work half days. Currently, there are no individual household water supply connections, and so people invest in private rainwater tanks. The Provincial Government ensures that all government officers have tanks installed near their house. No provision is made for other people outside of the government workforce.

Recently, there has been consultation by the government for the implementation of Integrated Water Resource Management (IWRM) as an overarching approach that governs water management in the Solomon Islands. In addition to the above national IWRM approach, there is an ongoing process to develop a national Water and Sanitation policy. Once formalized, the national IWRM approach and new policy will form the basis for a more concerted and effective approach towards water management throughout the Solomon Islands. The national water policy will also form the basis for Ordinances in the provinces to be able to legislate for protection, conservation and accessibility of water for the citizens of the provinces throughout the country.

Pilot Project Objectives

Taro township is almost saturated in terms of development. It is an island with limited space. Almost 40% of the island is used as runway for the airport. Any major source of water demand is limited as the Provincial Government has secured land for industrial

development on the main island of Choiseul itself. Limited options therefore remain for a small island with a high population growth rate and density. Extensive reporting is available for the proposed site in Choiseul. The predicted impacts of climate change on the existing water resources was assessed at the site during the PPG.

Proposed Activities

Utilising the proposed project strategy of developing the Water Sector Climate Change Adaptation Response Plans to identify the adaptation needs for site water management, the following proposed activities will be reviewed and improved during the inception phase of the project.

1. Strategic Rainwater Storage

Although priority appears to be given to government workers in the town as the Provincial Capital, equity of access to water supply, especially during dry periods needs to be improved.

Construction of additional rainwater storage, especially at community and government buildings as strategic storage during dry periods is required. This includes the Sport Centre building, Provincial building, and some Churches. This is water for all – and not just water for government workers. This will require a detailed assessment of roof sizes, suitability, materials required such as guttering, etc, and the development of a clear management policy for the maintenance of community water reserves and their use. Project interventions are described below:

- Conduct a rainwater harvesting survey to determine the condition and quality of the water people are using. Review materials people use, and the construction of the rainwater capture and storage systems, focusing on capture of water, but significantly the need to maintain clean drinkable water in the tanks through avoiding pollution sources, ensuring tanks are covered, etc;

- Based on community consultation, information collected, and surveys conducted during the PPG phase, provide investment at the household level for the poorest of households who currently have limited access to fresh potable water. Use these investments to provide examples of how to correctly set up rainwater harvesting systems. Provide the benefit to the poorest households, but use these investments as a learning opportunity for the wider communities and township.

- Review building codes and ensure that any new building development should be approved by the Town and Country Planning Board [TCPB] to ensure that new buildings will always contain adequate rainwater harvesting technologies. This is to ensure that increasing population water needs do not add stress to the available potable water per capita. Good and technically correct rainwater harvesting provides the opportunity to expand water supply per capita – as it entails simply storing the water hygienically. Unfortunately, many rainwater harvesting tanks fall into disrepair, or are incorrectly cleaned and maintained. This is especially true of guttering and roofs – effectively mini-catchments that add both diversity to water supplies, but which can also be remarkably resilient as micro-catchments – they can be relatively easily replaced, and can be re-built quickly provided materials are available. New building developers should ensure, under building codes, that they provide a minimum of two rain storage tanks [minimum capacity: 3000 litres each] and the correct materials for harvesting rainwater are required as part of the build approval process. This includes roofing iron, guttering, the location of tanks,

including tap height and covers to prevent contamination. Building codes should also be expanded to include sanitation needs, although rainwater (for drinking and cooking) should not be used for toilets.

2. Sourcing a new sustainable water source

As a strategic reserve, effort is required to locate an alternative water source. A spring located 8km away on the main island of Choiseul could provide an alternative safe water supply for Taro town. The spring was visited during the PPG phase and rapid discharge and quality tests were conducted. The flow was found to be 2lts/sec, but it is not known is this supply is constant. With increasing climate variability, the community has become, at times, vulnerable to severe water shortages. Under this component the following activities are proposed:

- Feasibility study for the use of the spring as a strategic reserve – using the appropriate technical capacities to assess the flow rate, reliability of supply, water quality testing, and possible pollution sources affecting the water quality.

- An assessment will need to be made regarding the governance issues surrounding land tenure and ownership of the spring, the land it drains from, and flows over. If the spring is found to be a stable and clean resource, ideally the project should attempt to secure the resource as a strategic reserve, in negotiation with the Provincial Government and land owners and communities concerned.

- For consideration by the project, is minor development of the source including some small scale headworks to protect the source, and initial piping to a collector tank.

- Development of an operation and maintenance schedule, including financing and stakeholder/institutional responsibilities for the spring, should even minor development of the source (as described above) take place. This is important to ensure the source, if viable, does not become polluted or 'forgotten'.

- If the source is developed, it is advisable for the Provincial Government to develop a protocol for the use of this water during periods of drought or other 'emergencies'. This includes collection, of water, shipping and logistical issues concerning distributing the water around the town and communities, responsibilities, equity of distribution (not to just government workers). The project will help with this is requested.

Further development of the site should be based on investment from the Provincial Government, private households, and private sector demands as necessary.

3. Development of Groundwater Management Protocols

The majority of the wells contain water that is suitable for washing and bathing, but which is unsuitable for cooking with or drinking. Most of the wells have been hand dug and are lined with concrete. The following activities are proposed.

- A groundwater survey is undertaken. This would require equipment necessary for an earth resistivity survey to better understand the groundwater characteristics, and to take samples for water quality testing to determine if, under a certain collective management regime, groundwater could be considered a source of freshwater. The management regime would be based on a sustainable pumping rate for the groundwater to ensure sustainable yield of potable water. However, this also requires protection of the water resource as an underground water catchment. For this approach to work, maintaining the quality is also determined by preventing

pollution into the groundwater from surface sources. In line with the Rural WASH policy, wells are a useful and if well managed correctly, sustainable secondary source of water.

- During the PPG phase it was apparent that a shallow wetland area in the middle of the island may also be a key groundwater recharge area. Despite this, the wetland area is used for the disposal of solid waste, containing plastic, food, metal and other waste. The project will look at options to clean up this site, remove the waste safely and dispose of it appropriately following the national Waste Management Policy. Options will be discussed with the communities and town to look at how this site can be better protected as a freshwater recharge area. Investigations will need to take place into the quality, and actual recharge value of this area, and if this is indeed important for the resilience of freshwater supply, the project will look at options to protect the site, and will implement them with the appropriate stakeholders.

Leaving this potential freshwater source to degrade is a missed opportunity to help the island adapt to climate change. Degradation and pollution puts pressure on existing sources of freshwater. This requires additional investments to be made to source freshwater, when better management, recognition, knowledge and information can lead to the better management and utilization of existing resources as an adaptation response. This approach is key to mobilise the overall project strategy using the resilience framework.

4. Sanitation

As there is no way to empty the septic tanks in Taro safely, or anywhere to dispose of the waste, it is recommended that a change to sanitation approaches, including open defecation is mobilised through implementation of the new Rural Water Supply, Sanitation and Hygiene Policy.

Groundwater is a resource that needs to be protected for three reasons: (i) it is a useful resource for bathing and washing, and some small scale irrigation uses. Polluting the water further would render it unsafe for these uses, and people would therefore use potable water from rainwater tanks for non-potable uses, thereby using strategic reserves; (ii) depending on the investigations into the groundwater, reducing pollution and better management of the resource may yield a safe potable water supply. Polluting this further will effectively narrow down water supply options for the town into the future; and finally (iii) in order to maintain the resource, it needs to be protected from pollution, especially sanitation waste from poorly designed sanitation interventions.

The project will take a four year strategic approach to sanitation marketing in Taro town. Over the four years of the project it will:

- Collect information, working closely with the communities and town on sanitation use, needs, and the current impacts of poor sanitation where possible. It will develop a series of ‘stories’ designed to better explain, in a culturally appropriate way, the sanitation problems, health concerns, and alternative options. This work will not be implemented at a pace which is focussed on ‘outputs’, but is instead more focused on ‘behaviour change’ (as an output). In-line with the rural WASH policy – a ‘no subsidy’ approach is preferred. However, project ‘seed’ funding will be used to:

    1. Look at construction options for VIP latrines, and dry latrines and composting toilets

2. Assess the material supply chains for sanitation construction – explaining how to develop latrines, skills required, resources needed, materials required, etc
3. Construction of appropriate latrines at the school, medical facilities, and sports centre (but not flush toilets using precious rainwater in tanks)
4. Provision and presentation of information on different latrine uses and choices – and why only certain technologies are suitable for Taro
5. Creation of a local hygiene campaign to alert people to the risks around common WASH disease, etc – working with the MHMS-EHD and the relevant Health Promotion Unit.
6. Community engagement, training in construction, maintenance, development of operation and maintenance approaches and guidance – for latrine choices and construction
7. Through consultation, selection of willing families to trial new latrines, funded by the project, as 'demonstrations' of households willing to 'try' latrines. This will include a series of monitoring activities with the families and communities involved where pros and cons of the latrines are openly discussed within the communities. The aim is to use these pioneering families and households (including government offices and small businesses) to be 'live' monitors for toilet use, who report back on a regular basis to the wider community and town on their perspectives regarding latrine use relative to open defecation on the beach/mangroves. This way, transparent perspectives are presented to the town and communities- and they can therefore make the choice about what they want to do for their 'sanitation future'.
8. A national sanitation campaign, called (proposed as) 'Our Sanitation Future' will be developed by the overall SIWSAP project (described in the main project document). Video diaries, using participatory video techniques and 'testimonies' from families using new latrines will be part of the campaign.
9. Sanitation interventions will be aligned with the 'Healthy Settings' approach adopted by the Government to ensure the uniformity of health messages and hygiene practices.

The aim of these sanitation interventions is behaviour change through community awareness, knowledge generation and self-empowerment, rather than project 'hand-out' approaches which often do not lead to sustainable change. Using Taro as a key 'demonstration' site for sanitation change for the wider Choiseul Province is critical and the project would provide additional resources for promotion of sanitation across the Province in local languages. Sanitation Champions, identified during the project will be supported by the project to lead and grow Provincial Campaigns for sanitation development under the national 'Our Sanitation Future' Campaign.

Capacity Development Strategy

Capacity Development will be addressed throughout implementation of project activities. There will need to be training activities to understand the responsibilities of the different stakeholders who will be involved such the Province, Communities, project staff, etc. For example,

- RWSS staff, and consultant support, with the PMU, will be required to implement some of the activities.
- Works Division, including the Planning Division of the Provincial Government will be included in implementation with the PMU
- At the community level - activities can also be implemented through the Church
- Some Provincial support may be required with logistics as well, although the SIWSAP funded Provincial Officer will assist with this as well.

Stakeholder involvement plan

(i) ***Involvement and control:*** Whilst the idea is to involve all stakeholders that no one is purposely left out, there has to be involvement but at the same time a control over the process through which the community consultation will be held from conception to end result;

(ii) ***Participation and Inclusion***: It is vital that all stakeholders who may be affected by the project interventions have to be included, or the choice to decide not to be included.

(iii) ***Influence***: Despite whatever discussion is held or problems encountered, suggestions people make must be listened to , and influence from more powerful individuals and processes needs to be balanced with equitable implementation and destruction of project interventions, and therefore benefits.

(iv) ***Learning through practice***: Through the consultation period, people including politicians, administrators, technical officers, RWSS/Works Division, women, youth, chiefs and zone leaders, and all stakeholders must learn through practice;

(v) ***Sustainability***: Stakeholders, through learning new skills and knowledge should increase efficiency and management of water resources to help them address the impacts of climate change.

Proposed Communications Approaches (*to align with the overall SIWSAP Communication Strategy*)

1. Meeting with community leaders, women and youths
2. Awareness using various tools to attract people
3. Radio programs
4. Theatre
5. School curriculum
6. Using the established Church structure and groups
7. Using the established cultural leadership system

CO-FUNDING

The Provincial Government has already pledged to support the project with SBD$800,000 (US$111,000) over the period of four years during which the SIWSAP project will be implemented. The co-financing may be considered for the following activities:

(i) The government has already agreed that they will allocate some money for the project as part of their co-financing commitment.

(ii) NGOs may carry out some activities on behalf of project in activities that may have been outsourced by the Provincial Government which are in line with their programme. Further consultation can be made with RDP

(iii) EU; AusAID, and UNICEF co-funding as appropriate. Other co-funding will be sourced during the project implementation.

ANNEX A: BUDGET DETAILS

A.1. DETAILED BUDGET

BUDGET ITEMS	DESCRIPTION OF EXPENDITURES/BUDGET NOTES	TOTAL (US$)
Materials and Equipment		
RWH tanks (aluminium and rotamold)	For strategic water storage (note construction and logistics and sourcing costs)	
Timber, roofing, guttering, building materials, aggregate,	To build strategic storage and additional household storage (some material will be provided by local communities)	
Labour costs	For construction, latrine construction and development (some will be provided by local communities)	
Vehicle/boat hire	For transporting materials, logistical support, solid waste removal	
Sub-total		40,000
Field Surveys and Activities		
Rainwater Harvesting Survey	Of types, storage needs, equipment, location, water quality.	
Household RW tank provision (3,000lt tanks)	At poorest households, and investment in wider community shared strategic storage.	
Spring Source feasibility study (and minor development as necessary)	To assess spring viability as a water source during drought. Minor development of the source if feasibility study suggests this. Investment in small works and small tank for collection and water quality testing. Development of an O&M plan for the source, and funding of source protection – including landowner involvement.	
Governance review	Regarding water sources, access, land tenure, and building codes to help develop a water governance model for the township that focuses on climate resilience that all parties can agree to.	
Groundwater survey/assessment	Detailed groundwater assessment to determine volume and quality of reserve, and define management regime to protect the water source and use it for the most quality driven appropriate uses.	
Wetland protection	Solid waste removal, wetland governance plan developed, linked to groundwater management regime	
Sanitation (and groundwater protection)	Participatory sanitation survey including: Construction of appropriate dry latrines Latrine demonstrations (eco-sanitation) Local campaign development for advocacy purposes Community activities, communications and awareness raising, hygiene focussed campaign	
Sub-total		60,000
Contractual Services		

BUDGET ITEMS	DESCRIPTION OF EXPENDITURES/BUDGET NOTES	TOTAL (US$)
Groundwater survey	Contractor team, logistics, travel, DSA, reporting costs	
Sanitation survey support	To work with the communities to assess sanitation behaviour and needs	
Advocacy and communication support	To support communities in understanding the project interventions, document climate change impacts, water shortages, gather information from the community as anecdotal baselines, work with neighbouring communities to generate interest	
Sub-total		35,000
Total		135,000

SOLOMON ISLANDS WATER SECTOR ADAPTATION PROJECT (SIWSAP)

WATER SECTOR-CLIMATE CHANGE ADAPTATION RESPONSE (WS-CCAR)

Tigoa, Renbel Province

October 2013

PROJECT BACKGROUND, OBJECTIVES, ACTIVITIES AND OUTPUTS

Situations change, project supporter's move on, projects get delayed in starting. Based on experience, it is recommended that the design of this project is reviewed by the PMU prior to any implementation at the proposed site(s). The project needs to be presented and discussed with local stakeholders during the establishment of the Pilot Project Committee in the Inception Phase of SIWSAP. Expectations, confusions, further information and explanation can then be provided at project start – and the design of the project adjusted to fit new realities at the site in order to ensure project interventions are clear and understood by all – and stakeholder support is provided throughout implementation.

Project Context and Background

Renbel Province comprises of the two Polynesian islands of Rennell (Mu Nggava) and Bellona (Mu Ngiki) which are raised atolls. It has a population of approximately 3,000 people. The populace is mostly Polynesian and their language is a branch of Polynesian. Tigoa is situated on the island of Rennel and the provincial centre of the Renbel Province. The Tigoa township include the following communities that are adjacent to the town namely; Tigoa village, Mangae, Hatagua, Papae and Gogona. The total population is about 543 and the communities are spread over an estimated total land area of around 3-5 square km. Most of the people about 144 (74%) practice subsistence agriculture, markets of artifacts or local produce and/or tourism.

Water Supply and Sanitation

The assessment of the water resources in Tigoa, Rennell Island, Renbel Province were limited to underground water resources (through wells) and rainwater harvesting. However, both the underground water and rainwater harvesting is very much dependant on the rainfall. The only recorded rainfall for Tingoa was done in the 1969 – 1973 with the average annual rainfall of 3,418 mm. This average annual rainfall may not represent the current rainfall and trend that is currently being experience throughout the country.

Most people use tanks for water supply for drinking and cooking, however, the capacity of the tanks is inadequate to sustain the population over a long period of time. The place also has some natural water caves which can help to sustain water and at the same time can be used to pump and distribute to the community and the township. However, there is no proper water distribution in the town, and thus, there would be need to have a proper system to pump water from cave or reservoir and then redistribute to the buildings in township and the surrounding villages.

There are a few flush toilets in the township and especially the motels and offices and private homes, but most of the toilets used are mainly pour flush and pit toilets. Few people use the bush. Currently, the population is spread over a wide area, but as population increases, sanitation would be a critical issue not only for the usage of water, but the effect it may have on groundwater over a long period of time.

Institutional and policy context

The community has had various donors or NGOs including the government giving support with their water. The appearances of the different types of tanks indicate the activity at a different time by a different donor. Some are still functioning, whilst others are no longer working.

- The fibre-glass round tanks were also donated to some household after the cyclone Namu in the Tigoa communities and are still functioning. However, they are small and only a few household still has them.

- The Fibre-glass 600 gallon tanks about few tanks are available which people may have privately bought. They are pretty old.

- The Water Supply system was connected to a natural cave water and is pumped to a tank on top of the hill. It was used occasionally to supply water as an alternative to the tanks when they are dry. However, it was not connected to the whole station but to a few houses close to it. The system is still functional until when logging machinery destroyed the system.

- The Rotomould tanks were provided by the European Union Micro-project Fund. They were donated to certain places like the Clinic and staff houses and other institutions.

- The Aluminum tanks, were provided by the PGSP through the Provincial Government funding which they qualify for after analyzing their performance.

Vulnerability assessment

Prevailing water resources and systems identified at Tinggoa town and nearby villages are: *Water sheds / catchments, Groundwater and Rainwater*. These water resources and systems are vulnerable to a number of climate change threats. Hence, the need to respond and intervene with improvements on existing adaptive measures practiced by the people, as well as, providing best alternative water supply for the people.

The table below shows a detailed analysis of current exposure and sensitivity to climate shocks and stresses while the following text summarises how these impacts interact with the individual adaptive capacities to determine the vulnerability of the different water resources and systems.

The impact of climate changes and variation is easily noted in the Island of Rennell. The presence of groundwater is dependent on the recharge from depressions/basins within the locations of natural water holes and hand dug wells. The watershed at Tigoa, which is the entire island because there are no streams and rivers but abundant groundwater resources, is not vulnerable to seawater contamination because it is located in the middle of Rennell Island towards the west. Under drought conditions, however, water may be contaminated by saline intrusion hence monitoring is a crucial activity, especially for groundwater quality and especially near the coast. Furthermore, while the underground water is generally fresh by WHO drinking water quality standards but only for chemical parameters, analyses for bacteria must be determined to confirm the method and level of disinfection of the water supplies. Also to increase adaptive capacity against climate change impacts on groundwater resources, it is important to conserve or protect recharge areas by zoning and passing an ordinance at the provincial level. Additionally, landownership must be confirmed around the groundwater recharge zones to promote conservation or protection measures through sustainable land management practices. Since the township is developing, there are activities such as land clearance and residential housing expansion towards the groundwater catchment areas. Logging activities occur east of the island to harvest round logs (pencil cedar) but future concessions to log around this areas is unpredictable, which contributes to the currently high vulnerability of this resource and water system.

Detailed Analysis of Current Exposure and Sensitivity to Climate Shocks and Stresses for Tigoa, Renbel Province

Water source and system	Threat	Exposure	Sensitivity	Impact Level (expert assessment of exposure & sensitivity)	Impact Summary (what are the impacts)	Adaptive Capacity (consultation / expert assessment)	Vulnerability (risk x adaptive capacity)
Water sheds / catchments	Localized flooding/pooling	Low	Low	Low	Pooling occurs only on certain areas depending on prevailing geological features.	High	Low
	Storm surge/coastal flooding/saline intrusion	Low	Low	Low	Parts of island may be potentially affected.	Low	Medium
	Extreme drought	High	High	High	Potential drying of catchment	Low	High
	Increased temperature (~2^{o}C) / evaporation	Medium	Medium	Medium	Increase surface evaporation	Low	Medium
	Coastal erosion	Medium	Low	Medium	Reduction in size of island	Low	Medium
Groundwater	Localised flooding/pooling	Medium	Low	Medium	Pooling occurs only on certain areas depending on prevailing geological features.	Medium	Medium
	Extreme drought	Very High	Very High	Very High	Potential drying of catchment and salinity contamination affecting water quality.	Low	Very High
	Increased temperature (~2oC) / evaporation	High	Medium	High	Increase surface evaporation	Medium	Medium
Rainwater	La Nina	Medium	Medium	Medium	Increase rainfall	Low	Medium
	El Nino	High	High	High	Decrease rainfall	Low	High

Both the water well and rain harvesting depend on rainfall for recharge. Rainwater can only be harvested during rainfall, and its availability for use is largely depended on duration of the rainfall, the frequency of its occurrence, location and optimum storage volumes based on roof areas of permanent houses. Any climatic situation such as El Nino or drought or some kind of climatic oscillation of weather pattern such as a dry period due to climate variation and changes will have direct impact to the water resources. Additionally, wise use of water resources from storage facilities and repairs for leakages are important measures to water supply management, thereby reducing the likelihood to experience water shortages hence vulnerability to drought status.

The vulnerability assessment confirms that the water resources and systems in Tigoa and surrounding village are vulnerable to climate change threats. Reducing vulnerability of water systems for the township using the IWRM concept of "ridge to reef" under future climate change scenarios involves both demand and supply levels of water management. The IWRM approach involves catchment conservation/protection and water safety (for pristine and purity aspects of water resources), demand management (leakages reduction), water use efficiency (wise use) of supply systems and consumers behaviour. The "business as usual" or BAU aspects often results in poor water management practises which will result to increased vulnerability of water systems under future climate change scenarios; IWRM ideally covers the "whole of water systems" approach and not forgetting waste disposal from sanitation facilities. Thus, the need to build the capacity of the township and the village to adapt to climate change impacts is warranted. The following recommendations are made:-

- That the provincial government must have a proactive response programme to address the impacts of climate change on water resources and systems assets for Tigoa as baseline for the upcoming project.

- That the provincial government must have a land-use plan including a waste management plan to safeguard its water catchment and underground water resources. Additional assistance from the project will build upon this plan during implementation.

- That the Provincial government and nearby villages be willing and committed to participate and take ownership of the adaptive interventions from the project. This is crucial for long term sustainability of water resources and supply systems, not forgetting capacity building for provincial staff, community members and the general public who use water.

Relevant stakeholders

Relevant stakeholders who are operating in Rennell Bellona Province are:

- Rural Development Project: The RDP is operating there has provided some tanks under the project

- PGSP: As a national project, it is operating throughout the Solomon Islands. Funds can be sought through the development budget.

- Red Cross: The Red Cross has just established a building in Rennell, although it is quite far from the town, other services could sought from them

- European Union Micro-Project: The EU Micro-Project providing funding for the clinic and its tanks. There could be possibilities that another EU Micro-project could be signed in the future between Solomon Islands and European Union which applications could be prepared for funding

Current water supply management practices and weaknesses

The community of Tingoa and the Provincial Administration has been using both rainwater harvesting and natural wells for water supply. Renbel is a small Province relative to others in the country, with an entire population of only just over 3,000 people, with around 700 people living in Tigoa. This is most likely due to the isolation of the islands.

Previously the people of the island had been dependent on the natural water wells for their water use and consumption. The Provincial Administration has been dependent on a natural well close to their offices for some time, but this has been polluted.

The water from the well was pumped using a water pump [2 kW] using 50 mm diameter suction pipe of 10 m with a pumping rate of 600 litres per min to a two 1000 gallon tank with approximately 30 m head. However, according to the Works Officer and RWSS Officer the tanks normally takes 40 minutes to fill, therefore the pump is pumping at a rate of 225 litres per minute. The water was gravitationally distributed to the houses within the centre through a 40 mm diameter galvanised pipe and PVC pipe. However, this system is no longer working due to damage to the water supply pipe network.

The Provincial Administration had also attempt to use a solar system to pump water from a natural well. However, during the PPG it was clear, talking to staff, that the pump was not working. They had four solar panels of 80 watts with the output of 12 volts with the total watts 320 watts with the submersible pump of 48 volts. It is likely that the solar panel array and set up has not provided enough power to the pump. With no batteries for the solar panel to charge when the pump was not in use, the solar array was connected directly to the pump. This is not an efficient way to establish the system. The pump was used to pump water to two 1000 gallon tanks situated just 50 m from the nearest building.

During the PPG consultation meeting participants suggested and recommended that a natural water source is developed near the old Hutuna Village. However, during the visit the water source was not found. It was suggested to the provincial administration that they should follow up with the villagers about the proposed water source. Apparently, the natural water source is approximately 11 m in diameter. The depth from ground level to the water level is 6.10 m and the depth of the natural well is approximately 20 m deep. Some water quality sampling has suggested that the water is adequate for drinking.

Attention is needed to increasing the overall ability of the town to collect rainwater for domestic uses, and to most importantly sustain collecting it through better operation and maintenance of the rainwater systems, wells, and caves the supply the community with fresh water depending on the climate/season, and strength of the ENSO.

The only recorded rainfall for Tingoa was between 1969 – 1973 with the average annual rainfall of 3,418 mm. This average annual rainfall may not represent current rainfall and trends that are currently being experienced throughout the country. Tigoa will therefore be a site where hydrological monitoring will be improved to provide better climate related information to the Provincial Administration and Solomon Islands Government.

Pilot Project Objectives

Tigoa has the advantage of being relatively small in size, but is still a Provincial Administration and an area of economic growth for the Government to focus on. It has a serious shortage of available climate and hydrology related data, information, and therefore knowledge over the years to understand changes in rainfall and temperature, and other factors to really assess the status of its water resources. Many options exist to secure more strategic water resources, and diversity of sources, but it is unknown how sustainable these sources are, what the quality of them is (on a consistent basis), and what the threats

are to these sources for pollutants. Furthermore, it appears that good sources of water, such as a well near the Provincial Administration building has not been properly looked after and protected. An existing water supply scheme has been damaged, and incorrectly established and rehabilitation of this scheme may be considered, although this requires a proper survey.

Proposed Activities

Utilising the proposed project strategy of developing the Water Sector Climate Change Adaptation Response Plans to identify the adaptation needs for site water management, the following proposed activities will be reviewed and improved during the inception phase of the project.

1. Strategic Rainwater Storage

Although not large in population, Tigoa is a township geographically spread out; essentially a collection of communities that are linked together through different roads and paths as communication routes. Water also binds them together, given their collective location close to groundwater wells in caves. Construction of additional rainwater storage, especially at community and government buildings as strategic storage during dry periods is required. This includes the Sport Centre building, Provincial building, and some Churches.

The link between rainfall, and the impacts of ENSO on Rennell, as well as its reputation as a Province that regularly experiences cyclones, means that it has in the past suffered from damage and drought periods. During these periods people use water in caves, or from freshwater springs at the coast. Rennell is the largest raised coral atoll in the world, a large limestone rock that has no surface water resources because of its geology, but which can purify and store large amounts of good quality groundwater.

To complement the groundwater which is subject to other risks, and partly because of the distributed community, a reticulated network would be challenging to implement because of ownership, operation and maintenance, and financing costs medium term and beyond, it is recommend that a rainwater harvesting survey is conducted. This will need to assess the possible rainwater capture areas, and therefore the current tank capacities required relative to population needs. The project should then invest in rainwater tanks, roofing materials and guttering to improve individual household storage (because of the decentralised nature of the town). In consultation with the community and Provincial Administration, strategic storage options such as tanks as community reservoirs should also be considered a suitable option, particularly using large roof areas such as community buildings, Churches, etc. Training in maintenance of the rainwater harvesting technologies will also be required, including hygiene practices to preserve the quality of the water in tanks. In summary:

- Conduct a rainwater harvesting survey to determine the condition and quality of the water people are using. Review materials people use, and the construction of the rainwater capture and storage systems, focusing on capture of water, but significantly the need to maintain clean drinkable water in the tanks through avoiding pollution sources, ensuring tanks are covered, etc;

- Based on community consultation, information collected, and the brief surveys conducted during the PPG phase, provide investment at the household level for improved the correct materials, installation and training of tanks, guttering, downpipes, covers, etc. Use these investments to provide examples of how to correctly set up rainwater harvesting systems, and use these investments as a learning opportunity for the wider communities on Rennell.

- Review building codes and ensure that any new building development should be approved by the Town and Country Planning Board [TCPB] to ensure that new buildings will always contain adequate rainwater harvesting technologies. This is to ensure that increasing population water needs do not add stress to the available potable water per capita. Good and technically correct rainwater harvesting provides the opportunity to expand water supply per capita – as it entails simply storing the water hygienically. Unfortunately, many rainwater harvesting tanks fall into disrepair, or are incorrectly cleaned and maintained. This is especially true of guttering and roofs – effectively mini-catchments that add both diversity to water supplies, but which can also be remarkably resilient as micro-catchments – they can be relatively easily replaced, and can be re-built quickly provided materials are available. During the PPG phase it was clear that some tanks had been provided, but they were poorly connected or missing materials to properly, and importantly safely connect them to keep the water contamination free. New building developers should ensure, under building codes, that they provide a minimum of two rain storage tanks [minimum capacity: 3000 litres each] and the correct materials for harvesting rainwater are required as part of the build approval process. This includes roofing iron, guttering, the location of tanks, including tap height and covers to prevent contamination. Building codes should also be expanded to include sanitation needs, although rainwater (for drinking and cooking) should not be used for toilets.

2. Groundwater Wells and Caves

The use of groundwater in shallow wells, or from caves is a historical practice, especially during drier periods. However, this water can sometimes be contaminated from birds and/or bats in caves. Furthermore, as a raised coral atoll, pollutants can rapidly move through the porous rocks due to the high hydraulic conductivity. Consequently, there is a need to protect these sources of water from surface pollution. It is recommended that a selection of sites are identified (Hutuna was visited during the PPG phase) as strategic Provincial reserves, and a process is initiated with landowners to discuss the options for protecting and preserving these unique habitats and natural water wells. Land ownership is however complicated in Renbell, focusing on patrilineal kinship and the transfer of land through the male side of the family.

Consequently, a long term process of discussion needs to be initiated, led by the SIWSAP Provincial officer and supported by the PMU to enter into open and collaborative discussion with the landowners to look at sustainable long term protection options of the freshwater caves – a key element of ecosystem based approaches within an IWRM strategy – to focus on preservation of the source for the wellbeing of the wider community during dry and drought periods.

3. Source Protection, Rehabilitation, and Expansion Options

The well at the Provincial Administration should be cleaned and rehabilitated as a developed source of potable water. During the PPG mission it was found to contain hospital waste and was slightly acidic, although the acidity is normal in limestone and should not a concern. This source should be rehabilitated if the water is of adequate quality, and large tank supply installed as a community reserve for dry periods, provided the well sustainable pumping rate and quality is acceptable.

In discussions with the UNICEF project working in Tigoa, and with the Provincial Administration, SIWSAP will consider a feasibility study to assess the rehabilitation options of the current gravity fed water system that has been damaged. Rehabilitation of this

system should however, not be fully funded by the project, but with Government support. Any feasibility study should also take into consideration development of other sources (such as at Hutuna).

4. Sanitation

The PPG phase highlighted that there are a few septic tank systems in Tigoa, combined with some personal pit latrines, and wide use of the beach and bush. With no ability to empty the septic tanks this will be leaking into the groundwater. As with other sites, polluting a pristine source of groundwater due to poor sanitation practices is a poor water management practice, but also harmful to water reserves during dry periods, when water may exist but cannot be used due to pollution. Sanitation, given the lack of coverage in Tigoa, is therefore a major concern, given the population growth rate at over 2% per annum, and the existing dry periods of up to 3 months that the community experiences, with inadequate tank storage. Groundwater may become an increasingly used resource for drinking, cooking and other domestic needs.

The project will support the UNICEF project 'Building Human Development: Improving WASH in the Solomon Islands'. This project will work in Tiggoa and is looking to develop some water supply provision, and to focus on sanitation and participatory hygiene development, social marketing, water quality monitoring and capacity building. In this particular case, SIWSAP interventions will be to support the UNICEF sanitation interventions through ensuring adequate consideration has been given to medium term water storage and water quality issues, particularly in relation to an increased in sanitation options. The hydrogeology of Rennell makes sanitation a particular concern to maintain groundwater quality, and this process needs to be supported by the SIWSAP project to ensure that an increase in sanitation provision does not negatively impact current water resources. Further activities by SIWSAP will include:

1. Creation of a local hygiene campaign to alert people to the risks around common WASH disease, etc – working with UNICEF, MHMS-EHD and the relevant Health Promotion Unit.
2. Through consultation, and with UNICEF, selection of willing families to trial new latrines, funded by the project, as 'demonstrations' of households willing to 'try' latrines. This will include a series of monitoring activities with the families and communities involved where pros and cons of the latrines are openly discussed within the communities. The aim is to use these pioneering families and households (including government offices and small businesses) to be 'live' monitors for toilet use, who report back on a regular basis to the wider community and town on their perspectives regarding latrine use relative to open defecation on the beach/mangroves. This way, transparent perspectives are presented to the town and communities- and they can therefore make the choice about what they want to do for their 'sanitation future'.
3. A national sanitation campaign, called (proposed as) 'Our Sanitation Future' will be developed by the overall SIWSAP project (described in the main project document). Video diaries, using participatory video techniques and 'testimonies' from families using new latrines from Tigoa will be part of the campaign.
4. Sanitation interventions will be aligned with the 'Healthy Settings' approach adopted by the Government to ensure the uniformity of health messages and hygiene practices.

