

Funding Proposal

FP066: Pacific Resilience Project Phase II for RMI

Republic of the Marshall Islands | International Bank for Reconstruction and Development and
International Development Association (World Bank) | Decision B.19/12

16 March 2018





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Funding Proposal

Version 1.1

The Green Climate Fund (GCF) is seeking high-quality funding proposals.

Accredited entities are expected to develop their funding proposals, in close consultation with the relevant national designated authority, with due consideration of the GCF's Investment Framework and Results Management Framework. The funding proposals should demonstrate how the proposed projects or programmes will perform against the investment criteria and achieve part or all of the strategic impact results.

Project/Programme Title: **Pacific Resilience Project Phase II for RMI**

Country/Region: Republic of the Marshall Islands

Accredited Entity: The World Bank Group

Date of Submission: 30 December 2016_(revised March 24, 2017)___

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Note to accredited entities on the use of the funding proposal template

- Sections **A, B, D, E** and **H** of the funding proposal require detailed inputs from the accredited entity. For all other sections, including the Appraisal Summary in section F, accredited entities have discretion in how they wish to present the information. Accredited entities can either directly incorporate information into this proposal, or provide summary information in the proposal with cross-reference to other project documents such as project appraisal document.
- The total number of pages for the funding proposal (excluding annexes) is expected not to exceed 50.

Please submit the completed form to:

fundingproposal@gcfund.org

Please use the following name convention for the file name:

"[FP]-[Agency Short Name]-[Date]-[Serial Number]"

A.1. Brief Project / Programme Information		
A.1.1. Project / programme title		Pacific Resilience Project Phase II for RMI
A.1.2. Project or programme		Project
A.1.3. Country (ies) / region		Republic of the Marshall Islands
A.1.4. National designated authority (ies)		Office of Environmental Planning & Policy Coordination Mr. Lowell Alik, Director
A.1.5. Accredited entity		International Bank for Reconstruction and Development and International Development Association (World Bank)
A.1.5.a. Access modality		<input type="checkbox"/> Direct <input checked="" type="checkbox"/> International
A.1.6. Executing entity / beneficiary		<p>Executing Entities: Ministry of Finance, Ministry of Public Works</p> <p>Beneficiaries: National Disaster Management Office (NDMO), National Weather Service (NWS), Environmental Protection Authority (EPA) and Kwajalein Local Government</p> <p>Total number of beneficiaries: 16,000 direct beneficiaries from Ebeye and outer islands; 23,800 indirect beneficiaries in Majuro and Ebeye</p>
A.1.7. Project size category (Total investment, million US\$)		<input type="checkbox"/> Micro (≤ 10) <input checked="" type="checkbox"/> Small ($10 < x \leq 50$) <input type="checkbox"/> Medium ($50 < x \leq 250$) <input type="checkbox"/> Large (> 250)
A.1.8. Mitigation / adaptation focus		<input type="checkbox"/> Mitigation <input checked="" type="checkbox"/> Adaptation <input type="checkbox"/> Cross-cutting
A.1.9. Date of submission		December 30, 2016
A.1.10. Project contact details	Contact person, position	Denis Jordy, Senior Environmental Specialist
	Organization	The World Bank
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	Mailing address	World Bank Group 14 Martin Place Sydney NSW 2000 AUSTRALIA

A.1.11. Results areas <i>(mark all that apply)</i>	
<u>Reduced emissions from:</u>	
<input type="checkbox"/>	Energy access and power generation (E.g. on-grid, micro-grid or off-grid solar, wind, geothermal, etc.)
<input type="checkbox"/>	Low emission transport (E.g. high-speed rail, rapid bus system, etc.)
<input type="checkbox"/>	Buildings, cities and industries and appliances (E.g. new and retrofitted energy-efficient buildings, energy-efficient equipment for companies and supply chain management, etc.)
<input type="checkbox"/>	Forestry and land use (E.g. forest conservation and management, agroforestry, agricultural irrigation, water treatment and management, etc.)
<u>Increased resilience of:</u>	

- ☒ **Most vulnerable people and communities**
(E.g. mitigation of operational risk associated with climate change – diversification of supply sources and supply chain management, relocation of manufacturing facilities and warehouses, etc.)
- ☐ **Health and well-being, and food and water security**
(E.g. climate-resilient crops, efficient irrigation systems, etc.)
- ☒ **Infrastructure and built environment**
(E.g. sea walls, resilient road networks, etc.)
- ☐ **Ecosystem and ecosystem services**
(E.g. ecosystem conservation and management, ecotourism, etc.)

A.2. Project / Programme Executive Summary (max 300 words)

1. The Republic of the Marshall Islands (RMI) is one of the world's smallest, most isolated, and low-lying nations, and is highly vulnerable to climate change. The project, to be co-financed by the GCF and International Development Association (IDA), will provide transformational change to RMI by supporting the government of RMI to: improve resilience to the increasing risk from sea-level rise and changes in waves and storm surge; strengthen preparedness of its population to disaster events; and provide financial support for climate-related and other disaster responses. The project promotes a systematic transformation of RMI's coastal management through innovative solutions in the densely populated areas of Ebeye and Majuro. The project will draw on innovative and highly technical modelling of the RMI coastline to inform investments in coastal protection. It will also seek out new means for sourcing sustainable aggregate from atoll islands for use in construction, which will have wider benefits for other atoll nations. In addition, the project will strengthen enabling environments for investments in resilience, through improved planning, effective ecosystem management and prioritization of investments in climate and disaster resilient development.
2. The coastal protection works are designed to respond to RMI's challenges as an atoll nation subject to active erosion and flooding, with the added constraint of limited aggregate sources and construction market capacity. The project includes co-funded support from the Pacific Community (SPC) to bring economies of scale, extensive knowledge, and regional collaboration in disaster risk management and climate resilience.
3. The project beneficiaries include communities living in the coastal areas as well as national and local government agencies with strengthened capacity to address climate and disaster risks.
4. The main part of the project will be executed by national institutions with a regional technical assistance component executed by SPC, co-funded by IDA.
5. The project has been endorsed by the NDA, and is fully aligned with the National Determined Contribution as well as the Joint National Action Plan for Climate Change Adaptation and Disaster Risk Management in RMI.

A.3. Project/Programme Milestone

Expected approval from accredited entity's Board (if applicable)	9/05/2017
Expected financial close (if applicable)	November 2022
Estimated implementation start and end date	Start: <u>01/10/2017</u> End: <u>30/11/2022</u>
Project/programme lifespan	5 years

Investment lifespan	30 years
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B.1. Description of Financial Elements of the Project / Programme

6. The proposed financial instrument is an Investment Project Financing, funded by a combination of a grant from the International Development Association (IDA) through the World Bank and a grant from the GCF. The GCF grant and national IDA would finance activities implemented by RMI, whereas regional IDA funds will be used to finance activities implemented by SPC or PIFS.
7. A grant is requested from the GCF to finance the strengthened resilience of the coastal areas of Marshall Islands to the adverse impacts of climate change specifically through sea-level rise, changes in waves and storm patterns, coastal inundation as well as modification of the precipitation patterns resulting in seasonal droughts and changes in wind conditions. The component on coastal protection will be dedicated to the coastlines of the most densely populated island (Ebeye) where critical infrastructure such as the power plant, houses, and other important social and economic assets are located. Given the limited availability of solutions for coastal protection in atolls, this project will inform investments in other atoll islands within RMI and elsewhere.
8. Despite the recognized increasing needs to protect the infrastructures and the population, the high upfront costs to build the needed solutions have prevented the government of the RMI from planning and investing in coastal protection in a systematic and strategic way. Most of the past and current protection has been designed and implemented as fragmented and standalone projects, often through individual initiatives to address urgent needs, without consideration of increasing impacts of climate change along all of the coast line. The lack of a comprehensive, systematic and coordinated approach has led to poor outcomes, and, in some cases, to increased risks from climate-related factors as well as environmental degradation. Dedicated financial and technical resources are essential for improved and resilient outcomes.
9. Solutions that are resilient to climate change tend to be non-revenue generating investments, and often, have low economic rates of return, making them less attractive from an economic perspective when compared to meeting other development needs. In combination with the IDA grant, the GCF grant will allow the government of RMI to access the critical funding to implement a truly transformational and comprehensive approach to build the climate resilience of the atoll islands.
10. A breakdown of the project cost estimates is presented below. There is a contingency of 17.5% built into the project budget (US\$ 7.15 million), which allows for price and physical contingencies related to construction of the coastal protection works.

