



REQUEST FOR PROJECT/PROGRAMME
FUNDING FROM THE ADAPTATION FUND

The Appendix form should be completed and transmitted to the Adaptation Fund Board Secretariat by email or fax.

Please type in the responses using the template provided. The instructions attached to the form provide guidance to filling out the template.

Please note that a project/programme must be fully prepared (i.e., fully appraised for feasibility) when the request is submitted. The final project/programme document resulting from the appraisal process should be attached to this request for funding.

Complete documentation should be sent to:

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ADAPTATION FUND

PROJECT/PROGRAMME PROPOSAL TO THE ADAPTATION FUND

PART I: PROJECT/PROGRAMME INFORMATION

Project/Programme Category:	Regular Project
Country/ies:	Federated States of Micronesia (FSM)
Title of Project/Programme:	ENHANCING THE CLIMATE CHANGE RESILIENCE OF VULNERABLE ISLAND COMMUNITIES IN FEDERATED STATES OF MICRONESIA
Type of Implementing Entity:	RIE
Implementing Entity:	SECRETARIAT OF THE PACIFIC REGIONAL ENVIRONMENT PROGRAM (SPREP)
Executing Entity/ies:	Office of Environment and Emergency Management (OEEM) on behalf of Kosrae State Government, Pohnpei State Government, Yap State Government, Chuuk State Government
Amount of Financing Requested:	\$9,000,000 (in U.S Dollars Equivalent)

Project / Programme Background and Context:

Provide brief information on the problem the proposed project/programme is aiming to solve. Outline the economic social, development and environmental context in which the project would operate.

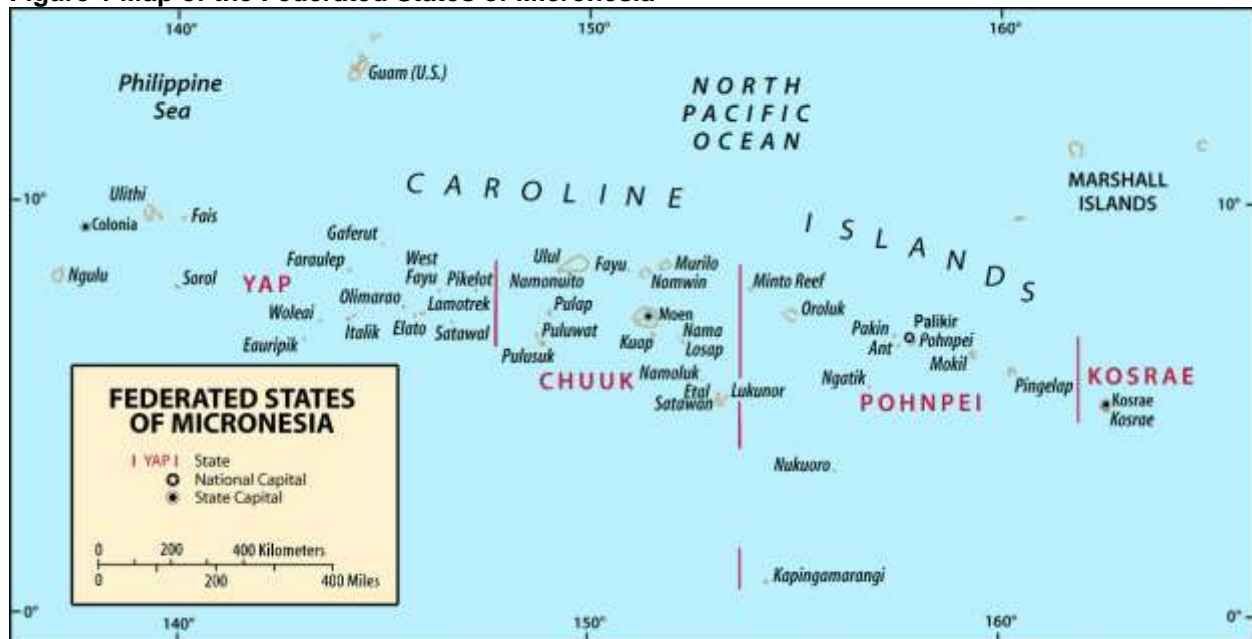
1. National and Local Level Context

1.1. Geography and Climate

The Federated States of Micronesia (FSM) is located near the equator about 4,000 km southwest of the Hawaiian Islands in the Western Pacific Ocean and within the Caroline Islands group. It is a group of approximately 607 islands covering 2,736 km² in the western Pacific Ocean (**Figure 1**). The land area totals 704.6 square kilometres, with 7,192 square kilometres of lagoon area. These islands vary from small islets are inundated at high tide, to atolls and large volcanic islands with land area of more than 80 km². Approximately 65 of the islands are inhabited. FSM's physical isolation, as well as the distance between states, and between islands within states, combined with limitations in transport, poses particular development challenges.

The FSM, located north of Papua New Guinea, south of Guam, and east of the Philippines, has an exclusive economic zone covering approximately 2,589,998 sq km (1,000,000 sq mi), yet the land mass of its 607 islands and atolls is only 704.6 square kilometres (270 sq mi). Four types of island occur: 1) Volcanic 'High islands' which can be highly rugged in their basalt interiors and typically surrounded by fringing or barrier reefs; 2) Low lying atolls and 3) Raised coral islands; and 4) Low coral islands. 'Low lying atoll and coral' 'outer islands' are especially isolated and require significant effort to reach from the main islands by boat or small plane. Of great biological significance are the coral fringing and barrier reefs that surround each island.

Figure 1 Map of the Federated States of Micronesia¹



Each of the four States is centered on one or more main high islands (**Table 1**). All but Kosrae State includes numerous outlying atolls. The capital of FSM, Palikir, is located in Pohnpei State. Many of the islands in FSM are extinct shield volcanoes, with steep and rugged centers that are densely vegetated and eroded. Mangroves grow around the coastal fringes. Land elevations range up to about 2,500 feet (760m). Other islands are relatively flat, small and swampy, with low-lying, forested atoll islets, typically one to five m above mean sea level².

The major vegetation types in the FSM are native upland forest, agroforest, mangrove forest and savanna, other shrubs and grasslands. About a third of FSM's land area is suitable for agriculture, but less than 5% of agricultural land is arable. About half is used for permanent crops, with the remainder being used for other agricultural purposes.

¹ By U.S. Central Intelligence Agency - Federated States of Micronesia (Political) 1999 from Perry-Castañeda Library Map Collection: Federated States of Micronesia Maps, Public Domain, <https://commons.wikimedia.org/w/index.php?curid=46492>

² FSM Second National Communication under the UN Framework Convention on Climate Change, 2015

Table 1 Geography of FSM's four states³ (* HV = high volcanics; A = atolls, **individuals per square kilometer).

STATE	# IS. GROUPS	# ISLANDS	# INHABITED IS.	TOPOGRAPHY (HV, A)*	LAND AREA (SQ.K M)	LAGOON AREA (SQ.KM)	POPN. (2010)	POPN DENSITY**
Yap	12	139	12	HV + A	119	1049	11,373	247
Chuuk	7	542	55	HV + A	127	2132	48,564	993
Pohnpei	6	26	6	HV + A	342	769	36,196	274
Kosrae	1	1	1	HV	117	0	6,616	156
Total	26	708	74		705	3,950	102,843	379

The tropical climate of FSM is due to its geographical location in the Western Pacific, just north of the equator, and the strong influence of northeast trade winds, thus generating consistently warm temperatures. The trade winds prevail from December through April. Periods of weaker winds and doldrums occur from May to November. Rainfall is generally plentiful, especially on the high volcanic islands of Kosrae, Pohnpei and Chuuk. It can exceed 400 inches (1,016 cm) annually, or 22 inches (559 mm) in any one day. The region is affected by storms and typhoons that are generally more severe in the western islands, as well as by periods of drought and excessive rainfall associated with different phases of the El Niño – Southern Oscillation (ENSO).

From May to November the rainfall is extremely high on the volcanic islands of Kosrae, Pohnpei and Chuuk. Yap lies in an area that generally experiences a monsoon climatic pattern, with more frequent periods of drought. The climate of Chuuk is hot and humid with an average temperature of 81°F (27°C), and little variation throughout the year. Average annual precipitation is 122 in (3,100 mm), with the months of January to March being drier. Pohnpei is generally hot and humid, also with a mean temperature of 81°F (27°C). Temperatures vary little from month to month. The mean annual rainfall is 190 inches (4826 mm), with January and February being slightly drier than the average of all months. Kosrae's climate is characterized by high temperatures, heavy rainfall and high humidity.

The average annual rainfall measured at the weather station in coastal Lelu is 203 inches (5000 mm). In the mountainous interior rainfall is estimated to be as high as 300 inches (7,500 mm) annually. Average temperature is again 81°F (27°C) at sea level. Average monthly temperatures vary from the annual average by no more than 0.5°F (1°C), and the difference between the average minimum and maximum temperatures is less than 14°F (8°C).

1.2. Political and Legislative

Since its inception in 1979, when it formed its own constitutional government, the FSM has worked with the United States government to achieve self-sufficiency through its primary source of assistance, the Compact of Free Association (1986-2003) and the subsequent Compact II (2004- 2023).

³ Namakin, 2008; FSM Division of Statistics, 2012 *in* FSM Second National Communication under the UN Framework Convention on Climate Change, 2015, p.16)

The country's government is modelled after the federal system of the United States with a national president and four state governors with respective legislatures and judiciaries. The government has four levels of governance – National, State, municipal, and traditional.

The four states – Chuuk, Kosrae, Pohnpei and Yap – where the project is to be implemented, have considerable degree of autonomy. Each State Government has its own constitutional Government, consisting of the three branches: Executive, Legislative and Judicial.

Each FSM state has its own set of environmental laws and regulations geared to protect the islands from the effects of climate change. Under the Compact II, Article VI and section 161 of Title II, FSM is committed to applying the National Environmental Policy Act of 1969 and “to develop and implement standards and procedures to protect its environment.”

In June 2012, FSM Environmental Protection Act became Public Law. Its purpose is to:

- reflect the current functions and responsibilities of the National Government in the area of environmental management and protection;
- eliminate duplication of responsibilities between the National and State Governments in the area of environmental management and protection; and
- provide the Office of Environment and Emergency Management (OEEM) with the necessary legal authority to implement, via regulation, the multilateral environmental agreements that FSM had already ratified, including the UNFCCC.

This project will be building on the existing legislative and policy framework that the national government and the state of Kosrae have already put in place.

The FSM Environment Sector Plan 2010-2015, prepared in accordance with the FSM Strategic Development Plan (SDP) 2004-2023, identifies achieving higher rates of compliance with environmental laws as a high priority for FSM National and State Governments. Among the most serious problems of environmental governance in FSM is that the laws and regulations are not enforced consistently or effectively. The new Environment Protection Act endeavors to address this and related issues, in part by strengthening enforcement action and by requiring the Director of OEEM to provide, on an annual basis, an environmental quality report covering the status and conditions of the environment of FSM, and a review of the programs and activities of the National Government, State Governments, municipal Governments and non-governmental organizations (NGOs), with particular reference to their effect on the environment of the country.

The FSM government has put in place national frameworks for adaptation: The Strategic Development Plan (SDP) 2004-2023 and the Infrastructure Development Plan (IDP) 2016-2025 are based on several frameworks which provide mitigation and adaptation measures to limit the impacts of climate change. Mitigation and Adaptation activities are on-going at the government and agency sectors.

The Strategic Development Plan (SDP) for FSM provides a road map for social and economic development for the 20 years, 2004 - 2023.

FSM adopted a national policy on climate change in 2009 and a policy on Disaster Risk Management and Climate Change Adaptation in 2013. Kosrae adopted a Shoreline

Management Plan in 2014. The State of Kosrae is the first state to develop a strategic plan that addresses coastal zone management in view of the adverse impacts of climate change.

The Kosrae Shoreline Management Plan (2014) states: “much development on Kosrae over the last two to three generations has occurred in low-lying coastal areas...many of the approaches we currently use...will be increasingly effective or inaffordable as sea levels rise. It will involve thinking differently than we have done in the past, particularly concerning where we locate infrastructure, our communities and our homes”.

There is an immediate need for capacity to support adaptation at the national level, and specific legislation, regulation and policy frameworks in the other 3 states so that they can deliver effective climate resilient measures for greater protection in the coastal zones.

1.3. Institutional Arrangements for Climate Change

FSM has ratified the UNFCCC and its Kyoto Protocol as well as Montreal Protocol (also known as the ozone treaty). FSM signed the Paris Agreement in 2016. In 2009, the FSM was awarded a Climate Protection Award from the U.S. Environmental Protection Agency for its contributions to Climate Protection under the ozone treaty.

FSM has a Multi-State Hazard Mitigation Plan 2005, which was developed after an extensive process of consultation, led by what was then the National Emergency Management Office, involving stakeholders across all states within and outside government.

FSM has commenced integration initiatives from a common institutional platform for disaster risk reduction and climate change adaptation overseen by the Office of Environment and Emergency Management.

A Nationwide Climate Change Policy was adopted by FSM in 2009. The focus is to mitigate climate change especially at the international level, and adaptation at the national, state and community levels to reduce the FSM's vulnerability to climate change adverse impacts. The Policy outlines the integration of climate change into the Strategic Development Plan/Infrastructure Development Plan (SDP/IDP) and into other policies, strategies and action plans, including disaster preparedness and mitigation, as necessary. The Office of Environment and Emergency Management is designated as the focal point for all government climate change activities by law under Title 25 the FSM Environmental Protection Authority Act.

The Nationwide Climate Change Policy identifies the following sectors and the agency responsible for implementing climate change adaptation actions:

- Department of Education
- Department of Health and Social Affairs
- Department of Resources and Development
- Department of Transportation, Communication & Infrastructure
- FSM Weather Service Station
- National Oceanic Resource Management Authority
- Office of Environment and Emergency Management
- Office of President

FSM is presently in the process of developing a joint policy for climate change adaptation and disaster risk management.⁴

A Framework National Water and Sanitation Policy for the Federated States of Micronesia was developed in 2011. The objective of the framework is to provide the rationale and direction for a Comprehensive National Water and Sanitation Policy for the Federated States of Micronesia. Key elements of comprehensive policy will include a “Federated States of Micronesia National Water Outlook” and Water Sector Investment Plan. The intent of this policy is to mainstream the principles of Integrated Water Resource Management and Water Use Efficiency into national and state development planning and resource management.

1.4. Demography

The population of FSM reached 102,843 at the last census taken in 2010. This was a decline of 4,344 persons relative to the 2000 census total of 107,008. The rate of population growth in FSM and its composite states has declined dramatically over the past three decades. At the national level, annual growth had dropped from 3.0 percent in the 1980-89 period, to minus 0.4 percent over the 2000-2010 period. At the state level, Chuuk and Kosrae have negative growth while in Pohnpei and Yap the rate of growth is still positive but very low at 0.4 and 0.1 percent, respectively. While declining fertility has contributed to the drop in the population growth rate, out-migration to the United States and other parts of Micronesia is the primary cause of negative growth.

Table 2 Population and household distribution of FSM⁵

STATE	% OF TOTAL FSM POPULATION	% OF TOTAL NO. OF FSM HH
Yap	11.1	13.8
Chuuk	47.3	41.9
Pohnpei	35.2	37.5
Kosrae	6.4	6.8

The population of the FSM is unevenly distributed between states in terms of total numbers and per sq. km (Table 2). Chuuk State represents 47% of the population, Kosrae 6%, Pohnpei 35% and Yap 11%. The population is young, with 36% between 0 and 14 years, 59% 15-59 years and 5.5 percent 60 or older, though the average age is increasing. There are 4% fewer women of child bearing age in the FSM today than 10 years ago and the population is declining for the first time in recent history. This demographic change has been influenced by a Compact between the FSM and U.S. The Compact transfers significant funds to the FSM, and promotes outmigration by allowing FSM citizens to go to the U.S. and join its military (the FSM also has its own U.S. mailing zip code). In return it provides the U.S. strategic regional Asian and Pacific military considerations. On high islands a mariner culture and rough interior has concentrated populations along the coasts⁶.

⁴ GCCA:PSIS. 2013. Climate Change Profile. Federated States of Micronesia. Version 2, July 2013.

⁵ Smith, W.J., J Mount, D. Bennet and P. Shed. 2014. Collaborative research methodologies and the construction of a national geospatial clearinghouse to conserve biodiversity in the Federated States of Micronesia. *Applied Geography* 54:198-208.

⁶ Ibid.

1.5. Economy

The National and State governments account for over one-half of the nation's employment and 38% of its GDP. Agriculture is primarily subsistence farming. Natural resources available for economic purposes are limited to timber, marine products, deep-seabed minerals, and phosphate. Commercial fishing is an important source of revenue through licensing fees and exportation of fish. A wide range of financial and project assistance has been provided through a variety of governments, international institutions, and non-governmental organizations, resulting in limited success in developing an integrated, self-supporting, and sustainable economy.

In the era of Compact II (2004-2023) FSM is at a critical point in its development. In a relatively short time frame, each FSM State is challenged not only to continue developing a self-sufficient economy, but also to modernize without sacrificing valued cultural traditions and natural resource assets. Geographical isolation and poorly developed infrastructure are major impediments to FSM's long-term growth. Over the years, agriculture's socio-cultural role as a safety net for the disadvantaged has greatly diminished. Inequality of income and the incidence of families with incomes below the poverty line are among the highest in the Pacific region. Poverty is a concern and FSM has, in general, made only limited progress towards achieving the Millennium Development Goals (MDGs) by 2015.

The mainstays of the FSM economy are subsistence farming and fishing. There is limited tourism due to lack of access and facilities, although it has increased in recent years with a number of small hotels opening in Pohnpei, Yap and Kosrae. Geographic isolation and poorly developed infrastructure are major impediments to FSM's economic growth, and poverty is among the highest in the Pacific region. FSM has, in general, made only limited progress towards achieving the Millennium Development Goals by 2015.

The public sector plays a central role in the economy, the national and state-level governments employ over half of the country's workers and government services and public enterprises account for 38% of GDP. Since the 1995 Economic Summit, the private sector has been a focus of economic development. There are now 22 private locally owned construction companies that also undertake road maintenance.

Daily life in most of the FSM is run on an extended family scale, with village or island functions integrated into this routine. National and state levels of government lack a sustained influence in this routine in most islands. Thus, conservation efforts must connect to the local scale and people with traditional ties into communities if they are to be sustained. The human and physical geography that define the FSM make this a major challenge. Conversely, it is undeniable that given the relative autonomy of islands and villages, but mobile and common nature of many marine resources such as coral, sea turtles, and fish, that large-scale planning may need to span 'ecoregions'⁷.

⁷ Smith, W.J., J Mount, D. Bennet and P. Shed. 2014. Collaborative research methodologies and the construction of a national geospatial clearinghouse to conserve biodiversity in the Federated States of Micronesia. *Applied Geography* 54:198-208.

1.6. Education

Education in the FSM is compulsory for all children, including those with disabilities, from ages six to fourteen or until completion of grade eight. Secondary schooling (grades 9-12) is not compulsory.

Quality of education is a key concern as more than forty per cent of pupils in grade eight score far below the minimum benchmarks for math and reading in performance assessments.

As more people have migrated to the state capitals, urban schools have become crowded and outer-island schools depleted of students. Many school buildings are old and in poor repair, textbooks and other teaching aids are in short supply. Outer island schools are typically very small, access is slow and expensive, and they can only be contacted by short wave radio. This makes it difficult for state and national agencies to provide technical assistance and support.

1.7. The Water Security Problems in Outer Islands

Areas of small island countries, such as the FSM, exceed well over 5000 mm of precipitation annually. These communities are in some of the wettest places on earth. Nevertheless, their geologic and geographic settings, technology, government capacity, village-scale governance and knowledge base can still make accessing safe drinking water exceedingly difficult. Despite billions of dollars in aid, labour, and local spending, inadequate progress has been made in recent years in much of the less wealthy communities in improving access to safe drinking water⁸.

Despite high national precipitation rates, water supplies on smaller, low-lying atoll islands are extremely vulnerable to droughts and to saltwater inundation caused by high tides. Water for drinking and other uses comes from two sources: rainwater catchments and shallow wells that draw from a layer or “lens” of freshwater that is underlain by brackish water or saltwater. Groundwater in the part of the lens that is near the ground surface in the central depression of the island is also important for taro cultivation. On some atoll islands, the freshwater lens is thin and highly vulnerable to contamination from the saltwater below, especially if too much freshwater is drawn from the lens.

The El Niño event of 1997–1998 caused severe droughts and water shortages on many of the Pacific Islands including FSM. During the drought, public were concerned about high level of demand and increased groundwater withdrawals because of the potential impact of saltwater intrusion on taro, breadfruit, and banana crops. The case demonstrates the vulnerability of freshwater resources on atoll islands. Data from monitoring are needed to manage rainwater and groundwater resources conjunctively and increase the adaptive capacity of low islands to meet the challenges posed by climate variability and change.

The water resources of the islands composing the 32 atolls of the FSM are under continual threat due to El Niño-induced drought events and potential sea-level rise. The contamination from septic tanks and waste-water runoff from pig pens is also a major issue.

⁸ Smith, W.J. 2008. *Geographical Journal* Vol. 174 No. 3, pp. 251–268, 2008

Another risk is the high-sea/surf events. In December 2007 and again in 2008, several atoll islands in the Federated States of Micronesia were flooded by series of high wave events. These saltwater floods had a significant impact on taro crops that are commonly cultivated in a depression near the center of the island. In December 2007, on the outer islands of Chuuk State, where 13,000 people or one-fourth of the state population resides, an estimated 90% of all taro crops were destroyed by saltwater inundation⁹.

Water use within atoll island communities is derived from either captured rain water (typically through a roof-gutter system that feeds a large storage tank) or groundwater. Rain catchment water is preferred for most domestic purposes such as drinking and cooking, whereas groundwater, typically accessed through hand-dug wells lined with concrete or rocks, is used for bathing and washing clothes. Communities may also use coconut juice to supplement drinking water.

Rain catchment tanks vary in construction material and size. Older tanks are made from concrete, whereas newer ones are made from fiber glass. Depth to water in the hand-dug wells ranges from 1 to 3 m, and fluctuates with the rise and fall of the tides. The water is extracted by either a rope and bucket or a small electric pump, and is typically shared by several households.

In general, only large leeward islands appear to be able to maintain substantial freshwater lens during both average and drought conditions. The majority of FSM atoll islands are windward and hence contain only a thin lens, irrespective of the rate of rainfall. These results provide water-resources managers of atoll island communities with important generalizations regarding the sustainability of island resources, and can be used for future planning within these communities.

The sustainability of water resources on atoll islands is therefore of serious concern due to their small catchment area, low-lying topography, isolation from other island communities, and the continual threat of El Niño-induced droughts. Most of the 32 atolls within the FSM are permanently inhabited, but their residents have always been continually at risk of water shortages. Groundwater resources are particularly important reserves, since the small exposed area of the island land surface and the high permeability of the carbonate sediments preclude the development of natural surface-water bodies or reservoirs. Man-made storage tanks are used to collect rainwater, but these can become depleted quickly during droughts. At such times, island residents rely on groundwater to fulfill their domestic water needs. The fresh ground-water, residing in the “freshwater lens”, however, is itself subject to stress and threat of depletion during El Niño-droughts. Atoll island groundwater is thus an inherently precarious resource.

The FSM government seeks to make each atoll island community sustainable in regards to water resources. Success obviously depends on maintaining sufficient potable water on each atoll island during even the most severe droughts. Therefore, the volume of freshwater reserves must be predicted for periods of scarce rainfall rather than for normal climate conditions.

⁹ Keener, V. W., Marra, J. J., Finucane, M. L., Spooner, D., & Smith, M. H. (Eds.). (2012). *Climate Change and Pacific Islands: Indicators and Impacts*. Report for the 2012 Pacific Islands Regional Climate Assessment. Washington, DC: Island Press.

1.8 Proposed Focus Area

The Government of FSM has identified two outer islands each in Pohnpei, Chuuk and Yap states as priorities for the water security component of this proposal to the Adaptation Fund. These are Kapingamarangi and Nukuoro in Pohnpei; Satawan and Lukunor in Chuuk and Eauripik and Woleai in Yap. The majority are among the atolls most remote from their respective main lands. The government has also focused on building the capacity of the communities of Malem and Utwe in Kosrae to respond to climate as well as improving the resilience of its infrastructure and natural environment to climate change under the coastal component of the proposal. The socio economic profiles of each of the States and the proposed sites are summarised below.

1.9 Yap State

Yap State consists of four main islands of Yap Island, Tomil-Gagil, Maap and Rumung and eight smaller islets sharing a common coral reef. Colonia is the capital of Yap State. It administers both Yap proper and 14 atolls reaching to the east and south for some 800km, namely Eauripik, Elato, Fais, Faraulep, Gaferut, Ifalik, Lamotrek, Ngulu, Olimarao, Piagailoe (West Fayu), Pikelot, Sorol, Ulithi, and Woleai atolls, as well as the island of Satawa. Yap accounts for 84 percent of the state's total landmass, is home to two-thirds of Yap State's population of 12,055 (FSM 2010 Census).

The significance of climate change to the State of Yap is set out in the Joint State Action Plan. As the westernmost state of FSM, Yap is exposed to a range of threats that create significant vulnerabilities for the state. Yap is located in 'Typhoon Alley', is likely to be disturbed by earthquakes and tsunamis, and suffers droughts due to the impact of El Niño Southern Oscillation (ENSO). ENSO is also the cause of both excessive and below average rainfall. Yap is drier than the other states of FSM, and is highly susceptible to drought. The lack of adequate water storage capacity on the outlying islands increases the inhabitant's vulnerability to the impacts of drought. Yap is very vulnerable to flooding during typhoons and storm surges. The state does not regularly receive large amounts of rain and thus the damage from extreme surge and rainfall events is usually much more intense.

The distances between islands makes it difficult to get much-needed food, water and medical supplies to residents after a disaster, meaning Yap is more vulnerable to health and other secondary impacts of disasters than the other FSM states. Through July 2015 and January 2016 island leader and community consultations, facilitated by the government of Yap through the Department of Resources & Development and SPREP, the atoll islands of Eauripik and Woleai are nominated for water security measures (Section II.H). The most recent impacts caused by Typhoon Maysak and the recent 2015-2016 El Nino phenomena was felt strongly at these islands requiring water resources to be secured.

1.10 Chuuk State

Chuuk is located (830nm) to the west of Yap state, with Pohnpei (1208nm) and Kosrae (1500nm) to the east. It is the most populated state of FSM. Chuuk State consists of several island groups with a combined population of 48,615 (FSM Census, 2010). The 2010 Census reported fewer residents in the state compared to 2000 (-1.0 percent decline) as a result of substantial net-migration to neighboring US Territories, Hawaii and US Mainland. This was associated with the recent mixed economic fortunes of the state.

Satawan with a population of 692 and Lukunor with 848 are the two Chuuk atoll communities that will be addressed by the project. These islands are only three to five meters above sea level and are therefore prone to impacts of sea level rise. The islands water wells are brackish and provide only limited water. Some wells are only used to draw water for washing and cooking during drought, as it is unsafe for general consumption. Most water wells are not covered, and therefore contamination from sea water, e-coli, and humus is common. Most of the households on both islands have at least one water tank, which has found to be unsustainable during drought. The rainwater harvesting systems are in poor condition as a result of sustaining damage from typhoons, lack of spare parts and poor maintenance, leaving these communities highly vulnerable to drought. During periods of drought, people and animals often resort to coconuts and root trees for water and hydration.

1.11 Pohnpei State

Pohnpei is a “high” volcanic island, having a rugged, mountainous interior with some peaks as high as 760 meters. It measures about 130 kilometres in circumference and is roughly circular in shape. Pohnpei Island is the largest, highest, most populated, and most developed island in FSM. A coral reef surrounds the island, forming a protected lagoon. There are no beaches on Pohnpei – the coast is surrounded by mangrove forests/stands growing on muddy substrate eroded from interior wetlands in the rainy environment. Several smaller islets, many of them inhabited, lie nearby within the lagoon-reef complex. The population of Pohnpei is approximately 34,840. Pohnpei is more ethnically diverse than any other island in the FSM. This is largely due to it being home to the capitol of the national government, which employs hundreds of people from the other FSM States having distinct ethnic and cultural origins.

Kapingamarangi and Nukuoro are the two Pohnpei atolls that will be addressed by the project, with a population of 350 and 210 respectively. The atoll’s ground water resources are already susceptible to sea water intrusion, underground water pollution and surface water pollution from agricultural practices. The western reef rim of Kapingamarangi atoll is almost submerged at high water. Much of the islets on this western reef that is used for growing fruit and vegetables are now under threat. As a result, the islanders are now looking to move the growing of such fruit and vegetables to the same islets where they are raising livestock, as well as on the main island of Touhou where people reside. This is already putting pressure on the water resources on Touhou, where the highest point is only 90 cm. On Nukuoro, the staple food crop is taro. Taro is highly susceptible to salt water intrusion. During drought, the communities use raised swamp taro patches as water reservoirs to catch water for cooking and washing. Buckets and recycled oil-drums are a common method of storing water at the household levels. The population of Nukuoro are highly vulnerable to water and vector-borne diseases as a result of poor quality of water.

1.12 Kosrae State

Kosrae is the easternmost and second largest island of the FSM, located approximately 372 miles southeast of Pohnpei. Kosrae has a land area of 42 square miles (112 square km) and an EEZ of 200 nautical miles. Between 1997 and 2010, Kosrae’s population declined by 12 percent to its current population of 6,616 people (FSM Census 2010), and constitutes 6 percent of FSM’s population. The negative population growth is largely due to considerable out-migration to the US and its territories. Accordingly, the working population age has dramatically declined, significantly reducing the productive work force and local production (UNFPA, 2013). This trend is mainly attributed to poor economic performance and reductions in the public sector, which

has traditionally been the main employer. As at 2010, the unemployment rate in Kosrae was significantly high at 23 percent.

Kosrae is the only state without an outer island. It is divided into four municipalities, with respective populations as follows: Lelu (2,160), Malem (1,300), Tafunsak (2,173) and Utwe (983). Geographically, the state is characterized by steep mountains and deep valleys covered with thick, fertile tropical vegetation and forests, and dense mangrove forests in coastal areas. The island's main natural resources are its abundant forests with significant agricultural potential, marine products and deep-seabed minerals¹⁰.

Kosrae is a high volcanic island surrounded by a fringing reef, mangroves and coastal strand forests that have been historically used for lumber and fuel by residents. There is a shallow fringing reef spotted with boulders of coral heads that have been dislodged from the fore – reef during occasional cyclone events. There are no outer islands. The island has steep, heavily vegetated watersheds, which in the mid to upper parts of the catchment are in relatively natural state. Where clearing or deforestation on sloping areas does occur, however, intense rainfall quickly denudes exposed soil. Invasive vegetation is a significant problem and has taken a foothold in many of the lower parts of many of the catchments.

¹⁰ Federated States of Micronesia Infrastructure Development Plan FY2016-FY2025. Volume 6 Yap State Infrastructure Development Plan



improved sanitation is generally higher in Kosrae than in the other FSM States, of concern is the relatively lower access to health dispensaries and other health facilities and higher rates of childhood obesity combined with under-nutrition. Although educational quality and attainment tend to be higher in Kosrae than in the other states, 63% and 51% of children leaving primary school fall below minimum competency levels for maths and reading respectively.

Kosrae's GDP growth has declined by 0.7% per annum since the beginning of the Amended Compact. A major issue is the size of the public sector in the economy, accounting for 40 percent of GDP activity. Salary and wage expenditure is high, and represented 53% of KSG's current expenditure in FY2013. These factors suggest the Kosrae economy is in a highly volatile state as it approaches 2023 and has no significant financial reserves to fall back on.

While FSM currently has no national strategy for coastal zone management, Kosrae has developed a strategic plan that addresses coastal zone management in view of adverse impacts of coastal hazards and climate change on development and infrastructure of Kosrae. Known as the Kosrae Shoreline Management Plan (SMP) this was initially developed with considerable community consultation between 1998 and 2000 and updated with further consultation in each Municipality in 2013. The SMP sets out the principles for coastal development in Kosrae over the coming decades, and details eight key strategies for responding to climate change and sea level rise and increasing the resilience of Kosrae's coastal communities over the next one to two generations (20 – 50 years) .

Over the last century changes in the position of the shoreline around Kosrae shows considerable variability. The most significant long-term coastal retreat over this time has occurred along the eastern front facing Lelu and Malem coastlines. Much of the east and south coastline on Kosrae has been built by storm and typhoon events over many years. The east coast is characterised by relatively narrow fringing reef, a narrow storm berm upon which the coastal road and most development has occurred, with areas of low lying infill swamp, farmland or lagoon mangrove, behind the berm to the volcanic part of the island. This coastal retreat is both related to natural changes primarily linked to a series of typhoon events (see the Kosrae SMP) and due to human impacts including past offshore mining of coral rubble and sand over the fringing reef flat for construction materials, beach mining for sand and gravel resources, and interruptions to alongshore sediment transport by engineering projects whilst sand and gravel removal from beaches and reef flat have long been controlled, the impacts from activities in the period between 1950s to 1980s are still being felt. The rate of coastal retreat is also being exacerbated by sea-level rise and this will continue to have an even greater influence on the rate of coastal change, and associated impacts on coastal infrastructure and development located on the berm, going forward.

Similarly overwash on the berm, and hence flooding of the road and property, due to high tide and wave conditions are extremely sensitive to sea-level rise. For example a high tide level of 2 m (relative to vertical land datum on Kosrae) is presently a very high tide on Kosrae, and typically results in overwashing and flooding problems. Such a high tide is experienced on average 2.8% of all high tides at present. Put another way, approximately 97% of all high tides in Kosrae are less than 2m high. With a mid-range sea level rise scenario, however, these statistics will change, by the:

- 2030s, the high tide level of 2m will be exceeded by 12% of all high tides
- 2050s, the high tide level of 2m will be exceeded by 27% of all high tides
- 2070s, the high tide level of 2m will be exceeded by 69% of all high tides

- 2090s, the high tide level of 2m will be exceeded by 95% of all high tides

In 2009 the Pacific Adaptation to Climate Change (PACC¹¹) project focused on coastal zone management in Kosrae, and specifically on 'climate proofing' a section of the Tafunsak to Walung circumferential road. The circumferential road on Kosrae plays a vital transport role for the people of the island, and also directs the location of other infrastructure and development. It is therefore critical to the resilience of the community that the road be able to withstand current and future impacts of climate and sea. The choice of project was influenced by earlier work under the Asian Development Bank (ADB)-funded Climate Adaptation in the Pacific (CLIMAP) project in 2005, which identified the need for climate proofing of the road, and carried out various assessments and analyses, but did not complete the on-the-ground work. Lessons from the PACC project have been considered by the project during its planning and design stages (see Annex 1)

The CLIMAP analyses found that the original road design had been based on inaccurate rainfall data, i.e. they had not accounted for increases in rainfall in the design and engineering. The road had been built with drainage works designed for a maximum hourly rainfall of 178 mm, which supposedly had a return period of 25 years. An analysis of more reliable data indicated that an hourly rainfall with a return period of 25 years is 190 mm. By 2050, however, the hourly rainfall with a 25-year return period is projected to increase to 254 mm as a consequence of climate change. Based on these results some aspects of the road design were amended, specifically the culverts were redesigned to accommodate the higher rainfall. These lessons are incorporated in to the proposed Kosrae component of the Adaptation Fund Project.

Kosrae's proposed project within the Adaptation Fund proposal targets the municipalities of Malem and Utwe for construction of a climate-proofed inland road, with the long-term objective of enabling the gradual relocation of households to safer inland areas. Of Kosrae's four municipalities Malem and Utwe are considered to be the most vulnerable to climate change-related impacts. The majority of households in both municipalities, along with all essential infrastructure are currently located close to the current shoreline and exposed to frequent coastal-related flooding. .

Box 1. Land in FSM

Land in FSM is managed under a complex mix of modern and traditional systems. Land is intricately connected to people's perception of inheritance and community. This needs to be tackled with a long-term perspective. The majority of transactions for commercial ventures transpire with survey; titling and documentation completed under modern land management institutions. Chuuk is an exception, due to long-standing unresolved disputes between individuals and clan groups. Disputes also arise periodically in the other states and can take an inordinately long period of time to resolve.

In Kosrae, Chuuk and Yap land rights may be legally sold to FSM citizen, but in Pohnpei land can only be sold to Pohnpeians. The FSM Constitution forbids the ownership of land by foreigners, but they are permitted to lease land. Multiple ownership of land still exists throughout the FSM, requiring the consensus of families, clans and traditional leaders for

¹¹ www.sprep.org/pacc

leases and development. This can present a constraint to development depending on the ability to achieve consensus. In all states the market for land is characterized by few transactions, limited market information, no formal mechanisms for public dissemination of market transaction data and price demands from (often multiple) landowners. As a result of these conditions, together with prevailing cultural factors influencing the perceived value of land, it can be said that transactions are only partly influenced by economic market forces and the potential productive value of land.

Distortions and rigidities in land market transactions will be difficult to reduce and change will undoubtedly be gradual. A focus on public education and information dissemination may result in accelerating this process. It is important that the current program of surveying and recording land titles of land available for development in the states is completed. Improvements in mortgage laws, leasehold mortgages and land management in general require actions within each state.

Chuuk State has taken action by passing leasehold mortgage law but has not yet promulgated regulations to implement the law. The extent to which land can be leveraged and mortgaged is important for increasing productive activity and incomes. Land assets that become locked outside the modern market economy cannot be leveraged or redeployed for production. The overall effect is that many landowners are asset rich and income poor.

Currently all land in Kosrae above the so-called *Japanese Line* (indicated in blue in map at right) is under government control. During the Japanese occupation of Kosrae, public lands were expanded to include the shoreline below the mean high water mark, the mangroves and the upland forests above the Japanese Line, which includes approx. 67% of the total land area of Kosrae. As much as 50% of this area is too steep for any development and should be maintained as forest for watershed protection. A recent



Constitutional amendment (Amen 19, 1995) was passed which allows reclamation of land above the Japanese Line by the original landowners. Land will be awarded by issuing a Certificate of Title to an individual or to the Tenancy-in-Common. A procedure for reclamation must be established by law before any advancement can be made and should be guided by this land use plan.

Sources: FSM 2023 Action Plan (pgs 47-48); Kosrae State Land Use Plan 2003

2. Climate change impacts and risks

The future for FSM does not look favourable for any development that is based on a business as usual approach. In the current period to 2100, according to PCCSP and PACCSAP (Australian BoM and CSIRO, 2011, 2014); the latest global climate model (GCM) projections and climate science findings for FSM indicate that:

- Surface air temperature and sea surface temperature are projected to continue to increase (very high confidence)
- El Niño and La Niña events will continue to occur in the future (very high confidence), but there is little consensus on whether these events will change in intensity or frequency;
- Average annual rainfall is projected to increase (medium confidence), with more extreme rain events (high confidence);
- Drought frequency is projected to decrease (medium confidence);
- Ocean acidification is expected to continue (very high confidence);
- The risk of coral bleaching will increase in the future (very high confidence);
- Sea level will continue to rise (very high confidence); and
- Wave height is projected to decrease in December–March (low confidence), and waves may be more directed from the south in June–September (low confidence).

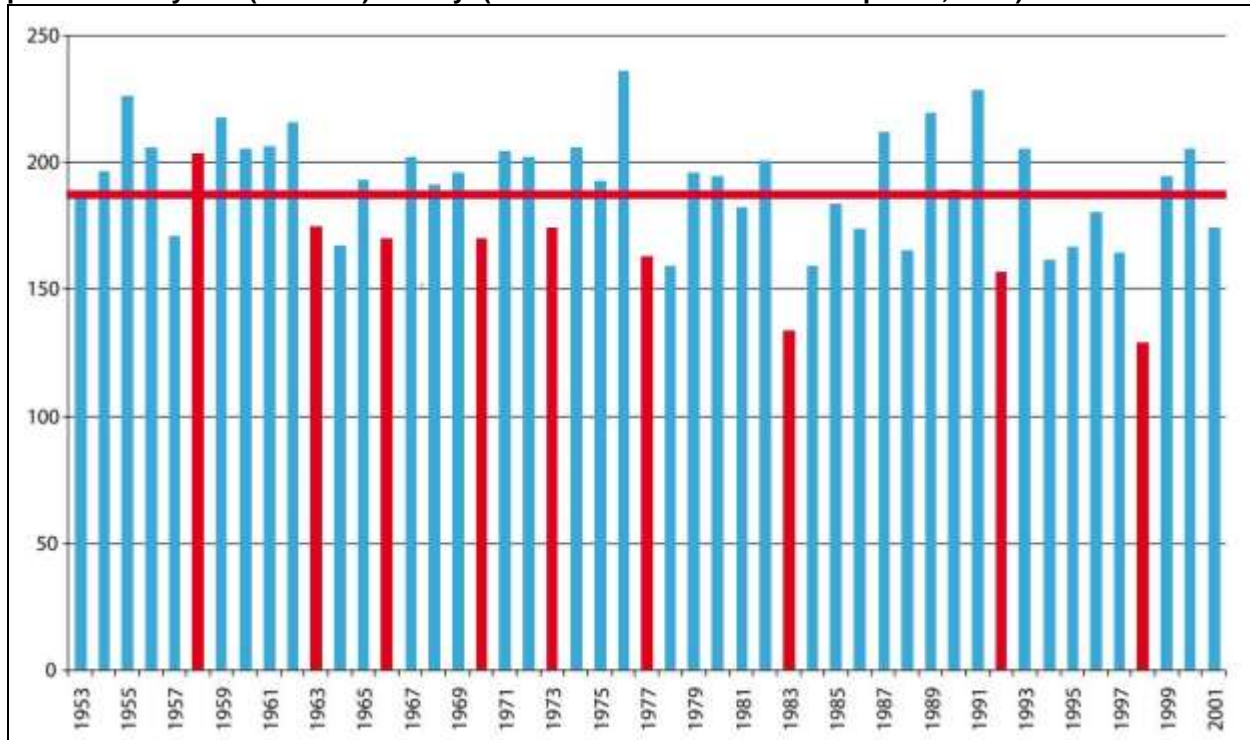
A number of studies suggest that global warming could accentuate the current climate regimes and the changes that come with ENSO events (e.g. Hay and Pratt, 2013). This will mean that the inherited and natural coping strategies that the inhabitants of the atoll islands and the atoll environment of FSM will not be enough to respond to these new climate regimes. It will be an ongoing challenge and burden to maintain and sustain the sensitive balance between ecosystem dynamics, the health of the marine environment, human settlement patterns and coastal resource use.

FSM's climate and sea level are both strongly modulated by the ENSO. Following El Niño conditions the country typically experiences drought. Severe drought events have resulted in water and food shortages as well as the occurrence of fires. Effects of El Niño on the FSM involve the persistence of a high-pressure weather zone over the Western Tropical Pacific for many months, blocking low-pressure, rain-bearing air masses. Nearly all extremely dry years in the FSM occur during the year following an El Niño event (Figure 3). In some years, drought conditions have continued through the wet season.

The driest year on record in Pohnpei and throughout most of Micronesia occurred in 1998, following the major El Niño of 1997. Some El Niño years are very wet depending upon the behaviour of typhoons and the monsoon trough. Most La Niña and neutral years have precipitation that is near normal to slightly above normal, unless it is a year following an El Niño, when rainfall is below normal. Deleterious effects include desiccation of grasslands and forests, draw-down of streamflow and well-heads, and wildfires¹².

¹² FSM Second National Communication Report to the UNFCCC, 2015.

Figure 3 Time series of annual rainfall at the Pohnpei Weather Service Observatory (WSO). Most post-El Nino years (red bars) are dry. (Source: Lander and Khosrowpanah, 2004)

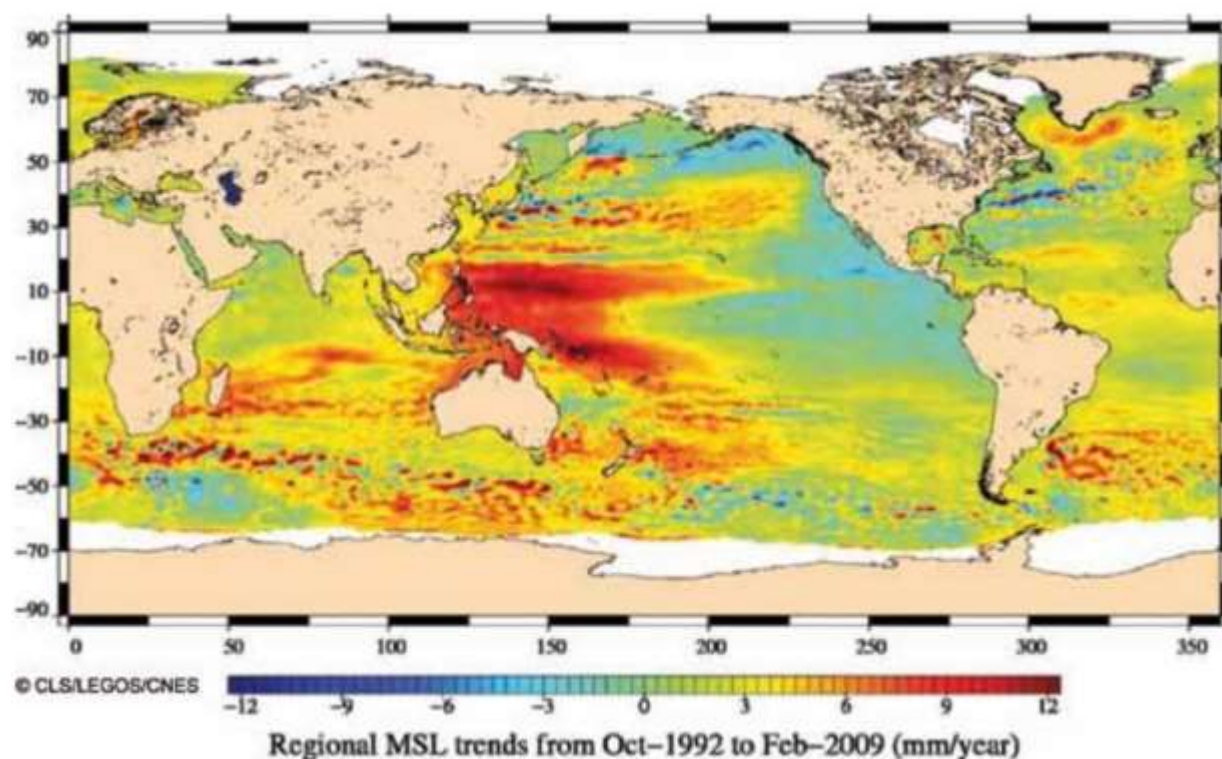


The droughts of 1982-1983 and 1997-1998 were especially severe on terrestrial habitats, increasing localized threats to biodiversity. Groundwater sources were taxed, agricultural systems damaged and problems associated with wildfires and invasive species were greatly aggravated. Insufficient rainfall caused water and food shortages, including staples such as taro, coconut, breadfruit, banana, yam, sweet potato, citrus, and sugar cane. Communities in the atolls survived because bottled water, food supplies, and reverse osmosis pumps were imported. Water rationing for only two hours a day in Pohnpei was necessary. High near-surface lagoon and ocean water temperatures, especially associated with low water spring tides, caused coral bleaching and damage to inshore marine ecosystems (Falanruw, 2001). Poor potable water quality resulted in cases of typhoid and cholera. There was also a decrease in fish catch, possibly due to the variations in water temperature that occur during El Niño events.

2.1 Sea Level and Extreme High Tides

FSM is located in part of the global ocean that has experienced some of the highest rates of sea-level rise (Figure 4) over the period of available satellite and tide gauge monitoring. Data from the Topex/Poseidon and Jason-1 satellites makes it possible to determine rates of sea-level change between 1992 and 2016.

Figure 4 Rate of Sea Level Change, 1992 - 2009



Monthly averages of the historical tide gauge, satellite (since 1993) and gridded sea-level (since 1950) data agree well after 1993. These data indicate an interannual variability in sea level around FSM of about 10 in (26 cm) (estimated 5–95% range), after removal of the seasonal cycle.