Capacity Development Strategy

Capacity Development will be addressed throughout implementation of project activities. There will need to be training activities to understand the responsibilities of the different stakeholders who will be involved such the Province, Communities, project staff, etc. For example,

- ***Community level by***
  - Resources
  - Manpower training
  - Skills and knowledge such as plumbing, electrical etc
  - Active involvement of the community
- ***Provincial Level through***
  - Passing a Town Council Ordinance such as Solomon Water
  - Establishing RWSS Division and developing their manpower, resources, knowledge and skills, tools and materials as well as their technical knowledge and skills

- ***Provincial budget allocation*** can be done through sourcing funds from the
  - Ward grant
  - Provincial Capacity Development Fund (Provincial Government Strengthening Project (PGSP))
  - Networking with SIG
  - Rural Development Program (RDP) project.
- ***National level through*** the following
  - Technical and financial support from line ministries
  - Financial support from Rural Constituency Development Fund (RCDF)
  - Millennium Fund
  - Livelihood Fund
  - NGOs

Stakeholder involvement plan

(i) ***Involvement and control:*** Whilst the idea is to involve all stakeholders that no one is purposely left out, there has to be involvement but at the same time a control over the process through which the community consultation will be held from conception to end result;

(ii) ***Participation and Inclusion***: It is vital that all stakeholders who may be affected by the project interventions have to be included, or the choice to decide not to be included.

(iii) ***Influence***: Despite whatever discussion is held or problems encountered, suggestions people make must be listened to , and influence from more powerful individuals and processes needs to be balanced with equitable implementation and destruction of project interventions, and therefore benefits.

(iv) ***Learning through practice***: Through the consultation period, people including politicians, administrators, technical officers, RWSS/Works Division, women, youth, chiefs and zone leaders, and all stakeholders must learn through practice;

(v) ***Sustainability***: Stakeholders, through learning new skills and knowledge should increase efficiency and management of water resources to help them address the impacts of climate change.

Proposed Communications Approaches (*to align with the overall SIWSAP Communication Strategy*)

1. Meeting with community leaders, women and youths
2. Awareness using various tools to attract people

3. Radio programs
4. Theatre
5. School curriculum
6. Using the established Church structure and groups
7. Using the established cultural leadership system

Table 1 – Summary of project strategies and activities for the implementation of the demonstration project and expected indicators, Tigoa

Project Components	Activities	"Outputs"/Impacts	Baseline Indicators	Target Indicators	Adaptation Relevance and Environmental Benefits
Stakeholder Communication and Consultation					
Strategic Rainwater Storage	- Conduct rainwater harvesting survey - Investment in rainwater harvesting materials and equipment for the poorest households - Review and improve building codes – integrate rural WASH policy requirements into building codes including sanitation - Training in RWH maintenance and forecasting available supplies - Develop strategic shared community water storage tanks	To enable semi-permanent and temporary houses to use their roofing to do rainwater harvesting. To make capacity to supply water for daily subsistence adequate and use of large non-residential buildings To improve capacity to withstand water shortages	12% of the community without adequate roofing to do rainwater harvesting 93% of tanks below 1000 gallons 55% of the community with tanks going empty more than 5 times per year (Adult Female 19% and Child/Youth 64%)	% decrease in tanks going empty annually by end of project 100% community has rainwater harvesting catchment available to them Increased safe water storage and access for community and individual households	Diversity of water supply prevents watershed and groundwater degradation and build resilience to dry periods and droughts Adds diversity to the water supplies available to communities
Groundwater wells and caves	- Spring source (in caves/sink holes) feasibility study - Governance assessment of use of the spring - Secure use of the spring as a strategic water reserve for Tigoa (Hutuna or other spring) - Minor development of the source, equipment, as	To decrease dependency on rainwater harvesting and stress on current tank capacity Increase of sustainable water source protection during dry and	11% of community serviced by wells or caves as source of water supply (Adult Female 19% and Child/Youth 64%)	% increases in access to safe water supplies from wells and caves as strategic reserve Increased safe water storage and access for community and individual households	Adds diversity to the water supplies available to communities Protects freshwater recharge areas and reserves as key

	appropriate, working with landowners and communities, etc - Development of O&M schedule, roles, responsibility of use and actions including who covers the costs - Protocol for Use of the Strategic Reserve Source – and protection of resource	drought periods			supply areas Determine best mgmt regime to keep natural freshwater reserves clean
Source Protection, Rehabilitation and Expansion Options	- Conduct groundwater survey and water quality testing - Determine an appropriate use and as a consequence management regime for the groundwater - Establish PES scheme for natural water sources - Support to UNICEF project working in Tigoa.	To decrease dependency on rainwater harvesting and stress on current tank capacity	0% of wells operated at suitable pumping rate Inadequate water storage and supply: 3 mnths of each year rainwater tanks are dry from lack of rainfall. 0% protection areas against pollution from silt and oil from heavy machinery and the logging activities (Adult Female 19% and Child/Youth 64%)	Watershed/source payment protection scheme established Groundwater resources assessed and yield and quality determined	Adds diversity to the water supplies available to communities
Sanitation	- Conduct sanitation survey - Specific community engagement on sanitation and hygiene issues and concerns – develop behaviour change pathways/stories - Identify best technical sanitation interventions (low	To increase control and management and reduce careless use of water especially at Taro To prevent the unhealthy practice of people using the bush or seaside for latrines	98% of taps that are outside or are shared to address efficiency and health issues 7% of community without some type of toilet facility (Adult Female 19% and	Appropriate sanitation technologies in place for 30% of community by end of project Hygiene campaign in place works with people (60% women and children/youth) to improve latrine use	Protection of freshwater reserves (groundwater) from poor sanitation practices to improve the longevity and quality of water supply during dry periods and drought

	to high tech) - Implement/construct sanitation interventions – VIP, dry pit, compost toilets – at trial family locations for 'live monitoring' - Construct appropriate sanitation interventions at community building (school, medical, sports) - Develop operation and maintenance plan with communities and Renbel Provincial Government for communal sanitation investments and financing - Design and implement a local hygiene campaign - Implement community training and awareness raising activities - Conduct video diaries and participatory video collection - Identify and support Sanitation Champions, and develop Provincial Sanitation Campaign		Child/Youth 64%)		

CO-FUNDING

Possible co-financing sources were identified through the PPG consultation for discussion during project implementation:

- World Bank - Rural Development Project
- UNICEF is also working in Tigoa and joint activities will be planned to improve the resilience of UNICEF interventions under EU Water Initiative funding.
- PGSP is another venue to be considered in provinces where they financing water supply for the duration of the SIWSAP project.

BUDGET ITEMS	DESCRIPTION OF EXPENDITURES/BUDGET NOTES	TOTAL (US$)
Materials and Equipment		
RWH tanks (aluminium and rotamold)	For water storage	
Timber, roofing, guttering, building materials, aggregate,	To build strategic storage and additional household storage	
Labour costs	For construction, latrine construction and development	
Vehicle/boat hire	For transporting materials, logistical support, solid waste removal	
Sub-total		60000
Field Surveys and Activities		
Rainwater Harvesting Survey and Strategic Storage developed	Of types, storage needs, equipment, location, water quality, tank capacities, roof sizing,	
Household RW tank provision (3,000lt tanks)	At poorest households, and investment in wider community shared strategic storage. Rehabilitation of RWH harvesting materials Training in RWH construction and use	
Groundwater Wells and Cave Assessment, Protection and Management Plan	To assess the viability of strategic freshwater reserves for the Province during drought periods, and also for development of the smallest Province. Governance assessment of the water sources Development mgmt plan for strategic safe water supplies, following assessment of capacity and quality of resources. Develop mgmt plan to protect suitable resources (karst springs), including funding options, involving the community and landowners.	
Source Protection, Rehabilitation and Expansion Options	Existing wells cleaned, protected, and rehabilitated (pumping tests, water quality checking and monitoring), installation of rain gauges and climate monitoring station to better assess recharge and rainfall. In collaboration with UNICEF, assess options to rehabilitate the current gravity fed water system – feasibility study Invest in system rehabilitation (as necessary, jointly with Government) Consider other water sources (Hutuna) as a possible alternative source – discuss with landowners, assess reliability, and discharge and quality of spring. Determine PES viability	
Groundwater survey/assessment	Detailed groundwater assessment to determine volume and quality of reserve, and define management regime to protect the water source and use it for the most quality driven appropriate uses.	
Sanitation (and groundwater protection)	Participatory sanitation survey including: Construction of appropriate dry latrines	

BUDGET ITEMS	DESCRIPTION OF EXPENDITURES/BUDGET NOTES	TOTAL (US$)
	Latrine demonstrations (eco-sanitation) Local campaign development for advocacy purposes Community activities, communications and awareness raising	
Sub-total		90,000
Contractual Services		
Groundwater survey	Contractor team, logistics, travel, DSA, reporting costs	
Sanitation survey support	To work with the communities to assess sanitation behaviour and needs	
Advocacy and communication support	To support communities in understanding the project interventions, document climate change impacts, water shortages, gather information from the community as anecdotal baselines, work with neighbouring communities to generate interest	
Sub-total		48,000
Total		198,000

SOLOMON ISLANDS WATER SECTOR ADAPTATION PROJECT (SIWSAP)

WATER SECTOR-CLIMATE CHANGE ADAPTATION RESPONSE (WS-CCAR)

Santa Catalina, Makira Province

October 2013

PROJECT BACKGROUND, OBJECTIVES, ACTIVITIES AND OUTPUTS

Situations change, project supporter's move on, projects get delayed in starting. Based on experience, it is recommended that the design of this project is reviewed by the PMU prior to any implementation at the proposed site(s). The project needs to be presented and discussed with local stakeholders during the establishment of the Pilot Project Committee in the Inception Phase of SIWSAP. Expectations, confusions, further information and explanation can then be provided at project start – and the design of the project adjusted to fit new realities at the site in order to ensure project interventions are clear and understood by all – and stakeholder support is provided throughout implementation.

Project Context and Background

Makira/Ulawa Province comprises seven islands including; San Cristabol (or Makira), Ulawa which is located approximately 65 kilometres from Makira, the "Three Sisters Islands", Ugi, Pio, Santa Ana and Santa Catalina (Fig 6). The land mass of the province is 3,230 km2. Santa Catalina is 3 km south of Santa Ana Island, and 80 km from Kirakira. It was located on the eastern end of Santa Cristobal Island. The Island is a raised coral reef about 3.2 km long and 2 km wide (6 sq km). The Island has good volcanic soils although they are vulnerable to coastal erosion. The population at Santa Catalina is 1,400 people. Economic activities of the people is mainly copra, cocoa and fish. Natural timber extraction has been mainly carried out by Asian loggers and the people have benefitted little from their timber resources.

Figure 1: Location map of Makira / Ulawa province – Santa Catalina island is east of the main island.

Makira is one of the most disaster prone provinces in the country. It is located on the hub of the active cyclone path between the eastern and southern regions exposing it to cyclones that form in these regions. During past years, the Makira/Ulawa province has been affected by a total of 15 cyclones and recorded a total of 56 potentially damaging earthquakes. The experience from people now is that rainfall is more frequent and can last longer period than before.

Water Supply and Sanitation

Santa Catalina is an island therefore there is no river or streams; however there is adequate underground water supplies on the Island. However, due sea level rise some of the water sources are infiltrated with saltwater by king tides. The communities rely on water from wells and tanks. The island is very much dependent on rain water harvesting for drinking water supplies.

Open defecation is commonplace on the island. According to information gathered from the Rural Water Supply and Sanitation, the community had been issued with sanitation block with 2 cistern unit. However, there is no running water for the sanitation use and thus it causes more problem than solving the problem.

Impacts of climate change

Prevailing water resources and systems identified at nearby villages are: *Water sheds / catchments, Groundwater and Rainwater*. These water resources and systems are vulnerable to a number of climate change threats. Hence, the need to respond and intervene with improvements on existing adaptive measures practiced by the people, as well as, providing best alternative water supply for the people.

The table below shows a detailed analysis of current exposure and sensitivity to climate shocks and stresses while the following text summarises how these impacts interact with the individual adaptive capacities to determine the vulnerability of the different water resources and systems. The water shed or catchment of Santa Catalina island is highly vulnerable to sea level rise and storm surge; inevitably giving rise to catastrophic submersion of the islands. Coastal erosion is evidenced throughout the island, which renders the catchment very highly vulnerable. Over time, these climate change threats will definitely reduce the total land area of the water sheds or catchments as well as increasing contamination of these catchments. The catchments are also drought sensitive, and are very highly vulnerable particularly during the El Nino event, when the ocean surface waters are warmer than normal and the equatorial divergence is located well to the east of the Pacific. Further, increase temperature will increase surface evaporation leading to increase stress on these catchments. Thus, the catchments are being rated very highly vulnerable also to increase temperature.

These climate change threats will negatively affect the underground water quality and renders it to be unfit for human use. Because the water table is low (1m – 2.0m deep), the ground water is expected to dry up during extreme drought events, thus the vulnerability to this threat is rated high. The prevailing geological characteristics of the island as raised coral atolls renders the ground water vulnerable to extreme drought. The adaptive capacity to these impacts is generally low also because of the influence of some non-climate change issues affecting water resources. Proper sanitation is critical to maintain quality of underground water. Thus, there is need for designing an ideally sanitation facilities for all sites. A part from saline intrusion, the quality of underground water may be potentially at risk of contamination by unmanaged solid waste disposal. Supply of rainwater is largely dependent upon rainfall. Equally important is the ability to capture or harvest the rainwater during rainfall. Observation on rainfall on the east end of the main island of Makira for past 7 years varies significantly but shows a rising trend. Since rainfall is influenced by several events including the El Nino-Southern Oscillation, the vulnerability assessment is based on occurrences of two phases of ENSO, namely La Nina and El Nino. Hence, rainwater is expected to be in short supply during the El Nino event but is envisaged to be in abundance during the La Nina event. In both scenarios, rainwater is vulnerable particularly during the El Nino phase of ENSO.

Detailed Analysis of Current Exposure and Sensitivity to Climate Shocks and Stresses for Santa Catalina, Makira Province

Water source and system	Threat	Exposure	Sensitivity	Impact Level (expert assessment of exposure & sensitivity)	Impact Summary (what are the impacts)	Adaptive Capacity (consultation / expert assessment)	Vulnerability (risk x adaptive capacity)
Water sheds / catchments	Localized flooding/pooling	Low	Low	Low	Pooling occurs only on certain areas depending on prevailing geological features.	High	Low
	Storm surge/coastal flooding/saline intrusion	Very High	High	Very High	The whole island is affected	Low	Very High
	Extreme drought	Very High	Very High	Very High	Potential drying of catchment	Low	Very High
	Increased temperature (~2^{o}C) / evaporation	Very High	Very High	Very High	Increase surface evaporation	Medium	Very High
	Coastal erosion	Very High	Very High	Very High	Reduction in size of island	Low	Very High
Groundwater	Localised flooding/pooling	Medium	Medium	Medium	Depending on prevailing geological features.	Low	Medium
	Storm surge/coastal flooding/saline intrusion	High	High	High	Infiltration into groundwater systems	Low	High
	Extreme drought	High	High	High	Lowering water table	Low	High
	Increased temperature (~2oC) / evaporation	Low	Medium	Medium	Potential lowering of water table.	Low	Medium
	Coastal erosion	High	Medium	High	Reduced size and volume of groundwater	Medium	High
Rainwater	La Nina	Low	Low	Low	Increase rainfall	Low	Medium
	El Nino	High	High	High	Decrease rainfall	Low	High

The vulnerability assessment confirms that the water resources and systems in Santa Catalina are vulnerable to climate change threats. Reducing vulnerability of water systems for the township using the IWRM concept of "ridge to reef" under future climate change scenarios involves both demand and supply levels of water management. The IWRM approach involves catchment conservation/protection and water safety (for pristine and purity aspects of water resources), demand management (leakages reduction), water use efficiency (wise use) of supply systems and consumers behaviour. The "business as usual" or BAU aspects often results in poor water management practises which will result to increased vulnerability of water systems under future climate change scenarios; IWRM ideally covers the "whole of water systems" approach and not forgetting waste disposal from sanitation facilities. Thus, the need to build the capacity of the township and the village to adapt to climate change impacts is warranted. The following recommendations are made:-

- That the provincial government must have a proactive response programme to address the impacts of climate change on water resources and systems assets in Santa Catalina island.

- That the provincial government must have a waste management plan, and ensure to safeguard its water catchment and underground water resources and system.

- That villagers must be willing and committed to participate and take ownership of the adaptive interventions from the project.

Institutional and policy context and current policies

Existing projects or activities relevant to the project at the local site

The Santa Catalina community has had various donors or NGOs including the government giving support with their water. The appearances of the different types of tanks indicate the activities at different times by many different donors. Some are still functioning, whilst others are no longer working.

- The Ferro-cement tanks: A big ferro-cement tank was situated in the middle of the community. This was provided by the Government in the 1970's when all communities having problem with water were given ferro-cement tanks.

  The problem with the Santa Catalina ferro-cement tank was that it was leaking due to the white sand beach on the sea shore being used for the mixture. Second, the wire netting which was used is now exposed as it rusted and has become a health hazard. Third, the roofing iron house built over the tank was so rusty and the house was broken down. The ferro-cement tank is no longer being used

- The fibre-glass round tanks designed as a drop of water were distributed by the Ministry of Health in the 1980's after the destruction casued by cyclone Namu in 1986. In response to the devastating effect the cyclone had on the island the government has distributed the tanks. Some of the fibre-glass tanks are still being used.

- The Fibre-glass 600 gallon tanks were donated by Sandra a French university student researcher gave a tank each to the 8 zones on the island. Those tanks are still being in use by the different zones.

- The stand pipe taps were prepared by ADRA through a former Provincial Member. The system was to have a central tank that would be distributed to the other pipes. Some of the stand pipes have been made. A generator was pumping water into the tank for distribution.

  The system was working for a week, when the fuel ran out and could not get fuel for about three weeks due to shipping and financial difficulties. Upon hearing that, a provincial worker took the generator and gave it to a different community somewhere in the province. That was the end of the system.

  Later on, during the next election, the provincial member who negotiated the system lost the election, so his supporters broke the system and is now no longer usable.

- The wind mill system was a donation arranged through a Canadian funding agency. A tank was already built on the hill close to the natural cave water. From the tank, water will be distributed to the village below.

  All the iron for the tower was shipped and the nuts and bolts were tightened together. Some of the pieces of iron put in a copra bag could only be carried by three strong men. One piece could not be carried to the site so was left on the sea side. After the windmill tower was built without any engineer supervision or facilitator supervision, the men could not go to the site after analyzing their strength compared to the weight of the 30 metre tower. They could not lift it, and over the years, a piece was removed bit by bit to be used for the cooking pots to sit on, and to use as anchors for their canoes. The bolts were used for "struck line" one of these deep sea fishing techniques.

- The Rotomould tanks were provided by the Rural Development Project, a tank was donated each for the zones. They were centrally located in the zones with small roofing iron houses for the households.

- The Aluminum tanks were donated by Provincial Government Strengthening (PGSP) for each zone. They were also centrally located in the zones with own roofing iron specifically for the tanks.

Relevant Project Stakeholders

Relevant stakeholders who are operating in Makira Ulawa Province are:

- World Vision is involved in the literacy training and the training Village Volunteer Nurses who have really helped the only nurse managing the whole of Santa Catalina

- Rural Development Project: The RDP has donated tanks to Santa Catalina and would be a good project to work with since it is a national programme

- ADRA: Helped in establishing a system, although it is not active moment. However the SDA is establishing church building there, so there would be an active participation health and development in future and ADRA could be utilized there.

Current water supply management practices and weaknesses

There is a natural water source located towards the western end of the islands, approximately 1.2 km from the centre of the village. The water level is about 2 metres from ground level. The water depth is approximately 1.5 metre depth. The natural water sources had been installed water supply system using a pumping station with a 63 mm PE pipe to a storage tank of 8000 gallon Ferro cement located at elevation of approximately 13 m. The water was distributed under gravitational through a GI pipe and was distributed through stand pipe. The information gathered during the site visit was that natural water source was affected by tides. The water quality test done during the site visit at the source shows that the water is brackish with salinity level of 480.5 ppm, according to information obtained from Rural Water Supply and Sanitation is that the source had been proposed for rehabilitation the old water reticulation system and proposed use of solar pumping system. The proposed system is to use standpipes at 8 zones on the island. However, the community are requesting a more sustainable option. The use of fuel is not sustainable and that use of renewable sources of energy would be the best possible option.

Currently the island had been very much dependent of rain harvesting for their drinking water. The community 'zones' had been given water tanks for each zone. During the site visits, each zone had 3 tanks. However, there is very limited number of houses that have roofing iron. The only houses that have roofing iron are schools, clinics, staff houses, Seventh Day Adventist Church and the tank sheds. The sizes of roof for tank houses for roof catchment areas is less than 10 m2with dimension size of average of 3.0 m x 2.5 m.

The capacity of the Rotomould tanks supplied by the Rural Development Program [RDP] is 5000 litres. With roof catchment of only 7.5 m2 and rainfall intensity of 10 mm / hr, the tank will requires about 2.8 days of continuous rainfall to fill the tank. Because of scarcity of water for drinking, community have developed rules to control use of water from tanks to avoid wastage.

During the consultation meeting with the community, the distribution of tanks was based on zones and not with the population. Therefore according to members of zone 8, their tank will only last one day, while member of zone 5 says that their tank will takes six weeks. The tanks of 800 gallons and with the population of approximately 84 in Zone 5 and 427 in Zone 8, the daily water consumption for each zone from the tank is about 1 litre per day per person and 4 litres per day per person respectively.

The site visit also found that there were four [4] 5000 galloon ferro – cement rainwater tank constructed in the early 1990's. Anyhow the tanks were no longer used as their roof catchment is nonexistence and the tanks have cracks on the site walling. Three [3] 1000 galloon aluminium tanks were also provided by RWSS purposely for the school. However, the school buildings are still without guttering and downpipes.

In 2007, six aluminium tanks were provided and installed with several roofing iron sheets on the island. Early 2013, eight [8] 5000 litres rotomould tanks were supplied to the villages. During the site visit three tanks are yet to be installed.

The clinic also has tanks but according to the community that the nurse imposes strict control on the water as it was purposely for clinic use. The clinic is now upgraded to Rural Health Centre; therefore it will require more water to provide the necessary services to the community.

Hand Dug Well

There were eighteen hand dug wells on the island with one natural well. The wells were purposely for washing and bathing. The wells were not protected and were exposed to roaming animals especially pigs and chicken within the community and some gravel sites. Some of the wells were fairly recently constructed. The wells are constructed without

culverts. However, during the community consultation they expressed a bad experience about using the culvert. Listening to the experience they were not properly advised on however to install a culverts on the wells.

The water in the eighteen wells was tested for chemical properties such salinity, total dissolved solids, conductivity and resistivity. The tests were specifically to test for the presence of saltwater in the water table and excessive extract of water may cause saltwater intrusion.

Results indicate that the water table had been affected by saltwater. It is clear that the coastline is clearly affecting water quality in the shallow wells, through salinization. The concentration is high on the well along the coastline and it decrease as the well location went inside the area. The contour shows that hand dug well is likely to be affected by sea level rise and not over pumping or extract of water. According to information received during the site visit, Zone five [5] area which include SW 8 were normally affected by king tides and sea level rise. It is also likely that the hand dug well SW 10 is likely to be affected by sea level rise. With the high rainfall normally experienced in Santa Catalina, it is likely that the well water and salinity level is likely to be diluted.

It is very likely that during dry season people will resort back well water for drinking despite the fact that the quality of water is not good for consumption. The water quality for natural wells is showing the salinity level is within the range of 400 – 500 ppm, which is in the acceptable range for consumption

The people in the community had been using the traditional ocean disposal for their sanitation. According to information gathered from the Rural Water Supply and Sanitation, the community had been issued with sanitation block with 2 cistern unit. However, there is no running water for the sanitation use and thus it causes more problem than solving the problem. Three [3] households have their privately owned pour flush sanitation unit. However, traditional system of walking for about five hundred [500] metre to going to the beach is better than using a sanitation system without a running water.

The design option approach taken for the Santa Catalina is to increase their storage capacity and sustain it for an acceptable period. If the climate variation or El Nino had caused no rainfall again, the strategy is the impact is likely to be reduced and acceptable situation. The following options were considered for Santa Catalina:

- Redevelopment of the natural water sources
- Increase storage and roof catchment capacity
- Rehabilitation of the existing well using culvert and concrete slab to properly secure from waste from roaming animals and provide a proper hand pump system.
- The proposed is to redevelop the natural water well using some existing and new infrastructure (possibly solar pumping system) to provide a small reticulation system for the purpose of washing and bathing.
- This will also provide options in controlling the use of water in the tanks.
- The existing hand dug well is likely to be contaminated by roaming animals like pigs and chicken etc. The hand dug well needs to be rehabilitated or new site be identified and well developed using culvert to avoid contamination from various animals.

The proposed rain harvesting needs some serious consideration as there is very limited house with roofing iron. Therefore, with an increase rainfall currently experienced in the country, there will be adequate water available but the community will need some serious roof catchment to capture the rainfall and adequate storage tanks. Therefore, the pilot project should also include a roof catchment to store adequate additional water.

Water Reticulation System

The proposed water reticulation system is suggested using the natural water source. The source had been used for water reticulation system. The water is being pumped to a storage tank through a 63 GI pipe for about 230 m with a total head of about 33 metres using solar pumping system with 8 panels of 85 watts for 48 volts DC output submersible pump or 6 panels of 125 watts for 36 volts DC output submersible pump. The pumped water is than distributed to the other storage tanks that also provide an additional storage capacity. The water will then be distributed to the stand pipe at each of zones. The number of stand pipes will varies depending on the population of each zone.

The water quality test done on the water sources of 1015.0 µS conductivity, 486.5 ppm TDS and 480.5 ppm salinity suggested that there is present of saltwater on the natural water sources. The increase number of pumping rate makes cause saltwater intrusion and is likely to increase the level of saltwater in the system.

Rainwater Harvesting

There is great potential to increase the storage capacity for rainwater harvesting for the community. Anyhow there is a need to add additional roof catchment. The proposed rain harvesting needs some serious consideration as there is very limited house with roofing iron. Therefore, with an increase rainfall currently experienced in the country, there will be adequate water available but the community will need some serious roof catchment to capture the rainfall and adequate storage tanks. Therefore, the proposed should also include a roof catchment needs to be addressed in order to counter climate change and climate variation.

Hand Dug Well

The existing hand dug well had been the main source of water for washing and bathing. However as stated above the hand dug well is exposed to contamination from roaming animals and children. The proposed intervention is to provide concrete culvert, with hand pump and filled bottom end and side of the concrete culvert with stone and gravel materials.. The height of each well will depend on the position of ground water level. Therefore the amount of culvert will varies but should be only 2 culverts addition.

The site assessment highlighted that Santa Catalina is vulnerable to climate change and variation. The design options highlighted will only reduce the impact of climate change to their already stressed water problem. With the indication that rainfall trend is increasing will not provide any comfort as the capacity to storage water is limited.

The community's adaptation or resilience to the impact of climate change and variation is important. The proposed intervention is expected to provide additional comfort the community with the development of the identified natural well; rehabilitation of the existing hand dug wells; Maintenance of existing tanks and guttering and provision of additional storage tanks with roof catchment.

The awareness about the daily consumption rate and use of brackish well water for washing and bathing will significant help the community to conserve stored water for drinking and cooking.

Using of water for the existing sanitation will not be a problem. However, should the sanitation affects the ground water resources then the sanitation should be addressed as well. The provision of sanitation for Santa Catalina community will also improve their quality of life, but it is unlikely not change the people to use their traditional system.

Objectives

Capacity development strategy

(i) Community level

- Plumbing skills transfer- operation and maintenance sustainability
- Training Needs for workers, especially youths:
  - Understanding the whole piping system from the source to the house
  - Understanding the names and purpose of the tools and where they can be bought
  - Understanding the right sizes for what system
- The training should be done before, during and after the implementation of the project

(ii) Provincial Level

- The RWSS and the Works Division at the Provincial Headquarter should possess the skills needed for the implementation and sustainability of the project
- The timeframe and schedule for the donors to implement the project should be made available especially during the implementation for the community to be aware of its activities
- The RWSS should also put into its program to regularly check after the completion of the project the status of the water supply system for maintenance and its sustainability.
- The transportation for the project should be well secured for the project and should also take into account a calm weather for the offloading of materials.
- There should also be careful consideration of partnership with NGOs who will be implementing the project to ensure that which NGO implements the project should be qualified effective in implementation.
- There should be a guarantee period for the project after its completion that the NGO is responsible if certain serious problems are experienced. An amount of money should be withheld from the implementation allocation.

Knowledge Management

- Manual Water Pump: They used to pump water manually but the system broke down inside which could be attributed to the thin water lens, and as a result of pumping sand instead of water. Thus the system broke down. There was no training on how to repair the system or the dangers of using the system.
- Ferro-cement Tanks: due to poor mixture, some of the tanks were broken and then the roofing iron for collection of water was destroyed by the cyclone. Other Roofing iron was so rusty that the rainwater catchment capacity declined and also became unhealthy to use.
- Generator Pumping water from Source and into a water supply system that has a network into the village. Unfortunately, people do not have money to pay for fuel every day to sustain the cost. They stopped and someone from Kirakira took the generator away and gave it away.
- Windmill to pump water from the source into the water supply system network in the village. Unfortunately, after they have joined the windmill which about 20-30m long, it cannot be lifted. Some of the parts of the wind cannot be carried to the site because it is so heavy and were left at the seashore. The funding should include engineers, mechanics who should assist in setting the windmill and see it working before leaving. Such activities should not be left for people to implement. They are not engineers, and they have never seen such a technology. People do not have the capacity to install such a gigantic windmill. Maybe a solar pump should be installed and repair the water supply system.

- 1971 Disaster Tank: The round tank (600 gallon) supplied after the cyclone is still functioning proper. Thus people are preferring tanks to a water supply system since it is reliable. It is the number and size of tanks that should be considered in the project.
- Piping from the Source to the Village: The piping should be done with galvanized pipes in the bush, and with pvc pipes in the community. This is because, people make gardens and burn the rubbish before the planting. Thus, exposed pvc pipes are burnt.

Stakeholder involvement / Communications strategy

- Radio (SIBC)
- Video
- Whole of SC Community Meetings
- 8 zones meetings separately
- Chiefs and tribes
- Church leaders (SSEC, Anglican, SDA)
- School Program about water
- Community Committee (SCCC-Santa Catalina Coordinating Committee) with two members from each zone

Proposed Activities

Utilising the proposed project strategy of developing the Water Sector Climate Change Adaptation Response Plans to identify the adaptation needs for site water management, the following proposed activities will be reviewed and improved during the inception phase of the project. Climate change threats at the site include the challenge of dealing with sea level rise, and increased storminess, and extremes of precipitation and dry periods. This has affected the quality of the shallow groundwater which reduces in quality and quantity during dry periods, in part due to its nature as a raised coral atoll. The island is strongly affected by ENSO, with long dry periods during El Nino and intense rainfall during La Nina periods. The strategy for the site based on the PPG assessment is as follows.

Increase storage capacity to provide a reasonable supply of freshwater for all the population during dry periods through:

- **Re-development of the natural water sources**, including protecting the existing source and looking at other options to expand supply using a reticulated system of small bore pipe. However, this will not build reliance on pumping - in line with the new rural WASH policy, and also based on past experience of the communities with pumping and sourcing of fuel. According to the rural WASH policy the main choice of systems should be gravity fed, and excessive costs such as fuel for pumps are not sustainable options.
- **Rainwater harvesting** - there are rainwater tanks in abundance, but no way to connect them to existing roofs. The roofs themselves need rehabilitating, with the provision of guttering and training in maintaining clean safe water. During the PPG it became clear that there are not enough roofs suitable to collected adequate rainwater, often needing intense rain for many days to fill up the tanks. The project will develop strategic fibreglass or Rotamold storage tanks (not concrete - due to the frequency of earthquakes on Makira), which will be developed with their own roof catchment area, suitable to capture enough water. Correct sizing and distribution will take place under the development of the WSCCAR plans.
- Further rainwater harvesting tanks with their own roofs are also required for small household level supply – the current distribution is based on zones, and not on number of households. Consequently, some households only have storage for a

few days, others of a few weeks. The distribution of storage needs to be made more equitable.

- **Restoration of shallow hand dug wells** are used for bathing and washing, but during dry periods are used for drinking. Despite this the water quality is poor and saline, and is used by roaming village animals as well. These hand dug wells need protecting with correct simple technologies such as culvert and concrete slabs. They should be rehabilitated with hand pump systems to protect the water, and community rules established regarding their use to try and avoid them being used for drinking – provided alternative sources of safe freshwater can be provided.
- **A groundwater assessment** is required using the correct technical interventions to assist with the identification of a new safe freshwater source. The hydrogeology of raised atolls often results in safe clean water stores underground, but also a high propensity for mixing of fresh and saline water. As the island is in a frequent earthquake zone, and experiences regular cyclones it poses challenges with choosing permanent or semi-permanent solutions. If a source is located that can be sustainable developed the project will invest in this to help build resilience into the communities supply options.

Sanitation – is a challenge on Makira. The traditional practice of using the beach does need addressing, but there are limited options for communities with little interests in changing sanitation practices. It is also not clear if the use of the beach is affecting the water quality, when they rely on rainwater safely stored in tanks. To support and build adaptation into the UNICEF project 'Building Human Development: Improving WASH in the Solomon Islands' which will also support WASH interventions in Makira focussing on health clinics and schools. As with other sites, SIWSAP will provide additional support to try and improve sanitation provision and protect what freshwater resources do exist. The project will support UNICEF sanitation interventions through supporting the

1. Creation of a local hygiene campaign to alert people to the risks around common WASH disease, etc – working with UNICEF, MHMS-EHD and the relevant Health Promotion Unit from the main island.
2. Through consultation, and with UNICEF, selection of willing families to trial new latrines, funded by the project, as 'demonstrations' of households willing to 'try' latrines. This will include a series of monitoring activities with the families and communities involved where pros and cons of the latrines are openly discussed within the communities. The aim is to use these pioneering families and households (including government offices and small businesses) to be 'live' monitors for toilet use, who report back on a regular basis to the wider community and town on their perspectives regarding latrine use relative to open defecation on the beach/mangroves. This way, transparent perspectives are presented to the town and communities- and they can therefore make the choice about what they want to do for their 'sanitation future'. The actual design of the latrines will be developed during the WSCAAR planning process.