Component	Sub-component (if applicable)	Amount (for entire project)	Local Currency	GCF funding amount	Currency of disbursement to recipient
Component 1 Institutional Strengthening, Early Warning, and Preparedness	1.1 Institutional strengthening, early warning & preparedness	3.10	<u>million USD (\$)</u>	1.95	<u>million USD (\$)</u>
	1.2 Impact forecasting, NDMO capacity building & post disaster needs assessment	1.06	<u>million USD (\$)</u>	0	<u>million USD (\$)</u>
Component 2 Strengthening Coastal Resilience	2.1 Coastal protection investments	38.44	<u>million USD (\$)</u>	22.31	<u>million USD (\$)</u>
	2.2 Strengthen integrated coastal risk management	2.33	<u>million USD (\$)</u>	0	<u>million USD (\$)</u>
Component 3 Contingency Emergency Response		0.50	<u>million USD (\$)</u>	0	<u>million USD (\$)</u>

Component 4	3.21	<u>million USD (\$)</u>	0.74	<u>million USD (\$)</u>
Project Management, Monitoring & Evaluation				
Total project financing	48.6	million USD (\$)	25.0	million USD (\$)

NB: the local currency in Marshall Islands is the United States dollar (USD)

Expenditure type	Amount (million \$US)
• Services	6.22
• Consultants	5.66
• Good	0.50
• Works	27.35
• Incremental operating cost	1.19
• Contingency emergency response fund provision	0.50
• Contingencies	7.18

B.2. Project Financing Information

	Financial Instrument		Amount	Currency	Tenor		Pricing
(a) Total project financing	(a) = (b) + (c)		48.6	million USD (\$)			
(b) GCF financing to recipient	(i) Senior Loans	.....	Options	() years	() %		
	(ii) Subordinated Loans	.....	Options	() years	() %		
	(iii) Equity	.....	Options		() % IRR		
	(iv) Guarantees	.....	Options				
	(v) Reimbursable grants *	.....	Options				
	(vi) Grants *	25.0	million USD (\$)				
	* Please provide economic and financial justification in section F.1 for the concessionality that GCF is expected to provide, particularly in the case of grants. Please specify difference in tenor and price between GCF financing and that of accredited entities. Please note that the level of concessionality should correspond to the level of the project/programme’s expected performance against the investment criteria indicated in section E .						
Total requested (i+ii+iii+iv+v+vi)		25.0	million USD (\$)				
(c) Co-financing to recipient	Financial Instrument	Amount	Currency	Name of Institution	Tenor	Pricing	Seniority
	Grant	23.60	million USD (\$)	IDA		() %	Options
	Options	.....	Options	.....	( ) years	() %	Options
	Options	.....	Options	.....	( ) years	() % IRR	Options
	Options	.....	Options	.....			Options

	<p>Lead financing institution: ...IDA.....</p> <p><i>The total cost of the PREP Phase II is currently estimated to amount to US\$48.6 million over 5 years. This includes: (i) US\$19.6 million in IDA Grant for RMI; (ii) US\$4 million in Regional IDA Grant for SPC; (iii) US\$25 million from GCF for RMI</i></p>
(d) Financial terms between GCF and AE (if applicable)	<p><i>Not Applicable</i></p>
B.3. Financial Markets Overview (if applicable)	
<p><i>Not applicable, coastal resilience (coastal protection, risk preparedness and long-term planning) is considered a non-revenue generating public good, with no available market.</i></p>	

C.1. Strategic Context

11. The Pacific Island Countries (PICs) include some of the world's smallest nations located in the world's largest ocean. PICs are among the most physically vulnerable nations in the world. They are highly exposed to adverse effects from climate change and natural hazards (including floods, droughts, tropical cyclones/typhoons, earthquakes, volcanic eruptions, and tsunamis), which can result in disasters that affect their entire economic, human, and physical environment, and impact their long-term development. Since the 1950s, natural disasters have affected roughly 9.2 million people in the Pacific region, causing around 10,000 deaths.¹ This has cost the PICs around USD 4.6 billion (in nominal terms) in associated damage costs (EM-DAT 2010, and World Bank).²
12. The Republic of the Marshall Islands (RMI) is one of the world's smallest, most isolated and vulnerable nations. The country consists of 29 atolls and five isolated islands (24 of which are inhabited) with a total land mass of just 181 km² set in an ocean area of over 1.9 million km². RMI's population is estimated to be 53,000, of which around 75% are concentrated in the urban areas (Majuro and Ebeye).
13. RMI is a lower middle-income country with a 2015 GDP of USD 179 million, and a per capita GDP of USD 3,325. GDP has grown at an average rate of 1.2% per annum in real per capita terms since independence in 1979. The size and remoteness of RMI increases the cost of economic activity and makes it unable to achieve economies of scale. Remoteness also imposes transport expenses that increase the costs of trade, and fundamentally constrains the competitiveness of exports of goods and services internationally. These factors also increase also the cost and complexity of providing public services and fulfilling the basic functions of Government. Exports are low, and the shallow domestic economy has brought high dependence on imports, which are funded largely by the sale of offshore fishing rights and high levels of foreign aid. Foreign aid funds support a very large public sector that dominates the economy.
14. The population of RMI is concentrated on small, low-lying atolls, with a mean altitude around 2 m above sea-level. This makes RMI particularly vulnerable to climate change, especially to sea-level rise. The country is exposed to occasional typhoons. Like other low-lying Pacific nations, its 370 km coastline (which is home to 99% of the population), renders it particularly susceptible to extreme water levels, waves and high tides and is already beginning to feel the effects of climate change.
15. RMI is exposed to a variety of disaster risks, including recurrent droughts, coastal hazards (e.g. wave-induced erosion and flooding linked to king tides and storm surge), tropical storms, and, to a lesser extent, typhoons. The Average Annual Loss related to typhoons and tsunami/earthquake, computed through catastrophic risk modelling, is estimated to be around 1.7 % of GDP (i.e. USD 3 million per year).³ Based on this calculation, in the next 50 years, RMI has a 50% chance of experiencing a loss exceeding US\$53 million, and a 10% chance of experiencing a loss exceeding USD 160 million.⁴ Typhoon Paka in 1997 caused an estimated USD 70 million of losses and damages. More detailed simulations for Ebeye done for the preparation of this project indicate that these figures reflect only a small portion of the costs of natural disasters. When also considering inundations due to storm surges and king tides, the average annual loss goes up to around USD 2 million for Ebeye alone.
16. These estimates do not take climate change into account and thus are an underestimate in terms of exacerbate risks to livelihoods, coastal settlements, infrastructure, ecosystems and economic stability.⁵ Climate change will lead to more damaging storm surges and coastal inundation, increased intensity of tropical storms, and more extreme events such as droughts and flooding. Increases in sea level will

¹ SPC Pocket Handbook, 2010

² Pacific Catastrophe Risk Assessment and Financing Initiative (PCRAFI). Countries covered by PCRAFI are Cook Islands, Federated States of Micronesia, Fiji, Kiribati, RMI, Nauru, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu, Vanuatu, and Timor-Leste.

³ RMI Country Risk Profile, PCRAFI (2011)

⁴ PCRAFI Country Risk Profiles, September 2011

⁵ IPCC, 2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland.

accelerate coastal erosion, increase coastal inundation, and increase salinization of freshwater resources. A state of emergency was declared on February 3, 2016, due to a prolonged drought which affected the country. El Nino events currently contribute towards recurrent droughts in RMI but, at this stage, the relationship between climate change and El Nino events is unclear. However, El-Nino like events are expected to increase affecting land and water resources as well as coral reefs. Coral reefs, which offer a natural protection of the shorelines, are also likely to be affected by ocean acidification and higher temperatures. Experience in RMI shows that coral reefs are already being damaged by human waste, garbage, and debris being washed onto the reefs during the ebb tide and is likely to make them more sensitive to changing climatic factors.

17. The natural hazard risks are particularly high in Majuro and Ebeye due to their large populations and extensive public infrastructure. Majuro has a population of about 27,000 and Ebeye some 11,000 people. The impacts of coastal erosion and inundations are evident along the shorelines of both islands. The shoreline erosion has left public infrastructure (e.g. sections of the roads on both the ocean and lagoon side of the two atolls, and the hospital in Majuro) highly exposed and vulnerable. Other vulnerable infrastructure includes the water reservoir close to the airport in Majuro, the airstrip, and private houses. Several schools are reportedly highly affected by erosion. The need for coastal protection around Ebeye is particularly critical because of its small size, high population density,⁶ the exposure of existing infrastructure to wave action, and the settlement of people immediately adjacent to the coastline without the option of retreating due to constrained land availability.
18. While disasters impact whole societies when they strike, the poor and vulnerable are hit the hardest. This was the case following recent disaster events in the Pacific and RMI (e.g. in the aftermath of tropical storm Nangka in July 2015) where poorer people were affected to a greater degree as they were less likely to have insurance, cash reserves, and alternative income sources that provide a means for them to recover quickly). There is very limited sex-disaggregated data on the impacts of climate change and natural disasters for RMI. However, as the underlying causes of vulnerability to climate change risks are related to lack of human endowments such as health, education and social protection, low economic opportunities and lack of voice and agency, it is valid to assume that women are more vulnerable than men to climate and disaster risks in RMI.
19. Recognizing these challenges, the Government has developed strategic priorities for disaster management and climate adaptation which are spelled out in the Joint National Action Plan on Climate Change Adaptation and Disaster Risk Management (JNAP) adopted in 2013. The five JNAP goals for the 2014–18 period relevant to this project are:
 - i. Establish and support an enabling environment for improved coordination of disaster risk management/climate change adaptation in the Marshall Islands;
 - ii. Public education and awareness of effective CCA and DRM from local to national level;
 - iii. Enhanced emergency preparedness and response at all levels within the Marshall Islands;
 - v. Enhanced local livelihoods and community resilience for all Marshall Islands people;
 - vi. Integrated approach to development planning including consideration of climate change and disaster risks.
20. This action plan aims to combine the Disaster Risk Management National Action Plan, developed in 2007 and reviewed in 2010, and the National Climate Change Policy Framework, formally endorsed in 2011 for “*building the resilience of the people of the Marshall Islands to climate change*”. Indeed, as most of the hazards impacting RMI are climatic related, the government decided to harmonize both strategies and policies and to set up a unique mechanism to deal with disaster risk and climate change adaptation.