The average of the observed in situ relative sea-level records is indicated in red, with the satellite record (since 1993) in light blue. The gridded sea level data at FSM 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). These indicate that individual monthly averages of sea level can be above or below longer-term averages¹³. FSM's climate and sea level are both strongly modulated by the ENSO. These variations are important as drought, floods and marine inundation due to high sea levels may damage soil and degrade food resources and drinking water. During an El Niño year, the mean sea level drops across most of Micronesia. During La Niña, the sea level is elevated above its normal value. These changes in sea level are highly coherent across the region from Yap to Guam, Chuuk, Pohnpei, and Kosrae.

¹³ Australian Bureau of Meteorology and CSIRO, 2011

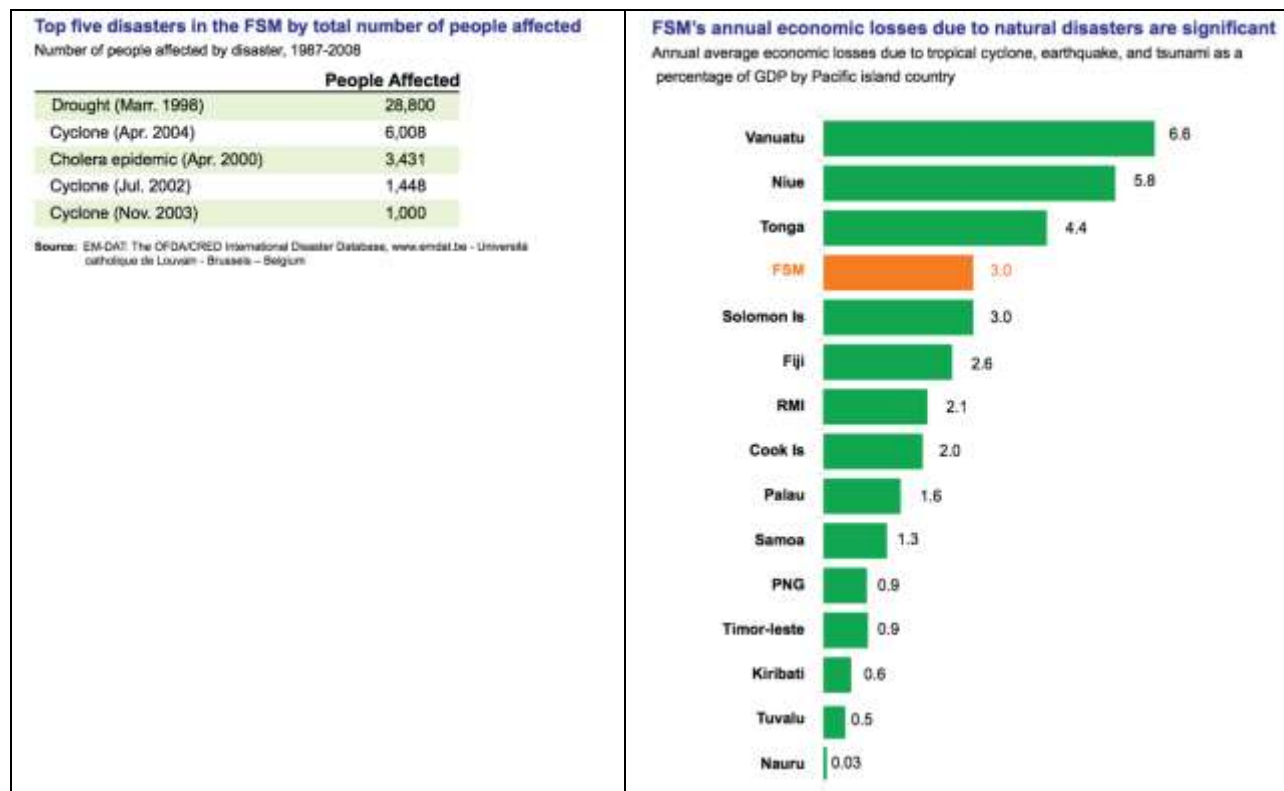
2.2 Rainfall

For FSM, wet season (May-October), dry season (November-April) and annual average rainfall amounts are projected to increase over the course of the 21st century. There is high confidence in this direction of change. The majority of models used in the study indicate little change (-5% to 5%) in rainfall by 2030. However, by 2090 the majority simulate an increase (>5%) in wet season, dry season and annual rainfall, with up to a third simulating a large increase (>15%) for eastern FSM under the A2 (high) emissions scenario. There is moderate confidence in this range and distribution of possible futures.

There is an inconsistency between the projected increases in rainfall described above and the recent declining (Pohnpei) or relatively steady (Yap) trends observed at individual meteorological stations. This may be related to local factors not captured by the models (e.g. topography), or the fact that the above projections represent an average over a relatively large geographic region. Models do not agree on future ENSO conditions and therefore on the effect of ENSO on future rainfall patterns. However, models do agree that as a global average, tropical settings are likely to see increased rainfall and rainstorm intensity

3. Vulnerability Assessment

Like many Pacific islands countries, the FSM's low-lying atolls and coral islands are very vulnerable to natural hazards and disasters such as cyclones, sea surges, and droughts. On average, annual economic losses due to natural disasters amount up to three per cent of GDP.



The islands of FSM Islands are categorized locally into three groups: 1) Volcanic 'High islands' which can be highly rugged in their basalt interiors; 2) 'Low' coral-based 'reef islands;' and 3)

‘Low’ coral-based ‘outer islands’ that are especially isolated and require significant effort to reach from the main islands by boat or small plane. Of great biological significance are the coral fringing reefs attached to land and extending watersheds into the marine environment in lagoons and Open Ocean¹⁴.

The distinction between “high” islands and “low” atoll islands is essential to explain the different climates on islands, their many specialized terrestrial and marine ecosystems, and the forms of human communities they currently support. The terrain of high islands is characterized by abrupt elevation changes (mountains, sheer cliffs, steep ridges and valleys), with the altitude and size of these features varying according to the age of the island. On high islands, orographic rainfall (rain associated with or induced by the presence of mountains) can cause the island to receive much higher rainfall than the surrounding ocean, and is responsible for large differences between leeward and windward rainfall. The landscape on high islands is conducive to the formation and persistence of freshwater streams and the development of soils that can support large and diverse plant and animal populations.

In contrast, the low atoll islands are small and flat. They are not tall enough to generate orographic rain, and thus the amount of rainfall on low islands is close to that for the surrounding ocean. The atolls generally lack the freshwater and fertile soils that are characteristic of volcanic islands and have limited terrestrial resources. Low islands are especially prone to drought, but their varied coral reef, mangrove, and lagoon environments support rich marine ecosystems. Because high islands have more land and freshwater resources than low islands do, they have more long-term options for responding to changes in sea level, rainfall, and other climate variables. The amount of land on volcanic islands that is flat enough for large-scale settlement, development, and agriculture is limited, however, resulting in high concentrations of population, infrastructure, and commercial development in low-lying coastal areas. Thus, while communities on high islands and low islands have somewhat similar short-term challenges associated with climate change, they have different degrees of flexibility in how they can adapt.¹⁵

Most of the 32 atolls within the FSM are permanently inhabited, but their residents have always been continually at risk of water shortages. Groundwater resources are particularly important reserves, since the small exposed area of the island land surface and the high permeability of the carbonate sediments preclude the development of natural surface-water bodies or reservoirs.

Atoll aquifers consist of a layer or “lens” of freshwater floating on saltwater. Recharge from rainfall typically forms a thin lens of freshwater that is buoyantly supported by denser, underlying saltwater, and mixing forms a zone of transitional salinity. The thickness of this mixing zone is determined by the rate of recharge, tidal dynamics, and hydraulic properties of the aquifer.

Water use within atoll island communities is derived from either captured rain water (typically through a roof-gutter system that feeds a large storage tank) or groundwater. Rain catchment water is preferred for most domestic purposes such as drinking and cooking, whereas groundwater, typically accessed through hand-dug wells lined with concrete or rocks, is used for

¹⁴ Ibid

¹⁵ Keener, V. W., Marra, J. J., Finucane, M. L., Spooner, D., & Smith, M. H. (Eds.). (2012). *Climate Change and Pacific Islands: Indicators and Impacts*. Report for The 2012 Pacific Islands Regional Climate Assessment. Washington, DC: Island Press.

bathing and washing clothes. Communities may also use coconut juice to supplement drinking water. The tanks used to collect and store rainwater can become depleted quickly during droughts. At such times, island residents rely on groundwater to fulfil their domestic water needs. However, this groundwater, residing in the freshwater lens, is itself subject to stress and threat of depletion, particularly during El Niño-droughts. Atoll island groundwater is thus an inherently precarious resource.

In general, only large Leeward Islands appear to be able to maintain a substantial freshwater lens during both average and drought conditions. The majority of FSM atoll islands is windward and hence contains only a thin lens, irrespective of the rate of rainfall.¹⁶

The FSM government seeks to make each atoll island community sustainable in regards to water resources. Success depends on maintaining sufficient potable water on each atoll island during even the most severe droughts as well as other extreme weather events such as tropical cyclones; however results from a recent study by a team of researchers from FSM, Guam and the USA, indicate that out of 105 major islands on FSM atolls, only six would likely retain sufficient groundwater to sustain the local community during an intense drought.^{17,18}

Box 2 The Special Challenges of FSM's Atolls¹⁹

Low-lying atoll islets pose special management challenges in FSM. Dozens of remote atoll islets are occupied by human communities of a few hundred people each.

These islets are composed of sedimentary accumulations of calcium carbonate sands and cobbles derived from the skeletal fragments of reef-dwelling organisms including coral and various carbonate-secreting algae. Some sediments are loose, and others are lithified by natural cements. Loose sedimentary deposits may be transported in various directions (seaward, lagoon ward, or along the shore) and redeposited on the island surface by storm overwash and winds.

Some researchers hypothesize that the tendency for high water events to carry sediment from the reef margin into island interiors may allow these islands to accrete upward with rising sea level. The islet landform might thus persist under a regime of accelerated sea-level rise associated with global warming. Other researchers speculate that atoll islets are pinned on the reef by rock ramparts and when rising waters breach these cemented deposits on oceanic shores, the islet will become unstable and rapidly erode out of existence.

The debate among geologists regarding the fate of atoll islets neglects a key point that is critical to the communities living on these islands: marine inundation, the same process that carries sediment to the island interior, is extremely damaging to atoll freshwater supplies, the soil, the forests that supply food, and the wetlands in which island residents

¹⁶ Bailey, R.T, J. W. Jenson & D. Taboroši. 2013. Estimating the freshwater-lens thickness of atoll islands in the Federated States of Micronesia. *Hydrogeology Journal* (2013) 21: 441–457.

¹⁷ For example, the severe El Niño-induced drought conditions of 1997-1999 in FSM caused water and food shortages including staples such as taro, coconut, breadfruit, banana, yam, sweet potato, citrus, sugar cane, and others. Communities among the atolls survived because bottled water, food supplies, and reverse osmosis pumps were imported. This was an extreme event, and provides a worst-case scenario for use in planning for future droughts.

¹⁸ Ibid.

¹⁹ Fletcher C.H. and B.M Richmond. 2010. *Climate Change in the Federated States of Micronesia: Food and Water Security, Climate Risk Management, and Adaptive Strategies*. Center for Island Climate Adaptation and Policy.

grow taro as a consumable staple. Long before the question of atoll landforms surviving sea-level rise is settled, human communities could be forced to abandon these environments unless a climate adaptation strategy is developed and implemented that provides them with potable water and sufficient food.

The following strategies for adapting to drought and improving sustainability under restricted water conditions have been recommended, with all but strategy 2 directly relevant to FSM's atoll communities²⁰:

1. Implement a water resources research program that improves understanding of groundwater, surface water, and their sustainable use.
2. Improve high island water accessibility and retrofit and replace infrastructure in the context of climate risk management.
3. Predict drought events and plan for increased frequency and duration of drought including improvements to emergency services.
4. Plan for more intense rains and the impacts that accompany them: flash flooding, mass wasting, inundation, drainage problems, cut-off communities, and others.
5. Improve low island water planning, usage, and conservation.
6. Identify data gaps in water resources and steps to fill these.
7. Support hydrologic modeling of island aquifer systems.
8. Support down-scaled climate modeling that emphasizes water resources.
9. Expand network of water monitoring instrumentation.
10. Develop a water management plan for each island including each inhabited atoll islet and neighboring resource islets.

3.1 National level response to vulnerability

The FSM Strategic Development Plan addresses climate change by raising awareness of climate change among the general population; developing coastal management plans in all four states; and developing ways to 'climate proof' facilities and structure that support social and other services. In 2012, the Presidential Task Force for Disaster Management decided that a Disaster Risk Management (DRM) and Climate Change Policy should be developed for the FSM, building on the Climate Change Policy 2009, and the Disaster Relief Act 1989 to provide overarching policy guidance for joint DRM and Climate Change Action Plans at state level.

The Strategic Development Plan (SDP) for FSM provides a road map for social and economic development for the 20 years 2004–2023ⁱ. The SDP and the Infrastructure Development Plan 2016-2025 (IDP) both recognise the need for mitigation and adaptation measures to limit the impacts of climate change. FSM developed a Multi-State Hazard Mitigation Plan in 2005, and in 2009 a national Climate Change Policy was adopted. The country developed a combined Policy for Climate Change Adaptation and Disaster Risk Management in 2013. This is being implemented through State Joint Action Plans for Climate Change and Disaster Risk Management. The Office of Environment and Emergency Management (OEEM) is the focal point for all government climate change activities.

While each state has its own strategic development plan, Kosrae is the only State with a climate-responsive Strategic Development Plan (2013–2024). The SDP recognises that “the

²⁰ Fletcher C.H. and B.M Richmond. 2010. Climate Change in the Federated States of Micronesia: Food and Water Security, Climate Risk Management, and Adaptive Strategies. Center for Island Climate Adaptation and Policy.

most prudent approach to addressing effects of naturally occurring events (climate change or disaster risks) long term would be to divert development and settlement along the coast to inland and higher grounds” (SDP 2013–2024, p. 29). The Environmental Results and Targets No. 6 states that by 2023 capacity is strengthened at all levels to climate change adaptation, and management and mitigation of risks of disasters enhanced so that communities are resilient to impacts of climate change and disaster risks. Resilience to climate change is also included within strategies for agriculture.

FSM currently has no national strategy for coastal zone management. The State of Kosrae, however, is the first state to develop a strategic plan that addresses coastal zone management in view of the adverse impacts of climate change. Kosrae has a Shoreline Management Plan (SMP), first developed in 2000 and revised and updated in 2014 (Ramsay et al., 2014). The SMP sets out the principles for coastal development in Kosrae over the coming decades, and details *eight key strategies* for increasing the resilience of Kosrae’s coastal communities. Taking on board lessons and practices from the Pacific Adaptation to Climate Change programme (PACC) and other coastal projects, this proposal aims to upscale and replicate lessons learned and best practices through guidance of these eight strategies of the SMP for Kosrae. The eight key strategies are:

- (i) Continued development and strengthening of community awareness including outreach activities with a focus on effective natural coastal defence and Kosrae-relevant climate change impacts and adaptation options.
- (ii) Amendment of the Kosrae Island Resource Management Authority (KIRMA) Regulations for Development Projects to incorporate climate change considerations and strengthening of regulation implementation to support successful long-term risk reduction and adaptation.
- (iii) Over the next one to two generations the primary coastal road network and associated infrastructure currently located on the beach/storm berm is developed inland away from long-term erosion and coastal inundation risk.
- (iv) Ensure new development (property, infrastructure) is located away from areas at risk from present and future coastal hazards or is designed with coastal hazards in mind.
- (v) Implement a program to encourage existing residential property owners to reposition homes away from areas of high risk from present and future hazards. This may be a staged approach over time as homes are routinely replaced or renovated. Objective prioritization of properties most at risk should also be explored.
- (vi) Incorporate a grant component in to the housing loan program to help encourage new property to be constructed in areas not exposed to coastal, river floor or landslide hazards.
- (vii) Commence community and state discussions to develop a relocation strategy and identify potential approaches to support relocation from areas exposed to coastal hazards where no alternative land is available.
- (viii) A strategic approach is adopted for the ongoing provision of coastal defences. These should be considered only where it is sustainable long-term option, or where it is accepted as a transitional approach to protecting areas over the short to medium term to enable relocation strategies to be implemented.

4. Water and Sanitation

There are significant differences in water and sanitation coverage between and within the four States of the FSM. Chuuk and the outer islands of Yap are especially lagging behind. Access

also varies according to socio-economic status; poorer households are less likely to use improved sanitation facilities than wealthier households.

Water quality and resultant health concerns remain a major challenge in the FSM. Only five out of the approximately 70 public or community water systems serving the main islands feature any type of treatment and even here, water is not consistently “safe” due to inadequate system maintenance and irregular supplies (FSM 2010 MDG Report, p. 80). Moreover, two of the five public sewerage systems available in the FSM pump raw sewage directly into the lagoons without treatment.

The FSM's Strategic Development Plan 2004-2023 gives high priority to water and sanitation issues with significant infrastructure development funding earmarked to the sector. However, FSM did not meet its own national targets, set for 2010, to provide universal access to safe drinking water and reach 50 per cent of rural and 100 per cent of urban households with sanitary latrines (urban 100%, rural 50%).

4.1 The Significance of Local Decision-Making to Water Security Adaptation in FSM

Throughout FSM but especially on the small, low islands, land is scarce. Decision-making has traditionally rested with landowners. Land equals power and land possession and occupancy influence political relationships and decision-making. Complex, diverse, and often competing tenure systems governing ownership and access rights to land have developed throughout the islands. Traditionally, inheritance of land rights depended on membership in a lineage or clan and often subject to chief-centered authority and control, but in most cases, the oldest male member of the lineage managed the estate. However, after a century of colonial rule, systems of land tenure followed a path away from descendant group ownership toward a western model of individualized tenure. Greater individual self-interest accompanying westernization is weakening traditional systems of land tenure based on lineage. However, authority regarding land use lies also with the local community. Hence, the implementation of any adaptation strategies requires that landowners, local communities, and decision-making bodies are all in agreement with regard to the problem, the need for a solution and the design of adaptation steps. Envisioning changes within the familiar framework of the existing system is more likely to engender greater trust, willingness, and acceptance compared to an approach that does not incorporate familiar elements.²¹

5. Discussions with Communities

OEEM carried out five sets of consultative meetings with all stakeholders including community, government and NGOs. This was during June to July 2015, January –February, and May-June 2016. The objectives of the consultations were to systemically identify and subsequently confirm the priorities that project will take up that will improve and enhance the resilience of the coastal village and island communities and their environment. The consultations involved prioritization and ranking of community and island needs to adapt to climate extremes from each of the four states.

²¹ Ibid.

This approach ensures that local communities, including men, women, youth, persons with disabilities, are supportive of these identified priorities. The discussions focused on community beneficiaries to identify alternatives or priorities and whether or not these alternatives or priorities take precedence over the initial priorities of the project (prioritization and ranking). Consultations were carried out in all four states. The Kosrae consultations required community views and responses to their vulnerabilities on island, including experiences on hazards, risks, coping strategies and their needs today. These were over and above the prioritization and ranking, output and activity-based discussions.

The stakeholders of the project include local community (farmers, housewives, youth representatives, senior citizens, village food inspectors, landowners, teachers, etc.), municipal government representatives (council members, council chairman) and government agencies (department of agriculture, fisheries, environment, island resources management authority, resources and economic affairs, land court, health services, state legislature, transport and infrastructure) and the business community. The summary of the meetings is provided in Section II.H.

6. Existing resilient practices in water security

The following table (Table 3) shows a summary of country experiences and practices that have improved resilience and reduce vulnerability to threats in the water and food security and food productions sector from the Pacific. These are accepted or prescribed as being correct or most effective (i.e., best practices)²². This project would refer to and consider these interventions to improve the selection and implementation of activities that will provide the most effective, efficient, sustainable and more relevant approach to improve resilience of communities to climate change.

Table 3 Relevant adaptation measures for water security in the Pacific

COUNTRIES IMPLEMENTED	DEMONSTRATED ADAPTATION MEASURES FOR WATER SECURITY
Nauru	By improving resilience to drought by improving management of the island's water supply, Nauru introduced solar water purifier purifiers. The units which have solar panels linked to a water distillation circuit, produce clean drinking water from non-potable sources such as seawater or contaminated groundwater. Nineteen households had solar purifier units fitted, providing 80 L of additional potable water per day per household. During a drought, this can be used for drinking, cooking and if in sufficient quantity, personal bathing. Even when not under drought conditions this is a useful and safe potable water supply. The system is operated by the household and does not require any major maintenance. The lifespan of the solar purifier is 15 years and no replacement of material is expected during this time.

²² The PACC publication series have been reviewed to ensure all information about on-the-ground demonstration activities of the project are best practices (<http://www.sprep.org/pacc/publications/technical-reports>). Lessons learned have been captured in the Experience series of the project and is available online in the same address as well.

Niue	<p>A process of research, consultation and analysis led to the decision to build a tank moulding facility and begin manufacturing water tanks in Niue. Tanks could be made at half the price of importing them, and this would further increase resilience by reducing dependence on imports. The PACC team joined forces with the Global Climate Change Alliance: Pacific Small Island States project, which is funded by the European Union and implemented by the Secretariat of the Pacific Community (GCCA PSIS – SPC), to implement the project.</p> <p>The facility is capable of producing up to eight 5,000 litre tanks each day. The tanks are made of a robust plastic called high-density polyethylene (HDPE), which is imported in powder form before it is processed and moulded into tanks. The tanks are lightweight, there are no joints that can split, and the plastic material complies with New Zealand and Australian safety standards. Properly maintained, the tanks will last for many decades.</p>
Tokelau	<p>Tokelau's three atolls total about 12 km² of land, rise to no more than 5 m above sea level, and are home to about 1,400 people. With drought a major threat, the PACC project improved water security in terms of both quantity and quality, and at both the household and community levels. Activities on all three atolls have included renovating or replacing water infrastructure such as pipes, guttering, and water tanks; and installing 'first flush diverters' which ensure that contaminants from the roofs do not enter the drinking water tanks.</p>
Tonga	<p>The objective of the Tonga project was to improve the water supply system to provide Hihifo residents of the main island of Tongatapu with better access to water in terms of reliability and pressure, and better water quality; and to enhance the capacity of the residents to sustainably manage their water resources and to effectively operate and maintain the improved water supply system. From a survey of all 354 households and a focus group discussion with key members of the communities, the SEA found that the problems were due to a combination of natural, governance and technical factors: the fragile and thin water lens which is increasingly vulnerable; a lack of community participation in the management of the precious water resources; and technical issues, such as breakdown of pumps and leakages. Solutions proposed included:</p> <ul style="list-style-type: none"> ■ Putting a water meter in every household; ■ Installing solar water pumps in villages; ■ More water tanks; ■ Strengthening governance capacities of water committees; and ■ Better transparency and communication between water consumers and water committees.

Tuvalu	Tuvalu built a water harvesting system using church building roof as water catchment, with guttering and downpipes. Capacity: 700,000 L ground cistern compartmentalized. Community ownership 100%. Management plan between government and community to alleviate drought risks. Replication on another community - Tekavatoetoe community and church with a capacity of 288,000L storage system succeeded. Launched July 2014. The project targeted Funafuti atoll, Lofeagai community, Target population, 637 (97 households, female 323, male 314). The project impacted on 90% of the village population with indirect benefits to the rest of Funafuti atoll. Individuals of the village now meet the minimum water supply of 40 L per household per day during dry periods and droughts
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7. Existing resilient practices in coastal management

Kosrae, PACC Project - The PACC project in Kosrae identified a 7 km section of the road in the Tafunsak municipality which was being progressively damaged by flooding from heavy rains and high tides. The original road had been designed to withstand a maximum hourly rainfall of 178 mm. Analysis of climate and sea level data, and projections to 2050, concluded that the road should be redesigned to withstand maximum hourly rainfall of 254 mm. Following a socio-economic assessment, community consultations, and input from expert coastal engineers, the road was redesigned and rebuilt to withstand the anticipated heavier rainfall and higher sea levels. Adaptations included raising parts of the road by up to one and a half metres, fitting larger culverts, and improving drainage. The improved road was officially opened in May 2014. The PACC developed guidelines to share experiences with climate proofing the road, which will help others to replicate this success²³.

The project also installed tide gauge and rainfall gauges in 2011 to improve availability and quality of local climate and sea level data. These now feed into climate-sensitive decision making and development for the state. The project team based in KIRMA also promoted the mainstreaming of climate risk into all development in the state and the country. The team supported development of the Kosrae State Climate Change Act, which was endorsed in 2011; and amendments to Kosrae's Regulations for Development, which now require all development projects to consider the potential impacts of climate change. The team also contributed to the revision of the 2014 Kosrae Shoreline Management Plan that provides comprehensive strategies for building resilience of Kosrae's coastal communities and infrastructure and now will guide this project.

The PACC project trialled the implementation of its relocated roads, using this manual as a guide and the purpose is to develop and promote appropriate methods of road engineering that gives the best possible access to communities at minimum cost.

Kosrae has a standard for road design (*Design standards for Kosrae circumferential road extension project*) developed when the circumferential road from Okat to Walung to Utwe was proposed (Barrett Consulting Group Inc, 1987). The standards cover the road pavement design, and associated structures such as drainage, bridges, culverts and rock revetment for coastal protection. The design standards have been applied for updating sections of the circumferential

²³ <http://www.sprep.org/attachments/Publications/CC/PACCTechRep18.pdf>

road, including the section completed under the previous PACC project. These standards are still applicable and have been updated and adjusted based on experience and as new information has become available. This includes:

- Updating rainfall design conditions used in the design of drainage, culverts and bridge to account for new analysis of extreme rainfall and climate change projections based on the information developed under the Asian Development Bank project: Climate Proofing. A risk based approach to adaptation. Appendix 1: Federated States of Micronesia Climate Risk Profile²⁴
- Refined coastal defence design guidelines and design criteria developed during associated activities related to the development of the original Kosrae Shoreline Management Plan in 1998-2000. These changes are based on best-practice guidelines outlined in *Manual on the use of rock in coastal and shoreline engineering*²⁵...

The nature and success of coastal interventions to enhance resilience to impacts of climate change are, as shown by examples from Cook Islands, Samoa and Vanuatu; very site-specific. The activities of this project that address coastal resilience would base its design and implementation against this backdrop of experiences given the similar circumstances, vulnerability, capacity, state of the natural environment, economy and certain social aspects of FSM.

8. Project / Programme Objectives:

List the main objectives of the project/programme.

Project goal: The overall goal of the project is to build social, ecological and economic resilience of the target island communities of FSM and reduce their vulnerabilities to extreme drought, sea level rise and other climate risks through water resource management, coastal resource and development planning, and by promoting gender perspectives and ecologically sound climate resilient livelihoods.

Project objective:

The overall objective of the project is to reduce the vulnerability of the selected communities to risks of water shortage and increase adaptive capacity of communities living in Woleai, Eauripik, Satawan, Lukunor, Kapingamarangi, Nukuoro, Utwe, Malem to drought and flood-related climate and disaster risks.

The proposed project will contribute to relevant outcomes and outputs of the Adaptation Fund Strategic Results Framework (AFB/EFC.2/3 from 31 August 2010), and corresponds particularly to the following higher order fund-level objectives as follows:

Project Objective 1: Prepare the necessary institutional and regulatory frameworks, policies, guidance and tools to help deliver a climate resilient FSM

²⁴ ADB, 2005

²⁵ CIRIA/CUR, 1991

Project Objective 2: Strengthen water and livelihood security measures to help 6 outer atoll islands adapt to impacts of climate change related to water, health and sanitation

Project Objective 3: Provide communities with climate resilient infrastructure to help relocate from high risk coastal inundation sites.

Project Objective 4: Capture and share the local knowledge produced on climate change adaptation and accelerate the understanding about the kinds of interventions that work in island environments in FSM

Project strategy: The project strategy is to provide all four (4) State Governments in FSM with development planning tools and institutional frameworks to help coastal communities prepare and adapt for higher sea levels and adverse and frequent changes in extreme weather and climate events. The project strategy is to also provide communities with the resources and technical support needed to adopt and manage concrete climate change initiatives and actions.

Project / Programme Components and Financing:

Fill in the table presenting the relationships among project components, activities, expected concrete outputs, and the corresponding budgets. If necessary, please refer to the attached instructions for a detailed description of each term.

For the case of a programme, individual components are likely to refer to specific sub-sets of stakeholders, regions and/or sectors that can be addressed through a set of well-defined interventions / projects.

PROJECT COMPONENTS	EXPECTED OUTCOMES		EXPECTED OUTPUTS	AMOUNT (US\$)
1. Strengthening policy and institutional capacity for integrated coastal and water management at national and state levels	Strengthened policy and institutional capacity of government to integrate climate risk and resilience into its water and coastal management legislative, regulatory and policy frameworks	1.1	Legislation and policy paper to guide regulation of climate resilient coastal and marine management at national level	150,000
		1.2	State regulations for development projects amended to consider climate change risks and resilience measures	175,000
		1.3	National Water and Sanitation Policy endorsed with climate and disaster risks and resilience, and gender mainstreamed	128,000
		1.4	National Water Outlook and Water Sector Investment Plan developed and implemented	314,642
2. Demonstration of water security measures in outer islands of Yap, Chuuk and Pohnpei	(A) Water conservation and management technology & practices adopted, responding to drought, sea level rise and early recovery from	2.1	Outer island communities oriented to CC, SLR, and adaptive capacity measures involving water, health, sanitation and environment	285,233
		2.2	Water Harvesting and Storage System (WHSS) repaired and installed in 6 atoll islands	1,044,646

PROJECT COMPONENTS	EXPECTED OUTCOMES		EXPECTED OUTPUTS	AMOUNT (US\$)
	cyclones	2.3	Self-Composting Waterless Toilets constructed to conserve water, improve soil environment, and reduce marine eutrophication on the lagoon side	732,982
		2.4	3,253 people trained on water conservation and management including coastal protection and livelihoods in 6 outer islands	260,052
	(B) Increased awareness of climate change through formal climate education	2.5	Teacher's Guide on Climate Change developed to improve climate change learning in FSM schools and training institutions	156,313
3. Demonstration of Kosrae Inland Road Relocation Initiative	Increased resilience of coastal communities and environment to adapt to coastal hazards and risks induced by climate change	3.1	3.6miles (5.8km) of Malem-Utwe inland road and access road routes constructed to sub-base roading standard for future relocation	3,005,474
		3.2	Transitional coastal protection at Mosral and Paal upgraded for immediate coastal protection	315,000
		3.3	State support program to access land in upland areas established	55,000
		3.4	Community-Based Ecosystem Management strengthened	105,000
		3.5	State support program to assist access to finance for vulnerable households established	40,000
4. Knowledge management for improved water and coastal protection	Capacity and knowledge enhanced and developed to improve management of	4.1	Climate resilient Municipality Development Plans developed and communicated	205,332

PROJECT COMPONENTS	EXPECTED OUTCOMES		EXPECTED OUTPUTS	AMOUNT (US\$)
	water and coastal sectors to adapt to climate change	4.2	Resource materials developed, tailored to local context, translated, published and shared amongst various stakeholders	238,943
		4.3	Stakeholders brought together to share, learn and exchange knowledge and skills on climate change, adaptation planning, monitoring, vulnerability assessments and climate change	295,296
4 Total Project Activity Cost (A)				7,506,913
5. Project Execution Cost (B)				788,018
6. Total Project Cost (A+B)				8,294,931
7. Project Management Fee charged by the Implementing Entity				705,069
Amount of Financing Requested				9,000,000

Projected Calendar:

Indicate the dates of the following milestones for the proposed project/programme

Milestones	Expected Dates
Start of Project/Programme Implementation	October 2017
Mid-term Review (if planned)	May 2021
Project/Programme Closing	September 2022
Terminal Evaluation	December 2022

PART II: PROJECT /PROGRAMME JUSTIFICATION

A Project Activities of the Project

Describe the project / programme components, particularly focusing on the concrete adaptation activities of the project, and how these activities contribute to climate resilience. For the case of a programme, show how the combination of individual projects will contribute to the overall increase in resilience.

Component 1. Strengthening policy and institutional capacity for integrated coastal and water management at national and state levels

Outcome 1: Strengthened policy and institutional capacity of government to integrate climate risk and resilience into its water and coastal management legislative, regulatory and policy frameworks

Output 1.1 Legislation and policy paper to guide regulation of climate resilient coastal and marine management at national level

Activity 1.1.1 Review of legislation and policies for infrastructure to identify climate change requirements

Current environmental legislation does not necessarily require environmental impact assessments on all projects²⁶. All infrastructure development projects are left to their own willingness to comply with relevant environmental planning provisions. A thorough legal and regulatory policy assessment shall be undertaken to assess the status of legislation and regulations established at the national and state level on development projects and its impacts on the environment including coastal and marine. It will also assess to what extent it will protect developments from impacts of climate change.

Activity 1.1.2 Regulatory and policy framework for climate change at national level

Kosrae state was the first state to amend its Regulations for Development Projects (No. 67-05) in 2014 to incorporate climate change impacts and adaptation measures. The regulations set specific requirements and establish standard procedures for the formal review of development projects relative to climate risks and adaptation measures. The Okat Bridge in Kosrae (\$12.7 million in FY2014) was the first development project that this was regulation was applied to. Lessons from Kosrae will therefore be applied where possible²⁷, and will be used to identify legal, regulatory and policy opportunities and approaches that will be applicable at National, State, Municipal and Outer island levels. This activity will aim to optimally produce a legislative framework for coastal and marine resource management at the national level that will introduce a Bill that aim at protecting and securing the coastal and marine resources of FSM from the impacts of climate change.

²⁶ IDP 2016-2025, Government of FSM

²⁷ PACC experiences are documented in the Technical Report and Experience Series found online at <http://www.sprep.org/pacc/publications>

A review of defined regulatory inspection procedures and protocols will be undertaken. This will work to improve clarity on the regulatory responsibilities within the government structures, and to identify ways to improve enforcement performance. A detailed consultation and participatory stakeholder engagement exercise, along with a desk review of existing information will be conducted to produce a detailed report / road map and action plan for the national government. This will accentuate climate resilient mainstreaming within government processes.

Activity 1.1.3 Develop policy and guidance documents for national and states; and

Activity 1.1.4 Endorse and adopt regulations, policy and guidance documents established for national and state levels

Following the outcomes of the review and framework development in activities 1.1.1 and 1.1.2, the project will seek to have policy and guidance documents developed at the National and State level, where required under the developed legislative framework. The project will proceed through the legal programmatic procedures of adopting all legal requirements produced by the project. In doing so, the project will aim to institutionalize certain government agencies - including Environment Protection Agency (EPA), Department of Resources & Development (R&D) to be responsible and carry out these works.

Activity 1.1.5 Lobby and advocate regulation and policy changes in media campaign and public awareness activities; and

Activity 1.1.6 Monitor and report feedback and progress

The project will build the resilience of coastal and marine management at all levels by supporting compliance of development projects to FSM's Climate Change Law (2013). These activities will lobby and educate relevant stakeholders on the changes made at the legislative and regulatory levels of decision making. It will ensure all development proponents participating in any development along the coastline and on marine environment are aware of and enforce these regulations. In doing so, the project will gather feedback and report to relevant national and state government departments.

Output 1.2 State regulations for development projects amended to consider climate change risks and resilience measures

Activity 1.2.1 Consultations and regulations at state level – Yap, Chuuk and Pohnpei

Currently, only Kosrae has regulations for development projects. The other three States of Yap, Chuuk and Pohnpei do not. In 2014 the Kosrae Pacific Adaptation to Climate Change (PACC) Project developed the Kosrae Regulations for Development Project (No. 67-05). These regulations which incorporate climate change impacts and adaptation measures will be considered and used as guidance in this project. One of the key lessons of the Kosrae PACC project was the revision of existing EIA Guidelines and its review processes to incorporate climate change considerations into the process.

This activity involves a series of consultations workshops with all key relevant stakeholders in each of the three states Yap, Chuuk and Pohnpei. The consultations will discuss and develop the required regulations, policy and guidance documents as well as a regulatory framework to effectively take these changes on board at the state congress level. These consultations will follow on from a completed review of the existing regulations on the environment protection in each of the three states. The review will seek to what extent climate risks are addressed and if any resilient measures can be identified and or strengthened. The consultations will provide recommendations as to the development of a regulatory framework that will aim to incorporate climate risks and resilience measures and provide a roadmap on the development of state regulation for development projects.

- Activity 1.2.2 Develop, endorse and adopt regulatory framework on development projects at state level; and**
- Activity 1.2.3 Initiate development of regulations, policy and guidance documents identified and adopt institutional changes to existing arrangements; and**
- Activity 1.2.4 Endorse and adopt regulations, policy and guidance documents established for national and state**

During the priority consultations in July 2015 and January 2016, Yap, Chuuk and Pohnpei stakeholders re-emphasised the need for regulation, policy and guidance documents to address climate change impacts, similar to those developed by Kosrae. Activities 1.2.2 – 1.2.4 will produce Regulations for Development Projects for Yap, Chuuk, and Pohnpei, to be approved by State cabinet. The project will ensure that institutional arrangements are developed, enacted and supported. Capacity building for these changes at the individual, systemic and institutional levels will be addressed under Component 4 of the project through the provision of training, workshops and other activities.

- Activity 1.2.5 Lobby and advocate regulation and policy changes through media campaigns and public awareness activities**
- Activity 1.2.6 Monitor and report feedback and progress**

Similar to activity 1.2.7, this activity will lobby and advocate for the changes made at the legislative and regulatory levels of decision makers, the general public and through relevant stakeholders. This will address stakeholders at both the state and national levels. It will ensure all development proponents participating in any development along the coastline and on marine environment of all islands belonging to the states are aware of and enforce the regulations established. In doing so, the project will gather feedback and report to the project and to relevant state government departments and other relevant national departments.

Output 1.3 National Water And Sanitation Policy endorsed with climate and disaster risks and resilience, and gender mainstreamed

- Activity 1.3.1 Review the water policy framework to incorporate gender and climate change**

Experiences gathered from climate change adaptation projects from the Pacific show that mainstreaming of gender considerations is required at the outset of climate change adaptation planning. It has also shown that the benefits of such mainstreaming at the policy level will

trickle down to the most vulnerable at the community levels. Taking on this lesson, this activity will carry out a gender review. The findings from this review will be used to inform and strengthen the Framework for National Water and Sanitation Policy for the FSM by mainstreaming gender aspects. This will ensure a gender-sensitive water and sanitation policy is produced (activity 1.3.2).

This activity will use tools for integrating gender perspectives into climate change policies taken from the Pacific Gender & Climate Change Toolkit, developed by Pacific regional organizations²⁸ - to gather targeted policy-relevant information relating to gender and climate change in FSM. The outline of a gender and climate change assessment for the policy is provided in table 4 below.

Table 4: The outline of the Gender Assessment work activity follows:

GENDER ASSESSMENT OUTLINE
Introduction, Background
Gender and climate change in FSM: the social dimensions of resilience and adaptive capacity
Why integrate gender? (policy and planning)
Methodology
Limitations
Findings of the Assessment
Policy design and planning
Policy implementation
Key recommendations

This activity will strengthen the existing National Water Task Force (NWTF) to develop, complete and launch the policy through a gender-sensitised approach. It will also be applied to implementation of other activities of the project at the outer island / municipality level, for example under activity 2.1.1.

Activity 1.3.2 Preparation of the National Water and Sanitation Policy (NWSP)

This activity will be the top-down implementation of water and sanitation measures designed to improve capacity of the government, state, municipality and outer islands to respond to impacts of climate change under the water sector. A Framework for National Water and Sanitation Policy was established in 2011. It institutionalised a National Water Task Force (NWTF) chaired by the Department of Resources & Development. Measures to finalise a comprehensive policy. The outline of the existing framework follows:

FRAMEWORK FOR WATER POLICY	STRATEGY
1. Rationale for a National Water Policy	

²⁸ GIZ, SPC, SPREP, UNDP, GIZ, PACC Project (2015)

FRAMEWORK FOR WATER POLICY		STRATEGY
2. Overview of Freshwater Resources and their their management in the Federated States Of Micronesia		
3. Developing a strategic approach for the management of the FSM’s freshwater resources	Policy Statement, Vision Goals Guiding Principles Priority Areas for Action, Priority Tasks for the National Water Policy Officer and National Water Task Force	
4. Strengthening national coordination of water and sanitation service delivery	4.1 Proposed Features of a Coordinating Body for Water and Sanitation 4.2 Proposed Membership of a Federated States of Micronesia National Water Task Force	
5. Proposed components of a national water and sanitation policy	4.3 Joint Communiqué/Resolution on National Water and Sanitation Policy Development and Implementation 4.4 Overarching Strategic Water and Sanitation Policy Statement 4.5 Federated States of Micronesia National Water Outlook 4.6 Federated States of Micronesia Water Sector Investment Plan 4.7 Water Utility and Environmental Protection Agency Codes of Conduct (as required)	
6. Monitoring, evaluation and dissemination		

The activity will engage the NTWF to facilitate a group of consultants or a Technical Team (including a gender specialist) to solicit views, put together the information and write the policy using the framework as the guide. Information will also be solicited from national and state level stakeholders. The national level consultations will identify national water resource management targets and performance indicators of the policy reaffirming the outline developed under the Framework.

The activity will follow up on the results of the gender review (activity 1.3.1) of the Framework for National Water and Sanitation Policy for the FSM, and ensure that the policy, the national water outlook program (activity 1.4.1) and the water sector investment plan (activity 1.4.2) factor in gender issues.

This activity will develop a Joint Communiqué / Resolution on 'National Water and Sanitation Policy Development and Implementation'²⁹. This will serve as the political instrument for the implementation of National Water and Sanitation Policy. The resolution will be developed as a result of consultations on the policy at the state and national level, facilitated by the Technical Team. It will also develop an 'Overarching Strategic Water and Sanitation Policy Statement'³⁰. This statement will provide the agreed strategic approach for the management of water and

²⁹ This is currently stated as Component 4.3 of the policy per the Framework of the NWSP 2011.

³⁰ This is currently stated as Component 4.4 of the policy per the Framework of the NWSP 2011.

sanitation in FSM. Information gathered from national and state consultations facilitated by the Technical Team will help develop this statement.

Thirdly, this activity will initiate work on 'Water Utility and Environmental Protection Agency Codes of Conduct'. Based on consultation results, water utilities environment agencies may be instructed to develop these codes as part of implementing the national water policy.

The activity will aim to get the policy endorsed by the President and Congress of FSM, publish and disseminate the policy through public awareness and media campaign activities.

Output 1.4 National Water Outlook and Water Sector Investment Plan developed and implemented

Activity 1.4.1 Implementation of the National Water Outlook Program

The activity will engage the NWTF in implementing the policy elements 4.5 - National Water Outlook, and 4.6 – Water Sector Investment Plan. The Water Outlook Program will be an annual program where as the Investment Plan will be comprised of prioritised costed actions for water and sanitation in each state³¹. The NWTF will finalize action plans of these components of the Water and Sanitation Policy and implement the activities.

The Water Outlook Program is an analysis of current trends and future projections of the state of water resources, demand, management issues in view of climate change risks and climate planning. The Program aims to strengthen the monitoring role of government and state owned enterprises in service delivery for water and sanitation throughout FSM. The activity will develop tailored information on water outlook, integrated with climate science and meteorology, providing monthly advisory support across FSM to be updated quarterly. The project will implement and monitor the Program and report results on a quarterly basis.

Activity 1.4.2 Implementation of the WSIP Program

The Water Sector Investment Plan is expected to guide all future investments in the sector to improve the government's fiscal and physical effectiveness for more efficient achievement of the sector's climate resilient targets and goals. The Plan will consolidate existing State Investment Plans to help address the impacts of climate change such as increased variability in rainfall and prolonged droughts, as well as minimise duplication and contradictions, assess the consequences of reduced sector funding compared to plans, population growth, increased demand, and impact of water resources management on the economy. It will acknowledge the highly diverse and vastly different resources and capacities to address the impact of climate change on the supply and treatment of freshwater on the main islands and outer islands of each State. The WSIP will identify investment needs according to the climate resilient strategies, targets and goals of the water sector, to build its resilience to climate change.

The Investment Plan activity will procure a technical team to develop and finalise the Water Sector Investment Plan (WSIP) as per the Policy and policy guidelines / implementation plan. The project will ensure that the WSIP emphasises equal consideration of support for the Outer

³¹ Framework of the National Water and Sanitation Policy, 2011

Islands. As a component of the Water and Sanitation Policy, the activity will also be monitored and results shared. Monitoring and evaluation planning process and reports on progress of the activities will be carried out under the activity.

Component 2. Demonstration of water security measures in outer islands of Yap, Chuuk and Pohnpei

Outcome 2a Water conservation and management technology & practices adopted, responding to drought, sea level rise and early recovery from cyclones

Output 2.1 Outer island communities oriented to CC, SLR, and adaptive capacity measures involving water, health, sanitation and environment

Activity 2.1.1 Arrangements for demonstrations of water and sanitation technologies

The activity will organise inception and orientation meetings at the outer island level led by the island governing council and facilitated by the State project management unit. Tools to ensure the consultations are gender-sensitised will be applied by the project. The objective of the training will clarify the overall project strategy, its objectives, outcomes, outputs, inputs, activities and roles and responsibilities of all stakeholders involved including transportation and logistics.

The communities will be actively involved in the orientation on climate change, sea level rise, vulnerability and adaptive capacity measures involving water, health, sanitation and environment on the island. Sex-disaggregated and age-disaggregated group sessions will be carried out in learning, training and awareness workshops within the communities. The approach will include everyone, through their traditional community-based organizations to actively participate and have their say in activities and strategies of the plan. This will include women, men, youth and elderly and those persons living with disabilities. The meetings may use a variety of tools, including participatory rapid appraisals (PRAs), socio-economic assessment surveys, and gender-sensitisation tools.

Through these consultations, other community needs may be identified and addressed to support the activities of the project. These may include basic skills training on managing and implementing project activities on a day to day basis. The results from all activities here will be collated to inform a much larger whole-of-island workshop on the development of a potential whole-of-island development plan for the atoll islands (see activities under Output 4.1). This whole-of-island approach has been trialled and found to be highly successful in outer island of Abaiang atoll of Kiribati and Choiseul island of the Solomon Islands.

With the knowledge and skills developed from the orientation workshops and having clarified and contextualised the social, cultural and environmental aspects of the islands and communities during the inception workshop, the communities will lead in the identification of community, schools, household infrastructures for demonstration of activities of the project. This activity may be repeated under activity 2.1.2 depending on the particular island(s) of the atoll identified for the project.

Activity 2.1.2 Carry out ground-truthing assessments

In order to reaffirm data and recommendations gathered from the consultations carried out during planning stages (July, November 2015; January, February 2016), and from recent rapid assessments carried out by the Department of Resources & Development, and International Organisation for Migration (IOM) in March 2016, **a ground-truthing assessment** will be carried out. This will include carrying out technical surveys on water, water use in the community villages on island, sanitation and health incidences related to water. These surveys will also collect information on social aspects such as traditional knowledge, cultural and political governance and how these may influence the implementation and management of the project.

This activity will carry out a two-step ground-truthing assessment of data collected from a rapid assessment carried out in March 2016 in the atoll islands of Eauripik, Ifalik and Woleai. The ground truthing assessment will identify household and community infrastructures for demonstration. It will be undertaken in two parts, firstly to conduct hydrological assessments for each island that include interviews and site surveys. The **interviews** will be carried out with key personnel that hold responsibilities for water, health and sanitation on each island. It will also interview women, men and youth in sample households. The survey will ground truth data on:

Water storage capacity (wells, tanks, etc)
Available rainwater catchment area
Water seal toilets (contributing to output 2.3 activities)
Sewage disposal systems

The **site surveys** will be carried by a technical team made up of a team of one local and one international expert. They will be accompanied by the committee on island community selected by the island municipal council with equal representation of women, men and youth. The main responsibilities that will be undertaken include:

- Global Position Survey
- Elevation survey
- Flora and fauna survey
- Well survey (depth, conductivity)
- Groundwater survey quality testing
- Water quality testing (chloride testing)
- Rain catchment inventory
- Household interview
- Photo documentation
- Drone survey (village setting, entire atoll, for video, 3D modelling)
- Project logistics: solar power setup, food and camp

There will be at least two people for each task (one main person, one backup) but the actual task may be carried out by more people. The information from this work will also inform activities of Output 2.3 for building and constructing self-composting toilets on the island.