Table 1 – Summary of project strategies and activities for the implementation of the demonstration project and expected indicators, Santa Catalina, Makira

Project Components	Activities	"Outputs"/Impacts	Baseline Indicators	Target Indicators	Adaptation Relevance and Environmental Benefits
Stakeholder Communication and Consultation	- Community Based Early Warning System developed through consultation and training	- CBEWS guidelines - Community understanding increased - Reduced risk	- No early warning system exists	Risk of water shortages and water pollution reduced	
Re-development of natural water sources	- Protection of existing freshwater wells - Feasibility study of alternative gravity fed safe water sources	- A sustainable and protected source of freshwater supply	- 94% of the community without adequate roofing to do rainwater harvesting - 21% of tanks above 900 gallons - 79% of the community with tanks going empty more than 5 times per year - (Adult Female 25% and Child/Youth 53%)	100% of the community has access to water annually through improved domestic and community supply	Adds diversity to the water supplies available to communities
Rainwater harvesting expansion including strategic storage	- Conduct rainwater harvesting survey - Investment in rainwater harvesting materials and equipment for equitable distribution across the community - Review and improve building codes – integrate rural WASH policy requirements into building codes including sanitation - Develop large scale strategic rainwater storage for the communities - Rehabilitate existing	- To decrease burden on existing rainwater tanks and improve storage capacity at household and wider community level - More resilient well managed water supplies - Development fo operation and maintenance plans and community responsibility and	- 50% ratio between tanks and wells as sources of water - (Adult Female 25% and Child/Youth 53%)	100% of the community has adequate roofing Communities sustainably managing their rainwater tanks with agreed practices, repairs, O&M schedules, and a community fund established for maintenance	Diversity of water supply prevents watershed and groundwater degradation and build resilience to dry periods and droughts

	rainwater storage that is not functioning	roles plan			
Restoration of shallow hand dug wells	- Water quality testing of wells - Protection of shallow wells - Installation of handpumps - Rules of practice for water quality use established	- Protected source of water for bathing and washing (not for human consumption)	- 0% of wells operated at suitable pumping rate - (Adult Female 25% and Child/Youth 53%)	Shallow hand dug wells protected and only used for non-potable activities	Protects freshwater recharge areas and reserves as key supply areas Determine best mgmt regime to keep natural freshwater reserves clean Improves human health
Groundwater Assessment	- Detailed groundwater assessment using resistivity technology to determine sustainable sources of good quality groundwater for medium to longer term usage (without this the community are mainly reliant on rainwater only)	- Identification of a long term sustainable water source	- 100% of taps that are outside or are shared to address efficiency and health issues	1 long term sustainable and good quality water source identified	Adds diversity to the water supplies available to communities Protects freshwater recharge areas and reserves as key supply areas
Sanitation advocacy and trials	- Local hygiene campaign with UNICEF - Sanitation trials – construction of appropriate sanitation technology (eco-sanitation would be appropriate for Santa Catalina)	- Community health improves, less pollution	- 99% of community without some type of toilet facility (Adult Female 25% and Child/Youth 53%)	- 30% of the community (60% women and children) use sanitation interventions by end of project - An additional 30% of the community requesting toilets/sanitation interventions by year 3 of the project -	Protection of freshwater reserves (groundwater) from poor sanitation practices to improve the longevity and quality of water supply during dry periods and drought

CO-FUNDING

Possible co-financing sources were identified through the consultation:

- World Bank Rural Development Project:
- PGSP is another venue to be considered in provinces where they financing water supply for the duration of the SIWSAP project

BUDGET DETAILS

DETAILED BUDGET

BUDGET ITEMS	DESCRIPTION OF EXPENDITURES/BUDGET NOTES	TOTAL (US$)
Materials and Equipment		
RWH tanks (aluminium and rotamold)	For water storage	
Timber, roofing, guttering, building materials, aggregate,	To build strategic storage and additional household storage	
Labour costs	For construction, latrine construction and development	
Vehicle/boat hire	For transporting materials, logistical support, solid waste removal	
Sub-total		25,000
Field Surveys and Activities		
Rainwater Harvesting Survey and Large scale Strategic Storage developed	Of types, storage needs, equipment, location, water quality, tank capacities, roof sizing,	
Household RW tank provision (3,000lt tanks) and construction, roofing, guttering, set up of tanks with communities Rehabilitation of failing RWH approaches and equipment	At poorest households, and investment in wider community shared strategic storage. Rehabilitation of RWH harvesting materials Training in RWH construction and use	
Protection of existing Groundwater Wells and, Protection and Management Plan	To assess the viability of strategic freshwater reserves for the island during drought periods, and also for development of the smallest Province. Governance assessment of the water sources Development mgmt plan for strategic safe water supplies, following assessment of capacity and quality of resources. Water quality testing Installation of handpumps and well protection Develop mgmt plan to protect suitable resources, including funding options, involving the community and landowners.	
Source Protection, Rehabilitation and Expansion Options	Existing wells cleaned, protected, and rehabilitated (pumping tests, water quality checking and monitoring), installation of rain gauges and climate monitoring station to better assess recharge and rainfall. In collaboration with Government, assess options to rehabilitate the current gravity fed water system – feasibility study Invest in system rehabilitation (as necessary, jointly with Government) Consider other water sources (Hutuna) as a possible	

BUDGET ITEMS	DESCRIPTION OF EXPENDITURES/BUDGET NOTES	TOTAL (US$)
	alternative source – discuss with landowners, assess reliability, and discharge and quality of spring. Determine PES viability	
Groundwater survey/assessment	Detailed groundwater assessment to determine volume and quality of reserve, and define management regime to protect the water source and use it for the most quality driven appropriate uses.	
Sanitation (and groundwater protection)	Participatory sanitation survey including: Construction of appropriate dry latrines Latrine demonstrations (eco-sanitation) Local campaign development for advocacy purposes Community activities, communications and awareness raising	
Sub-total		75,000
Contractual Services		
Groundwater survey	Contractor team, logistics, travel, DSA, reporting costs	
Sanitation survey support	To work with the communities to assess sanitation behaviour and needs	
Advocacy and communication support	To support communities in understanding the project interventions, document climate change impacts, water shortages, gather information from the community as anecdotal baselines, work with neighbouring communities to generate interest	
Sub-total		15,000
Total		115,000

SOLOMON ISLANDS WATER SECTOR ADAPTATION PROJECT (SIWSAP)

WATER SECTOR-CLIMATE CHANGE ADAPTATION RESPONSE (WS-CCAR)

Manaoba Island, Malaita Province

October 2013

PROJECT BACKGROUND, OBJECTIVES, ACTIVITIES AND OUTPUTS

Situations change, project supporter's move on, projects get delayed in starting. Based on experience, it is recommended that the design of this project is reviewed by the PMU prior to any implementation at the proposed site(s). The project needs to be presented and discussed with local stakeholders during the establishment of the Pilot Project Committee in the Inception Phase of SIWSAP. Expectations, confusions, further information and explanation can then be provided at project start – and the design of the project adjusted to fit new realities at the site in order to ensure project interventions are clear and understood by all – and stakeholder support is provided throughout implementation.

Project Context and Background

Manaoba (also known as Elisabeth Island, Maana'oba, Manoba Island, Ngwalulu) is an island to the northwest of the northern tip of Malaita Islands. Manaoba Island has the population of 3000 [2009 Census]. It is consists of several main villages namely; Ferafalu; Hatodea and Foumatoo; smaller villages are Maeloboa, Onearai, Kwailabu, Futuna and Haleta. Manaoba Island is a rising atoll island with the geology of mostly coral and limestone.

The project is focus mainly on the village of Ferafalu. Ferafalu is situated on the eastern side of the island facing the open sea. The population of the Ferafa'alu community is 213. Most of the people are engaged in subsistence farming and especially the fishing industry. However major portion of the population have moved to Honiara for employment and education. They (Manaoba Islanders) are fishermen and are well connected to the heavily populated mainland people who often provide a market for their catch. The entire island of Manaoba has a population of approximately 3,000 people. The village is vulnerable to coastal erosion. There is also an indication that the village had been affected by king tides or storm surges during high tides.

Water Supply and Sanitation

The village depends on hand dug and natural wells for water demand for washing and bathing. Rainwater harvesting was the main source for drinking water. There are 10 tanks in the community but capacity of these tanks is inadequate to support the community for a long period of time. The tanks then are only used for cooking, and drinking. Hence many people have to collect water from the caves or wash in the creek or swim in the sea.

The issue of sanitation can be seen in the number of houses people use. There are only two pour flush toilets. There are no flush toilets, no pit toilet, but of the 28 households, 26 (93%) of all the households use the bush or especially the sea. There are demarcated areas for males and females on the opposite end of the community.

Impacts of climate change

Prevailing water resources and systems identified at Ferafalu village, Manaoba Island are: *Water sheds / catchments, Groundwater and Rainwater*. These water resources and systems are vulnerable to a number of climate change threats. Hence, the need to respond and intervene with improvements on existing adaptive measures practiced by the people, as well as, providing best alternative water supply for the people.

The table below shows a detailed analysis of current exposure and sensitivity to climate shocks and stresses while the following text summarises how these impacts interact with

the individual adaptive capacities to determine the vulnerability of the different water resources and systems.

The impact of climate change and variation is easily noted in the quality of water resources at Manaoba Island. The water resources of Ferafalu village is highly vulnerable to coastal erosion, salinity intrusion and extreme drought. In Ferafalu village, the water shed or catchment is defined by the whole of Manoaba island, although assessment is concentrated on and within the boundary of the village. The village is located in the north of the island. Inland of the island are pockets of swamps, wetland and mixed planting dominated by coconut. Further inland is where people establish their food gardens on calcareous and rocky soils that appear to be severely deficient in plant nutrients. Coastal erosion is evidenced throughout the island, notably along the coastline of the village which renders the catchment very highly vulnerable. At the coast is white sand beach under severe erosion from storm surge and king tides, which was exacerbated by insufficient vegetation and coastal trees to buffer along the shoreline.

The underground water is highly vulnerable to salinity intrusion as a result of sea level rise, storm surge, and coastal flooding. In terms of underground water, porous coral atolls often have little or no groundwater compared to volcanic islands. Manoaba Island, although a raised coral reef island, it has prevailing underground water. A couple of natural wells are located near Ferafalu village, one of which people have been using it for drinking when rainwater from tanks are empty due to prolonged dry spell. This natural well (called *Faisafa* natural sinkhole), takes 25 minutes of walk from the village, is located at an altitude of 22 m above sea level. It was reported that this well is not being affected by dry season. Water quality testing conducted by the Water Division of the Ministry of Mines, Energy and Rural Electrification (MMERE) indicated that the water quality is within the WHO Drinking Water Guidelines. Two hand-dug wells are also available which were largely used by people for washing and bathing. These wells have been contaminated with sea water. Quality of water on these wells was not tested.

Both the water well and rain harvesting depend on rainfall for recharge. Rainwater which is collected mainly for drinking is largely dependent upon rainfall. This occurs during the wet period from June to December. However, rainwater can only be harvested and it requires proper storage facilities to capture and keep it away from contamination. Peoples' capacity to capture or harvest the rainwater during rainfall is low as evident from only a few water tanks have been installed in the village. Any climatic situation such as El Nino or drought or some kind of climatic oscillation of weather pattern such as a dry period due to climate variation and changes will have direct impact to the water resources. During the consultation meeting the members of the island community says that the longest dry period is 3 months of no rainfall in 1997.

The vulnerability assessment confirms that the water resources and systems in Ferafalu village are vulnerable to climate change threats. Reducing vulnerability of water systems for the township using the IWRM concept of "ridge to reef" under future climate change scenarios involves both demand and supply levels of water management. The IWRM approach involves catchment conservation/protection and water safety (for pristine and purity aspects of water resources), demand management (leakages reduction), water use efficiency (wise use) of supply systems and consumers behaviour. The "business as usual" or BAU aspects often results in poor water management practises which will result to increased vulnerability of water systems under future climate change scenarios; IWRM ideally covers the "whole of water systems" approach and not forgetting waste disposal from sanitation facilities. Thus, the need to build the capacity of the township and the village to adapt to climate change impacts is warranted.

Detailed Analysis of Current Exposure and Sensitivity to Climate Shocks and Stresses for Manaaoba, Malaita Province

Water source and system	Threat	Exposure	Sensitivity	Impact Level (expert assessment of exposure & sensitivity)	Impact Summary (what are the impacts)	Adaptive Capacity (consultation / expert assessment)	Vulnerability (risk x adaptive capacity)
Water sheds / catchments	Localized flooding/pooling	Low	Low	Low	Pooling occurs only on certain areas	Low	Medium
	Storm surge/coastal flooding/saline intrusion	Very High	Very High	Very High	The entire village is affected	Low	Very High
	Extreme drought	High	High	High	Potential drying of catchment	Low	High
	Increased temperature (~2^{o}C) / evaporation	Medium	Low	Medium	Increase surface evaporation	Low	Medium
	Coastal erosion	Very High	Very High	Very High	Reduction in size of village area and island as well	Low	Very High
Groundwater	Localised flooding/pooling	Low	Low	Low	Only in some areas	Low	Medium
	Storm surge/coastal flooding/saline intrusion	Very high	Very high	Very high	Infiltration into groundwater systems	Low	Very High
	Extreme drought	High	High	High	Lowering water table	Low	High
	Increased temperature (~2oC) / evaporation	Low	Medium	Medium	Potential lowering of water table.	Low	Medium
	Coastal erosion	High	Medium	High	Reduced size and volume of groundwater	Medium	High
Rainwater	La Nina	High	High	High	Increase rainfall	Low	High
	El Nino	High	High	High	Decrease rainfall	Low	High

The following recommendations are made:-

- That the provincial government must have a proactive response programme to address the impacts of climate change on water resources and systems assets for these Ferafalu and Ta'arutona villages as baseline for the upcoming project.

- That the provincial government must have a land-use plan including a waste management plan to safeguard its water catchment and underground water resources. Additional assistance from the project will build upon this plan during implementation.

- That the Provincial government and nearby villages be willing and committed to participate and take ownership of the adaptive interventions from the project. This is crucial for long term sustainability of water resources and supply systems, not forgetting capacity building for provincial staff, community members and the general public who use water.

Existing projects or activities relevant to the project at the local site

The community has had various donors or NGOs including the government giving support with their water. The appearances of the different types of tanks indicate the activity at a different time by a different donor. Some are still functioning, whilst others are no longer working.

- The Fibre-glass tank: About two fiberglass tanks were available at the community, but were pretty old. Their capacity is only about 600 gallons. The Rotomould tanks were distributed by the EU and Red Cross, and one was provided by the RDP for the kindergarten school. The Aluminum tank was donated by NZAID for the community. There were also private tanks which those working in Honiara were able to afford and purchased for themselves.

Relevant stakeholders to the project at the local site

Rural Development Project (RDP): The RDP is a potential programme which SIWSAP could develop further partnerships at the site. At Manaoba Island, RDP has helped develop a Kindy School and will also be assisting another village on the island.

Participation

In order to develop the capacity of communities and officers who will be involved in the SIWSAP project, a serious consideration of everyone involved has to be taken into account.

Capacity development involves strengthening the community, the provincial officer and the officers of the line ministry and the Project Management Unit. The following areas will have to be considered to effective prepare, implement, complete and sustainably manage the project

Water Supply System Manual – Material Development during the Course of Project Interventions

A manual that will be prepared is the water supply system manual. This refers to whether it is just a tank or pumping system or whatever system. People must have the system drawn for all of them for filing and reference when there is a problem.

- **Engineering design –** The engineering design for the project or the water system must be made available to the community. The community

has the right to see what will stay in the community. Provision of labour is not enough. People must know what is going into the community.

- **From the source to the Tap**: The community people must know the design for the natural cave water and to pump water to the tap. They must know the what type of pipe is used (galvanized or pvc), at what point is there a change from Galvanized to PVC. They must know the sizes and where sizes do differ along the pipes.
- **Tools names and purposes**: The people must know the different names of the tools that would be needed from the Source to the tap. The purposes of the tools and the sizes of the tools must be made available for the people in the community to see it, touch it and use it. The training must be done for both youths males and females and community leaders. In the village due to high mobility, it is better that many people undergo the training to have people that do backstopping. It should be part of the procurement that tools for sustainability be purchased for communities to own

Technological Manual (Technical Capacity Development)

This refers to the technologies which may be used in the water system either to pump or other areas in the water project. The community will need training in any new technologies introduced.

Community Saving Scheme Manual (Financial Capacity Development)

The financial capacity of the community is important. It is from this capacity that a lot of maintenance and sustainability will be implemented. The technical knowledge is one thing, but if there is lack of finance to purchase much needed spare parts or materials, then it will not be done.

World Vision has been involved in a Saving Scheme where people on an appointed time in a month, save an agreed amount of money and keep it in one place with three different locks by three different persons. The system has been successful in other parts and would be an activity that should be outsourced to World Vision. In Small Malaita an amount of about $300,000.00 was saved and at Tuwo, an estimated amount of $17,000.00 was saved. The maintenance can come in from the percentage for social activities which is about 10%. Psychologically, the savings is not a water bill, or maintenance fee or a monthly charge instead it is seen as savings, something which everyone would like to do.

The scheme is also accompanied by economic development activities.

Community Strengthening Facilitation (Human Resources Capacity Development)

There are many areas that needs facilitation of the community members to manage the project and take ownership of the project

- **Policy and Policing**
  The community must be assisted to draw up their own policy regarding the water system on the allocation of tanks, or taps or pipes or wells. After this, they must design or draw upon own policies owned by the community to look after the water system, to use it wisely, and to safeguard from abuse. At Tuwo, it was the youths who police the Marine Protected Areas. Youths and community leaders can draw the policy and put on the responsibility of management and policing by the youths as part of leadership development and empowerment.

- **From Land ownership to Project Ownership**
  The land owner of the places where the source of water is situated tends to have power over the source and the whole system. There has to be consultation that should result in the change of the mind in accordance with

the statement of the Water and Sanitation that water is a gift from God and that we as landowners are the stewards. The project should be owned by the community and the landowners for the sake of the community

- **Planning: from preparation to post-completion stage**
  Right at the beginning of the project, people must be helped to see the end result not as the end, but as the beginning of a new era. The new era is the era of usage and maintenance and sustainability. If the people look with that perspective, they will see the project responsibly. If they merely look at the completion stage, then they will forget the weight of cost to maintain.

- **From Development Expenditure to Recurrent Expenditure**
  Thus, people must change their mind from have a capital expenditure that is in the capital budget to a project which will be turned into a recurrent budget. The moment the project is handed over, that is the moment it enters the recurrent budget. The community must know that before -hand.

- **Financing: From donor to the User**
  Then the donor after completion passes on the cost to the consumer or the user. It may not be regarded as user pay, but consumers must be responsible for the recurrent cost. The money can come out from the saving scheme under the percentage for the social expenditure, or people will collect money on a monthly basis, or people charge fees. People must realize that GEF will not be drinking the water but the people of the community

Institutional Linkage (Institutional Capacity Development)

The institutional linkage needs to be recognized and strengthened to ensure that information, advice and communication flow from the community to the board or from the board to the community. This is important because capacity development in the communities will need strengthening to provide a backup for all the water systems in the country.

Thus the communication flow from Community to the Provincial Officer, and from the Provincial officer to the Project Management Unit and from the PMU to the Board and other levels in the structure has to be efficient and responsive to the call.

A lot of projects simply fail because there is no response to the need expressed by the community. When there is no response, or slow response to the requests by communities, that is the first step to the failure of the project even if it was successfully completed.

Proposed Activities

The PPG focused on the pilot site selected during the Inception workshop at Ferafula village. This village has a population of just 235 people in 26 households (approximately 65% are children and youths, and 18% women), but the entire islands of Maanaoba has a population of around 3,000 people. The island has a similar geology to the previous site Santa Catalina, as a raised coral atoll. Consequently the adaptation challenges are similar in terms of adequate rainwater storage, very little surface water availability apart from some hand dug wells close to the coastline which are saline, and only used for batching and washing. The village of Ferafula also suffers from heavy coastal erosion due to storms and frequent cyclone damage during the season. Sanitation practices are open defecation on the beach. Two pour flush latrines do exist and one pit latrine. Utilising the proposed project strategy of developing the Water Sector Climate Change Adaptation Response Plans to identify the adaptation needs for site water management, the following proposed activities will be reviewed and improved during the inception phase of the project, and then

implemented. Five main areas are to be considered under this pilot project. During full implementation of the project the WSCAAR Plan will be developed not just for Ferafula, but also for the entire island of Maanaoba..

Interventions at Ferafula would therefore be limited to:

- **Development of the natural spring (Faisafa)**, including assessing the yield and water quality of the spring/sink hole, and securing access with landowners to use the source for the village. The source would then need to be developed for use using small bore pipe, with the aim of gravity supply. According to the rural WASH policy the main choice of systems should be gravity fed, and excessive costs such as fuel for pumps are not sustainable options.
- **Rainwater harvesting restoration and development**- there is sensible use of rainwater tanks in the village. The project will restore the sensible gravity fed rainwater harvesting system that needs restoring and technical upgrading to provide easier free flow abundance. It is also recommended that given the small population, rainwater tanks are equitable provided including strategic storage tanks, with their own roof catchments. Correct sizing of roof equipment and other materials and distribution will take place under the development of the WSCCAR plans. The school roofing should also be assessed for capturing water and tanks fitted as freshwater storage for the school.
- **Restoration of shallow hand dug wells** are used for bathing and washing. Despite this the water quality is poor and saline, and is used by roaming village animals as well. These hand dug wells need protecting with correct simple technologies such as culvert and concrete slabs. They should be rehabilitated with hand pump systems to protect the water, and community rules established regarding their use to try and avoid them being used for drinking.
- **A groundwater assessment** is required for the entire island of Manaoba using the correct technical interventions to assist with the identification of a new safe freshwater source. The size of the island, and the WSCAAR planning process will be useful to better understand how climate change is affecting the entire island system. From this a better understanding of the need to protect the watershed and natural wells/sink holes are key water resources for the island can be better understood. A hydrogeological survey would be required for the entire island, but if the sink holes are a valid resource, some form of protection zone and fund would need to be established

Sanitation – The traditional sanitation practice of using the beach will be addressed. As with other sites, SIWSAP will provide additional support to try and improve sanitation provision and protect what freshwater resources do exist. The project will support sanitation interventions through supporting the:

1. Creation of a local hygiene campaign to alert people to the risks around common WASH disease, etc – working with UNICEF, MHMS-EHD and the relevant Health Promotion Unit from the main island.
2. Through consultation, and with selection of willing families to trial new latrines, including eco-sanitation or dry composting toilets funded by the project, as ‘demonstrations’ of households willing to ‘try’ latrines. This will include a series of monitoring activities with the families and communities involved where pros and cons of the latrines are openly discussed within the communities. The aim is to use these pioneering families and households (including government offices and small businesses) to be ‘live’ monitors for toilet use, who report back on a regular basis to the wider community and town on their perspectives regarding latrine use relative to open defecation on the beach/mangroves. This way, transparent perspectives are presented to the town and communities- and they

can therefore make the choice about what they want to do for their 'sanitation future'. The actual design of the latrines will be developed during the WSCAAR planning process.

3. Given the small scale of Ferafula, the main village where the pilot work will be developed, it is also recommended that the sanitation campaign is targeted at the entire island of Manaoba of 3,000 people, using interventions at Ferafula and other sites to mobilise behaviour change for the entire island.

Table 1 – Summary of project strategies and activities for the implementation of the demonstration project and expected indicators, Manaoba, Malaita

Project Components	Activities	"Outputs"/Impacts	Baseline Indicators	Target Indicators	Adaptation Relevance and Environmental Benefits
Stakeholder Communication and Consultation	- Community Based Early Warning System developed through consultation and training	- CBEWS guidelines - Community understanding increased - Reduced risk	- No early warning system exists	Risk of water shortages and water pollution reduced	
Strategic Rainwater Harvesting restoration and Development	- Restoration of gravity rainwater harvesting scheme with technical upgrade and O&M plan and fund established - Installation of RWH tanks at the school for strategic storage	To enable semi-permanent and temporary houses to use their roofing to do rainwater harvesting. To make capacity to supply water for daily subsistence adequate and use of large non-residential buildings To improve capacity to withstand water shortages	- 45% of the community without adequate roofing to do rainwater harvesting - 0% of tanks above 900 gallons - 90% of the community with tanks going empty more than 5 times per year - (Female 15% and Youth/Children 72%)	Existing RWH scheme rehabilitated and supplying safe water 100% rehabilitated A % increase in strategic safe water supply for the entire island School has access to reliable safe water supply year round. Each household at Ferafula village has RW tank storage available	Diversity of water supply prevents watershed and groundwater degradation and build resilience to dry periods and droughts
Development of natural spring (Faisafa)	- Water quality and yield survey of the spring - Secure land access and use of the spring - Develop the source if viable as gravity fed alternative supply to the village – and other villages where technically and socially feasible - Establishment of a payment protection scheme (such as	To decrease burden on those who cannot afford tanks and have no access to wells Guidelines, community fund	- 38% of community using natural caves, creeks or other supply as their source of water - (Female 15% and Youth/Children 72%)	60% increase in access to safe water supplies by end of project	Adds diversity to the water supplies available to communities – in this case entire island

	PES)				
Restoration of shallow hand dug wells	- Restoration and capping of shallow groundwater wells - Installation of handpumps on the wells to try and preserve what quality water there is and reduce contamination - Development of guidelines/protocol to maintain handpumps, and use of water (quality dependent)	To decrease dependency on rainwater harvesting and stress on current tank capacity Guidelines, manuals, community fund	- 20% ratio between wells and tanks as sources of water - 0% of wells operated at suitable pumping rate - (Female 15% and Youth/Children 72%)	100% of shallow wells used only for bathing and washing 100% wells are covered and handpumps working, with O&M manuals and asset cost fund established	Protects freshwater recharge areas and reserves as key supply areas Determine best mgmt regime to keep natural freshwater reserves clean Improves human health
Groundwater Assessment	- Groundwater assessment for the island on Manaoba – to assess the resilience of the island to climate change situations – sea level rise being one challenge for karst limestone - Identify areas to protect as recharge areas for freshwater - Work with community to establish protection zones - Develop guidance and training workshops for GW protection	Identification of safe water supplies for the future, and therefore areas on the island requiring protection to preserve water supplies	- No technical understanding or measurement of groundwater resources of the island exists - No surveys or data exist	Strategic freshwater reserves % increased (reliant on outcome of GW assessment)	Adds diversity to the water supplies available to communities Protects freshwater recharge areas and reserves as key supply areas
Sanitation	- Create local hygiene campaign, for the island of Manaoba, not just the village of Ferafula level - Trial new technically appropriate latrines – eco-sanitation (not so easy on karst) and other latrine approaches will be developed	To increase control and management and reduce careless use of water To prevent the unhealthy practice of people using the bush or seaside for latrines.	- 100% of taps that are outside or are shared to address efficiency and health issues - - 93% of community without some type of toilet facility - (Female 29% and Youth/Children 38%)	100% increase in access to safe sanitation for Ferafula village 100% increase in access to safe sanitation for Manaoba island	Protection of freshwater reserves (groundwater) from poor sanitation practices to improve the longevity and quality of water supply during dry periods and drought

CO-FUNDING

Possible co-financing sources were identified through the consultation:

- Rural Development Project: Through combining effort in areas like Manaoba and Ta'arutona, a co-funding source could be reached
- PGSP is another venue to be considered in provinces where they financing water supply for the duration of the SIWSAP project
- OceansWatch: Is engaged in environmental conservation as well as economic activities, solar power and water in the Reef Islands

BUDGET DETAILS

DETAILED BUDGET

BUDGET ITEMS	DESCRIPTION OF EXPENDITURES/BUDGET NOTES	TOTAL (US$)
Materials and Equipment		
RWH tanks (aluminium and rotamold)	For water storage	
Timber, roofing, guttering, building materials, aggregate,	To build strategic storage and additional household storage	
Labour costs	For construction, latrine construction and development	
Vehicle/boat hire	For transporting materials, logistical support, solid waste removal	
Sub-total		32,000
Field Surveys and Activities		
Rainwater Harvesting Survey and Strategic Storage developed	Of types, storage needs, equipment, location, water quality, tank capacities, roof sizing, Expansion of School RW storage	
Restoration of gravity RWH scheme – technical upgrade	Provision of new tanks, roofing, guttering, piping, construction work, logistics, labour, training	
Household RW tank provision (3,000lt tanks) and construction, roofing, guttering, set up of tanks with communities Rehabilitation of failing RWH approaches and equipment	At poorest households, and investment in wider community shared strategic storage. Rehabilitation of RWH harvesting materials Training in RWH construction and use	
Restoration of existing Groundwater Wells and, Protection and Management Plan	Development mgmt plan for strategic safe water supplies, following assessment of capacity and quality of resources. Water quality testing Installation of handpumps and well protection, and guidelines in use Develop mgmt plan to protect suitable resources, including funding options, involving the community and landowners.	
Source Protection, Rehabilitation and Expansion Options	Development of natural spring Survey of site, protection of spring source, pipe connections for gravity fed scheme to Feraful and other communities if feasible Establishing a protection zone and fund	
Groundwater survey/assessment	Detailed groundwater assessment to determine volume and quality of reserve, and define management regime	

BUDGET ITEMS	DESCRIPTION OF EXPENDITURES/BUDGET NOTES	TOTAL (US$)
	to protect the water source and use it for the most quality driven appropriate uses across Manaoba Identify and protection plans established for recharge zone	
Sanitation (and groundwater protection)	Participatory sanitation survey including: Construction of appropriate dry latrines Latrine demonstrations (eco-sanitation) Local campaign development for advocacy purposes Community activities, communications and awareness raising	
Sub-total		38,000
Contractual Services		
Groundwater survey	Contractor team, logistics, travel, DSA, reporting costs	
Sanitation survey support	To work with the communities to assess sanitation behaviour and needs	
Advocacy and communication support	To support communities in understanding the project interventions, document climate change impacts, water shortages, gather information from the community as anecdotal baselines, work with neighbouring communities to generate interest	
Sub-total		18,000
Total		88,000

SOLOMON ISLANDS WATER SECTOR ADAPTATION PROJECT (SIWSAP)

WATER SECTOR-CLIMATE CHANGE ADAPTATION RESPONSE (WS-CCAR)

Tuwo, Temotu Province

October 2013

PROJECT BACKGROUND, OBJECTIVES, ACTIVITIES AND OUTPUTS

Situations change, project supporter's move on, projects get delayed in starting. Based on experience, it is recommended that the design of this project is reviewed by the PMU prior to any implementation at the proposed site(s). The project needs to be presented and discussed with local stakeholders during the establishment of the Pilot Project Committee in the Inception Phase of SIWSAP. Expectations, confusions, further information and explanation can then be provided at project start – and the design of the project adjusted to fit new realities at the site in order to ensure project interventions are clear and understood by all – and stakeholder support is provided throughout implementation.

Note this report for Tuwo is not as comprehensive as for other sites as the full PPG Team could not visit the island.

The islands of Temotu province are scattered some 350 km east of the main Solomon Islands chain and located approximately between latitudes $9^0$45' S – $12^0$30'S and longitudes $165^0$57'E – 170^0E. Three main islands in the province are Santa Cruz (Nendo), Vanikoro and Utupua; there are also a number of smaller islands, including the Reef Islands, Duff Islands (Taumako), Tinakula (active volcano), Tikopia, Anuta and Fatutaka. The population of Temotu province has increased from 18,912 in 1999 to 21,362 in 2009, an increase of about 88.5% over a decade. In Tuwo, there a total of 1016 people of which adult males 162 or 16% and females 172 (17%).

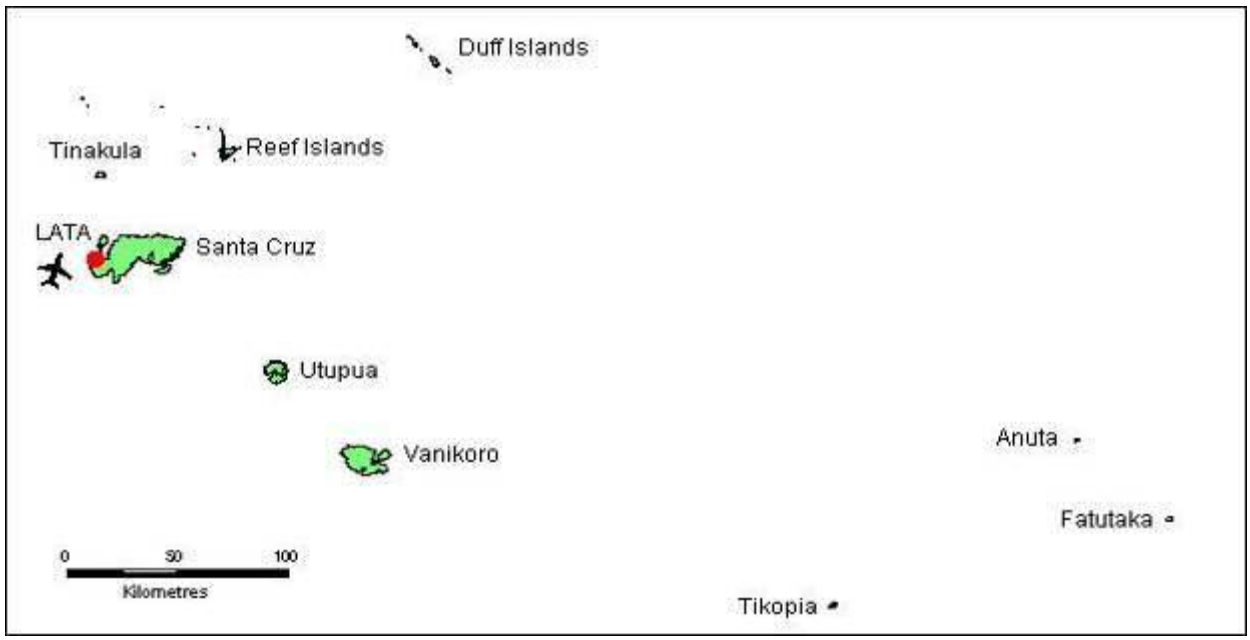


Fig 1: Location map of islands of Temotu province. *Source:* SIDDAPP

Water Supply and Sanitation

There are 12 wells and 14 tanks in the community. The tanks are equally distributed amongst the 4 zones of the community. Most of the people use the wells and tanks but sometimes they also dig along the sand beach during low tides to collect water coming from the land. During dry periods the tanks do not meet demand for water supply and only the wells are used for water. For a reliable supply of water to sustain the population on the island, there is great need to increase the capacity of the tanks or the storage of the source

(as tanks have run dry up to 5 times per year). There are 7 pour flush toilets in the community and the rest of the household practices open defecation.

Impacts of climate change

The Reef islands have been experiencing a number of climate change threats and their impacts have been absolutely devastating. People lost their treasured properties and personal belongings; the resources supporting their livelihoods have been also damaged and / or completely destroyed. The most recent experience in the Reef islands in terms of climate change threats is the sea level rise in 2011. When this disastrous event occurred, the Temotu Provincial Government mandated a team of seven members to assess the effects of sea level rise on the islands in terms of damages to crops, living condition of people and the land mass. Nine communities have been assessed for such damages. Overall, the impacts of sea level rise in these communities have resulted in increased coastal erosion, crops damaged and / or destroyed and the people have been displaced and in desolation.