C.2. Project / Programme Objective against Baseline

Baseline scenario:

⁶ Ebeye has a population density of more than 30,000 people/km², and is in the top ten most densely populated islands in the world.

21. Some climate change trends have already been observed in RMI as reported in the *Climate Change in the Pacific: Scientific Assessment and New Research* report.⁷
22. Annual maximum and minimum **temperatures** have increased in both Majuro and Kwajalein since mid-20th century, with increasing rates consistent with global trend (between 0.12°C and 0.20°C per decade in Majuro and Kwajalein, respectively).
23. Satellite data indicate the **sea level has risen** near RMI by about 7 mm per year since 1993 (see Figure 1). This is larger than the global average of 2.8–3.6 mm per year. This higher rate of rise may be partly related to natural fluctuations that take place year to year or decade to decade caused by phenomena such as the El Niño-Southern Oscillation.
24. **Rainfall data** since 1950 for Kwajalein show a decreasing trend in annual and seasonal rainfall. In Majuro, since 1950, there is a decreasing trend in annual and dry season rainfall but no trend in wet season rainfall. A high inter-annual variability is observed in both islands.
25. Observed data show that since the 18th century the level of ocean **acidification** has been slowly increasing in Marshall Islands' waters.
26. Over the 21st century, based on the climate projections from different climate models, some of these trends are expected to continue while others might even exacerbate the threat caused by Climate change to RMI:
27. Land and ocean **Temperatures** are projected to continue to increase. Projections for all emissions scenarios indicate that the annual average air temperature and sea surface temperature will continue to increase also likely to result in a rise in the number of hot days and warm nights, and a decline in cooler weather. Models project an increase in the intensity and frequency in days of **extreme heat**.
28. **Sea level is expected to continue to rise** in the Marshall Islands. By 2030, under a high emissions scenario, this rise in sea level is projected to be in the range of 3–16 cm. **Acidification** of ocean will continue to increase and keep threatening the coral reef ecosystem.
29. Almost all the global climate models project an increase in average annual and seasonal mean **rainfall** over the course of the 21st century. Wet season increases are particularly due to the expected intensification of the West Pacific Monsoon and the Intertropical Convergence Zone. However, as with global studies, rainfall projections are less certain and not all models show consistent results. Droughts are projected to become less frequent throughout this century. Model projections show extreme rainfall days are likely to occur more often and be more intense ("very high confidence").
30. The Marshall Islands is in a region where projections tend to show a **decrease in typhoon frequency** by the late 21st century, and a **decrease in the proportion of the more intense storms**.

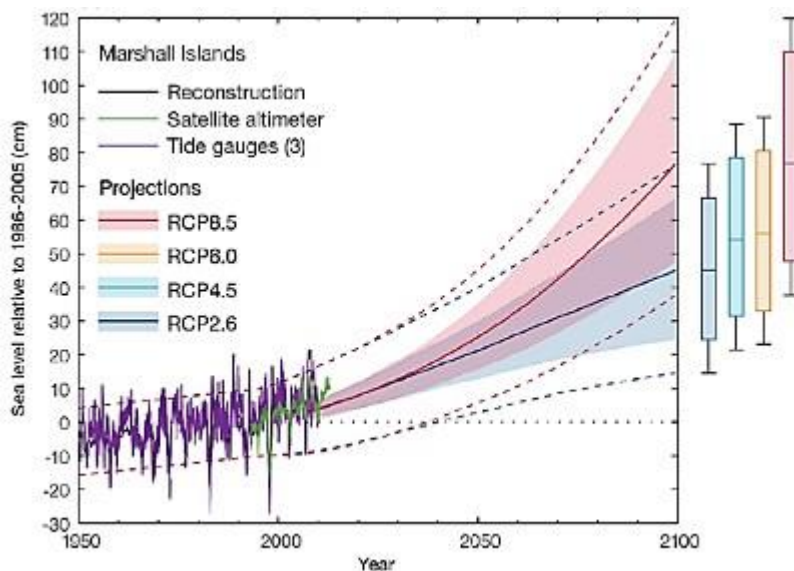


Figure 1: Observed and projected sea level rise for Republic of Marshall Islands (CSIRO, 2014)

⁷ Australian Bureau of Meteorology and CSIRO, 2011. *Climate Change in the Pacific: Scientific Assessment and New Research*. Volume 2: Country Reports

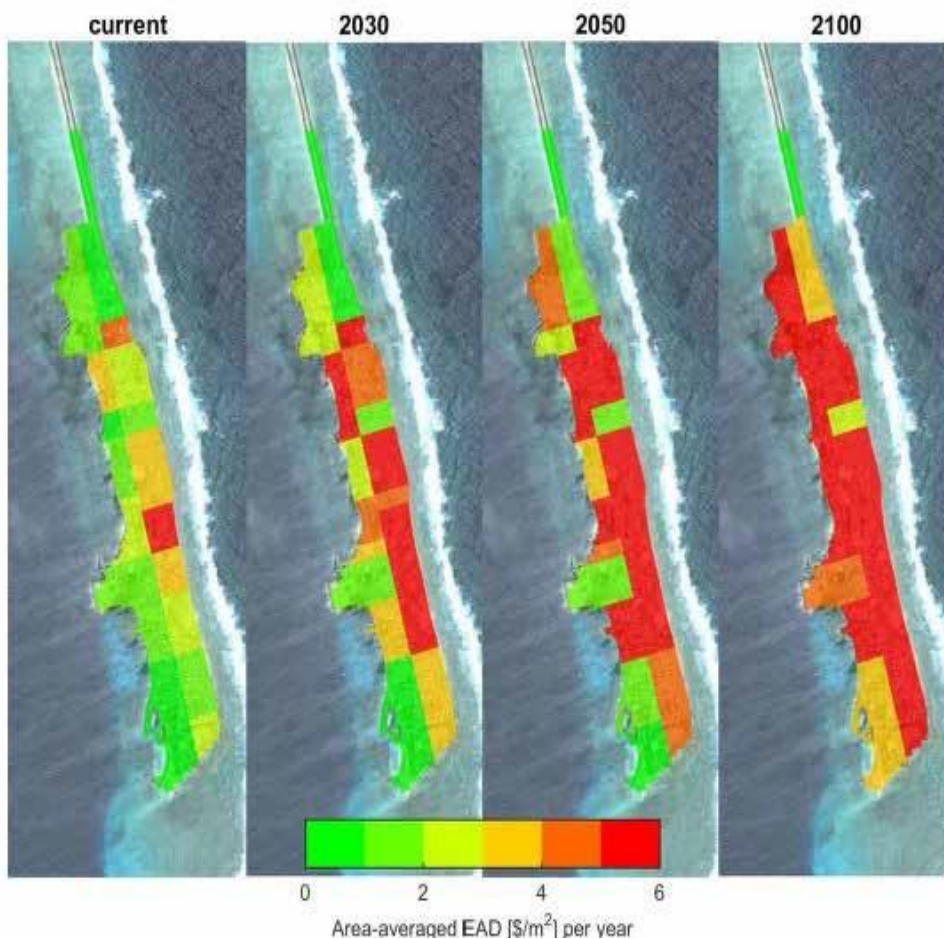
31. The effects of climate change are already being observed in RMI, and they will only be exacerbated in the future. Without any significant investment and transformative approach to coastal protection, the whole habitability of the atoll nation over the coming decades is at risk. Based on simulations performed by Deltares in preparation of this application (see annex II), the area in Ebeye severely inundated (i.e. with water depth more than 0.5m) during important, but quite frequent, events (i.e. occurring on average every 5 years) will increase by multiples of six (RCP 4.5 scenario) to 10 (RCP 8.5) in 2100 compared with the current period. At the end of the XXIst century, extreme events, with return period above 50 years, will flood Ebeye to depths greater than 50 cm in both scenarios (see Table 1).