The second step will be active consultations with the community for finalisation of the site selection for the installations of the water tanks at the household and community levels. Lessons from PACC Nauru have shown that once sites have been established and agreed to, signed agreements between households / community organizations and the island government council should be put in place to ensure the sustainability of the activities throughout and beyond the life of the project. The basic conditions of the agreements are as follows:

Community / private owners agree to:

- undergo training on water conservation practices and maintenance
- carry out maintenance of the installed systems over time per maintenance schedules
- agree to lead in collection of data and participate in monitoring and evaluation of data.
- provide feedback on benefits and challenges of the systems.

Project agrees to:

- provide training on water conservation practices and maintenance
- provision of resources (materials, services)
- provision of spare parts / materials

The results of the community consultations will also produce short (maximum 3 years) or long-term action plans (5 years or more) for managing of water resources on the island. These plans will include three key components – 1 water infrastructure and maintenance (including maintenance schedules), 2 – water and health and 3 awareness and education. The plans will be linked to the community development climate change adaptation plan to be developed under output 4.1. The activities outlined under the signed agreements between households and community and the project will also form a part of these implementation of the plans.

Output 2.2 Water Harvesting and Storage System (WHSS) repaired and installed in 6 atoll islands

The water harvesting and storage systems will address the climate stresses, namely the prolonged periods of drought such as those experienced in the 1997-1999, 2003-2005, 2015-16 El Nino events, and the extreme weather events leading to high intensity rainfall, and lengthening of the dry season months. These climatic stresses necessitated review of atoll water resources that include design and status of wells, sanitation and rainwater tanks and their water holding and storage capacities.

At present, various types of water harvesting systems exist in poor conditions on the islands and people resort to coconut juices to meet their water demands³². The rainwater harvesting and ground water wells that exist are largely privately owned. The current rainwater harvesting systems and storage elements include roofing, guttering, downpiping, water tanks and concrete tanks. All systems are in poor, basic or unusable conditions as a result of damage from cyclones, extreme high tide events damaging infrastructure coupled with no maintenance due to lack of equipment and spare parts³³. In Yap for example, 40% of water tanks on all nine outer islands including Woleai and Eauripik do not have proper rain harvesting systems (tin roofs for collecting rainwater and gutters including down spout, fasteners and clips). Nearly 90% of water wells had very low water levels; all are brackish and nearly all were uncovered.

³² Rapid Assessment Report, March 2016, FSM

³³ *ibid*



Figure 5 Sample of water tanks and wells from outer islands – Eauripik, Woleai atoll, Ifalik, and Feraulap atoll (Source: Rapid Needs Assessment, March 2016, Yap, FSM)

Activity 2.2.1 Repairing household rainwater harvesting and storage system

The constituents of the water harvesting and storage systems include roofing, guttering, downpipes, first flush diverters, cisterns or tank and tank base. The systems are linked to and part of housing infrastructure.



Figure 6 Installing a rainwater harvesting system at the household level (source, PACC Niue, 2014)

This activity will rehabilitate and repair existing materials of the households selected from activity 2.2.1, to close leaks and improve efficiency of existing rainwater harvesting systems. It

will extend the gutters to the full dimensions of the catchment to capture more water; increase the catchment area to improve long-term water security and storage tank size if overflow is frequent.

The repair of household level rainwater harvesting systems and construction of community tank activities will be undertaken under the following minimum requirements:

HOUSEHOLD LEVEL	SUB-ACTIVITIES
Rainwater catchment systems	
Key activities	Repair household rainwater catchment systems
Minimum requirements	<ul style="list-style-type: none"> • Repair existing systems to ensure that there is: • 2 HDPE³⁴ tanks per household criteria for maintenance without • Extend gutters to full dimension • Increase catchment area by using reliability curves³⁵ • Increasing storage tank volume using reliability curves • Clean up awareness campaign • Clean up and maintenance training • Maintenance schedules established • Project and Household agreement for monitoring and maintenance through duration of project
Wells	
Minimum requirements	<ul style="list-style-type: none"> • Construct rim walls extending up off the ground for wells without walls • Build covers for wells without and repair damaged covers

The repair and installation of rainwater harvesting systems has worked successfully in many low-lying atoll islands around the Pacific such as the Marshall Islands, Tuvalu, Niue, Nauru and Tokelau - in the face of drought. A full rainwater harvesting system successfully demonstrated in Niue under the PACC / EU-GCCA PSIS projects is shown in the picture below will be similar to what will be carried out in the six islands at the household level.

³⁴ HDPE – high density polyethylene tanks known for stiffness, strength, toughness, resistance to chemicals and moisture, permeability to gas, ease of processing, and ease of forming.

³⁵ Beikmann, A., Bailey, R., (2015) Freshwater Resources for Selected Atolls - Recommendations based on Modelling Study. In: Beikmann, A., Bailey, R., Jenson, J., Kottermair, M., Taboroši, D., Bendixson, V., Flowers, M., Jalandoni, A., Miklavič, B., and Whitman, W. (2015). Enough Water for Everyone? A Modelling Study of Freshwater Resources for Selected Atolls of Yap State, FSM. WERI Technical Report 157. Water and Environmental Research Institute of the Western Pacific, University of Guam, Mangilao, Guam.



Figure 7. A fully installed rainwater harvesting & storage system (source: PACC Niue, 2014)

Activity 2.2.2 Constructing community rainwater harvesting and storage systems

Community tanks are recommended to assist the larger community in times of drought to relieve pressure on individual household water tanks, and to meet basic water requirements for medium-term survival needs (activity 2.2.3). These include meeting not only the short-term survival requirements of drinking and cooking, but personal washing, washing clothes, cleaning home, growing food, and sanitation and waste disposal³⁶.

The construction of community tank activities will be undertaken under the following minimum requirements:

	COMMUNITY LEVEL
Rainwater catchment systems	
Key activities	Install community tanks

³⁶ Based on Maslow's hierarchy of water requirement needs, WHO 2013.

	COMMUNITY LEVEL
Minimum requirements	<ul style="list-style-type: none"> • Minimum 2 x 5,000 L / 2,000 Gallon HDPE tanks per atoll island > 100 population • <100 population requires re-assessment • > 400 population = 4 tanks • HDPE tanks preferred over concrete tanks • Extend gutters to full dimension • Catchment area sized appropriately to tank volume using reliability curves. • Encourage standalone catchment areas to shelter tanks and fence for protection • Access and maintenance rules established and to include cleaning each tank on a rotation basis, cleaning to be 3 times per year • Rules for access to include access by neighboring villages in times of drought • Maintenance schedules established
Wells	
Minimum requirements	<ul style="list-style-type: none"> • Municipal council review, assessment and executive orders on environmental advice on burials to encourage use of existing cemeteries and reconsider burials in private residences and plots • Exceptions to consider sites down hydrological gradient from wells.

Activity 2.2.3 Monitoring and maintenance

The project management unit on island will collect information on a monthly basis on the repair and construction work and prepare monitoring progress reports on a quarterly basis. A monitoring and maintenance plan will be developed following completion of repair and construction. Data on water saved, quality, use and distribution, will be collected against the baseline from the surveys. Throughout the duration of the project, the maintenance schedules will be used to monitor the quality and use of assets, and provide solutions to maintain the assets using spare parts collected by the project. Climate related extremes and environmental conditions will be recorded as well. The climate extreme events that may occur during the life of the project will be reported against the project and communicated. This will be used to develop lessons and practices of the project and provide any corrective actions.

Output 2.3 *Self Composting Waterless Toilets constructed to conserve water, improve soil environment, and reduce marine eutrophication on the lagoon side*

The latest global climate model (GCM) projections and climate science findings for FSM indicate El Niño and La Niña events will continue to occur in the future (very high confidence), but there is little consensus on whether these events will change in intensity or frequency³⁷. El Niño event for FSM means longer drought periods. Drought is a major threat to water resources and water supply in the small outer atoll islands of FSM with no surface water, heavy reliance on rainwater and vulnerable groundwater. The recent drought that struck the northern Pacific including FSM, the Marshall Islands and Palau in early 2015 until early 2016 is a reminder of the disastrous potential of long lasting droughts. In the outer islands, the education sector is affected by drought period when schools have no other choice but close because of insufficient water to run flushing toilets.

The community leaders of the outer islands chose to invest in technologies to conserve water as much as possible to respond to the drought periods driven by El Nino. At the same time, strengthen the resilience of their environment to withstand increases in sea level rise, and buffer storm surges. Self-composting toilet technologies has been chosen as one of the investments along with RWHSS. The technologies have been proven in communities in Tuvalu and Nauru through the Integrated Water Resource Management (IWRM) project in partnership with PACC, as one of the best solutions to conserve water as it uses no water at all and the technology avoids sewage contamination of the groundwater. It therefore promotes replenishment of groundwater useful for bathing, washing, planting, and depending on the environment for cooking. The current practice of using the lagoon side as toilets will be reduced significantly as the schools and community halls or public places – will be targeted by the project to install these units. This practice contributes to reducing marine eutrophication on the lagoon side. The expected environmental benefit will be healthy lagoon environments ultimately strengthened to buffer storm surges, and provide for the sources of protein and livelihood of the communities in times of dire need such as droughts and cyclones brought about by the impacts of climate change.

This project will therefore aim to develop a plan to promote self-awareness on the benefits of self composting toilets to adapt to and respond to climate change in the immediate to long-term. It will demonstrate the units at schools and or community halls, churches. It will train teachers, boys, girls and community members on the use of the units and its functions. It will train the beneficiaries on WASH and water conservation practices in school and communities as well as monitoring and care after.

The cultural diversity amongst the six outer islands of the three states suggests there may be diverse preferences for the types of sanitation technologies used on the islands. The absence of pit toilets on some of the islands on the atoll in Woleai and Eauripik in Yap and Satawan in Chuuk are a blessing for the local groundwater and its quality. These practices should not change if the groundwater is to be retained as a clean and viable source for showering, washing, and cooking, as well as an emergency source for drinking water. The concern, however, is that beaches and shallow seawater are used instead. There is possible evidence of eutrophication during low tide on the lagoon side. At such time when circulation with the ocean is reduced, solar heating of the water is increased, and water can hold less dissolved oxygen. When algal metabolism removes oxygen at night it can cause fish to suffocate. Algal growth in the lagoon is boosted by excessive nutrient input from human waste. Local people have reported that dead fish wash up on the beach following very low tide events on the lagoon side

³⁷ Australia Bureau of Meteorology and CSIRO, 2011

of the island³⁸. The onset of climate stresses that include increase in sea surface temperatures will exacerbate this problem contributing to food security issues as well as water, sanitation and health issues.

Note: The ground-truthing assessments in activity 2.1.2 may yield some results on disagreement to proceeding with output 2.3 and its activities. The result may come from any of the six island communities as a result of cultural and social barriers. In the event that this output is not entertained, the project team will refer the community / island to other community potential alternative adaptation priorities they identified, and the activities therein. The community will consult in agreement based on these priorities and that are within the scope of the project and aligned with the Fund's mandate. Lessons from PACC, ECOSAN and IWRM, suggests that the project will need to consult with communities on alternative activities at the outset before implementation. This was carried out by the project during the planning stages and a list of alternative adaptation activities that are considered livelihood security measures was produced and is listed in Annex 2. The project will seek Project Board endorsement of the revised community activity priorities based on meeting criteria of the project that include alignment with the Project's objectives, the Fund's mandate, and within scope of time, budget, risks and capacity of the project.

Activity 2.3.1 Developing plans/ guidelines for self-composting water less toilets (SCT) awareness, installation and maintenance

The community consultations carried out under the ground truthing assessments of output 2.1.1 will include identification of school, community or household sites for installation of self-composting toilets supported by this activity. Special sessions for developing and agreeing to plans and guidelines for SCTs will be developed for the outer island targeting women, men and youth of the communities. An awareness, installation and maintenance component will be part of these guidelines and manuals. A demonstration unit will be carried out on the main island of the atoll.

Training workshops on construction will be carried out as required. These training events will be coupled with Basic Water, Sanitation and Health (WASH) practices and water conservation awareness sessions outlined under Activity 2.3.4. The plans and guidelines review and site – specific context will be developed by the team, but based on the established '*Sustainable sanitation manual and construction guidelines for a waterless composting toilet*' (SPREP, 2007). Lessons from Nauru and Tuvalu under the Integrated Waters Resource Project ECOSAN component and PACC projects will be applied to improve on the construction designs of the project as well.

Activity 2.3.2 Constructing self composting toilets – using plans (1 unit each per gender)

The construction of the units will act as a demonstration measures. There will be separate unit for females and a separate unit for males. Each unit is a superstructure for a freestanding toilet building. The toilet house is built on top of the composting chambers that includes a ventilation and drainage system.

³⁸ Based on Maslow's hierarchy of water requirement needs, WHO 2013.

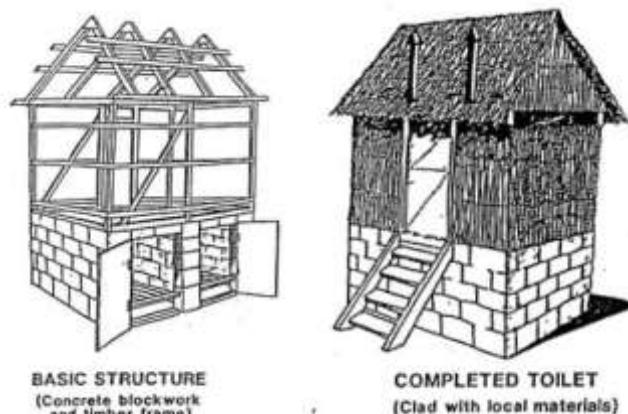


Figure 8 Basic and completed structure of self-composting toilets (source: SPREP, 2007)

The frame of the unit or superstructure will be built to storm resistant standard and suitable for covering with natural materials such as pandanus thatch or permanent materials such as fibro, plywood, or corrugated iron. The toilet rooms will provide a cool setting that allows cool air to settle and push down the hot air in the chambers up the tall ventilation pipes and out. The toilet rooms will be spacious, ventilated and allow for natural light. The roof will either be in zincalume, corrugated iron, or thatched with local materials. The materials and design of the superstructure toilet room can be varied to suit local building regulations and the practicalities and aesthetics of the site, as long as it does not compromise the function of the composting chamber and the drainage system.

A lead builder / carpenter on each main island will be identified with a team of men, women and youth to undertake the construction of the self composting toilets. The 'Sustainable sanitation manual and construction guidelines for a waterless composting toilet'³⁹ will be used to guide the construction.

³⁹ International Waters Project – Pacific Technical Report no.52,
http://www.sprep.org/att/publication/000560_IWP_PTR52.pdf



Figure 9 Images of self-composting systems in the Pacific. L-R, a SCT using the roof as a catchment area for rainwater harvesting in Tuvalu (source: IWRM, Nauru). The toilet room, completed SCT in Tuvalu (IWRM, Nauru); construction of chambers, IWP Samoa and Vanuatu

The by-products of the SCTs will be managed through a soil improvement program led by communities.

Activity 2.3.3 Training on WASH and water conservation practices in school and communities

The training for Water, Sanitation and Health is particularly essential in the outer islands because of existing water storage infrastructures that are not maintained and are in very poor condition. A WASH survey tool will be used to collect information over the duration of the project and measure WASH baseline and changes as a result of the project intervention. Results of the WASH survey will contribute to evaluation results of the project overall. The tool will look at the following four indicators:

- Water & sanitation access.
- Water quality.
- Behaviour change.
- Health outcomes.

It will carry out the survey activities that include:

- Sanitary survey / Rainwater tanks survey
- H₂S tests for water quality

- Diarrheal/skin sore information
- Direct observation of sanitation facilities/ hygiene & household water storage & treatment practices

The WASH survey will be undertaken by a survey team lead by the Health department of each state, and those responsible for health on the outer islands. Teams will be assembled on each outer island and trainings carried out. Key experts will be sought from the Pacific WASH Coalition⁴⁰ program to assist. The project will work in partnership with IGOs such as the Red Cross Society and the State Health Services of each state. Women, men and youth members will be encouraged to form the teams and carry out the work. Following training, there will be at least four (4) rounds of surveys where round 1 will establish the baseline information. Monitoring behavioural change will need strong emphasis and how this will be catalogued will form an important part of the training programmes. This activity will need to be carried out subsequently, however, and not concurrently due to an unavailability of WASH experts in FSM and the region. As such, this activity may have to be carried out by one state or two outer islands each time.

Activity 2.3.4 Monitoring and after care

Data and information will be collected on a monthly basis and provided to the Outer Island Coordinator (OIC). The OIC will compile the quarterly progress report and update the Team Leader on the main island. The Team Leader will compile his/her quarterly report and submit to the Project Manager based in Pohnpei.

The after care activities will include maintenance checks and runs to the water harvesting systems installed, as well as the self composting toilets constructed. Caring for the assets developed by the project will be undertaken by the beneficiary themselves with assistance from the project, through provision of resources and materials agreed to during consultations. Any issues, risks and problems will be reported and corrective actions taken.

Output 2.4 3, 253 people trained on water conservation and management including coastal protection and livelihoods in 6 outer islands

The activities of this output are training workshops on skills and knowledge required to improve the ability of women, men and youth to carry out the work required for all activities under outputs 2.1, 2.3 and 2.4. The men, women and youth of the communities will be trained on skills and knowledge required for demonstration of water harvesting and storage systems, water data collection, quality testing and survey developments. This training will also include components on monitoring and maintenance and the after care of systems.

The trainings will be undertaken concurrently under each of the three areas of training needs as follows:

Activity 2.4.1 Water data collection and quality testing and survey developments	Activity 2.4.2 Construction, operations and maintenance of systems	Activity 2.4.3 Monitoring and maintenance / after care of systems
<ul style="list-style-type: none"> • Well survey (depth, conductivity) 	<ul style="list-style-type: none"> • Operation and maintenance of rainwater harvesting 	<ul style="list-style-type: none"> • Gender and climate change tools training

⁴⁰ Pacific WASH Coalition is a partner platform of various agencies formed in 2007 which supports/collaborates, coordinated regional initiatives for WASH

<ul style="list-style-type: none"> • Groundwater survey quality testing • Water quality testing (chloride testing) • Rain catchment inventory training • Flora and fauna survey training • WASH survey techniques and tools 	<ul style="list-style-type: none"> • systems • Construction guidelines for building self-composting toilets (SCTs) • Operation and maintenance of SCTs 	<ul style="list-style-type: none"> • Climate change impacts on low-lying atoll island environments • Project management basics course training – importance of roles and responsibilities • Coastal geospatial assessment survey • Data collection, reporting and non-reporting.
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Outcome 2b. Increased awareness of climate change through formal climate education

Output 2.5 *Teacher's Guide on Climate Change developed to improve climate change learning in FSM schools and training institutions*

The activity will produce a guide that will advance climate education at the state and outer island level and enhance the capacity of teachers to be able to teach climate and incorporate them into current curriculum on the environment.

Activity 2.5.1 Organizing climate change education planning workshops; and Activity 2.5.2 Teacher's Guide on Climate Change translated in six outer island languages

The project management unit at state level of the project will be responsible for organising a series of state wide climate change education planning workshops. The objective of the workshops will be to develop a specific teacher's guide on climate change for each state. The guide will be translated to the local language in each of the outer islands. The aim of this guide is to deliver nationally prioritised key messages relevant to climate change science, the effects of climate change on FSM and the outer islands, and options to adapt to expected changes and awareness on options to mitigate its causes. It targets teachers, trainers or lecturers, and will be made easy for anyone to teach their students about climate change and increase their resilience to the effects of global warming.

The activity will undertake a collective review by participants of the workshops of the existing Pacific Guide developed by Regional SPC/GIZ/SPREP Programme called, Coping with Climate Change in the Pacific Island Region (CCCPIR)'. The '*Learning about climate change the Pacific way: A guide for Pacific teachers*'. The Pacific resource consists of a set of 16 colourful pictures with a description each. It describes each picture with suggested learning outcomes, suggestions for teaching and learning activities; definitions and background information presented in colorful boxes. A glossary of key terminology is provided at the end of the guide. The FSM resource will consider these features and supplement and complement them with FSM-specific information.

Activity 2.5.3 Training of Trainers / Teachers on Teacher's Guide on Climate Change.

Following the review and finalisation of a FSM-specific resource, the activity will undertake at least a 3-day certified “train the trainer” workshop at each state. The objective of the training will be to train pre-service and in-service trainers in the teaching of climate change using the new FSM-tailored education resource: *Learning about climate change the FSM way*. Where appropriate the workshop will incorporate associated climate change education tools and topics.

Activity 2.5.4 Implement Teacher's Guide in Schools; and Activity 2.5.5. Monitoring effectiveness of Teacher's Guide development system, and Guide itself

Following certified teachers and trainers, the activity will support schools on island proper and outer island in implementing the guide. A monitoring activity will be undertaken by providing evaluation forms for feedback by both teachers –on the use of the guide, and students – on the knowledge and lessons they learned on climate change from the new and added curriculum activity.

Component 3. Demonstration of Kosrae Inland Road Relocation Initiative

Over 6,680 inhabitants of Kosrae are likely to benefit from the intervention measures proposed (direct or indirect benefits) under Component 3.

Outcome 3. Increased resilience of coastal communities and environment to adapt to coastal hazards and risks induced by climate change

The Kosrae Shoreline Management Plan developed a prioritised list of inland road and essential infrastructure development (Figure 10) to be implemented over the next one to two generations as an essential component for developing resilience to coastal-related hazards and sustained adaptation to climate change. Developing and upgrading the inland road between Malem and Utwe was considered the highest priority due to the current threats posed to vulnerable populations and infrastructure due to wave overwashing and potential breaching of the narrow coastal berm upon which present infrastructure and much of the population of Utwe and Malem Municipalities are located.. At Paal and Mosral, there is a very real present day risk that a breach in the berm could occur, resulting in road access to Utwe being cut off and the potential loss also of power and telecommunications which are located alongside the road. Relocating infrastructure is a key enabling mechanism to allow gradual relocation over the next 10-20 years of Malem and Utwe communities exposed to ever increasing coastal erosion and inundation impacts. In addition to developing the inland road and supporting infrastructure complimentary activities will be conducted to begin to streamline the process and help both communities relocate inland.



Figure 10: Priority sections of the development of the inland road on Kosrae (as identified in the Kosrae Shoreline Management Plan).

The beneficiary populations will be the entire Kosrae population. The specific and immediate and daily beneficiaries, however, will be the Malem and Utwe municipal village communities. According to the 2000 census, the Malem population was 1300 with males 663 and females 637 and the number of households at 238. The Utwe population stands at 983 on the 2000 census and was composed of 458 males and 525 females. Twenty three percent (23%) of the Utwe population is high school age. These potential beneficiaries, coupled with about 90 employed by National Government require daily access to go to the only high school located in Tofol and to the government administration district in Tofol.

There are other potential beneficiaries, approximately less than 100 people who reside in Walung municipal. Walung village community does not have access to the main roads of the island. Everyone at present uses boats to travel to Tafunsak. The only road from Walung to the rest of Kosrae is via Utwe and ultimately this will be the only road to Walung as the road south from Tafunsak is now suspended due to the Yela area being protected. In essence there are two out of five villages reliant on the road access as the only connection to the rest of Kosrae including the health services, high school, Government centre, airport and port.

Output 3.1

3.6 miles (5.8 km) of Malem-Utwe inland road and access road routes constructed to sub-base roading standard for future relocation

Activity 3.1.1 Survey, design, construction, reconstruction and maintenance of road and related infrastructure to ensure climate change resilience

Given the investment required, a staged approach based on the priorities identified in the Kosrae Shoreline Management Plan is being adopted to the development of the relocated road, associated infrastructure and ultimately village infrastructure and residential development. Ultimately the intention is to develop the road to the same standard as the existing two lane paved road based on the design standards developed for the Kosrae Circumferential Road Extension Project (Barret Consulting Group Inc, 1987), and located around the base of the volcanic part of the island (as presently occurs between the airport and Tafunsak village - shown in Figure 11, left). Over the next one to two generations the inland road will become the primary road access from Utwe and Malem to the main Government Centre at Tofol and to the airport and port..

Activity 3.1.1 will construct 3.6 miles (5.8 km) of inland road between Malem and Utwe. The road alignment for the inland road was carried out by the Department of Transport and Infrastructure, and finalised as part of the EIA, consulted and agreed to by government, municipal government and communities (Figure 12). Based on the road alignment (and other details) details presented in the EIA the KIRMA development review board have issued a development permit (Annex 10). The road alignment has been determined based on observational field surveys including GPS tracking. GPS coordinates for the road alignment are available and will be used as the basis for further site specific topographic surveying and design. Maps of the Road alignment are provided in Annex 11 of this proposal. This is confirmed in a letter to the Implementing Entity Coordinator (SPREP) from the Kosrae State Government (see Annex 3). The inland road would be developed around the perimeter of the lower slopes of the volcanic part of the island and well above the inland boundary of freshwater swamp or mangrove areas following the 10 m contour. alignment of the road is final, with only very minor and location specific variations expected, to be determined upon full topographic road design and surveying Road construction will involve a mix of widening of existing farm roads (Figure 13) and construction of new road sections typically following existing footpaths.



Figure 11: Paved inland road between the airport and Tafunsak village (left) and on the narrow storm berm at Mosral, Malem (right).

The inland road will be well above areas likely to be directly impacted by sea-level rise over the next century and beyond (Ramsay et al, 2014). Following the natural contour of the topography minimizes any significant road slopes, need for substantial cut and fill, and reduces erosion

potential and land slipping hazard. The intention is that the road, when complete, will be similar to the present inland sections of road for example between the airport and Tafunsak village (see Figure 11).

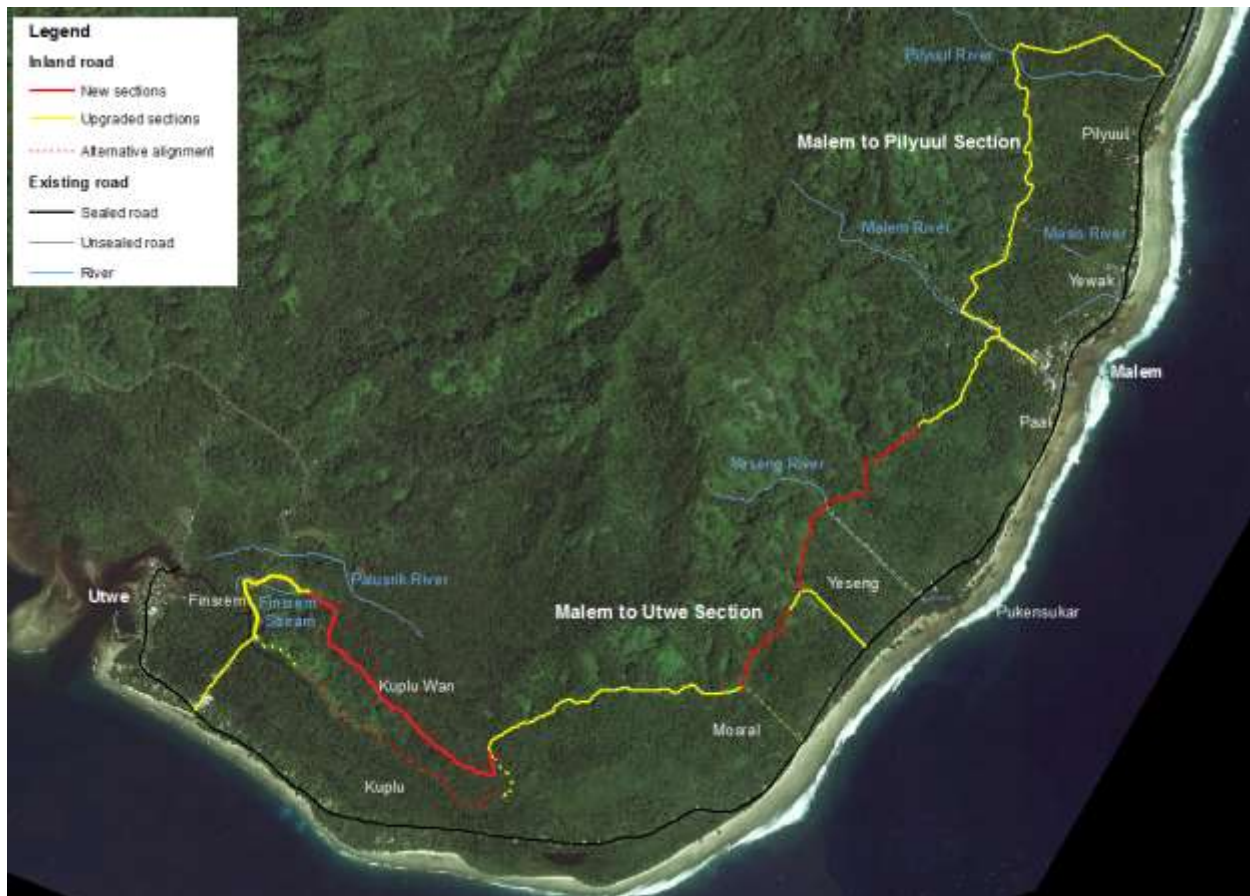


Figure 12: Alignment of inland road between Utwe and Malem. The sections in yellow require upgrading and widening of existing farm roads. The sections in red are new sections of road.



Figure 13: Typical farm road which will be widened and upgraded to a sub-base standard by the project.

Activity 3.1.1 will construct the 3.6 miles (5.8 km) of inland road up to an unsealed rural road standard (sub-base standard) (see Figure 13). This is the first stage of inland road construction. Upgrading the road to a hot-mix asphalt surface is expected to be subsequently completed with additional development funding assistance⁴¹. The upgrading of the sub-base road will be the second stage of the Malem-Utwe Inland Road Relocation Initiative.

⁴¹ Refer to Annex 8



Figure 14: PACC road in Tafunsak completed to sub-base surface standard.

The road design of the **first stage** of inland road construction is based on the design standard developed for Kosrae circumferential road extension project (Barret Consulting Group Inc., 1987) and is consistent in design to other part of Kosrae's primary road network. It assumes:

- A 60 feet standard easement width.
- A 12 foot standard lane width.
- A 3% cross-section drainage gradient for the sub-base surface.
- Existing sections of inland farm roads will be widened to obtain a roadway width of 30 ft., and include construction of roadway drainage structures (bridges and culverts) and resurfacing to sub-base course level.
- An integrated infrastructure approach is adopted which includes relocation of power distribution, and any water or telecom service infrastructure.

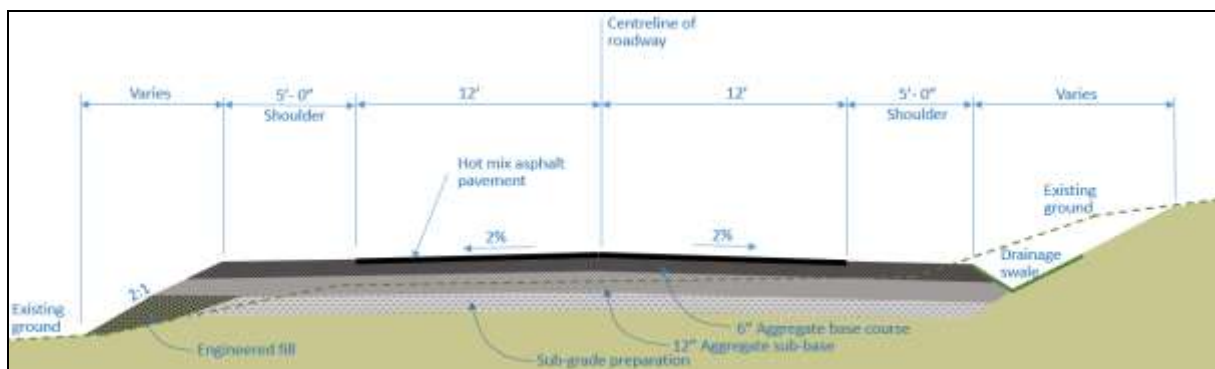


Figure 12: Typical road cross-section. Based on the design standard developed for Kosrae circumferential road extension project (Barret Consulting Group Inc., 1987).

The first stage of the inland road construction will be implemented by the Department of Transport and Infrastructure. DTI will lead in designing the road and provide equipment to construct the road to sub-base level. The second stage of the inland road construction will require external construction support and this **latter stage will not be implemented nor funded by the project**. The aggregate or fill material for the sub-base construction will be sourced from existing permitted quarries adjacent to the proposed inland road, for example at Yeseng, and aggregates from the PUK quarry in Tenwak.

A number of activities will be undertaken to construct the total distance of Malem-Utwe inland road and access routes as follows. Firstly, the project will conduct vegetation clearing, using local Municipal workforce, along the easement alignment for the road. A full topographic survey will be conducted by Kosrae's Land and Survey Department as well as full survey by Kosrae's Historic Preservation Office (part of KIRMA) along the easement length to re-confirm there are no unknown historical or cultural sites that would be affected (Annex 4a, annex 7)).

The Department of Transport & Infrastructure (DTI) will then move to design each section of the inland road and access routes from Malem to Utwe via Kuplu Wan to sub-base. Procurement of companies to provide the goods and services to support DTI in construction of the road will follow. The design, procurement and construction will include minor upgrade to access road from from Utwe to Finsrem and the Yeseng access road. The Malem Municipal Council will be providing co-financing support by upgrading the access road at Malem which stems from the coastal road inland towards the starting point of the inland road from Malem.

New and relay works of water mains along the Malem - Yeseng - Mosral - Kuplu section will be carried out under DTI. The new mains will be connected to existing water supply at Malem and Finfokoa. The Kosrae Utilities Authority (KUA) will then install new electricity lines along entire length of inland road from Malem to Utwe via Kuplu Wan. The power lines will be installed together with new telecommunication lines where required once the roads have completed construction.

Once construction is completed, the project will carry out monitoring and provision of support for road maintenance within the project life. This will assist the government under its Infrastructure Maintenance Fund budget to maintain the road until the end of the project in approximately June 2022. Thereafter the Government will maintain the road to the appropriate standard through its own resources.

DTI will coordinate the implementation of this activity in partnership with KIRMA, Land and Survey Department and the two Municipal Governments..

Output 3.2 ***Transitional coastal protection at Mosral and Paal upgraded for immediate coastal protection***

Activity 3.2.1 Coastal protection works

The Kosrae Shoreline Management Plan identified that over the short-term the effect of sea-level rise on the ability of existing coastal defences to provide a "satisfactory" level of protection is likely to be manageable through, for example upgrading the level of protection of these existing defences. However, beyond this time the magnitude of sea-level rise is expected to be too great to enable such protection to be effective or affordable other than at locations where

there are no other management or adaptation options. The SMP plan developed a coastal defence strategy identifying:

- Long-term defences: a priority on protecting sections of road or other critical infrastructure where there is no other feasible option to reposition away from coastal hazards.
- Transitional defences:
 - Upgrading sections of existing defences to provide adequate temporary protection for the road or highly developed areas over the short to medium term to enable longer-term adaptation strategies (such as inland road development) to be implemented.
 - Limiting any new sections of coastal defences only to the areas where the road is critically threatened at present (e.g., at Paal and Mosral). This would be undertaken only with a view to provide short to medium term protection

Emergency works were subsequently conducted in response to high tides and waves undermining the road at Paal and Mosral in early 2014. This was an emergency measure involving dumped and roughly placed recycled concrete slabs from the upgrading of the runway hardstanding, and at Mosral placement of large concrete filled bags to create a wall.

Whilst the emergency works has stabilised the immediate undermining of the road, the ad hoc nature of the construction, does not provide an adequate level of protection to the road, with areas still being undermined and the potential for significant damage to occur during storm conditions. The communities of Malem and Utwe discussed this at length during consultations and concluded that given the poor nature of the emergency works that a component of the project to upgrade the emergency defences at both Paal and Mosral was necessary to ensure continued access between Malem and Utwe until the alternative inland road was in place.



Mosral section of Malem road. mass concrete bags, loose boulders and broken concrete, placed randomly to reduce surge impact and prevent wave overtopping and erosion of road (photo credit: Simpson Abraham, 2015)



Paal section of the coastal road. Existing dumped concrete rubble. A low reef flat breakwater to 'stabilize' shoreline will also be required further south to prevent outflanking and downdrift erosion. (photo credit: Simpson Abraham, 2015)

At Paal, the 160 m length of the emergency defences will be reconstructed. This will involve:

1. Remove the existing dumped concrete rubble to enable the underlying sand and coral rubble material to be regraded approximately 1:2 slope.

2. Geotextile filter layer will be laid between the underlying material and the armour layer to prevent wash out and winnowing of fine material between the armour layer.
3. The concrete slabs are of a sufficient size to withstand design wave conditions over the reef flat at Paal. These will be reused as the armour layer for the base and lower part of the face of the revetment and will be laid at a slope of 1:2 in a stepped manner.
4. There are insufficient concrete slabs to complete the full stepped revetment. Basalt rock armour, sourced from an existing permitted quarry inland between Paal and Mosral, will be used to complete the crest of the revetment. Armour rock will be a minimum of 0.66 m in diameter and will be laid at a 1:2 slope with the crest of the revetment at least 3 rocks wide. The crest of the defence will be above the elevation of the road.
5. At the southern end of the reconstructed defence the revetment the road curves inward with a wider coastal buffer protecting it, with the shoreline position at this location, “held” by a small strand of reef flat mangroves. The revetment will extend behind the existing shoreline at this point to ensure that outflanking and down drift erosion does not occur.

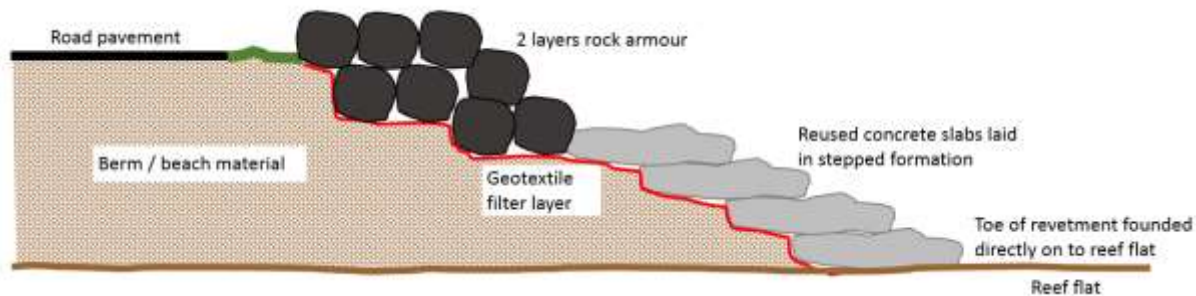


Figure 15. Cross-section of the proposed reconstructed revetment at Paal.

At Mosral, the 110 m length of the emergency defences will be reconstructed. This will involve:

1. Remove the existing dumped large concrete blocks and rubble to enable the underlying sand and coral rubble material to be regraded to approximately a 1:2 slope.
2. The small fillet of sand beach in front of the existing defence will be stockpiled on the adjacent reef flat and re-instated in front of the reconstructed defence on completion.
3. Geotextile filter layer will be laid between the underlying graded slope and the armour layer to prevent wash out and winnowing of fine material between the armour layer.
4. The concrete blocks are of a sufficient size to withstand design wave conditions over the reef flat at Mosral. These will be reused as the armour layer for the base of the revetment and will be laid to form the base of the revetment.
5. There are insufficient concrete blocks to complete the full revetment. Basalt rock armour, sourced from an existing permitted quarry inland between Paal and Mosral, will be used to complete the crest of the revetment. Armour rock will be a minimum of 0.66 m in

diameter and will be laid at a 1:2 slope with the crest of the revetment at least 3 rocks wide. The crest of the defence will be above the elevation of the road.

6. At the southern end of the reconstructed defence the revetment there is potential for down drift erosion to occur and outflanking of the defence. To prevent this, the slope of the revetment will be constructed at a shallower slope and the armour rock used to construct a wider and flatter toe on the reef flat. This will ease the transition from defence to beach and prevent any exacerbated erosion on the coastline immediately to the south.

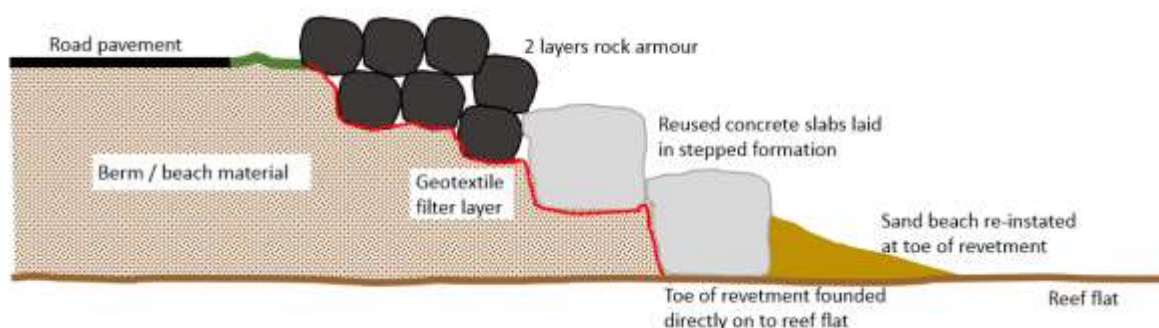


Figure 16. Cross-section of the proposed reconstructed revetment at Mosral

DTI will be in charge of design and construction of the coastal protection works at Paal and Mosral.. It will provide oversight of the work ensuring quality control and the activity will be in compliance with the protective engineering structure design standards of the Kosrae circumferential road extension project (ADB, 2005). The proposed works have been permitted through KIRMA's Development Review and permitting process and KIRMA will provide oversight to ensure all design and environmental requirements are adhered to during the construction.

Output 3.3 State support program to access land in upland areas established

Activity 3.3.1 Land consultations, surveys, mapping and regulatory framework for future inland movement of vulnerable coastal people and infrastructure

It is normal practice for the people of Kosrae to swap land. They do this regularly between landowners, and between landowners and the Kosrae State Government. The practice to relocate land between the government of Kosrae and a private land owner to facilitate a municipal waste dump for the capital is a recent and succesful example. The Kosrae State Government has therefore been able to successfully negotiate with private land owners for appropriate sites and appropriate prices for their land.

At present, there is no program to facilitate land access anywhere except the socially agreed method of 'land swap'. The consultations from all stakeholders during the planning stages of Inland Road Relocation Initiative (IRRI) identified the need for a State program to systematically support access to land in upland areas for inland road access.

Capacity support will be provided to the Land Court to help facilitate the development of a land registry, including procedures and policy and guidance documents that may be required. The project will ensure that consultations will be an active participation involving all community stakeholders, including landowners, women, men and youth.

A mapping exercise of all households in vulnerable areas that are without land in inland areas will be undertaken as a first step. This will be followed by a community infrastructure relocation planning exercise with both Malem and Utwe municipalities. The options for a land provision for households who are without upland land will be highly considered. A land purchase and swap registry to be used by Malem and Utwe households who own no land inland in inland areas for homes and public infrastructure (schools, municipal govt buildings) will need to be established to support the implementation of the community infrastructure relocation plans. KIRMA in association with the Department of Resources and Economic Affairs will undertake coordination of this activity closely with Activity 3.1.1 during project implementation (see Activity 3.1.1.)

Output 3.4 Community-Based Ecosystem Management strengthened

Activity 3.4.1 Palusrik / Kuplu Wan watershed protection strategy, native vegetation buffer zones and stream health monitoring program to strengthen sustainable use of upland areas

The community of Utwe raised concerns as to the potential impacts of the construction of the road and the location of the road on Utwe village's water supply during the EIA consultations. As a result, the alignment of the road through the southern part of the Kuplu Wan plateau (Palusrik catchment) has been re-aligned completing alignment for the inland road (DTI, 2016). According to the Environment Impact Statement report, the final realignment results in a minimum buffer of 150 m at the watershed between the two catchments and over 350 m for the majority of the section of inland road within the Palusrik catchment (see Figure 17 below, also Annex 4a Figure 24). Given the distance to the Palusrik River, the only perennial stream in the catchment, and the characteristics of the likely catchment drainage pathways, there is *unlikely* to be any impact from the construction or operation of the road itself on Utwe's water supply.

The community of Utwe agreed that this activity will develop a community-led Watershed Protection (Management) Strategy for the Palusrik and Kuplu Wan area as a proactive adaptation measure to protect its water supply now and into the future. The strategy will take into consideration immediate, long-term and future potential developments in the area. It will promote ecosystem-based adaptation services, practices and activities that aim to maintain the ecosystem services that the area provides.



Figure 17 Kuplu Wan road alignment and buffer zones from the Palusrik River.

The communities with technical assistance provided by the Kosrae Conservation Society Organization (KCSO) will lead in developing, implementing and monitoring native vegetation buffer zones along sensitive areas where roads and rivers meet. The community will:

- 1) re-plant endemic vegetation around river and stream areas at road crossings; and
- 2) develop community gardens along road easement strip to stabilise cleared land; and
- 3) raise awareness about climate-resilient food crops and nutrition.

A community-led stream health monitoring program will engage schools, women and youth organization of the communities to be able to monitor the surrounding environment effectively, particularly where the new inland road is constructed. The program will educate, train and provide hands-on collection of data along the rivers and streams to gauge the level of water quality. The program will implement bio-assessment techniques such as sampling a body of water to find the biodiversity of macroinvertebrates in the water, providing strong indication of the water quality.

Awareness campaigns implemented throughout the project to support continued sustainable use of upland areas, catchments, waterways, swamp and mangrove ecosystems will be carried out by KCSO and community based organization working under the guidance of the municipality governments and project.

Output 3.5 State support program to assist accessing finance for vulnerable households established

Activity 3.5.1 Preparation of support program for accessing finance

The Kosrae Housing Authority (KHA) and the FSM Development Bank (FSMDB) currently have existing loan mechanisms that can be accessed by those that are eligible to apply. Currently most applicants are not eligible for loans under the FSMDB because they do not meet income criteria of USD 10-30,000 per adult. The Consumer loans are for up to USD 30,000; 5 yr term, 15% flat rate. If declined, one can apply under personal/consumer loan category or go to KHA. The KHA loan sizes are small relative to home construction costs.

The following table (table 5) summarizes current mechanisms that are available from the only two funding institutions operating in Kosrae:

Table 5 Current Finance Mechanism available

CURRENT FINANCE PROGRAMS		BASIC CRITERIA	ELIGIBILITY
FSM Development Bank	1) Housing Loan Program 100k/yr	USD \$30,001+ Term: 20 years Interest Rate (IR): 9% (fixed)	Income fo USD10-30,000 per adult Currently most applicants are not eligible – do not meet the income criteria; move to – Personal / Consumer Loan
		USD \$20-30,000 Term: 5 years IR:15% (fixed)	
	2) Personal / Consumer loan	USD 5-19,999 Term: 5 years IR: 15% (fixed)	If ineligible, refer to Kosrae Housing Authority loan programs
Kosrae Housing Authority	1) Housing Loan Program Disbursement of \$200-300K per year.	USD \$7-10,000. Term: 15-20 years IR: 7% (fixed) # of disbursed loans / yr: 15-20	Eligible applicants are provided a promissory note and deed of trust and explained. Most loan takers are aged 25-40 yrs.
	2) USDA-funded Rural Development Program	These are “rural development” loans that can be used to improve home sites. IR: 4%	For senior citizens (over 62) with funding from the USDA.
	3) (new loan program) USDA-funded 50-80,000/yr program in development	Not yet qualified by USDA	Unknown

FSMDB’s national lending target has a USD 9 million per year. In Kosrae lending target is 1.5 million per year; Housing Loans make up 20% of the National portfolio but only 1% of the Kosrae portfolio.

This activity will impact 1,476 people in Malem and Utwe communities. It will contribute to the high level target of the project of gradual inland relocation over the next 10-20 years of the 236

households in Malem and 161 households in Utwe, starting with the 93 households - 83 in Malem and 10 in Utwe, currently extremely exposed to coastal hazards. The objective of the activity is to help vulnerable and poor households to be able to afford finance for inland relocation by establishing an enabling program from the state government.