Prevailing water resources and systems identified in the Reef Islands are: *Water sheds / catchments, Groundwater and Rainwater*. In the Reef islands the water sheds or catchments is defined by the entire island, of which their size varies. As no rivers or streams are found on these islands, this leaves climate change impact considerations to underground water and rainwater.

A full vulnerability assessment as for other proposed pilot sites could not confirm that the water resources and systems in the Reef Islands are vulnerable to climate change threats nor the need to respond and intervene with improvements on existing adaptive measures practiced by the people, as well as, providing best alternative water supply for the people. However, the scoping study mentioned above has gathered important information about the islands of Temotu province, its people and communities; the socio-economic situation; and the prevailing environment. In respect of the Reef islands, the study provided information on existing water resources, experiences on climate change impacts and how people have been coping.

The table below shows an analysis of the most recent impacts of sea level rise on land mass, crops and socio-economic conditions at Tuwo village while the following text summarises how these impacts interact with the individual adaptive capacities to determine the vulnerability of the different water resources and systems.

Detailed Analysis of Current Exposure and Sensitivity to Climate Shocks and Stresses for Tuwo, Temotu Province

Communities	Threats	Climate Change Impacts on…		
		Islands / Land mass	Crops	Socio-economic conditions
Tuo HH: 74 Pop: 352 people	• Sea level rise • Storm surge • Saline intrusion • Coastal inundation • Coastal erosion	• Available land reduced in size through coastal erosion and is unsuitable for crop and infrastructure development. • Coastal forests protecting shoreline are destroyed.	• Food crops such as bananas and breadfruit are destroyed. • Yields of these crops have dropped subsequently; their growth is abnormal. • Fruit / Nut trees affected, especially oki (Tahitian Chestnut) – some trees died. • World vision demonstrate alley cropping.	• Acute food shortage experienced, eat mainly fish and coconut. • Kitchens destroyed, some living houses damaged. • Several hand-dung wells for washing / drinking • Thirteen water tanks – still not enough for everybody. • There is school on the island up to class 5. • Houses are made of sago leaves. • Community transport – canoe + OBM broken down. • 2-way radio communication. Mobile network coverage only at higher ground. • Flue and headache are the main health issues. • Two cemeteries destroyed – remaining part is 3m off shoreline.

For many years, the people of Reef islands have been largely dependent upon underground water for their livelihoods through hand-dung wells as well as natural wells located throughout the islands. Generally, the underground water is fresh, although saline intrusion has occurred in some parts of islands, which affected the quality of water from these wells. There is need to test the quality of water from these wells. Six natural wells have been identified with potential to be improved to supply villages.

Through assistance from the government (from MPs), donor partners, the RWSS program and NGOs, people have water tanks from which to collect rainwater However, efforts to harvest rainwater have been considered inadequate at the moment, hence the need to determine ways in which to strengthen peoples' capacity to maximise rain water harvesting and existing adaption measures more in general. For example:

- when hand-dug wells are inundated, the people collect water from coastal springs during low tides.
- Rainwater supply is limited by the amount of rainfall and the capacity to harvest enough of it – tanks are limited but people use containers / buckets to collect enough rainwater for their needs.
- Green coconut – where wells are affected by salinity and rainwater is in short supply, people harvest green coconut to drink from.

Additionally, other reviews of the WASH sector capacity needs suggest that recommendations be made in the following areas:

- **Lack of water source data and poor sharing of water resources data**: Water information survey (location, type, simple quality parameters, household use and management) must provide good basic data for target areas. Action must support provincial government follow-up monitoring of water sources and system O&M issues annually. All water resources information and data must be shared with RWSS headquarters, the national RWSS sector stakeholder group, and Ministries of Energy, Mines and Rural Electrification (MEMRE) and Environment, Conservation and Meteorology (MECM).
- **Poor water source and water catchment protection**: Education and awareness activities related to these vital resources must be included in community mobilization/awareness raising exercises. While cultural barriers currently appear to preclude the use of low-cost 'sanitize-and-recycle' approaches, education and awareness activities related to this sanitation option must be included in locations where this technology may be appropriate. Earthquakes have a major impact on water sources causing subsidence and re-routed flow in springs. Community must be encouraged to eliminate open free defecation (OFD) for better water catchment protection.

Proposed Capacity Development Process

UNDP ----- MMERE & MPGIS + MRD (MP&CDO)

Temotu Provincial Government

- Provincial Development Committee
- RWSS/WASH Division
- Works Division
- Private Sector and NGOs

Fenualoa Ward Level Institutional Operations

- MPA

- WDC (RDP est.)

Tuwo Village Development Committee

(Chiefs, Women, Youth, Church, Health & Education Reps)

Strengthen

Raise Funds, Awareness & Clarify Roles

Knowledge Management, Communication and Exit Strategies

- **Knowledge management**
  - Insufficient information to implement the project would result in incomplete projects. It is important that all information about the project made known to the people
  - Communities may not give full support if the whole picture is not put open to the people
- **Communication Strategies**
  - The information about the project be made public during village communities so that all questions can be answered or there would be suspicion about how the project is being implemented
  - Information can also be relayed to faraway places through the 2 way radio.

Proposed Activities

The entire Province of Temotu only contains 5.600 people, and based on the PPG assessments, 1,000 of these are based on the island of Tuwo. It is an atoll island, and therefore has limited options in water collection and storage, and faces other vulnerabilities from sea level rise, storms, and cyclones. Most of the water resources are rainwater collected in tanks, with some shallow freshwater available but overuse of this renders the wells saline, and therefore unfit for drinking water, but suitable for washing and bathing. Sanitation consists of 7 pour flush latrines, or the beach for the majority of the population. Interventions at this pilot site will consist of:

- **Rainwater harvesting restoration and development**- there is sensible use of rainwater tanks in the village, and previous support has been offered by the World Bank Rural Development Programme. However, there is community tension over the allocation of tanks, which suggests they were not distributed equitably. SIWSAP will assess this situation and based on the WSCAAR plans, invest in tanks to ensure equitable distribution and access to shared water resources. Furthermore, the project will invest in strategic shared storage for the entire community, using tanks with their own roofs. The reason for this is that some of the communities use traditional housing with sago leaves, which are not effective at collecting rainwater. Correct sizing of roof equipment and other materials and distribution will take place under the development of the WSCCAR plans. The school roofing will also be assessed and replaced for capturing water and tanks fitted as freshwater storage for the school.
- **Restoration of shallow hand dug wells** are used for bathing and washing. Despite this the water quality is poor and saline, and is used by roaming village animals as well. These hand dug wells need protecting with correct simple

technologies such as culvert and concrete slabs. They will be rehabilitated with hand pump systems to protect the water, and community rules established regarding their use to try and avoid them being used for drinking.

- **Groundwater assessment** study is required for the entire island of Temotu using the correct technical interventions to assist with the identification of a new safe freshwater source – or at least to see if one can be developed with a sustainable pumping rate. The size of the island, and the WSCAAR planning process will be useful to better understand how climate change is affecting the entire island system. From this a better understanding of the need to protect the watershed and natural wells/sink holes are key water resources for the island can be better understood and shared across the province, informing the development of the overall Provincial Plan on water and adaptation.

Sanitation – The traditional practice of using the beach will be addressed. As with other sites, SIWSAP will provide additional support to try and improve sanitation provision and protect what freshwater resources do exist. The project will support sanitation interventions through supporting the

1. Creation of a local hygiene campaign to alert people to the risks around common WASH disease, etc – working with UNICEF, MHMS-EHD and the relevant Health Promotion Unit from the main island.
2. Through consultation, and with selection of willing families to trial new latrines, , including eco-sanitation and dry composting toilets funded by the project, as 'demonstrations' of households willing to 'try' latrines. This will include a series of monitoring activities with the families and communities involved where pros and cons of the latrines are openly discussed within the communities. The aim is to use these pioneering families and households (including government offices and small businesses) to be 'live' monitors for toilet use, who report back on a regular basis to the wider community on their perspectives regarding latrine use relative to open defecation on the beach/mangroves. This way, transparent perspectives are presented to the town and communities- and they can therefore make the choice about what they want to do for their 'sanitation future'. The actual design of the latrines will be developed during the WSCAAR planning process, with local experience and national experience from organisations such as Kastom Gaden.

Table 1 – Summary of project strategies and activities for the implementation of the demonstration project and expected indicators, Tuwo, Temotu Province

Project Components	Activities	"Outputs"/Impacts	Baseline Indicators	Target Indicators	Adaptation Relevance and Environmental Benefits
Stakeholder Communication and Consultation	- Community Based Early Warning System developed through consultation and training	- CBEWS guidelines - Community understanding increased - Reduced risk	- No early warning system exists	Risk of water shortages and water pollution reduced	
Rainwater harvesting restoration and development	- Provide RWH tanks, guttering, and materials, roofing etc - Develop training to establish a more equitable distribution of water supply to people - Provide strategic community storage - Train in RWH O&M, financing and establishment of maintenance fund - Conduct RWH survey to identify what storage is needed, and how long it will last for, and develop community monitoring system to ensure storage is well managed	To enable semi-permanent and temporary houses to use their roofing to do rainwater harvesting. To make capacity to supply water for daily subsistence adequate and use of large non-residential buildings To improve capacity to withstand water shortages	- 92% of the community without adequate roofing to do rainwater harvesting - 7% of tanks above 2000 gallons - 100% of the community with tanks going empty more than 5 times per year - (Female 17% and Youth/Children 67%)	% increase in access to reliable and safe water supply 100% increase in safe reliable water supply to the school	Diversity of water supply prevents watershed and groundwater degradation and build resilience to dry periods and droughts
Restoration of shallow hand dug wells	- Cover and protect shallow dug wells - Installation of handpumps. (where freshwater does exist, it needs protecting) - Determine water quality and use of these wells with the community (most likely not for consumption)	To decrease burden on those who cannot afford tanks and have no access to wells	- 82% of community digging in the sand beach to supplement their source of water - (Female 17% and Youth/Children 67%)	% reduction in use of saline water for drinking	Protects freshwater recharge areas and reserves as key supply areas Determine best mgmt regime to keep natural freshwater reserves

	- Develop O&M and training for the handpumps - Establish asset fund of handpumps				clean Improves human health
Groundwater assessment	- Asses the groundwater characteristics for the entire island including water quality testing - Determine a sustainable pumping rate if possible - Identify better protection measures for the shallow lens - Develop guidance and training to protect the GW resources	To decrease dependency on rainwater harvesting and stress on current tank capacity	- 85% ratio between wells and tanks as sources of water - 0% of wells operated at suitable pumping rate - (Female 17% and Youth/Children 67%)	% increase in access to reliable and safe water supply Groundwater for Tuwo protected Guidelines developed and applied across the Province (with Provincial Government)	Adds diversity to the water supplies available to communities Protects freshwater recharge areas and reserves as key supply areas
Sanitation interventions and trials	- Create a local sanitation campaign for Tuwo, and wider for Temotu Province - Identify pioneering families willing to trail sanitation technologies such as eco-sanitation (CT's). - Design and construct most appropriate sanitation technology - Construction guidance and training developed - Establish Community Sanitation Committee with PEHD officers and SIWSAP Provincial Officers	To increase control and management and reduce careless use of water To prevent the unhealthy practice of people using the bush or seaside for latrines.	- 100% of taps that are outside or are shared to address efficiency and health issues - 96% of community without some type of toilet facility - (Female 17% and Youth/Children 67%)	100% increase in latrine use 20% reduction in open defecation	Protection of freshwater reserves (groundwater) from poor sanitation practices to improve the longevity and quality of water supply during dry periods and drought

BUDGET DETAILS

DETAILED BUDGET

BUDGET ITEMS	DESCRIPTION OF EXPENDITURES/BUDGET NOTES	TOTAL (US$)
Materials and Equipment		
RWH tanks (aluminium and rotamold)	For water storage	
Timber, roofing, guttering, building materials, aggregate,	To build strategic storage and additional household storage	
Labour costs	For construction, latrine construction and development	
Vehicle/boat hire	For transporting materials, logistical support, solid waste removal	
Sub-total		75,000
Field Surveys and Activities		
Rainwater Harvesting Survey and Strategic Storage developed	Of types, storage needs, equipment, location, water quality, tank capacities, roof sizing, Training in establishing RWH sites Rainfall monitoring training – determining resource availability, roof sizing etc Household RW tank provision (3,000lt tanks) and construction, roofing, guttering, set up of tanks with communities	
Restoration of existing Groundwater Wells and, Protection and Management Plan	Development mgmt plan for strategic safe water supplies, following assessment of capacity and quality of resources. Water quality testing Installation of handpumps and well protection, and guidelines in use Develop O&M guidelines and training in maintenance of pumps Establish asset fund for maintenance (including for RWH equipment and materials) Develop mgmt plan to protect suitable resources, including funding options, involving the community and landowners.	
Groundwater survey/assessment	Detailed groundwater assessment to determine volume and quality of reserve, and define management regime to protect the water source and use it for the most quality driven appropriate uses across Tuwo Identify and protection plans established for recharge zone	
Sanitation (and groundwater protection)	Participatory sanitation survey including: Construction of appropriate dry latrines Latrine demonstrations (eco-sanitation) Local to Provincial wide campaign development for advocacy purposes on sanitation options, and use of	

BUDGET ITEMS	DESCRIPTION OF EXPENDITURES/BUDGET NOTES	TOTAL (US$)
	appropriate sanitation technologies Community activities, communications and awareness raising – establishing community sanitation committee	
Sub-total		42,000
Contractual Services		
Groundwater survey	Contractor team, logistics, travel, DSA, reporting costs	
Sanitation survey support	To work with the communities to assess sanitation behaviour and needs	
Advocacy and communication support	To support communities in understanding the project interventions, document climate change impacts, water shortages, gather information from the community as anecdotal baselines, work with neighbouring communities to generate interest	
Sub-total		34,000
Total		151,000

SOLOMON ISLANDS WATER SECTOR ADAPTATION PROJECT (SIWSAP)

WATER SECTOR-CLIMATE CHANGE ADAPTATION RESPONSE (WS-CCAR)

Gizo Township Western Province

October 2013

PROJECT BACKGROUND, OBJECTIVES, ACTIVITIES AND OUTPUTS

Situations change, project supporter's move on, projects get delayed in starting. Based on experience, it is recommended that the design of this project is reviewed by the PMU prior to any implementation at the proposed site(s). The project needs to be presented and discussed with local stakeholders during the establishment of the Pilot Project Committee in the Inception Phase of SIWSAP. Expectations, confusions, further information and explanation can then be provided at project start – and the design of the project adjusted to fit new realities at the site in order to ensure project interventions are clear and understood by all – and stakeholder support is provided throughout implementation.

Project Context and Background

Gizo is the capital of the Western Province, Solomon Islands. It is located west of New Georgia and Kolombangara. Gizo is relatively small compared to the surrounding islands with a population of approximately 7,177 (2009 census), it is the second largest town in the country with an urban population of 3,547 [2009 census].

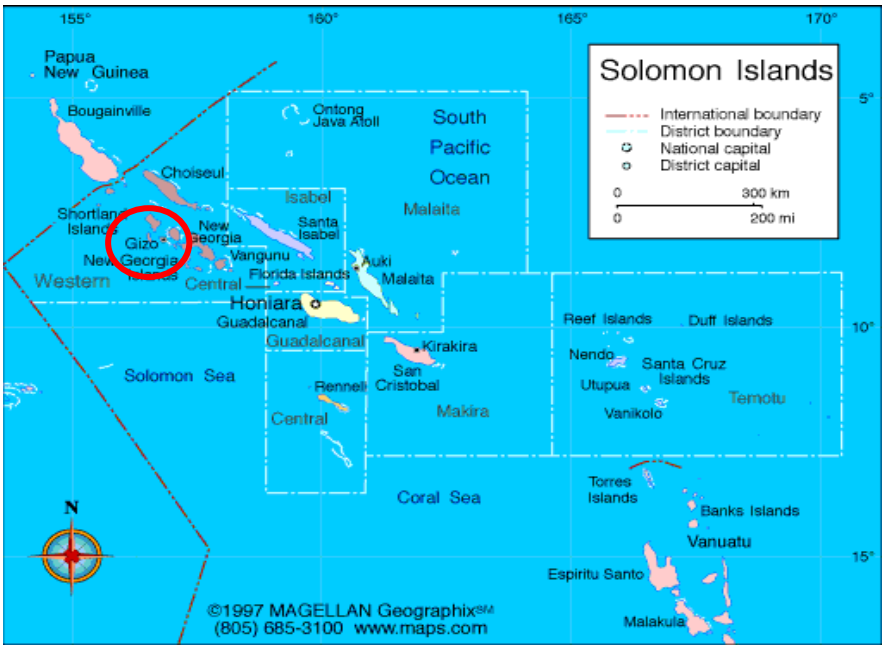


Figure 1 – Gizo, Solomon Islands

Water supply and Sanitation

Gizo Water Supply system dates back to time of the colonial government (see Gizo Township Water Supply System report by UNDP for further information). There are several streams and springs which provide water – in particular Leoko Stream, which is approximately 7 km to the western part of the island. Rainwater harvesting is a common practices in Gizo Township. The water supply system is not connected to every household. Thus, whilst some are connected to the supply system and are receiving a reliable water supply, some are receiving irregular supply and most are not connected to the water supply system. Those who receive irregular supply of water and those that are not connected to the water supply have water tanks as their main source of water supply. Gizo water supply is problematic and has been affected by the climatic variation. The sewerage system does not cover the whole of Gizo town. Another new line is being built although the connection is not yet complete from the houses to the main line

Institutional and policy context and current policies

This project area would fall under the The Solomon Islands Water Sanitation and Climate Outlook which identified six priority areas that matter most to the nation's water resources and sanitation services. In order of priority, the following issues were stated;(i) the

institutional and governance frameworks for effective water resources management, (ii) the human and financial capacity of the government and NGO to respond to existing and emerging IWRM issues, (iii) land and water governance regarding ownership, rights and obligations, (iv) environmental degradation due to development activities, (v) environmental contamination of water sources due inadequate waste management and (vi) climate change including sea level rise and its impacts on livelihoods[3]. A national water policy is close to finalization which incorporates water, sanitation and hygiene as vital for the Solomon Islands.

Vulnerability assessment

Prevailing water resources and systems identified in Gizo Island are: *Water sheds / catchments, Groundwater and Rainwater*. These water resources and systems are vulnerable to a number of climate change threats. Hence, the need to respond and intervene with improvements on existing adaptive measures practiced by the people, as well as, providing best alternative water supply for the people.

The table below shows a detailed analysis of current exposure and sensitivity to climate shocks and stresses while the following text summarises how these impacts interact with the individual adaptive capacities to determine the vulnerability of the different water resources and systems.

[3] Mike Low 2011 Solomon Islands Water, Sanitation and Climate Outlook

Detailed Analysis of Current Exposure and Sensitivity to Climate Shocks and Stresses for Gizo, Western Province

Water source and system	Threat	Exposure	Sensitivity	Impact Level (expert assessment of exposure & sensitivity)	Impact Summary (what are the impacts)	Adaptive Capacity (consultation / expert assessment)	Vulnerability (risk x adaptive capacity)
Water sheds / catchments	High intensity – flash flood	Medium	Low	Medium	Subjective, especially when vegetation is disturbed	Medium	Medium
	Localized flooding/pooling	Low	Low	Low	Pooling may occur in areas above damp site.	Medium	Medium
	Large scale extreme flooding	Low	Medium	Medium	Source has potential to be damaged and rerouted.	Low	Medium
	Extreme drought	High	Very High	Very High	Potential drying of catchment due to its limited capacity	Low	Very High
	Increased temperature (~2^{o}C) / evaporation	Low	Medium	Very High	Subjective, especially when vegetation is disturbed	Medium	Medium
Groundwater	High intensity – flash flood	Low	Low	Low	Repeated occurrence could become a concern on slope areas	Low	Medium
	Localised flooding/pooling	Medium	Medium	Medium	Depending on prevailing geological features.	Low	Medium
	Storm surge/coastal flooding/saline intrusion	Low	Medium	Medium	Most critical to coastal areas through infiltration into groundwater systems	Low	Medium
	Large scale extreme flooding	Medium	Low	Medium	Potential to cause damage to catchment	Low	Medium
	Extreme drought	Medium	High	Medium	Lowering water table	Low	High
	Increased temperature (~2oC) / evaporation	Low	Low	Low	Potential lowering of water table.	Low	Medium
	Coastal erosion	High	Medium	High	Reduced size and volume of groundwater	Medium	High
Rainwater	La Nina	Low	Low	Low	Increase rainfall	Low	Medium
	El Nino	High	High	High	Decrease rainfall	Low	High

In terms of vulnerability rating of water sheds or catchments of Gizo Island to climate change threats, it is contemplated that the catchments are very highly vulnerable to extreme drought. Current experience of Gizo town residence is consistent with this finding, suggesting rainfall as one of the key factors crucial to the health and productivity of the catchments. The water source easily dries up in response to prolonged dry spell. The vulnerability of the catchments to other climate change threats including flash flooding, extreme flooding and localized flooding / pooling and increased temperature, they have all been rated medium. It was considered that these climate change threats will have some impacts, which may also result into secondary impacts.

The underground water along the coastal strip of the island is moderately vulnerable to sea level rise, **storm surge, coastal flooding and saline intrusion** along coastal areas of the township. However, it is rated highly vulnerable to **coastal erosion** and **extreme drought**. These climate change threats will reduce the underground water quality and renders it to be unfit for human consumption.

Supply of rainwater is largely dependent upon rainfall. Equally important is the ability to capture or harvest the rainwater during rainfall. Observation on rainfall for the last 52 years varies significantly but shows a slight ascending trend. Since rainfall is influenced by several events including the El Nino-Southern Oscillation, the vulnerability assessment is based on occurrences of two phases of ENSO, namely La Nina and El Nino. Hence, rainwater is expected to be in short supply during the **El Nino** event but is envisaged to be in abundance during the La **Nina** event. In both scenarios, rainwater is vulnerable particularly during the El Nino phase of ENSO. Concern during the La Nina phase is on the ability and capacity to maximise rainwater harvesting.

The vulnerability assessment confirms that the water resources and systems in Gizo town are vulnerable to climate change threats. Thus, the need to build the capacity of the township and the village to adapt to climate change impacts is warranted. The following recommendations are made:-

- That the provincial government must have a proactive response programme to address the impacts of climate change on water resources and systems assets in Gizo town.

- That the provincial government must have a proactive water shed protection and management plan, and ensure to safeguard its water catchment and underground water resources and system.

Existing projects or activities relevant to the project at the local site

- The Gizo Women's Action Group (GWAG) was formed in 2003 with the help of the WWF. Building on this would be helpful in providing a gender-balanced view on the implementation and sustainability of the SIWSAP project. GWAG secured funding from AusAID to gather information on the status of the local marine environment due to the impact of rubbish disposal, sewage and the lack of water supply at Gizo. The GWAG did a study on the water supply at Gizo. The study also included a socio-economic survey of Gizo household and business houses covering areas.
- The Asian Development Bank works on infrastructural construction and has built a water treatment station, new storage tanks, pumps, and a dam.
- UNICEF working with primary health and sanitation project for schools.
- After the earthquake and tsunami disaster that adversely affected Gizo, a lot of international NGOs and government agencies were engaged in rebuilding and rehabilitation work in Gizo and the Western Province as a whole. These include Oxfam,

World Vision, UNICEF, Rotary and other religious organizations such as ADRA and other denominational organizations.

- The World Fish deals with conservation especially on the sea resources.
- Save the Children program can assist with engagement with the youth especially in the training not of the leaders but also the youths to be able to sustain, manage and implement knowledge with regards to the water sector adaptation project and the climate change.
- Local NGOs - Kolomonbagara Islands Conservation Association, Marove Islands National Biodiversity Association Livelihood

Relevant stakeholders to the project at the local site

- At the provincial level - the Member of Provincial Government
- Works Division which deals with the urban water supply system and the Rural Water Supply and Sanitation (RWSS). The water supply will run through the rural area and thus, RWSS would play a major role in dealing with the communities.
- The Lands Division, Forestry Division, Police, Health Division and Education Division including Finance Division would also be important stakeholders in the implementation.
- Women organizations - Western Province's Council of Women (WPCW) and the GWAG.
- Faith Based Organizations - United Church, Roman Catholic Church, Anglican, SSEC, etc.
- The Chiefs, Landowners, community/village leaders and Gizo zone leaders are another group of people stakeholders which should also participate for the preparation and maintenance of the project.
- The private sector

Current water supply management practices in the target sites and identified weaknesses and options for improvement.

(i) ***Source***: The current source at Leoko is inadequate to supply water to meet the demand of Gizo town and at the same time meet the demand of the communities along the way. Thus, it is important that additional sources will have to be identified. The alternative sources to be considered are; (i) Konulavata in the Forestry area of the government. It is bigger than the Leoko source and would be enough to fill the storage tank at Gizo; (ii) The source which the new prison service is built near would be another additional source to meet the water demand at Gizo. In the past it has been consistently flowing and does dry up during the dry season; (iii) small private streams near some residential houses could be protected and build little dams to use for washing and bathing which uses a lot of water. This complements the tanks and the water supply.

(ii) ***Treatment Plant and tanks***: There is only one treatment plant which supplies water to the 100,000 gallon tank on the hill. However, there is also another 80,000 gallon tank which does not have a treatment plan. Thus, this water cannot be pumped to the tank on the hill to be connected to the communities because it is untreated. This is an issue that must be considered so that there is adequate supply of water goes into the 100,000 gallon tank to later supply the town.

(iii) ***Reticulation:*** There is no connection to all the houses and thus, does not allow the flow of water to circulate to other houses. The current system is a dead end in itself and thus, water cannot flow.

(iv) ***The Works Division*** has no water vehicle to move around regarding water issues. Thus, sometimes the tank is not turned off when full on a daily basis. It takes two days to fill up the 100,000 gallons tank.

(v) ***Maintenance:*** The need for maintenance is vital as the leakage of water reduces water that consumers should be using. The maintenance issue can be considered from (i) from the source to the town's tank, (ii) From the storage tank to the 100,000 tank and (iii) from 100,000 to the different houses. A lot of the pipes were built many years ago, and needs maintenance. Water is not flowing through some taps which implies there would be a lot leakage underground which would require some overhaul in such areas.

(vi) ***Policy and Legal framework***: The provincial government needs to formalize its own water policy in accordance with its own water demand. This should be initiated by the government implying its political will to address the water situation for its residents. The water policy also continue on from the national water policy which about completion.

(vii) ***Economics:*** The water system in Gizo is not charged and thus, the government or the Water Division collects no revenue for the water that is being pumped although the SIEA charges $35,000.00 per month. There is need to connect water meter to residents to provide for cost recovery. This should assist the government or the responsible institution for the water to collect revenue and eventually provide adequate finance to make water available for everyone to use. The efficient and availability of water would lead to an improvement on sanitation and would lead to an improvement of health especially of mothers and children.

(viii) ***Community Awareness;*** There is great need for an effective awareness for the Gizo people understand the water problem, the current situation, the proposed project and the implementation and the sustainability of the project. The policy, legal, economic and any infrastructure development on water supply or sanitation, needs to be conveyed to the people through an awareness program.

Capacity development strategy

(i) RWSS

- Financial resources: The provincial government needs to provide financial allocation for the implementation or the sustainability of all its projects
- Human resources- Increase of number of people to cater for the province and in particular the implementation and sustainability of not only the SIWSAP project but any other provincial projects
- HR- training of officers who administer the office either in the technical or the administrative areas. The training be a long term one which could be done at the Solomon Islands National University or a short workshop on specific skills or activity to be knowledgeable about.
- HR- Vehicles and canoes for assisting the rural areas- the human resources would also need other resources to do monitoring and to be mobile for supervision, maintenance or implementation

(ii) Works Division

- Financial resource- Similar to the RWSS, so the Works Division should also be well-resourced to be able meet the needs of the Gizo residents. This should be allocated from the provincial budget or be included in a Provincial Governments Strengthening Project.
- Available transport for doing work on a daily basis should be provided. This should be used to monitor all related activities in the town with regards to water, sanitation and solid waste disposal.
- Increase the number of workers to work and monitor other activities outside Gizo town.
- Technical officers – There would be need for more technical officers not only to supervise implementation of the provide but to provide training and supervision and well as advise officers and villagers during repair and maintenance

(iii) Community landowners and focus groups

- Training should be done for leaders to be able to manage the water supply system on behalf of the RWSS in the rural areas.

(iv) NGOs and Churches

- Development of skills to be responsible for their respective areas and at the same time protect the water system that may be put in place

(v) Provincial Government leaders or the political and administrative officers

- Should also be trained about the activities of the project and the water system that will be provided.

Proposed Stakeholder involvement plan

WHO	***STRATEGY***	***MEANS***
Provincial Government	** Provincial Government will eventually provide financial resources towards the project* ** PG owns the project and have overall responsibility of oversight and implementation and sustainability after completion*	-Budgetary Allocation -Administrative and management -Radio/TV
RWSS Works Division	**Provides the technical oversight in implementation with the communities and workshop* ** Supervise repair and maintenance and training*	-Assist engineering design -Labour mobilization -Radio, television
Chiefs & Landowners	*Avail land and source of water and protect source to be used for water supply * Know skills to be able to repair and maintain water supply problems	-Usage of the source - Able to repair water supply -radio -workshop
NGOs	* Assist the project in sharing specific areas of expertise related to climate change and water supply * Work with the project to do consultation with SIWSAP	- Workshop-speciality - Workshops-consultation -radio
Churches	*Assist congregation on awareness and management of the water supply * Participate in workshops and leadership of the church	- Announcement - Workshop -radio -training
Women and Youths	* That they be able to participate in decision making and during workshop * Youths attend training and know how to repair and maintenance of their water supply system	-Workshop participation - Repair & Maintain water supply training -Radio
Gizo Citizens	To be able to understand and appreciate and have a sense of ownership and protection of the activity	-Radio, television, meetings, Workshop

Proposed Activities

Gizo is the capital of the Western Province. It is a relatively small when compared to the surrounding islands; the island is 11 km long and 5 km wide, with a summit elevation of 180m (Maringe Hill). With a population of approximately 7,177 (2009 census), it is the second largest town in the country with an urban population of 3,547 (2009 census).

Gizo Water Supply system was one of the old systems that was established during the Colonial government. There have been several studies commissioned to assess various sources and option including ground water. Gizo Island also had several streams and springs. Leoko Stream situated on the western part of the island was also studied and was included with an automatic water level monitoring recorder. The mean flow was measured to be 6 litres per second, although there is no weather monitoring station in Gizo, but there is a monitoring station in Munda on New Georgia Island with annual rainfall of 4230 mm in 2012.

In terms of vulnerability, the watersheds of Gizo Island are highly vulnerable to extreme drought periods. The island is well known for running short of water. Gizo water supply is problematic and had been affected by the climatic variation and conditions. Residents have had to resort to using hand dug wells at times. However, almost all houses with roofing iron collect water from rainfall using tanks. Rainwater harvesting is a common practice in Gizo Township because the actual water supply system does not work very well as it runs dry during dry periods, and illegal off-takes and other challenges, such as rural urban challenges over water, and vandalism, have left a good water system not fully functioning. SIWSAP activities at Gizo will include:

- Utilising the proposed project strategy of developing the Water Sector Climate Change Adaptation Response Plans to identify the adaptation needs for the town. This will incorporate a survey of the water supply system. As a core growth area of the country, and a population growth rate nearing 4%, Gizo town is a key showcase pilot location for the SIWSAP project to demonstrate the adaptation response approach.
- **Protection of existing source and development of a new additional water source** at Leoko and Tirokogu - a payment for ecosystem services scheme, or similar mechanism needs to be developed to protect the existing watershed above the source covering an area of approximately 1km^2). A new source, close to the existing one also needs to be surveyed and assessed as a suitable source of water. A feasibility study will be prepared with the Provincial governments support to develop the other source at Tirokogu.
- **Repairs and monitoring: of the existing system**. Vandalised pipes will be replaced to expand capacity to the existing network system, and the old reservoir will be rehabilitated, including the development of a protection zone around the reservoir to improve the resilience of the system through providing additional storage and capacity. Sand filters and other water quality equipment will need to be replaced.
- The current single source is not reliable for providing adequate water security to the town. Human encroachment into the watershed due to the tsunami of 2007 (which forced people to relocate into the watershed area away from the coast) is threatening the quality and quantity of the current water supply. The existing source requires additional protection from pollutants, and to sustain the reliability of the supply. A **Water Safety Plan** is required for the existing network to better understand pollution sources, and the high leakage rates (estimated at 70%). The project will look to partner with Solomon Water (formerly SIWA) to ask for their support in developing sustainable water sources for Gizo to improve the water security of the town.

- A **rainwater harvesting survey** of the entire town is required. Some tanks will not contain clean water, some additional storage is required, and communal back-up storage should be developed in communal buildings, and extended in areas with large roofs, such as Churches. In many places guttering is required, and training in maintaining tanks for clean water provision.
- Extensive **community consultations** need to take place with the Gilbertese villages who access water from the pipe networks illegally. A detailed survey of who uses what water, and can they be connected properly before the water pipes enter the town (and become a municipal responsibility) needs to be done. At present there is a lot of anecdotal information about what exactly the problems are and the WSCCAR process needs to define more clearly exactly what the cause and effect situation is. At present illegal access to the towns water supply is due to local sources becoming salinized or containing poor quality (brackish) water.
- Creation of a **Province wide sanitation and hygiene 'campaign'** based in Gizo for all the Western Province, working with UNICEF, MHMS-EHD and the relevant Health Promotion Unit to generate the advocacy material and energy required to foster the behaviour change required. In some cases, the shallow groundwater used by the Gilbertese villages will be polluted from shallow pit latrines.