Table 1: Percentage of maximum inundation in Ebeye with return periods of 5, 10, 30 and 50 years. The percentage relative to the island area is given for a minimum inundation depth of 50 cm. (Deltares, 2016)

[%] of island inundation (>50 cm)				
RP [yr]	Current SLR = 0 m	RCP 4.5: 2030 SLR = 0.12 m	RCP 4.5: 2050 SLR = 0.23 m	RCP 4.5: 2100 SLR = 0.53 m
5	4,7	5,8	7,9	28,1
10	5,9	7,8	10,9	34,9
30	38,6	50,8	59,7	70,4
50	84,5	90,3	91,6	98,7
RP [yr]	Current SLR = 0 m	RCP 8.5: 2030 SLR = 0.13 m	RCP 8.5: 2050 SLR = 0.26 m	RCP 8.5: 2100 SLR = 0.78 m
5	6,2	6,0	8,7	48,4
10	10,1	8,0	12,0	54,3
30	32,9	51,6	62,6	88,3
50	83,7	90,4	91,7	99,6

32. These evolutions would have direct repercussions on the population and built environments they are facing. Assuming the exposure and the vulnerability would remain the same, the expected annual damage for Ebeye would go from around \$US 2 million to 4–6 million, based on the different sea level scenarios (see Figure 2). As Ebeye is likely to develop further, with, among others, the planned construction of new water and energy infrastructures, these evolutions of future damages are likely to be underestimated.

Figure 2: Evolution of the coastal hazard risks in Ebeye for different time horizons for the RCP 8.5 scenarios, expressed as the expected annual damages per m² (Deltares, 2016)



Ongoing Initiatives in RMI

33. Donor partners are also supporting RMI address to disaster and climate change issues. These initiatives cover for example: (i) upgrading the water supply and sewerage system in Ebeye (supported by the Asian Development Bank); (ii) a water and waste management program for the Majuro Water & Sewage Company (supported by Japan); (iii) implementation support for the RMI drought response plan (supported by Thailand, the People's Republic of China, India, Australia, and the USA); (iv) agriculture and food security (supported by Taiwan and China); (v) National Disaster Management Office (NDMO) support to finalize the JNAP Strategic framework and response to the drought (supported by the European Union); (vi) upgrading climate stations and meteorological equipment (supported by Finland, through Secretariat of the Pacific Regional Environment Programme, SPREP); and (vii) technical assistance in emergency preparedness and water resources management (Supported by the Secretariat of the Pacific Community). Potential future projects include an integrated water resource management in Majuro and outer islands project (supported by the United Nations Development Programme, with a financing proposal to GCF under preparation), and strengthening the building code and establishing a resource center through which all disaster and climate policy and project documents can be shared (supported by Italy through SPREP).

Existing coastal protection works

34. A range of coastal protection works have been built to enclose the areas reclaimed from the sea in the most populated islands (Majuro and Ebeye). Most of this is in urban areas. However, existing coastal protection infrastructure is insufficient to protect the shorelines of RMI under the current conditions, and it is envisaged that as the impacts of climate change increase, the gap between the current standard of protection and the required level of protection will increase. In addition, lack of planning and uncontrolled reclamation has devastated the natural integrity of the coast. Nearly 100% of the high value shoreline in Majuro is already protected by some form of coastal barrier, but the coastal protection solutions are very heterogeneous, including riprap boulders extracted from the ocean-side reef flats, engineered vertical concrete seawalls, and piles of vegetation and trash as pseudo barriers. Most of the constructions are private initiatives, rarely adopting best practices. The situation is different in Ebeye, with very limited protection on the ocean-side, which faces the most intense hazards. A revetment has been built in the northern part of the island to protect the causeway leading to Gugeegue. However, due to insufficient funding, only the first portion of the causeway is protected by a new, well-constructed revetment. The differences in height and construction standards are reflected in the protection performance, with higher water overtopping observed in the north part of the causeway.



Figure 3: Inventories of the current materials and coastal defense types along the coastlines of Ebeye

Related Projects

35. Some government-led initiatives to increase the resilience of the coastlines of RMI have been completed in places, but they are mostly oriented either towards the protection of the main infrastructure in Majuro or for outer islands using lower-technology solutions.
36. **RMI Port Authority Runway Safety Area Project:** As part of the improvement of the safety of the Amata Kabua International Airport in Majuro, started in 2011, some land reclamation has been constructed to extend the length of the runway. The works involved land filling of 109,000 m³ and 610 m of rock revetment (sloped wall shaped from various rocks).
37. **Micronesia Challenge: Sustainable Finance Systems for Island Protected Area Management.** The sub-regional initiative aims to promote traditional knowledge and ecosystem based approaches to conserve coastal resources. The objective of this initiative is to protect at least 30% and 20% of the near shore and terrestrial resources, respectively, by 2020.

38. **The Reimaanlok Process 2010–20 “looking to the future”:** As part of RMI’s commitment to the Micronesia challenge, the Reimaanlok process has been built as a planning framework to provide guidance on the creation of conservation area and ecosystem based solutions. The process support the efforts of communities to use sustainable resources, reduce the impacts of changing conditions and climate to secure the area for future generations to get access to the coastal resource. The World Bank is supporting this initiative through the Pacific Oceanscape Program (PROP).

Key Barriers to resilience building in RMI which will be addressed by this project:

39. Certain barriers have prevented implementation of necessary policies and investments to overcome the threats posed by the coastal hazards and the sea-level rise. These barriers include those listed below and will be addressed by the project:
40. **Lack of clear implementation mechanism for disaster risk management, reduction and preparedness and lack of human resources in key organizations.** The design and implementation of efficient coastal resilience strategies requires strong coordination and implementation mechanisms. The JNAP has defined the framework to do so, but still needs to be fully operationalized. The National Disaster Management Office is its implementing agency, but its human resources are insufficient to fulfill the tasks and mainstream disaster risk and climate change adaptation into the different national policies. The NDMO is also in charge of disaster preparedness and response, with the support of the National Disaster Committee. However the lack of human resources and clear roadmap for the NDMO prevents training for preparedness in outer islands. There are no clear disaster response plans or protocols for the different governmental agencies involved in disaster response.
41. **Lack of capital to invest in coastal protection, fragmented international support and constrained national resources.** Construction of coastal protection works which adhere to good practice, use sustainable materials, and which are able to be adapted for future conditions, requires massive investment. As coastal protection investments are not revenue generating, they tend not to attract private investors, and given the high costs, there is little prospect that they could be financed by the government with its own resources.
42. **Lack of long term strategy to build resilience over time.** Because of the barriers described above, most of the disaster risk reduction and climate change adaptation investments and operations have so far addressed the short term, most urgent needs, through ad-hoc approaches. This means that there is no systematic approach to enhancing resilience.
43. **The proposed project is designed to overcome the identified barriers.** The project will provide sufficient resources for the government to invest in a coherent and comprehensive way to build its resilience. Government’s capacity within central agencies such as the Chief Secretary’s Office, Ministry of Finance (and possibly EPPSO and OEPPC) will benefit through policy reforms, governance arrangements and capacity building. This will enhance RMI’s capability in pursuing its strategic and longer-term resilience agenda.
44. The Project will invest significantly in strengthening capacity of existing institutions in charge of early warning, preparedness and response to natural hazard events (e.g. National Disaster Management Office and the National Weather Service) and climate resilience planning and implementation. Technical staff including meteorologists and hydrologists will be trained to ensure that staff skills and knowledge is current, and to introduce new techniques to improve forecast warnings and communications. Tools will be developed to monitor and observe, analyse and forecast, and to communicate and disseminate information. The capacity of staff at the MPW, and EPA will also be strengthened, through participation in the design, , environmental risk management, environmental licensing, and construction of coastal protection measures, as well as long term coastal resilience planning.

C.3. Project / Programme Description

45. The Project will comprise a combination of nationally implemented activities and co-funded regionally implemented activities (implemented by SPC), as described in the matrix below. These activities will overcome the barriers described above and reach the overall objective of the project, to “*strengthen resilience to climate change and natural hazards in RMI through improved early warning systems, climate*

resilient investments in shoreline protection, and to provide immediate and effective response to an Eligible Crisis or Emergency..”