The activity will carry out a review of existing finance mechanism and identify options including financial incentives to support upland residential development. The activity will be implemented by the Department of Resources & Economic Authority (DREA). Firstly, the project will carry out a review of existing access to finance (for home construction) programs and schemes in Kosrae and Pacific Island Countries. This will be carried out in partnership with the financial institutions (KHA, USDA, FSMDB, Bank of Guam) utilizing their networks to collate information on best practices. Secondly, the activity will take the findings and case studies from these reviews and adapted them to existing local schemes. A key part of this adaptation is localizing and tailoring the schemes to encourage engagement of the vulnerable households in coastal zones by incorporating their current levels of income, vulnerability and understanding and awareness of financing systems in Kosrae into the programs. DREA, the Kosrae House Authority and the FSM Development Bank will partner to consider applications to GEF 6 via grant and non-grant instruments. The project activity will explore this assistance in its review.

The Kosrae State Government identified a number of strategies within the IRRI program that it will implement with the view to encourage the local communities to access the existing financing schemes considering their vulnerability to coastal hazards (Annex 5). These include:

- Support adaptations to existing local schemes, ensuring they cater for vulnerable households in coastal hazard zones
- Proper application and enforcement of regulations aimed at managing infrastructure development in coastal hazard zones.
- Strengthen and/or develop regulations for management of infrastructure development in coastal hazard zones
- Develop plan to site public infrastructure in upland areas
- Develop funding proposals for public infrastructure (e.g. schools, municipal offices, health dispensaries) in upland areas

Component 4 Knowledge management for improved water and coastal protection

Outcome 4. Capacity and knowledge enhanced and developed to improve management of water and coastal sectors to adapt to climate change

Output 4.1 *Community resilient (Municipality) Development Plans developed and communicated*

Activity 4.1.1 Organizing development of Island / Municipal Government Development Plan

The eight Development Plans developed by and for the eight communities of the project (Woleai, Eauripik, Satawan, Lukunor, Nukuoro, Kapingmarangi, Malem and Utwe) will serve as the overall strategic plans of the communities. These will be climate and disaster resilient plans that link all sectors plans that exist currently for the islands integrating approaches with the view

to reduce vulnerability and promote risk reduction measures to island water and municipality coastal resources. Each Plan will encompass not just the priority sectors identified during the planning stage, but other sectors that the communities have identified as required climate resiliency measures to be incorporated. The new Plans will update the old and existing plans. These plans will be explicitly linked to state and national sector plans, policies, regulations and relevant legislations. An Action Plan outlining clear actions, timeframe and responsible community and partners, as well as a Communication strategy will be key components of each Plan.

An organizing community planning workshop will be used to form a Working Committee to develop, or review existing Island / Municipal Government Development Plans. A terms of reference for the Working Committee will be agreed upon at this Inception workshop and submitted to the Chief Magistrate seeking an Executive Order for the establishment of the Working Committee. A consultative planning processes by the Working Committee on island involving all stakeholders will be established under this working committee. This will ensure ownership of the process and document to be developed. The activity will promote partnership with Non Government Organizations and Community Based Organizations to work together to develop the Plans.

Activity 4.1.2 Implement institutional changes to existing arrangements and establish effective communications based on new/ revised Plan and communications strategy

At the finalisation of the Plan, the working committee will recommend to the Municipal Council is adoption. The activity will implement the adoption by establishing new institutional arrangements on island. It will require the improvement of existing municipal government council offices, roles and responsibilities will be revised, and personnel set up. It will install key relevant basic communication equipment required to communicate effectively to stakeholders on the main island, including to other islands of the atoll.

Activity 4.1.3 Share and disseminate Plan to partners and stakeholders

The activity will implement the communication strategy of the Plan, by launching, and implementing outreach programs firstly within the atoll island, amongst the population. It will then disseminate this Plan and any progress reports and success stories, outwards to supporting partners, through government and NGO networks.

The Plans will complement activities that will be carried out by the outer island as outlined under Components 2 for all six outer islands and Component 3 where applicable for Malem and Utwe communities in Kosrae. The plans will also complement and link to relevant plans, policies and guidance notes developed under component 1.

Output 4.2 *Resource materials developed, tailored to local context, translated, published and shared amongst various stakeholders*

The activities under this output are expected to produce two kinds of resource materials: visibility and knowledge-based. Resource materials that promote visibility of the project, its lessons and best practices include project briefs, brochures, booklets for leaders, pamphlets in english and local languages targeting the communities, and success stories that are shared through national and regional newsletters (e.g., SPREP Climate Change Matters) on a frequent basis (monthly, quarterly). It may also include prints on pens, drives that include information

about the project, calendars, shirts, hats, and other items that may increase awareness and support media campaigns about the project.

Knowledge-based products capture the adaptation knowledge generated by the project and from project processes and results. These include documentaries about the project and the results it has achieved. It includes peer-reviewed technical reports, manuals, guides, training modules, etc developed as a result of the interventions of the project.

The key areas of learning and knowledge generation, its documentation and sharing, would be as follows:

1. Legislation and regulation assessment on coastal and marine resource management at national and state levels in FSM.
2. Water harvesting and storage infrastructures and capacity in outer islands, FSM.
3. Water quality maintenance relative to water resources in outer islands – focusing on wells and tanks.
4. Water quantity relative to water harvesting systems in outer islands.
5. Success of reducing vector and water-borne diseases from changes in water and sanitation practices in outer islands, FSM.
6. Willingness to relocate, and linkages to access to land and finance, and provision of utility services (inland roads, water mains, telecommunications and power)

At least 20 knowledge products will be produced by this activity, including an Operations and Maintenance Guide for rainwater harvesting and storage systems, and climate resilient design guidelines for inland road access routes.

Activity 4.2.1 Capture and document data and information generated by the project

The project will, through this activity, develop a project communication and knowledge management strategy that will guide and ensure the project is visible to partners and stakeholders and the work that they do. It will also guide the capturing, development, production and dissemination of knowledge products of the project.

The data and information generated, lessons learned and best practices of the project will be captured and developed into products that will be peer-reviewed, scientifically edited and published in journals or online and through existing government and regional publication series. The project will learn from the knowledge management process of the PACC project where a Technical Series and Experience Series⁴² was established, published, and shared online and in hard copies where possible.

The activity will engage a local expert on knowledge management and communications to be based within OEEM project management unit of the project, to capture, store and collate data and information incoming from state project management units. This will be through monthly

⁴² The PACC Technical Report Series and the Experience Series can be found online at <https://www.sprep.org/pacc/publications>. The products can also be found by searching within the regional climate change portal, <https://www.pacificclimatechange.net>; and the SPREP Information Resource Center and Pacific Environment Information network <https://www.sprep.org/pacific-environment-information-network/pein>

and quarterly progress reporting. Data and information including metadata, pictures, sound recordings, maps, videos from ground truthing assessments, technical surveys, consultation workshops, reports carried out will be captured and stored. This will be useful for measuring against the baseline of the project and annually for changes, to measure results of the project against its strategic results framework. Communication equipment required to effectively carry out the required work will be addressed under this activity.

Activity 4.2.2 Organizing consultancy support to edit scientific and peer reviewed knowledge products from the project

Previous projects such as the PACC and GCCA:PSIS learned that engaging a knowledge management expert early in the process once results are generated, is more effective, especially for when production of knowledge management products and technical climate change adaptation information is required by decision and policy makers. Previous and current project experiences show that the project manager, and finance officers are always tied up in the day to day management of the project, that often times, the results of the project is never captured effectively, nor is it shared to those concerned and would benefit from it. This project will learn from that lesson by engaging an expert early in the process to edit and peer review information

The activity will engage a knowledge and communications officer after the first year of the project, prior to the mid term evaluation, and when results are generated from the community level. The knowledge management expert will write technical reports based on data and information collected from activity 4.2.1 and carry out interviews, visits, triangulating and revalidating data. The officer may propose specific technical experts to carry out technical review on processes and designs of adaptation interventions proposed by stakeholders. The aim is also to generate targeted lesson reports, practical guides, and manuals that help reduce risks and improve resiliency to climate change within the sectors. These will become knowledge products that will be captured and produced and shared locally, nationally, regionally and internationally.

The activity will also engage local experts including NGOs and community-based organizations (CBOs) that include women, men, and youth as partners to capture and produce knowledge products from the project, at the state and community level. The products will focus on documenting results of the project with the aim to target the local community population, the younger age groups, and/or specifically to women, elderly, men, youth, and people living with disabilities.

Activity 4.2.3 Print, publish, produce and share materials through public awareness and media campaigns

OEEM will carry out a peer-reviewed process for the knowledge products to ensure the information and package is of high quality, before it can be printed for public consumption. OEEM will reach out to regional partners such as SPREP and SPC for their technical review of these products. The activity will launch the products at various events locally, regionally and abroad. It will invite key stakeholders and hold public awareness activities and media campaigns to ensure wide range of audience is captured. Once printed in hard copies and in soft copies, the materials will be distributed widely to stakeholders including communities involved. Each product will be assigned ISSN and ISBN numbers with the aim to distribute widely amongst key library and academic institutions within FSM and the Pacific.

The project will utilize existing distribution networks such as through the SPREP's award winning network - Pacific Environment and Informations Network (PEIN); the Informations Resouce Center, the Pacific Climate Change Portal (www.pacificclimatechange.net); and the Pacific Disaster Net (www.pacificdisaster.net).

Output 4.3 ***Stakeholders brought together to share, learn and exchange knowledge and skills on climate change, adaptation planning, monitoring, vulnerability assessments and climate change***

Activity 4.3.1 **Trainings on climate change, sea level rise and adaptive capacity measures on water and coastal sectors**

The activity will carry out training workshops at the state level on climate change impacts, both global and localised changes on water resources for the water sector based states and coastal sectors for Kosrae. The workshops will be carried out in Kosrae with technical assistance from key partners such as SPREP and SPC North Pacific Regional Office, the Micronesian Trust and Micronesian Challenge program. These will be sector and state specific workshops that will address impacts of climate change and sea level rise on the proposed sectors. It will provide experiences from elsewhere in the Pacific.

The activity will carry out a number of varied and applicable refresher trainings during the course of the project for water priority states. The trainings will include the use of gender and climate change tools, improving communications between main and outer island, application of regulations and policis and basic financial management for state and community based organizations. There will also be opportunities to provide hands on basic plumbing, water tank cleaning and maintenance schedule trainings for water priority states. This will be a proactive adaptive capacity building measure that will be learned from other islands and applied to others. The project will partner with women's council groups on main island as well as other non governmental organizations to carry out these trainings.

There will also be an opportunity to carry out a participatory 3-dimension modelling approach during consultations. This will be completed as one of the first activities of the project during inception phase. The activity will aim to map the bathymetry of the atoll islands as well as the surrounding islands of the atoll. This will assist in decision and policy making by members of the community.

B Benefits

Describe how the project / programme provide economic, social and environmental benefits, with particular reference to the most vulnerable communities, and vulnerable groups within communities, including gender considerations. Describe how the project / programme will avoid or mitigate negative impacts, in compliance with the Environmental and Social Policy of the Adaptation Fund.

The project is expected to deliver a set of targeted and interlinked economic, social and environmental benefits, as well as serve as a model for future replication throughout the four states of the country in other sectors (food security, marine resource management). The project will promote a set of innovations, together with partner institutions / organisations that will help create better living conditions for the outer island and coastal communities of FSM.

The project will be implemented in the six outer islands namely Woleai and Eauripik in Yap State, Satawan and Lukunor in Chuuk State, and Nukuoro and Kapingamarangi in Pohnpei State. The project will also be implemented in Malem and Utwe communities of Kosrae. The relevant demographic details of the villages collected throughout the planning stages are given in the tables below. The key indicators for improved water and toilet access are given below in percentage per households. The figures include the average percentage of households in outer islands.

Table 6 Relevant demographics of the two outer islands of Yap State, Eauripik and Woleai

NAME OF ISLAND >	EAURIPIK	WOLEAI	TOTAL
Population	110	800	910
Male	54	425	479
Female	56	375	431
Households	18	85	103
Source of drinking water, % per household	Improved ⁴³		99.5
	Not Improved ⁵⁴		0.5
Toilet facility - % per household	Improved ⁴⁴		24.7
	Not Improved ⁵⁵		75.3
No. of Rubber / Plastic Water Tanks	13	67	80
No. of Concrete tanks	0	8	8
No. of Concrete wells	6	55	61

Table 7 Relevant demographics of the two outer islands of Chuuk State, Satawan and Lukunor

NAME OF VILLAGE >	SATAWAN	LUKUNOR	TOTAL
Population	692	848	1540
Male	353	432	785
Female	339	416	755
Households	97	119	169
Sources of drinking water, % per household	Improved ⁵⁴		94.7
	Not Improved ⁵⁴		5.3
Toilet facility - % per household	Improved ⁵⁵		34.2
	Not Improved ⁵⁵		65.8
Rubber / Plastic Water Tanks	Incomplete information. Will be assessed in ground-truthing assessment activities		

⁴³ 'Improved' includes sources from public water supply, community water supply, household tank, protected well, bottled water, and household water tank. 'Not improved' is water truck, rivers, lakes, springs and other sources of drinking water. (source: Divisions of Statistics, SBOC, FSM, 2014)

⁴⁴ Improved includes flush toilet, water sealed and ventilate improved pit. 'Not improved' are not-ventilated-improved pit, any 'other' form of toilet and not having a toilet (source: Divisions of Statistics, SBOC, FSM, 2014)

NAME OF VILLAGE >	SATAWAN	LUKUNOR	TOTAL
Concrete tanks			
Concrete wells			

Table 8 Relevant demographics of the two outer islands of Pohnpei State, Kapingamarangi and Nukuoro

NAME OF VILLAGE >	KAPINGAMARANGI	NUKUORO	TOTAL
Population	350	210	560
Male	179	107	286
Female	171	103	274
Households	60	36	95
Sources of drinking water, % per household	Improved ⁵⁴		98.4
	Not Improved ⁵⁴		1.6
Toilet facility - % per household	Improved ⁵⁵		55.2
	Not Improved ⁵⁵		44.8
Rubber / Plastic Water Tanks	Approximately 60 units of various water holding mechanisms on island	-	-
Concrete tanks		-	-
Concrete wells		-	-

Table 9 Relevant demographics of the two outer islands of Kosrae State, Malem and Utwe

NAME OF VILLAGE >	MALEM	UTWE	TOTAL
Population	1300	983	1476
Male	663	458	715
Female	637	525	761
Households	224	169	393
Sources of drinking water, % per household	Improved ⁵⁴		92.4
	Not Improved ⁵⁴		7.6
Toilet facility - % per household	Improved ⁵⁵		98.3
	Not Improved ⁵⁵		1.7

The vulnerable groups expected to benefit from this project include:

Women, Men and Youth - The 2010 census finds that the domestic chores and responsibilities at the domestic level in households in FSM are largely owned and carried out by women and youth. It is in the range of 85-90% of the population reside in low-lying coastal areas in volcanic islands such as Kosrae, and 100% in the low-lying targeted atoll islands of Yap, Chuuk and Pohnpei which are highly exposed to climate extreme events. Women and children are therefore highly vulnerable to climate hazards and their impact. The proposed interventions in Yap, Chuuk and Pohnpei, that address water with indirect benefits to food security will be targeting and supporting the young and elderly women and youth to adapt.

Over 6,680 inhabitants of Kosrae are likely to benefit from the intervention measures proposed (direct or indirect benefits) in Component 3. The specific and immediate and daily beneficiaries will be the Malem and Utwe municipal village communities. According to the 2000 census, the Malem population was 1300 with males 663 and females 637 and the number of households at 238. The Utwe population stands at 983 on the 2000 census and was composed of 458 males and 525 females. Twenty three percent (23%) of the Utwe population is high school age. These potential beneficiaries, coupled with about 90 employed by National Government require daily access to go to the only high school located in Tofol and to the government administration district in Tofol.

There are other potential beneficiaries, approximately less than 100 people who reside in Walung municipal. Walung village community does not have access to the main roads of the island. Everyone at present uses boats to travel to Tafunsak. The only road from Walung to the rest of Kosrae is via Utwe and ultimately this will be the only road to Walung as the road south from Tafunsak is now suspended due to the Yela area being protected. In essence there are two out of five villages reliant on the road access as the only connection to the rest of Kosrae including the health services, high school, Government centre, airport and port.

Business owners and general local consumers:

Kosrae: It is anticipated that the livelihood benefits shall include the creation of over 450 employment opportunities across these communities on coastal protection engineering support and monitoring, community engagement / business diversity opportunities. For example, through hired labour in the municipalities for vegetation clearing, manual laboring through road construction, provision of services, such as aggregate and rock armor from local quarry operators and local contractors to support DTI. Micro finance renovation loan schemes such as Palau's successful Renewable Energy Subsidy Loan program would be one of the programs that the project will learn from and how it may assist homeowners and land owners in relocating into the new inner roads development. Water lines will be installed at the same time it is constructed and to be followed by electricity and telecommunication lines in the next stage when the road is upgraded to hot-mix asphalt. It will build economic resilience by providing assurance to business by enabling them to naturally and autonomously migrate inland and away from the coastal hazard zones. Furthermore it will improve access to key agro-forestry areas around the lower-slopes of the volcanic parts of the island increasing potential for food security and agricultural development.

Yap, Chuuk, and Pohnpei: Stabilization of water and food production before, during and after extreme events will make available more nutritional and balanced food at affordable rates. This will allow the more vulnerable and poor populations of the outer islands to better sustain the supply of food, water and rich-protein food more consistently over time.

Schools in Outer Islands - The communication and awareness raising activities will engage local and national media, and will also target the primary and secondary schools in the island communities, reaching out to different generations of the country. For the purpose of the project the term "gender" will focus on men, women and children, including the elderly and people living with disabilities that are living in and deriving an income from the strip of land along the coastal zone. The project would emphasize women and children.

In summary, the main social, economic and environmental benefits from the project are given below, compared to the baseline scenario:

Table 10 Social, Economic and Environmental Benefits for the outer islands of Yap, Chuuk and Pohnpei

Type of Benefits	Baseline Scenario	Key Benefits
Social	Lack of outer island development plan addressing climate change impacts	Community mobilized, organized and trained for improved management of water resources, sanitation and health practices
	Lack of island water resource management plan incorporating climate and disaster risks	Capacity is built to work collectively for water security, water management, climate change risks and vulnerabilities
	Lack of leadership quality to address issues relating to natural resource management and climate change related issues	Specific training will be offered related to water rainwater harvesting systems repair, maintenance and cleaning of water assets (tanks, gutters, downpipes, first flush diverters)
	No trained personnel on water conservation and management practices, health and sanitation including water harvesting systems maintenance and care	Specific training on construction of self-composting toilets to it can be replicated in other islands and communities
	‘Dependency’ approach to development with high reliance on a diminishing US Compact funds for development (ending 2023).	Specific training on water, sanitation and health practices and monitoring and survey skills targeting women and youth

Type of Benefits	Baseline Scenario	Key Benefits
Economic	<p>Costs of health treatment and services high for treatment of water and vector borne diseases (hepatitis, polio yellow skin, can't eat, crippled, bacteria salmonella, E-coli boils, sores, infections in ears and eyes, protozoa giardia vomiting, runny stomach, no energy, round worms, whip worms)</p> <p>Low income from crops and capture fishery due to depletion of fishery resources from algal bloom as a result of use of lagoon and seas as toilets.</p> <p>Loss of income and livelihood assets from food drought (loss of crops, agriculture fields) as a result of water drought from prolonged days of no rain</p>	<p>Reduced health problems as a result of improved access to clean water and sanitation.</p> <p>Reduced health cost as a result of availability of safe potable water</p> <p>Employment in rainwater harvesting repairs and maintenance, community water tank maintenance</p> <p>Employment in construction of self-composting toilets during and after the life of the project</p> <p>Sustained income for maintenance of water and SCT systems in schools and community governing council properties.</p> <p>Reduced the loss of livelihood assets like farms and agriculture fields from drought, cyclones and high waves</p> <p>Reduced loss of health services to the communities</p> <p>Reduced health costs as a result of availability of safe potable water</p>

Type of Benefits	Baseline Scenario	Key Benefits
Environmental	<p>Eutrophication of lagoon side during low tide – as a result of use of lagoon as toilets</p> <p>Less dissolved oxygen available in lagoon and mangrove areas leading to incidences of suffocated fish and other marine life</p> <p>Algal growth boosted around lagoon and mangrove areas as a result of excessive nutrients from human waste</p> <p>Dead fish wash up on shore during very low tide events on lagoon side</p>	<p>Restored areas of lagoon side, increasing aesthetic and ecosystem services</p> <p>No pollution of groundwater and underground to the reef from wastewater from pit toilets on island</p> <p>No pollution of surface water and lagoon from human waste</p> <p>No excessive drawing of water from groundwater and wells allowing water in ground for plants and animals, improving the ecosystems during drought and post cyclones.</p>

Table 11 Social, Economic and Environmental Benefits for Beneficiaries of Kosrae State

Type of Benefits	Baseline Scenario	Key Benefits
Social	<p>High risk of communities being cut off from access to capital and utilities (power, water, electricity, hospital, main high school, port, airports)</p> <p>Malem and Utwe communities inaccessible to inland farm and land</p> <p>Landless unable to access land and finance to purchase and build on land</p> <p>‘Dependency’ approach to development with high reliance on a diminishing US Compact funds for development (ending 2023).</p>	<p>Increase coastal resilience to inundation and erosion and guaranteed improved access to services benefiting 2,283 inhabitants of Malem and Utwe</p> <p>Landless, women, men and youth will have representation at municipality institutions</p> <p>Landless, women, men and youth will have access to land upland</p> <p>Landless, women, men and youth will have access to finance to support relocation</p> <p>Participation of women, men and youth in decision making processes ensured</p>
Economic	<p>Economically poor, low to non-existent level of agricultural labour, highly reliant on imported foods labour also only on a season basis</p> <p>Low-cost but high risk random bouldering seawall construction along high risk coastal road areas</p> <p>High risk to assets, safety, and livelihoods from unprotected exposure to risk of natural disasters</p> <p>High risk to infrastructures during cyclones and other natural disasters</p> <p>Eroding/disappearing beaches negatively affects tourism potential</p>	<p>Employment in road construction and community based ecosystem management activities for poor families in the project villages</p> <p>Sustained income from potential tourism and agriculture in upland areas</p> <p>Reduced loss to income, time and stress as a result of continued access to key utility services on island (water, electricity, telecommunications, hospital, ports, schools, safety (police))</p> <p>Lower risk as a result of coastal zone protection measures. Ability to access land and increase income by investing in agriculture or tourism in upland areas</p> <p>Ability to access finance to build inland voluntarily as a result of state support program on access to finance. Coastal zone protection and potential finance for tourism in alternative areas.</p>

Type of Benefits	Baseline Scenario	Key Benefits
Environmental	<p>Frequent sea water inundation of coastal environment as a result of breaches of coastline from king tide, high tide events as well as storm surges</p> <p>Saltwater inundation on coastal environment and plantations and residential areas</p> <p>Lack of community-based ecosystems management practices at community level to manage ecosystems in lowland and upland areas</p> <p>Existing farm tracks in upland and access roads does not consider excessive water runoff and blocks catchment drainage pathways</p>	<p>Coastal road strengthened to withstand waver over topping, overwash, inundation and severe erosion.</p> <p>Protection of coastal areas from cyclones, erosion</p> <p>Limited inundation and overwash as a result of the transitional coastal defences</p> <p>Road relocated and constructed inland withstanding and safe from accelerated sea level rise impact on roads at sea level areas.</p> <p>Road designs improved, draining improved preventing water logging and flash flooding downstream.</p>

A number of indirect environmental benefits are also expected to accrue from the project, especially under components 2 and 3. Firstly, the project will utilise the available rain water to the best possible extent for plants (crops, trees) and animals (livestock, local species). Secondly improving water quality maintenance, tank water protection for utilisation in dry condition and potentially act as carbon sinks. Thirdly, preventing of water run off by improving (repairing, installing new) catchment areas, as well as wastewater control would be helpful to minimise soil erosion, better soil water holding capacity, excessive nutrient runoff, minimise top soil erosion and overall maintaining soil quality and fertility. Fourthly, as further outlined in the Environmental Impact Statement (Annex 4a) and cost benefit analysis summary report (Annex 6) developing a watershed management strategy for the upland areas in Kosrae, will help maintain the diversity in the upland ecosystem by prohibiting agricultural activities and other development activities that will harm the environment.

Table 12 Key Social, Economic, Environmental Benefits from the project, at the output level

OUTPUT		KEY BENEFITS (DIRECT)		
		Social	Economic	Environmental
Component 1 Strengthening policy and institutional capacity for integrated coastal and water management at national and state levels				
Legislation and policy paper to guide regulation of climate resilient coastal and marine management	Adaptation legislation, policies, and plans recognize the social imperatives of the communities in outer islands and municipalities			National legal standards for application country wide.

OUTPUT		KEY BENEFITS (DIRECT)	
State regulations for development projects amended to consider CC risks and resilience			Better management of the local coastal and marine environment by developers
National Water & Sanitation Policy developed	Policy recognizes the susceptibility of outer island communities to drought, El Nino, and typhoons and cyclones		National guidance on the principles to be followed for sustainable water access and sanitation practices
National Water Outlook and Water Sector Investment Plan	Proactive and systematic planning at the municipality levels for farmers, fisher folks, women, youth based on sound climate and water information	Concerted and targeted investment for cost-effective and efficient responses from partners and stakeholders to water related crisis	
Component 2. Demonstration of water security measures in outer islands of Yap, Chuuk and Pohnpei			
Climate Change adaptation plans	Women, men and youth involved in decision making on managing their own island resources	Targeted and directed support by partners	
Water harvesting and storage systems installed in 6 islands	Plenty of good quality water, sanitation and health benefits for women and men of the islands in atoll during climate extreme events (drought, post cyclones, etc.).	Reduced cost of shipping in water during long dry spells	Pressure on underground water is reduced and is replenished for benefit of the natural ecosystems
Self-composting toilet programs established	Improved health and sanitation	Cost-saving on water purchases	Good soils with no pathogens, excellent for soil replenishment, gardening and plantation
Trained stakeholders on water conservation and management	Skilled and resourceful community to respond and address their water needs	Cost-saving on water purchases	
Teacher's Guide on Climate Change	Skilled and resourceful community to respond and address climate change for at least the next two generations		

OUTPUT		KEY BENEFITS (DIRECT)	
Component 3 Demonstration of Kosrae Inland Road Relocation Initiative			
Design and construction of 3.6 miles (5.8km) of inland and access road routes	All residents of Malem and Utwe are able to commute to and from capital and where services are provided (government, business district, hospital, port, airport, schools, etc.).		Design considers mitigation of impact of road on catchment drainage pathways, avoiding inundation and flash floods impact on the environment and residential areas
Transitional coast protection at Mosral and Pal upgraded	Allows for immediate to future commute by all Kosrae commuters, in particular access by Utwe to and from central business district	Reduce cost and pressure on project to hasten construction and	Protection of coastal areas from inundation and severe coastal erosion.
State support program to access land in upland areas established	Landless people from affected coastal zone are able to access safe land in in upland areas		
Community-based ecosystem management strengthened	Knowledge and skills at the municipality level to be able to manage changes of the natural environment, ecosystems from development in the short to long term		Protected watershed areas and managed development of upland areas to minimize environmental impacts and maintain ecosystem services of the natural forests and mangrove areas
State program to assist access to finance for vulnerable households established	State government recognizes and assists the needs of the poor and vulnerable households	Reduced costs for state government, private sector and households in relocating in upland areas	
Component 4 Knowledge management for improved water and coastal protection			

OUTPUT		KEY BENEFITS (DIRECT)	
Community Plans developed	Adaptation plans at the community level recognize climate change impacts and the need for proper adaptation planning under development for the islands and communities. Finance and supporting resources to implement the plans are provided by the project		
Resource materials developed	Knowledge and information captured and shared for replication and upscaling to other island communities and secure future support for adaptation. Dissemination of information country wide.		
Stakeholders brought together to share, learn and exchange	Knowledge, awareness and skills developed for communities to be able to undertake implementation, monitoring and future planning of concrete adaptation activities for their islands, homes and environment		

As may be seen from above, implementation of the project will not cause any negative social and environmental impacts. Outer Island communities and municipalities have been consulted in the design of the project components and are in line with the prevalent regulations, policies and standards of National and State Governments. Components proposed under the project have been designed with consideration towards the Social and Environmental Policy of Adaptation Fund.

C Cost-effectiveness

Describe or provide an analysis of the cost-effectiveness of the proposed project.

Component 1 focuses on mainstreaming of climate change at the national and state levels, through operationalizing the policy and planning processes for infrastructure, water and

sanitation services. **Component 2** focuses on two main activities of increasing access to (and storage of) good quality water and reducing water wastage through installation of self-composting toilets. The benefits of the activities are expected to reach over 3,253 individuals across the 6 selected atolls during the course of the project. The impact of both components is expected to reach the 103,000 population of FSM beyond the life of the project.

The per capita cost of the water security activities (component 2) will be high given the inherent demographic (low population density) and geographical (distance to outer islands is only accessible by boat) nature of FSM, as is in other Pacific island countries. The costs are justified given the interventions of the project are of immediate to long-term need and are sustainable. The activities under **Component 4** will invest in knowledge management that will ensure sustainability, replication and up scaling of programs and activities.

The ‘cost effectiveness’ of the project based on the component outputs of the project for components 1 and 2 only is given in the following table (table 13). The cost effectiveness of **component 3** activities is outlined separately below.

Table 13 Cost Effectiveness of the project for Components 1 and 2 only.

CURRENT ADDRESSING MECHANISM	HOW IS IT ADDRESSED BY THE PROJECT	COST EFFECTIVENESS
Component 1, Output 1.1 Legislation and policy paper to guide regulation of climate resilient coastal and marine management at national level		

CURRENT ADDRESSING MECHANISM	HOW IS IT ADDRESSED BY THE PROJECT	COST EFFECTIVENESS
<p>FSM has a national climate change and disaster risk management policy.</p> <p>The Strategic Development Plan provides for the macro-economic framework and the policies for each sector; the sector planning matrices; and the Infrastructure Development Plan. Of the four states, only Kosrae and Pohnpei have SDPs.</p> <p>FSM does not have legislation either at the national or state level to enact climate resilient management of its coastal and marine resources.</p> <p>With the exception of Kosrae state, there are no laws and regulations at the national level to protect and conserve FSM's coastal and marine resources from business as usual development. Kosrae only has a climate change law, climate change policy, climate mainstreamed Regulation for Development Projects 2014 and EIA Guidelines</p>	<p>Development of a national and or state legislative framework, legislative draft that identifies and recognizes the social, economic and environmental imperatives to FSM's future development.</p> <p>The project may not be able to achieve the endorsement of a law on management of its natural resources, as there is likelihood it will be beyond the scope (time) of the project.</p> <p>The project, however, will develop a legislative framework / draft that will direct the national and state governments to initiative legislative and regulatory work to guide and govern its resources. The national government will continue the development of this framework beyond the lifetime of the project</p>	<p>The legislative framework/draft will introduce climate resilient factors into its environmental governance and development frameworks. In particular it will assist its SDP and IDP 2016-2025 in its governance aspects.</p> <p>Greater efficiency of expenditure will be achieved through the clarity and standards provided by a nation-wide approach. The legislative framework/draft developed by the project will trigger and push for state governments to develop their regulations for development projects – similar to Kosrae's RDP 2014 and EIA Guidelines.</p> <p>It will initiate actions to review, improve, and strengthen the SDP and IDP to ensure developments, especially infrastructure developments along the coastal and marine areas – are climate resilient.</p>
<p>Component 1, Output 1.2 State regulations for development projects amended to consider climate change risks and resilience measures</p>		

CURRENT ADDRESSING MECHANISM	HOW IS IT ADDRESSED BY THE PROJECT	COST EFFECTIVENESS
<p>With the exception of Kosrae State, existing EIA regulations of Yap, Chuuk and Pohnpei have not yet incorporated climate change and disaster.</p> <p>None of three states have a climate resilient Regulations for Development Projects.</p> <p>There is no mechanism to keep development in check with climate resiliency, environment impact assessment at a minimum. The current practice is largely voluntary</p>	<p>The project will consult, review, develop, endorse and promulgate regulations for development projects in each of the three states. It will take on board lessons from Kosrae State under the PACC project the developed, and revised the RDP 2014 for Kosrae.</p> <p>The project will look at existing regulations including the EIA regulations and update those regulations to incorporate climate risks and resilience factors to strengthen them.</p> <p>The project will see to it that the regulations are adopted, institutionalized and applied to any development in the each of the state</p>	<p>Long term contribution of the project in the on-going development of climate change environmental monitoring and governance at national and state level</p> <p>Opportunity of government stakeholders to review their existing regulations, policies and practices in light of climate change factors</p>
Component 1, Output 1.3 National Water and Sanitation Policy endorsed with climate and disaster risks and resilience, and gender mainstreamed		
<p>FSM has a framework for a policy but does not have a policy on water and sanitation. It has institutionalized the framework but has made no progress on developing and finalizing a policy.</p> <p>There is no mention in the framework of mainstreaming of climate change into the policy.</p> <p>The components of the policy proposed for under the framework does not incorporate climate risks and resilience, governance and support programs for water and sanitation issues across FSM, including the highly vulnerable outer islands</p>	<p>The project will incorporate climate risks and resilience factors into the national water and sanitation policy.</p> <p>It will do so by reactivating the national water task force. The project will aim to finalize the policy, and submit to congress for endorsement and launch nation-widely.</p> <p>The project will attempt to link its work under other outputs to the policy. Activities under output 1.3, component 2 and 4 will be part and parcel of the implementation plans of the policy.</p>	<p>The policy will enable the water plans at the national, state and municipality level to be better streamlined into development work.</p> <p>The policy will enable climate change adaptation programs for water, food, health and sanitation to be formally considered and addressed not only by government but by its partners.</p>

CURRENT ADDRESSING MECHANISM	HOW IS IT ADDRESSED BY THE PROJECT	COST EFFECTIVENESS
Component 1, Output 1.4. National Water Outlook Program (and Water Sector Investment Plan developed and implemented)		
<p>There is no outlook program in FSM to inform and assure stakeholders of the availability and distribution of water. This will have a major impact on both the main island and outer island population.</p> <p>There is no mechanism that will inform farmers, businesses, village communities of what El Nino and La Nina will mean for different parts of FSM, and therefore its attribution on water resources.</p> <p>Current practices rely on weather information and climate information provided by NASA, NOAA and SPREP. The scale by which information is provided and the time lapse is not enough to prepare and take decisions. This continues to have a detrimental effect on society, the economy (agriculture, tourism) and environment.</p>	<p>The project will work in partnership with NOAA, NASA, SPREP Climate Change Center through its Pacific Meteorology Desk to develop climate and weather based products that inform scenarios of water availability on account of rainfall, temperature, wind, and ENSO. It will also work to develop the capacity of local stakeholders.</p>	<p>The project will contribute to developing products tailored to sectors (tourism, agriculture, transportation, etc.) that will inform choices for the different development sectors.</p> <p>The project will create a shift in paradigm by building individual and systematic capacities of the local institutions, to develop the products. This will increase the sustainability beyond the life of the project.</p> <p>The information provided will contribute to facilitate improved protection against loss of income on account of anticipated climate change based impacts.</p>
Component 1, Output 1.4 : (National Water Outlook Program) and Water Sector Investment Plan developed and implemented		

CURRENT ADDRESSING MECHANISM	HOW IS IT ADDRESSED BY THE PROJECT	COST EFFECTIVENESS
<p>There is poor consideration of investment planning required to ensure sustainability of services of the water sector throughout FSM and across its islands.</p> <p>FSM lacks human capacity development that is needed for integrated water resource management and sustainable water supply solutions.</p> <p>The states are unable to systematically upgrade and utilize their existing assets for the supply of water in a sustainable manner across all islands (main, lagoon and outer islands)</p> <p>FSM lacks an investment plan at state level to be able to manage internal finances and acquire external financial assistance to meet safe water and sanitation goals.</p>	<p>The project will develop a water sector investment plan that FSM can prioritise costed actions for water and sanitation in each state and at all island levels – main, lagoon and outer islands.</p> <p>The project will improve institutional capacity for monitoring and support for action on findings from the water investment planning workshops</p> <p>The project will consider in the plans the need to acquire external financial assistance to meet its safe water and sanitation goals to build resilience of the water sector to climate change impacts</p>	<p>The plan will produce prioritised and costed actions for water and sanitation in each state and at the island level including all islands – main, lagoon and outer islands.</p> <p>The plan will minimise costs for future water supply upgrades by maximising the use of existing assets as far as possible, and respond to its human capacity development needs</p> <p>The plan will build on lessons and best practices gathered from the water demonstration activities in the six outer islands of the project. It will help inform and develop the investment plan, particularly in strengthening the outer island components of the plans. The plans will also ensure the effective use of resources based on informed and evidence based decision making.</p>
Component 2. Output 2.2 Water harvesting and storage systems (WHSS) installed in 6 atoll islands		

CURRENT ADDRESSING MECHANISM	HOW IS IT ADDRESSED BY THE PROJECT	COST EFFECTIVENESS
<p>Almost all households in the outer islands have water tanks that are either in very poor conditions or are not used at all. There are water tanks but very poor or no rainwater harvesting systems. Nearly 40% of the tanks in the outer islands of Woleai and Eauripik do not have proper rainwater harvesting systems</p> <p>Nearly 90% of water wells had very low water level, all brackish and all uncovered</p>	<p>Repairing of existing rainwater harvesting systems</p> <p>Training of women, men and youth on maintenance and cleaning of existing systems</p> <p>Establishing maintenance schedules with families / households</p> <p>Building community tanks to alleviate pressure on individual household water tanks during drought</p> <p>Ensure minimum 2 tanks per household / 2 community tanks per island to serve maximum 100 population</p>	<p>Repairing the existing rainwater harvesting systems will be cost-effective as it will utilize existing resources that are currently underutilized.</p> <p>Applying the optimal 2 water tanks per household rule will assist with cleaning of one tank interchangeably while the other is being utilized. The same rule is applied at the community level but for 10,000L capacity, plastic tanks, 2 minimum per maximum population of 100 persons.</p> <p>Communities will be involved in the development of tank maintenance protocols to ensure full community ownership.</p>
Component 2, Output 2.3 Self-Composting Waterless Toilets constructed to conserve water, improve soil environment, and reduce marine eutrophication on the lagoon side		
<p>There are no self-composting toilets installed on the islands, i.e. where no use of water is required.</p> <p>There are three common types of toilets that exist in the outer islands - flush toilet, water sealed and ventilate improved pit. These toilets use a lot of water that could have been conserved for other use (washing, bathing, watering, etc.). It is also not healthy and sanitary, and the wastewater contribute to pollution and contamination of the underground water, reef and lagoons</p>	<p>Install waterless self-composting toilets at the school level. These will act as demonstration structures. There will be one unit for girls / women and one for boys / men.</p> <p>The project will also install these toilets at community and household level</p>	<p>Saves a lot of water from ever being used in a toilet</p> <p>It provides pathogen-free rich compost that can be added to plantation and agriculture fields or enriches the thin atoll island soil environment.</p> <p>It reduces environmental costs by containing waste in a closed system (chambers)</p> <p>It reduces health costs by containing and killing pathogens within its closed system and avoids a visit to the medical clinic for diarrhoea, yellow eyes, etc.</p>

The elements of cost-effectiveness and efficiency of the activities under the particular outputs 2.2 and 2.3 are further outlined in the following table (table 14).

Table 14 Specific elements of cost effectiveness and efficiency for key activities under outputs 2.2 and 2.3

OUTPUT / ACTIVITY	ELEMENTS OF COST-EFFECTIVENESS	EFFICIENCY
For: Water Harvesting and Storage system		
Household rainwater harvesting system	<p>Increasing catchment area</p> <p>Keeping all elements of the catchment systems clean</p> <p>Choosing right tank size relative to catchment area</p>	Improving guttering of existing rainwater collection systems
Community water tanks	<p>Increasing catchment area</p> <p>Plastic tanks (HDPE) with man-hole covers are easy to clean, maintain and moved allowing for use of land for other livelihood activities</p> <p>Choosing the right tank size relative to catchment area</p>	<p>Increased number of the same size of tank</p> <p>Easier to clean versus concrete tank.</p>
For: Self-composting toilets		
Household, Community / school / church / health dispensary unit	<p>SCTs are cheaper to build and maintain than a septic system</p> <p>Water savings — CTs don't need water for flushing, which means precious water can be saved for essential needs.</p> <p>Built above ground — the SCT chambers must be constructed above ground, so stairs or a ramp are needed to access the toilet room.</p>	<p>SCTs don't smell when properly used and maintained.</p> <p>Safe —SCTs can destroy all pathogens, including worm eggs and viruses.</p>

The project interventions under component 2 would result in the following positive externalities:

- The impact of drought and aftermath of typhoons on water resources, have caused out migration from outer island to the main islands. Social impacts of the residue population include family and community disintegration, health issues for women and school dropouts. Improved water security and sanitation and health will assist to relieve these conditions over time, during drought and immediately in early recovery following cyclones and typhoons. Water will be essential to support all livelihood activities including food security, sanitation and health.
- Improved village and school level organization and training will assist communities to gain confidence and find solutions. It will improve the willingness to work collectively to address emerging socio-economic and environmental threats

- Water and land resources remain degraded and unproductive. Project investments will directly help to rehabilitate some unproductive areas.
- Current concrete tanks that have leaked cannot be repaired including those that have been repaired previously but leak again. The community concrete tanks are too large to maintain and have incapacitated land that could have been put to better use. Investing in HDPE plastic tanks versus concrete tanks at community level will improve the ability to clean and carry out maintenance. They can also be moved from one location to another, allowing land to be used for alternative purposes.
- Natural and social systems remain exposed to vulnerabilities. Project investments will improve the community's capacity to improve and manage the local natural resources on a sustainable basis. Alternatives for achieving long-term water storage and efficiency savings were considered. For example through the consultations communities considered the following:

Table 15 Alternative Options

ACTIVITY PROPOSED	ALTERNATIVES	BENEFITS
Water Harvesting & Storage Systems		
<p>Repairing existing rainwater harvesting systems at household / private level, minimal purchase of just one other PVC to allow cleaning interchangeably</p> <p><i>Cost per household including maintenance cost for at least a year comes to \$560 USD⁴⁵.</i></p>	<p>Construction of new systems per household with two HDPE tanks to allow cleaning interchangeably</p> <p>The cost per household will come to \$1,120 USD plus added logistical coverage of about \$5,000 minimum to import all new equipment required to install and monitor, comes to \$6,000-\$7,000 USD per household</p> <p>Install Reverse Osmosis Units. The installation of RO Units has been considered in other Pacific island contexts. While the effectiveness of RO units has been proven in some instances, they are accompanied by prohibitively high purchase installation, and maintenance costs and ownership issues. Spare parts are expensive and difficult to replace in outer islands. Filters have short-life span (6 to 12 months).</p>	<p>Repairing existing systems is less expensive</p> <p>Requires less maintenance</p> <p>Spare parts are easily attainable and shipped within FSM</p>

⁴⁵ Capital cost of water tanks in FSM ranges from \$350 to \$750. The project takes the lowest cost, typical cost if a new water tank size is required of \$350 for 1,000 gallon capacity. \$210 for repairs and maintenance. The \$560 is total activity budget for repair activities of Eauripik outer island divided by the number of households. This is used as the baseline by the project. Transportation costs of the equipment are born by the project.

ACTIVITY PROPOSED	ALTERNATIVES	BENEFITS
<p>Constructing community tanks to serve and alleviate pressure on private systems</p> <p><i>Cost comes to \$750 USD per 2,000 gallon, minimum 2 required to serve a minimum population of 100. Total with guttering and down pipes comes to \$3,000 USD per tank</i></p>	<p>Construct new systems for all households on all islands of the atoll without need for any community tanks</p> <p>Provision of systems for all will exceed the budget of the project per state.</p>	<p>Community tanks system is less expensive to import, construct, maintain, clean and own</p> <p>2 community tanks / 100 population easier to manage, clean and maintain compared to many household systems without spare parts</p>

ACTIVITY PROPOSED	ALTERNATIVES	BENEFITS
<p>Construction of 2 SCT units each at a school, community building and 1 unit at a household select</p> <p><i>\$4000 USD⁴⁶ per unit x 5 total per outer island, total range in costs \$25,000 - \$50,000 based on outer island distance of shipment of materials</i></p>	<p>Build either the following:</p> <p>Bush toilet — this is a hole in the ground with a simple cover around the hole.</p> <p>Pit toilet — pit toilets are usually covered with a concrete slab and have a “house” on the slab. The house needs to be moved when the pit fills up.</p> <p>VIP toilet — VIP stands for ventilated improved pit toilet. These are really the same as pit toilets, but have a PVC pipe added to improve airflow and reduce flies and smells.</p> <p>Water seal — A pit covered with a concrete slab and a concrete toilet seat. A bucket of water is used to flush the waste into the pit.</p> <p>Flush/Septic toilet — A porcelain toilet with a water cistern. These require piped water to flush the waste into a concrete septic tank, where solids settle in the tank. The water collects in the tank and then passes out into a “soak”, or straight into the soil and groundwater. The discharged water should be treated in a properly constructed trench to destroy the pathogens.</p>	<ul style="list-style-type: none"> • Self-compost toilet (SCT) — The waterless compost toilet (SCT) works just like a compost heap for your garden. In the garden compost heap you mix pig manure with dead leaves and chopped up branches, and leave it for a few months until it decomposes and makes a good fertiliser. In the SCT it is human manure instead of pig manure, mixed with leaves and left for at least six months so that all the pathogens are killed by the composting process.

The PACC programme delivered a similar set of activities to the ones proposed for this project. The terminal evaluation found that the community driven and managed interventions “successfully....reduced water insecurity through better catchment regularity and retention; rainwater tanks and roof catchment systems”. Results were more mixed with solar purifiers,

⁴⁶ Based on cost of 1 whole unit built in Nauru \$4,500-\$5000 AUD. Not including transportation and shipping costs to be borne by the project through execution costs and other activity costs

especially those targeting individual households. The evaluation also acknowledges the relatively high cost of increased water availability achieved by the project, though does not provide a reference baseline. Given the geographic location, de-centralized and often non-existent water supply systems a relatively high cost for provision of water in such environments is to be expected.

Alternative options are either very expensive or socially unacceptable to the outer island communities and against local and World Health Organization health and sanitation standards. The major advantage of the proposed project as against alternative options is in its ability to provide sustainable livelihoods through increased provision of enough safe drinking water to not only for human consumption but to plants and animals. The project, therefore, is environmentally sound and socially acceptable. It addresses the immediate threats faced as a result of drought, sea level rise, typhoons and cyclones.

In summary, the following key characteristics of the project, particular to components 1 and 2, that would considerably enhance its cost effectiveness:

1. The major component 2 activities of water harvesting and storage systems and installation of self-composting toilet programs are highly replicable under similar outer island environments and conditions
2. The implementation mechanism by involving experienced NGOs, intergovernmental organizations such as IOM, and linking with the Micronesian Challenge (MC) to strengthen the state and community ownership and achieve high level of local ownership is highly cost-effective. These organizations have been very active during the planning stages of this proposal and very involved with work in the outer islands.
3. Being cost-effective, government departments would convince interest in up-scaling of the project through various programmes such as those under IOM and MC.

Under **component 3**, a detailed cost-benefit analysis study⁴⁷ has been completed for the proposal to construct and operate an inland road from Malem to Yeseng to Utwe. A copy of the cost-benefit analysis study is provided at Annex 6. The main purposes of the study were to:

- 'ground-truth' whether the inland road development is a priority investment (strategic rating of 8.9/10) as stated in the State's Infrastructure Development Plan (IDP), Volume 4 of the FSM IDP (DTCI 2015);
- inform how the design of the inland road development can be refined and improved; and
- further develop the evidence-base needed to support funding applications for this infrastructure investment.

⁴⁷ The cost-benefit analysis study was supported through the Pilot Program for Climate Resilience: Pacific Regional Track (PPCR-PR) - a regional program which aims to strengthen integration of climate change and disaster risk considerations into 'mainstream' planning and related budgetary and decision-making processes (i.e. 'climate change and disaster risk mainstreaming'). The PPCR-PR is being implemented by the Secretariat of the Pacific Regional Environment Program (SPREP) and the Asian Development Bank (ADB), and is funded through the Climate Investment Fund (CIF). More information on this program can be found at <https://www.climateinvestmentfunds.org/cif/node/7295>

The cost-benefit analysis examined the proposal to construct and operate an inland road from Malem to Yeseng to Utwe. This option includes 20 years maintenance and revetment of the existing coastal road in order to provide time for households to relocate to safer areas, as is the intention of the proposed IRRI program.