Table 1 – Summary of project strategies and activities for the implementation of the demonstration project and expected indicators, Gizo Town, Western

Project Components	Activities	"Outputs"/Impacts	Baseline Indicators	Target Indicators	Adaptation Relevance and Environmental Benefits
Stakeholder Communication and Consultation	- Community Based Early Warning System developed through consultation and training	- CBEWS guidelines - Community understanding increased - Reduced risk	- No early warning system exists	Risk of water shortages and water pollution reduced	
Rainwater harvesting survey and investment	- Provide RWH tanks, guttering, and materials, roofing etc - Provide strategic community storage at key locations (hospital, Provincial buildings, RAMSI interventions (new police station, etc) - Train in RWH O&M, financing and establishment of provincial maintenance fund for strategic tanks - Work with Churches and their networks to include Churches as strategic storage options due to large roof areas (and their ability to collect funds through their networks9 - Conduct RWH survey to identify what storage is needed, and how long it will last for, and develop community monitoring system to ensure storage is well managed	To enable semi-permanent and temporary houses to use their roofing to do rainwater harvesting. To make capacity to supply water for daily subsistence adequate and use of large non-residential buildings To improve capacity to withstand water shortages	- 18% of the community without adequate roofing to do rainwater harvesting - 38% of tanks above 900 gallons - 53.8% of the community with tanks going empty more than 5 times per year - (Female 29% and Youth/Children 38%)	% increase in access to reliable and safe water supply % reduction in damaged RWH systems due to project interventions RWH Guidelines developed and applied across the Province (with Provincial Government)	Diversity of water supply prevents watershed and groundwater degradation and build resilience to dry periods and droughts

Protection of existing source and development of new water source	- Establish a PES or water fund scheme (or equivalent based on local acceptance and ideas) and watershed protection zone - Protect existing source at Leoko better from pollution sources, especially during rainfall and high flows for biological pollutants - Develop with government, a feasibility study for development of a second water source for the town (Tirokogu) to increase reliability of supply - Guidelines and training developed in PES scheme	To increase resilience of existing freshwater supply to shortages in rainfall; which will have an immediate effect on water storage for the town.	- 5% of community serviced by streams or small dams near their houses - (Female 29% and Youth/Children 38%)	20 % increase in water supply availability for the town Measurable improvement in water quality in reticulated system	Adds diversity to the water supplies available to communities – in this Gizo twon as the second largest town in the country.
Monitoring and repair of the system	- Replace vandalised pipe that reduce system capacity and restore system functionality - Rehabilitate reservoir, sand filters, and protection zone around reservoir – establish a protection zone - Develop necessary governance requirements, with Provincial Government, to protect watershed areas of strategic importance to Gizo township. - Establish project partnership with Solomon Water (formerly SIWA)	To decrease dependency on rainwater harvesting and stress on current tank capacity To decrease dependency on rainwater harvesting and stress on current tank capacity To decrease solid waste contamination of wetland as a key groundwater recharge zone	- 20% ratio between wells and tanks as sources of water - 0% of wells operated at suitable pumping rate - (Female 29% and Youth/Children 38%) - 0% protection areas against pollution from waste water and runoff from the prison houses - (Female 29% and Youth/Children 38%)	30 % increase in water supply availability for the town Measurable improvement in water quality in reticulated system	Reduction of losses, reduced energy use, improving water use efficiency, reduction of pollution entering the system Expanding water available to town.
Water safety plan to guide climate resilient water	- Conduct water safety plan for the town with Solomon	To increase control and management and	- 73.5% of taps that are outside or are shared to	Measurable improvement in water quality in reticulated	Reduction of losses, reduced energy use,

storage investments	Water as public/private partner - Identify problem areas and develop monitoring and asset management plan	reduce careless use of water To prevent the unhealthy practice of people using the bush or seaside for latrines.	address efficiency and health issues - 20% of community without some type of toilet facility - (Female 29% and Youth/Children 38%)	system	improving water use efficiency, reduction of pollution entering the system
Community consultations to solve the rural urban divide on water access and institutional responsibility	- Identify options to connect Gilbertese villages (legitimately) to the main supply line (possibly valid if the second source is utilised) - Survey water points and develop an accurate picture of impacts on the pipeline and supply of water to the town from source to sea - Provide strategic water storage ot Gilbertese villages or options for them to be connected to mainline supply (and connect where technically and availability provides enough water)	Reduce tensions and include Gilbertese villages in future decision making regarding water supply Improve access to water supply through RWH provision	- 20% of community without some type of toilet facility - RWH dry 3 times a year. Use of mainline supply possible but not connected - (Female 29% and Youth/Children 38%)	Reduce conflict and misconceptions between town and rural areas Increase access to safe and reliable water supply by 20% for Gilbertese villages	Joint problem solving to identify best solutions, and reduce damage and water wastage.
Province wide sanitation and hygiene campaign	- Develop a Provincial wide (Western) campaign on Sanitation and Hygience, working with partners UNICEF, MHMS-RWSS, works, and PEHD. - Guidance and training - Community engagement, theatre - Identify and support sanitation Champions - Install appropriate latrine as	To rapidly increase sanitation use in Gizo town and wider across the Province	- 20% of community without some type of toilet facility	100% increase in latrine use 20% reduction in open defecation 30% increase in demand from the project for sanitation interventions (eco-sanitation, CT's, pit latrines, etc)	Protection of freshwater reserves (groundwater) from poor sanitation practices to improve the longevity and quality of water supply during dry periods and drought Behaviour change, reduced pollution of groundwater

	trials in Gizo town to reduce pollution and open defecation - Identify pioneering families willing to trail sanitation technologies such as eco-sanitation (CT's) -Gilbertese villages will also be included on the periphery of Gizo town itself - Design and construct most appropriate sanitation technology				reserves and other freshwater sources

ANNEX A: BUDGET DETAILS

DETAILED BUDGET

BUDGET ITEMS	DESCRIPTION OF EXPENDITURES/BUDGET NOTES	TOTAL (US$)
Materials and Equipment		
RWH tanks (aluminium and rotamold)	For water storage	
Timber, roofing, guttering, building materials, aggregate,	To build strategic storage and additional household storage	
Labour costs	For construction, latrine construction and development	
Vehicle/boat hire	For transporting materials, logistical support, solid waste removal	
Sub-total		145,000
Field Surveys and Activities		
Rainwater Harvesting Survey and Large Scale Strategic Community Storage developed	Of types, storage needs, equipment, location, water quality, tank capacities, roof sizing, Training in establishing RWH sites, O6M, repair, maintaining water quality Rainfall monitoring training – determining resource availability, roof sizing etc Household RW tank provision (3,000lt tanks) and construction, roofing, guttering, set up of tanks with communities Strategic storage options for municipal current buildings and Churches	
Protection of existing source and development of new water source to improve resilience to drought and irregular rainfall patterns/intensity	Establishing a PES scheme – including fund development, guidelines and training Watershed survey and protection plans drawn up – with investments in protecting the watershed Community engagements, and identification of pollution sources/conflicts of water use Feasibility study for alternate source at Tirokogu Community consultation – Gilbertese villages including water point survey, water quality testing, strategic water storage (RWH or through pipe connection) for Gilbertese villages if technically possible	
Monitoring and repair of current water system	Development mgmt plan for strategic safe water supplies, following assessment of capacity and quality of resources. Water quality testing Replacing damaged materials – pipes Rehabilitation of reservoir and sand filters Establishing protection zone around reservoir Develop partnership with Solomon Water	
Water safety planning	Water safety plan for Gizo town Develop asset mgmt plan and WSP to maintain water quality	

BUDGET ITEMS	DESCRIPTION OF EXPENDITURES/BUDGET NOTES	TOTAL (US$)
Sanitation (and groundwater protection)	Provincial wide campaign focused on behaviour change Participatory sanitation survey including: Construction of appropriate dry latrines Latrine demonstrations (eco-sanitation) Local to Provincial wide campaign development for advocacy purposes on sanitation options, and use of appropriate sanitation technologies Community activities, communications and awareness raising – establishing community sanitation committee	
Sub-total		218,000
Contractual Services		
Sanitation survey support	To work with the communities to assess sanitation behaviour and needs	
Advocacy and communication support	To support communities in understanding the project interventions, document climate change impacts, water shortages, gather information from the community as anecdotal baselines, work with neighbouring communities to generate interest	
Sub-total		120,000
Total		483,000

Annex 6: Communications Approach for SIWSAP

The importance of developing a Communications Strategy

Development of a communications strategy can help to:

- Establish a 'baseline' picture of existing "Knowledge levels, Attitudes, Practices and Behaviours" (KAPBs) that will in turn indicate where there are gaps in behaviours or attitudes that need to be addressed or targeted[1];
- Identify key actors and channels for communications including traditional forms of communication;
- Clarify and reinforce project objectives, particularly in terms of strengthening environment and resource management at the national level;
- Link communications objectives to project objectives;
- Set achievable project objectives, given available resources;
- Develop useful tools and activities to raise awareness;
- Identify key indicators (including behavior change indicators) and measure their performance; and,
- Influence key stakeholders and gain support in re-allocation of resources and in developing policies and institutions necessary to achieve project goals.

The overall process follows five stages described below.

Stage 1: Assess

- The current KAPBs and gaps that need to be addressed;
- The problem (including how local communities and project stakeholders perceive the problem, which can be ascertained through baseline KAPB research or situational analysis;
- The target audiences;
- Communication channels and opportunities; and,
- Resources available to implement communications activities.

Stage 2: Plan

Set realistic, achievable and measurable objectives. Both SMART objectives and 'necessary and sufficient' indicators.

Stage 3: Design

Develop effective messages, communication interventions or activities that engage stakeholders in learning about the problem and in identifying solutions.

Stage 4: Pre-test

Test these messages and methods with their target audiences.

Stage 5: Evaluation

Find ways to continuously improve their communications programmes through reflective learning and using monitoring.

[1] The Strategic Action plan and the Pacific RAP both identified weaknesses in understanding as a root cause of climate change impacts and environmental degradation across the Pacific region.

Background to the SIWSAP Project

The Solomon Islands Water Sector Adaptation Project (SIWSAP) has the overall objective of improving the resilience of water resources to the impacts of climate change in order to improve health, sanitation and quality of life, and sustain livelihoods in targeted vulnerable areas of the Solomon Islands.

The SIWSAP Project aims to achieve the objective through 4 outcomes:

1. Water Sector – Climate Change Adaptation Response (WS-CCAR) plans formulated, integrated and mainstreamed in water sector-related and in broader policy and development frameworks
2. Increased reliability and improved quality of water supply in targeted areas
3. Investments in cost-effective and adaptive water and sanitation management and technology transfer, and
4. Improved governance and knowledge management for Climate Change Adaptation in the water sector at both the local and national levels.

Pilot Projects – Pilot sites will be used as demonstrations to both create and implement a water sector vulnerability assessment process, and from this develop Adaptation Response Plans. These will guide investments at the six sites. In turn, over the course of the project these sites will be used as 'demonstrations' to improve the resilience of the communities to climate impacts on their water systems, and for others from communities to Provincial to National level government to learn from through the use of learning practices, and 'strategic investment' opportunities.

Target Audiences

SIWSAP Provincial Officers

The Provincial Officers will coordinate and implement activities at pilot site level, possible replication site levels, and at any strategic investment sites. They are the key linkage points between beneficiary communities and the Provincial Government and Agencies. They will work with these to ensure the interventions are appropriate, and that the project activities are signed-off by the Ministry of Health and Medical Services, Environmental Health Division (MHMS-EHD) to ensure policy and technical compliance. Note that these positions will report directly to the Project Management Unit (PMU), but will also report to the Provincial Government to ensure clear communications and transparency, and should therefore be highly valuable resources to the Solomon Islands Government at the end of the project.

Pilot Project Communities

The communities are the ultimate beneficiaries, and it is critical that they are involved in helping to scope out intervention needs, capacity needs and to also provide their knowledge and experience of dealing with water shortages, floods, storms, and other impacts captured in community history and stories.

Pilot Project Committees

In some cases it is expected that local partners (NGO's for example) and Provincial Government will coordinate with the community beneficiaries and the SIWSAP Provincial Officer(s) for project activities and logistical support where needed. These groups, as 'Committees', will guide and coordinate pilot site interventions with the SIWSAP Provincial Officer(s). Where appropriate, Pilot Project Committees (PPC) will be established at the level of the pilot projects. These will help guide activities within each pilot project, and where possible help implement the activities through provision of materials, labour, etc. In reality,

due to the strong sense of community and kinship in the country, formal 'committee establishment' may be unlikely.

Lead Agencies/Ministries/Provincial Governments

It is vital that key persons within lead agencies and ministries (e.g. MMERE, MECDM, MHMS-EHD, NDMO, NIWCC, CCWG, and MDPAC) as well as provincial governments see how the SIWSAP Project, including Pilot Projects can be used to improve their ongoing work to manage natural resources throughout watershed areas, both during and beyond the life of the Project. Many donor projects worldwide have attempted to find effective ways to promote ownership of the project within lead agencies. Tactics have included:

- Profiling key management officials in the media/videos
- Involving key lead agency managers and staff in project Communications Teams

National Water and Adaptation Forum

Adaptation approaches at the community level will have relevance to other rural communities and townships across the Province and country at large. To ensure these lessons are captured and can be learned from Pilot to Provincial level, a national level Water and Adaptation Forum will take place at the beginning of Year 2 of the project. This will involve all relevant agencies, the communities and townships involved in the pilot projects, current replication sites identified, relevant Provincial agencies and stakeholders, including private sector suppliers, and National government agencies. External support and participants will also be invited where identified.

Wider National Public

Generating understanding and support from the wider public is necessary if there is to be sustainable change at the national level. National level social marketing campaigns may help promote behaviour change.

Other key Target Audience members include:

- Private Sector: national and regional organizations representing farmers; fisherfolk; manufacturers; hotel owners/managers; tour operators; dive operators; yachtsmen etc.
- Government
- Scientific Community
- CROP Agencies
- Non-government organizations
- Implementing Agencies
- Regional Partners and Co-financers
- Other Projects
- International/Donors
- International Partners

Key Messages - specific messages will be adapted for specific target audiences. Messages should be communicated consistently and incorporated into local messaging efforts. As far as possible they should refer to the negative consequences of low resilience of water resources to the impacts of climate change upon health, sanitation and quality of life, in line with the overall project objective. Messages will need to be reinforced and stressed on a regular basis. Specific Pilot Projects may require very precise messages that are practical, 'how to do it' types of messages which promote specific behaviour and practices.

The Communications Strategy will follow a similar format to the following three approaches:

1. **Public Relations and Awareness Raising;**
2. **Developing Social Marketing – Behaviour Modification Campaigns** to encourage behaviour and attitudinal change to counter negative impacts and to promote sustainable practices;

3. **Documentation and Communicating Lessons Learned and Best Practice** in order to encourage replication of successful approaches.

Each of these approaches is briefly discussed below and expanded on.

Public Relations and Awareness Raising

Activities to consider:

- Communications strategy specifically for public relations and awareness raising (National and Provincial advocacy messages – to brand the project)
- Project brochures
- Project logo
- Media CC, CCA, IWRM sessions
- Media releases and 'media event's for key milestones
- Profiles of key managers
- Feature press article/s
- Media tours of pilot project sites
- Short radio messages
- Theatre (popular across Melanesia)
- Video documentary/public service announcements (ideally, to be done with both a PR perspective in mind and an 'instructional' perspective for later communication of best practices
- Video diaries by communities involved in the project themselves, especially those trialing new and culturally 'different' approaches
- Pilot web pages on SIWSAP website

Communications Strategy

The outlining of a communications strategy is a useful exercise to conduct early. Clearly identify the objectives, processes and benefits of the project for key target audiences (including the community) at the local, national and regional level. A rapid assessment of communications capacity might be needed in order to ensure that the communications strategy is realistic, actionable and measurable.

Project Brochure

Project brochures should be simple and should clearly describe the objectives, processes and benefits of the project. Target audiences should be carefully considered amongst project partners, and national, provincial and community level stakeholders.

Media CC, CCA, Session at National Forum on Water and Adaptation

One of the aims of the Forum is to help raise awareness to adaptation needs and vulnerability concerns, and to promote the mobilisation of the National Climate Change Policy across multiple sectors. Organizing a specific session to sensitize the media to CC, CCA, IWRM issues, whether a workshop or shorter format meeting at the Forum, can be well worth the effort. It is an opportunity to introduce the media to CC, CCA, IWRM issues and the process, to establish a network of contacts amongst local media and to get feedback from them on public interests and perspectives as well as preferred ways of receiving information from the project. Media information kits should be developed for and distributed at such events. They could consist of simple briefing sheets, contact information and any

public education materials developed for the project. Media coverage of such an event should also be pursued so that the opportunity to reach the wider public as well is not lost. The PMU will assist with these workshops and the information and materials required.

Media Releases

Media releases are distinguished from feature press articles in that they should be used to provide information on events, landmark project developments, and updates of public significance. They should be concise, relevant to public interest, and clearly provide information on who should be contacted for additional information or for interviews. They should ideally be followed up by a phone call, particularly if coverage of the event is desired. Key persons or "champions" referred to in the media release or who are spokespersons for the project should be prepared for requests for interviews, whether in person or via telephone. Each Pilot Project should also have a 'timeline' for which key milestones should be achieved and should plan to have media releases and/or media events at each of these junctures to help raise the profile of SIWSAP in the national press.

Profiles of Key Communities involved in Pilot Sites, Community Members, and Provincial Officers

Key individuals within lead stakeholder institutions involved in the project can be profiled to help clarify connections between community activities and relevant plans to address climate change impacts on water services. Short case studies on valuable approaches and experiences of the project managers will be actively supported via website and other media (newsletter, etc).

Feature Press Article/s

Establishing a contact at a local newspaper editorial department can be helpful in terms of placing feature articles, tip sheets and interviews. Feature articles written by the Project Manager, or with the guidance of the National Forum, Provincial Officers, etc. can be placed in local newspapers and national magazines. Editors can be approached to determine their willingness to print single or short series of articles accompanied by an illustration. They are often willing to provide space free of charge (copy) provided that the articles are placed exclusively with them at the national level. News story ideas can also be provided to features editors. Alternatively, local journalists could be contracted to write articles. Feature articles should: help clarify project objectives at community and national levels; raise local awareness by showing the regional importance and interest in the work; build local media interest in the project.

Short radio messages

Radio is listened to extensively throughout the Solomon Islands and can therefore be an effective broadcast medium. Community radio in particular is listened to in areas where it exists. Short radio messages (two minutes or less) can be pre-recorded/produced and aired by arrangement on several radio stations, sometimes as public service announcements. Government Information Services are often available to assist with production in most countries and may make time slots for public service announcements (PSAs) available to the project.

Video documentary/public service announcements

Establish contact with television news and current affairs editors and reporters. Providing news story ideas, tip sheets, media releases and videotaped coverage of events makes it easier and quicker for them to provide coverage, particularly as it is not always possible for them to reach remote areas. Wherever possible, video footage should be shot

'instructionally' so that later 'how to do it' best practice examples can be clearly communicated. Video diaries and national campaign videos could be develop around specific issues, such as sanitation, or groundwater management pumping rates, or spring source protection. Videos can be made into instructional video training.

Pilot web pages on SIWSAP website

The PMU will be responsible for a SIWSAP Project web site and will be creating pages dedicated to specific Pilot Projects which should consider the type of content which they would publish. Links will be made with IW:LEARN.

Phase II: Social Marketing – Behavioural Modification[2]

Social marketing entails the following:

- Audience research – it is important to develop a clear understanding of the root causes of specific environmental problems.
- Analysis of the GAPs
- Campaign focus – decide issue/s to be tackled (e.g. sanitation, vulnerability, climate change impacts, floods and droughts) targets; messages, products and activities, monitoring and evaluation, pre-testing; timeline and implementation schedule.
- Participatory strategy design and material development
- Participatory implementation
- Evaluation

Possible Approach

The aim here is to develop and implement a social marketing campaign which promotes changes in behaviour at the provincial and community levels. Key to the success of such a campaign is not only demonstrating the link between the behaviour and the negative impact but also upon presenting practical alternatives. While Pilot Project Committees will be guided by the objectives of their respective pilot sites in determining the particular issue to be focused upon in this phase, the PMU will use a more general approach to a more pervasive issue. A key activity for SIWSAP will be to develop a national network of stakeholders, from community to cabinet level, who better understand, and can advocate for climate change adaptation, using water as the entry point into wider discussions.

Baseline studies conducted during the PPG examined the initial vulnerabilities and primary environmental issues and problems associated with water resource management in the Solomon Islands, then followed a logical progression to identify the root causes. Many of the root causes are closely linked or overlapping. An examination of the root causes may be helpful in determining what group and behavior, or set of behaviors, might be reasonably targeted during the course of the project. The initial assessments at the sites during the Inception Phase, and development of the WS-CCAR Plans will help with understanding where certain behavior reduces the resilience of households, the communities and townships to climate change. This may include, for example looking at the difficulty with community Operation and Maintenance requirements, sanitation challenges, protecting watersheds and groundwater.

Provincial Social Marketing-Behavioural Modification Campaign

[2] For further information see: Menzies, S. 2004. The Social Marketing Guide for the Pacific. Pacific International Waters Project.

In an effort to change the "approach to problem-solving" (if not the actual behaviour) of decision-makers, the PMU will target decision-makers with the aim of convincing/persuading them that an intersectoral approach to the management of water resources across the entire watershed and coastal area is essential if sustainable social and economic development is to take place and that they have an important role in ensuring this. The SIWSAP Project makes tools and resources available to assist them.

The root causes acting together to cause degradation of aquifers, surface water quality and land in a particular hotspot geography include:

1. limited communication and collaboration between various sectors;
2. a fragmented approach to environmental management;
3. limited knowledge as to the vulnerabilities and impacts;
4. limited information on alternative practices;
5. limited knowledge of inadequate laws and policies linked to an absence of intersectoral networking and communication as a result of weak institutional arrangements.

At the provincial level it is possible to reasonably treat with the above in a "social marketing" campaign of limited duration such as during the workshops to follow development of the Water Sector-Climate Change Adaptation Response Plans for the pilot sites. The PMU will design a campaign which:

- surveys decision makers and technocrats in different sectors to determine their level of understanding of the problems associated with watershed and coastal area management.
- targets decision-makers and technocrats at provincial and national level (key actors) with the aim of sensitizing them to the issues of aquifer, surface water quality and land degradation as a consequence of climate change, and through this introducing them to some of the IWRM resources and adaptation approaches which can help them to address the problem.
- sends messages describing the extent of the problem (supported by figures and statistics etc.), presenting resources and tools being created, alternatives or actions already being undertaken by the SIWSAP Project to address these and how these resources and tools can be accessed both during and after the project.
- creates opportunities for sharing best practice and lessons learned by the Pilot Projects through development of an information portal on the project website.
- evaluates the impact of this campaign.

Convincing decision-makers that these problems can only be solved using an integrated approach, introducing them to easily accessible tools, and, persuading them to use them on an ongoing basis is a major challenge given the many things which compete for their time. The uptake of such messages by decision-makers and their actual use of the resources provided by the SIWSAP project would be a major achievement.

Pilot Project Social Marketing-Behavioural Modification Campaign

The Pilot Projects will have to determine, based upon their particular circumstances, the behavior which they might best address in the time available. Different stakeholders in the community could be brought together to decide upon the focus of such a campaign as well as to design and implement it. The benefit of this approach would include getting their buy-in and input/"wisdom" as to the local situation early.

Phase III: Document and Communicate Lessons Learned

While documentation is a routine activity at every level and stage of the project, it is important to ensure that information is easily accessible and to find effective ways of promoting the benefits and lessons learned in the SIWSAP project. The PMU, and Provincial Officers in particular need to give these issues consideration. Tools such as video and photo documentation are very useful. Advance planning is however necessary in order to incorporate these into reporting and documentation. This aspect of communications planning can have a significant positive impact upon the project sustainability. Information and resources developed as part of the project should be available to the many stakeholders well beyond the life of the project.

General Documentation and Dissemination of Information Activities

Several activities undertaken by the PMU as well as in Phase I of the Communications Plan, Public Relations and Awareness Raising, will promote the outputs of the project and how they may be accessed. During the Project, the following activities or products could be considered as means of communicating best practice and lessons learned. They could all be based upon the outputs of various project activities:

- Technical Reports
- Guides/ toolkits re. water sector vulnerabilities (e.g. resilience of rural water supply and sanitation interventions, wider water management interventions such as flood protection, watershed management and water source protection including groundwater), etc.
- 1-page fact sheets or Decision-Makers Briefing Sheets
- Pilot Project Case Studies Book
- Individual Demonstration Project Videos
- Focus meetings/workshops/seminars

Annex 7: Terms of References for Project Governance, Management Arrangements, and Key Project Staff

Project Board

The Project Board will:

- Ensure that there is coherent project organization at both the National and Provincial level
- Following agreement, set tolerances in the Annual Work Plans and other plans as required with the Project Manager, with the involvement of the Project Director (as necessary)
- Monitor and control the progress of the project activities at a strategic level considering the changes influenced by the project on any baseline investments
- Ensure that risks are being tracked and mitigated as effectively as possible
- Organise Project Board meetings, to be Chaired by the Project Director, on a regular basis to be defined by the Board in agreement with the Project Director and Project Manager. Normally these meetings will take place quarterly.
- Review and assess progress towards achieving the outputs is consistent from a project supplier perspective
- Promote and maintain focus to deliver the outputs from the project
- Ensure that the resources from the project supplier are readily available
- Arbitrate on, and ensure resolution of any supplier priority or resource conflicts
- Ensure that the expected project outputs and related activities of the project remains consistent with the perspective of project beneficiaries
- Be informed of meetings relevant to overall regional project implementation, including any regional activities conducted in partnership
- Facilitate national policy and institutional changes necessary to engender success in project activities.
- Annually review project progress and make managerial and financial recommendations as appropriate, including recruitment for the Project Management Unit, review and approval of annual reports, budgets and workplans.

Project Advisory Group

The SIWSAP Advisory Group shall:

- Serve as a source of information concerning available country resources for all aspects of project implementation, including data;
- Provide governance assistance, policy guidance and political support in order to facilitate and catalyze implementation of the project, and to ensure relevant project outcomes are appropriately raised for incorporation into other national policy processes, programmes, and national actions;
- Technically guide the project through advice and support as necessary to catalyse implementation of the project.
- Annually review programme progress and make recommendations as appropriate;

Project Director

The SIWSAP Project Director shall:

- Chair the Project Board meetings
- Act in the role to ‘oversee’ the project on a regular basis and to ensure that institutional support from MMERE is provided
- Raising project awareness across Government

- Represent the project at the national level for the Solomon Islands Government
- Ensure the flow of project results and learning to the Project Board
- This position will not be funded by the project.

Project Management Unit

The PMU will be, where required, guided by the decisions of the Project Board to support the achievement of project outcomes through the following tasks:

Project Management

- Ensure timely and effectively planning and implementation of the project
- Ensure timely and effective financial management of the project in accordance with UNDP financial and operational policies, rules and regulations for National Implementation, through effective partnership with implementing partners, responsible partners, and UNDP.
- Manage and assist implementing pilot projects through guidance and administrative support;
- Delivery of the regional components of the project with National Coordinators;

Coordination and Networking

- Coordination with other international, multilateral and bilateral activities among regional countries related to the implementation of the project, including sourcing additional funding to ensure future sustainability of project interventions (for example, through the GEF Small Grants Programme for community initiatives, supported by National Project Staff); and,
- Facilitate networking between Provincial and National stakeholders;
- Establishment of and assistance in networking between specialized institutions, stakeholders, and technical specialists from elsewhere;

Technical Support to Project Implementation

- Organization of technical cooperation activities between national organizations for capacity building, climate change, water and environmental policy, and management related to the implementation of the project;
- Organization of consultative meetings for introducing and implementing programme activities;
- Collection and dissemination of information on policy, economic, scientific and technical issues related to the project;
- Provision of support for the preparation of technical and feasibility studies;

Project Monitoring and Reporting

- Timely and effective preparation of progress reports (technical and financial) concerning programme results, outputs and activities in accordance with Project monitoring and reporting requirements based on UNDP and GEF policies and formats;

Knowledge Management and Communication

- Maintenance of project information archives- photos, video, documents, outputs, etc,
- Appropriate dissemination and publication of materials and outputs from the project;
- Capturing Pilot Project, national activities, and project process lessons learned and disseminating them in appropriate formats (maintaining project website and links to national ministries, IW:LEARN, UNDP-ALM, UNDP Websites, etc)

Project Management Unit - Specific Post Descriptions

National Project Manager (international recruitment)

The Project Manager shall be responsible for the overall planning, implementation, reporting, and timely delivery of good quality outputs and results of the Solomon Islands Water Sector Adaptation Project (SIWSAP) through providing high-quality supervision of the project Management Unit as well as effective coordination between the implementing partner, reasonable parties, beneficiaries and UNDP.

He/she will report directly with the Project Director, project board and Project Advisory Group, key beneficiaries, and other relevant bodies and stakeholders where relevant. He/she will also liaise with representatives of UNDP, and GEFSEC, as well as other regional donors, in order to coordinate the annual work plan and report on project activities, outputs, and reslts on a timely basis. The Project Manager will also liaise with other project managers and coordinators of related and relevant projects and programmes implemented by UNDP, and/or funded by GIZ, AusAID, the EU;, and UNICEF; as well as national Government and NGO's, and regional CROP Agencies as required.

He/she will be responsible for all technical, planning, managerial, monitoring, progress and financial reporting for the project. He/she will provide overall supervision for all staff in the Programme Management Unit (PMU). This will include performance planning and monitoring. The Project Manager will consult and coordinate closely with the Director of MMERE-WRD and the UNDP Deputy Resident Representative in Honiara. He/she shall also consult with the respective UNDP officers in Suva, Samoa, Bangkok, and New York and other senior representatives of partner agencies as required. In particular the Project Manager will:

- Serve as the Head of the Project Management Unit (PMU) located in the offices of MMERE-WRD, and manage its staff and budget to ensure effective delivery of project activities, outputs, and results;
- Assume general responsibility for the day-to-day management, planning, implementation, and monitoring of all project objectives and activities;
- Be responsible for the delivery of all technical outputs and plans and financial reporting in-line with the requirements of UNDP
- Supervise all related activities pursuant to implementation of the objectives and specific activities of the SIWSAP Project, specifically the successful implementation of pilot projects across the Provinces
- Prepare the annual work plan of the project, work programme and monitoring and evaluation procedures and Financial Regulations and reports on the basis of the Project Documents and in close consultation and coordination with the Project Director, Project Board, and UNDP.
- Coordinate and monitor the activities described in the work plan, and report to UNDP and the Project Board, and present to the Project Advisory Group
- Facilitate liaison and networking within the project, including with relevant donors, regional organisations, other relevant organisations, non-governmental organisations, key stakeholders and other individuals involved in project implementation
- Foster and establish links with other related South Pacific programmes and projects and, where appropriate, with other regional GEF projects, e.g. IW:LEARN, PACC
- Ensure consistency between the various project elements and related activities provided or funded by other donor organizations and national Government;

- Prepare and oversee the development of Terms of Reference for consultants and contractors, manage/follow up to ensure timely consultancy deliverables, and be ultimately responsible for the delivery of work produced by consultants under the project;
- Coordinate and oversee the timely and effective preparation of the substantive and operational reports for project implementation
- Collect and disseminate information on policy, economic, social, scientific, and technical issues related to Project implementation;
- Promote public awareness and participatory activities necessary for successful SIWSAP implementation, including overseeing the marketing and branding of SIWSAP;
- Represent the project at national and regional fora, including international events where required.
- Assist in the delivery of training courses on both technical and project management, monitoring and evaluation issues to strengthen national capacity in this area;
- Prepare progress and monitoring reports concerning project activities in accordance with the project monitoring plan, and in accordance with UNDP/GEF requirements and format; and
- Participate and prepare project reviews where required;
- Source additional funding for initiatives started by the project at the local (site and Provincial level) and national level to ensure sustainability of the interventions. This includes working with national Government to assist them in learning from project initiatives and looking for mainstreaming opportunities to ensure replication and sustainability.

Qualifications

The selected candidate will have:

- At least ten years of professional experience in senior project management posts with increasing modern management responsibility in fields related to the assignment;
- Demonstrated flexible cross-cultural team leadership, diplomatic and negotiation skills;
- Demonstrable excellent verbal and written communications skills, both at a technical level and in the preparation of information for policy makers and wider civil society;
- Previous experience in the operational aspects of UN-funded projects or similar regional/multi-country projects, as well as experience with funding organizations such as the GEF will be an advantage;
- Proven financial management experience of large budgets;
- The selected candidate will have a post graduate degree or equivalent qualifications in project management or business administration with further qualifications in one or more of the following disciplines: climate change, natural sciences, social sciences, public health, environment, economics, or water management, WATSAN, engineering (or related discipline). Small Islands Developing States and integrated water resource management experience will be an advantage.
- Excellent working knowledge of English. Familiarity and knowledge of Melanesia and their languages would be an advantage;
- Familiarity with the goals and procedures of international organizations, in particular of the GEF and UNDP. Knowledge of GEF co-financing approaches will be a distinct advantage;
- Experience of aligning project goals with wider development frameworks for long term benefits and understanding of cross-sectoral national planning processes will be highly regarded.
- Experience of evaluating both technical projects and organisational strategy, policy development and change management, including development of M&E frameworks will be an advantage.

Other essential requirements include: the ability to manage the work of consultants; a proven ability to work as part of a team; the ability to meet project deadlines, often under difficult circumstances; and an ability to live and work within Pacific Island Communities. Applicants with experience of climate change adaptation and/or integrated water resources management issues in the Pacific region will be at an advantage. Broad based development professionals are actively encouraged to apply.

Duty Station: Honiara

PMU Technical Adviser – Water Specialist (national recruitment)

The Water Specialist will work under the direct supervision of the Project Manager. The Water Specialist will assume direct responsibility for the technical delivery of the project outcomes relating to water services and water management, working with other members of the PMU. In particular the Water Specialist will:

- Contribute to the development of the annual work plan of the programme;
- Support the Project Manager, principally in technical capacity, during Board Meetings and meetings with the Advisory Group
- Coordinate and monitor the activities of the pilot projects and other replication and investment activities of the project as per the annual work plan, and provide assistance in developing the M&E plan
- Facilitate liaison and networking between the pilot sites in particular the relevant organisations involved in the project, nongovernmental organizations, key stakeholders and other individuals involved in project implementation on matters related to IWRM and climate change adaptation
- Assist with the preparation and oversight of Terms of Reference for consultants and contractors;
- Provide technical advice and support in implementing pilot activities, including specific filed work, reporting, guidance, training and capacity development where necessary
- Collect and disseminate information on climate change, adaptation, policy, economic, scientific, and technical issues related to adaptation and water relevant for the Solomon Islands
- Promote public awareness of climate change impacts and vulnerabilities, and water management solutions
- Assist with the preparation of technical and feasibility studies, and monitoring and evaluation activities where applicable;
- Assist in the delivery of training courses on both technical and project management, monitoring and evaluation issues to strengthen regional capacity in this area;
- Support project dissemination and knowledge sharing activities between countries and across the region;
- Assist with the preparation of progress reports concerning project activities; and
- Participate and prepare project reviews where required.