	Nationally Implemented Activities (Funded by combination of National IDA and proposed GCF grant)	Pacific Community Implemented Activities (Funded by Regional IDA)
Component 1: Institutional strengthening, early warning and preparedness (Funded by combination of IDA and proposed GCF Grant)	<ul style="list-style-type: none"> Strengthen integrated governance of disaster and climate change Improve early warning communication systems for outer islands Develop a roadmap and implement priority improvements to modernize the NDMO's facilities 	<ul style="list-style-type: none"> Institutional strengthening of the NDMO and disaster management capacity Post Disaster Needs Assessments
Component 2: Strengthening coastal resilience (Funded by combination of IDA and proposed GCF Grant)	<ul style="list-style-type: none"> Improve and expand the coastal vulnerability assessment for Ebeye and Majuro Priority coastal protection works investments including investigations, design, and construction supervision 	<ul style="list-style-type: none"> Strengthen integrated coastal risk management Investigate sustainable sources of aggregates in Majuro and Kwajalein atolls
Component 3: Contingency Emergency Response (Funded by National IDA)	<ul style="list-style-type: none"> Contingency Emergency Response Component (CERC) 	N/A
Component 4: Project management (Funded by combination of IDA and proposed GCF Grant)	<ul style="list-style-type: none"> Project management for all nationally implemented activities, and oversight of the Pacific Communities' activities 	Support from regional PREP: <ul style="list-style-type: none"> Program Support Unit (housed in SPC) to provide operational TA, M&E, procurement, and financial management support Regional Coordination Unit (PIFS) to provide high level strategic vision and support oversight and some technical assistance

46. The design of the project ensures an integrated approach to resilience for the population of RMI. Ebeye and targeted risk prone areas in Majuro will be better protected from coastal inundation through coastal protection works. This new infrastructure will be complimented with improvements to land use planning and the enabling environment for resilient development. Improved early warning measures will also be introduced to the population of RMI, with remote areas receiving strengthened emergency communication infrastructure/equipment under the Project, and the agencies responsible for early warning and preparedness undergoing institutional strengthening (including strengthened Standard Operating Procedures). This will be coupled with financial resilience tools (including the CERC and Disaster Risk Financing Insurance – financed under Phase I of the PREP) to provide a full and comprehensive package of adaptation measures.

Component 1: Institutional strengthening, early warning and preparedness

47. This component will strengthen the effectiveness of the RMI institutions responsible for climate and disaster resilience, and disaster early warning and preparedness, and will support the implementation of the JNAP. This component 1 has two sub-components: (i) institutional strengthening, early warning, and preparedness (implemented by RMI and funded by a combination of National IDA and a proposed GCF grant); and (ii) NDMO capacity building and post disaster needs assessment (implemented by SPC, and funded by Regional IDA).

48. This component will improve the effectiveness of the RMI institutions/departments responsible for climate and disaster resilience, as well as disaster early warning and preparedness. The JNAP provides a great

basis to better integrate disaster risk management and climate change adaptation. However, governance mechanisms need to be clarified, including the roles and responsibilities of the National Climate Change Committee chaired by the Office of Environmental Planning and Policy Coordination (OEPPC), and the National Disaster Committee chaired by the Office of the Chief Secretary. Major issues to be addressed include accelerating implementation of the JNAP priorities and improving capacity to make evidence-based planning for disaster and climate resilient investments in sectors and at the community level.

49. While detecting, forecasting, and warning of natural hazard events is relatively well established in RMI with NOAA support, dissemination of warnings to the population, including “last mile” communication to outer islands and Ebeye, is less well established. Little information exists on how women and men receive and respond to early warning messages in RMI. The development of emergency preparedness and response mechanisms, and their implementation on the ground, particularly at community level, needs to be improved as it is important for early warning systems efforts to understand and address women and men’s priorities and needs at the community level to be fully effective. Experience with conflict early warning⁸ for example has shown that women’s contributions in information and response have been overlooked. The project will therefore ensure that the dissemination of warnings are gender-informed.

Component 1.1: Institutional strengthening, early warning and preparedness (funded by a combination of National IDA and proposed GCF Grant)

Budget: Total: 3.1 million USD (\$) – GCF: 1.95 million USD (\$)

Expected outcomes:

50. Increased the coverage of hazard forecast and warning messages to women and men at risk by up to 70 %
51. NDMO modernized and operating in accordance with pre-agreed performance standards
52. Multi Hazard Early warning systems are established and operating, and women and men knows how to react through gender-informed dissemination of warnings.

JNAP objectives supported are:

53. **Objective 1.2:** Adequately resource key administrations for DRM/CCA at national and local government levels, including securing avenues for sustainable financing
54. **Objective 1.3:** Strengthen human resource capacity of women and men of key organizations for DRM/CCA including at the national and local governments levels
55. **Objective 2.1:** Plan for the development of human resources to provide, improve and retain the technical, scientific, management skills and expertise in-country
56. Three activities are proposed under Component 1.1:
 - i. Institutional strengthening. This will support the government to integrate climate change adaptation (with a 1.5-2°C outlook) with disaster risk management, as planned under the JNAP, and to operationalize working groups at central and local government levels. Also, institutional strengthening of the agencies responsible for implementing the JNAP will be undertaken.
 - ii. Improved Early Warning Communication Systems. This will include better multi-hazard early warning systems, preparation of a systems and technology roadmap for outer island communications, and upgrading of communications systems (e.g. FM radio, Chatty Beetle) in remote locations and training of women and men to use them (including community awareness/training/drills). This work will be harmonized with preliminary work underway by others (e.g. IOM). The project will ensure that the trainees include women and youth in the trainees’ pool.
 - iii. Strengthened NDMO Facilities. This will develop a roadmap and implement priority investments to modernize the NDMO’s facilities. This may include accommodation upgrades, interior fit-out, systems improvements, the final scope of which will be determined during project implementation. The modernization of the NDMO

⁸ UNWOMEN (2012) Gender-Responsive Early Warning: Overview and How-to-Guide

will ensure that the facility is operating in accordance with standards which account for future climate change scenarios (rather than business as usual DRR activities).

Component 1.2: NDMO capacity building, and Post Disaster Needs Assessment (funded by Regional IDA)

Budget: Total: 1.06 million USD (\$) – GCF: 0 million USD (\$)

Expected outcomes:

- 57. Women and men understand and are prepared to respond to impact based forecasting
- 58. NDMO staff is reinforced and better qualified to fulfill its mandate

Outputs:

- 59. Post-Disaster Need Assessment would be delivered quickly, in case a disaster happens
- 60. The PDNA Guidelines on Gender will be applied in case a disaster happens
- 61. Collection of sex-disaggregated data and gender-specific disaster impact data will be promoted

JNAP objectives supported are:

- 62. **Objective 2.5:** Inform and train women and men about emergency communication and emergency response procedures, giving priority to the needs to selected institutions and the needs of vulnerable groups.
- 63. **Objective 3.1:** Strengthen preparedness and response capacity amongst relevant ministries and agencies at national and local levels, in particular a focus addressing the needs of the most vulnerable groups
- 64. This sub-component will be implemented by SPC. It will provide TA to support: (i) institutional strengthening of the NDMO and its preparedness for response to disasters; and (ii) provision for post disaster needs assessment. This sub-component will contribute to the regional platform which is being developed under the PREP Phase I for strengthening early warning and preparedness systems in the Pacific region, harmonization and building common approaches for DRM and climate resilience, and knowledge sharing with other Pacific Islands countries.

Sub-component 1.2.1: National Disaster Management Office capacity building

- 65. Under this sub-component, extensive support will be provided to institutionally strengthen the NDMO, building its capacity to prepare for and respond to disasters consistent with the direction provided under Component 1.1. Extensive training, coaching, and support will be provided for existing and new staff (being recruited), including:
 - i. Undertake a disaster management skills capacity assessment, and gap analysis of the NDMO and, if required, other key government and provincial agencies involved in disaster management. An action plan, with well-designed activities, training programs, terms of reference for additional human resources, and so forth, will be developed to improve long-term institutional capacity.
 - ii. Help prepare position descriptions, operating procedures, training records, drills, response plans, community awareness and outreach programs, and the like. Help the NDMO fully implement all aspects of operations and responsibilities.
 - iii. Document and further develop best practice in emergency coordination, preparedness, and response for all emergency services (fire and rescue, ambulance, police, armed services, etc., and relevant government departments such as the NDMO). Lessons and methodologies will be introduced from the Pacific Islands Emergency Management Alliance (PIEMA) program.
 - iv. Introduce impact forecasting using hazard models to forecast the impacts of extreme events, including typhoon, storm surges, and flooding⁹. The tools will make use of the coastal hazard analysis under Component 2, and be incorporated into RMI's multi-hazard warning platforms. The tools will need to be simple, determined from a needs assessment, and be within the NDMO's capacity to use consistently.

¹⁰ Action 2.10.7: 'Strengthened capacity to anticipate, resist, plan and prepare for, respond to and recover from the consequences of disasters and climate change'.

Community awareness raising and educational programs will also be developed to summarize the most important points about hazard and risks. Advice will be given on practical interventions that best reduce risks.

Sub-component 1.2.2: Scholarship program

66. As a further means of building the longer term national capacity for climate and disaster resilience and coastal risk management, this sub-component will provide targeted support for selected students involving academic or vocational scholarships. Twinning arrangements will also be offered.

Sub-component 1.2.3: Post Disaster Needs Assessment (PDNA)

Provision is included in the project to carry out a post disaster needs assessment through the auspices of the Pacific Community should disaster arise where a PDNA or a rapid damage assessment is warranted during the life of the project. Implementation of priority recommendations arising out of the 2016 Drought PDNA specifically in relation to its DRM recommendations will also be undertaken within this sub-component. The priorities for support will be determined by the NDC.