The analysis also examined an alternative option to upgrade the existing coastal road, including elevating it and ramparting segments that are particularly exposed to erosion and over-wash.

A wide range of cost and benefit categories for each option were considered, reflecting the many dimensions of coastal hazard risks faced by Malem and Utwe coastal communities and of relocating communities and infrastructure inland. A summary of these costs and benefits for each infrastructure option is provided in Table 16 below.

Table 16 Summary of cost-benefit analysis results (PV\$ @ 4% discount rate)

	INLAND ROAD DEVELOPMENT - PHASE 1 MALEM TO YESENG TO UTWE	UPGRADE EXISTING COASTAL ROAD - MALEM TO YESENG TO UTWE
<i>(1) Costs</i>		
establishment and operational costs, including awareness programs	5,846,667	5,307,444
impacts on inland environment from inroad development	Not valued	0
impacts on coastal environment from upgrading existing coastal road	0	Not valued
	5,846,667	5,307,444
<i>(2) Benefits</i>		
avoided clean-up costs from coastal flooding events	15,576	12,192
avoided damages to cars	Not valued	Not valued, but lower than inland road option
avoided damages to home gardens	Not valued	Not valued, but lower than inland road option
avoided damages to housing infrastructure	177,472	91,742
avoided damages to road infrastructure	278,375	1,517,936
avoided trauma and loss of life from major typhoon event	Not valued	Not valued, but lower than inland road option
avoided income losses associated with road damages (preventing access to workplaces)	1,452	1,185
avoided disruptions to schooling	Not valued	Not valued, but lower than inland road option

	INLAND ROAD DEVELOPMENT - PHASE 1 MALEM TO YESENG TO UTWE	UPGRADE EXISTING COASTAL ROAD - MALEM TO YESENG TO UTWE
avoided disruptions to accessing hospitals	Not valued	Not valued, but lower than inland road option
increased food production achieved through improved access to inland areas	2,446,134	0
other benefits (e.g. tourism and cultural) achieved through improved access to inland areas	Not valued	0
migration out of Kosrae and associated economic implications	Not valued, but lower than upgrading coastal road option	Not valued
Avoided replacement of coastal road at existing design standard	3,194,855	3,194,855
Avoided maintenance of existing coastal road	22,580	22,580
	6,136,444	4,840,490
(3) NPV = (2)-(1)	289,777	(466,954)
(4) BCR = (2)/(1)	1.05	0.91

As can be seen from Table 16 above, the quantitative results show that only the inland road option is expected to generate net benefits for the Malem and Utwe communities - relative to the status quo scenario - whereby the existing coastal road is retained at its current design specifications and a protective rampart (revetment) constructed to protect sections of the road most exposed to over-wash.

The CBA report also emphasizes that a number of important costs and benefit categories were not valued due to a lack of data, and hence are not reflected in the quantitative results. These costs and benefit categories include:

- benefits of the inland road relating to (i) avoided damages to cars and home gardens; (ii) avoided trauma and loss of life from major typhoon events; (iii) avoided disruptions to schooling; (iv) avoided disruptions to accessing hospitals; and (v) a range of other benefits expected to be generated from improving access to inland areas (e.g. tourism and culture);
- environmental costs of upgrading the existing coastal road, especially in terms of downstream coastal erosion; and

- broader economic implications relating to outmigration from Kosrae if the existing coastal road is maintained or upgraded.⁴⁸

When these categories are taken into account, the inland road option would be expected to show a much stronger return on investment and represents a worthwhile use of resources. The social and environmental impacts will also be avoided, minimized, reduced through the proper application of the mitigation factors outlined in the Environmental Social and Management Plan (Annex 7).

The CBA report further stresses that a number of other (non-public-infrastructure related) barriers are constraining households capacity to relocate to inland areas - and that these barriers will need to be addressed if the infrastructure investment is to fully realize its intended objectives.

Key barriers identified as part of community consultations were a lack of access to finance (e.g. to construct a new house) and a lack of access to land located upland. Moreover, if households are slow to relocate inland, then the Government will likely be required to re-establish the coastal road - when it meets the end of its economic life in approximately 20 years' time. This would represent a substantial additional cost for the Government - in the order of US\$3.4 million. This reinforces the need for complementary measures to address non-infrastructure-related barriers to relocation.

The project will address these by developing state support programs to access land and finance under outputs 3.3 and 3.5., to enable and facilitate the re-location preferences of the communities. These activities are considered essential in order to be able to realise the cost-effectiveness of the project

The key findings and conclusions outlined in the CBA report are consistent with the recommendations made in the Kosrae Shoreline Management Plan (2014). The key findings have also been peer-reviewed by a number of different stakeholders, including technical officials from SPREP, the Pacific Community (SPC), German International Co-operation Agency (GIZ), and the National Institute of Water and Atmospheric Research (NIWA).

Based on the CBA results, the Inland Road Development - Phase 1 Malem to Yeseng to Utwe is confirmed as a high priority investment for Kosrae. Moreover, the CBA results suggest that this project should be pursued ahead of some other infrastructure projects ranked higher than in the Infrastructure Development Plan 2016-2025. One example is the Lelu water systems improvement project for which a CBA study was also completed and shown to be economically unviable.

The project will not be able to fully fund Phase 1 of the inland road development which is the establishment and operational costs, including awareness programs with a total cost of \$5,846,667 USD. The remaining allocation of \$9 million USD under the AF for FSM will not suffice the concerted implementation of all components of the project. Component 3 alone constitutes 47% of the total project activity costs. The Kosrae State Government with assistance of the National FSM government continues to pursue discussion with development partners to

⁴⁸ households located seaward of the coastal road have advised they will leave Kosrae if their safety remains compromised.

support implementation of Phase II of the inland road development. The national state government has confirmed this commitment through a letter to the AF Board dated 8 July 2016 (see Annex 8).

D Consistency with Development Strategies

Describe how the project is consistent with national or sub-national sustainable development strategies, including, where appropriate, national or sub-national development plans, poverty reduction strategies, national communications, or national adaptation programs of action, or other relevant instruments, where they exist.

Key Policies of Central and State Government, on which this project is based, are as follows

NO.	NATIONAL / STATE GOVERNMENT POLICY, RESPONSIBLE AGENCY	PROJECT ELEMENTS CONSISTENT WITH THE POLICY
1	Nationwide Climate Change Policy, <i>Office of Environment and Emergency Management (OEEM)</i>	1. Developing legislation and regulation frameworks for climate resilient development in coastal and marine areas 2. Developing climate resilient water and sanitation policies 3. Implementing water outlook program to prepare and manage water resources in advance of climate variability and changes
2	National Strategic Development Plan,	1. Protection, conservation of freshwater, marine and terrestrial ecosystems, inland road relocation, coastal protection from erosion, training and awareness of CC, SLR, vulnerability, issues and causes of increasing hazards 2. Developing climate resilient regulations for development projects – to ensure developments at the coastal areas are climate-proofed
3	Nation Wide Integrated Disaster Risk Management and Climate Change Policy, <i>OEEM</i>	1. Cross-sectoral climate change coordination mechanisms within office of environment and emergency management at national level, state environment protection agencies 2. Preparation of outer islands against onset of El Nino periods that bring long dry spells. 3. Training of outer island communities on water and sanitary monitoring and other disaster preparedness and response measures
4	Kosrae Climate Change Act, <i>Kosrae State Government</i>	1. Cross-sectoral climate change coordination mechanisms amongst Kosrae State Government departments and utilities 2. Abide with regulations for development projects requirements to meet EIA guidelines and standards 3. Apply climate change hazard mitigation actions to protect society and the environment
5	Kosrae Shoreline Management Plan, <i>Kosrae Island Resource & Management Authority (KIRMA)</i>	1. Implementing the first priority of the shoreline management plan under the Inland Road Relocation Initiative (IRRI) program

NO.	NATIONAL / STATE GOVERNMENT POLICY, RESPONSIBLE AGENCY	PROJECT ELEMENTS CONSISTENT WITH THE POLICY
6	KSG Regulations for Development Project, <i>KIRMA</i>	1. Abide by regulation rules and requirements under the project
7	Kosrae Strategic Development Plan, <i>Office of Development Assistance</i>	1. Mainstreaming climate change into development through design and construction of roading infrastructure 2. Revetment of existing coastal roads to prolong the shelf life of the roads from sea level rise and resultant tidal surges, king tides and extreme high tide events.
8	Pohnpei State Strategic Development Plan , <i>Pohnpei State Government</i>	1. Integrated water resource management in the outer islands helping to conserve safe drinking water. 2. Implementing simple and effective wastewater treatment technologies such as self-composting toilets. It does not use water but it effectively decomposes off of wastewater in environmentally-friendly set up. 3. Constructing potable water source facilities in outer islands that will provide significant support to environmental improvement and economic growth on main island.
9	National Infrastructure Development Plan , <i>Ministry of Transport, Infrastructure and Communication</i>	1. Implementing cost-effective, safe, reliable and sustainable infrastructure (environmentally sound and climate proof) 2. Implementing high priority infrastructure needs of the states that is submitted to national government under guidance of the NIDP
10	National Climate Change and Health Action Plan, <i>Department of Health</i>	1. Reducing incidences of water and vector-borne diseases in outer islands / hard to reach places 2. Building capacity of women, men and youth to better water, sanitation and health conditions and assets on island through trainings, survey assistance, construction and carrying out monitoring roles
11	Kosrae Shoreline Management Plan, <i>KIRMA</i>	1. Implementing the priority strategy identified by the KSMP
12	Yap Joint State Action Plan, <i>Department of Resources & Development</i>	1. Implementing the water goals for the outer islands
13	National Framework on Water and Sanitation Policy	1. Integrated water resource management helping to conserve water 2. Optimise water use by increasing water use efficiency by at least 20% 3. Enhancing storage, both above and below ground, special effort to increase water storage capacity

NO.	NATIONAL / STATE GOVERNMENT POLICY, RESPONSIBLE AGENCY	PROJECT ELEMENTS CONSISTENT WITH THE POLICY
14	“Endorsing Access and Right to Safe Drinking Water and Sanitation in the Micronesia Region” - Micronesian Traditional Leaders Conference	<ol style="list-style-type: none"> 1. Providing access to safe drinking water and sanitation in the outer island regions of Micronesia 2. Providing training and awareness amongst the women, men and youth of the outer islands 3. Building capacity of the traditional leaders, island governing councils to manage climate change adaptation projects relating to water, sanitation and health
15	Second National Communication Report to the UNFCCC	<ol style="list-style-type: none"> 1. Providing water and water tanks to outer islands immediately including improving food security by provisions of water to plants and crops
16	National Biodiversity Strategy and Action Plan	<ol style="list-style-type: none"> 1. carry out a community-based ecosystem management program with municipal communities 2. work with leading NGOs to carry out monitoring and surveying of ecosystems
17	National Action Plan to Combat Land Degradation	<ol style="list-style-type: none"> 1. Develop and implement water shed protection strategies 2. build capacity of communities to lead and manage community-based ecosystem management programs
18	Joint National Action Plan for climate change adaptation (CCA) and disaster risk management (DRM) (developing)	<ol style="list-style-type: none"> 1. carry out coordination mechanisms at national and state levels involving the national office of environment and emergency management, state EPAs and departments of resources and development and department of transport, infrastructure and communications
19	National Environmental Policy Act of 1969	<ol style="list-style-type: none"> 1. Protection, conservation of freshwater, marine and terrestrial ecosystems, inland road relocation, coastal protection from erosion, training and awareness of CC, SLR, vulnerability, issues and causes of increasing hazards 2. Developing climate resilient regulations for development projects – to ensure developments at the coastal areas are climate-proofed

E Consistency with Technical Standards

Describe how the project / programme meet relevant national technical standards, where applicable, such as standards for environmental assessment, building codes, etc., and comply with the Environmental and Social Policy of the Adaptation Fund.

The overall objective of the project is in line with the Climate Change Policy of the FSM Government 2009, the Framework for National Water and Sanitation Policy 2011, and the Infrastructure Development Plan 2016-2025. At the state level, the Climate Change Act 2011 and the Regulations for Development Project 2014 and EIA Guidelines 2014 of the State of Kosrae as well as adhering to the recommendations of the Joint Strategic Action Plan on Climate Change and Disaster Risk Management of each state. Secondly, the project will be governed as per the policy and preference of the Government of FSM in adherence to all the specific local criteria. Apart from that, the project would also adhere to the recommendations

communicated by FSM's Second National Communication report 2015 to the UNFCCC with regard to climate change adaptation benefits.

The National Government provides guidance and technical assistance to the States when needed and requested on matters related to planning, economic development, natural resources, fisheries, and the environment.”⁴⁹ The National Climate Change Policy of 2009 for instance provides guidance related to infrastructure:

Adaptation

- a. All development activities in FSM to take into account projected climatic changes in the design and implementation as stipulated in the FSM Strategic Development Plan/Infrastructure Development Plan (SDP/IDP); and
- b. To use eco-system based approaches where applicable.

Technology Transfer

- a. To optimize the use of local technologies where available.
- b. To identify technology that is locally appropriate.
- c. To enhance easy access to, and sustainable use of new technologies

Finance

- a. To maximize the use of local resources through establishment of sustainable financing mechanism to support adaptation, mitigation and resource management initiatives.

The involvement of the key stakeholders in the technical teams, working committee and project steering committee will ensure compliance with policies, guidance and law. The monitoring of compliance to technical standards where applicable would be done at field level units by the Outer Island Project Working Committees for Yap, Chuuk and Pohnpei, and by the Kosrae Island Resource Management Authority (KIRMA). SPREP as RIE and OEEM as EE would monitor the adherence to the technical standards during its period field visits.

The following table (table 17) provides a summary of the key activities and the applicable standards that are applied by the relevant government department supporting the project.

Table 17 Key Activities

NO.	ACTIVITY	APPLICABLE STANDARDS	APPLICATION TO PROJECT BY
	Component 1		
1	Legislative framework and draft	Apply normal procedural standards in draft legislation and replicate lessons from Kosrae State Climate Change Act (refer to further description below)	Division of Litigation, Department of Justice

⁴⁹ Federated States of Micronesia State-Wide Assessment and Resource Strategy 2010-2015+. Undated. p. 10. <http://www.wflccenter.org/islandforestry/fsm.pdf>

NO.	ACTIVITY	APPLICABLE STANDARDS	APPLICATION TO PROJECT BY
2	State regulations for development projects	Apply normal procedural standards in draft legislation and replicate lessons from Kosrae State Regulations for Development Projects. (Refer to further description below)	Offices of the Attorney General Yap State, Chuuk State, Pohnpei State
	Component 2		
3	Rainwater harvesting systems	Minimum standards of the Rainwater Catchment Design And Installation Standards (ARCSA, 2009) State EPA Regulations Climate Adaptation Guide for Infrastructure 2014	Environment Protection Agency – Yap, Chuuk and Pohnpei States
4	Self-composting toilet programs constructed	Sustainable sanitation manual and guidelines for a waterless composting toilet (SPREP, 2007) State EPA Regulations Climate Adaptation Guide for Infrastructure 2014	Environment Protection Agency – Yap, Chuuk and Pohnpei States
	Component 3		
5	Construction of 3.6 miles of road to sub-standard level and transitional coastal protection	Design standards for Kosrae circumferential road extension project. Standards cover the road pavement design, and associated structures such as drainage, bridges, culverts and rock revetment for coastal protection – ADB 2005	Department of Transport, Communications & Infrastructure
		Refined coastal defence design guidelines and design criteria developed during associated activities related to the development of the original Kosrae Shoreline Management Plan in 1998-2000. <i>Manual on the use of rock in coastal and shoreline engineering</i> (CIRIA/CUR, 1991)	Department of Transport, Communications & Infrastructure

NO.	ACTIVITY	APPLICABLE STANDARDS	APPLICATION TO PROJECT BY
		Engineering design standards: subsurface conditions, material specifications, cross section and standard dimensions and drainage and erosion – ADB 2011	Department of Transport, Communications & Infrastructure
		Non-engineering design standards: maintenance planning and early warning, land use planning, community-based ecosystems management – ADB 2011, KSG (KIRMA) 2015	Department of Transport, Communications & Infrastructure, Kosrae Island Resource Management Authority
		Climate Adaptation Guide for Infrastructure 2014	Department of Transport, Communications & Infrastructure
	Component 4		
	Key stakeholder participation	IDP strategic consideration of ‘Involvement of States’	OEEM, State EPA and R&D offices, KIRMA
	Generation of evidence based learning	SNC Report adaptation recommendations, National Climate Change Policy suggested benefits	RIE, OEEM
	Sharing of learning	Government protocols for participation in learning sharing events	OEEM, State EPA offices, R&D office, KIRMA
	Development of knowledge products	Knowledge standards established by SPREP and other agencies	SPREP and OEEM

FSM does not have a formal building code. At present projects are generally designed in accordance with international codes, standards and guidelines, but with only limited account taken of the specific circumstances of FSM. Some guidelines have been developed for specific aspects including seismic and wind loading and are summarized in Climate Adaptation Guide for Infrastructure. FSM through the Department of Transport and Infrastructure, under the guidance of the IDP 2016-2025, plans to develop a National Building Code with State specific requirements where appropriate. The Code will be based on the International Building Code and other US based codes and standards, but will also take account of the requirements of FSM and incorporate existing state and national guidelines.

Without any national or state level rainwater catchment design and installation standards, the project will attempt to apply and meet minimum standards of the American Rainwater Catchment Systems Association (ARCSA) and the American Society of Plumbing Engineers (ASPE) based on its Rainwater Catchment Design and Installation Standards manual (ARCSA, 2009). The standard will be applied to new rainwater catchment installations, alterations,

additions, maintenance and repairs to existing installations. The standards are designed to assist engineers, designers, plumbers, builders, developers, local government and users in safely implementing a rainwater catchment system. The environmental norms (water quality) notified with regards to rainwater harvesting systems, will be in conformity with the pollution norms outlined under each state of the State Environmental Protection Agency regulations.

F Duplication of project

Describe if there is duplication of project / programme with other funding sources, if any.

The project target areas are not the focus of any other climate change adaptation initiatives. In fact, this is the first, focused effort to implement a climate change adaptation project based on identified priorities on the ground in these remote and vulnerable islands of Yap, Chuuk and Pohnpei. In Kosrae state, this will be the second time a project will be focused on climate-proofing roading infrastructure, but a first time on the southern and most vulnerable coastlines of Malem and Utwe. The first project was a pilot project, that was successfully demonstrated under the PACC project in the northern coastline of Tafunsak from 2009 – 2015⁵⁰.

This project would be the first one to explicitly focus on improving water security as an adaptation strategy in the selected outer islands of FSM. The protection and preservation of ecosystems (lagoon and mangrove areas) and reduction of incidences of water and vector-borne diseases are complementary adaptation measures of the project. It will complement on-going government programs that are being implemented to improve outer island water resource management, agricultural productivity and conservation of biodiversity. The project will take required measures to avoid potential fund duplication with other funding sources for similar activities. Some of the potential schemes/programmes of Government that have complimentary components are as follows:

PROJECT	OBJECTIVES	COMPLEMENTARITY	GEOGRAPHICAL COVERAGE / AGENCY
Micronesia Challenge (MC)	Sub-regional conservation initiative which enhances community resiliency by using traditional knowledge and ecosystem strategies to conserve vulnerable coastal land resources by 2020; goals are to effectively conserve at least 30% of near-shore resources and 20% of terrestrial resources.	Construction of inland road with a community-based ecosystem management focus to reduce climate change impacts on road and community infrastructure and contribute to conserving terrestrial resources (mangrove forests and swamps) from future flooding events as a results of climate-proofing designs of the inland roads. Reducing impact of wastewater runoff into mangrove and lagoon effectively conserving vulnerable outer island environments	FSM, Palau, CNMI, Marshall Islands / KIRMA, KCSO – Kosrae State

⁵⁰ See Technical Report No.18 <https://www.sprep.org/pacc/publications/technical-reports>

Micronesia Conservation Trust (MCT)	A charitable and irrevocable corporation organized to manage and provide funds for the accomplishment of the following mission: “to support biodiversity conservation and related sustainable development for the people of Micronesia by providing long term sustained funding.”	<p>Promoting community-based ecosystem management practices complementing coastal infrastructure development</p> <p>Promoting conservation of biodiversity in outer islands by changing common practices that pollute the surrounding environment and ground water resources</p>	<p>All States /</p> <p>KIRMA – Kosrae State</p> <p>EPA – Chuuk, Pohnpei States</p> <p>EPA, R&D – Yap State</p>
Pacific Adaptation to Climate Change Project (PACC)	<p>To enhance the capacity of the FSM to adapt to climate change and climate variability in coastal management</p> <p>Kosrae was chosen as pilot State focusing on coastal infrastructure</p>	Replication of the PACC activity in Tafunsak – climate proofing coastal road by relocating and constructing inland road. Building capacity of communities and coastline to climate variability.	Kosrae State / KIRMA
International Climate Change Adaptation Initiative-Pacific Adaptation Strategy Assistance Program (ICCAI PASAP)	To enhance the capacity of partner country to assess key vulnerabilities and risks, formulate adaptation strategies and plans and mainstream adaptation into decision making. For FSM: adaptive strategies informed by best practice methods and improved knowledge: community participatory surveys conducted in Yap which included Ulithi and Fais Atolls; evidence-based field research conducted on drought and salt tolerant varieties of sweet potatoes and sweet taro in Dinay and Wugeem, Yap	<p>Water harvesting and storage systems informed by best practices, methods and surveys.</p> <p>Ground truthing assessments based on rapid assessments of water resources in response to drought</p>	<p>All States /</p> <p>EPA in Yap, Chuuk and Pohnpei States</p>
Geospatial Analysis for Food Security Adaptation	Trying to find suitable places to relocate the agricultural areas (particularly taro) with the help of geospatial analysis (GPS, remote sensing) and geographic information systems.	<p>Repairing rainwater harvesting systems and installing community tanks for outer island communities.</p> <p>Watershed protection strategy to identify areas out of bounds for agriculture, residential and other developments</p>	<p>All States /</p> <p>EPA – Yap, Chuuk, Pohnpei</p> <p>KIRMA, KCSO – Kosrae</p>
Pacific - Australia	Supporting the government	Establishing National Water	All States / OEEM

Climate Change and Adaptation Planning Program	of FSM develop improved climate change projections and adaptation planning activities. FSM and 14 other Pacific countries are part of this AUD\$32 million project which builds on the foundation of the Pacific Climate Change Science Programme and the Pacific Adaptation Strategy Assistance Programme.	Outlook Program	
Implementing Sustainable Water Resources and Wastewater Management in Pacific Island Countries	The FSM's GEF Pacific IWRM Demonstration Project entitled "Ridge to Reef: Protecting Water Quality from Source to Sea" has strengthened national coordination in the water and sanitation sector and has enhanced community collaboration to improve water resource management. It has three main foci—(i) protected areas (improving existing ones and creating new ones), (ii) managing ecosystems outside protected areas, and (iii) improving agro ecosystems.	<p>Develop and endorse National Water and Sanitation Policy</p> <p>Develop and implement national water outlook program</p> <p>Develop and implement national water sector investment plan</p> <p>Repair and construct water harvesting and storage systems at the outer island level</p> <p>Train and build capacity of national water task force and relevant stakeholders at the state level</p>	Outer islands of Yap, Chuuk, Pohnpei States / R&D and EPA of each of the 3 states
Water and Environmental Research Institute of the Western Pacific (WERI)	Mission is to seek solutions through research, teaching and outreach programs, to issues and problems associated with the location, production, distribution and management of freshwater resources in Micronesia. Current projects and programs include watershed management program, rooftop rain catchment sizing, groundwater and aquifer research, atoll hydrologic modelling, water quality production and distribution, water resources management and GIS	Ground truthing assessments on water harvesting and storage systems	Outer islands of Yap, Chuuk, Pohnpei States / R&D and EPA of each of the 3 states
Global Climate	To support the governments	Develop and implement national	Outer islands of Yap,

Change Alliance: Pacific Small Island States	of nine Pacific smaller island states, including FSM, in their efforts to tackle the adverse effects of climate change.	water outlook program Develop and implement national water sector investment plan Repair and construct water harvesting and storage systems at the outer island level Train and build capacity of national water task force and relevant stakeholders at the state level	Chuuk, Pohnpei States / R&D and EPA of each of the 3 states
University of the South Pacific European Union Global Climate Change Alliance Project	To develop and strengthen the Pacific ACP countries' capacity to adapt to the impacts of climate change.	Ground truthing assessments on water harvesting and storage systems	Outer islands of Yap, Chuuk, Pohnpei States / R&D and EPA of each of the 3 states
Coping with Climate Change in the Pacific Island Region (CCCPIR)	Undertaking mainstreaming climate change, and integrated land and marine resource management at the national and local level. Addressed six components ranging from regional and national mainstreaming of climate change, implementation of adaptation activities on the ground, and climate change related to tourism, energy and education	Develop and endorse National Water and Sanitation Policy Train and build capacity of national water task force and relevant stakeholders at the state level Developing a Teacher's Guide on Climate Change at the state level	All States/ OEEM
Technical Assistance (TA) to FSM for Strengthening Infrastructure Planning and Implementation	support state utilities within the FSM) in executing infrastructure projects more effectively by having an agreed upon approach to systems and procedures for project planning, design, and management across the country; and build capacity in the Department of Transportation, Communications and Infrastructure (DTCI) to plan, design, and oversee project execution.	Design and construct the Malem-Utwe inland road Build capacity of DTI in implementing CCA projects	Kosrae State / OEEM, KIRMA, DTI
Second National Communications to	National obligation under the UNFCCC to produce status report on national	Implement water, sanitation and health adaptation activities in outer islands	All States / OEEM

the UNFCCC	climate change measures and priorities. FSM is using a consultative approach involving a range of stakeholders to produce this report.	Develop climate resilient infrastructure	
MAPCO2 Project	A MAPCO2 was deployed within the Chuuk Lagoon in November 2011. The goal of this joint effort is to establish a long term monitoring station in Micronesia as part of global ocean monitoring network system for coral reef areas.	Developing legislative framework to oversee enforcement of coastal and marine resource management, including protection of environment from development projects National Water Outlook Program	All States / OEEM
Pacific Islands Climate Education Partnership (PCEP)	Educates students and citizens across the Pacific about the urgency of climate change impacts in ways that exemplify modern science and honour indigenous cultures and environmental knowledge, so that students and citizens within the region will have the knowledge and skills to improve understandings of climate change and adapt to its impacts	Developing a Teacher's Guide on Climate Change at the state level	All States / OEEM, Department of Education
Unite for Climate Pacific Regional Integrated Sciences and Assessments (Pacific RISA)	To enhance Pacific Island communities' abilities to understand, plan for, and respond to a changing climate. Emphasizing the engagement of communities, governments, businesses, and scientists by translating scientific research into information and materials that are valuable for stakeholders in key sectors such as water resources. Climate focused water sector education and outreach is part of Pacific RISA's core mission	Ground truthing assessments carried out for water resources in the outer islands will contribute to water sector education and will be excellent for outreach activities in FSM Technical reports and other knowledge products developed from results of the project will contribute to information and materials valuable for future adaptation planning under water, health, sanitation and coastal zone management.	All states / OEEM
Schools of the Pacific Rainfall Climate Experiment	To increase awareness of the younger generations about global environmental	Developing a Teacher's Guide on Climate Change at the state level	All States / OEEM, Department of Education

(SPaRCE)	issues, such as climate change, with hands-on experience by involving them in the collection of rainfall data.		
Climate Adaptation, Disaster Risk Reduction and Education (CADRE)	Aims to build resilience of vulnerable communities to natural hazards particularly those that are climate induced.	Developing a Teacher's Guide on Climate Change at the state level Ground truthing assessments carried out for water resources in the outer islands will contribute to water sector education and will be excellent for outreach activities in FSM Technical reports and other knowledge products developed from results of the project will contribute to information and materials valuable for future adaptation planning under water, health, sanitation and coastal zone management.	All States / OEEM, Department of Education
U.S. Peace Corps Small Project Assistance (SPA) for Adaptation	Reaching out to remote communities by supporting the following efforts of Peace Corps volunteers: (1) development of youth camps that promote environmental awareness, knowledge and skills among the youth to become responsible natural resource stewards; (2) trainings that support community adaptation to climate change and build capacity for disaster risk reduction (DRR); and (3) small-scale community projects that can demonstrate application of climate change and DRR principles	Implementing water harvesting and storage systems program in the outer islands Installing / constructing self-composting toilets in outer / remote island environments, applying climate change and DRR principles	All States / EPA, R&D, KIRMA
Coastal Community Adaptation Project (C-CAP), 2013-2017	To build the resiliency of vulnerable coastal communities in the Pacific region to withstand more intense and frequent weather events and ecosystem degradation in the short-term, and sea level rise in the long-term.	Inland Road Relocation Initiative program Building capacity of landless to access land upland , and access to finance to assist with relocation Constructing inland road away from low and exposed coastal roads degraded from impacts of sea level rise	Kosrae State / KIRMA
Pacific Catastrophe	To provide the Pacific	Developing the Water Outlook	All States / OEEM

Risk and Assessment Initiative (PCRAFI)	Island Countries (PICs) with disaster risk modeling and assessment tools to help them better understand, model, and assess their exposure to natural disasters, and to engage in a dialogue on integrated financial solutions for the reduction of PICs financial vulnerability to natural disasters and to climate change.	<p>Program.</p> <p>Application of adaptation planning models and tools that include EIA, CBA, MEF, V&A assessment tool, mainstreaming, gender and climate change tools</p> <p>GIS spatial mapping exercise</p> <p>Implementing Participatory 3 Dimension mapping exercise as a consultation tool</p>	
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Box 3 Climate proofing Kosrae's coastal road

Kosrae, one of the four States comprising the Federated States of Micronesia (FSM), was selected to host the country's PACC project. Kosrae has a population of 6,616 (2010 census), and more than 75% of the island's people and infrastructure are located in the coastal zone. The demonstration project focused on improving a section of Kosrae's coastal road, which is the main transport route on the island.

The project identified a 7 km section of the road in the Tafunsak municipality which was being progressively damaged by flooding from heavy rains and high tides. The original road had been designed to withstand a maximum hourly rainfall of 178 mm. Analysis of climate and sea level data, and projections to 2050, concluded that the road should be redesigned to withstand maximum hourly rainfall of 254 mm.

Following a socio-economic assessment, community consultations, and input from expert coastal engineers, the road was redesigned and rebuilt to withstand the anticipated heavier rainfall and higher sea levels. Adaptations included raising parts of the road by up to one and a half meters, fitting larger culverts, and improving drainage. The improved road was officially opened in May 2014. The PACC team is now developing guidelines to share their experiences with climate proofing the road, which will help others to replicate this success.

Also under the PACC project, a tide gauge and rainfall gauges were installed on Kosrae in 2011 to improve availability and quality of local climate and sea level data. These will also feed into climate-sensitive decision making and development for the state.

The project team has also been promoting the mainstreaming of climate risk into all development in the state and the country. The team supported development of the Kosrae State Climate Change Act, which was endorsed in 2011; and amendments to Kosrae's Regulations for Development, which now require all development projects to consider the potential impacts of climate change. The team also contributed to the recently revised Kosrae Shoreline Management Plan, which provides a comprehensive strategy for building resilience of Kosrae's coastal communities and infrastructure into the future.

The project is to field test the above lessons of the PACC to create models which could be replicated and up-scaled through a similar program such as the Inland Road Relocation Initiative of Kosrae.

For more information on the FSM PACC project, please visit the project webpage: <https://www.sprep.org/pacc/fsm>

G Learning & KM

If applicable, describe the learning and knowledge management component to capture and disseminate lessons learned.

The project proposes a dedicated component aimed at improving knowledge management and develop capacity at all levels of development intervention (individual, island, municipal, state and national). Component 4 will provide a systematic approach at the country level, to improving understanding on climate change impacts on water and coastal zones. In doing so, the goal here is to enhance and activate participation of key stakeholders to address the risks and challenges of climate change in the coastal sector in a holistic manner.

The project, through its management units at the national and state levels will each develop a project-based Knowledge Management and Communication Strategy that will guide the implementation of its work in capturing and disseminating lessons learned of the project. It will act as a media outreach strategy. It will be the overall guide to facilitating, monitoring and evaluating all knowledge, communication and learning works of the project. Each state will develop an action plan matrix that help guide and report against the work of the strategy. Each municipal and outer island community will also develop a similar action plan matrix, and will form part of the Community Plans under a knowledge and communications strategy component.

An action plan matrix will outline clear learning objectives, the desired learning, knowledge and communication outcomes, target audience, key messages for each communication outcome, knowledge product and knowledge sharing tools, and indicators. The strategy and action plan matrix will mirror the Communication Plan developed under the PACC project for FSM.

The key areas of learning and knowledge generation, its documentation and sharing would be as follows:

1. Legislation and regulations assessment on coastal and marine resources management at national and state levels in FSM
2. Water harvesting and storage infrastructures and capacity in outer islands, FSM
3. Water quality maintenance relative to water resources in outer islands – wells and tanks
4. Water quantity relative to water harvesting systems in outer islands
5. Success of reducing vector and water-borne diseases from changes in water and sanitation practices in outer islands, FSM
6. Willingness to relocate and its linkages to access to land and finance and provision of utility services (inland road, water mains, telecommunications, power)

The knowledge products that will be developed by the project include:

1. Legislation paper to guide regulation of marine and resource management
2. Policy and guidance documents on regulations for development projects
3. National Water and Sanitation Policy
4. National Water Outlook Program
5. Water Sector Investment Plan
6. Community Development (Climate Change Adaptation) Plan for Eauripik Atoll
6. Community Development (Climate Change Adaptation) Plan for Woleai Atoll
7. Community Development (Climate Change Adaptation) Plan for Satawan Atoll
8. Community Development (Climate Change Adaptation) Plan for Nukuoro Atoll
9. Community Development (Climate Change Adaptation) Plan for Kapingamarangi Atoll

10. Operations and maintenance guide for rainwater harvesting and storage systems in the outer islands, FSM
11. Sustainable sanitation manual and construction guidelines for self-composting toilets in the outer islands, FSM
12. Operations and maintenance guide for self-composting toilets in outer islands, FSM
13. Climate resilient water conservation and management practices in low-lying atoll island environments, FSM
14. Teacher's Guide on Climate Change, FSM
15. Climate resilient design guidelines for inland road and access routes on a volcanic island, Kosrae FSM Case study
16. Community-based ecosystems management guidelines for upland forested areas, Kosrae, FSM
17. Land registry, Kosrae, FSM
18. State support program on access to finance for vulnerable households
19. Training Manual for Carpenters and Plumbers on Installing, Repairing, Cleaning and Maintenance of Community Water Tanks, and Household Water Tanks and Wells
20. Training Manual on Construction, Operations and Maintenance of self-composting toilets in outer islands, FMS
21. Awareness materials on climate change and water
22. Awareness materials on climate change and coastal management
23. Awareness materials on climate change, legislation and regulations

The project's knowledge management systems will adapt what previous projects have carried out under the PACC project and elsewhere. It will utilize technology-based systems through setting up of blog spots (popular in FSM projects and programmes) on internet, website, and library linkages through EE and RIE (SPREP) networks. It will also use Facebook, Twitter and other forms of social media to link and share its success stories and knowledge products. The few knowledge products outlined in the list above will be peer-reviewed and published and assigned ISSN and ISBN codes so that it can be shared globally. Throughout the project, the learning and knowledge sharing will be through interactive seminars, workshops, conferences in many climate change programs internally in FSM, in the region through SPREP and other regional agencies, as well as internationally through FSM's reporting obligations (National Communications to the UNFCCC).

This project would focus on developing materials and information that requires capturing, review and share lessons learned and best practices applies – output 4.2. The products that are translated into both English and the local dialect and native language which consider the cultural diversity of the target islands of the project will include science, traditional knowledge and educational materials such as brochures, booklets, technical reports that capture data and information that inform policy and management plans at the island and community levels. The lessons from the development of knowledge management products of other projects will be considered. For example the PACC Technical and Experience Series developed to capture the adaptation demonstration process of various adaptation projects, in the very key areas that this project is focusing on least of which is coastal zone management.

The training of stakeholders will include module-based trainings on important social capacity building skills such as gender and climate change tools. The department of social affairs will be working closely with EPA / KIRMA to carry out refresher trainings on gender perspective in coastal management and coastal monitoring. This comes as a result of existing technical training guides and modules that the project will utilise, for example the Pacific Gender and Climate Change Toolkit, developed by regional agencies and with assistance of the PACC

project and are now available online through the climate change portal (www.pacificclimatechange.net).

Complementary products will be developed to capture processes of implementation of the projects. Documentaries, radio and TV programmes, leaflets and posters will target the public with special attention to audio-visual presentations in DVDs using English and local languages. The project will strengthen existing agency website already established with links targeting development professionals, teachers and schools at state level and including outer island communities. Peer-to-peer exchange of knowledge through web-based platforms such as Pacific Environment Information Network, the Micronesia Challenge Trust, the Pacific Climate Change Portal; the Adaptation Learning Mechanism will be encouraged to be used to share information and also promote project findings within the country.

An exchange visit amongst islanders within the island communities will be part of the learning program of the project. It will encourage members of other outer island communities amongst the three states under the water component for example to (where travel arrangement permit) visit the programmes work sites and observe the technologies used. For example, this will be part of the extension services work in the country and will stimulate learning and sharing of practices.

H. Consultation Process

Describe the consultative process, including the list of stakeholders consulted, undertaken during project preparation, with particular reference to vulnerable groups, including gender considerations, in compliance with the Environmental and Social Policy of the Adaptation Fund.

The stakeholders of the project include local community, traditional community leaders, municipal government council, NGOs; research institutions such as the College of Extension Services of Micronesia; women's council; sub-regional organizations such as the Micronesia Challenge and International Organization for Migration, and government agencies such as the departments of Environment (EPA), Office for Internal Affairs, Planning & Budget, Resources & Development, Youth and Social Affairs, Transport & Infrastructure and Communications.

The stakeholders identified and consulted include the following:

Table 18 Stakeholders consulted

STATE	COMMUNITY	GOVERNMENT	NGOS, IGOS
Yap State	<ul style="list-style-type: none"> - Village community – Woleai, Eauripik - Council of Pilung (Yap Proper) chief leaders - Council of Tamol (Outer islands) chief leaders 	<ul style="list-style-type: none"> - __ Office of Internal Affairs (OIA) - __ Fishing Authority (FA) - __ Office of Planning & Budget (OPB) - __ Environment Protection Agency (EPA) - __ Department of Agriculture & Forestry (DAF) - __ Resources & Development (R&D) 	<ul style="list-style-type: none"> - __ International Organization for Migration (IOM)
Chuuk State	<ul style="list-style-type: none"> - Satawan community (Women, men) - Lukunor community (Women, 	<ul style="list-style-type: none"> - DAF - EPA 	<ul style="list-style-type: none"> - Chuuk Women's Council

	men)	<ul style="list-style-type: none"> - ODA - R&D - College of Micronesia (COM) - College Extension Services (CES-COM) - College Research Extension (CRE-COM) 	<ul style="list-style-type: none"> - IOM
Pohnpei State	<ul style="list-style-type: none"> - Traditional leaders Nukuoro - Women leaders Kapingamarangi - Chief leader Pingelap atoll - Church minister 	<ul style="list-style-type: none"> - CES-COM - CRE-COM - Department of Lands and Natural Resources (LNR) - Department of Transport and Infrastructure (DTI) - FSM Youth and Social Affairs - DAF - Conservation Society of Pohnpei (CSP) - Office of Emergency and Environment Management (OEEM) - Pingelap atoll conservation 	<ul style="list-style-type: none"> - IOM - Micronesia Challenge (MC) - Red Cross Society
Kosrae State	<ul style="list-style-type: none"> - Malem Community (Elderly, Women, Men, Youth) - Utwe Community - Farmers - Landowners - Fisherman - Council Chairman - Bankers - Food Inspectors 	<ul style="list-style-type: none"> - KIRMA - DREA - Kosrae Land Court - Kosrae Governor's Office - Senator - DTI - DAF - Dept. Health Services - Dept. Environment - Kosrae Utilities Authority - ODA 	<ul style="list-style-type: none"> - Micronesia Challenge Trust – Kosrae Office - Kosrae Conservation Society Organization - COM - IMO - MCT
National government and high level officials	<ul style="list-style-type: none"> - Vice President of the Federated States of Micronesia - Secretary (Minister) of the Department of Foreign Affairs, serving as NDA of AF - Secretary of Finance - Secretary of Resources and Development - Secretary of Overseas Development Assistance - Governor and Lieutenant Governors of Yap, Chuuk, Pohnpei and Kosrae - Traditional Leaders and Mayors of Malem, Utwe, Woleai, Eauripik, Satawan, Lukunor, Kapingamarangi and Nukuoro - United States Embassy of FSM 		

The details of the consultations with stakeholders are described below. There were five sets of consultative meetings with all stakeholders including community, government and NGOs. As shown in table 19 below, the first set of consultative meetings (July 2015) was to re affirm the adaptation priorities of the project from the communities and government against their development plans and priorities to address climate change in the specific sites. These priorities were identified by the state governments during the concept planning stage in 2013 and 2014. The second consultative meeting (November 2015) was to work with the national

and Kosrae state government in securing a development partner to assist in the construction of the Malem-Utwe inland road and access roads.

The third consultative meeting (November 2015) was with the Kosrae state government and community in establishing an Inland Road Relocation Initiative (IRRI) adaptation strategy. The objectives of this meeting were twofold: firstly, examining the methodology, results and findings of the completed cost-benefit analysis (CBA) study for the Malem to Utwe inland road component (Annex 6), and secondly developing a Monitoring and Evaluation Framework (MEF) for the project to reduce climate risks faced by the Malem and Utwe communities (Annex 5). The results of the consultation contributed to the strategic results framework elements of component 1, 3 and 4.

The fourth set of consultative meetings (January – February 2016) was a repeat of the MEF objective of the meeting in Kosrae, but for Yap, Chuuk and Pohnpei states addressing water resource management, food security and marine resource management as priorities for adaptation in the outer islands of the states. As a result, three more MEFs were developed which contributed to strategic results framework for component 2. All the findings of the consultative and follow up meetings contributed to framing the strategic results for components 1, 3 and 4.

The fifth consultative meeting (May 2016) was part of the environment impact assessment for Kosrae given the potential for risks proposed for the construction of the inland road. The consultations were carried out for both Malem and Utwe communities.

Two sets of follow-up visits and one partnership and due diligence meeting was carried out from November-December 2015, January-February 2016 and June 2016 respectively. These visits included high level government officials such as the Vice President of FSM, Secretary (Minister) and officials of the Office of Overseas Development Assistance, Resources & Development, Finance and Department of Foreign Affairs serving as the National Designated Authority of the Adaptation Fund for FSM,. Special attention was paid to Kosrae given the potential risks of the activities under Component 3. As such, follow up meetings with Kosrae included high level state government representatives that included the Governor, Lieutenant Governor, Cabinet members, Speaker and Legislature, Attorney General, the Infrastructure Planning and Implementation Committee (IPIC); and mayors and traditional leaders of Malem and Utwe communities. The follow up visits in Pohnpei also included the United States Embassy to FSM and the College of Micronesia.

Table 19 Key Meetings and Findings

MEETING	DATES	CONSULTED	KEY FINDINGS
Consultative Meeting 1.1	22 June 2015	Pohnpei stakeholders	<ul style="list-style-type: none"> - Re-affirming community support of project priorities - Ranking of priorities of the project - Role of community, island governing council and representatives on island proper (main island) - Coordination mechanism of the department with other

			government departments and NGOS/IGOs
Consultative Meeting 1.2	24 June 2015	Chuuk stakeholders	<ul style="list-style-type: none"> - Community confirmation of project priorities - Ranking of priorities of the project by the community - Role of community, island governing council and representatives on island proper (main island) - Coordination mechanism of the department with other government departments and NGOS/IGOs
Consultative Meeting 1.3	25 Jun 2015	Yap stakeholders	<ul style="list-style-type: none"> - Community confirmation of project priorities - Ranking of priorities of the project by the community - Role of community, island governing council and representatives on island proper (main island) - Coordination mechanism of the department with other government departments and NGOS/IGOs
Consultative Meeting 1.4	6 July 2015	Kosrae stakeholders	<ul style="list-style-type: none"> - Community confirmation of project priorities - Ranking of priorities of the project by the community - Role of community, island governing council and representatives on island proper (main island) - Coordination mechanism of the department with other government departments and NGOS/IGOs
Consultative Meeting 2	16-19 November 2015, Palikir, Pohnpei, Colonia, Pohnpei	Vice President, Secretary Department of Foreign Affairs, Secretary Overseas Development Assistance,	<ul style="list-style-type: none"> - Update Infrastructure Development Plan for Kosrae State and FSM - Plan for FSM Development Partner's Forum meeting in March 2016 to secure donor support to co-finance and construct the Malem-Utwe

		Secretary Ministry of Finance Governor Pohnpei Lieutenant Governor Pohnpei Director, EPA Pohnpei	road\ - Coordination and collaboration mechanisms between national and state levels
Follow up Meeting 1.1	23 November 2015 Kosrae State	Governor, Lt. Governor Kosrae Infrastructure Planning and Implementation Committee, Speaker of the Legislature Mayor of Malem Municipal Government Director DTI, Engineers DTI Director KIRMA and KIRMA Permitting Unit	- Updated Infrastructure Development Plan for Kosrae State - Reviewed Malem-Utwe inland road within the priority listing of the IPIC list as one of two high infrastructure priorities of the state requiring immediate implementation - Review of CBA results, costings and benefits of the Malem - Utwe inland - Identified potential risks of the Malem-Utwe inland road and agreed to carry out an Environmental Impact Assessment (EIA)
Consultative Meeting 3	24-26 November 2015, Kosrae State	Kosrae State Government, NGO, IGO stakeholders	- Improved the accuracy and usefulness of the cost benefit analysis - Developed the IRRI program - Formulated 'logic model' and developed monitoring and evaluation framework of the IRRI program
Follow-up Meeting 1.2	27 November 2015, Kosrae State	Mayor of Malem Municipal Government Director DTI, Engineers DTI Director KIRMA and KIRMA Permitting Unit	- Legislature approval of Malem-Utwe inland road as one of two high infrastructure priorities of the state - Review of CBA results, costings following consultation meeting with Kosrae stakeholders (consultative meeting 3) - Developed Terms of Reference for EIA

Follow Up Meeting 1.3	30 November – 3 December 2015, Pohnpei State	<p>Vice President, Ministry of Finance, Department of Foreign Affairs, ODA, OEEM, Secretary Resources & Development,</p> <p>United States Embassy</p> <p>Secretariat of the Pacific Community (SPC) Deputy Director General</p>	<ul style="list-style-type: none"> - Considered the Government of China as a potential donor to co-finance and construct the Malem-Utwe road - Coordination and collaboration mechanisms between national and state levels - Coordination between national, state and US Compact activities related to infrastructure priorities of states - Briefed potential collaboration with SPC sector related projects on food security, water resource management in outer islands, marine resource management (Marine Protected Areas, Fish Aggregating Devices)
Follow Up Meeting 1.3	30 November – 3 December 2015, Pohnpei State	<p>Vice President, Ministry of Finance, Department of Foreign Affairs, ODA, OEEM, Secretary Resources & Development,</p> <p>United States Embassy</p> <p>Secretariat of the Pacific Community (SPC) Deputy Director General</p>	<ul style="list-style-type: none"> - Considered the Government of China as a potential donor to co-finance and construct the Malem-Utwe road - Coordination and collaboration mechanisms between national and state levels - Coordination between national, state and US Compact activities related to infrastructure priorities of states - Briefed potential collaboration with SPC sector related projects on food security, water resource management in outer islands, marine resource management (Marine Protected Areas, Fish Aggregating Devices)
Follow Up Meeting 1.4	3 December 2015, Pohnpei State	<p>College of Micronesia (COM)</p> <p>College Extension Services (CES-</p>	<ul style="list-style-type: none"> - Training of Agriculture Extension Officers for outer islands - Potential outer island

		COM) College Research Extension (CRE- COM)	activities on Food Security activities <ul style="list-style-type: none"> - Raised taro patches technology for outer islands - Coordination and collaboration with Food Security related projects
Consultative Meeting 4.1	20-22 January 2016	Yap stakeholders	<ul style="list-style-type: none"> - Trained government and community stakeholders on logic model and development of the Monitoring & Evaluation Framework - Re-confirmed community priorities for the outer islands - Formulated 'logic model' and developed the MEF for water security, marine resource management and food security priorities - Identified no potential social, economic and environmental risks to any of the activities of the project
Consultative Meeting 4.2	26-28 January 2016	Chuuk stakeholders	<ul style="list-style-type: none"> - Trained government and community stakeholders on logic model and development of the Monitoring & Evaluation Framework - Re-confirmed community priorities for the outer islands - Formulated 'logic model' and developed the MEF for water security, marine resource management and food security priorities - Identified no potential social, economic and environmental risks to any of the activities of the project
Consultative Meeting 4.3	1-3 February 2016	Pohnpei stakeholders	<ul style="list-style-type: none"> - Trained government and community stakeholders on logic model and development of the Monitoring & Evaluation Framework - Re-confirmed community priorities for the outer islands

			<ul style="list-style-type: none"> - Formulated 'logic model' and developed the MEF for water security, marine resource management and food security priorities - Identified no potential social, economic and environmental risks to any of the activities of the project
Follow Up Meeting 2.1	3 February 2016	Vice President FSM, ODA, R&D, MOF, OEEM, DFA	<ul style="list-style-type: none"> - Brief update of the proposal - Further discussions with Government of China' support for co-finance and construction of the road to the tune of \$5m USD in technical assistance - Confirmed support for a environmental impact assessment required for the project.
Consultative Meeting 5	23-27 May 2016	Malem and Utwe communities of Kosrae – via the EIA process	<ul style="list-style-type: none"> - Concerns were raised by the Utwe community over alternative road alignments through the Kuplu Wan plateau resulting in potential contamination of their water supply which is sourced from the Palusrik catchment due to: <ul style="list-style-type: none"> - 1. The location of the road and construction resulting in increased sediments or other contaminants entering the Palusrik River and the Utwe water supply. - 2. The improved access to the Kuplu Wan area created by the road subsequently leading to increased development in the Kuplu Wan area, including land clearing, septic tanks, pig pens etc., resulting in increased potential for contamination of the Utwe water supply. - The alignment of the road

			<p>through the southern part of the Kuplu Wan plateau (Palusrik catchment) has been re-aligned to ease community concerns on potential impacts on Utwe village's water supply. This results in a minimum buffer of 150 m at the watershed between the two catchments and over 350 m for the majority of the section of inland road within the Palusrik catchment. Given the distance to the Palusrik River, the only perennial stream in the catchment and the characteristics of the likely catchment drainage pathways, there is unlikely to be any impact from the construction or operation of the road itself on Utwe's water supply.</p>
Follow Up Meeting 3.1	20 June 2016	Vice President FSM, DFA, ODA, OEEM; US Embassy	<ul style="list-style-type: none"> - Brief update of the proposal – appraisal stage - Letter confirming co-financing support pursued by national government at the November 2016 FSM Development Partner's Forum Meeting
Follow Up Meeting 3.2 – SPREP Appraisal phase	21 June 2016	Lieutenant Governor Cabinet members IPIC Mayors of Malem and Utwe and Municipal Government representatives Malem Community, landowners	<ul style="list-style-type: none"> - Brief update of the proposal - Support to development of the proposal to SPREP provided by the USAID USADAPT Asia-Pacific Project - National government acknowledgement of endorsement by Kosrae State of the Malem-Utwe road under the AF proposal as one of the top two priorities of infrastructure requiring immediate support for implementation - Re-affirmation of the priorities of the project by the

			Utwé Municipal government, women, men, elders and youth of the community of Malem
Follow Up Meeting 3.3	22 June 2016	Director and staff, KIRMA Director and staff, DTI IPIC and ODA Utwé Community and landowners	<ul style="list-style-type: none"> - Brief update of the proposal - Support to development of the proposal to SPREP provided by the USAID USADAPT Asia-Pacific Project - IPIC, ODA acknowledgement of endorsement by Kosrae State of the Malem-Utwé road under the AF proposal as one of the top two priorities of infrastructure requiring immediate support for implementation - Re-affirmation of the priorities of the project by the Utwé Municipal government, women, men, elders, youth, landowners of the community of Utwé
7Site Visit	23 June 2016	Malem-Yeseng-Utwé inland road, access routes, ADB Utwé Water Reservoir, Kuplu Wan plateau where road will access, coastal points Paal and Mosral, settlement areas, upland areas	<ul style="list-style-type: none"> - Visited Palusrik catchment in Utwé municipality - Visited inland roads that are accessible of the Malem-Utwé inland road stretch, including Kuplu Wan plateau - Visited all access routes coastal-inland - Visited PACC Tafunsak climate-proof road

I Justification for funding

Provide justification for funding requested, focusing on the full cost of adaptation reasoning.