Qualifications

- The selected candidate will have a degree in: water resource management, engineering, water supply and sanitation, emergency relief, environmental engineering (or a related engineering discipline) or environmental science/management. Further qualifications in public health, hydrology, hydrogeology will be an advantage. Small Islands Developing States experience will be highly regarded, as will experience of understanding the links between climate change and water resources. Further experience in monitoring and evaluation will be an advantage;
- At least 5 years of professional experience in senior technical or policy advice posts;
- Demonstrated technical and project delivery skills, including experience of working in cross sectoral environments;
- Demonstrable excellent verbal and written communications skills, both at a technical level and in the preparation of information for policy makers and wider civil society;
- Previous experience in the delivery of regional/multi-country projects, as well as experience with funding organizations such as the GEF will be an advantage;
- Excellent working knowledge of English. Familiarity and knowledge of Melanesian countries and their languages would be an advantage;

Other essential requirements include: the ability to manage the work of consultants; a proven ability to work as part of a team; the ability to meet project deadlines. Applicants with a direct experience of water and climate change issues in the Solomon Islands and Pacific region will be highly regarded.

Duty Station: Honiara

PMU Technical Adviser – Climate Change Adaptation and Disaster Risk Reduction Specialist (national recruitment)

The Climate Change Adaptation and Disaster Risk Reduction Specialist will work under the direct supervision of the Project Manager. The Specialist will assume direct responsibility for the technical delivery of the project outcomes relating to climate change adaptation and disaster risk reduction (DRR), working with other members of the PMU. In particular the Climate Change Adaptation and Disaster Risk Reduction Specialist will:

- Contribute to the development of the annual work plan of the programme;
- Support the Project Manager, principally in technical capacity, during Board Meetings and meetings with the Advisory Group
- Coordinate and monitor the activities of the pilot projects and other replication and investment activities of the project as per the annual work plan, and provide assistance in developing the M&E plan
- Facilitate liaison and networking between the pilot sites in particular the relevant organisations involved in the project, nongovernmental organizations, key stakeholders and other individuals involved in project implementation on matters related to climate change adaptation and disaster risk reduction
- Serve as an expert resource for the various committees and working groups of the project;
- Assure the development of and be responsible for the successful implementation of the work plan as it relates to community participation and information, communication and education activities;
- Assist with the preparation and oversight of Terms of Reference for consultants and contractors;
- Provide technical advice and support in implementing pilot activities, including specific filed work, reporting, guidance, training and capacity development where necessary
- Collect and disseminate information on climate change, adaptation, policy, economic, scientific, and technical issues related to adaptation, DRR, and water relevant for the Solomon Islands
- Promote public awareness of climate change impacts and vulnerabilities, and water management solutions
- Assist with the preparation of technical and feasibility studies, and monitoring and evaluation activities where applicable;
- Assist in the delivery of training courses on both technical and project management, monitoring and evaluation issues to strengthen regional capacity in this area;
- Support project dissemination and knowledge sharing activities between countries and across the region;
- Assist with the preparation of progress reports concerning project activities; and
- Participate and prepare project reviews where required.

Qualifications

- The selected candidate will have a degree in: disaster management, risk reduction, climate change, vulnerability and resilience, water resource management, engineering, water supply and sanitation, environmental engineering (or a related engineering discipline) or environmental science/management. Further qualifications in public health, hydrology, hydrogeology will be an advantage. Small Islands Developing States experience will be highly regarded, as will experience of understanding the links between climate change and water resources. Further experience in monitoring and evaluation will be an advantage;
- At least 5 years of professional experience in senior technical or policy advice posts;

- Demonstrated technical and project delivery skills, including experience of working in cross sectoral environments;
- Demonstrable excellent verbal and written communications skills, both at a technical level and in the preparation of information for policy makers and wider civil society;
- Previous experience in the delivery of regional/multi-country projects, as well as experience with funding organizations such as the GEF will be an advantage;
- Excellent working knowledge of English. Familiarity and knowledge of Melanesian countries and their languages would be an advantage;

Other essential requirements include: the ability to manage the work of consultants; a proven ability to work as part of a team; the ability to meet project deadlines. Applicants with a direct experience of water and climate change issues in the Solomon Islands and Pacific region will be highly regarded.

Duty Station: Honiara

PMU Financial and Administrative Assistant (national recruitment)

The Financial and Administrative Assistant will work under the direct supervision of the Project Manager. The Assistant will assume direct responsibility for the financial management of the SIWSAP Project, under the supervision of the Project Manager whilst also working closely with other SIWSAP project team members as part of the national Project Management Unit. Close liaison will be required with the SIWSAP Provincial Officers. The Assistant shall:

- Be responsible for, coordinate and report on the financial management for the project activities, including assisting and collating financial information and reporting to UNDP
- Serve as an expert resource on financial reporting requirements;
- Provide support to the PMU and the SIWSAP Provincial Officers on efficient and effective financial management, including training support;
- Assure the development of and be responsible for the successful implementation of the work plan regarding project financial management, including regular financial monitoring and reporting as per UNDP and Solomon Island Government requirements;
- Assist the Project Manager in day-to-day running of the PMU office, including organisational support to meetings, including the National Water and Adaptation Forum
- Specifically provide logistical support for travel nationally and internationally for the PMU and Provincial Officers
- Supervise and engage in procurement procedures, including supporting the development of Terms of Reference and technical requirements, procurement and selection of equipment, shipping and handling fees, etc
- Other essential requirements include: the ability to manage the work of consultants and committees; a proven ability to work as part of al team; the ability to meet project deadlines, often under difficult circumstances; experience with the assessment of social, cultural and economic conditions in Pacific Island Countries; an understanding of Pacific cultures;

Qualifications

- The selected candidate will have a degree in accounting, financial management, or a similar subject, with demonstrable experience in project financial management.
- The candidate must possess excellent written and oral communication skills in English, familiarity and knowledge of financial processes and procedures used in Government and preferably with UNDP
- A minimum of five years of direct, relevant, project-based experience is a necessity;
- Be fully computer literate with Microsoft Office programmes;
- Excellent working knowledge of English. Familiarity and knowledge of Melanesian countries and their languages would be an advantage;
- Experience in providing a streamlined financial service role to a project management team, including experience in developing and delivering financial training materials and presentations;
- Demonstrated initiative in carrying out his/her duties and ability to work independently to tight deadlines;
- A flexible approach and a willingness to assist with a variety of other tasks within the PMU and a willingness to work outside normal hours.

This position demands a high degree of integrity and the ability to work efficiently with sometimes little direct supervision. Only applicants with demonstrable financial management experience of large projects will be considered.

Duty Station: Honiara

PMU Procurement Assistant (national recruitment)

The Procurement Assistant will provide support to the PMU in all procurement matters including the implementation of sourcing strategies, control of project assets, assisting in logistical services and support to knowledge sharing within the PMU and MMERE on UNDP Procurement guidelines.

The Procurement Assistant will also be responsible for performing key Atlas functions to ensure that goods and services are delivered in an effective and efficient manner to realise project goals. Full Terms of Reference for this post will be drafted by the Project Manager, MMERE-WRD, and the Financial and Administrative Assistant to ensure the correct skills are sourced, based on previous experience of procurement challenges in other project administered by UNDP.

SIWSAP Provincial Officers

The SIWSAP Provincial Officers will:

- Coordinate and implement activities at pilot site level, replication and strategic investment sites.
- Work closely with the Provincial Government and national agencies, including RWSS and Public Works to ensure sign off on technical implementations are in-agreement with national policies, Provincial Plans, and the SIWSAP project, in close liaison with the Project Management and PMU
- To work in a participatory manner with the Pilot Project Committees, other beneficiaries and local and national partners
- Coordinate and support the delivery of training throughout the project, including providing support to national and international consultants
- That he or she has experience in a field relevant to water management, vulnerability, climate change, disaster risk, natural resource management. Candidates with experience of data collection and analysis will be highly regarded
- That he or she will be computer literate with Microsoft Office programmes;
- That he or she will be accountable for project delivery to the Project Manager, and therefore ultimately the Project Board
- That he or she will be required, and will therefore need the necessary qualifications and experience to manage the project and to deliver on the activities. Approximately 10% of the post is expected to be spent on project management of pilot sites and replication/investment sites, with the remainder of the workload on technical implementation and delivery, communications and awareness raising, including working closely with the Pilot Project Committees and other project beneficiaries
- To request meetings with the PMU and Provincial Government where required.
- Be nationally recruited and provide a dedicated service to the SIWSAP project for 48 months maximum

Duty Station: Relevant Provincial Capitals

Note that to secure Provincial Officers housing support may need to be provided.

Pilot Project Communities

The Pilot Project Communities (PPC) will:

- be established at the level of the individual pilot projects
- help guide activities within each pilot project, and where possible help implement the activities through provision of materials, labour, etc,
- be established in agreement with benefitting communities – following a governance structure they are happy with, but contain 40% women at least
- Coordinate with local partners (NGO's for example) and Provincial Government and the SIWSAP Provincial Officer(s) for project activities and logistical support where needed.
- Work closely with the SIWSAP Provincial Officer on pilot site interventions.

National Water and Adaptation Forum

The purpose of the National Water and Adaptation Forum is to:

- Provide a meeting space for the annual SIWSAP project meeting, in addition to which
- Provide the opportunity for adaptation, climate change, vulnerability, and water resources and services work to come together to present scientific and project findings of relevance, explain what data and information people have and how it can be shared
- Training in specific areas to be defined each year
- To include external experts to discuss climate change impacts and ways to mitigate them using different technologies and capacities that may not be nationally present
- To share stories, lessons, videos and other communications material from the Provinical level to National level
- To better understand the real life adaptation challenges from Provincial stakeholders and communities themselves
- For an annual meeting of the PMU with the SIWSAP Provincial Officers for annual training needs
- To promote climate change concerns, and the need for better cross-sectoral knowledge sharing and action to central government, and to the wider media and journalists specifically invited
- The Forum (post SIWSAP specific meetings) will be Chaired by the National Climate Change Working Group and the two sub-groups of the Development Partners Working
- Group and the NGO Working Group.

Annex 8: Stakeholder Engagement Plan

During the PPG Phase a stakeholder assessment was undertaken to determine which institutions had the experience, capacity, and interest to work in support of the project. The following institutions were identified:

Solomon Islands Development Trust (SIDT) – is an indigenous non-government organisation working with villagers across the Solomon Islands to promote community empowerment, community led development and inclusive participation. They are a key stakeholder for SIWSAP, having been involved in implementing parts of the AusAID supported rural WASH work, and having key competencies in community engagement. SIDT focus on sustainable infrastructure and look at replicating successful approaches across communities. They look to villager participation, acceptance, and ultimately ownership, through focusing on capacity development. They strive to ensure that communities are always correctly informed prior to interventions, and that the communities themselves are part of the process for any external intervention. This is critical to ensure traditional governance is both respected, and learned from as part of the capacity development process. They also work on a variety of different communications tools, from printed media to radio at community level, theatre, child centered approaches (they have a child centered project on adaptation), participation, village advocacy and networks.

World Vision – is a Christian relief, development and advocacy organisation dedicated to working with children, families, and communities to overcome poverty and injustice. In the Solomon Islands they work with a variety of different partners, from Government to development agencies. They have specific experience of working on WASH interventions, including both small scale infrastructure interventions but also on behaviour change regarding schools, children, and hygiene practices. In Malaita and Temotu Provinces they also work on livelihoods and resilience work, identifying and mitigating community identified climate change risks and natural hazards.

Kastom Garden Association – is a local NGO that works with Solomon Island communities to improve their food futures through: community food security assessment training in small scale village agriculture; supporting family nutrition; and in association with the Solomon Islands Planting Material Network, the provision of training and assistance in setting up and managing community-based seed and planting material production/distribution networks. To further the goal of regional food security, Kastom Garden Association cooperates with community organizations, development agencies, agriculture departments, hospitals and health services, religious organizations, government and donors.

SWoCK (Strogem Woaka lo Community fo Kaikai) is a UNDP implemented project in partnership with the Ministry of Agriculture, Livestock and the Ministry of Environment, Climate Change, Disaster Management and Meteorology to strengthen the ability of communities to make informed decisions and manage likely climate change driven pressures on food production and management systems. SWoCK will develop vulnerability and adaptation assessment approaches and tools for agriculture and livelihoods activities, and assist communities and households to plan and implement ways to improve and sustain food and crop production.

Live and Learn Environmental Education (LLEE) – is an international NGO which focuses on local knowledge and global understanding as the starting points in developing an ethic in environmental and development education. Local ownership of environmental and development education programs, open participation and equality remain the foundation of LLEE approaches. They work with communities throughout the Pacific to better understand climate change, on water, sanitation and hygiene activities, particularly sanitation, and in community based disaster prevention and preparedness. LLEE are a partner with UNICEF in their new EUWI project for sanitation and hygiene promotion.

Adventist Development & Relief Agency (ADRA) – is an NGO that mainly focuses on the physical construction of water points, the provision of material for communities to build their own water points and toilets, and the rehabilitation of damaged or old sites. They do have a specific sanitation component that builds public latrines attached to clinics so that patients can be served, and this also provides training with communities on installing water equipment and basic maintenance. They also focus on health and HIV. ADRA works across all the Provinces, and also works on disaster risk reduction in Makira Province, funded by AusAID.

Rural Development Programme (World Bank) – is a national programme that works on community level development, focused on small scale infrastructure including water supply and sanitation, and the modalities it uses to engage communities. The Programme and its staff have a lot of experience in working across Provinces, and in the procurement of equipment and materials, adaptation planning and interventions, operation and maintenance and payments schemes. Between 201-2012 RDP completed 51 projects with a total value over US$1m.

Solomon Islands Red Cross – have a Disaster Risk Reduction (DRR) programme that has identified the need to build adaptation skills in communities. They focus on 'attachment' programmes whereby they take one community to another around common issues so that the communities can act together and therefore learn together. They work in Malaita, Choiseul, Western Province, Isabel, Guadalcanal and in the peri-urban area around Honiara. They also work on governance structures and provide small grants (up to 15,000SBD) to communities for water supply, sanitation and health (WASH) projects. Most of the activities have focused on providing rainwater tanks, and some composting toilet (CT) construction. An earlier project under their Preparedness for Climate Change Programme focused on Vulnerability Capacity Assessment (VCA) which worked with communities in disaster prone areas using VCA tools to facilitate and gather information and help them decide on suitable coping strategies.

Furthermore, projects under implementation and development were consulted and discussed with UNDP where possible. These projects offer key learning and guidance for SIWSAP and are briefly identified below for the Project Management Unit to engage with during full project implementation:

Pacific Adaptation to Climate Change Programme (PACC) - UNDP with the South Pacific Regional Environment Programme (SPREP) acting as the Executing Agency, developed a GEF funded regional programme called the Pacific Adaptation to Climate Change Programme (PACC). Building on earlier climate change work through the Pacific Climate Change Assistance Programme,PACC is particularly focused on developing guidelines for reducing the vulnerability of small isolated island communities, specifically in relation to food production and food security.

Pacific Integrated Water Resources Management Project – a UNDP-GEF regional project that targets water supply and demand in the capital city of Honiara using the IWRM approach. The demonstration site for this project is implemented by WRD, the same agency that will implement SIWSAP. Lessons emerging from the application of IWRM in this project are useful to guide the SIWSAP project. The focus of SIWSAP will be rural areas so it will not duplicate any activity of the Pacific IWRM project in Honiara.

Community Resilience to Climate and Disaster Risk in Solomon Islands Project (CRISP) – a project about to start by the World Bank, focused on increasing the resilience of selected communities to the impacts of climate change and natural hazards by strengthening government capacity in disaster and climate risk management, and in implementing disaster risk reduction and climate change adaptation investments in selected communities.

Choiseul Integrated Climate Change Program (CHICHAP) – Choiseul Province has developed a holistic programme designed to coordinate multiple interventions at the Provincial level between national government and development partners. Supported by SPC, SPREP, GIZ, the Pacific-Australia Climate Change Science and Adaptation Planning Programme (PACCSAP), The Nature Conservancy, and UNDP (through SWoCK), the CHICHAP Program provides a coordinating function to ensure that activities are supporting each other to improve the resilience of Lauru people and local communities against climate change and natural disasters. The program is a province wide – cross-sectoral, 'ridge-to-reef' approach designed to coordinate activities and support a multitude of provincial national commitments.

Provincial Governance Strengthening Project (PGSP) –implemented by UNDP and funded by UNDP together with other donors (UNCDF, EU and AusAID) is strengthening the capacity of Provincial Governments to plan and implement development programmes as well as in administration of provincial affairs. During implementation SIWSAP will work closely with PGSP on activities in the Provinces.

Building Human Development: Improving WASH in the Solomon Islands – is a project funded by the EU Water Initiative and implemented by UNICEF. It focuses on Choiseul, Isabel, Renbel, Makira, and Temotu Provinces – and in some towns in those provinces. This project will focus on improving water supply and sanitation facilities to communities and schools, and to help mobilise sector reform for improved WASH and to mobilise the new rual WASH policy. This project will be a key partner for SIWSAP.

Improved governance and access to WASH for rural people – is a sector reform contract to the Solomon Islands government from the EU focusing on improving the living conditions of rural populations through implementation of the rural WASH policy and in scheme design and construction across the Provinces. MHMS-EHD – are already a key partner in SIWSAP as a co-implementer. The expected funding for this is in the region of €17m.

Solomon Islands Access to Clean Water &Sanitation Initiative (SIACWSI) – is an ongoing initiative started in 2008 with development partners and the MHMS. AusAID is a lead donor to the Health Sector, providing around AUD $20m a year, and has supported the development of the National Health Strategic Plan 2011-2015 which prioritizes rural WASH. Support for SIACWSI is provided through sector health support. Despite the priority attached to rural WASH; it has remained as a parallel project type 'approach' within the MHMS. Initiated in 2010, SIACWSI is an AUD $11m initiative designed to mobilize rural WASH activities with other development partners, such as the EU improved governance and access to WASH for rural people sector support to MHMS. SIACWSI aims to (i) increase coverage of WASH in rural areas, (ii) improve sector coordination, capacity and equity, (iii) establish sustainable and inclusive operation and maintenance models, and (iv) establish sustainable systems for improved hygiene awareness and to create demand for socially inclusive sanitation. A mid-term review of SIACSWI in 2012 resulted in a change for the initiative, and to work with MHMS in reforming its approach to WASH; including the need for the Rural Water Supply and Sanitation Unit (RWSSU) to take a more '*regulating, coordinating, monitoring, developing and enforcing standards and becoming a contract manager rather than implementer'* role in the sector, and to contract out as much as possible. The challenge, as SIACSWI re-engages in implementation, is to mobilize the RWSSU and reform it into a new mode of delivery, and at the same time build capacity of NGOs, private sector, and other possible service providers to deliver the quality and quantity of works, in a sector expecting a tripling of development support. SIWSAP will work closely with SIACSWI, and MHMW-EHD with RWSSU as a co-implementer of the project.

Annex 9: Project Implementation Schedule

SIWSAP Workplan	Year 1				Year 2				Year 3				Year 4			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Outcome 1 Water Sector – Climate Change Adaptation Response Plans formulated, integrated and mainstreamed in water sector-related and in broader policy and development frameworks																
Output1.1 *Vulnerability assessments of water supplies (in terms of quantity and quality) to climate change in targeted critical areas refined or formulated*																
1.1.1 Establish Pilot Project Committees(recruit staff to be placed within the RWSS/EHD of the 6 pilot provinces as well as mobilise Community Water Committees in the pilot communities																
1.1.2 Design Water Vulnerability Assessment Framework through Inception Workshops in pilot sites																
1.1.3 Establishment of Vulnerability of assessment teams																
1.1.4 Conduct water vulnerability assessments in 6 pilot provinces																
1.1.5 Propose measures to reduce priority Water Vulnerability in 6 pilot provinces and communities																
1.1.6 Develop training package in development and use of the water vulnerability assessment process(Budgeted as Outcome 4 activity)																
Output 1.2 *WS-CCAR plans prepared in the context of IWRM and in line with and integrated into existing local and national policy and development planning processes*																
1.2.1 Host participatory design workshops at 6 pilot province and communities, to get inputs to the WS-CCAR based on an enhanced awareness of water sector vulnerabilities within the respective provinces and communities																

SIWSAP Workplan	Year 1				Year 2				Year 3				Year 4			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1.2.2 Develop training package for participatory WS-CCAR design methods that engages various stakeholders (including theatre, games ,radio programmes and/or audiovisuals) (Budgeted as Outcome 4 activity)																
Output 1.3 *Government budgets allocated to support implementation of key components of WS-CCAR plans*																
1.3.1 Conduct cost-benefit analysis of interventions proposed through vulnerability assessment and participatory design workshop to select most appropriate activities, in consultation with the PPC's and other beneficiaries																
1.3.2 Develop proposed budgets for selected water resource resilience measures to be integrated into the WS-CCAR, development policies and/or annual budgets																
1.3.3 Finalize costed WS-CCAR plans in the six pilot provinces and communities																
1.3.4 Validation and adoption of the WS-CCAR plans																
1.3.5 Develop training package in development and use of the CBA approaches applied to water sector (Budgeted as Outcome 4 activity)																
1.3.6 Conduct replication site assessments and selection of 6 provincial and 6 community replication sites																
1.3.7 Training and facilitation of WS-CCAR plans																

SIWSAP Workplan	Year 1				Year 2				Year 3				Year 4			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
in replication sites led by 6 pilot provinces and communities																
1.3.8 Finalisation of WS-CCAR plans in replication sites																
Outcome 2 Increased reliability and improved quality of water supply in targeted areas																
Output 2.1 *Community-level WS-CCA soft measures implemented to improve sanitation and water supply in times of scarcity*																
2.1.1 Six pilots sites across the country to enhance the capacity to adopt/ maintain a variety of different interventions, guided by the WSCCAR plans to frame water adaptation interventions, including:																
• Strategic rainwater storage options • Sourcing/development of new water sources																
• Protecting existing sources, include ecosystem/watersheds using payment protection schemes (i.e. payment for ecosystem services)																

SIWSAP Workplan	Year 1				Year 2				Year 3				Year 4			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
• Groundwater management improvement and training, including protocol development																
• Groundwater surveys/assessments																
• Rehabilitation of existing systems, including reservoirs and filters																
• Sanitation campaigns and introduction of trial latrines for community assessment and review (Province wide campaigns for Western, and Temotu)																
Output 2.2 *Community-based Climate Early Warning and Disaster Preparedness Information System tailored for water resources management developed and implemented in targeted areas*																
2.2.1 Participatory design of top-down and bottom-up Water Resource EWS in 6 pilot sites																
2.2.2 Development of detail design of the EWS in 6 pilot sites																
2.2.3 Procurement, installation, and system testing of EWS in 6 pilot sites																
2.2.4 Development and dissemination of communication materials (i.e. radio programme and videos) of how to establish water resource EWS																
2.2.4 Replication of EWS establishment efforts in selected sites																
Outcome 3 Investments in cost-effective and adaptive water and sanitation management and technology transfer																
Output 3.1 Strategic investments in water infrastructure in target areas, including but not limited to: new household and communal water storage systems and infrastructure; provision of up to 4 portable water filtration and/or desalination systems for sharing across communities in times of																

SIWSAP Workplan	Year 1				Year 2				Year 3				Year 4			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
extreme water scarcity																
3.1.1 20 Adaptation Sites identified using vulnerability information across six Provinces with community driven and designed water and adaptation interventions							■	■	■							
3.1.2 Projects implemented with the support and training from the PMU and SIWSAP Provincial Officers								■	■	■	■	■				
3.1.3 Adaptation interventions designed and integrated into national and development partner projects focussing on rural WASH								■	■	■	■	■	■	■	■	
3.1.4 Regional partnerships with CROP Agencies and others for training communities and government in relevant subjects specifically at the 20 sites (3.1.1) (i.e. adaptation planning, new WASH approaches, water resource assessments, catchment hydrology and meteorology, DRR, communications)				■	■	■			■	■	■			■		
Output 3.2. *Compilation of best practices on applicable technologies for dissemination and replication by project partners with support from the project*																
3.2.1 Recruitment of local communications specialists to develop national products explaining the project, tailoring outputs, developing communications materials to influence behaviour change, and raise awareness (advocacy outputs)				■	■			■	■				■	■		
3.2.2 Mobilise volunteer(s) support to develop best practice material and guidance – taking technical responses into guidance notes, briefing materials, training videos, national, regional, and international outputs to be developed that build on lessons and experience from SIWSAP and co-financing partner projects							■	■	■	■						
Outcome 4 Improved governance and knowledge management for CCA in the water sector at the local and national levels																

SIWSAP Workplan	Year 1				Year 2				Year 3				Year 4			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Output 4.1: *Overarching policy and legislation for the water sector that integrates CCA components in IWRM plans drafted and advocated, including guidelines for climate resilient*																
4.1.1 Development of a Climate Change Knowledge Clearing House with partners																
4.1.2 Scientific Output: climate change impacts on the water resources of the Solomon Islands																
4.1.3 Development of and publication of guidelines for climate resilient water supply and sanitation development in vulnerable areas of the Solomon Islands																
4.1.4 With Partners, design, development, facilitation, and resourcing for a National Water and Adaptation Forum																
Output 4.2 *Institutional and community capacities strengthened toward water-sector CCA formulation, implementation and monitoring at the national and local levels*																
4.2.1 Improvements in current, and expansion of national hydrological monitoring sites to include climatic/meteorological parameters																
4.2.2 Development of the Sanitation and Adaptation Partnership with Tuvalu, including exchange visits, assessments, active demonstrations with partners																
4.2.3 Design and implementation of a National Sanitation Campaign, including demonstrations and consultations																
4.2.4 Peer-to-Peer Learning Network established, including site exchange visits within and between Provinces																
4.2.5 Development of a national diploma on Water and Adaptation with the Solomon Islands National University, including higher course development																

SIWSAP Workplan	Year 1				Year 2				Year 3				Year 4			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
4.2.6 Community and provincial level training of climate adaptive water management infrastructure maintenance and sustainability (in conjunction with Output 2.1 and 3.1)																
Output 4.3 *Multi-media knowledge products on CC, CCA, IWRM, lessons learned and best practices developed and disseminated extensively to communities, schools and the general population and through ALM*																
4.3.1 Participatory video and video diary 'kits' and training procured and implemented across communities																
4.3.2 Commissioning of theatre and radio communication products and roll-out across schools, Churches, rural training centres and communities on climate change impacts, vulnerabilities, impacts on water resources, protection and pollution and sanitation																
4.3.3 Project communication branding development, and open source sharing of all materials																
M&E																
Project Meetings																

Climate Change Adaptation - LDCF/SCCF Adaptation Monitoring and Assessment Tool

Goal: Support developing countries to become climate resilient by integrating adaptation measures in development policies, plans, programs, projects and actions
Impact: Reduced absolute economic losses at country level (including loss of life, property and ecosystem services) due to climate change, including variability
Indicator: Economic loss trend over a project period and beyond due to climate change, including variability
Metric: Total property loss per event in $US/ Number of people affected by event during the project lifetime (Use CRED or Country Data)

Objective 1: Reduce vulnerability to the adverse impacts of climate change, including variability, at local, national, regional and global level

	Outcome and Output Indicators	Metric	Target at CEO Endorsement		Baseline	
Outcome 1.1: Mainstreamed adaptation in broader development frameworks at country level and in targeted vulnerable areas						
			Number	**Type**	**Number**	**Type**
Indicator 1.1.1	Adaptation actions implemented in national/sub-regional development frameworks	Number and type				
			Type	**YES/NO**	**Type**	**YES/NO**
Indicator 1.1.2	For each action listedunder indicator 1.1.1, indicate which ones include adaptation budget allocation and targets	Yes =Y, No=N				
			Type	**Score**	**Type**	**Score**
Indicator 1.1.3	For each action listed under indicator 1.1.1, indicate to what extent targets set out in plans have been met	Score: 1= Not significantly 2= Significantly 3= significantly				
Output 1.1.1: Adaptation measures and necessary budget allocations included in relevant frameworks						
			Type	**Level**	**Type**	**Level**
Indicator 1.1.1.1	Development frameworks that include specific budgets for adaptation actions	List type of development framework and briefly describe the level of the action	Water and Adaptation Plan\forms Provincial Plan	Provincial	No adaptation budgeting, guidance, or planning	Provonical
			Type	**Level**	**Type**	**Level**
Indicator 1.1.1.2	Sectoral strategies that include specific budgets for adaptation actions	List type and level				
			Type	**Level**	**Type**	**Level**
Indicator 1.1.1.3	Regulatory reform and fiscal incentive structures introduced that incorporate climate change risk management	List type and level				
Outcome 1.2: Reduced vulnerability in development sectors						
Based on development sector(s) that project/program targets, select appropriate indicator(s) from list below or provide relevant indicator to track reduced vulnerability in targeted development sector:						
Indicator 1.2.1	Infection rates of population to climate- sensitive diseases as compared with past population infected per year similar climatic conditions (% change)	% change			0% change	
			Female	**Male**	**Female**	**Male**
Indicator 1.2.2	% of targeted population covered by innovative insurance mechanisms (disaggregated by gender)	% disaggregated by gender				
Indicator 1.2.3	Number of additional people provided with access to safe water supply and basic sanitation services given existing and projected climate change	number disaggregated by gender	16000	20000	142000 (water supply) / 32.000 (sanitation)	158000 (water supply) / 48.000 (sanitation)
Indicator 1.2.4	Increase in water supply targeted areas	tons/m^3			no increase	
Indicator 1.2.5	Increase in agricultural productivity in targeted areas	tons/ha			no increase	
Indicator 1.2.6	Water availability for energy production	(liters/gallons available for hydropower)				
Indicator 1.2.7	Energy production from hydropower	(kW/hr generated from hydro)				
Indicator 1.2.8	% change in projected food production in targeted area given existing and projected climate change	% change of food production (measured in tons/year)			0% change	
Indicator 1.2.9	% change in food availability given existing and projected climate change	% change in food availability (measured in tons/year)			0% change	
Indicator 1.2.10	% change in income generation in targeted area given existing and projected climate change	% change in income (US $)			0% change	
			Female	**Male**	**Female**	**Male**
Indicator 1.2.11	% of population with access to improved flood and drought management	% of population disaggregated by gender				
Indicator 1.2.12	% of livestock farmers covered by a monitoring and early warning and response action scheme for climate sensitive plants pests and diseases	% of livestock farmers				
Indicator 1.2.13	% of cropland area covered by a monitoring and early warning and response action scheme for climate sensitive plants pests and diseases	% of cropland area (Ha)				
			Female	**Male**	**Female**	**Male**
Indicator 1.2.14	Vulnerability and risk perception index (Score) - Disaggregated by gender	The score for this indicator will have to be assigned based on the results of a conducted survey. The score ranges from 1 to 5 and below are the explanations of the rankings: 1. Extreme Vulnerability 2. High Vulnerability 3. Medium Vulnerability 4. Low Vulnerability 5. No Vulnerability				
Output 1.2.1: Vulnerable physical, natural and social assets strengthened in response to climate change impacts, including variability						
As with Outcome indicators, include or select indicators, include or select indicator(s) relevant to sector project/program is targeting:						
			Type	**Level**	**Type**	**Level**
Indicator 1.2.1.1	Health measures introduced to respond to climate-sensitive disease	Type and level				
			Type	**Level**	**Type**	**Level**
Indicator 1.2.1.2	Resilient infrastructure measures introduced to prevent economic losses	Type and level				

			Type	Level		Type	Level
Indicator 1.2.1.3	Climate resilient agricultural practices introduced to promote food security	Type and level					
			Type	Level		Type	Level
Indicator 1.2.1.4	Sustainable drinkine water management practices introduced to increase access to clean drinkine water	Type and Level					
			Catchment mngt (see 1.1.1)	local to Province		Catchment mngt (see 1.1.1)	local to Province
			Rainwater harvesting	Community to local		Rainwater harvesting	Community
			Groundwater mgmt and protection	Community to local		Groundwater mgmt and protection	Community
			solid waste removal	Community to local		solid waste removal	Community
			Pollution removal and control	Community to local		Pollution removal and control	Community
			improved sanitation practices	Provincial		improved sanitation practices	Community
			Type	Level		Type	Level
Indicator 1.2.1.5	Sustainable water management practices introduced to increase access to irrigation water under existing and projected climate change	Type and level					
			Type	Level		Type	Level
Indicator 1.2.1.6	Sustainable water management practices introduced to increase energy production from water resources under existing and projected climate change	Type and level					
			Type	Level		Type	Level
Indicator 1.2.1.7	Type and level of innovative insurance mechanisms introduced to reduce climate induced damages	Type and Level					
			Type	Level		Type	Level
Indicator 1.2.1.8	Type and level of integrated disaster response measures to extreme climate events introduced to increase number of lives saved	Type and level					
Outcome 1.3: Diversified and strengthened livelihoods and sources of income for vulnerable people in targeted areas							
			Female	Male		Female	Male
Indicator 1.3.1	Households and communities have more secure access to livelihood assets	Score - Disaggregated by gender. *Score for this indicator will have to be assigned based on the results of a conducted survey. The score ranges from 1 to 5 and below are the explanations of the rankings: 1. No access to livelihood assets 2. Poor access to livelihood assets 3. Moderated access to livelihood resources 4. Secure access to livelihood resources 5. Very secure access to livelihood resources*					
Indicator 1.3.2	% increase per capita income of farm households due to adaptation measures applied	%				0 % increase	
Indicator 1.3.3	% increase per capita income of households outside of climate change vulnerable sectors due to adaptation measures applied	%				0% increase	
Output 1.3.1: Targeted individual and community livelihood strategies strengthened in relation to climate change impacts, including variability							
Indicator 1.3.1.1	% of targeted households that have adopted resilient livelihoods under existing and projected climate change	%				0 targeted households	

Annex 11: UNDP Risk Log

#	Description	Date Identified	Type	Impact & Probability	Countermeasures / Mngt response	Owner	Submitted, updated by	Last Update	Status
1	Civil unrest	Pre-PPG Phase	Operational Organizational Political Other (Safety)	The project would be unable to function due to limited ability f government to function, travel restrictions, safety concerns. P = 1 I = 5	Monitoring of political and security situation by UNDP Regular discussions with Government				*Current?*
2	Weather impedes travel to Provinces, in some cases for months. Health and safety concerns with outer islands and drought weather/boat rides. Extreme natural events	Aug 2013	Environmental Operational	Delay in implementation at field sites, and in participation from outer islands Health and safety of project staff and partners P =2 I = 4	Avoiding travel during times of the year when the weather is known to be changeable and rough seas Project will purchase 2 safety kits for boat travel containing lifejackets, strobe, satellite phones, other emergency equipment				
3	Insufficient ownership of pilot site interventions by communities involved	Aug 2013	Operational Organizational	P =1 I = 4	Consistent support to communities with local project staff at the Provincial level and their direct involvement in shaping pilot site interventions and in delivering the project. As the project outputs				

					and outcomes will benefit communities directly, it is expected that cooperation will be at the highest level. Participatory approaches through IWRM, capacity building and communications will build strong ownership by communities. The project will also explore in-kind inputs from communities, where feasible.				
4	Limited capacity in government agencies to implement the project and sustain project outcomes	Aug 2013	Operational	It may be difficult to find the Project officers required at Provincial level with the skills needed, making pilot site implementation difficult P =2 I = 4	Provincial officers will be recruited with Provincial Administration support. PMU will assist the officers in their duties with quarterly review meetings on progress. Strengthening water governance is one of the project components. This would cover capacity building of government partners and communities in all				

					aspects of the project and post-project activities. Ownership of the project by the partners will be ensured by letting them take the lead with assistance from the project team.				
5	Provincial administrations are unable to secure budget allocations at end of project for adaptation	Aug 2013	Organizational	Medium to long term impact of project is put at risk P =2 I = 3	The project is specifically designed to work at the Provincial level with the administrations to highlight the adaptation costs and implications throughout the project				
6	Inappropriate use of sanitation increases pollution	Aug 2013	Environmental Regulatory	Poor use of sanitation interventions may pollute fresh water P =1 I = 4	Sanitation will only be developed in areas where pollution risks can be minimised, using closed systems or compost toilets (eco-san). All sanitation interventions will be development with a monitoring plan				
7	Large tracts of land under customary ownership could be an			Lack of site access, reduction of pollutants, or inability to protect water sources	The IWRM process in formulating CCA plans will undertake				

	impediment to spatial approaches in CC-A IWRM if landowners do not cooperate			P =1 I = 3	consultative and transparent processes, including with landowners. The co-benefits from IWRM through partnerships will be emphasized with landowners.				
8	Weak coordination amongst project partners may impede project progress				The project will support the initiative of the MECDM to sustain (convened in October 2011): Climate Change Working Group (CCWG); Sub-Group of Development Partners within the CCWG; Sub-Group of Government and NGO Partners within the CCWG; Annual Environment Donors Roundtable; and Environment Summit. This initiative aims to strengthen partnership among partners, leadership by government and coordination among stakeholders. The				

					Initiative is currently being discussed and project will support the coordination mechanisms that will be promulgated through this Initiative.				