Component 2: Strengthening coastal resilience

67. This component will strengthen coastal planning, increase understanding of current and future risks, help the government to prioritize future investments, and deliver targeted coastal protection investments. Component 2 is divided into two sub-components: (i) coastal protection investments (which will be implemented by RMI, and funded by a combination of IDA and proposed GCF grants); and (ii) strengthen integrated coastal risk management (which will be implemented by SPC and funded by IDA)

Component 2.1: Coastal protection investments (funded by a combination of National IDA and proposed GCF grant)

Budget: Total: 38.4 million USD (\$) – GCF: 22.31 million USD (\$),

Expected outcomes:

90 % of the population (of which 50 % are women) protected in Ebeye

Reduction of 0.70 million USD in expected annual damages

Outputs:

68. 1.5km of coast with reduced vulnerability to flooding and storm surges

69. Training on inspection and maintenance of coastal protection works

JNAP objectives supported are:

70. **Objective 5.4:** Strengthen policy and technical capacity for Integrated Coastal Management (ICM) to improve environmental management and reduce vulnerability to climate change and natural hazards, including monitoring and enforcement of regulations
71. **Objective 5.8:** Address the issue of loss of land in the RMI
72. **Objective 6.1:** Strengthen land use and settlement planning processes and systems (including lease arrangements) at all levels from community, local to national
73. **Objective 6.2:** Ensure planning and policy development at all levels reflects an understanding of climate change and disaster risk.
74. **Objective 6.3:** Develop sound and accurate baseline information to support adaptation and risk reduction planning via an integrated approach for data management
75. This sub-component aims to strengthen coastal protection and resilience in Ebeye, and subsequently in Majuro (with Majuro coastal protection investments to be financed by IDA). Coastal protection works will start on Ebeye (financed by a combination of IDA and proposed GCF grants) because of the high population density, concentration of public assets, and the already evident erosion impacts.

Sub-component 2.1.1: Coastal Vulnerability Assessment (to be funded by National IDA)

76. As part of project preparation, Deltares were commissioned to undertake a Coastal Vulnerability Assessment (CVA) to quantify coastal hazards and their effects around Majuro and Ebeye, and quantitatively assess coastal risks on the Ebeye coastline, considering effects on people, housing, and infrastructure. From this, Deltares recommended priority areas for coastal protection in Ebeye, and prepared robust concept designs and cost estimates (see para 172 for further details and Annex 2- feasibility study). This work has been shared with stakeholders and screened for environmental and social risks. Under this sub- component, the CVA will be expanded to key coastal areas of Majuro. The methodologies and details of the previous analysis will be reviewed and, if appropriate, may be improved (e.g. by using higher resolution databases or new calibration/validation data, or introducing refinements to the analysis techniques, where these provide a worthwhile improvement to the prediction accuracy of the models).

Sub-component 2.1.2: Priority Coastal Protection investments (to be funded by National IDA and proposed GCF grant)

77. A coastal design and supervision firm will be appointed to refine and build on Deltares' analysis and designs for Ebeye and undertake the final engineering design of coastal works. For the high-energy ocean coastline, analysis has shown that rock rip-rap, or concrete armour units, or a combination, are likely to be the only effective, and therefore preferred, structural solutions. Robust concept designs were prepared as part of project preparation, and will be developed into engineering designs, after further analysis and modelling, during project implementation (as is typical with World Bank funded projects – the cost of preparing detailed designs during project preparation can be prohibitive for governments – and in this case, the detailed designs are estimated to cost in the vicinity of USD2 million - and is often combined with supervision to reduce transaction costs). The Deltares' analysis has compared risks for periods of up to 50 years in the future, considering sea level rise and hazards such as storms, typhoons, and water level fluctuations. Works for all the Ebeye and Majuro coastlines cannot be considered within the available budget so a risk based process of prioritization will be undertaken.
78. The coastal protection investments will complement existing coastal protection. In Ebeye, these existing protection works are limited to roughly one kilometer of the Guggegue causeway (north of Ebeye), or are ad hoc, low capacity, and poorly constructed structures. Existing structures provide no real protection to the residential, commercial, or industrial areas of Ebeye. The CVA identifies key, high risk hotspots in Ebeye (wave inundation and erosion risk sites) based on: (i) current climate and conditions (i.e., taking existing coastal protection infrastructure into consideration); and (ii) future, changed climate, and the ability of existing coastal protection infrastructure and the proposed future coastal protection infrastructure to withstand the changing impacts from climate-related risks conditions for periods of up to 50 years in the future (i.e. increased sea levels and higher intensity typhoons). The proposed investments will first and foremost seek to reduce the risk of inundation and shoreline erosion in these hotspots. Such investments will help bring a systematic approach to coastal protection based on detailed analysis of the natural hazards and climate change, their effects, and engineering treatments designed to deliver prescribed levels of performance over the next 50 years or more. Different potential solutions have been analyzed for the different locations where the risks are higher, and the effectiveness of these interventions in reducing the hazards have been tested by means of identical modelling simulations. The design options have incorporated a crest level of approximately 1.5 metres above ground level. The type of material used for the options considered will be either rock or concrete tubes. Consideration has been given to revetments with, or without berms, and also with or without breakwaters. The potential intervention schemes for Ebeye that have been considered as part of the project design all aim at reducing the effects of hazards from the ocean side, which will lead to the highest risk reduction compared to hazards from the lagoon. The considered options included: (i) an extreme case solution where all the ocean side of Ebeye is protected (costing between US\$32-37 million depending on the revetment type, standard or berm); (ii) interventions aimed at protecting the coastline at hot spot locations only (costing between US\$3-5 million depending on the hotspots and revetment type); (iii) options which extend the existing seawall and protect key hotspots and areas in between (costing approximately US\$20 million); and (iv) options which aim at extending the existing revetment next to the causeway all the way to Gugeege (costing between US\$83-99 million). The estimated costs have a good degree of accuracy and have been developed by a process akin to the development of a bill of quantities, based on estimated quantities for the different components (e.g. rock, concrete armour units, backfill, capping walls, etc).
79. The cost-effectiveness of these different options, which feature revetments at different locations and with different lengths have been assessed, to inform the final decisions and design of the project. Cost-effectiveness is defined as the ratio between construction costs and reduction in expected annual damage.

This process has resulted in the identification of two preferred rigorous conceptual designs which were found to be the most cost effective - one which includes a standard revetment and a second which includes a revetment and berm. Both of these preferred options aim at extending the existing seawalls in Ebeye and protecting key “hotspots” of higher risk and areas in between. Of these two options, it is envisaged that the option including the berm will be adopted, although this will be confirmed during project implementation following further consultations with relevant stakeholders, including community groups, landowners and government. The cost estimate for the preferred option including the berm is US\$ 20 million. The remaining US\$ 6 million allocated for coastal protection would be used for coastal protection investments either to protect a longer part of the ocean side or the lagoon side of Ebeye or in Majuro.

80. Given that the current availability of locally sourced aggregate is limited, and that the extraction methods have high, negative environmental and social impacts, it is assumed that all aggregates will be imported from sustainable sources in other countries. This contributes substantially to the cost of the investments.
81. While the coastal geography and wave properties on the ocean side of Ebeye will necessitate hard engineering coastal protection solutions, a wider range of “softer” or ecosystem based solutions may be available for the lagoon and the Majuro coastline and will also be promoted as part of the integrated coastal protection approach under component 2.2. Ecosystem-based approaches may include options for (re)vegetation, creation of shoreline berms (a nourishment approach currently being explored by the RMI Coastal Management Advisory Committee), and improving coral growth to allow them to buffer some of the wave actions. Mangroves plantation at this stage may be a limited solution, as mangroves do not occur naturally in Majuro or Ebeye. For both Majuro and Ebeye, attention will be given to landscaping, shade and screen tree planting, marine habitat restoration, and creating recreational spaces as part of any works. Some of these activities use simple and appropriate labor-based methods that are gender-sensitive and suitable in the context of RMI. A decision would be made on the suitability and specifics of such approaches during the implementation of the project, following completion of a CVA for Majuro.
82. The capacity of local contractors to construct and maintain coastal protection works has been reviewed. The conclusions are that the large scale works likely required for the coastal protection component will be beyond the capabilities of Ministry of Public Works, and the smaller local contractors, who have low capacity to manage environmental and social impacts. Large contracts may be required to attract international competition.
83. The project will work closely with contractors to ensure that the local communities, and women and youth in particular, are employed in construction activities when possible. The project will promote an inclusive work environment with the contractors, especially because policies, laws and mechanisms to protect the employment of labor rights have not been established throughout RMI yet.