The design of the four components is largely influenced by results of the consultative and follow-up visits as outlined in Section II.H of the proposal.

Component 1. Strengthening policy and institutional capacity for integrated coastal and water management at national and state levels

Baseline Scenario

The 2009 national climate change policy exists at the national level and only one state – Kosrae - has strengthened its state legal and regulatory policies. This was possible under the PACC project and it became successful as it is now guiding and regulating development projects of the State. The Okat Bridge in Kosrae (\$12.7 million in FY2014) was the first development project to have applied the regulation.

FSM has been carrying out coastal zone protection and enforcement of existing regulations largely through EPA (and KIRMA for Kosrae). The regulations are, however, based on scope and frameworks of EPA United States of America, many of which are not applicable or the resources required by the island to effect these regulations are not realistic.

There are initiatives that are carried out in isolation and ‘in-silos’ that require a concerted effort from a project of all of FSM. For example, the ecological surveys and monitoring activities in Yap State only will have benefited if there were enough resources to monitor and implement any actions identified, in particular, with coastal marine resource management program for the fishing population on the island.

Where initiatives exist to protect the island coasts including low-lying atoll islands, these are carried out relatively through an individual approach. There is less or no concerted effort to identify and demonstrate activities that are done in an integrated fashion.

Yap, Chuuk and Pohnpei currently do not have state-level policy frameworks, let alone legal and regulatory instruments that have climate risks incorporated, enforced or monitored. As a result, development in these three states, in particular construction and infrastructure related, 95% of which are along the coastal and urban areas are carried out through a business-as-usual approach development.

The current generation’s experiences with their water, coastal and marine resources have been voiced at community consultations of the project. There are no management plans at the island community levels to assist in managing these natural resources, against threats of climate change. There are community calls and recent scientific studies that have concluded the urgent need for water and coastal management plans if good quality drinking water, coral reefs, fishes are to provide any support for food security for the outer islands.

Review and assessments of legal and regulatory frameworks and instruments is needed by the government and states in order to position it strongly to implement mainstreaming of climate risks into its sector development programs.

Adaptation Alternative

The project is planning to develop a national legislative draft, regulations for development projects for Yap, Chuuk and Pohnpei as a lesson learned from Kosrae under its PACC project. It will develop a legislation draft and policy paper to strengthen the concerted effort to manage coastal and water resources as a whole of country response to climate change. This is budgeted at \$325,000 USD

The project will develop a National Water and Sanitation Policy, and implement two components of the policy. These are the National Water Outlook and Water Sector Investment Plans. The development and implementation of these two components of the policy will be integrated with and inform the demonstration activities of the outer islands in Component 2 and altogether,

budgeted at \$442,642 USD. The lessons learned and best practices from activities in Component 2 will inform and improve the policy. All these activities will incur high costs because of the extensive consultation meetings and logistical and procurement costs involved due to the vast distance and isolation of the four states, and the time required to carry out, development, consolidate, produce and implement the two components of the plans.

The total cost for delivering legislation and regulation changes, as well as providing the tools, scope and frameworks to deliver effective management of coastal, marine and water resources is budgeted at \$767,642 USD.

Component 2 – Demonstration of water security measures in outer islands of Yap, Chuuk and Pohnpei

Baseline Scenario

Of the six outer islands, only Kapingamarangi atoll of Pohnpei attempts to address climate change adaptation in its community development plan. A portable water reservoir system is the number one climate change adaptation priority activity for Kapingamarangi according to its 'Utamadua Development Plan' 2015. This is followed by shoreline erosion prevention, food security and natural disaster preparation.

All of the six outer islands have rainwater harvesting systems but are either no longer in use, in poor condition, cannot be maintained or harbour harmful pathogens that carry vector and water-borne diseases. Within one month of drought, the communities resort to drinking coconut juices to quench their thirst. Stagnant water in water tanks and saline water from wells are used for washing and cooking. Women and youth are required to fetch for water from neighbours or travel long distances to fetch water from dry and salinated wells. Rainwater harvesting systems often do not have spare parts available on island to assist with maintenance. Concrete tanks and cisterns are no longer supported by the communities as a feasible option to store water. It is difficult or useless to maintain and takes up valuable space on island that becomes useless for any development.

The six islands either have bush, pit, VIP, water seal, flush / septic or no toilets at all. The islands that do not have any toilet facilities use the lagoon or the ocean side beaches. The safety and health concerns on both the environment (lagoon side beaches, mangrove areas, terrestrial ecosystems) and people (hepatitis, polio, salmonella, e-coli, giardia, round worms, whip worms, etc.) are therefore a high concern with the Ministry of Health for these outer islands. In times of drought and other climate change impacts, these negative health and sanitary effects have been exacerbated. Other toilets that require water puts pressure on individual family-owned water tanks and therefore compete with washing, cooking and other needs.

Adaptation alternative

Investing in repairing of existing household and private rainwater harvesting systems by providing equipment, training and establishing maintenance support plans and educating all members of the community will assist in expanding and maintaining good supply of drinking water that will prove useful during drought periods. This was the highest recommendation from the recent rapid assessment of water resources in the outer islands of Yap following the drought experienced as a result of the 2015/16 El Nino. The project will, at the same time, review and recommend installation of a minimum of 2 community tanks at 10,000L capacity to serve a minimum of 100 people population. This will provide enough potable water to also cater and meet not only the minimum threshold of water per capita for survival (30L/capita/day) but also

able to water plants, crops and feed livestock (70L/capita/day). At the household level, the project will ensure through its ground-truthing assessment that repair and installation will allow for a minimum of two storage tanks. This will assist with interchangeable maintenance schedules. Where one tank is emptied and maintenance carried out, the other tank is being used. The same approach will be applied for community tanks.

Saving water and promoting health and sanitation habits is an adaptation strategy that the project will apply at the individual and household level that is very much required and will become useful when impacts of climate change are at its worse. The project will target the younger generation to build this habit and impact behavioural change. As such, the installation of self-composting toilets aims to promote water conservation, improve health and sanitation, as well as improve the island environment, through a significant reduction in pollution of the water ways and reefs. It will demonstrate the construction of self-composting toilets at schools and other community infrastructure such as community halls or church buildings.

The six target islands of the three states are distant from the main islands where the key government and central business district is located. Logistics and procurement activities will cost the project significantly, in areas such as transportation and communications and time. The consultations, and ground truthing social and environment assessments will take time and will require expert involvement to identify and demonstrate adaptive agriculture crops, water harvesting, and coastal marine resources management practices. Over the duration of the project, it is expected to incur costs totalling \$2,479,226 USD.

Component 3 – Demonstration of Kosrae Inland Road Relocation Initiative

Baseline Scenario

A full review of the Kosrae coastline has been carried out. The review has led to the development of the Kosrae Shoreline Management Plan 2014 which has since been endorsed by the Governor of the State.

A number of priority interventions were identified and, in following up for upscaling of the PACC project results, all stakeholders (communities, government, NGOs, etc.) agreed to the priority intervention measures of the PACC project be implemented.

Adaptation Alternative

The people of Malem and Utwe community have clearly outlined, reiterated and repeated themselves in saying for the need to implement the priorities identified in the KSMP 2014. The communities and government had identified five key outputs to be implemented to achieve the alternative of relocating the coastal road inland. After a series of community and government consultations spanning two years, the construction of the 3.6 mile (5.8km) Malem-Utwe inland road and access road routes is to be carried out in two phases as agreed by all stakeholders.

The first phase it to construct to substrate base standard road, and the second phase is sealing of the road. A series of surveys, design and construction will be implemented by the project in close collaboration of government and community stakeholders. The activity will cost the project a total of \$3,005,474 USD to be implemented over the course of three to five years. While the increase in sea level rise will mean destructive storm surges in Mosral and Paal in the immediate term and throughout the next five years, the project will upgrade the protection of these vulnerable points of the existing coastal road. This important alternative activity will cost \$315,000 USD.

Kosrae requires a proactive enabling environment that will support the community and people in accessing land and finance to assist relocation in the immediate to long-term. This will be carried out by the project, contributing to the adaptation objective to move to safe grounds in view of accelerating sea level rise and its related effects. The state support programs to access land and access finance for vulnerable households will be carried out. Training and awareness of conservation practices and sustainable practices for the communities is equally important as the ecosystem and surrounding environment will need to be protected, monitored and sustainably managed. Together, the total cost is \$200,000 USD and altogether, Kosrae's IRRI program will cost the project \$3,520,474 USD.

Component 4 – Knowledge management for improved water and coastal protection

Baseline Scenario

All States of FSM have projects that provide lessons and information only for the project and is largely for visibility of the project during the time of the project. There is no programmatic approach and institutional and systemic capacity program that ensures climate change information continues to be made available and produced for the benefit of the communities and state in water and coastal zone management areas.

Yap, Chuuk and Pohnpei have programs and schemes that promote water conservation but is business as usual and do not have climate change clearly incorporated. Some outer islands, for example, Kapingamarangi have their own community development plans. These address economic and social development, and political reform. Climate Change adaptation, however, is only addressed under the economic development section. Climate change is not seen in a holistic manner in these development plans.

Kosrae State have, during the conceptualising and planning stages of this project, decided on the importance of addressing climate risks in infrastructure plans and community development plans.

All islands have resources in English and less in the local context. Traditional knowledge is also not equally captured as the science and social science of the impacts of climate change.

The mainstreaming of climate change in national and state curricula is carried out voluntarily and there are no specific and targeted materials that will improve climate education amongst the young and future generations of FSM.

Capacity development in terms of training personnel in key sectors of society and the economy on climate change is addressed largely at the project level. There is no programmatic approach to building capacity within the water and coastal sector with the exception of Kosrae for the latter development sector.

There is a technology framework that has already been developed and assisted to by regional partners of FSM. For example SPREP developed a knowledge management online database through the Pacific climate change portal (<https://www.pacificclimatechange.net>). These will be used to store and capture information developed and collected by the project.

Adaptation Alternative

The project will address the institutional, individual and systemic capacities of key stakeholders (governments, NGOs, communities) to be able to develop, capture and disseminate learning and knowledge from the project outputs.

Systemically, the project will invest in climate resilient municipality development plans that will address sustainability in responding to climate change during and beyond the life of the project. It will consult, solicit and collate views of all stakeholders under each plan. The plans will be linked to outer island plans and outer island development goals of sector plans owned by the state. The project will ensure linkages of these community development plans to state plans relative to water and or coastal and marine management. It will ensure that community development plans link its goals to those of the water and sanitation policy, regulations for development project and other relevant legislation and regulatory frameworks that address climate change. It will link the plans to the national climate change policy. It will set realistic goals that are achievable with support of development partners and secure political will and commitment of local municipality, state and national governments. This activity will cost \$205,332 USD addressing all eight municipality communities of the project.

The project will capture lessons learned and best practices at the legislation, regulatory and governance levels. It will capture and share knowledge management products that capture demonstration practices of water and livelihood security measures, as well as inland road relocation initiatives. The products will be shared and disseminated amongst local, state, national, sub-regional and regional levels. The products will be tailored to local context, translated, published and shared amongst various stakeholders. This will allow usability amongst a wide range of audience in the FSM and the Pacific. The development and distribution of resource materials will be budgeted at \$238,943 USD under the project.

Stakeholders from each of the states will come together to share, learn and exchange knowledge and skills on climate change, adaptation planning, monitoring, vulnerability assessments and climate change. Institutional and individual capacity will be built via a number of trainings, lessons and learning workshops of the project. The knowledge and skills built from these workshops will engage the national, state and local teams deliver on the adaptation activities of the project. Exchange visits to sites will be a key part of building knowledge and sharing it as quick as possible. These will allow exposure to methods, tools, hands-on learning of the various coastal management techniques that are available and being trialled at the different island environments of the project. The project will focus on enhancing two-way communication between scientists and traditional knowledge holders, educating the modern scientists and appreciating knowledge of the indigenous beneficiaries in natural resource management in the outer islands. The sustainability, relevance, effectiveness and efficiency of the project will rely on a large part to this component that will complete the bottoms-up and top-down approach of the project. This share, learning and exchange of knowledge activities are budgeted at \$295,296 USD.

J: Sustainability

Describe how the sustainability of the project outcomes has been taken into account when designing the project.

The project has, over the course of the concept and planning stages - December 2013 until June 2016, gathered strong community, government, political and partnership support to push for and put in place measures to sustain the investments of the project. Through a community consultation to reconfirm priorities, all stakeholders agreed to redesign the project to ensure elements of sustainability are incorporated. As such, the project has incorporated sustainability

practices and activities that will ensure the investments it are sustained beyond the life of the project, and are resilient to future climate change.

Project Redesign

Stakeholder discussions that ranged from the individual women, men and youth of the municipalities, to community based organizations such as traditional leaders to the highest political support from the Vice President of FSM; His Excellency Yosiwo George resulted in changing the design of the project from three components to four. In order to capture the process and results of the project, a knowledge management component must be explicit in the design of the projects, managed from state to community level. The lessons and practices from the community level will be captured and used to inform the policies at the mainstreaming, state and national government levels.

Sustainability: Legislation, regulation and policies

Strengthening legislation, regulations and policies at the national level to address and respond to climate change impacts on coastal and water sectors will impart two sustainability benefits. Firstly, from a bottom-up approach, it will strengthen FSM's stance on responding to climate change threats as a nation, contributing to the region's solidarity efforts to mainstream climate change and disaster risks into its development. FSM's position and stance on enhancing resilience will attract development and bilateral partners to invest in a climate resilient development for FSM. As a result, it will help implement its goals under the Paris Agreement and set a process of mainstreaming climate into policy, to achieve its intended nationally determined contributions under the UNFCCC. It will, at the same time, sustain support of it's the top-down benefits as a result.

In spite of the autonomous governance at the state level, a national legislation will channel support of resources to protect and conserve its natural resources, and promote climate resilient development of its people, at the capital and outer island communities.

State regulations for development projects will support national legislation and implement best practices, replicated from the Kosrae example. Future development such as infrastructure projects, along the coastline of the main islands as well as the outer islands will need to comply with these regulations. Policy and guidance documents that will be identified and or those existing, are linked to these regulations will help development partners and those providing technical assistance to FSM, to comply.

The National Water and Sanitation Policy will strengthen the work of the National Water Task Force. This will now provide continuous basis of the Force to continue its work through proper training, institutionalisation of processes, and implements components of the policy. These include the Water Outlook Program and Water Sector Investment Plan. The latter plan is a sustainability plan in place for the water sector of FSM. It will be the platform that all stakeholders, including development partners will need to work from in providing technical and funding assistance, resource and services to the water sector. The project will work to mainstream climate change in to the investment plan to ensure future investments are climate resilient.

Sustainability: Climate Change adaptation plans in six island communities for optimal management of resources

The activity to develop climate change adaptation plans for the six outer islands of Yap, Chuuk and Pohnpei is a popular community suggestion that has been incorporated into the project design to address exactly the issue of sustainability. The community group themselves raised the issue of addressing their water priority and other important concerns such as health, nutrition, outer-island migration, transportation, communications, yet are outside of the scope of the project. Other communities wanted to review their existing community development plans, and incorporate climate change.

The climate change adaptation plans will be an overarching plan that allows other priorities of the islands to be captured and targeted to reduce its vulnerability from impacts of climate change. The plans will contain a strategic results framework and action plan matrix that will assist its development partners to fund and implement its work activities and at the same time, align the activities of its government sectors. The plan will therefore allow continued support of activities of the project once it has been closed.

The plans will be linked to state sector plans and will be aligned to the national climate change policy, and linked to legislation and regulations relating to water and coastal management. This will ensure that the state and development partners will recognize and continue to support the adaptation needs of the islands beyond the life of the project.

In the latter stages of the project – Years 3, 4 and 5, the project will undergo a review of the plan. This will allow a review of what has been achieved, lessons learned and how to secure support for implementing any urgent and future activities.

Sustainability: Water Harvesting and storage systems

Building the capacity of the community through training on how to repair, clean, care and maintain parts of their water harvesting systems will ensure long-term use of the 20 year shelf-life of the water tanks. Each island will have spare parts stored in an island governing council storage facility. A maintenance schedules will also be incorporated into the training, and the island's water committee that will be set up, will assign roles and responsibilities to members of the community in caring for their assets.

The water harvesting systems themselves will be made resilient to climate change by locating them in safe localities around the island for community tanks. The individual household water tanks will be assigned two HDPE tanks. This will serve two purposes; allow serviceability of one while the other is being used. This is useful when drought is expected and one other tank provides the sustenance. There is also the fifty percent chance of one of the tanks to survive a typhoon/hurricane. The minimum of two x 10,000L HDPE tanks per island population of 100 has been calculated to suffice the community with safe drinking water. Again, when one other tank is being emptied and cleaned, one other suffices the supply, easing the pressure on individual family water tanks. HDPE plastic themselves are known for stiffness, strength, toughness, resistance to chemicals and moisture, permeability to gas, ease of processing, and ease of forming. It can therefore withstand high temperatures and salt spray conditions. The project will ensure these assets are sheltered, secured and protected.

In response to accelerated sea level rise within the next 10-20 years, the ground-truthing assessment that will be carried out will determine the location where the tanks will be safe from threats of erosion, king tide high wave impacts, wave over topping and over washing

Sustainability: Self-composting toilet programs

The protection, security, maintenance provided to the water harvesting and storage systems will also be applied to the self-composting toilets. Training and educational, awareness and media campaign programs on island will assist with awareness, acceptance, and proper treatment of the facilities. This will ensure sustainable use of the toilets.

These investment themselves will be made resilient from future climate change by constructing the infrastructures away from areas where they are exposed to high wave over topping, overwash, erosion of ground soil and protected from the sun as much as possible.

The installation at schools program has shown to be successful in Nauru and Tuvalu. Results show that the use of self-composting toilets is highly successful when installed at the community level relative to household level. It is more so in outer islands – atoll environments, than on main islands /volcanic settings. Monitoring and maintenance program will be developed to allow for results to be shared. This will encourage change of behaviour and promote good conservation habits, for water, soil and the environment.

Sustainability: Teacher's Guide on Climate Change

Developing a Teacher's guide on climate change, contextualised to outer islands and state level has shown from application in other Pacific island countries, to be successful in developing awareness and understanding of the issue of climate change.

The five year period of the project will not be enough to develop a fully-fledged curriculum on climate change to be applied at the primary and high school levels. This project therefore is to contribute to developing materials that will target this long-term goal by the Department of Education. The development of, and translation into the local languages ensures the results of the teaching and training will be more sustaining, than simply printing, publishing and disseminating the knowledge product.

Sustainability: 3.5 miles (5.8km) of Malem-Utwe inland road and access routes constructed to sub-base roading standard for future relocation

According to the cost benefit analysis report carried out under the PPCR project, the road could be expected to benefit communities beyond the 50 year period of the analysis, benefitting the community for generations to come. Repositioning the road to higher ground ensures a long-term sustainable all weather access for the whole community as well as removing a significant barrier to the long-term development and relocation of residential property to higher ground.

The investment itself will be made resilient to climate change by climate proofing the design and avoid risks and hazards as a result of impacts of climate change. The alignment of the road has been designed to be well above any potential impacts of sea-level rise and coastal hazards over at least the next century based on guidance in the Kosrae Shoreline Management Plan which has been incorporated in to January 2014 amendments to the *Regulations for Development Projects*. This requires new infrastructure on the volcanic parts of the island to be at an elevation of at least 4 m above mean sea level datum of Kosrae, which is approximately around

2 m above mean high spring tide level. The alignment of the road is typically at the 10 m contour and should minor shifts be required during the detailed survey it should not extend below the 4 m contour or require fill of land areas below the 4 m contour⁵¹.

Further, to improving the resiliency of the road to impacts of climate change, the next phase of construction will be to upgrade the Malem to Utwe inland road to hot-mix asphalt. The Kosrae State Government will be securing its development partner, through assistance of the national government, at FSM's Development Partner's Forum in May 2017 to carry out this second phase of the road (Annex 8).

Sustainability: Transitional coast protection at Mosral and Paal upgraded

Upgrading of the coastal protection at Mosral and Paal will buy time' not only for the project to carry out the first phase of the inland road construction, the second phase in tar sealing the road, but also to allow people to voluntarily resettle inland and discourage further development along this coastline. At present, around 120 metres of road at Mosral and 200 metres of road at Paal are critically exposed and at risk of being breached at any time. Such a breach cuts off the village of Utwe (population approximately 983) and removes road access to Walung (population approximately 268), as well as potentially disrupting utilities (power and telecommunications) which run parallel to the road. It is assumed for illustrative purposes that, because of the perilous state of the road around Paal and Mosral and towards Utwe, the revetment is be implemented immediately and the road is replaced now over a two year period, subsequently being replaced again in re-replaced 35 years' time (the average of 30 and 40 years)⁵².

Sustainability: State support programs to access land and finance

The state support programs are themselves sustainability measures to facilitate the government support for voluntary resettlement from the community. The project will develop the content of the support programs for the state. It will not be a means to an end, rather it is to initiate an obligatory role of the State government for the welfare of its communities and protect them from impacts of climate change.

The project will review the support programs towards the latter half of the project; to ensure the institutional set up and relevant capacity and consultations developed and carried out within government and with private and business community stakeholders. This will facilitate opportunities for people to be able to relocate voluntarily overtime.

Based on consultations with the communities concerned (Annex 5) community members are completely in favour of relocating because the threat of coastal inundation and harm to person security, health and well-being is high. Discussions were held with government representatives – some of whom are based in the affected communities – to consider potential scenarios for relocation, should an inland road be established. Based on these discussions together with discussions with the State Government of Kosrae (Lipar George, personal communication, October 2015), a *conservative* base case relocation rate was estimated in which two

⁵¹ Environment Impact Statement, Department of Transport and Infrastructure, Kosrae State Government, 2016

⁵² Cost-Benefit Analysis In Coastal Zone Management In Kosrae (FSM): Economic Assessment Of Coastal Road Relocation In The Face Of Climate Change, SPREP 2016

householders relocate every five years *following the completion* of the road. This would result in an average relocation over fifty years of 18 households (18 per cent)⁵³.

Sustainability: Community-based Ecosystem Management

The project will facilitate a community-based ecosystem management program at the outset of the project with communities. The activities will be a replication of activities already carried out under similar ongoing programs facilitated by the Kosrae Conservation Safety Organization (KCSO). In fact, KCSO will be the lead responsible agency for implementing the program for Malem and Utwe. It will build on lessons and practices from other programs that have been completed and ongoing. The women, youth and schools will be lead community beneficiaries of the activities.

Community ecosystem based adaptation activities that will help manage road construction impacts on the environment will include fringing mangrove restoration / protection / and permitting. Also spatial planning for expanding / creating new upland/mangrove/nearshore coastal protected areas. To address sustainability of the activities, the project will aim to reduce vulnerability of food security and avoid unintended impacts of relocation by creating and improving community gardens, nurseries and raise awareness about climate-resilient food crops and nutrition. Project financial management skills for women, men and youth will be encouraged. This will ensure sustainability of activities beyond the life of the project, as management skills in food and nutrition, and improved knowledge on the linkages of food security and ecosystem services provided by the upland forested areas will ensure a well-managed resource.

The management activities themselves will be made resilient to future climate change impacts by implementing community-based risks management responses to risks such as landslides, flooding, and agricultural development. For example, regulation of timber harvesting, water catchment activities, requirements for agriculture buffer zones, control of pesticides / herbicide use, and more. The skills and knowledge in reduction of these risks will be institutionalised by the project through integrating these into roles and responsibilities of the various community based organizations of the project.

Replication and Scaling up

The institutional arrangement for implementation of the project is based on the institutional capacity and its operational mandate given by State and National Government. This will help to synergise the outcome in future plan and policy of Government. Based on the data and analysis that will be undertaken during implementation, the viability, sustainability and replicability of the model will be tested.

The capacity of the executing entities at national, state and municipality / outer island level, particularly the institutional capacity has been designed to allow for future and similar programs to be operationalized. The institutions, that include Working Committees, department management units on water, roading construction will synergise these works in future plan and policy of Government. In Kosrae, the project is already replicating the climate-proofing of road infrastructure. It will continue to improve on the process building on the capacity of individuals that started with the PACC project. The situation is similar for water-related projects of Yap, Chuuk and Pohnpei. It is already learning lessons from GCCA: PSIS project and has

⁵³ ibid

incorporated this into its design. It has learned to plan around transportation and logistical schedules with the Department of Transportation when organizing for shipments of equipment and services to the outer islands.

The process documentation and evidence-based assessments and studies, gathered from monitoring activities as well, will provide the necessary information to develop peer-reviewed information and knowledge products that users, including academic institutions, policy and decision makers at all levels, will capitalise on and enable wider replication of success stories from the project.

K Environment and Social Impacts and Risks

Provide an overview of the environmental and social impacts and risks identified as being relevant to the project / programme.

CHECKLIST OF ENVIRONMENTAL AND SOCIAL PRINCIPLES	JUSTIFICATION	POTENTIAL IMPACTS AND RISKS
1 Compliance with the Law	<p>No</p> <p>The Project complies with the FSM Environmental Protection Act 1999 (FSM EPA 1999); Environmental Impact Assessment Regulations 1989;</p> <p>Further the project complies with Yap State Environmental Quality Protection Act (Y.S.L. 3-73); Kosrae Regulations for Development Project (No. 67.05); Kosrae State Building Code (Section 11.2104); Chuuk EIA Regulations (CSL 2-94-0)</p>	None
2 Access and Equity	<p>No</p> <p>The project will provide fair and equitable access to the project benefits for men, women and children across the target communities, and will not impede access to any of the other requirements like health clean water, sanitation, energy, education, housing, safe and decent working conditions and land rights.</p> <p>The project ensures that women, men and youth, including people living with disabilities have equitable access to capacity building activities (training, meetings, surveys, monitoring) and project benefits.</p>	None
3 Marginalized and Vulnerable Groups	<p>No</p> <p>The project works with and supports vulnerable groups that have limited capacity to withstand impacts of climate change. The vulnerable groups include women, girls, children, men,</p>	None

	<p>elderly, and people living with disabilities living in atoll island environments and those that do not own land in upland areas. The project interventions pose no risk to the vulnerable groups. The project has incorporated into the decision making bodies of the project key representatives of each of the vulnerable groups. There are no marginalized groups in FSM such as those groups in other societies that are excluded from normal economic / social fabric.</p>	
4 Human Rights	<p>No</p> <p>The Project is in compliance with all applicable FSM and international laws relating to human rights.</p> <p>The proposed interventions respect and where applicable, promote international human rights. It does not foresee any violation of human rights</p>	None
5 Gender Equity and Women's Empowerment	<p>Yes.</p> <p>The design of the project and in particular community and stakeholder consultations has ensured equal and active participation, however, there is a risk that gender may not be mainstreamed into the Framework for National Water and Sanitation Policy for the FSM, the National Water & Sanitation Policy, National Water Outlook Program (activity 1.4.1), and the Water Sector Investment Plan (activity 1.4.2).</p>	Low
6 Core Labor Rights	<p>No.</p> <p>The Project is in compliance with all applicable FSM and international labour laws. All labour payments including ad hoc labour payments will adhere to State laws as promulgated by labour regulations defining the relevant wage rate, workers benefits and other relevant working conditions.</p>	None
7 Indigenous Peoples	<p>No.</p> <p>All applicable international and national instruments relating to indigenous peoples would be adhered to by the project.</p> <p>Component 3: All landowners affected by activities proposed in Component 3 of the project have been fully involved during community consultations in the planning stages and have committed to providing easements for the inland road. This was re-iterated each time consultations were carried out during the planning stages of this project (2014, 2015, and 2016).</p>	None
8 Involuntary Resettlement	<p>No.</p> <p>No project components require involuntary resettlement. The</p>	None

	inland road between Malem and Utwe is adjacent to 7 properties and the indicative line and easement of the inland road has sufficient space to align the road and avoid any relocation or removal of property.	
9 Protection of Natural Habitats	<p>Yes.</p> <p>Component 3: The possible risks from inland road construction (activity 3.1.1) may include habitat destruction, including removal of any large tree species particularly endemic species such as Nunu (<i>Horsfieldia</i>), mangrove or wetland ecosystems. The coastal defense activities (coastal revetments) (activity 3.2.1) may impact on mangrove strands.</p>	Low to moderate
10 Conservation of Biological Diversity	<p>Yes</p> <p>Component 3: There is risk of increased sediment run-off and siltation impacting on down stream ecosystems including streams, wetlands, mangrove & coastal areas, as a result of construction work of the inland road (activity 3.1.1). There is potential increase in localized suspended sediment in the water column at high tide as a result of removal of the existing emergency armour material and re-grading the underlying beach (activity 3.2.1). This may impact on beach and coastal ecosystems. The project would not, however cause any impact on bio-diversity values overall.</p>	Low to moderate
11 Climate Change	<p>No.</p> <p>The project will not result in any significant increase in greenhouse gas emissions.</p>	None
12 Pollution Prevention and Resource Efficiency	<p>Yes.</p> <p>There will be minimal material waste generated from the construction works under Component 2. It will include timber and other materials that will be re-used by the project and community.</p> <p>The inland road construction (activity 3.1.1) and coastal road defenses (activity 3.2.1) will generate waste materials including cleared vegetation, topsoil and geotextile materials. There is potential for surface and groundwater contamination from release or spills of fuel and lubricants during fueling and maintenance of construction equipment.</p>	Low to moderate
13 Public Health	<p>Yes.</p> <p>The risks include unlikely possible injury to the community / public from construction works, contamination of water sources, and public health disease out-break. Prevention, precautionary and participatory approaches are taken</p>	Low

nonetheless to safeguard the community and public.		
14 Physical and Cultural Heritage	<p>Yes.</p> <p>While FSM does not have any World Heritage sites⁵⁴, the project will aim to be in compliance and identify any potential un-surveyed cultural or historic sites to conserve.</p> <p>Component 3: During the initial walkover of the road alignment with staff from the Historic and Preservation Office of KIRMA, no cultural or historic sites were identified. There may, however, be cultural and historic sites that may not have been identified in the initial walkover. The project will refer to relevant agencies if cultural and historic sites are identified during the construction stages. Some very minor shifts in the road alignment may be required at this stage over short sections (within a few 10s of metres) and will <i>not impact</i> on the findings of the EIS.</p>	None to Low
15. Lands and Soil Conservation	<p>Yes.</p> <p>Component 3: Construction activities 3.1.1 and 3.2.1 have potential for increased surface erosion of soils from areas cleared of ground-cover vegetation. For activity 3.1.1 there is the potential for catchment drainage pathways to be impacted from changes to drainage alignment, and increased surface-water and sediment runoff.</p> <p>The impacts of the transitional coastal defenses in Paal and Mosral (activity 3.2.1) may include increased suspended sediments in the nearshore water column and the potential for exacerbated erosion along adjacent (downdrift) sections of coast. The latter has been addressed in the design of the revetment to ensure the transition between defenses and beach does not exacerbate downdrift erosion.</p> <p>The defenses will be, as identified by the initial screening, affected by climate change impacts, particularly – the loss of land associated with ongoing shoreline change or coastal erosion, coastal flooding from high tides, large swells, storm or typhoon-related events; exposure of people or property to water related hazards such as flooding or tidal waves; and the effects of sea-level rise or other climate change influences of the hazards abovementioned.</p>	Low to Moderate

There are four out of the fifteen ES principles of the Adaptation Fund show a risk rating of '**low to moderate**' and include Protection of Natural Habitats (ESP9), Conservation of Biological Diversity (ESP10), Pollution Prevention and Resource Efficiency (ESP12) and Lands and Soil

⁵⁴ 10A: Final report on the results of the second cycle of the Periodic Reporting exercise for Asia and the Pacific, UNESCO, Periodic reports, whc.unesco.org/archive accessed on 30 July 2015

Conservation (ESP15). Gender Equity and Women's Empowerment (ESP5) was identified as important to be mainstreamed into FSM's National Water & Sanitation Policy and executed within its follow up activities namely the National Water Outlook Program (activity 1.3.2) and the Water Sector Investment Plan (activity 1.4.2). The risk for ESP5 and Public Health (ESP13) is **low**. Physical and Cultural Heritage (ESP14) has **none to low** risk rating.

In view of this, the project is categorized as "**Category B**". To ensure that the project conforms to the AFP's Environmental and Social Policy (approved in November 2013) an Environment Social Management Plan (ESMP) has been developed (Annex 7) to manage the impacts and risks of the project throughout implementation. A precautionary and prevention approach has been applied in management and mitigation measures to address all risks as outlined in the ESMP.

PART III: IMPLEMENTATION ARRANGEMENTS

A Institutional arrangements

A. Describe the arrangements for project / programme implementation.

The project will implement its activities through the four levels of governance of FSM – National, State, municipal, and traditional. The municipal and traditional levels are really one and the same. This project will refer to the municipal communities of Malem and Utwe of Kosrae state as municipals. It will refer to the six outer islands of Woleai and Eauripik (in Yap), Satawan and Lukunor (in Chuuk), and Nukuoro and Kapingmarangi (in Pohnpei) as traditional or the outer island level.

The institutional arrangements will have clear lines of authority from the RIE to the communities who are the key beneficiaries of the project. The arrangements will also ensure that the objectives of the project contribute directly to FSM's climate change objectives.

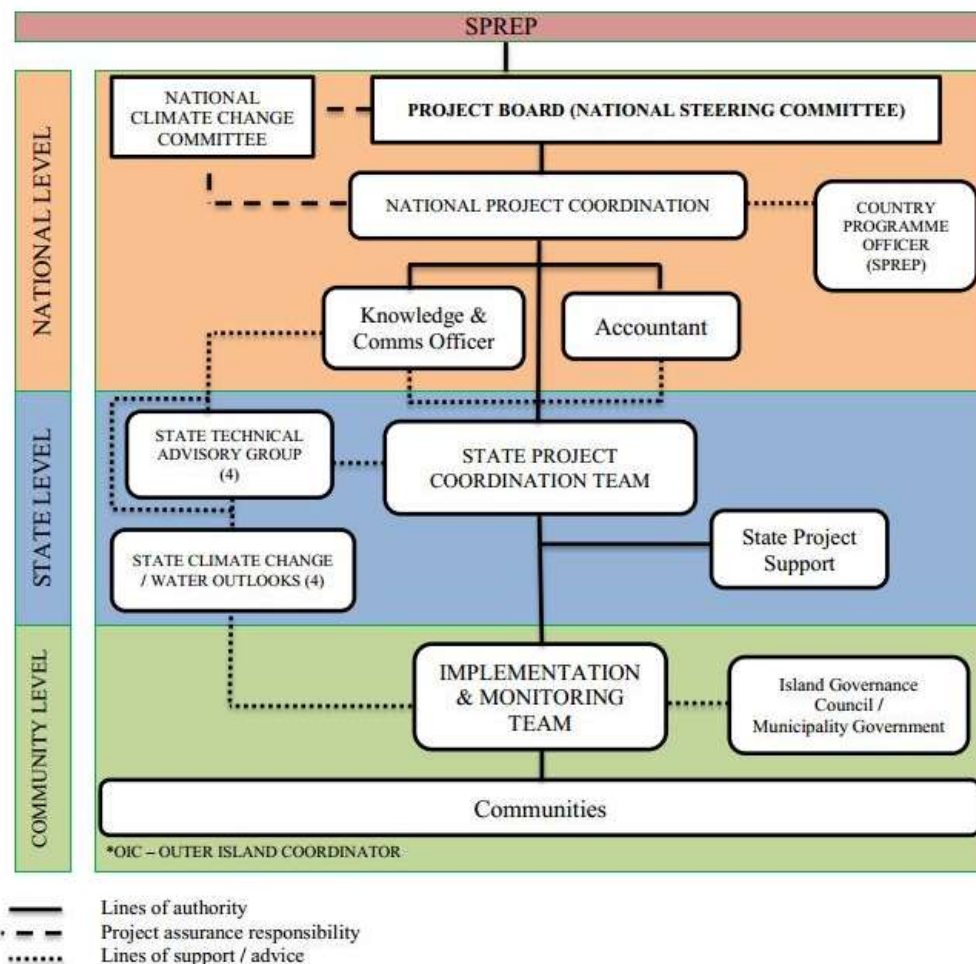


Figure 18. Institutional arrangement for the project

The Executing Entities of the project are:

- Office of Environment and Emergency Management (OEEM) at the national level

- Kosrae State Government in Kosrae
- Pohnpei State Govt in Pohnpei;
- Yap State Government, Yap; and
- Chuuk State Govt, Chuuk

In summary, the institutional arrangements and their roles and responsibilities under the project are as follows:

Table 20. Roles and responsibilities of the project management

INSTITUTIONAL STRUCTURE	COMPOSITION/MEMBERSHIP	ROLE AND RESPONSIBILITY
Project Board (PB)	<p>Senior officials from OEEM; Department of Resources and Development Yap; Environment Protection Agency Chuuk; Environment Protection Agency Pohnpei; Kosrae Island Resource Management Authority (KIRMA) Kosrae; Department of Transport & Infrastructure Kosrae; Office of Development Assistance (ODA) Kosrae; Office of Attorney General, National Government; SPREP as RIE</p> <p>Observers: Micronesia Challenge, IOM, MCT, COMS FSM SPC NPRO, UNDP, GIZ</p> <p>Substitutes: National government representatives of R&D, EPA, DTI, KIRMA, ODA</p>	<ul style="list-style-type: none"> • Being accountable for the success or failure of the project in terms of the objectives of the project • Providing unified direction to the project. • Approving the resources and authorizing the funds necessary for the successful completion of the project • Ensure effective decision making • Providing visible and sustained support for the National Project Manager • Ensure effective communication both within the project team and with external stakeholders • Provide assurance that all activities have been delivered satisfactorily • Approve the Terminal Report and ensure that any issues, lesson and risks are documented and passed on to the appropriate body • Support approval of project closure and send project closure notification to SPREP as RIE.

INSTITUTIONAL STRUCTURE	COMPOSITION/MEMBERSHIP	ROLE AND RESPONSIBILITY
State Technical Advisory Groups (STAGs)	<p>Experts with qualification and experience in:</p> <p>Legislation & Regulations</p> <ul style="list-style-type: none"> • Institution Development Specialist • Environment Legislative and Regulation drafters • Climate Change Scientist • Climate & Environmental Law • Water Sector • Water Engineering • Rainwater harvesting systems • Outer island development • Civil Engineering • Atoll Island Soil Scientists • Gender and Education • Climate Education Specialist • Curricula Development specialist • Gender & CC Trainers • Coastal Infrastructure • Civil Engineering • Agricultural Engineer • Geo Hydrology • GIS Specialist 	<ul style="list-style-type: none"> • Provide technical inputs to the team members • Assess relevance and impact of the climate adaptive strategies and advice the NPD, NCCC and NPM • Make recommendation to the Project Team on technical matters to incorporate into activities and implementation plan <p>Each STAG will be constituted for the purpose of the project and will be convened by the Project Manager to draw upon the expertise from this group</p>
Climate Change / Water Outlook Advisory Group (WOG)	<p>Experts with qualification and experience in:</p> <ul style="list-style-type: none"> • Water Engineering / Specialist • Climate Forecaster / Seasonal Climate Forecasting • Geo / Hydrologist • Climate Modeler • Programmer 	<ul style="list-style-type: none"> • Provide technical and advisory information to inform decisions of the STAG • Provide timely information and advice to the KCO to the project team • Provide three monthly advance advice on climate and water outlooks for project sites / islands <p>The WOG will be constituted for the purpose of the project and for implementing the National Water Outlook Program of the Water Policy. It will be convened by the Project Manager to draw upon the expertise from this group to provide advice to the water priority state activities.</p>

INSTITUTIONAL STRUCTURE	COMPOSITION/MEMBERSHIP	ROLE AND RESPONSIBILITY
Country Programme Officer (CPO)	The CPO will be based at SPREP.	<ul style="list-style-type: none"> • Advise on selection of project team members • Advise on stakeholders engagement • Ensure that the Communication Management Strategy is appropriate and that planned communication activities actually take place
Country Project Team	The Country Project Team will exist at three governance levels: (i) at the national level comprising the National Project Coordination Team is the National Project Manager, Knowledge & Communications Officer and the Accountant; (ii) at the state level, each of the four states with a State Project Coordination Team comprising of the Team Manager acting as the Field Manager, the Operations and Finance Officer and Junior Communications Officer. The latter two officers make up the State Project Support team; and (iii) at the community level, each of the eight communities will have an Implementation and Monitoring Team (IMT)	<ul style="list-style-type: none"> • Overall responsibility for the implementation of the project • Engage with external stakeholders to achieve project objectives • Responsible to the NIE for fulfilling monitoring and evaluation activities under the project.