Annex 12: References

ADB (2013) Asian Development Bank & Solomon Islands Fact Sheet. http://www.adb.org/countries/solomon-islands/main

ADB (2011). Guidelines for Climate Proofing Investment in the Transport Sector Road Infrastructure Projects. http://www.adb.org/sites/default/files/guidelines-climate-proofing-roads.pdf

Anderson, G. and Kear, D. (2007). Review of the training programme of the South Pacific Applied Geoscience Commission for the SOPAC Governing Council, April 1991. SOPAC Miscellaneous Report #126. http://ict.sopac.org/VirLib/MR0126.pdf

AusAID - Health Resource Facility (2013). Joint Audit and Capacity Assessment of Solomon Islands Access to Clean Water and Sanitation Initiative: Final Report. February 2013.

Australian Bureau of Meteorology and CSIRO (2011). Climate Change in the Pacific: Scientific Assessment and New Research. Volume 2: Country Reports. Chapter 13: Solomon Islands" http://www.pacificclimatechangescience.org/wpcontent/uploads/2013/06/PCCSP_Vol2_Ch13_Solomonislands.pdf

Batchelor, C., Schouten, T., Smits, S., Moriarty, P. and Butterworth, J. (2009). Climate change and WASH services delivery – Is improved WASH governance the key to effective mitigation and adaptation? Perspectives Paper prepared for the 5th World Water Forum, Istanbul, Turkey. http://www.worldwatercouncil.org/fileadmin/world_water_council/documents_old/Library/Publications_and_reports/Climate_Change/PersPap_14._WASH_Services_Delivery.pdf

Bourke, R.M., Camarotto, C., D'Souza, E.J., Nema, K., Tarepe, T.N. and Woodhouse, S. (2004). *Production Patterns of 180 Economic Crops in Papua New Guinea*. Coombs Academic Publishing, The Australian National University, Canberra. 213 pp.

Carpenter, C., and Jones, P. (2004). An Overview of Integrated Water Resource Management in Pacific Island Countries: A National and Regional Assessment. Status Report for GWP – Integrated Water Resource Management (IWRM). SOPAC Miscellaneous Report 554.

Cole, A.J., Pratchett, M.S. and Jones, G.P. (2008) Diversity and functional importance of coral-feeding fishes on tropical coral reefs. *Fish and Fisheries 9*:286-307.

Falkland, A. (2011) Report on water Security and Vulnerability to Climate change and Other Impacts in Pacific Island Countries and East Timor. For the Pacific Adaptation Strategy Assistance Program, Department of Climate change and Energy efficiency, GHD Pty, Ltd. August, 2011.

Folke, C., S. R. Carpenter, B. H. Walker, M. Scheffer, F. S. Chapin III, and J. Rockström. (2010). Resilience thinking: integrating resilience, adaptability and transformability. Ecology and Society 15(4): 20.http://www.ecologyandsociety.org/vol15/iss4/art20/

GEF Secretariat (2010). Revised Programming Strategy on Adaptation to Climate Change for the Least Developed Countries Fund (LDCF) and the Special Climate Change Fund (SCCF). GEF/LDCF.SCCF.9/4/Rev.1 http://www.thegef.org/gef/CC_adaptation_strategy_doc

Gero, A., Fletcher, S., Rumsey, M., Thiessen, J., Kuruppu, N., Buchan, J., Daly., J, and Willetts. J. (2013). *Disaster response and climate change in the Pacific*. National Climate Change Adaptation Research Facility, Gold Coast, pp. 202.

Hansell, J.R.F. and Wall. J.R.D. (1976). *Land resources of the Solomon Islands*. Surbiton, Surrey edition: Land Resources Division, Ministry of Overseas Development; 1St Edition

Hunnam, P., Kenny, G. and Carpenter, C. (2011). Pacific Adaptation to Climate Change Project Solomon Islands MTE Report 23. Oct.2012 draft. http://erc.undp.org/evaluationadmin/downloaddocument.html?docid=6732

Integrated Water Resources and Wastewater Management Project in Pacific Island Countries (2007). National Diagnostic Report - Water Resources Management Situation in Solomon Islands. http://www.pacific-iwrm.org/pacific-iwrm-documents/National-IWRM-Diagnostic-Reports/Solomon-Islands---National-Diagnostic-Report-for-the-GEF-Pacific-IWRM-Project/

IFRC (2012). Community early warning systems: guiding principles. International Federation of Red Cross and Red Crescent Societies, Geneva, 2012. http://www.ifrc.org/PageFiles/103323/1227800-IFRC-CEWS-Guiding-Principles-EN.pdf

IPCC (2008) IPCC Fourth Assessment Report: Climate Change 2007. http://www.ipcc.ch/publications_and_data/ar4/wg2/en/tssts-4-1-2-ecosystems.html#footnote15

Kastom Gaden (2006). Survey of South Guadalcanal

Krchnak, K., Smith, M. and Deutz, A., (2011) Putting Nature in the Nexus: Investing in Natural Infrastructure to Advance Water-Energy-Food Security *Bonn2011 Conference: The Water, Energy and Food Security Nexus – Solutions for the Green Economy, Background Papers for the Stakeholder Engagement Process, IUCN/TNC*

Lacovino, C. (2013). Ecosystem-based adaptation and climate change vulnerability in Choiseul Province, Solomon Islands – a synthesis report. Apia, Samoa : SPREP, 2013. http://www.sprep.org/attachments/Publications/Choiseul_Sol_EBA_synthesis.pdf

MacQuarrie, P. and Barchiesi, S. (2013). Climate Change Adaptation within a Resilience Framework: The Importance of Adaptive Capacity and Resilience Monitoring. SEARCH Resilience Briefing No. 2. Adapted from Smith, M. 2011. Combining the what and how of building climate resilience: water ecosystems and infrastructure. pp. 201-203 in: Waughray D (editor), Water Security: The Water-Food-Energy-Climate Nexus. Island Press, Washington DC, and; Smith, M. 2011. Development and Application of a Resilience Framework to Climate Change Adaptation. SEARCH Resilience Briefing No. 1.

Ministry of Environment Conservation and Meteorology (2008) Solomon Islands State of Environment Report, 2008. http://www.sids2014.org/content/documents/180SOLOMONISLANDS-STATEofENVIRONMENT2008.pdf

Ministry of Health and Medical Services – Environmental Health Division, Solomon Islands Government (2013). Rural Water Supply, Sanitation and Hygiene Policy. Draft. June, v.11

Moriarty, P. B. et al. (2004). *Resources, infrastructure, demands and entitlements (RIDe): a framework for holistic and problem-focussed water resources assessments*. (WHIRL Project working paper; no. 9). Chatham, UK, NRI.
Moriarty, P.B.; Batchelor, C.H.; Laban, P. and Fahmy, H. 2010. Developing a practical approach to 'light IWRM' in the Middle East. Water Alternatives, 3(1): 122-136.

Mudaliar, M.M., Bergin, C. and MacLeod, K. (2008). Drinking Water Safety Planning: A Practical Guide for Pacific Island Communities. World Health Organization and Pacific Islands Applied Geoscience Commission. Suva, Fiji. WHO/SOPAC Joint Contribution Report 193

Munasinghe, M. and Swart, R. (2005). Primer on Climate Change and Sustainable Development: Facts, Policy Analysis and Applications, Cambridge University Press, Cambridge ISBN 0521008883 xii and 445 pp.

National Disaster Council, (2009). National Disaster Risk Management Plan: For Disaster Management Arrangements and Disaster Risk Reduction including for Climate Change. October, 2009.

Nelson D. R., Adger W. N. and Brown K. (2007). Adaptation to environmental change: contributions to a resilience framework. *Annual Review of Environment and Resources* 32: 395-419.

Pacific Adaptation to Climate Change Project (2011) Vulnerability and Adaptation Assessment Report for Low-Lying Atolls – Ontong Java http://www.sprep.org/attachments/Climate_Change/PACC_Solomons_VA_Report.pdf

Pacific Horizon Consultancy Group (2008). Solomon Islands State of Environment Report 2008. Honiara. http://www.sids2014.org/content/documents/180SOLOMONISLANDS-STATEofENVIRONMENT2008.pdf

Pahl-Wostl, C. (2009). A conceptual framework for analyzing adaptive capacity and multi-level learning processes in resource governance regimes. *Global Environmental Change, 19*(3):354-365.

Pacific Climate Change Science Program (2011). Climate Change in the Pacific: Scientific Assessment and New Research. Volume 1: Regional overview. http://www.pacificclimatechangescience.org/wp-content/uploads/2013/08/Climate-Change-in-the-Pacific.-Scientific-Assessment-and-New-Research-Volume-1.-Regional-Overview.pdf

Potter, S. (2008) *The Sting of Climate Change: Malaria and Dengue Fever in Maritime Southeast Asia and the Pacific Islands.* Lowy Institute Policy Brief. http://www.lowyinstitute.org/files/pubfiles/Potter,_The_sting_of_climate_change.pdf

SIWSAP Inception Workshop, 16-17 April 2013, Honiara.

Solomon Islands Government (2013). National Water Resources and Sanitation Policy (September, 2013, draft)

Solomon Islands Government (2013). The National Rural Water Supply, Sanitation and Hygiene Policy (v.11, July, 2013, draft)

Solomon Islands Government (2013). Establishing an 'Integrated National Framework for Resilient Development' (INaF), Draft Concept Note, 2013

Solomon Islands Government (2011). National Development Strategy 2011-2020

Solomon Islands Government (2009). National Agriculture and Livestock Sector Policy 2009-2014 http://www.spc.int/lrd/index.php?option=com_docman&task=doc_download&gid=1049&Itemid=125

Solomon Islands Government (2009). National Waste Management Strategy and Action Plan 2009-2014

Solomon Islands Government (2001). Solomon Islands Initial National Communication under the UNFCCC—Submitted 2004. http://unfccc.int/resource/docs/natc/slbnc1.pdf

Solomon Islands Government (2000). Population Report

SOPAC/UNDP/UNEP/GEF Project. http://www.pacific-iwrm.org/

SOPAC (2012). Catalogue of Rivers for Pacific Islands. http://www.sopac.org/sopac/hycos/SOPAC%20Rivers%20Catalogue%20Full%20version.pdf

SOPAC (2007) Solomon Islands Country Information http://www.pacificwater.org/pages.cfm/country-information/solomon-islands.html

Smith, D.M. and Barchiesi, S. (2009). Environment as infrastructure – resilience to climate change impacts on water through investments in nature. Perspectives Paper prepared for the 5th World Water Forum, Istanbul, Turkey. http://www.worldwatercouncil.org/fileadmin/world_water_council/documents_old/Library/Publications_and_reports/Climate_Change/PersPap_02._Environment_as_Infrastructure.pdf

Stern, N., 2006, *Review on the Economics of Climate Change*, H.M. Treasury, UK, October. http://www.sternreview.org.uk

Yamin, F., Mitchell, T. and Tanner, T. (2005). Linking climate adaptation: a research agenda. IDS Bulletin, Volume 36, Issue 4.

UN (2013). Millennium Development Goals: 7 Ensure environmental sustainability. Fact Sheet. http://www.un.org/millenniumgoals/pdf/Goal_7_fs.pdf

UNISDR (2009).Terminology http://www.unisdr.org/we/inform/terminology

UNDP (2010).Designing Adaptation Initiatives. http://www.undp-aap.org/sites/undp-aap.org/files/A%20Toolkit%20for%20Designing%20Adaptation%20Initiatives%20(Mar%202010).pdf

WHO (2004).Guidelines for drinking water quality - Volume 1: Recommendations. http://www.who.int/water_sanitation_health/dwq/gdwq3rev/en/

Wikipedia (2013) Map of the Solomon Islands. http://en.wikipedia.org/wiki/File:Solomon_Islands_1989.jpg

World Bank (2011). Pacific Catastrophe Risk Financing Initiative: Catastrophe Risk Assessment and Options for Regional Risk Financing. Phase 1 Report.

World Water Council Co-operative Programme on Water and Climate and IUCN (2009). Don't stick your head in the sand! Towards a framework for climate-proofing. http://www.worldwatercouncil.org/fileadmin/world_water_council/documents_old/Library/Publications_and_reports/Towards_a_Framework_for_Climate-Proofing.pdf

Annex 13: Co-Finance Letters of Support

SOLOMON ISLANDS GOVERNMENT

OFFICE OF THE PERMANENT SECRETARY FOR MINISTRY OF DEVELOPMENT PLANNING AND AID COORDINATION
P.O. BOX G30
HONIARA, SOLOMON ISLANDS

Tel No: (+677) 38255/38336 Fax No: (+677) 30490/30163

12th December 2013

Akiko Suzaki
Joint Presence Manager and
UNDP Deputy Resident Representative
City Centre Building, 1st Floor
Mendana Avenue
Honiara
Solomon Islands

Re: CO-FINANCING COMMITMENT
Solomon Islands Water Sector Adaptation Project (SIWSAP). Solomon Islands.

Dear Ms Suzaki,

The Solomon Islands Government would hereby like to express its commitment to allocate co-finance support to the GEF funded Solomon Islands Water Sector Adaptation Project over the four years of implementation, with a total of USD37,080,000 as co-finance to support the achievement of project objectives.

The initiatives which will support SIWSAP include:

- US$ 23,370,000 - Improving governance and access to WASH for rural people from the European Development Fund 10, under a Sector Reform contract (FED/2012/023-803).
- US$10,260,000 - Solomon Islands Access to Clean Water and Sanitation Initiative (SIACWSI), through the Health Sector Support Program supported by AusAID; and
- US$3,450,000 - Solomon Islands Water Sector Development Programme under the Governments Multi Year Development Budget 2014-2017

The above projects are focused on a number of activities which are relevant to the SIWSAP project, including improving sector coordination and capacity, establishing sustainable water supply and sanitation systems and approaches, and conducting water source surveys and protection activities.

Yours sincerely

.....
Jeremiah Manele
Permanent Secretary
Ministry of Development Planning and Aid Coordination

MINISTRY OF DEVELOPMENT PLANNING & AID CO-ORDINATION
P.O.BOX G30
HONIARA
SOLOMON ISLANDS

United Nations Development Programme

Solomon Islands Sub-Office, Multi-Country Office in Fiji

UNDP Solomon Islands

29 November, 2013

Dear Ms.Dinu,

RE: CO-FINANCING SUPPORT TO THE SOLOMON ISLANDS WATER SECTOR ADAPTATION PROJECT (SIWSAP)

The UNDP Solomon Islands Sub-Office is pleased to confirm its parallel co-financing support to the important project "Solomon Islands Water Sector Adaptation Project (SIWSAP) that aims to strengthen resilience of selected communities throughout Solomon Islands to the adverse impacts of climate change on their water resources.

UNDP is currently implementing an institutional strengthening project that aims to strengthen the abilities of Provincial Governments (sub-national level) to plan, budget and implement small scale infrastructure projects in communities throughout the country's nine (9) provinces. Out of this, approximately 25 percent of the total grants is allocated for the WASH sector. Under the second phase of the Provincial Governance Strengthening Programme (PGSP), which will commence in April 2014, UNDP will provide a parallel co-financing of 6,400,000 USD to complement the activities that will be undertaken under SIWSAP.

SIWSAP and PGSP will be completing each other in the areas of strengthening capacities for incorporation of climate resilient approaches in water resources management into Provincial Development Plans, as well building the capacities of the Provincial Governments to effectively implement WASH activities. Furthermore, through the provision of grants for small-scale infrastructure projects to Provincial Governments, the activities of SIWSAP will be strongly connected to those of PGSP, especially in the six targeted Provinces of the SIWSAP design. UNDP will ensure that there is strong coordination between these two projects and that the collaboration will lead to an effective co-financing to the SIWSAP.

Thank you for your kind support and cooperation.

Yours Sincerely,

Akiko Suzaki
Deputy Resident Representative
UNDP Solomon Islands

Ms. Adrianna Dinu
Officer-in-Charge and Deputy
Executive Coordinator of UNDP – GEF
UNDP Headquarters
New York

CHOISEUL PROVINCE

PROVINCIAL OFFICE
P.O. BOX 34, TARO
CHOISEUL BAY
SOLOMON ISLANDS

Phone: 63131/63132, fax: 63113/63131

Ms Akiko Suzaki
United Nations Development Programme
Honiara Sub-Office
P.O.Box 1954
Solomon Islands

Date : 30 th April 2013

Dear Ms Suzaki,

Subject: Co-financing support to Solomon Islands Water Sector Adaptation Project.

The Choiseul Provincial Government is pleased to confirm that it will provide financing support to this project 'Solomon Islands Water Adaptation Project'. This project is an intervention of the Solomon Islands National Adaptation Plan of Action (NAPA).

The Choiseul Provincial Government will provide an in-kind contribution of SBD 800,000 through provincial budget for water and sanitation sector. The LDCF project will address water sector vulnerabilities and water resources capacity for the provincial township of Taro as well as Poroporo Community, located in the Choiseul Bay area. This co financing support will apply to the 4 years that the project will be implemented. The Choiseul Provincial Government will ensure that there is close collaboration between the water sector and project to ensure effective co financing of this LCDF project.

Thank you very much for your kind support and cooperation.

Yours sincerely,

John Tabepuda
Provincial Secretary
Choiseul Provincial Government

MALAITA PROVINCIAL GOVERNMENT
P.O. BOX 63
AUKI
MALAITA PROVINCE
SOLOMON ISLANDS

TEL: (677) 40071/40072
Fax: (677) 40220

MALAITA PROVINCE

Your Ref: **Our Ref** **Date: 11 August 2013**

Attention
Ms Akiko Suzaki
United Nations Development Programme
Honiara Sub-Office
P.O.Box 1954
Solomon Islands

Dear Ms Suzaki,

SUBJECT: CO-FINANCING SUPPORT TO SOLOMON ISLANDS WATER SECTOR ADAPTATION PROJECT

The Malaita Provincial Government is pleased to confirm that it will be a stake holder in (province) co-financing support to this project 'Solomon Islands Water Sector Adaptation Project'. This project is an intervention of the National Adaptation Programme of Action (NAPA).

The Malaita Provincial Government will provide an in-kind contribution of SBD180, 000.00 through its "Rural Development Programme' and an provincial water and sanitation budget of SBD 50,000. The LCDF project will address water sector vulnerabilities and water resources capacity for the rural sites of Manaoba and Taarutona, Malaita Province. The co-financing support will apply for the first year of project implementation, 2014. The Malaita Provincial Government will ensure there is close collaboration between the water sector and project for effective and efficient co-financing of this LDCF project.

Thank you very much for your kind support and cooperation.

Yours sincerely,

MALAITA PROVINCE
OHMS

Honourable Everett Kairi Edgar
Minister for Economic Development Planning and Aid Coordination
Malaita Provincial Government

UNDP Environmental and Social Screening Template (December 2012)

QUESTION 1:

Has a combined environmental and social assessment/review that covers the proposed project already been completed by implementing partners or donor(s)?

Select answer below and follow instructions:

☒ →NO: Continue to Question 2 (do not fill out Table 1.1)

☐→YES: No further environmental and social review is required if the existing documentation meets UNDP's quality assurance standards, and environmental and social management recommendations are integrated into the project. Therefore, you should undertake the following steps to complete the screening process:

1. Use Table 1.1 below to assess existing documentation. (It is recommended that this assessment be undertaken jointly by the Project Developer and other relevant Focal Points in the office or Bureau).
2. Ensure that the Project Document incorporates the recommendations made in the implementing partner's environmental and social review.
3. Summarize the relevant information contained in the implementing partner's environmental and social review in Annex A.2 of this Screening Template, selecting Category 1.
4. Submit Annex A to the PAC, along with other relevant documentation.

Note: Further guidance on the use of national systems for environmental and social assessment can be found in the UNDP ESSP Annex B.

TABLE 1.1: CHECKLIST FOR APPRAISING QUALITY ASSURANCE OF EXISTING ENVIRONMENTAL AND SOCIAL ASSESSMENT	**Yes/No**
1. Does the assessment/review meet its terms of reference, both procedurally and substantively?	
2. Does the assessment/review provide a satisfactory assessment of the proposed project?	
3. Does the assessment/review contain the information required for decision-making?	
4. Does the assessment/review describe specific environmental and social management measures (e.g. mitigation, monitoring, advocacy, and capacity development measures)?	
5. Does the assessment/review identify capacity needs of the institutions responsible for implementing environmental and social management issues?	
6. Was the assessment/review developed through a consultative process with strong stakeholder engagement, including the view of men and women?	
7. Does the assessment/review assess the adequacy of the cost of and financing arrangements for environmental and social management issues?	

Table 1.1 (continued) For any "no" answers, describe below how the issue has been or will be resolved (e.g. amendments made or supplemental review conducted).

QUESTION 2:

Do all outputs and activities described in the Project Document fall within the following categories?

☐ Procurement (in which case UNDP's Procurement Ethics and Environmental Procurement Guide need to be complied with)
☐ Report preparation

☐ Training
☐ Event/workshop/meeting/conference (refer to Green Meeting Guide)
☐ Communication and dissemination of results

Select answer below and follow instructions:

☒ **NO** → Continue to Question 3
☐ **YES** → No further environmental and social review required. Complete Annex A.2, selecting Category 1, and submit the completed template (Annex A) to the PAC.

QUESTION 3:

Does the proposed project include activities and outputs that support *upstream* planning processes that potentially pose environmental and social impacts or are vulnerable to environmental and social change (refer to Table 3.1 for examples)? (Note that *upstream* planning processes can occur at global, regional, national, local and sectoral levels)

Select the appropriate answer and follow instructions:

☐ **NO** → Continue to Question 4.

☒ **YES** →Conduct the following steps to complete the screening process:

1. Adjust the project design as needed to incorporate UNDP support to the country(ies), to ensure that environmental and social issues are appropriately considered during the upstream planning process. Refer to Section 7 of this Guidance for elaboration of environmental and social mainstreaming services, tools, guidance and approaches that may be used.
2. Summarize environmental and social mainstreaming support in Annex A.2, Section C of the Screening Template and select "Category 2".
3. If the proposed project ONLY includes upstream planning processes then screening is complete, and you should submit the completed Environmental and Social Screening Template (Annex A) to the PAC. If downstream implementation activities are also included in the project then continue to Question 4.

TABLE 3. 1 **EXAMPLES OF UPSTREAM PLANNING PROCESSES WITH POTENTIAL DOWNSTREAM ENVIRONMENTAL AND SOCIAL IMPACTS**	Check appropriate box(es) below
1. Support for the elaboration or revision of **global- level** strategies, policies, plans, and programmes. *For example, capacity development and support related to international negotiations and agreements. Other examples might include a global water governance project or a global MDG project.*	
2. Support for the elaboration or revision of **regional-level** strategies, policies and plans, and programmes. *For example, capacity development and support related to transboundary programmes and planning (river basin management, migration, international waters, energy development and access, climate change adaptation etc.).*	x
3. Support for the elaboration or revision of **national-level** strategies, policies, plans and programmes. *For example, capacity development and support related to national development policies, plans, strategies and budgets, MDG-based plans and strategies (e.g. PRS/PRSPs, NAMAs), sector plans.*	x
4. Support for the elaboration or revision of **sub-national/local-level** strategies, polices, plans and programmes. *For example, capacity development and support for district and local level development plans and regulatory frameworks, urban plans, land use development plans, sector plans, provincial development plans, provision of services, investment funds, technical guidelines and methods, stakeholder engagement.*	x

QUESTION 4:

Does the proposed project include the implementation of *downstream* activities that potentially pose environmental and social impacts or are vulnerable to environmental and social change?

To answer this question, you should first complete Table 4.1 by selecting appropriate answers. If you answer "No" or "Not Applicable" to all questions in Table 4.1 then the answer to Question 4 is "NO." If you answer "Yes" to any questions in Table 4.1 (even one "Yes" can indicated a significant issue that needs to be addressed through further review and management) then the answer to Question 4 is "YES":

☐ **NO** → No further environmental and social review and management required for downstream activities. Complete Annex A.2 by selecting "Category 1", and submit the Environmental and Social Screening Template to the PAC.

☒ **YES** → Conduct the following steps to complete the screening process:

1. Consult Section 8 of this Guidance, to determine the extent of further environmental and social review and management that might be required for the project.
2. Revise the Project Document to incorporate environmental and social management measures. Where further environmental and social review and management activity cannot be undertaken prior to the PAC, a plan for undertaking such review and management activity within an acceptable period of time, post-PAC approval (e.g. as the first phase of the project) should be outlined in Annex A.2.
3. Select "Category 3" in Annex A.2, and submit the completed Environmental and Social Screening Template (Annex A) and relevant documentation to the PAC.

TABLE 4.1:	**ADDITIONAL SCREENING QUESTIONS TO DETERMINE THE NEED AND POSSIBLE EXTENT OF FURTHER ENVIRONMENTAL AND SOCIAL REVIEW AND MANAGEMENT**	
1.	**Biodiversity and Natural Resources**	**Answer** (Yes/No/ Not Applicable)
1.1	Would the proposed project result in the conversion or degradation of modified habitat, natural habitat or critical habitat?	No
1.2	Are any development activities proposed within a legally protected area (e.g. natural reserve, national park) for the protection or conservation of biodiversity?	No
1.3	Would the proposed project pose a risk of introducing invasive alien species?	No
1.4	Does the project involve natural forest harvesting or plantation development without an independent forest certification system for sustainable forest management (*e.g. PEFC, the Forest Stewardship Council certification systems, or processes established or accepted by the relevant National Environmental Authority*)?	No
1.5	Does the project involve the production and harvesting of fish populations or other aquatic species without an accepted system of independent certification to ensure sustainability (*e.g. the Marine Stewardship Council certification system, or certifications, standards, or processes established or accepted by the relevant National Environmental Authority*)?	No
1.6	Does the project involve significant extraction, diversion or containment of surface or ground water? *For example, construction of dams, reservoirs, river basin developments, groundwater*	No

TABLE 4.1: ADDITIONAL SCREENING QUESTIONS TO DETERMINE THE NEED AND POSSIBLE EXTENT OF FURTHER ENVIRONMENTAL AND SOCIAL REVIEW AND MANAGEMENT		
	extraction.	
1.7	Does the project pose a risk of degrading soils?	No
2.	**Pollution**	**Answer** (Yes/No/ Not Applicable)
2.1	Would the proposed project result in the release of pollutants to the environment due to routine or non-routine circumstances with the potential for adverse local, regional, and transboundary impacts?	No
2.2	Would the proposed project result in the generation of waste that cannot be recovered, reused, or disposed of in an environmentally and socially sound manner?	No
2.3	Will the propose project involve the manufacture, trade, release, and/or use of chemicals and hazardous materials subject to international action bans or phase-outs? *For example, DDT, PCBs and other chemicals listed in international conventions such as the Stockholm Convention on Persistent Organic Pollutants, or the Montreal Protocol.*	No
2.4	Is there a potential for the release, in the environment, of hazardous materials resulting from their production, transportation, handling, storage and use for project activities?	No
2.5	Will the proposed project involve the application of pesticides that have a known negative effect on the environment or human health?	No
3.	**Climate Change**	
3.1	Will the proposed project result in significant[1] greenhouse gas emissions? *Annex E provides additional guidance for answering this question.*	No
3.2	Is the proposed project likely to directly or indirectly increase environmental and social vulnerability to climate change now or in the future (also known as maladaptive practices)? You can refer to the additional guidance in Annex C to help you answer this question. *For example, a project that would involve indirectly removing mangroves from coastal zones or encouraging land use plans that would suggest building houses on floodplains could increase the surrounding population's vulnerability to climate change, specifically flooding.*	No.Project intends to reduce vulnerability
4.	**Social Equity and Equality**	**Answer** (Yes/No/ Not Applicable)
4.1	Would the proposed project have environmental and social impacts that could affect indigenous people or other vulnerable groups?	Yes. Positive impacts
4.2	Is the project likely to significantly impact gender equality and women's empowerment[2]?	Yes.Positive impacts
4.3	Is the proposed project likely to directly or indirectly increase social inequalities now or in	No

[1] Significant corresponds to CO_2 emissions greater than 100,000 tons per year (from both direct and indirect sources). Annex E provides additional guidance on calculating potential amounts of CO_2 emissions.

[2] Women are often more vulnerable than men to environmental degradation and resource scarcity. They typically have weaker and insecure rights to the resources they manage (especially land), and spend longer hours on collection of water, firewood, etc. (OECD, 2006). Women are also more often excluded from other social, economic, and political development processes.

TABLE 4.1: ADDITIONAL SCREENING QUESTIONS TO DETERMINE THE NEED AND POSSIBLE EXTENT OF FURTHER ENVIRONMENTAL AND SOCIAL REVIEW AND MANAGEMENT	
the future?	
4.4 Will the proposed project have variable impacts on women and men, different ethnic groups, social classes?	No
4.5 Have there been challenges in engaging women and other certain key groups of stakeholders in the project design process?	No
4.6 Will the project have specific human rights implications for vulnerable groups?	No
5. Demographics	
5.1 Is the project likely to result in a substantial influx of people into the affected community(ies)?	**No**
5.2 Would the proposed project result in substantial voluntary or involuntary resettlement of populations? *For example, projects with environmental and social benefits (e.g. protected areas, climate change adaptation) that impact human settlements, and certain disadvantaged groups within these settlements in particular.*	No
5.3 Would the proposed project lead to significant population density increase which could affect the environmental and social sustainability of the project? *For example, a project aiming at financing tourism infrastructure in a specific area (e.g. coastal zone, mountain) could lead to significant population density increase which could have serious environmental and social impacts (e.g. destruction of the area's ecology, noise pollution, waste management problems, greater work burden on women).*	No
1. Culture	
6.1 Is the project likely to significantly affect the cultural traditions of affected communities, including gender-based roles?	No
6.2 Will the proposed project result in physical interventions (during construction or implementation) that would affect areas that have known physical or cultural significance to indigenous groups and other communities with settled recognized cultural claims?	No
6.3 Would the proposed project produce a physical "splintering" of a community? *For example, through the construction of a road, powerline, or dam that divides a community.*	No
2. Health and Safety	
7.1 Would the proposed project be susceptible to or lead to increased vulnerability to earthquakes, subsidence, landslides, erosion, flooding or extreme climatic conditions? *For example, development projects located within a floodplain or landslide prone area.*	No
7.2 Will the project result in increased health risks as a result of a change in living and working conditions? In particular, will it have the potential to lead to an increase in HIV/AIDS infection?	No
7.3 Will the proposed project require additional health services including testing?	No
3. Socio-Economics	
8.1 Is the proposed project likely to have impacts that could affect women's and men's ability to use, develop and protect natural resources and other natural capital assets? *For example, activities that could lead to natural resources degradation or depletion in communities who depend on these resources for their development, livelihoods, and well-being?*	No

TABLE 4.1: ADDITIONAL SCREENING QUESTIONS TO DETERMINE THE NEED AND POSSIBLE EXTENT OF FURTHER ENVIRONMENTAL AND SOCIAL REVIEW AND MANAGEMENT		
8.2	Is the proposed project likely to significantly affect land tenure arrangements and/or traditional cultural ownership patterns?	No
8.3	Is the proposed project likely to negatively affect the income levels or employment opportunities of vulnerable groups?	No
9.	**Cumulative and/or Secondary Impacts**	**Answer** (Yes/No/ Not Applicable)
9.1	Is the proposed project location subject to currently approved land use plans (e.g. roads, settlements) which could affect the environmental and social sustainability of the project? *For example, future plans for urban growth, industrial development, transportation infrastructure, etc.*	No
9.2	Would the proposed project result in secondary or consequential development which could lead to environmental and social effects, or would it have potential to generate cumulative impacts with other known existing or planned activities in the area? *For example, a new road through forested land will generate direct environmental and social impacts through the cutting of forest and earthworks associated with construction and potential relocation of inhabitants. These are direct impacts. In addition, however, the new road would likely also bring new commercial and domestic development (houses, shops, businesses). In turn, these will generate indirect impacts. (Sometimes these are termed "secondary" or "consequential" impacts). Or if there are similar developments planned in the same forested area then cumulative impacts need to be considered.*	No

ANNEX A.2: ENVIRONMENTAL AND SOCIAL SCREENING SUMMARY

(to be filled in after Annex A.1 has been completed)

Name of Proposed Project: Integrating Climate risks and resilence in the water sector of Solomon Islands-Solomon Islands Water Sector Adaptation Project

A. Environmental and Social Screening Outcome

Select from the following:

☐ Category 1. No further action is needed

☒ Category 2. Further review and management is needed. There are possible environmental and social benefits, impacts, and/or risks associated with the project (or specific project component), but these are predominantly indirect or very long-term and so extremely difficult or impossible to directly identify and assess.