Component 2.2: Strengthen integrated coastal risk management (funded by Regional IDA)

Budget: Total: 2.33 million USD (\$) – GCF: 0 million USD (\$)

Expected outcomes:

84. A long-term coastal security strategy is developed and adopted by the key central and atoll government agencies

Outputs:

85. Sustainable sources of aggregate, and methods of extraction, are identified and quantified in Kwajalein and Majuro atolls
86. Knowledge sharing on study for alternative aggregate and development and implementation of efficient long term planning strategies.
87. JNAP objectives supported are:
88. **Objective 1.5:** establish a visible and coordinated approach to mainstreaming natural hazard risk considerations into development planning, macroeconomic policy, fiscal management and national budgetary processes which allows for clear entry points for international support.
89. **Objective 2.3:** build the knowledge base for decision makers at all levels regarding the link between land-use and settlement planning and vulnerability to climate change and disasters.

90. **Objective 5.4:** Strengthen policy and technical capacity for Integrated Coastal Management (ICM) to improve environmental management and reduce vulnerability to climate change and natural hazards, including monitoring and enforcement of regulations
91. This sub-component will be financed with Regional IDA funding, and will be regionally implemented by the Pacific Community in close partnership with the RMI Environment Protection Agency and the Coastal Management Advisory Committee (CMAC). The objective of this component is to strengthen the coastal planning capacity of the Government of RMI, increase understanding of current and future risks, and help prioritize future investments. This sub-component combined with concrete investments planned under Sub-Component 2.1 and institutional changes promoted under Component 1 aims to promote an uptake of risk-informed coastal planning in the RMI government. Support will be provided to develop capacity in using risk information in land planning, infrastructure development, environmental management and the like. Risk information will be made available using open source decision making tools to strengthening the capacities and promote behavior changes of the development planning institutions such as EPA, MPW, and the NDMO. The activities undertaken under this sub-component will have application for improving capacity for disaster risk information and decision support tools in other Pacific islands countries.
92. The sub-component involves two activities: (i) Strengthen integrated coastal risk management; and (ii) identification of sustainable sources of aggregates.

Strengthen the coastal risk management and long term planning. Improved coastal risk information, essential for land use planning, development of coastal resilience policies and action plans, and future design of coastal protection works, will be developed as follows:

93. Expand and improve the Coastal Vulnerability Assessment (CVA) conducted by Deltares. Improvements will be introduced if appropriate using better topographical information, more accurate water level datums, and more refined wave run-up/overtopping assessments. A coastal risk index will be calculated spatially, providing a semi-quantitative measure of the probability-based impacts due to coastal hazards on people and infrastructure for different time periods.
94. The risk analysis will be developed and presented in forms that can be integrated by multiple agencies in their risk management tools such as EPA (Coastal Management Framework; building code improvements under SPREP), MPW (National Infrastructure Management Plan), and NDMO (impact forecasting and disaster management). Support will be provided to develop capacity including in using risk information for land planning, infrastructure development and environmental management.

Sustainable source of aggregates. Building on previous work by SPC/SOPAC, investigation work will be carried out to identify and quantify sustainable sources aggregates in the Majuro and Kwajalein atolls. The suitability of the aggregates for various uses will be evaluated, as well as methods of extraction and commercial distribution to wholesale and retail markets. State-Owned Enterprise method of extraction may be considered, and south-south knowledge sharing with Kiribati could be organized to examine a State-Owned Enterprise aggregate mining operation in a lagoon.

95. It is hoped that some of this work can be integrated with wider, international research programs undertaken separately from the project but sponsored, to some extent, by the Bank and others. The results of these aggregate studies will have application, and be of interest, to other Pacific, Indian Ocean, and Caribbean atoll countries.

Component 3: Contingency Emergency Response (funded by National IDA)

Budget: Total: 0.5 million USD (\$)– GCF: 0.0 million USD (\$)

Expected outcomes:

96. Time taken to commit funds from the contingency emergency response component (CERC) requested by Government for an eligible emergency below 4 weeks

JNAP objectives supported are:

97. **Objective 3.1** Strengthen preparedness and response capacity amongst relevant ministries and agencies at national and local levels to ensure in particular a focus on addressing the needs of the most vulnerable groups such as women, children, the elderly and those with special needs
98. The Contingency Emergency Response Component (CERC) will be fully funded by IDA financing, and will strengthen RMI's preparedness and capacity to immediately respond to low and medium scale disasters and would complement the disaster risk insurance scheme financed under Phase I of the PREP. In particular it would finance response efforts for disasters that are not covered by the insurance scheme (e.g. drought and flooding, as well low and medium size disasters that would not trigger a payout). The CERC provides a mechanism to: (i) quickly disburse funds to meet the immediate needs of RMI to finance critical imports following the proclamation of a state of emergency; or (ii) finance emergency recovery or reconstruction works and associated services. The specific details of the proposed implementation arrangements and procedures governing the use of the CERC funds will be detailed in a standalone CERC annex within the Project Operations Manual (POM). Further CERC funds might be reassigned (from IDA financing) for another component of the project if necessary after an event. If the CERC is not triggered, the funds may be deployed elsewhere in the project.

Component 4: Project management

99. The objective of this component is to provide efficient and effective implementation support to PREP II, including staff, operating costs, monitoring and evaluation, and the cost of audits. It will also provide regional support from the PSU that was established under the PREP Phase I.

Component 4.1: Project Management (funded by National IDA and proposed GCF grant)

Budget: Total: 2.58 million US\$ – GCF: 0.74 million US\$

Expected outcomes:

100. The National Disaster Committee acting as the Steering Committee of the project is meeting once per year and provides oversight to the project; and Project is managed and monitored effectively

1. This sub-component will be implemented by RMI and will include carrying out a program of activities designed to strengthen the capacity of RMI for Project management, coordination, communications and outreach, monitoring, evaluation, and reporting. It will also support Project procurement, financial management, auditing, and social and environmental safeguard oversight. A Project Implementation Unit (PIU) will be established which will include: (i) a Project Manager; (ii) a Project Accountant; and (iii) a Safeguards Advisor. Support will be provided by the PIU for procurement, financial management, contract, and project management, as well as social and environmental safeguards oversight.

Component 4.2: Regional Program Management (funded by Regional IDA)

Budget: Total: 6.12 million US\$ – GCF: 0.0 million US\$

Expected outcomes:

102. Strengthened capability of RMI to manage and implement the Project, including procurement, financial management, monitoring and evaluation.

3. This sub-component will be regionally implemented by SPC and will include carrying out a program of activities through the Program Support Unit (PSU) to support the Republic of the Marshall Islands to manage and implement the Project, including procurement, financial management, monitoring and evaluation, and operational technical assistance. The PSU was established under PREP Phase I, and is housed in SPC. The PSU will support the efficient implementation of the broader PREP (both Phase I and Phase II), through the provision of technical and fiduciary support for the implementation of regional activities as well as operational, technical, fiduciary and reporting, monitoring and evaluation for the implementation of nationally implemented PREP Phase II activities.

C.4. Background Information on Project / Programme Sponsor (Executing Entity)

104. The project will be a part of the regional Pacific Resilience Program (PREP), a 'Series of Projects' implemented in two phases at this stage, with the potential for more phases in the future. Marshall Islands is currently one of the four countries participating in the PREP Phase I. Along with Vanuatu, RMI is involved in a single component of the PREP Phase I involving disaster financing – PCRAFI. The other two participating countries, Samoa and Tonga, have a wide involvement across all four components of the PREP. The Secretariat of the Pacific Community (SPC) and the Pacific Islands Forum Secretariat (PIFS) are also involved, providing technical and implementation support and coordination between the participating countries. The proposed project will be a Phase II of PREP, dedicated only to RMI.
105. The high level objective of Phases I and II of the PREP is to improve the resilient and sustainable economic and social development of the participating countries and the region. The Program is aligned with the strategic direction and frameworks that identify needs and priorities to respond to the effects of climate change and natural hazards identified by the participating country Governments, the World Bank, and regional bodies.
106. The PREP is in line with regional strategies, and will help achieve the Sendai Framework for Disaster Risk Reduction. It addresses key priorities of the Framework for Climate and Disaster Resilient Development in the Pacific (FRDP),¹⁰ as well as key priorities of the Pacific Islands Meteorological Strategy 2012–2021 on 'Improved End-to-End Multi-Hazard Early Warning Systems'. Pacific leaders, recognizing the importance of early warning and preparedness, developed a Regional Early Warning Strategy in 2007, to which the PREP also contributes.
107. The project is consistent with the RMI's Joint National Action Plan on Climate Change Adaptation Disaster Risk Management (JNAP), as well as with the Country Partnership Strategy (CPS) between the government of RMI and the World Bank Group. The CPS highlighted that the World Bank would: (i) play a greater role in addressing the threats that RMI faces from natural hazards, including the effects of climate change and sea level rise; (ii) look for opportunities to strengthen the disaster risk management capacity of RMI; and (iii) help to build resilience to external shocks, including natural and other disasters. Strengthening the physical resilience of atoll islands using, for instance, coastal defense structures and ecosystem-based approaches, is also a recognized priority in the recently published Systematic Country Diagnostic of Eight PICs,¹¹ including RMI, and will be included in the PIC 9 Regional Partnership Framework which is currently under preparation. PREP Phase II is also aligned with the World Bank's Regional Partnership Framework (RPF), which covers RMI.
108. The project is in line with the World Bank's planning and policy documents, including: "Pacific Possible: Report on Climate and Disaster Resilience" (July 2016); the Engagement Note for "Disaster and Climate Resilient Development Programming in the Pacific Islands Region" (April 2014); and the Policy and Practice Note "Acting Today for Tomorrow" (2012). The project will be a practical means to fulfill these plans and policies, developed in close collaboration with donors and regional organizations, which have been well received.
109. **Small Island States Resilience Initiatives (SISRI):** The challenges of Small Island States are distinct and complex, calling for specialized expertise. To address this, the World Bank established, in November 2014, a SISRI Support Team. It currently includes about 50 operational and technical staff concentrating on the needs of Small Island States, with specializations covering the SISRI Building Blocks. The Support Team meets regularly around a subject of global interest – for example, links between climate resilience and social protection, or measuring resilience in Small Island States. Capturing and disseminating global knowledge across disciplinary and geographic teams is proving to be important to enhance the quality of World Bank operations, as well as the support received by countries. The SISRI Support team has: (a) built a community of practice amongst practitioners from Small Island States; and (b) produced a series of best