INSTITUTIONAL STRUCTURE	COMPOSITION/MEMBERSHIP	ROLE AND RESPONSIBILITY
Implementation and Monitoring Team (IMT)	The composition of the IMT for the Outer Islands - comprising of the Outer Island Coordinator, the Women's group representative, Men's group representative, Youth group representative, Persons living with disabilities group representative, and traditional leader / elderly representative. For Malem and Utwe communities, a community working committee will be under the coordination of the Team Manager in KIRMA.	<ul style="list-style-type: none"> • Carry out the technical surveys and assessments of the project based on consultations and direction from the communities and island governing council in relation to project outputs. • Assess relevance and impact of the climate adaptive strategies • Make recommendation to the Project Team on technical matters to incorporate the same in the implementation plan • Improve the design of the activities • Develop climate change adaptation plans specific for the island and sector • Train and lead in implementing adaptation activities • Report to the OIC progress, risks and issues of the activities
National Climate Change Committee	All relevant stakeholders of government, NGO, Inter government organizations, and Community Based Organizations and private sector	<ul style="list-style-type: none"> • Advise on other climate change projects and programs ongoing with the view to integrate, synergize and not duplicate efforts • Assure liaison with stakeholders of the project is maintained • Ensure Applicable standards are being used • The needs of specialist interests (for example, vulnerable groups) are being observed. •

The organizational structure for the implementation of the project requires staffing at three levels: national level will provide direction of the project through the project board. The National Project Manager and the project support team will manage the project from the national level with assistance of the country programme officer (CPO) based at SPREP. The delivery of the project will be at the state and community levels. There will be four Team Managers posted at state level with a coordination team comprising of an Operations and Finance Officer and a Junior Communications Officer. The Outer Island Coordinator will provide oversight of the implementation of the project at the community level, as well as carrying out monitoring and reporting. The organization structure of the staff is presented in the diagram below:

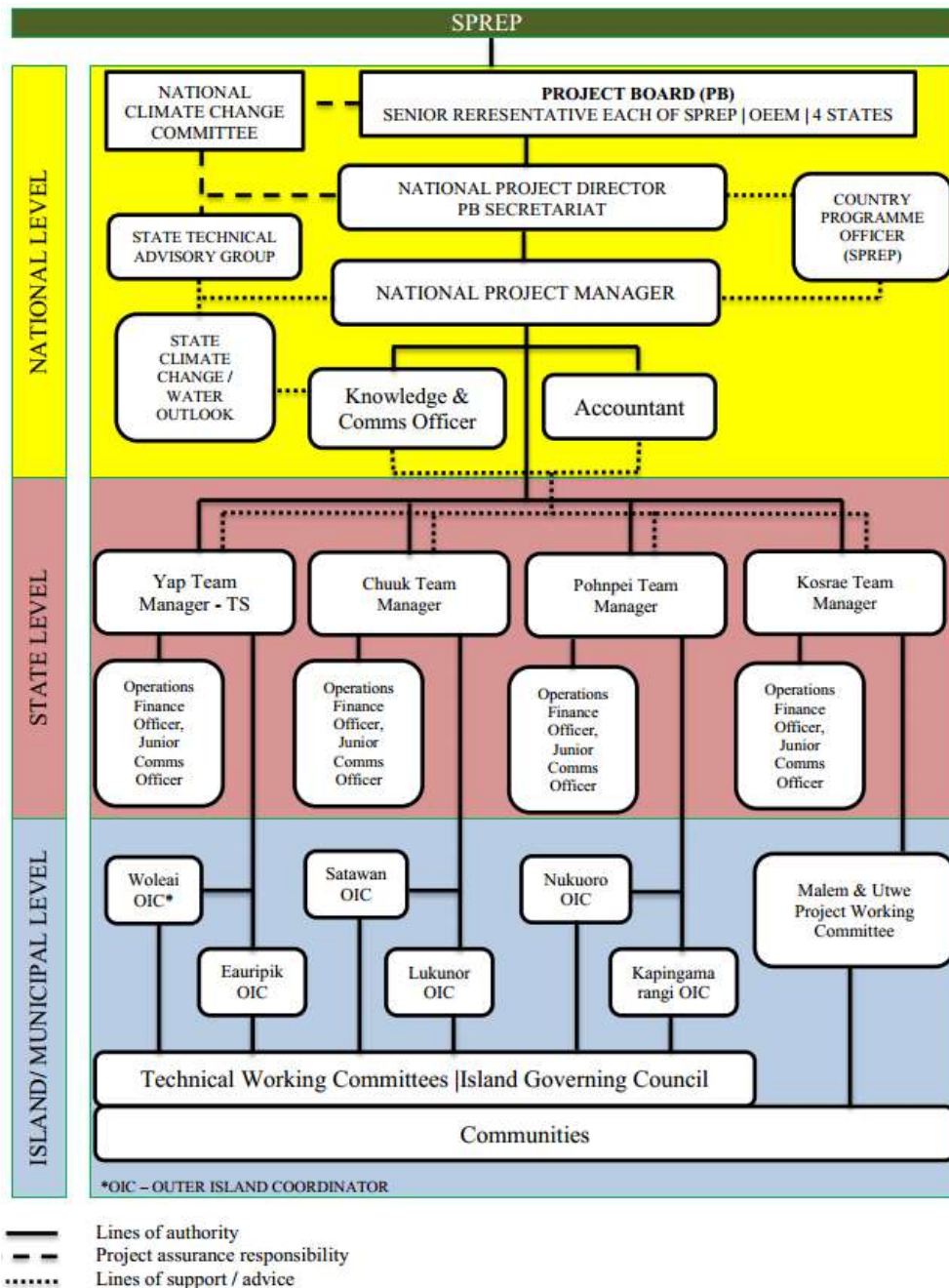


Figure 19. Staffing structure of the project

The key roles and responsibilities of the key staff are summarised in Table 21 below

Table 21. Key roles and responsibilities of Project Staff

POSITION	KEY ROLES & RESPONSIBILITY
National Project Director	<ul style="list-style-type: none"> - Organize and co-chair the Project Board reviews - Provides high-level advice to the Board on progress, risks and issues against the objectives of the project. - Monitor and control the progress of the project at a strategic level, in particular reviewing the objectives of the project regularly - Appoint the project management team - Ensure overall objective and goals of the project remains on target, is achievable and will be completed within the agreed scope of the project
National Project Manager	<ul style="list-style-type: none"> - Secretary to the Project Board - Overall responsibility for the implementation of the project - Engage with external stakeholders to achieve project objectives - Responsible to the NIE for fulfilling monitoring and evaluation activities under the project. - Liaise with SPREP Country Programme Manager and account managers - Lead and motivate the project management team - Manage the information flows between the directing and delivering levels of the project - Provide oversight to the project activities of each component, taking responsibility for overall progress and use of resources and initiating correction action where necessary - Advise the Project Board through the National Project Director of any deviations of the project. - Unless appointed to another person(s), perform the Team Manager role - Unless appointed to another person(s), perform the Project Support roles - Prepare and maintain quarterly, semi-annual, annual and bi-annual reports of the project - Schedule and respond to annual financial audits
Team Managers (TMs) (technical specialists)	<ul style="list-style-type: none"> - Responsible for delivering the activities of the project to an appropriate quality and completion within a planned and agreed timescale and cost. - Authorize and responsible for planning project activities and managing a team of specialists / experts - Unless appointed to another person(s), perform the Project Support roles - Assist in schedule and responding to annual financial audits - Report to the NPM, KCO and Accountant - Carry out technical reviews where required - Prepare and maintain quarterly, semi-annual, annual and bi-annual reports of the project

POSITION	KEY ROLES & RESPONSIBILITY
Knowledge & Communications Officer (KCO)	<ul style="list-style-type: none"> - Collect, collate and document data and information from management team at national and state levels - Assist in managing development of knowledge products and visibility materials - Provide administrative support for the project management team at national level - Provide advice to Team Managers at state level
Accountant	<ul style="list-style-type: none"> - Manage and advice the financial situation of the project - Develop and communicate (forecast) financial situations and reports to relevant stakeholders on a timely basis - Provide financial advice to NPD via the NPM and TMs - Provide administrative support for the project management team at national level
Communications Officer (CO)	<ul style="list-style-type: none"> - Based at state level, the CO is to - Capture, collect and document data and information from management team at state and community levels and share with national office - Update database of the project and ensure activities of the communication strategies take place. - Assist in development of knowledge products and visibility materials Provide administrative support for the project management team at national and state level - Report risks, issues and progress of the project against the communication plan and strategy
Operations & Finance Officer (State level)	<ul style="list-style-type: none"> - Provide administrative support for the project management team
Outer Island Coordinator (OIC)	<ul style="list-style-type: none"> - Coordinate execution of activities and services on island with the island / municipal governing council - Report progress, risks and issues of the project to the Team Manager - Communicate project data and information to the TM

B Risk Management

B. Describe the measures for financial and project / programme risk management.

Table 22. Project Risk Management Measures

Expected Risk	Rating of Risk	Risk Management Strategy
Institutional		
Limited or no buy-in from national and state government stakeholders	Low	<ul style="list-style-type: none"> - The inception workshop will invite high level key stakeholders from national and state. - A capacity needs assessment will identify those that are relevant to the project and those with limited input

Expected Risk	Rating of Risk	Risk Management Strategy
Lack of capacity within executing agencies cause delay or insufficient level of implementation	Med – Low	<ul style="list-style-type: none"> - Contracts will be for three years and notice for leaving will be for longer duration; recruitment of local persons at the State and community level so that they do not have motivation to leave and build ownership; - Regular project team meetings and capacity building to ensure that all staff understand their role in the project
Environmental		
Extreme natural disasters affect the implementation of the project	Medium	<ul style="list-style-type: none"> - The current practice in responding during and post-disaster phases is that all of the government functions will be diverted to emergency response measures. - The project will communicate in advance expected delays and actions required to minimise the risk and impact on the project activities, assets and personnel. - The national project manager will inform all key stakeholders in advance.
Climate hazards are more severe than anticipated leading to higher climate-proofing related costs for building the inland road	Medium	<ul style="list-style-type: none"> - The project will address the climate hazards in advance under this project. It will minimize the risk to people and infrastructure by revetment of the coastal road as planned under activity 3.2.1 of the project
Social		
Logistical/transport problems and/or prohibitive costs leading to delays in arrival of people and/or materials	Med-High	<ul style="list-style-type: none"> - Identify annual travel plans of the community around community occasions, events and celebrations. Incorporate into project plans - Work with the transportation shipping companies on the schedules in advance to avoid planning around delayed or no sailing days
Traditional values and governing structures restrict the participation of women	Low	<ul style="list-style-type: none"> - Break up into gender-based working groups will be applied to community consultations. - There will be an elderlies / traditional leaders only group, women's only group, youth only group discussions. Where youth are required to break further into girls and boys, that will also be carried out

Expected Risk	Rating of Risk	Risk Management Strategy
Limited or no buy-in from communities or island council	Low	<ul style="list-style-type: none"> - The inception workshop will clarify the project goals, strategies, objectives, activities, roles and responsibilities of all stakeholders involved. - Annual meetings and refresher meetings will be called by the Outer Island Coordinator for the project to update progress and report on risks, issues and assistance required by the project from the community and vice versa
Theft of assets from the water systems	Low	<ul style="list-style-type: none"> - Build fencing around assets where required - Awareness and education of the importance of the assets - Enforce community by-laws
Financial		
Delays in expediting funds to state and community project units to execute project activities	Low-Med	<ul style="list-style-type: none"> - Carry out refresher training on financial reporting - SPREP to assist in direct modality in advance and in support of the Finance departments of national and state
Delays in acquitting funds	Low-Med	<ul style="list-style-type: none"> - SPREP and OEEM to convene meetings to address the issue and aim to 1) utilize funds for other planned activities, 2) divert funds to other community, state or national activities that have been completed and ready to implement other planned activities
Operational		
State run ships to outer islands are unreliable and very slow to get to many outer islands, and only stay on island for half a day (on average).	Med – High	<ul style="list-style-type: none"> - The project will explore options of collaborating with the shipping companies with assistance of key government stakeholders. These may include chartering of ships and agreement to a working schedule such as frequencies, length of stops, and unloading processes
Team/ island communication difficulties (e.g., only have shortwave radio)	Medium	<ul style="list-style-type: none"> - Project will improve communication equipment of existing government office which is required by the project to effect timely reporting of project aspects including progress, risks and issues monthly and quarterly

Expected Risk	Rating of Risk	Risk Management Strategy
Difficult to reach out and train teachers in Outer Island schools	Low-Med	<ul style="list-style-type: none"> - A progressive plan of developing the Teacher's Guide will be carried out at state level and training carried out at state level. - The project will trial out training of teacher's in only 2 of the six islands. Identify issues and lessons to improve the conducting of training in other islands. - One other strategy is to bring volunteer and or selected teachers from both islands from each state to the main island for training. Upon return with materials and competency-based training have been undertaken
Land issues (disagreement/conflicts over access of land for installation tanks/reserves)	Low-Med	<ul style="list-style-type: none"> - Consultation and awareness prior to agreement - Letter of agreement between landowner and island governing council acting as the Principal of the agreement on behalf of the project, at the outset of the project.
Unsuitable infrastructure (e.g., house roofs can't support catchment systems)	Low	<ul style="list-style-type: none"> - Ground truthing assessments will include baseline and technical surveys to identify suitable housing infrastructure and modify design of installation of water harvesting systems
Agreement cannot be reached with all landowners on easements required for building the inland road	Low	<ul style="list-style-type: none"> - The June 2016 consultations with Malem and Utwe communities addressed this risk. The municipal governments have initiated development of agreements with all the relevant landowners. All landowners have already signed agreements to building the road during consultations in the planning stage of the proposal.
Phase II (upgrade to hot-mix asphalt pavement) starts during implementation of AF project	Low	<ul style="list-style-type: none"> - AF Project team to provide assistance to DTI to ensure all issues and risks are identified assessed and a revised Risk Management Plan is developed before Phase II project starts.
Implementing partner has inadequate capacity	Low	<ul style="list-style-type: none"> - The capacity of NGOs delivering the activities will be developed through training and or recruitment of a local consultant to carry out the activities required - Training with CBOs will address the capacity issues. Emphasis will be placed on women councils and women's organization that will be requesting to assist.

Expected Risk	Rating of Risk	Risk Management Strategy
Locally available printing, video and audio production capacity	Low	- The project will seek printing companies from within FSM to assist. The project will also seek services from nearby neighbouring countries to assist, in particular Guam where such services have the capacity
Political		
There is no capacity on island to carry out needed trainings	Medium	- The project units at state level will work with NGOs and consultants to develop a team of trainers to go into the islands and carry out 'Train the Trainers', module and competent-based trainings. This will build capacity of the island teams to be able train and build capacity of the local population.
There is no political will and commitment from island leaders, and municipal government	Low	- The proposal has been on the agenda of the Vice President for 12 months since July 2015. The communications from the Vice President to the high level officials of government has been supportive to move with the project. - Mayors, traditional leaders have issued high political support of their local governments to the project. Their support letters are provided in Annex 9

The project has noted the key social risk with regards to the installation of self-composting toilets as an alternative adaptation option to conserve water, improve the thin soil environment and reduce marine eutrophication on the lagoon side of the atolls.

The project's risk response strategy will be to further identify, assess and control the risk during inception and adaptation planning meetings. The project will ensure that there is a common understanding of the risks to the project and community, carry out a survey and put control measures in place and communicate widely before further work is carried out. The control measures may include the enhancing the understanding of community members on the benefits and costs between the current practices and the new alternative technology introduced as part of adapting to impacts of climate change. Another control measure is to fallback to food security and marine resource management priorities identified by the communities in the planning stages.

C Environmental and Social Risk

C. Describe the measures for environmental and social risk management, in line with the Environmental and Social Policy of the Adaptation Fund.

The project is categorized as "**Category B**" with 'low to moderate' impacts and social risks (refer to Part II. K). In line with the Fund's Environment and Social Policy, the measures for management of environmental and social risks are outlined in the project's Environment and Social Management Plan (ESMP) annexed to this proposal (Annex 7).

The ESMP outlines risks and measures to mitigate the risks of activities under each relevant ES Principle of the Fund. The ESMP will be shared as a key document to project stakeholders

particularly those that are responsible for management of the identified risks. The roles and responsibilities will be briefed by the national and state project coordination teams with technical advisory support provided by SPREP through its Country Programme Officer (refer to **Figure 18**).

The low risk identified for gender equality and women empowerment under component 1 will be managed by the national project coordination team with monitoring oversight provided by SPREP country programme officer (see Figure 18.).

The 'low to moderate' impacts and risks identified against the Protection of Natural Habitats and Conservation of Biological Diversity Principles of the Fund refer to activities under Component 3. In particular, the inland road construction (activity 3.1.1) and coastal defenses (activity 3.2.1) have been subjected to risk management under the Title 19 of the Kosrae State Code and the Regulations for Development Projects. The Kosrae Board of Commissioners has issued a development review permit with conditions that have been assigned to avoid, minimize or eliminate the effects or impacts of the proposed activity (3.1.1) on the environment (Annex 10). This was a result of the Kosrae Board approval of the Environment Impact Statement (Annex 4a). The approval signals relevant consultations and public disclosure of the impacts and risks of the project process completed (see also section 7 of the ESMP).

Under its Development process, Kosrae also has a grievance redress mechanism outlined under the State's existing EIA Guidelines. The states of Yap, Chuuk and Pohnpei do not have grievance redress mechanism or EIA Guidelines, but are, however guided by the EPA regulations. The project will apply the five step grievance management process outlined in the ESMP, complimented by the Kosrae EIA process.

Managing environmental and social risks for the different stages of the inland road relocation initiative. The project identified during the planning consultations the important measures to be taken to manage the Kosrae inland road construction stages in which activity 3.1.1 of this project will undertake the *first stage*. This is the construction of the Kosrae inland road to an unsealed rural road (sub-base standard) to be followed by the *second stage* which is sealing the road using hot-mix asphalt pavement. The project does not address the environment and social risks of the latter stage. The Kosrae Regulations for Development Project 2014 and the Environment Impact Assessment Guidelines 2014 proposes that the second stage will require a separate and new Development Permit.

In the event that stage two commences within the implementation period of the AF project, to the extent at which it may impact on the outcomes delivered by the AF project, the project will provide assistance in assessing any additional environmental and social risks identification and management plan. It will devise a Risk Management Plan with relatively minor changes to update the documentation as will likely to be required. The key information will be the risks, mitigation measures and clear timelines and responsibilities on implementation and managing of risks. The scope of the ESMP (Annex 7) provides guidance on how to assist the second stage to be compliant to the Fund's ES Policy. One proactive measure for that the project will undertake sharing and referencing mitigation measures and lessons from the project to inform the second stage *at least six months prior to implementation of the second stage* of the inland road construction.

The full environment and social risks management plan for the project is outlined in detail in the ESMP (Annex 7).

D Monitoring & Evaluation

Describe the monitoring and evaluation arrangements and provide a budgeted M&E plan.

The monitoring and evaluation (M&E) scheme will be applied in accordance with the established SPREP procedures throughout the project lifetime. This shall ensure the timeliness and quality of the project implementation. The M&E plan will be implemented as proposed in Table 24 below.

The following sections outline the principle components of the Monitoring and Evaluation scheme and indicative cost estimates related to M&E activities.

Project Inception Phase

Inception Workshops (IW): A national and all state Inception Workshop will be carried out by the project within three months of project start and the first tranche of funds have been received. A full project team with assigned roles in OEEM, KIRMA, EPA Pohnpei, Chuuk and Yap, and where appropriate and feasible, collaborating partners of the project and technical advisors will lead the workshop. The IW is crucial to building ownership for the project results and to plan the first year annual work plan.

The overall objective of the inception phase is for key stakeholders to take ownership of the project's goals and objectives, as well as finalize preparation of the project's first annual work plan on the basis of the project's strategic results framework (Table 25). The key objectives of the workshop are:

- To review stakeholder analysis for each project;
- To review and check through the logic of the Project Framework;
- To draft a stakeholder capacity needs assessment in management of the project;
- To clarify the monitoring protocol for indicators; and
- Clarify clear project boundaries (both technical and geographical).

The activities of the workshop include:

- Reviewing the strategic results framework (indicators, means of verification, assumptions), imparting additional detail as needed;
- Agree upon the first Annual Work Plan (AWP) with measurable performance indicators;
- Introduce support processes and technical backstopping mechanisms available;
- Agree on elements of the project's communication strategy, including requirements of the communication infrastructure for project implementation;
- Agree on the monitoring and evaluation process including provisions of training on project management skills and execution;

The inception workshop would be the opportunity to understand the project 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 and decision-making structures will be discussed and clarified, as needed, in order to clarify for all, each party's responsibilities during the project's implementation phase

The national inception workshop will also provide the first annual meeting of the Project Board (PB) with responsibilities over management decisions including approving implementation work plans and budget revisions, identifying problems, suggesting actions to improve project performance (see **Project Board and Project Board meetings**)

Inception Report. A Project Inception Report (IR) will be prepared immediately following the series of Inception Workshops. It will include a detailed first year/AWP divided in quarterly time-frames detailing the activities and progress indicators that will guide implementation during the first year of the project. The Report will also include Appendixes of detailed project budget for the first full year of implementation, prepared on the basis of the AWP, and including any monitoring and evaluation requirements to effectively measure project performance during the targeted 12 months' time-frame.

The Inception Report will include the agreed detailed narrative on the institutional roles, responsibilities, coordinating actions and feedback mechanisms of project related partners that were discussed in the workshops.

Annual Progress Report (APR): The APR shall be prepared by the National Project Manager and is to be presented at the Annual Review Meeting for endorsement. The APR will be prepared with progresses against set goals, objectives and targets, lessons learned, risk management and detailed financial disbursements.

Project Annual Review (PAR) Meeting: An Annual Review Meeting shall be conducted annually, with the first meeting a year after the National inception workshop. The meeting will be a high-level review meeting where key representatives of major stakeholders of the project are represented. The objective of the meeting is to review progress, discuss results, challenges and opportunities. Recommendations of the progress review meeting will be the key outcome of the meeting. The recommendations and report of the annual review meeting is submitted to the Project Board for endorsement for action.

Project Board and Project Board meetings: The Board is represented by high-level representatives of the implementing entity SPREP and the executing entities (OEEM, KIRMA Kosrae, R&D Yap, EPA Chuuk, EPA Pohnpei). It is chaired by the Director General of SPREP or a senior adviser directed by the Director General. It is co-chaired by the Director of OEEM acting as the Director of the Project. The National Project Manager acts as the secretariat to the Board. The Board will agree and adopt a coordinated implementation strategy of the project and its partners, as well as endorse the project's first year's annual work plan.

The Board will also include high level representatives of the communities in the project proposed areas. The Board will meet annually at the auspices of the PAR. The Board will call meetings immediately following the PAR meetings. The objective of the board meetings is to discuss recommendations of the project progress and way forward as agreed to and presented by the PAR meeting outcomes. Agreement and approval of the direction and way forward from the Board in view of the recommendations of the PAR will be key outcomes. The outcomes of the Project Board, including approved APR of the project is shared and submitted to the Donor via SPREP as the RIE.

Independent Evaluation

The project would carry out at least two independent external evaluations as follows:

Mid-term Evaluation: The project will undergo an independent Mid-Term Evaluation (MTE) at the mid-point of project implementation. The MTE will determine progress being made toward the achievement of outcomes and will identify course correction if needed. The evaluation will address effectiveness, efficiency and timeliness of project implementation. It will check the relevancy of the project activities so far carried out by the project. It will outline risks and issues that relate to the management and implementation of the project. The list of recommendations will highlight decisions and actions that require responses and execution. The evaluation will review and suggest lessons in relation to the design, implementation and management of the project. The findings of the evaluation will inform the final half of the project period.

Final Evaluation: The project will undergo a final evaluation that will be carried out within three months following implementation closure of the project. The evaluation will be carried out by an independent evaluation time. A final project annual review (PAR) meeting will be conducted following the completion of the final evaluation report. All stakeholders will review the report and the final PAR meeting will be to present, discuss, finalize and endorse the final evaluation report of the project.

The content of the evaluation report will include progress towards the outcome of the project. It will review any immediate impact and sustainability of results of the project. It will outline results against the strategic results framework and provide a conclusion, of whether or not the project has achieved its goal, objectives, outcomes and outputs it set out to implement. A review on the contribution to capacity development and knowledge management in FSM would be presented in the report. The report will outline key management and capacity recommendations highlight results, lessons learned, best practices. It must amalgamate these results into a section of the report, designed to be useful for future projects and or programs of FSM.

As the regional implementing entity, SPREP will be in charge of organizing the management of both the mid-term and final evaluation activities. This will include drafting of the terms of reference, procure the evaluation team, manage the logistics maintain the time period of the review, and ensure reports are submitted on time.

Table 24. Budget for Monitoring and Evaluation Plan

BUDGET FOR M&E PLAN:								
Monitoring and evaluation plan Activity	Responsible person	Year 1	Year 2	Year 3	Year 4	Year 5	Total \$	Timeframe
Inception workshops (activity 4.3.1)	Project Manager	30,000					30,000	Within 6 months of project starting
Inception report	Project Manager						part of execution cost	Within 3 months after inception stage
Participatory Monitoring & Evaluation by beneficiaries	Project Manager and Team Leaders						part of execution cost	Quarterly
Quarterly Progress Reports	Project Manager and Team Leaders						part of execution cost	Quarterly
Six monthly Progress Reports	Director OEEM						part of execution cost	6 monthly
Audits	External auditor						part of execution cost	Every year - starting 2018
Annual Project Advisory Committee Meetings	Project Manager						part of execution cost	Annual
Bi-Annual field visits by representatives of Project Advisory Committee (under activity 4.3.7)	Project Manager	-	-	18,000		18,000	36,000	Bi-annual - starting 2019
Minutes of Advisory Committee Meeting	Project Manager						part of execution cost	annually, twice starting 2019

BUDGET FOR M&E PLAN:								
Impact assessment** (under activity 4.3.7)	Director OEEM			4,500		4,500	9,000	Bi-annual - starting Oct 2018
Mid-term Evaluation	External Consultant			106,938			106,938	Mid term
Final evaluation	External Consultant					107,488	107,488	3 months before end of project
	TOTAL	30,000	-	129,438	-	129,988	289,426	

E. Results Framework

Include a results framework for the project proposal, including milestones, targets and indicators.

A fully endorsed stakeholder results framework for the project proposal, including milestones, targets and indicators is presented in the following table.

Table 25. Projects Strategic Results Framework

OUTCOME / OUTPUT	INDICATOR	BASELINE	TARGET	SOURCE OF VERIFICATION	RISKS AND ASSUMPTIONS
Component 1: Strengthening policy and institutional capacity for integrated coastal and water management at national and state levels					
Outcome 1: Strengthened policy and institutional capacity of government to integrate climate risk and resilience into its water and coastal management policy and regulatory frameworks	Number of national and state level stakeholders participating in EPA, R&D, NWTF meetings, planning and implementation of activities.	FSM regulations for development projects does not consider climate risks and resilience, with the exception of the Kosrae State Regulations for Development Projects 2014	At least two relevant regulatory frameworks endorsed and adapted to guide and support development of regulations on development projects at national and state level.	Legal and regulatory policy assessment report	Assumptions: Political will and commitment that encourage full participatory participation of key government stakeholders at national and state level Risks: Limited or no buy-in from national and state government stakeholders
	Number of relevant sector and community based consultations carried out to identify institutional capacity gaps and capacity needs	Existing policy lacks consideration of existing climate change risk and disaster risk and projected risks	Climate change is mainstreamed into the FSM National Water & Sanitation Policy, Water Outlook Program, Water Sector Investment Plan, national and state development projects.	President and Government Resolution on National Water & Sanitation Policy, National Water Outlook Program, National Water Sector Investment Plan	
	Number of staff across sectors trained and build their awareness on the new regulations enforcement	A framework for developing a water and sanitation policy, water outlook, and water sector investment plan exists but no plans that integrate climate risks and consider gender-sensitive approaches		Stakeholder consultation reports	
	Number of regulatory framework drafts developed for development projects regulations at state level			Annual reports of ministries and other government agencies.	

OUTCOME / OUTPUT	INDICATOR	BASELINE	TARGET	SOURCE OF VERIFICATION	RISKS AND ASSUMPTIONS
Output 1.1 Legislation and policy paper to guide regulation of climate resilient coastal and marine management at national level	Number of stakeholder organizations participating in legal and regulatory assessment meetings Number of regulation, policy and guidance documents drafted at national level	No current and future climate risks mainstreamed into current legislation, regulation, policy and guidance documents for development projects in FSM	A legislative framework to guide national level regulation of climate resilient coastal and marine resource management at national level A national level regulation for development projects with climate risks and resilience incorporated developed, endorsed and adopted	Legal and regulatory policy assessment report President and Government Resolution on legislative and regulatory frameworks on development projects Stakeholder consultation reports Annual reports of ministries and other government agencies.	Assumptions: Political will and commitment to ensure plans and planning “tools” are prepared in a fully participatory manner. Strong national and state leadership and support for, and engagement in project activities in all 4 States. Risks: Limited or no buy-in from national and state government stakeholders
Output 1.2 State regulations for development projects amended to consider climate change risks and resilience measures	Number of stakeholder organizations participating regulatory framework workshops at state level Number of regulation, policy and guidance documents drafted at state level	No current and future climate risks mainstreamed into current legislation, regulation, policy and guidance documents for development projects in Yap, Chuuk and Pohnpei States	At least one state has endorsed and adopted changes to its state regulation for development project that consider climate risks and resilience	Stakeholder Consultation Reports State Level resolutions on regulatory frameworks, policy and guidance documents Annual reports of ministries and other government agencies.	Assumptions: Political will and commitment to ensure plans and planning “tools” are prepared in a fully participatory manner. Strong national and state leadership and support for, and engagement in project activities in all 4 States. Risks: Limited or no buy-in from state government stakeholders

OUTCOME / OUTPUT	INDICATOR	BASELINE	TARGET	SOURCE OF VERIFICATION	RISKS AND ASSUMPTIONS
Output 1.3 National Water and Sanitation Policy endorsed with climate and disaster risks and resilience, and gender mainstreamed	<p>Number of stakeholders participating in NWTF meetings, planning and implementation of activities</p> <p>Number of women, men, and youth participating in gender and climate change trainings, meetings and public awareness activities</p> <p>Number of stakeholders (organizations) participating in NWSP awareness activities</p>	<p>No national climate resilient water and sanitation policy</p> <p>No gender-focused policy on water and sanitation</p>	NWSP with climate risks and resilience, and gender incorporated, is endorsed and adopted by a resolution of the President and Government of FSM (Four state endorsement)	<p>Stakeholder Consultation Reports</p> <p>President and Government Resolution on National Water & Sanitation Policy</p> <p>Official National Water & Sanitation Policy document</p> <p>NWSP Gender Assessment and Action Plan report</p>	<p>Assumptions: Political will and commitment</p> <p>Strong national and state leadership and support for development of the NWSP and its elements</p> <p>Risks: Limited or no buy-in from state government stakeholders in finalising the NWSP</p> <p>Traditional values and governing structures restrict the participation of women</p>
Output 1.4 National Water Outlook and Water Sector Investment Plan developed and implemented	<p>Number of women, men and youth and stakeholder organizations participating in NWTF meetings, planning and implementation of activities</p> <p>Number of stakeholder organizations participating and implementing water outlook programs</p> <p>Number of partnerships strengthened under the water sector investment plan</p>	<p>No water and sanitation policy</p> <p>Limited emphasis on the importance of social roles and responsibilities of women, men and youth in water, sanitation and climate change policies</p>	<p>NWSP with climate risks and resilience, and gender incorporated, is endorsed and adopted by a resolution of the President and Government of FSM (Four state endorsement)</p> <p>National Water Outlook Program endorsed adopted and implemented</p> <p>National Water Sector Investment Plan endorsed, adopted and implemented</p>	<p>Stakeholder Consultation Reports</p> <p>Annual reports of ministries and other government agencies.</p> <p>President and Government Resolution on National Water & Sanitation Policy</p> <p>Official National Water & Sanitation Policy document</p> <p>NWSP Gender Assessment and Action Plan report</p>	<p>Assumptions: Political will and commitment</p> <p>Strong national and state leadership and support for development of the NWSP and its elements</p> <p>Risks: Limited or no buy-in from state government stakeholders in finalising the NWSP</p> <p>Traditional values and governing structures restrict the participation of women</p>
Component 2: Demonstration of water security measures in outer islands of Yap, Chuuk and Pohnpei					

OUTCOME / OUTPUT	INDICATOR	BASELINE	TARGET	SOURCE OF VERIFICATION	RISKS AND ASSUMPTIONS
Outcome 2a: Water conservation and management technology & practices adopted, responding to drought, sea level rise and early recovery from cyclones	<p>Available capacity (volume in cubic litres) of water per person per day</p> <p>Storage capacity for potable and grey water at household and community level</p> <p>Rainfall data collected on a monthly basis used to provide advice on water conservation practices and advice on other development sectors (farming, fishing, etc.).</p>	<p>Poorly maintained traditional water harvesting and conservation infrastructure and technology available. It cannot cope with the dry seasons.</p> <p>No monitoring stations on island to collect and monitor rainfall data to advice on water conservation practices including advice on other sectors</p>	<p>By end of project, at least 80% of households have collected enough water to respond to drought events</p> <p>By end of project, at least five project islands and its communities have increased storage capacity to store potable and grey water.</p> <p>By end of project, women, men, and youth know how to use and read rain gauges</p>	<p>Participatory evaluation report, survey report progress report developed by Municipal Government quarterly reporting</p> <p>Data collected by the Island municipal government office through rain gauges (on water resources, quality, use and maintenance of water conservation and management technologies)</p>	<p>Risks:</p> <p>Theft of water resources</p> <p>Logistical/transport problems and/or prohibitive costs leading to delays in arrival of people and/or materials (R2)</p> <p>Assumptions:</p> <p>Household / Individuals accept the need to limit water usage</p> <p>Maintenance plans can be implemented</p>
Output 2.1 Outer Island communities orientated to CC, SLR and adaptive capacity measures involving water, health, sanitation and environment	<p>Number of men and women in six outer islands trained in CC, SLR and adaptive capacity measures for water, health, sanitation and environment</p>	<p>The six island sites have limited understanding of the impacts of climate change and sea level rise on the water, health, sanitation and environment sectors</p> <p>Limited knowledge and experience in the application of climate change information to adaptation planning in outer islands</p>	<p>At least 60% of the community population in the six outer islands (of which close to 50% are women) are educated on the impacts of CC and SLR on water, health, sanitation and the environment, and have their capacity enhanced to develop adaptation measures to address these impacts</p> <p>At least 80% of those that participate in the above capacity building activities have acquired knowledge and skills to develop and implement adaptation plans and actions</p>	<p>Training and awareness materials.</p> <p>Workshop reports, including participants lists and evaluation results</p> <p>Community adaptation plans developed and endorsed</p> <p>Progress reports on implementation of adaptation actions</p>	<p>Risks:</p> <p>Community engagement is low</p> <p>Assumptions:</p> <p>Community are receptive to training and are able to engage</p>

OUTCOME / OUTPUT	INDICATOR	BASELINE	TARGET	SOURCE OF VERIFICATION	RISKS AND ASSUMPTIONS
Output 2.2 Water Harvesting and Storage System (WHSS) installed in 6 atoll islands	<p>Number of WHSS installed in 6 islands</p> <p>Capacity of storage water (in m3 and ft3) constructed / maintained, per household and per community</p> <p>Number of women, men and youth with access to water from WHSS systems installed at household and community level (church, school, community halls)</p> <p>Agreed maintenance schedules for installed WHSS</p>	<p>Water cisterns and tanks exist on the islands in poor conditions (leakages, contaminated), including poor guttering and down piping</p> <p>There is no culture of maintenance of water harvesting systems at community level due to lack of specialised equipment and maintenance planning.</p> <p>Very limited awareness of WASH techniques useful for application during drought periods and post-typhoon situations</p>	<p>100% of target population have access to enough potable water from the WHSS</p> <p>At least 20% members of the island council and women, men, and youth community groups trained in maintenance of community water harvesting and storage systems</p>	<p>Training documents including visuals and reports</p> <p>Surveys and interviews</p> <p>Progress reports</p> <p>Monitoring reports</p> <p>Visibility materials – awareness programs</p> <p>Picture of WHSS installation</p> <p>Maintenance schedules and guidelines</p>	<p>Risks:</p> <p>Logistical / transport problems and /or prohibitive costs leading to delays in arrival of people and /or materials</p> <p>Team/ island communication difficulties (e.g., only have shortwave radio)</p> <p>Unsuitable infrastructure (e.g., house roofs can't support catchment systems)</p> <p>Assumptions:</p> <p>Availability of skilled facilitators</p> <p>Community involvement including participation of women and elders</p> <p>Most HH benefit</p>
Output 2.3 Self-composting waterless toilets constructed to conserve water, improve soil environment, and reduce marine eutrophication on the lagoon side	<p>Number of SCT units constructed and in working condition</p> <p>Changes in level of nutrients in soil and groundwater</p> <p>Percentage of change in dissolved oxygen in the lagoon levels</p>	<p>Currently the majority of people use the lagoon for toileting.</p> <p>The existing water-flushed toilets or pit-latrines are in poor condition, with leakage into soil and lagoon.</p> <p>Contamination / eutrophication of lagoon from excessive nutrient input from human waste</p>	<p>By the end of the soil quality and lagoon water quality have improved as a result of reduced leakage from toilets.</p>	<p>Soil management reports</p> <p>Lagoon water quality reports</p> <p>Surveys and interviews</p> <p>Progress reports</p> <p>Monitoring reports</p>	<p>Risks:</p> <p>Logistical / transport problems and /or prohibitive costs leading to delays in arrival of people and /or materials</p> <p>Accessibility to labs to validate soil and lagoon monitoring tests</p> <p>Team/ island communication difficulties (e.g., only have shortwave radio)</p> <p>Assumptions:</p> <p>Availability of skilled facilitators</p> <p>Community involvement including participation of women and elders</p>

OUTCOME / OUTPUT	INDICATOR	BASELINE	TARGET	SOURCE OF VERIFICATION	RISKS AND ASSUMPTIONS
Output 2.4 3, 253 people trained on water conservation and management including coastal protection and livelihoods in 6 outer islands	Number of women , men, youth trained in demonstration of water harvesting and storage systems Number of women, men, youth trained in water data collection and quality testing Number of women, men and youth carrying out survey of potable and non-potable water needs, water use (quality & quantity), storage capacity, sanitation, conservation methods, practices Most significant understandings ⁵⁵ gained by youth, women and men through climate change adaptation training	Business as usual knowledge exists on water conservation and management methods and practices Limited awareness about climate change impacts on water use and water resources on low-lying island environments and communities	By the end of the project, at least 80% of targeted women men and youth trained in water conservation and management methods and technology	Training documents including visuals and reports Survey reports Training evaluation reports (interviews, feedbacks) Progress reports Monitoring reports	Risks: Logistical/transport problems and or/prohibitive costs Team/Island communication difficulties Assumptions: Availability of skilled staff to carry out, analyse & present survey results Community involvement, including participation of women and elders Availability of skilled staff to develop & deliver training a/o resources

⁵⁵ What did each group learn during the training that has made the most practical difference to their lives?

OUTCOME / OUTPUT	INDICATOR	BASELINE	TARGET	SOURCE OF VERIFICATION	RISKS AND ASSUMPTIONS
Outcome 2b: Increased awareness of climate change through formal climate education	<p>Number of schools with climate education curriculum introduced</p> <p>Level of awareness of climate education in schools at different elementary and all grades</p> <p>Number of teachers trained in climate education at elementary and all grade schools</p>	<p>Climate education materials are available</p> <p>Lack of systematic training on climate education for teachers</p>	<p>By end of project, at least two schools participated in the development of the curriculum plan</p> <p>At least 60% of teachers trained on climate education under the new climate education curriculum.</p> <p>At least 80% of students enrolled and taken climate education have a pass rate of 65%</p>	<p>School reports</p> <p>Department of Education report</p> <p>Teacher's training report</p>	<p>Assumptions: Teachers have sufficient knowledge & resources to teach the CCA curriculum</p> <p>The Department of Education communication system to outer island teachers are reliable and efficient</p> <p>Risks: Difficult to reach out and train teachers in Outer Island schools</p>
Output 2.5: Teacher's Guide on Climate Change developed to improve climate change learning in FSM schools and training institutions	<p>Number of climate change education planning workshops carried out to identify tailored education resources to enhance learning about climate change in schools and training institutions</p> <p>Number of State-specific versions that is culturally relevant to teachers and students distributed to schools, providers of technical and vocational education and training (TVET) and libraries in FSM.</p>	<p>There are very few educational resources that address adaptation measures that are specific to FSM.</p> <p><i>Learning about climate change the Pacific way:</i> A guide for Pacific teachers exists and has been applied in Fiji, Kiribati, Samoa, Tonga and Vanuatu.</p>	<p>By the end of the project, at least 80% of teachers employed in all schools of the targeted six islands have access to the correct specific version of the Guide.</p> <p>By the end of the project, at least 25% of schools in the six targeted islands and 50% of targeted training institutions have used and applied the guide to enhance climate change learning</p>	<p>Workshop reports</p> <p>Training workshops Reports</p> <p>Electronic version of the Teacher's Guide available online on Department of Education websites</p> <p>Distribution report of the Guides</p> <p>Survey on use of the Guide by teachers in schools of the targeted islands.</p>	<p>Risks: Limited or no buy-in from communities or island council</p> <p>Logistical/transport problems a/o prohibitive costs leading to delays in arrival of people a/o materials</p> <p>Team/Island communication difficulties</p> <p>Assumptions: Islands & communities have existing social & institutional structures to assist with project implementation</p> <p>Community involvement including participation of women and elders</p> <p>The model Teacher's Guide developed for other PICs is appropriate for FSM</p>
Component 3: Demonstration of Kosrae Inland Road Relocation Initiative					

OUTCOME / OUTPUT	INDICATOR	BASELINE	TARGET	SOURCE OF VERIFICATION	RISKS AND ASSUMPTIONS
Outcome 3: Increased resilience of coastal communities and environment to adapt to coastal hazards and risks induced by climate change	Number of women, men and youth benefitting from the access provided by inland road Quality condition of road after extreme rainfall event	Malem-Utwe coastal road highly exposed to severe coastal erosion and is in high risk of being washed away within the next 10 - 30 years Unsealed inner road limits access of communities inland	At least 1,476 inhabitants of Malem and Utwe have increased coastal resilience to inundation and erosion. At least one landslide, flooding or agriculture-related risk management response has been implemented by Malem and/or Utwe By the end of the project replication and up-scaling activities are explicitly informed by lessons learned and good practices relating to gender in Kosrae Targeted beneficiaries are the 2,283 people resident in the Malem ⁵⁶ and Utwe ⁵⁷ municipalities. Indirect beneficiaries include 4,333 residents of other Kosrae Municipalities	Documents on lessons learned, best practices and case studies Records and reports of government executing partners in Kosrae Project monitoring and evaluation reports documenting lessons learned and good practices in climate change mainstreaming that comprehensively addresses gender Independent evaluation reports Training evaluation reports Reports of State Governors. Community , public, stakeholder perception surveys that are sex-disaggregated	Island stakeholders and key players (e.g.: Kosrae State Government) have a high interest in, support for, and engagement in capacity building activities in Kosrae. Political will and commitment from the community and government Continuous support provided by the government and development partners.

⁵⁶ Gender and age breakdown for Malem: Adult men 286; Adult women 284; Youth 252; Children 478

⁵⁷ Gender and age breakdown for Utwe: Adult men 196; Adult women 241; Youth 180; Children 366

OUTCOME / OUTPUT	INDICATOR	BASELINE	TARGET	SOURCE OF VERIFICATION	RISKS AND ASSUMPTIONS
Output 3.1: 3.6 miles (5.8km) of Malem-Utwe inland road and access road routes constructed to an unsealed rural road standard for future relocation	Number of road easements obtained against number of road easements required Number of kilometers of inland road constructed to an unsealed rural road standard Length of new and re-lay water mains along Malem - Yeseng - Mosral - Kuplu section installed and connected to existing water supply at Malem and Finfokoa. Length of new power line along entire length of inland road from Malem to Utwe via Kuplu Wan installed Length of new telecommunication lines along entire length of inland road from Malem to Utwe via Kuplu Wan installed	Current inland road (1.5 km) is gravel only, in poor condition, and does not meet climate resilience standards No water mains are connected from Malem and Utwe except old water mains. No power lines and telecommunication lines from Malem to Utwe via Kuplu Wan	Approximately 8.5 km of inland road of the Malem-Utwe road constructed to climate resilient unsealed rural road standard with access routes to the two villages Water running through connected and completed mains for the Malem – Yeseng – Mosral – Kuplu section New power and telecommunication lines installed along the entire length of the inland from Malem to Utwe via Kuplu Wan	DREA and DT&I reports Progress reports Records of landowner agreements on easements Road, water, power and telecommunication progress reports Pictures of construction and installation Climate resilient engineering design and reports	Risks: Agreement cannot be reached with all landowners on easements required for building the inland road Climate hazards are more severe than anticipated leading to higher climate-proofing related costs for building the inland road Assumptions: DT&I has adequate capacity DT&I can secure quality contractors to design and build the road KSG is able to fund maintenance of the new road
Output 3.2: Transitional coast protection at Mosral and Paal upgraded for immediate coastal protection	Length (in metres/miles) of coastline revetted	Ineffective loose boulder defences at Mosral and Paal patched only after extreme events	Mosral and Paal coastline revetted in the order of 2.5 km or 1.6 miles	DT&I reports	Assumptions: KSG is able to fund maintenance of the transitional defences

OUTCOME / OUTPUT	INDICATOR	BASELINE	TARGET	SOURCE OF VERIFICATION	RISKS AND ASSUMPTIONS
Output 3.3: State support program to access land in upland areas established	<p>Percentage of household without land inland who accessed land inland</p> <p>Area (m²) of safe land inland identified for access</p>	No state government program to assist access land in upland for those without land	At least 30% of the household in the coastal hazard zone with no land inland access land (18 HH in Malem; 9 in Utwe)	DREA records and reports	<p>Assumptions:</p> <p>Land swaps occur (between private owners and between private owners and KSG)</p> <p>KSG is able to successfully negotiate with private land owners for appropriate sites and appropriate prices</p>
Output 3.4: Community-Based Ecosystem Management strengthened	<p>Number of women, men and youth trained on community-based ecosystem management tools</p> <p>Number of women, men and youth participating in planning and consultation meetings on rehabilitation of streams through community and school-led stream health monitoring programs</p> <p>Number of women, men and youth participating in planning meetings, implementation and monitoring of Malem and Utwe watershed management strategies</p>	No watershed managements strategies and municipal government policies to guide community-based and community-led ecosystem management programs	<p>At least 90% of the 1,476 inhabitants (50%) are women) of Malem and Utwe community participated in community-based ecosystem management planning meetings, implementation and monitoring activities</p> <p>At least one landslide, flooding or agriculture-related risk management response has been implemented by Malem and/or Utwe</p> <p>By the end of the project replication and up-scaling activities are explicitly informed by lessons learned and good practices relating to gender in Kosrae</p> <p>Malem and Utwe Watershed Management strategies developed, endorsed by Municipal Government Council and adopted for implementation and monitored</p>	<p>CBO work plans</p> <p>KSCO progress reports</p> <p>Progress reports</p> <p>Awareness activity reports</p> <p>Success stories on media</p> <p>School newsletters</p>	<p>Risks:</p> <p>Implementing partner has adequate capacity</p> <p>Assumptions:</p> <p>Communities and CBOs participate in initiatives for community-based ecosystem management</p>

OUTCOME / OUTPUT	INDICATOR	BASELINE	TARGET	SOURCE OF VERIFICATION	RISKS AND ASSUMPTIONS
Output 3.5 State support program to assist access to finance for vulnerable households established	<p>Number of stakeholder organizations (including development banking institutions) participating in planning meetings of the adapted finance mechanisms, implementation and monitoring</p> <p>Number of women, men and youth participating in community consultations on the state program</p> <p>No. of people who have used the adapted finance mechanism</p> <p>Existing housing finance mechanisms adapted</p> <p>Recommendations are produced by a review of programs and practices in Kosrae and other Pacific Island Countries</p>	<p>Existing loan mechanisms are offered by Kosrae Housing Authority⁵⁸ and FSM Development Bank⁵⁹</p> <p>Most applicants for the FSM Development Bank loans do not meet eligibility criteria; Kosrae Housing</p> <p>Authority loan sizes are small relative to home construction costs</p>	<p>At least 20% of people enrolled and participated in consultations (50% are women) have used the adapted finance mechanism</p> <p>At least 1 existing program is adapted to improve affordability of finance for house construction inland</p> <p>Recommendations address affordability of finance</p> <p>Recommendations identify ways to serve needs of vulnerable household in coastal risk zones</p>	<p>DAF study and reports</p> <p>KHA reports, newsletters</p> <p>FSM Development Bank reports and newsletters</p>	<p>Assumptions:</p> <p>Schemes prioritise vulnerable household in coastal hazard zones</p>
Component 4: Knowledge management for improved water and coastal protection					

⁵⁸ Kosrae Housing Authority (HA) currently offers loans through two mechanisms: 1) Housing Loan Program; 2) USDA-funded Rural Development Program. The HA house loan lending target is 200-300K/yr; Disburse 15-20 loans/yr between USD 7-10,000. Loan terms are 15-20 yrs with a fixed rate (7%). Most loan takers are aged 25-40 yrs. Staff explain the T&C, particularly related to the promissory note and deed of trust. A second type of loan is for senior citizens (over 62) with funding from the USDA. These are "rural development" loans that can also be used to improve home sites. Interest rate is 4%. HA would like to add new program, with USDA funding of USD 50-80,000/yr; does not currently qualify. Main requirement: USD 500,000 escrow; Have only USD 300,000

⁵⁹ FSM Development Bank has capitalization from the FSM National Govt plus USD 2M and 5M loans (5 yr term) from China EXIM and the European Investment Bank. FSMDB's national lending target is USD 9 M/yr. In Kosrae lending target is 1.5 M/yr; Housing Loans make up 20% of the National portfolio but only 1% of the Kosrae portfolio; Housing Loans: up to USD 100,000; terms of up to 20 yrs; Interest rate: 9% flat. Currently most applicants are not eligible (do not meet income criteria of USD 10-30,000 per adult). If declined, can apply under personal/consumer loan category or go to Housing Authority. Consumer loans are for up to USD 30,000; 5 yr term, 15% flat rate; Have translated legal docs to Kosrae to help clients understand T&C; Options for FSM Dev Bank to increase affordability are 1) seeking additional sources of funding; 2) advocate for govt social housing scheme (standard housing).