☐ Category 3. Further review and management is needed, and it is possible to identify these with a reasonable degree of certainty. If Category 3, select one or more of the following sub-categories:

☐ Category 3a: Impacts and risks are limited in scale and can be identified with a reasonable degree of certainty and can often be handled through application of standard best practice, but require some minimal or targeted further review and assessment to identify and evaluate whether there is a need for a full environmental and social assessment (in which case the project would move to Category 3b).

☐ Category 3b: Impacts and risks may well be significant, and so full environmental and social assessment is required. In these cases, a scoping exercise will need to be conducted to identify the level and approach of assessment that is most appropriate.

B. Environmental and Social Issues (for projects requiring further environmental and social review and management)

In this section, you should list the key potential environmental and social issues raised by this project. This might include both environmental and social opportunities that could be seized on to strengthen the project, as well as risks that need to be managed. You should use the answers you provided in Table 4.1 as the basis for this summary, as well as any further review and management that is conducted.

1. The Project will aim to reduce the impact of climate change on water sector in remote atoll islands, which will include repair and maintenance on the existing water storage systems, hence the impact on environment will be minimal but social benefit from the project will help and ease the burden of water shortage and provide more benefit to the women and children.

2. The Project will address vulnerabilities issues in the water sector, and it will involve development of Water Sector Climate Change Adaptation Response Plans in the context of Integrated Water Resource Management, whicih will be developed for 6 pilot sites . Inspite the good intentions of this actions community people may not see this actions as tangible benefits. Consequently, capacity buildiing in the form of on the job trainings and awareness raising will need to be carried out to support the commmunity and create sustainability to the project.

3.The project will involve improved storage of water capacity in the targeted sites/ communities. This will attract people from neighbouring villages to collect water during dry periods. In one perspective this is positive as more people can benefit from water and can be linked to improved adaptation of targeted sites as well as their neighbours, This does not mean people will be migrating in numbers overnight but with proper management and rules it will definitely provide quality water to the people.

4. The project will include improved accessibility to water in the targeted sites , these would result in the reduction of burdens for collecting water for the familiy. Due to the structure of the community and culture the task usually remains for the women and young children. The project will be able bring water close to the community, therefore the people should not travel far and

should also spend less time collecting water. Consequently, this will also allow women to engage in other livelihood activities to support their families.

5. The project will be working in rural areas where majority of land is customary owned. Therefore there may be minor land issues during the course of the project. However, with proper consultation and communication such issue will be easily resolved.

6.In this project, Outcome 4 / Output 4.2 focuses on ' Improved governance and knowledge management for Climate Change Adaptation in the water sector at the local and national levels.' In particular, Ouput 4.1 is on 'Institutional and community capacities strengthened toward water-sector CCA formulation, implementation and monitoring at the national and local levels. With this, one key issue is community ownership and maintenance of assests that this project provides to the targeted sites. This can lead on to unsustainability of good practices that this project has attempted in addressing.

7. The capacity of community with basic skills and knowledge on project implementation and the provision of adequate understanding of repair and maintenance should be enhance along with the concepts of Integrated Water Resources Management will definitely create sustainability to the project.

C. Next Steps (for projects requiring further environmental and social review and management):

In this section, you should summarize actions that will be taken to deal with the above-listed issues. If your project has Category 2 or 3 components, then appropriate next steps will likely involve further environmental and social review and management, and the outcomes of this work should also be summarized here. Relevant guidance should be obtained from Section 7 for Category 2, and Section 8 for Category 3.

The project will need to undergo further environmentl and social review and management. These will include the following outcomes:

1. Ownership and maintenance for sustainability that is critical at the sub-naitonal and rural levesl can be addressed by strengthening or building from existing governance structures/mechanisms that work well for communities. This will aslo include identification of community leaders and champions who can faciliate community work. Additionally, institutionalise revenue collection at the community level to achive sustainability of community assets.

2. Strengthening capacities at the local to subnational level to improve their understanding and awareness about climate change risks and the concept of integrated water resource management.

3. Adoption of strategies to mitigating land disputess and employ broader and inclusive consultations incuding men, women, children, landowners at subnational and rural community levels.

D. Sign Off

Project Manager	**Date**
PAC	**Date**
Programme Manager	**Date**

Annex 15: Responses to Project Reviews

GEF Secretariat Review Question	GEF Secretariat Recommended Action by CEO Endorsement	Response
7. Is the project aligned with the focal /multifocal areas/ LDCF/SCCF/NPIF results framework?	Not entirely. Some expected outputs are not aligned with the CCA Results Framework. Please refer to Section 14.	As per Section 14, Outputs have been alinged by: - Removing Outputs 1.2.1 and 1.2.2 - Consolidating Outputs in Components 1 and 3
8. Are the relevant GEF 5 focal/ multifocal areas/LDCF/SCCF/NPIF objectives identified?	Not clearly. The project identifies Objective CCA-1 only. However, some of the Outcomes in Component 1 and Component 3 fit Objective CCA-2. Namely: Expected Outputs 1.1.1, 3.1.2, 3.1.3, and 3.1.4. Likewise, some of the activities listed under Component 2 could potentially support objective CCA-3, including technologies for effective water catchment and storage demonstration and replication, and use of water filtration systems. Recommended Action: please include objective CCA-2 in Table A. Also, please consider including objective CCA-3. April 23, 2012: Objectives CCA-2 and CCA-3 have been included in the FA Strategy Framework.	Objectives CCA-2 and CCA-3 have been included in the FA Strategy Framework.
11. Is (are) the baseline project(s), including problem (s) that the baseline project(s) seek/s to address, sufficiently described and based on sound data and assumptions?	Not clearly. The proposal lists a number of interventions as "baselines", however some of these are not sufficiently described and/or cannot be accounted for as baseline: a) Uncoordinated donor support, listed under Component 1 cannot be accounted as baseline, as it is not a development activity upon which the adaptation interventions can be built on. b) The baseline referring to SIWA under Component 2 is not sufficiently described. c) The proposal states a UNDP/GEF project on IWRM. GEF-funded projects may not work as baseline for LDCF-funded projects. d) Further information is needed on water sanitation projects by Australian government and the Red Cross program, such as total investment amount. The EU-funded "Rural	Pilot sites have been indicated in the Project Document as well as alignment of pilot sites to AudAid and EU projects have also been described within Project Document Output 2.1.

GEF Secretariat Review Question	GEF Secretariat Recommended Action by CEO Endorsement	Response
	Water and Sanitation Improvement initiative" can be accounted as a solid baseline for this proposal, depending on whether it targets the same pilot sites as this proposal. Recommended Actions: Please clarify the areas of intervention for the EU-funded project. Furthermore, if the projects listed above, in this Section, are to be considered baselines, please describe further: How much money is invested in these initiatives? How many beneficiaries do they target? Which are the pilot sites? For how long have these initiatives been implemented? April 23, 2012: From the proposal, it would appear that the RWSS programme, consisting of two projects on rural WatSan, and jointly funded by the EU and Aus Aid, will serve as baseline for the investment component of the project (component 2). The EU-funded project is expected to start implementation in 2013; the AusAid initiative, started in 2010. However, it is important that the pilot sites for both interventions (EU and AusAid-funded activities) are the same as the pilot sites of the proposed project. Recommended Action: By CEO Endorsement, please state the pilot sites for the proposed project, and demonstrate their correspondence to the areas of intervention of the baseline project, RWSS.	
13. Are the activities that will be financed using GEF/LDCF/SCCF funding based on incremental/ additional reasoning?	Not clearly. Please see Section 11 on the clarification of potential baseline projects for this proposal. Without sufficiently described baselines, it is difficult to justify additional cost principle. April 23, 2012: Yes, the EU- and AusAID â€“funded projects will be complemented with the inclusion of climate change adaptation measures to make the basic	The EU- and AusAID â€“funded projects will be complemented with the inclusion of climate change adaptation measures to make the basic water supply and sanitation projects resilient to the impacts of climate change. The SIWSAP project will build on the baseline project "Rural Water and Sanitation Improvement Initiative" by integrating CC considerations in significant ongoing and planned water sector projects that are primarily developmental in nature.

GEF Secretariat Review Question	GEF Secretariat Recommended Action by CEO Endorsement	Response
	water supply and sanitation projects resilient to the impacts of climate change. The SIWSAP project will build on the baseline project "Rural Water and Sanitation Improvement Initiative" by integrating CC considerations in significant ongoing and planned water sector projects that are primarily developmental in nature.	
14. Is the project framework sound and sufficiently clear?	No. Activities listed as Outputs 1.2.1 and 1.2.2 are not adaptation Outputs. It is not clear if these activities are budgeted under Component 1. LDCF cannot finance investment dialogues and meetings to seek additional funding for this project. Some of the Expected Outputs under Component 1 and 3 are redundant and could be consolidated: Output 1.1.2 and 1.1.3 and 3.1.1; as well as 3.1.3 and 3.1.4. Expected Output 2.1.1 specifically mentions "protection and restoration of ecosystems that protect critical water resources". These activities may need to be done under "business-as-usual" initiatives, if other pressures on these ecosystems exist and are not predominantly climatic in nature. Such activities should focus on managing other pressures on these ecosystems, whereas managing impacts of climatic stress can be financed under the LDCF. Recommended Action: Please remove Outputs 1.2.1 and 1.2.2. Please remove redundant Outputs or consolidate as describe above. Consider reducing the requested budget for each component as redundant outputs are consolidated. Please describe the adaptation benefits of protecting and restoring ecosystems, i.e. given the prospect of climate change and variability, as it is included under Output 2.1.1., as well as explaining why this method is	As per Section 14, Outputs have been alinged by: - Removing Outputs 1.2.1 and 1.2.2 - Consolidating Outputs in Components 1 and 3

GEF Secretariat Review Question	GEF Secretariat Recommended Action by CEO Endorsement	Response
	being selected to improve sanitation and water supply, in the context of climate change. April 23, 2012: Outputs 1.2.1 and 1.2.2 have been removed. Outputs in Components 1 and 3 have now been consolidated. The restoration activities in Output 2.1.1 are explained: restoration and protection of watersheds is expected to contribute to the conservation of the limited freshwater lens, as the primary source of potable water; possibly reducing variability in water supply during droughts. Outcome 2.2 has been added, to contribute to Objective CC-A 3, and has increased the grant amount requested in Component 2, by $1,758,000. Co-financing for the component has increased as well (by $7 M), and this component is now labeled "INV" as opposed to "TA". This Outcome includes outputs on water and sanitation infrastructure investments and, according to Section B.2 in the proposal, proven technologies will be demonstrated in communities covered by the project through a sequential implementation, particularly of infrastructure investments.	
15. Are the applied methodology and assumptions for the description of the incremental/additional benefits sound and appropriate?	Not clearly. Please refer to previous point on Output 2.1.1, in Section 14. April 23, 2012: This is cleared. See Section 14.	This comment has been addressed
18. Does the project take into account potential major risks, including the consequences of climate change and provides sufficient risk mitigation measures? (i.e., climate resilience)	Not entirely. Poor coordination among project partners is a high risk in the project as it currently stands. Recommended Action: please identify coordination amongst project partners to be a high risk, and identify solid mitigation measures to respond. April 23, 2012: The MECDM is undergoing discussions for a CC	The MECDM is undergoing discussions for a CC Working Group initiative to strengthen partnerships. This has been proposed as a mitigation measure for the risk of weak coordination among partners.

GEF Secretariat Review Question	GEF Secretariat Recommended Action by CEO Endorsement	Response
	Working Group initiative to strengthen partnerships. This has been proposed as a mitigation measure for the risk of weak coordination among partners.	
19. Is the project consistent and properly coordinated with other related initiatives in the country or in the region?	Not clearly. The proposal does not mention the current project being developed by the World Bank which is also requesting LDCF resources. Other initiatives by other MFIs are also under preparation. Coordination with these agencies is not discussed in this proposal. This discussion is critical for further development of this project. Further clarification is also needed to ensure that the following initiatives do not duplicate efforts of the current proposal and/or explain in more detail how this proposal will benefit from and/or incorporate lessons learned in such initiatives: 1. Pacific Integrated Water Management project. 2. Provincial Government Strengthening Project 3. Constituency development funds (especially since these Funds aim to scale up IWRM and CCA) 4. Solomon Islands Red Cross Health and Sanitation Program The SEMRICC (UNDP) project is not mentioned in this section. Clarification on coordination with this initiative, to avoid overlap of activities is needed. Recommended action: please provide clarification and more information on coordination efforts as requested in this section. April 23, 2012: Coordination with WB and ADB initiatives is explained. Coordination with other activities is also clear.	Coordination with WB and ADB initiatives is explained. Coordination with other activities is also clear.
20. Is the project implementation/ execution arrangement adequate?	Not entirely. There is very little mention of execution arrangements as this project is in very early stages of preparation. However, coordination with other activities in the country is not	This comment has been addressed.

GEF Secretariat Review Question	GEF Secretariat Recommended Action by CEO Endorsement	Response
	clear in some cases. See Section 19. Recommended action: please include a section on expected execution arrangements. April 23, 2012: This is cleared. An execution arrangements section has been included. A Project Steering Committee composed of key government and non-government partners, and UNDP will be at the core of the organizational scheme.	
24. Is the funding and co-financing per objective appropriate and adequate to achieve the expected outcomes and outputs?	Not entirely. Components 1 and 3 include Outputs that are either redundant or not aligned with the CCA RBM and therefore should be removed and/or consolidated. (See Section 14). In this regard, the funding per Component should be reduced. Funding per Objective also needs clarification, as the project potentially addresses CCA-2 and CCA-3 and therefore the budget in Table A needs to be revisited. Recommended action: please revisit funding requested per Component, as well as funding requested per Objective (Table A). April 23, 2012: Co-financing has increased by $7M for Component 2, which is now an "Investment" component. This Component now supports CCA-3 and includes one more Outcome and 2 Outputs. The budget in table A has been adjusted.	Total co-financing for the project is $ 43,615,546, which has increased from proposed co-financing during PIF (estimated at $40,255,000).
26. Is the co-financing amount that the Agency is bringing to the project in line with its role?	Not clear. Please note that LDCF projects should be co-financed by a baseline intervention. The UNDP SEMRICC project (listed in the proposal as UNDP's co-financing) should be discussed under Section B.6 in which discussion of "coordination with other activities" is stated. Recommended Action: Please clarify in section B.6 how the proposed project will coordinate with SEMRICC, in order to avoid duplication of efforts and overlapping of activities.	This comment has been cleared.

GEF Secretariat Review Question	GEF Secretariat Recommended Action by CEO Endorsement	Response
	Please state a different UNDP co-financing source coming from a baseline initiative. April 23, 2012: This is cleared. Most of the grant co-financing comes from the baseline project "RWSS" funded by EU and AusAID. UNDP is only providing $1.7 million from the SEMRICC project.	
United States comments on the PIF		**Response**
We assume, and would like the Agency to confirm, as the information is not explicitly provided in the PIF, that: The vulnerability assessments will include an analysis of current exposure to climate shocks and stresses as well as model-based analysis of future climate impacts in addition to an understanding of the vulnerability of individuals, communities and water-related plans, projects and policies;		The vulnerability assessment will include an analysis of current exposure to climate shocks and stresses as well as some level of model and/or scenario-based analysis of future climate impacts so that the assessment, as well as the Water Sector Climate Change Adaptation plans that the vulnerability assessments will feed into, are climate-proofed. In the Project Document, we have proposed to adopt existing tools such as CRiSTAL, CEDRA, VCA (Red Cross) to the context of the project pilot sites.
Adaptation strategies and measures will be designed and implemented based on this information and measures will be appropriately targeted, depending on exposure to climate variation, which is primarily a function of geography (whether on the coasts or in the highlands of the Solomon Islands) and the degree to which water sector plans and projects, as well as targeted communities, in the baseline project are sensitive to climate stresses;		As mentioned above, the vulnerability assessments that take into consideration the existing and future climate impacts will serve as the bases of the provincial and community level Water Sector Climate Change Adaptation plans. Furthermore, lessons and information generated through the local level planning process will also inform and catalyze climate change mainstreaming into national development policies.
The project will leverage climate information services to help decision-makers make more informed		Project Document Outcome 2 Output 2.2. focuses on establishing a Community-based Climate Early Warning (EWS) and Disaster Preparedness Information System

GEF Secretariat Review Question	GEF Secretariat Recommended Action by CEO Endorsement	Response
decisions, which will help baseline projects and targeted communities effectively adjust to climate change, including climate variability and extremes, and therefore reduce the risk of potential loss and damage associated with the adverse effects of climate change; and		tailored for water resources management. Climate information regarding rainfall and dry spells will be communicated through a community-based EWS so that people in the pilot sites may adjust their water consumption behaviors and methods accordingly.
The baseline projects will deal with strengthening institutional capacity, broadly speaking, in order to address the governance-related barriers identified in Section B.1, while the LDCF-funded project will be targeted toward building *technical adaptation* capacity of relevant institutions. We suggest that the Agency include relevant regional institutions in section B.5, such as SPC (which recently absorbed SOPAC) and SPREP, as well as relevant bilateral development partners, such as USAID and AusAID.		Ongoing baseline projects, particularly the Provincial Governance Strengthening Project (PGSP), implemented by UNDP and funded by UNDP together with other donors (UNCDF, EU and AusAID), is focused on strengthening the capacity of Provincial Governments to plan and implement development programmes as well as in administration of provincial affairs. Projects such as this will contribute the SIWSAP in overcoming governance-related barriers identified as risks. In CEO Endorsement Form B1, we have added SPC/SOPAC, AusAID, EU, and USAID with their expected roles and nature of partnership with the SIWSAP project.
We also request that the Agency strongly consider including programs and projects that address deforestation in Section B.6, as deforestation in the Solomon Islands compounds local vulnerability to extreme hydrological events.		Interventions supported in Gizo and Taro provinces relate to utilizing ecosystems-based approach to enhancing resilience to hydrological events. The watershed restoration proposed to take place and Gizo and Taro are already quite forested area. However, logging is a key concern and therefore training will be provided on conservation and management. Furthermore, in Gizo, a natural spring that serves as a small-scale reservoir will be rehabilitated. Again, the reservoir is located in a forested area, but some small scale tree planting will take place. As an effort to address issues of deforestation more comprehensively, the UNREDD programme is currently enabling the Solomon Islands government to

GEF Secretariat Review Question	GEF Secretariat Recommended Action by CEO Endorsement	Response
		address the drivers of deforestation by protecting natural forest and ecosystems through development of National REDD+ Roadmap, guidelines for safeguards and stakeholder engagement that focus on the broader agenda of sustainable development, including ecosystem-based approaches to water resource management in the context of Solomon Islands. Furthermore, a project focusing on ***Integrated forest management in the Solomon Islands*** is currently being developed by FAO in partnership with the Ministry of Environment, Climate Change, Disaster Management and Meteorology, Ministry of Forest and Research, and Ministry of Agriculture and Livestock to be funded by GEF. As forest management relates closely with enhancing quality and quantity of water resources, SIWSAP will work closely with the development and implementation of this project to ensure synergies and alignment at both national levels and in the pilot sites.
Taken together, three of the risks identified in Section B.4 – limited capacity of government to implement and manage a large complex project, the customary land tenure structure, and concern regarding buy-in from communities – create a picture of much larger concern about the capacity of community stakeholders to absorb different messages from the multiple program partners, including provincial government. In developing the proposal in the next stage, the Agency should strongly consider ways in which it can strengthen its efforts to overcome these barriers		In order to address the risk of limited capacity of government to implement and manage large complex projects, we are proposing to establish a project management team with sufficient project management and technical capacity as well as deploy project focal points to be placed within provincial offices to provide on-the-ground support to the consultations, designs, and implementation of pilot level activities. Furthermore, through request from the Government of Solomon Island, UNDP Country Office will provide support to the National Implementation of the Project through providing operational and oversight support to the government implementing partner as per a Letter of Agreement that will be signed between the Government of Solomon Island and UNDP. To mitigate the risk of customary land tenure structure, we take the approach of participatory design and consultation for all components of the project, from planning to implementation/rehabilitation of both soft and hard climate-adaptive water management infrastructures. This

GEF Secretariat Review Question	GEF Secretariat Recommended Action by CEO Endorsement	Response
		approach will also contribute to minimizing risk of lack of community buy-in as the Project will ensure that key stakeholders, including women and children, will be engaged from the design to implementation of activities and interventions.
Finally, we look forward to seeing a much more detailed description from the Agency in the next stage of proposal development of how this project takes gender into consideration.		A summary of gender considerations that will be taken into account is included within Project Document II Strategy, 2.1 2.3 Design Principles and Strategic Consideration.

ANNEX 16: Resilience Framework

- SIWSAP has developed from a long legacy of recognition of the fragility of water resources in the region, the concerns over sanitation, hygiene and health related benefits, and the impacts of climate change on water resources. The project will mobilize the new Rural Water Supply and Sanitation Policy (draft, July 2013) by uniquely taking the policy straight to implementation at the Provincial level. Often policy processes can get 'stuck' in national level dialogue and institutional delivery discussions. SIWSAP will mobilize this policy and strengthen rural WASH interventions medium term through targeted additional activities designed to improve strategic rural WASH services.Furthermore, the strategy the project will adopt is focused on better understanding and applying 'resilience in practice'. Resilience is defined by different agencies, including by the IPCC (2008) as '*…the ability of a social or ecological system to absorb disturbances while retaining the same basic structure and ways of functioning, the capacity of self-organization, and the capacity to adapt to stress and change'*. It describes a process whereby both natural, and human systems are able to both withstand shocks, and where and when necessary, rebuild appropriately.
- The understanding of 're-building when necessary' can be interpreted in different ways, especially in the Pacific where in some cases communities are static in their location, and in other examples they move with seasons, food supplies, cultural change, religious beliefs, and natural climate variability (cyclones for example). Adaptation itself means that at times, adjustment will need to be made to keep things as they are, but at times more transformational changes will need to be made under a shifting climate regime. The concept of stationarity, where operational water management practices have been guided by an assumed level of annual or decadal climate "stationarity", based on historic records of seasonal variation as a good indication of the future hydrology (Matthews & Le Quesne, 2009) guides water managers in conventional practice. But this can limit resilience – and therefore the ability to adapt. As the climate changes, so do the tools, methodologies approaches, and consequently institutions who deal with water and associated management challenges. Resilience includes the capacity for this transformation where our climate systems change to the point where they cross thresholds. This is important where it causes dramatic shifts in, for example, precipitation rates, or affects ecosystems and their functions which support various livelihood activities. Because of the connection people have with their environment, and their reliance on ecosystems services in the Solomon's – the climate impacts beyond disasters and more rapid shocks (such as flooding) will manifest in changes in ecosystem services.
- Pacific Island communities often have well developed local institutions and networks, and informal institutions and traditional governance practices allow communities to respond to times of stress through being flexible and authoritative. Sensitivity to environmental changes, more immediacy in the way ecosystems respond to poor land or water management and pollution, and the impact this can have on ecosystem services people rely upon, such as springs and water sources, can weaken resilience to climate change.
- One of the reasons that we are able to better understand response needs to climate change is because of advances in the social and ecological sciences. Technical approaches tend to rely on this 'impact-specific' response, but the addition of wider social, ecological, and economic understanding have helped guide thinking, combined with more general experience, to understand how people and institutions respond to challenges such as disasters, shocks, and slower onset challenges such as drought. Greater knowledge also exists at the data level in terms of climate monitoring and social monitoring, although this constantly needs improving. The idea that resilience always means that things go back to the way they were after a shock or stress – like a spring – is only part of the story. Folke et al (2010) call this 'engineering resilience'. In the complex, inter-dependent social and ecological systems in which we live, resilience also includes the capacity for transformation when systems cross thresholds. This is 'social-ecological resilience' (Folke et al., 2010).

- SIWSAP will be guided by a structure, which will aim to build resilience, in alignment with national policy objectives for the Solomon Islands, regional objectives as a PIC, and the overall project objective to '*improve the resilience of water resources to climate change….'*. To also mobilize and move beyond national level thinking only, the project is cost-effective in implementation at the Provincial level. No on-the-ground activities are planned on Guadalcanal (Central Province), but instead Honiara will be a focal point for national level learning from Provincial activities.
- Climate resilient communities will take impact-specific actions to help them adapt, but they will also make sure they organise their local to regional and ideally national institutions, infrastructure, both built and natural[1], and economy in ways that are highly adaptive. As both expected and unexpected impacts of climate change unfold, it is in these locations that development activities will be able to continue to progress due to higher capacities to cope with shocks and, when necessary, re-adjust and rebuild – or transform – according to new realities. For a country as naturally de-centralized as the Solomon Islands due to its geography, Provincial capitals are future economic growth centres where capacity is increasing, and communication lines are improving, both practically with improved airports and more shipping and boat providers, and through communications technologies.

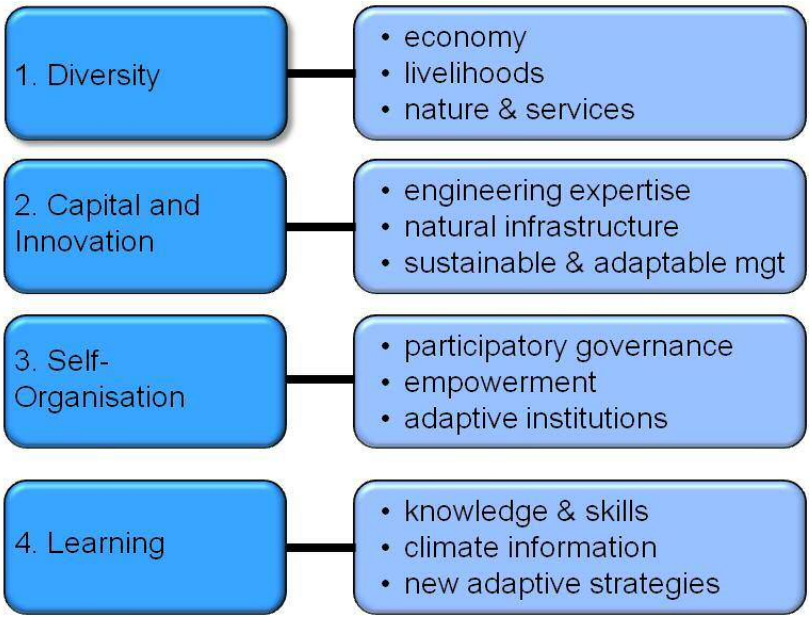


Figure : Resilience Framework (MacQuarrie and Barchiesi, 2013[2])

- New possibilities to learn together often emerge around these complex problems such as climate change – problems which affect the silo based institutional environments, and the connections that exist between them. Climate change will affect the silos that we tend to create, across social, environmental, health, and therefore economic issues. Government processes normally follow rather than lead in this learning process, and any changes are often preceded by policy change. However a large amount of this learning is also affected by external influences, such as theory, off-the-shelf approaches (models), and certainty. Certainty allows institutions to minimize risks in their activities. However, adaptation requires a change to this approach. Institutions, both formal and informal need to work closer together to develop better joint responses. Adaptation approaches need to be both responsive, and based on the need to improvise at times. This requires

relationship building from national, to provincial, to community level, and the building of trust and collaborative working partnerships.

- Adaptation to climate change therefore requires a different approach to planning and implementing solutions that recognize there is often disagreement and uncertainty about the magnitude of different climate changes, and therefore the solutions to deal with these predicted shifts. Dealing with this requires a process of dialogue – collaborative forum to discuss the issues and develop joint solutions that can work generally, but that also require contextual changes depending on the location. A one size fits all approach for adaptation, especially for water resources will not provide the resilience required, given localized changes in precipitation and temperature, and large effects of drying cycles, sometimes leading to drought. Learning across both formal and informal institutions can be improved by promoting the role of people who can act as bridges between these institutions, the networks and communities to facilitate shared thinking and to identify joint solutions. Framing adaptation as a learning process not only allows identification of the appropriate activities to adapt to the impacts of climate change, it also helps to move adaptation beyond activities – but to changes in behavior and the development of adaptive capacity. The project will mobilize using the resilience framework as a guiding framework for interventions described in Section 2.4.
- ***Diversity*** – of solutions to improve the resilience of water supply and sanitation 'services' at the six pilot sites, and provide lesson learning at the Provincial to National level. It is important consider a range of solutions when dealing with the application of rural WASH services. During the PPG Phase it became clear that each site is different, and each social context is also different. In some cases, previous project interventions still stood, unused by communities – who had not been provided with adequate training and knowledge, or who had been provided with inappropriate approaches. During implementation, the PMU will need to pay particular attention to the correct responses per site – and to not apply 'blanket approaches' to deal with adaptation challenges. Alternative water supplies, strategic storage, improved management, information, knowledge and learning all provides resources and tools from community to wider Provincial and National level stakeholders to learn from. SIWSAP in this way can be catalytic at improving the design and project/programme planning process for future water resources, supply and sanitation and health interventions, across a range of different line Ministries, and to help develop donor programming with MDPAC for interventions that support adaptation interventions – moving away from business-as-usual water projects.. This is where interventions will move beyond being purely 'impact-specific' based on planning processes, and will influence existing baseline rural WASH programmes to bring in the additional adaptation element to WATSAN systems they develop.
- ***Capital and Innovation*** – solution approaches, as interventions on-the-ground (to move adaptation beyond plan development and plan drafting) to actually apply technologies at site level. Technologies, however, that are best suited to the local situation. These technologies may therefore be low cost, but in turn, are therefore cheaper to maintain and repair. This is critical to ensure the resilience of water supply and sanitation systems, with performance rates for the Solomons Islands as low, averaging around 18% rural WATSAN coverage in reality (AUSAID 2013[3]). This is also a new and specific requirement under the new Rural WASH Policy, (draft, June 2013). This element of capital also refers to human capital, and social capital – during project implementation to work with communities in designing the best interventions with their support and guidance to build ownership of the process. This is why the inception phase is so important, to manage expectations, and to revisit the designs to ensure agreement and support. The need for improved management of water supply systems, watershed management approaches, building sanitation awareness through social marketing, and investment in natural infrastructure must be considered. Provincial governments are focused on doing what they can with limited resources – adaptation to climate change is often, at best, an afterthought. There is an urgent need to include adaptation into Provincial Planning processes. As further climate

change adaptation finance is predicted to materialize in the future, Provinces need to be better prepared to understand, prepare, and receive this finance, with clear plans for where vulnerabilities lie, and how they will deal with them, within the framework on the National Climate Change Policy. This is demonstrated by, where possible, co-financing support from some of the Provincial Governments, and the MMERE-WRD.

- ***Self-organisation*** – participatory governance and empowerment. These are elements which are strong already in the Solomon Islands, although the recognition of the role of women as key water supply and sanitation stewards in households needs to be clearly articulated. The draft rural WASH policy (June, 2013) specifically calling for recognition of the role women play as prime uses of WASH facilities, but also often prime 'carers' of these facilities – meaning operation and maintenance of them[4]. Women's role in community consultations will be critical to the success of the project. Self-organization, as a concept, also needs to be applied at the Provincial to National level in terms of the need to develop a much better understanding of who has what information, and how valid is it for adaptation purposes. This also includes donor agencies. As the PACC Mid Term Evaluation[5] points out, *'...subsequent to the inception of PACC there have been a rapidly growing number of climate change adaptation projects, which are increasingly overlapping in many cases'*. There are number of different projects now working across the Solomon Islands either specifically, or in part on climate change adaptation, vulnerability mapping, etc. Although it is no surprise that resources, awareness, demand and supply of these projects has materialized, in a country that requires exactly this support, the efficiency of the approach and the impact on Government time requires assessment. In particular:
    a. Some projects only focus at an individual Provincial level and it is not clear how this learning it taken back into National Government and shared across all Provinces;
    b. Some of the interventions would appear to be solely 'impact-specific' – when the opportunity exists to build a wider portfolio of options and solutions for adaptation interventions;
    c. Some of the projects are managed either directly at the national level, or solely by donors, or even from other donor offices outside the Solomon Islands;
    d. Although consultations do take place, there is a considerable difference of opinion in some sectors as to what the priorities are, and who has access to what information, and the quality of that information. Confusions exists over vulnerability mapping, the scale and actual granularity of this for planning interventions;
    e. It is not clear what learning framework exists to pull this information together, and where this information is stored, who has access to it etc, what format it is in and does it speak to different needs, etc. IWRM approaches demand information in formats that can be shared and discussed across sectors.
- ***Learning*** – to ensure that the institutions involved, and individuals at the pilot sites and Provincial levels can learn from SIWSAP interventions (and the other projects concerned) and therefore can use new skills to adapt and make more effective use climate change information, demonstrations of water supply, sanitation and hygiene interventions, as the lessons become available.
- Learning has been described as cycles of experience, observation, reflection, and the development of both conceptual behavior changes, and generalized changes through testing and application[6]. This testing – learning in action, leads back into a new cycle of the learning process. This process has been divided into both single and double-loop learning. Single loop learning goes through this process once, and as a consequence individuals and organizations becoming increasingly skilled in a particular activity. This is a common project approach – learning a new particular skill, and embedding this in staff and institutional processes or cultures. Double loop

learning creates a shift in institutional thinking and therefore understanding. At the point of 'reflection', institutions are better able to frame questions that allow them to better understand the issues, and to question their own assumptions, procedures, and applications to identify how their approaches could be improved. This period of reflection allows this shift to open up new approaches and new solutions to tackle problems. For adaptation to climate change, learning together opens up new areas for collaboration to seek joint solutions. Joint learning - because no-one individual, no-one institution has the solution, and indeed, often no-one individual or institution can fully understand the problem. This is especially so in an institutional environment where things are commonly divided into 'sectoral silos' to help manage complex problems.

- To mobilize this learning component a National Water and Adaptation Forum will be developed. This is designed as a platform to share 'official' project outputs and progress, but to also invite other stakeholders to present their perspectives and learning from their own work on adaptation - both vulnerability and science work, to on-the-ground community engagement elements. The link between the policy framework – advisory science approaches (and needs) – and the impact at the community level needs to be better presented and understood across all stakeholders. This Forum will be designed as a 'collaboratory' approach across institutions, government, UNDP, Provincial Administrations, and NGO's. The PMU will draft the agenda for this National Forum.
- Building resilience, and focusing on adaptation as a learning process to mainstream the lessons more fully across sectors links well with the Integrated Water Resource Management (IWRM) approach. IWRM is based on the recognition of the interconnectedness of the hydrogeological, geographical, health, economic, social, cultural, governance, legal and political aspects of water and the importance of an integrated, collaborative approach to achieving sustainable, equitable and fair outcomes. The MMERE-WRD is leading the IWRM approach and its more PIC-relevant "ridge-to-reef" concept, which includes all of Solomon Islands environments and all levels of society, from 'community to cabinet'.