OUTCOME / OUTPUT	INDICATOR	BASELINE	TARGET	SOURCE OF VERIFICATION	RISKS AND ASSUMPTIONS
Outcome 4: Capacity and knowledge enhanced and developed to improve management of water and coastal sectors to adapt to climate change	Awareness materials on CC, SLR, Vulnerability and Adaptive capacity, and about the project is prepared in local language and distributed to community and other stakeholders	Programs carried out by various stakeholders (government, private sectors, and academic institutions) in the Outer Islands are not consolidated and implemented under island development plans that exist.	At least eight (50%) success stories, or knowledge products generated on lessons learned and best practices have been produced, published and shared with targeted stakeholders each project year	Site/field visits and surveys.	Assumptions: Local capacity exists to produce training materials that are of a high standard. Strong island and community interest in, support for, and engagement in capacity building activities in the Outer Islands of each State. Risks: Locally available printing, video and audio production capacity
	Number of success stories developed and shared on briefs, brochures, pamphlets, posters prepared and distributed	No systematic approach to awareness of opportunities and issues around climate change in outer islands and community / municipal government levels	At least 50% of perception responses (at least 50% are from women) to significant level of awareness and acknowledgement of gender and climate change benefits – compliance with natural resource management and gender dimensions of climate change	Project reports	
	Number of men, women and youth participating in trainings and planning meetings	There is lack of gender-sensitized management and execution of climate-related projects and programs. The approaches with existing projects are only in pilot and in silo approaches without integration across program planning		Project monitoring and evaluation reports. Project monitoring and evaluation reports documenting lessons learned and good practices in climate change mainstreaming that comprehensively addresses gender Independent evaluation reports Training evaluation reports	

OUTCOME / OUTPUT	INDICATOR	BASELINE	TARGET	SOURCE OF VERIFICATION	RISKS AND ASSUMPTIONS
Output 4.1: climate resilient municipality development plans developed and communicated	Number of women, men and youth participating in development and review of existing island / municipal government development plans Number of meetings and workshops held Number of brochures and pamphlets prepared and distributed	Existing island and municipal government development plans have not mainstreamed climate risks and resilience	Climate change (including risks and resilience factors) are mainstreamed into Island and Municipal Government Development Plans Development plans are printed and disseminated to various stakeholders	Brochures, pamphlets Workshop reports Island / Municipal Development Plans Progress reports	Risks: There is no political will and commitment from island leaders, and municipal government Assumptions: All community groups are supportive of the plans Government departments assist in review of community / municipality development plans
Output 4.2 Resource materials developed, tailored to local context, translated, published and shared amongst various stakeholders	Number of knowledge products (training materials, etc.) generated on lessons learned and best practices published and shared Percentage of women and men staff trained on the various technical and skill-building trainings	0 awareness materials available and no resources to distribute	By the end of the project, at least 60 awareness materials and knowledge management products on the project results, on CC, V&A results, gender-based results are produced and disseminated to all relevant key stakeholders.	Printed awareness materials Workshop proceedings and reports Visuals Training evaluation reports	Risks: There is no capacity on island to carry out needed trainings Assumptions: The trainees are willing to learn and absorb the skills based trainings. English is the common language used in trainings
Output 4.3: Stakeholders brought together to share, learn and exchange knowledge and skills on climate change, adaptation planning, monitoring, vulnerability assessments and climate change	Number of trainings, workshops and learning programs developed and carried out on CC, V&A, gender, coastal, water, project management, and climate education Number of women, men, youth trained at national, state and community level	0 workshops organized on CC, SLR, vulnerability to CC and CC adaptive capacity 0 trained or aware of gender and CC, CC adaptation techniques on the environment, water resources and coastal rehabilitation	13 training and learning workshops, 8 at community level (municipality, outer island), one each at state and one national At least 1 inter-state experience exchange on lessons learned and best practices on practical and concrete island intervention At least 2 learning course programs targeting environment champions /ambassadors on CC, water resource management, or integrated coastal management course At least 1 Participatory 3D Mapping & Community Workshop	Workshop proceedings and reports Visuals 3D Map of Island	Risks: Logistical / transport problems and /or prohibitive costs leading to delays in arrival of people and /or materials Team/ island communication difficulties (e.g., only have shortwave radio) Assumptions: Community involvement including participation of women and elders

F. Alignment with AF RF

Demonstrate how the project aligns with the Results Framework of the Adaptation Fund

Table 26. Program alignment with AF Result Framework

PROJECT OBJECTIVE(S) ⁶⁰	PROJECT OBJECTIVE INDICATOR(S)	FUND OUTCOME	FUND OUTCOME INDICATOR	GRANT AMOUNT (USD)
Project Objective 1: Prepare the necessary institutional and regulatory frameworks, policies, guidance and tools to help deliver a climate resilient FSM	Number of institutional, regulatory and planning policies, frameworks and tools introduced to implement climate resiliency for all FSM States	Outcome 2 Strengthened institutional capacity to reduce risks associated with climate-induced socioeconomic and environmental losses Outcome 7. Improved policies and regulations that promote and enforce resilience measures	2.1 No. and type of targeted institutions with increased capacity to minimize exposure to climate variability risks 7.2. No. or targeted development strategies with incorporated climate change priorities enforced	767,642
Project Objective 2: Strengthen water and livelihood security measures to help 6 outer atoll islands adapt to impacts of climate change related to water, health and sanitation	Number of risk-exposed communities in Yap, Pohnpei and Chuuk protected through adaptation measures	Outcome 3: Strengthened awareness and ownership of adaptation and climate risk reduction processes at local level Outcome 4: Increased adaptive capacity within relevant development and natural resource sectors	3.2. Modification in behavior of targeted population 4.1. Development sectors' services responsive to evolving needs from changing and variable climate	2,479,225
Project Objective 3: Provide communities with climate resilient infrastructure to help relocate from high risk coastal inundation sites.	Length of climate-resilient infrastructure (road, power lines, water mains, telecommunication lines) constructed	Outcome 2: Strengthened institutional capacity to reduce risks associated with climate-induced socioeconomic and environmental losses Outcome 4: Increased adaptive capacity within relevant development and natural resource sectors	2.2. Number of people with reduced risk to extreme weather events 4.2. Physical infrastructure improved to withstand climate change and variability-induced stress	3,520,474

⁶⁰ The AF utilized OECD/DAC terminology for its results framework. Project proponents may use different terminology but the overall principle should still apply

PROJECT OBJECTIVE(S) ⁶⁰	PROJECT OBJECTIVE INDICATOR(S)	FUND OUTCOME	FUND OUTCOME INDICATOR	GRANT AMOUNT (USD)
Project Objective 4: Capture and share the local knowledge produced on climate change adaptation and accelerate the understanding about the kinds of interventions that work in island environments in FSM	Number of knowledge products developed and men, women and youth trained on CC, SLR, vulnerability and adaptive capacity	Outcome 3: Strengthened awareness and ownership of adaptation and climate risk reduction processes at local level	3.1. Percentage of targeted population aware of predicted adverse impacts of climate change, and of appropriate responses	739,571

Table 27. Project Outcome and indicators in relation to the AF RF Fund Output and Output Indicators

PROJECT OUTCOME ⁶¹	PROJECT OUTCOME INDICATOR(S)	FUND OUTPUT	FUND OUTPUT INDICATOR	GRANT AMOUNT (USD)
Outcome 1: Strengthened policy and institutional capacity of government to integrate climate risk and resilience into its water and coastal management policy and regulatory frameworks	<p>Number of national and state level stakeholders participating in EPA, R&D, N WTF meetings, planning and implementation of activities.</p> <p>Number of regulatory framework drafts developed for development projects regulations at state level</p>	<p>Output 2.1: Strengthened capacity of national and regional centres and networks to respond rapidly to extreme weather events</p> <p>Output 7: Improved integration of climate-resilience strategies into country development plans</p>	<p>2.1.1. No. of staff trained to respond to, and mitigate impacts of, climate-related events</p> <p>7.1. No., type, and sector of policies introduced or adjusted to address climate change risks</p> <p>7.2. No. or targeted development strategies with incorporated climate change priorities enforced</p>	767,642
Outcome 2a: Water conservation and management technology & practices adopted, responding to drought, sea level rise and early recovery from cyclones	<p>Available capacity (volume in cubic litres) of water per person per day</p> <p>Storage capacity for potable and grey water at household and community level</p> <p>Rainfall data collected on a monthly basis used to provide advice on water conservation practices and advice on other development sectors (farming, fishing, etc.).</p>	Output 4: Vulnerable physical, natural, and social assets strengthened in response to climate change impacts, including variability	4.1.1. No. and type of health or social infrastructure developed or modified to respond to new conditions resulting from climate variability and change (by type)	2,037,680

⁶¹ The AF utilized OECD/DAC terminology for its results framework. Project proponents may use different terminology but the overall principle should still apply

PROJECT OUTCOME ⁶¹	PROJECT OUTCOME INDICATOR(S)	FUND OUTPUT	FUND OUTPUT INDICATOR	GRANT AMOUNT (USD)
Outcome 2b: Increased awareness of climate change through formal climate education	<p>Number of schools with climate education curriculum introduced</p> <p>Level of awareness of climate education in schools at different elementary and all grades</p> <p>Number of teachers trained in climate education at elementary and all grade schools</p>	Output 3: Targeted population groups participating in adaptation and risk reduction awareness activities	3.1.1 No. and type of risk reduction actions or strategies introduced at local level	156,313
Outcome 3: Increased resilience of coastal communities and environment to adapt to coastal hazards and risks induced by climate change	<p>No. of people benefitting from the road</p> <p>Quality condition of road after extreme rainfall event</p>	<p>Output 2.2: Targeted population groups covered by adequate risk reduction systems</p> <p>Output 4: Vulnerable physical, natural, and social assets strengthened in response to climate change impacts, including variability</p>	<p>2.2.1. Percentage of population covered by adequate risk-reduction systems</p> <p>2.2.2. No. of people affected by climate variability</p> <p>4.1.2. No. of physical assets strengthened or constructed to withstand conditions resulting from climate variability and change (by asset types)</p>	3,520,474
Outcome 4: Capacity and knowledge enhanced and developed to improve management of water and coastal sectors to adapt to climate change	<p>Awareness materials on CC, SLR, Vulnerability and Adaptive capacity, and about the project is prepared in local language and distributed to community and other stakeholders</p> <p>Number of success stories developed and shared on briefs, brochures, pamphlets, posters prepared and distributed</p> <p>Number of men, women and youth participating in trainings and planning meetings</p>	<p>Output 3: Targeted population groups participating in adaptation and risk reduction awareness activities</p> <p>Output 2.2: Targeted population groups covered by adequate risk reduction systems</p>	3.1.1 No. and type of risk reduction actions or strategies introduced at local level	739,571

Table 28. Project Impact

IMPACT	INDICATOR
	Number of beneficiaries (direct and indirect)
AF Impact: Increased resiliency at the community, national, and regional levels to climate variability and change.	Direct Beneficiaries: <ul style="list-style-type: none"> At least 2,365 women and 2,365 men oriented to CC, SLR and adaptive capacity concepts and measures – in relation to water resource management, coastal and ecosystem sectors At least 14 communities participating in adaptation planning, project management meetings, implementation and monitoring activities have the tools, knowledge and skills to respond to new conditions results from climate variability and change
Project Impact: The atoll communities of Woleai & Eauripik, Yap; Kapingamarangi & Nukuoro, Pohnpei; and Satawan and Lukunor, Chuuk have sufficient safe, clean water to ensure resilience to natural disasters	<ul style="list-style-type: none"> At least 1,627 women and 1,627 men participated in planning, implementation and monitoring of activities of the project in the six outer islands of Yap, Chuuk and Pohnpei At least six water harvesting and storage systems infrastructure developed or modified on six outer islands to respond to new conditions resulting from climate variability and change
Project Impact: The Kosrae communities most vulnerable to coastal climate change-related hazards (Malem and Utwe) are relocating inland to safer village areas	<ul style="list-style-type: none"> By end of project, at least 5% of the populations of Utwe and Malem have considered measures for relocating inland to safe village areas. At least 185 women and 185 men (25% of total population) are aware of the risk reduction systems in place to respond to impacts of climate change 5.8km of inland road constructed and strengthened to withstand conditions resulting from climate variability and change

G. Detailed Budget

Include a detailed budget with budget notes, a budget on the Implementing Entity management fee use, and an explanation and a breakdown of the execution costs.

Table 29. Budget

Component		Activity	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL (\$, USD)
1. Strengthening policy and institutional capacity for integrated coastal and water management at national and state levels	Output 1.1: Legislation and policy paper to guide regulation of climate resilient coastal and marine management at national level							
	1.1.1	Review of regulatory inspection procedures, protocols and enforcement	15000	22500	22500	7500	7500	75,000
	1.1.2	Regulatory and policy framework for climate change at national level	6,000	9,000	9,000	3,000	3,000	30,000
	1.1.3	Develop policy guidance documents for national and states	1,000	1,500	1,500	500	500	5,000
	1.1.4	Endorse and adopt regulations, policy and guidance documents established for national and state levels	5,000	7,500	7,500	2,500	2,500	25,000
	1.1.5	Lobby and advocate regulation and policy changes in media campaign and public awareness activities	1,000	1,500	1,500	500	500	5,000
	1.1.6	Monitor and report feedback and progress	2,000	3,000	3,000	1,000	1,000	10,000
	Output 1.2: State regulations for development projects amended to consider climate change risks and resilience measures							
	1.2.1	Consultations and regulations at state level - Yap, Chuuk and Pohnpei	5,000	7,500	7,500	2,500	2,500	25,000
	1.2.2	Develop, endorse and adopt regulatory framework on development projects at state level	10,000	15,000	15,000	5,000	5,000	50,000
	1.2.3	Initiate development of regulations, policy and guidance documents identified and adopt institutional changes to existing arrangements.	4,000	6,000	6,000	2,000	2,000	20,000
	1.2.4	Endorse and adopt regulations, policy and guidance documents established for national and state	12,000	18,000	18,000	6,000	6,000	60,000
	1.2.5	Lobby and advocate regulation and policy changes in media campaign and public awareness activities	2,000	3,000	3,000	1,000	1,000	10,000
	1.2.6	Monitor and report feedback and progress	2,000	3,000	3,000	1,000	1,000	10,000

	Output 1.3: National Water and Sanitation Policy endorsed with climate and disaster risks and resilience, and gender mainstreamed						
	1.3.1	Review the water policy framework to incorporate gender and climate change	12,400	18,600	18,600	6,200	62,000
	1.3.2	Preparation of the National Water and Sanitation Policy	13,200	19,800	19,800	6,600	66,000
	Output 1.4: National Water Outlook and Water Sector Investment Plan developed and implemented						
	1.4.1	Implementation of the NOW Programme	31,464	47,196	47,196	15,732	157,321
	1.4.2	Implementation of the Water Sector Investment Plan (WSIP) Programme	31,464	47,196	47,196	15,732	157,321
	Total: Component 1						767,642
	2. Demonstration of water security measures in outer islands of Yap, Chuuk and Pohnpei						
	Output 2.1: Outer island communities orientated to CC, SLR, and adaptive capacity measures involving water, health, sanitation and the environment						
	2.1.1	Arrangements for demonstrations of water and sanitation technologies	20,620	10,310	30,930	30,930	103,100
	2.1.2	Carry out ground-truthing assessments	36,427	18,213	54,640	54,640	182,133
	Output 2.2: Water Harvesting and Storage System (WHSS) installed in 6 islands						
	2.2.1	Repairing household rainwater harvesting and storage system	53,342	26,671	80,013	80,013	266,709
	2.2.2	Constructing community rainwater harvesting and storage system	117,227	58,613	175,840	175,840	586,135
	2.2.3	Monitoring and maintenance	38,360	19,180	57,541	57,541	191,802
	Output 2.3: Self-composting waterless toilets constructed to conserve water, improve soil environment, and reduce marine eutrophication on the lagoon side						
	2.3.1	Developing plan/ guideline for self-composting toilets (SCT) awareness, installation and maintenance	27,180	13,590	40,770	40,770	135,901
	2.3.2	Constructing self-composting toilets - using plans (1 unit each per gender)	86,458	43,229	129,688	129,688	432,292
	2.3.3	Training on WASH and water conservation practices in school and communities	18,413	9,207	27,620	27,620	92,066
	2.3.4	Monitoring and care after	14,544	7,272	21,817	21,817	72,722
	Output 2.4: 3, 253 people trained on water conservation and management including coastal protection and livelihoods in 6 outer islands						

	2.4.1	Selecting stakeholders (men, women, youth) for training	-	-	-	-	-	-
	2.4.22	Organizing training in water data collection and quality testing and survey developments	18,692	9,346	28,038	28,038	9,346	93,459
	2.4.33	Organizing training in construction, operations and maintenance of systems	21,128	10,564	31,692	31,692	10,564	105,641
	2.4.44	Monitoring and maintenance / after care of harvesting systems	12,190	6,095	18,285	18,285	6,095	60,952
	Output 2.5: Teacher's Guide on Climate Change developed to enhance climate change learning in FSM schools and training institutions							
	2.5.1	Organizing climate change education planning workshops	3,836	1,918	5,754	5,754	1,918	19,181
	2.5.2	Develop Teacher's Guide on Climate Change in English and translation in six main island languages	14,000	7,000	21,000	21,000	7,000	70,000
	2.5.3	Training of Trainer's / Teachers on Teacher's Guide on Climate Change.	5,754	2,877	8,631	8,631	2,877	28,771
	2.5.4	Implement Teacher's Guide in Schools	3,836	1,918	5,754	5,754	1,918	19,181
	2.5.5	Monitoring effectiveness of Teacher's Guide development system, and Guide itself	3,836	1,918	5,754	5,754	1,918	19,181
		Total: Component 2						2,479,225
	3. Demonstration of Kosrae Inland Road Relocation Initiative							
	Output 3.1: 3.6 miles (5.8km) of Malem-Utwe inland road and access road routes constructed to unsealed rural road standard for future relocation							
	3.1.1	Survey, design, reconstruction and maintenance of road and related infrastructure to ensure climate change resilience	300,547	901,642	901,642	751,369	150,274	3,005,474
	Output 3.2: Transitional coast protection at Mosral and Paal upgraded for immediate coastal protection							
	3.2.1	Coastal protection works	31,500	94,500	94,500	78,750	15,750	315,000
	Output 3.3: State support program to access land in upland areas established							
	3.3.1	Land consultations, surveys, mapping and regulatory framework for future inland movement of vulnerable coastal people and infrastructure	5,500	16,500	16,500	13,750	2,750	55,000
	Output 3.4: Community-Based Ecosystem Management strengthened							

	3.4.1	Plusrik / Kuplu Wan water shed protection strategy, native vegetation buffer zones and stream health monitoring programme to strengthen sustainable use of upland areas	10,500	31,500	31,500	26,250	5,250	105,000
	Output 3.5: Develop state program to assist access to finance for vulnerable households established							
	3.5.1	Preparation of support programme for accessing finance, Identify options and Kosrae workshops for developing financial incentive mechanisms to support upland residential development to complement existing programmes/schemes in Kosrae providing access to finance	4,000	12,000	12,000	10,000	2,000	40,000
		Total: Component 3						3,520,474
4. Knowledge management for improved water and coastal protection	Output 4.1: Community Resilient (Municipality) Development Plans developed and communicated							
	4.1.1	Organizing development of Island/Municipal Government Development Plan	6,632	13,264	19,895	13,264	13,264	66,318
	4.1.2	Implement institutional changes to existing arrangements and establish effective communications based on new/revised Plan and communications strategy	10,523	21,046	31,569	21,046	21,046	105,230
	4.1.3	Share and disseminate to partners and stakeholders	3,378	6,757	10,135	6,757	6,757	33,785
	4.2 Resource materials developed, tailored to local context, translated, published and shared amongst various stakeholder							
	4.2.1	Capture and document information generated by the project	9,602	19,205	28,807	19,205	19,205	96,024
	4.2.2	Organizing consultancy support to edit scientific and peer reviewed knowledge products from the project	8,060	16,120	24,180	16,120	16,120	80,601
	4.2.3	Print, publish, produce and share materials through public awareness and media campaigns	6,232	12,464	18,695	12,464	12,464	62,318
	4.3 Stakeholders brought together to share, learn and exchange knowledge and skills on climate change, adaptation planning, monitoring, vulnerability assessments and climate change							
	4.3.11	Trainings on climate change, sea level rise and adaptive capacity measures on water and coastal sectors	29,529.6	59,059	88,589	59,059	59,059	295,296
		Total: Component 4						739,571

		Total Components (1- 4)	1,063,113.1	1,678,413.2	2,252,073.9	1,852,423.0	660,889.7	7,506,913
5. Project Execution Cost (B)	5.1	Salary of Project Staff	50,000	147,764	147,768	147,768	147,768	641,068
	5.2	Financial Audit	-	11,099	11,098	11,098	11,098	44,393
	5.3	Operating Costs	24,000	1,200	700	650	1,700	28,250
	5.4	Bi-annual Meeting Costs	-	-	7,500	-	7,500	15,000
	5.5	Inception, Meetings, Workshops	1,300	900	1,300	900	1,300	5,700
	5.66	Mid Term Evaluation Costs	-	-	26,735	-	-	26,735
	5.77	Terminal Evaluation Costs	-	-	-	-	26,872	26,872
		Total Project Execution Cost (5)	75,300.0	160,963.0	195,101.0	160,416.0	196,238.0	788,018
6. Total Project Cost			1,150,678	1,843,234.6	2,447,148.8	2,008,980.6	844,862.77	8,294,931
7. Regional Implementing Entity Fee (RIE Fee)			97,807.6	156,674.99	208,009.88	170,763.33	71,813.33	705,069
8. Amount of Financing Requested from AFB			1,248,485.6	199,909.5	2,655,184.7	2,179,743.9	916,676.00	9,000,000

Table 30. Project Execution Costs breakdown

Project Execution Activities	USD	Budget Note Table
Salary of Project Staff	641,068.00	31
Financial Audit	44,393.00	32
Operating Costs	28,250.00	33
Bi-annual Meeting Costs	15,000.00	34
Inception, Meetings, Workshops	5,700.00	35
Mid Term Evaluation Costs	26,735.00	36
Terminal Evaluation Costs	26,872.00	37
TOTAL*	\$ 788,018.00	

Table 31. Salary of Project Staff

	<i>Location</i>	<i>START</i>	<i>Year 1</i>	<i>Year 2</i>	<i>Year 3</i>	<i>Year 4</i>	<i>TOTAL (US\$)</i>
		2017	2018	2019	2020	2021	
Project Manager	P-OEEM	24,214	24,214	24,214	24,214	24,214	121,068
Accountant	P-OEEM	12,000	12,000	12,000	12,000	12,000	60,000
Knowledge & Comms Officer	P-OEEM	12,000	12,000	12,000	12,000	12,000	60,000
Operations & Finance Officer	Kosrae	-	10,000	10,000	10,000	10,000	40,000
Operations & Finance Officer	Yap	-	10,000	10,000	10,000	10,000	40,000
Operations & Finance Officer	Chuuk	-	10,000	10,000	10,000	10,000	40,000
Operations & Finance Officer	Pohnpei	-	10,000	10,000	10,000	10,000	40,000
Outer Island Coordinator 1	Y-Woleai		10,000	10,000	10,000	10,000	40,000
Outer Island Coordinator 2	Y-Eauripik		10,000	10,000	10,000	10,000	40,000
Outer Island Coordinator 3	C-Satawan		10,000	10,000	10,000	10,000	40,000
Outer Island Coordinator 4	C-Lukunor		10,000	10,000	10,000	10,000	40,000
Outer Island Coordinator 5	P-Nukuoro		10,000	10,000	10,000	10,000	40,000
Outer Island Coordinator 6	P-Kapinga		10,000	10,000	10,000	10,000	40,000
TOTAL		50,000	147,764	147,768	147,768	147,768	641,068

Table 32. Financial Audit

Description	Location	START	Year 1	Year 2	Year 3	Year 4	TOTAL (US\$)
		2017	2018	2019	2020	2021	
Financial Audit - Kosrae	Kosrae	NA	6,342.0	6,342.0	6,342.0	6,342.0	25,368
Financial Audit - Yap, Chuuk, Pohnpei	Yap, Chuuk, Pohnpei,	NA	4,757.0	4,756.0	4,756.0	4,756.0	19,025
TOTAL		-	11,099	11,098	11,098	11,098	44,393

Table 33. Operating Costs

<i>Description</i>	<i>START</i>	<i>Year 1</i>	<i>Year 2</i>	<i>Year 3</i>	<i>Year 4</i>	<i>TOTAL USD\$</i>
Land Telephone Charges	500	200	200	200	200	1,300
Stationery and other Office Supplies	500	500	500	450	500	2,450
Audio & Visual Equipment, Productions	18,000	-	-	-	500	18,500
Acquisition of Communication Equipment	5,000	500	-	-	500	6,000
TOTAL	24,000	1,200	700	650	1,700	28,250

Table 34. Bi-annual Meeting Costs

Description	Location	START	Year 1	Year 2	Year 3	Year 4	TOTAL (US\$)
		2017	2018	2019	2020	2021	
6 members Travel	All	NA		7,500		7,500	15,000

Travel miscellaneous costs (venues, catering)				1,500		1,500	3,000
TOTAL		-	-	9,000	-	9,000	18,000

Table 35. Inception, Meetings, Workshop Costs

	Location	START	Year 1	Year 2	Year 3	Year 4	TOTAL (US\$)
		2017	2018	2019	2020	2021	
Stationery, Venue, Catering and sundries	P-OEEM	400	300	400	300	400	1,800
Stationery, Venue, Catering and sundries	Kosrae	300	150	300	150	300	1,200
Stationery, Venue, Catering and sundries	Yap	200	150	200	150	200	900
Stationery, Venue, Catering and sundries	Chuuk	200	150	200	150	200	900
Stationery, Venue, Catering and sundries	Pohnpei	200	150	200	150	200	900
TOTAL		1,300	900	1,300	900	1,300	5,700

Table 36. Mid-term Evaluation Costs

	Location	START	Year 1	Year 2	Year 3	Year 4	TOTAL (US\$)
		2017	2018	2019	2020	2021	
Mid Term Evaluation - Coastal Specialists	Kosrae	NA	NA	5,363	NA	NA	5,363
Mid Term Evaluation - Water Specialists	Yap, Chuuk, Pohnpei,	NA	NA	8,938	NA	NA	8,938
Travel Costs (ticket, DSA) (both specialists)	All	NA	NA	11,185	NA	NA	11,185

Misc.	NA	NA	1,250	NA	NA	1,250
TOTAL	0	0	26,735	0	0	26,735

Table 37. Terminal Evaluation Costs

	Location	START	Year 1	Year 2	Year 3	Year 4	TOTAL (US\$)
		2017	2018	2019	2020	2021	
Terminal Evaluation - Coastal Specialists	Kosrae	NA	NA	NA	NA	5,500	5,500
Terminal Evaluation - Water Specialists	Yap, Chuuk, Pohnpei,	NA	NA	NA	NA	8,938	8,938
Travel Costs (ticket, DSA) (both specialists)	All	NA	NA	NA	NA	11,185	11,185
Misc.		NA	NA	NA	NA	1,250	1,250
TOTAL		0	0	0	0	26,872	26,872

Project Management fee

The project management fee (8.5% of the total budget) will be utilized by SPREP, the Regional Implementing Entity, to cover the costs associated with the provision of general management support. Table 36 below provides a breakdown of the estimated costs of providing these services.

Table 36. RIE Fee

Project Cycle Management Fee	Amount (US\$)	Distribution
Project Identification	35,253	5%
Preparation of Project Concept	49,355	7%

Preparation of the detailed Project Document	56,406	8%
Project Approval and Start Up	70,507	10%
Project Implementation and supervision	423,041	60%
Evaluation	70,507	10%
TOTAL	705,069	100%

a) Project identification

- (i) Consult with appropriate stakeholder's in-country, including the AF operational focal point, Director of the Office of Environment & Emergency Management (OEEM); identify opportunities for AF financing, using country dialogue and other country planning/sector strategy documents as a basis.
- (ii) Review options for co-financing and partnerships.
- (iii) Incorporate AF opportunities in appropriate planning/country assistance strategy documents of the AF Agency.

b) Preparation of project concept

- (i) Discuss AF eligibility criteria with FSM project operational focal point (OEEM) and other stakeholders.
- (ii) Undertake brief in-country consultation mission if necessary.
- (iii) Consult within the AF Agency.
- (iv) Assist OEEM to prepare project concept, in consultation with appropriate stakeholders, including the AF operational focal point and the AF Secretariat.
- (v) Assist with the preparation of the project concept.
- (vi) Obtain endorsement letter(s) from the operational focal point (OEEM).
- (vii) Discuss with the AF Secretariat on clearance and approval.

c) Preparation of the detailed Project Document

- (i) Prepare and execute legal agreements for project concept activities. Keep OEEM informed.
- (ii) Help OEEM write Terms of Reference for consultant(s), if required, to undertake project concept activities.
- (iii) Assist the project proponent (OEEM) to identify and recruit consultants to assist with project preparation, if necessary.
- (iv) Supervise project preparation, in consultation with all appropriate stakeholders, including missions to the field, with particular focus on risk assessment, governance issues, execution arrangements, co-financing, capacity development, partnership building and outreach.
- (v) Negotiate and reach agreement on incremental cost with government and other relevant stakeholders.
- (vi) Submit Project Document with Request for CEO endorsement template to the AF Secretariat.

vii) Coordinate with relevant stakeholders in formulating a programmatic approach (PA); prepare a Program Framework Document (PFD) for submission to the AF Secretariat for work program entry and Council approval; implement the PA; monitor and report on progress of the PA, prepare and submit for approval; complete implementation of all projects under the PA.

d) Project Approval and Start-up

- (i) Appraise the project and finalize project implementation arrangements, including mission travel.
- (ii) Prepare legal and other documentation for approval by the AF Agency approval authority.
- (iii) Advise the project proponent on the establishment of a project management structure in the recipient country.
- (iv) Assist project management to draft TORs and advise on the selection of experts for implementation.
- (v) Advise on and participate in project start-up workshop.

e) Project implementation and supervision

- (i) Mount at least one supervision mission per year, including briefing operational focal points on project progress.
- (ii) Provide technical guidance, as necessary, for project implementation.
- (iii) As necessary, include technical consultants during supervision missions to advise government officials on technical matters and provide technical assistance for the project as needed.
- (iv) Pay advances to the executing entity and review financial reports.
- (v) Oversee the preparation of annual project implementation reports (APIR) for submission to the AF Secretariat.
- (vi) Monitor and review project expenditure reports.
- (vii) Prepare periodic revisions to reflect changes in annual expense category budgets.
- (viii) Undertake the mid-term review, including possible project restructuring. Send a copy to the AF Secretariat.
- (ix) Undertake the terminal / closing review (refer to (f) below) and where possible hold a Lessons Learnt Workshop.

f) Project completion and evaluation

- (i) Oversee the preparation of the Project Completion Report/Independent Terminal Evaluation; submit the report to AF Secretariat.
- (ii) Prepare project closing documents.
- (iii) Prepare the financial closure of the project.

H. Include a disbursement schedule with time-bound milestones

Table 37 below presents the proposed disbursement matrix for the project. The funds disbursements schedules closely follow the initiation of activities as per the Gantt chart provided in Appendix H. The funds required upon agreement for example will initiate the inception workshops of the project, initiate assessments, develop the knowledge management and capacity development strategy and plan of the project and carry out required trainings. For example, monitoring and evaluation trainings on the strategic results

framework (log frame) that would be refined following inception workshops. Technical meetings and terms of references for all activities will be developed earlier before actual procurement can commence in into the first 12 months after the project initiation. Implementation on the ground is expected to start in the second year of the project and would be well underway by the third year. Monitoring and evaluation and capturing of lessons and practices with setting up of the project for closure and terminal evaluation would be the focus of the last eighteen months of the project.

The matrix and clear time-bound milestones will be refined during the inception phase of the project.

Table 37. Project Disbursement Matrix

S. NO	MAJOR ACTIVITY	TIME LINE
1	Inception Phase: Inception Workshops at national, state, municipality	0-12 month
2	Hiring staff, project management unit set up	0-12 month
3	National Water & Sanitation Policy - development, implementation & monitoring	7-24 month
4	Developing legislation, regulations, policy and guidance documents	7-24 month
5	Identification of sites for WHSS and SCTs - for Yap, Chuuk and Pohnpei islands	9-15 month
6	Climate proof designing of WHSS, SCTs	15-20 month
7	Procurement of Materials for WHSS, SCTs	15-29 month
8	Construction of WHSS, SCTs , maintenance and monitoring	23-30 month
9	Finalisation of road easements, survey clearing & topographical surveys - Kosrae	7-12 month
10	Climate proof design inland road section / transitional defences - Kosrae	7-18 month
11	Procurement of Construction Company, Equipment & Materials	13-36 month
12	Construct to design - inland road section / transitional defences - Kosrae	19-47 month
13	State Support Program on Access to Land - Kosrae	12-51 month
14	Community-Based Ecosystem Management program - Kosrae	14-51 month
15	State Support Program on Access to Finance - Kosrae	14-51 month
16	Capacity building and training programmes	3-51 month
17	Programme Management activities including reporting	3-64 month
18	Mid-term monitoring by stakeholder	28-39 month
19	Final evaluation	52-60 month

S. NO	MAJOR ACTIVITY	TIME LINE

Table 38. Disbursement Schedule

DISBURSEMENT SCHEDULE						
	Upon Agreement Signature	One Year after Project Start	Year 2	Year 3	Year 4	Total (USD)
Scheduled Date	April 2017				March 2022	
Project Funds	1,150,678.0	1,843,234.6	2,447,174.8	2,008,980.6	844,862.7	8,294,931
Implementing Entity Fee	97,807.6	156,674.9	208,009.8	170,763.3	71,813.3	705,069
Total	1,262,172.5	2,519,832.1	2,638,099.3	1,597,044.3	982,851.9	9,000,000

PART IV: ENDORSEMENT BY GOVERNMENT AND CERTIFICATION BY THE IMPLEMENTING ENTITY

A. Record of endorsement on behalf of the government²⁴ *Provide the name and position of the government official and indicate date of endorsement. If this is a regional project/programme, list the endorsing officials all the participating countries. The endorsement letter(s) should be attached as an Appendix to the project/programme proposal. Please attach the endorsement letter(s) with this template; add as many participating governments if a regional project/programme:*

<i>Lorin. S. Robert</i> Secretary Department of Foreign Affairs, Federated States of Micronesia	Date: 6 January 2017 Note: please see endorsement letter and certification attached separately.
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B. Implementing Entity certification *Provide the name and signature of the Implementing Entity Coordinator and the date of signature. Provide also the project/programme contact person's name, telephone number and email address*

I certify that this proposal has been prepared in accordance with guidelines provided by the Adaptation Fund Board, and prevailing National Development and Adaptation Plans, the 2004 National Strategic Development Plan, 2013 National Policy on Disaster Risk Management Plan and Climate Change Adaptation, 2011 Kosrae State Climate Change Act, 2014 Kosrae Shoreline Management Plan and other relevant regulations, and subject to the approval by the Adaptation Fund Board, <u>commit to implementing the project/programme in compliance with the Environmental and Social Policy of the Adaptation Fund</u> and on the understanding that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this project/programme.	
<i>Kosi Latu,</i> Director General SPREP Implementing Entity Coordinator	
Note: please see endorsement letter and certification attached separately.	
Date: 6 January, 2017	Tel. and email: +685 21929; kosil@sprep.org
Project Contact Person: Simon Wilson	
Tel. And Email: +685 21929 simonw@sprep.org	

²⁴ Each Party shall designate and communicate to the secretariat the authority that will endorse on behalf of the national government the projects and programmes proposed by the implementing entities.

ACRONYMS

List of Acronyms used in the project proposal

• ADB	Asian Development Bank
• AF	Adaptation Fund
• AFB	Adaptation Fund Board
• AF RF	Adaptation Fund Results Framework
• APR	Annual Progress Report
• AWP	Annual Work Plan
• BOM	Bureau of Meteorology
• CBO	Community Based Organisation
• CC	Climate Change
• CCCPIR	Coping with Climate Change in the Pacific Region
• CDM	Country Development Manager
• CEO	Chief Executive Officer
• CLIMAP	Climate Adaptation in the Pacific project
• CROP	Council of the Regional Organisations of the Pacific
• CSIRO	Commonwealth Scientific and Industrial Research Organisation
• CSO	Civil society organisations
• DAC	Development Cooperation Directorate
• DAF	Department of Administration & Finance
• DREA	Department of Resources and Economic Authority
• DRM	Disaster Risk Management
• DTI	Department of Transport and Infrastructure
• ECOSAN	Ecological sanitation
• EE	Executing Entity
• EEZ	Exclusive Economic Zone
• EIA	Environmental Impact Assessment
• ENSO	El Nino Southern Oscillation
• EPA	Environment Protection Agency
• EU	European Union
• FSM	Federated States of Micronesia
• FSMDB	Federated States of Micronesia Development Bank
• GCCA	Global Climate Change Alliance
• GDP	Gross Domestic Product
• GEF	Global Environment Facility
• GIZ	Deutsche Gesellschaft für International Zusammenarbeit
• SPC	Secretariat of the Pacific Community
• HDPE	High Density Poly Ethylene

• HH	Households
• HMA	Hot Mix Asphalt
• IDP	Infrastructure Development Plan
• IGO	Inter-Governmental Organisation
• IOM	International Organisation for Migration
• IR	Interest Rate
• IR	Inception Report
• IRR	Inland Road Relocation Initiative
• ISBN	International Standard Book Number
• ISSN	International Standard Serial Number
• IW	Inception Workshop
• IWRM	Integrated Water Resources Management
• KCSO	Kosrae Conservation Society Organisation
• KIRMA	Kosrae Island Resource Management Authority
• KHA	Kosrae Housing Authority
• KSG	Kosrae State Government
• KSMP	Kosrae Shoreline Management Plan
• KUA	Kosrae Utilities Authority
• LAN	Local Area Network
• MDG	Millennium Development Goals
• M&E	Monitoring and Evaluation
• MTE	Mid Term Evaluation
• NWOP	National Water Outlook Programme
• NCCC	National Climate Change Committee
• NECC	National Environmental Coordinating Committee
• NGO	Non-Governmental Organisation
• NIW	National Inception Workshop
• NPM	National Project Manager
• NWTF	National Water Task Force
• OECD	Organisation for Economic Cooperation and Development
• OEEM	Office of Environment and Emergency Management
• OIC	Outer Island Coordinator
• PAC	Project Advisory Committee
• PACC	Pacific Adaptation to Climate Change Project
• PACCSAP	Pacific Climate Change Science and Adaptation Programme
• PAR	Project Annual Review
• PB	Project Board
• PCCSP	Pacific Climate Change Science Project
• PEIN	Pacific Environment and Information Network
• PIC	Pacific Island Country
• PIU	Project Implementation Unit
• PMU	Project Management Unit

- PNG Papua New Guinea
- PRA Participatory Rapid Response
- R&D Resources and Development
- RTSM Regional Technical Support Mechanism
- RIE Regional Implementing Entity
- SCT Self Composting waterless Toilets
- SDP Strategic Development Plan
- SIS Small Island State
- SLR Sea Level Rise
- SMP Shoreline Management Plan
- SPREP Secretariat of the Pacific Regional Environment Programme
- TWG Technical Working Group
- UNDP United Nations Development Programme
- UNFCCC United Nations Framework Convention on Climate Change
- UNFPA United Nations Population Fund
- US United States
- USD United States Dollars
- WASH Water Sanitation and Health
- WHSS Water Harvesting and Storage System
- WSIP Water Sector Investment Plan
- V&A Vulnerability and Adaptation
- 3D Three dimensional

ANNEXES

Annexes referred to in the proposal:

Annex 1	Pacific Adaptation to Climate Change Lessons Learnt
Annex 2	List of Alternative Adaptation Activities to Support Community Objectives under the Project
Annex 3	Letter of Support, Kosrae Inland Road Alignment, 29 August 2016
Annex 4a	Malem to Utwe Inland Road Initiative. Environment Impact State for the inland road. Prepared for the Kosrae State Government and the Secretariat of the Pacific Regional Environment Programme, May 2016, NIWA
Annex 4b	(Appendix C of Annex 4a)
Annex 5	Malem-Utwe Inland Road Relocation Initiative, Kosrae, Monitoring and Evaluation Framework, SPREP, 2016
Annex 6	Cost-Benefit Analysis in Coastal Zone Management in Kosrae (FSM): Economic Assessment of Coastal Road Relocation in the Face of Climate Change
Annex 7	Environment and Social Management Plan – FSM Adaptation Fund Project
Annex 8	Official correspondence from Federated States of Micronesia Department of Foreign Affairs, to Mr Naresh Sharma (Chair), Adaptation Fund Board Secretariat, endorsing the priorities identified in the AF Project Proposal (8 July, 2016)
Annex 9a	Official correspondence from Utwe Municipal Government endorsing the project, April 13, 2016
Annex 9b	Official correspondence from Malem Municipal Government endorsing the project, July 6, 2015
Annex 10	KIRMA Board Decision (approval) and Issuance Permit

ADDITIONAL DOCUMENTS ATTACHED, FOR THE INFORMATION OF THE ADAPTATION FUND

1. Kosrae Shoreline Management Plan, 2014
2. Federated States of Micronesia Infrastructure Development Plan 2016 – 2025
3. Kosrae Island Resource Management Authority (KIRMA) Regulations for Development Projects.
4. Kosrae State Climate Change Act, 2011
5. Development Review Permit Application
6. Official correspondence from Government of Kosrae (Office of the Governor) to President of FSM, with regards to Prioritisation of Inner Roads within the Infrastructure Development Plan Framework for Kosrae State (November 6, 2015)
7. Legislative Resolution No.11-106, Endorsing the inner road construction projects as one of the highest infrastructure priority projects for the State of Kosrae and for other purposes (November 24, 2015).
8. Workshop Report, Developing a Monitoring and Evaluation Framework for a Project to Reduce Climate Risks Faced by Malem and Utwe Communities, 2015.
9. Summary findings from consultations, held with Yap, Chuuk, Pohnpei and Kosrae communities (June, 2015)

BIBLIOGRAPHY OF DOCUMENTS REFERRED TO IN THE PROJECT DOCUMENT

Asian Development Bank (2005). Climate Proofing. A risk based approach to adaptation. Pacific Studies Series. Asian Development Bank.

Australian Bureau of Meteorology and CSIRO, 2011

Bailey, R.T, J.W. Jenson & D Taborosi. 2013. Estimating the freshwater-lens thickness of atoll islands in the Federated States of Micronesia. Hydrology Journal (2013) 21: 441 – 457

Beikmann, A., Bailey, R., (2015). Freshwater Resources for Selected Atolls

Beikmann, A., Bailey, R., Jenson, J., Kottermair, M., Taborosi, D., Bendixson, V., Flowers, M., Jalandoni, A., Miklavic, B., and Whitman, W. (2015). Enough Water for Everyone? A modelling Study of Freshwater Resources for Selected Atolls of Yap State, FSM, WERI Technical Report 157. Water and Environmental Research Institute of the Western Pacific, University of Guam, Mangilao, Guam.

CIRIA/CUR (1991). Manual on the use of rock in coastal and shoreline engineering. Construction Industry Research and Information Association (CIRIA) Special Publication 83 / Centre for Civil Engineering Research and Codes (CUR) Report 154

Climate Adaptation in the Pacific (CLIMAP) Project, ADB

Compact of Free Association (1986 – 2003)

Compact of Free Association II (2004 – 2023)

Coping with Climate Change in the Pacific Region (CCCPIR), SPC, GIZ, SPREP

Cost-Benefit Analysis in Coastal Zone Management in Kosrae (FSM): Economic Assessment of Coastal Road Relocation in the Face of Climate Change

Development Review Permit Application

Environment Social Management Plan, July 2016

Federated States of Micronesia, 2023 Action Plan (pp 47 – 48)

Federated States of Micronesia, Climate Change Law, 2013

Federated States of Micronesia, Disaster Relief Act 1989

Federated States of Micronesia, Environmental Protection Authority Act, 2012 (title 25)

Federated States of Micronesia, Environment Sector Plan 2010 – 2015

Federated States of Micronesia, Infrastructure Development Plan 2016 – 2015

Federated States of Micronesia, Millennium Development Goal report, 2010

Federated States of Micronesia, Multi-State Hazard Mitigation Plan, 2005

Federated States of Micronesia, National Environmental Policy Act, 1969

Federated States of Micronesia, National Policy on Climate Change, 2009

Federated States of Micronesia, Policy on Disaster Risk Management and Climate Change Adaptation 2013

Federated States of Micronesia, Population Census, 2010

Federated States of Micronesia, Second National Communication under the UN Framework Convention on Climate Change, 2015

Federated States of Micronesia, Strategic Development Plan, 2004 – 2023

Fletcher C.H. and B.M Richmond. 2010. Climate Change in the Federated States of Micronesia: Food and Water Security, Climate Risk Management, and Adaptive Strategies. Center for Island Climate Adaptation and Policy.

Framework for National Water and Sanitation Policy, 2011

IDP 2016 – 2025, Government of FSM

Keener, V.W., Marra, J.J., Finucane, M.L., Spooner, D., & Smith, M.H (Eds). 2012. Climate Change and Pacific Islands: Indicators and Impacts. Report for the 2012 Pacific Islands Regional Climate Assessment, DC: Island Press.

Kosrae Environmental Impact Assessment guidelines

Kosrae Island Resource Management Authority (KIRMA) Regulations for Development Projects

Kosrae Shoreline Management Plan, 2014

Kosrae State Climate Change Act, 2011

Kosrae State Joint Action Plans for Climate Change and Disaster Risk Management

Kosrae State Land Use Plan, 2003

Kosrae State Regulations for Development Projects (No. 67-05), 2014 Amendment

Kosrae State Strategic Development Plan, 2013 – 2024

Learning about Climate Change the Pacific Way: A Guide for Teachers

Legislative Resolution No.11-106. Endorsing the inner road construction projects as one of the highest infrastructure priority projects for the State of Kosrae and for other purposes (November 24, 2015).

Malem to Utwe Inland Road Initiative. Environment Impact Statement for the inland road. Prepared for the Kosrae State Government and the Secretariat of the Pacific Regional Environment Programme, May 2016. NIWA

Malem-Utwe Inland Road Relocation Initiative, Kosrae, Monitoring and Evaluation Framework, SPREP, 2016

Maslow Hierarchy of water requirement needs, WHO, 2013

Namakin, 2008; FSM Division of Statistic, 2012, in FSM Second National Communications under the UN Framework Convention on Climate Change, 2015, p.16

Official correspondence from Government of Kosrae (Office of the Governor) to President of FSM, with regards to Prioritisation of Inner Roads within the Infrastructure Development Plan Framework for Kosrae State (November 6, 2015)

Pacific Adaptation to Climate Change Project, Vanuatu Manual

Pacific Gender and Climate Change Toolkit, GIZ, SPC, SPREP, UNDP, GIZ, PACC Project, 2015

Raid Assessment Report, March 2016, FSM

Secretariat of the Pacific Community (SPC) GCCA: PSIS Project, Climate Change Profile - Federated States of Micronesia. Version 2, July 2013

Smith, WJ; J Mount, D. Bennet and P. Shed, 2014. Collaborative research methodologies and the construction of a national geospatial clearinghouse to conserve biodiversity in the Federated States of Micronesia. Applied Geography 54: 198 – 2008

Smith, WJ, 2008. Geographic Journal, Vol. 174 No.3, pp. 251 – 268, 2008

Smith, WJ., Mount, D. Bennet and P. Shed. 2014. Collaborative research methodologies and the construction of a national geospatial clearinghouse to conserve biodiversity in the Federated States of Micronesia. Applied Geography 54: 198 – 208

Summary findings from consultations, held with Yap, Chuuk, Pohnpei and Kosrae communities (June, 2015)

Sustainable sanitation manual and construction guidelines for a waterless composting toilet, SPREP, 2007

Water Sector Investment Plan

Workshop Report, Developing a Monitoring and Evaluation Framework for a Project to Reduce Climate Risks Faced by Malem and Utwe Communities, 2015.

RELEVANT WEBSITES:

<http://www.sprep.org/attachments/Publications/CC/PACCTechRep18.pdf>

Pacific Climate Change Portal, www.pacificclimatechange.net

Pacific Disaster Net, www.pacificdisaster.net

[Http://www.sprep.org/pacc/publications/technical-reports](http://www.sprep.org/pacc/publications/technical-reports)

International Waters Project, Pacific Technical report no.52,
http://www.sprep.org/publication/000560_IWP_PTR52.pdf