¹⁰ Action 2.10.7: 'Strengthened capacity to anticipate, resist, plan and prepare for, respond to and recover from the consequences of disasters and climate change'.

¹¹ World Bank, Systematic Country Diagnostic for Eight Small Pacific Island Countries: Kiribati, RMI, Federated States of Micronesia, Palau, Tonga, Tuvalu, and Vanuatu. Report 102803-EAP, January 20, 2016.

practices knowledge notes, aimed at disseminating south-south learning. It also provides support for design and implementation of projects in various small island states, including in RMI

C.5. Market Overview (if applicable)

110. **Not applicable**, coastal resilience (coastal protection, risk preparedness and long-term planning) is considered a non-revenue generating public good, with no available market.

C.6. Regulation, Taxation and Insurance (if applicable)

111. **Land Acquisition and Involuntary Resettlement:** Land can be acquired for public use under a lease arrangement (such as for quarrying, laydown areas, ramps etc.) or land can be voluntarily donated (through MoU's). The Land Acquisition Act 1996 makes 'provision for the acquisition of lands and servitudes for public use including payment of compensation. In practice, the Government does not compulsorily acquire land because the *Iroij* hold customary power which is highly respected. Land is considered 'anything of the earth' and extends into the lagoon and ocean.
112. On Ebeye islet there are no land disputes and land ownership is clear. There are three senior land owners that are responsible for all land use permissions following customary traditions enshrined in the Constitution. Community consultation and engagement is also an integral part of development. Particularly in Ebeye, all the governmental and non-governmental stakeholders during the mission emphasized that ongoing and meaningful community consultations is very important.
113. A long term 'Master Lease' for Ebeye has recently been negotiated and finalized between the government and the land owners. The lease has been signed by all the parties. The lease will be fully executed by the time the project becomes effective.
114. Environmental impact assessments will be submitted and all permits will be obtained before starting any coastal protection works. Applicable legislation includes the National Environmental Protection Act (1984), the Earthmoving Regulations (1989), and the Historic Preservation Act (1991). The World Bank's environmental and social safeguard processes will also apply concurrently.
115. It is proposed that GCF financing will fund taxes for the project. This will be consistent with the IDA co-financing, which will also be used to fund taxes.

C.7. Institutional / Implementation Arrangements

116. Although both the approach and coordination of the broader PREP is regional, PREP Phase II will be implemented mainly at the national level via the relevant implementing agencies, with technical and implementation support and coordination from the Program Support Unit (PSU) housed in SPC as required.

National Arrangements

117. **National Steering Committee:** RMI will be responsible for implementing activities under each component of the Project. The institutional framework will include the National Steering Committee (NSC), headed by a Chairperson, which will comprise the National Disaster Committee (NDC) and representatives from the National Climate Change Committee (NC3). The NSC will also have representatives from Kwajalein atoll. The NSC will govern the Project at the national level and will provide the oversight and guidance for the project implementation. The Chief Secretary Office (CSO) will act as the secretariat to the NSC. The NDC and CSO will be responsible for ensuring strategic coordination between the key implementing agencies.
118. **Implementation Agencies:** Ministry of Finance (MoF) will be responsible for the overall coordination of project activities, along with the implementation of activities under Components 1, 3 and 4. Ministry of Public Work (MPW) will be responsible for implementing activities under Component 2. Both MoF and MPW will liaise closely with the Chief Secretary Office. Other key line agencies include the National Disaster Management Office (which is part of the CSO), the National Weather Service, the Environmental Protection

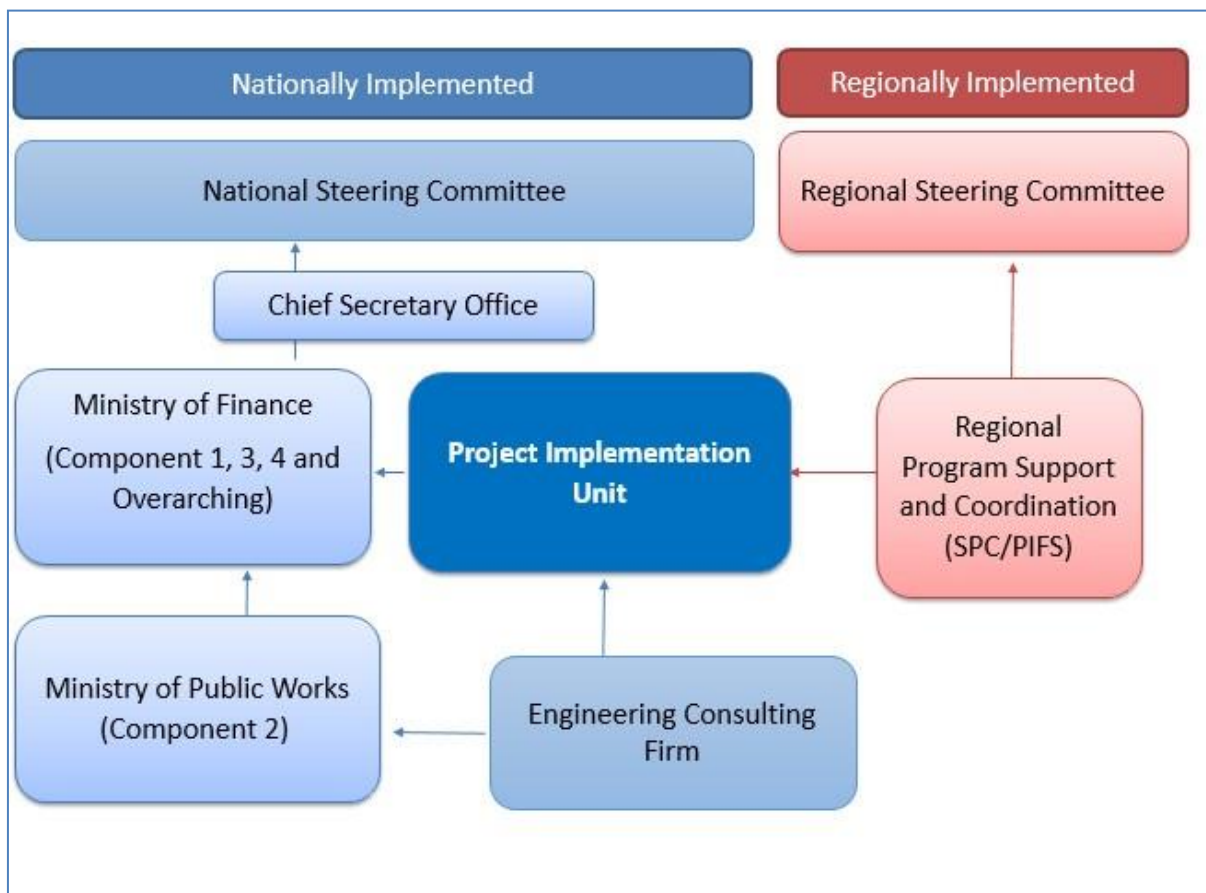
Authority, the Kwajalein Local Government, and the Kwajalein Atoll Development Agency, with potential for others to be added in the future.

119. **Project Management:** A Project Implementation Unit (PIU) will be established within MoF/Division of International Development Assistance (DIDA) and include a Project Manager, a Safeguards Advisor, a Project Accountant and a PIU Liaison Officer who will be based in Ebeye. The Project Manager will assist the MoF project coordination and manage the day-to-day implementation of the PREP activities for RMI, including procurement activities for Component 1, 3, and 4 with support from the Regional Program Support (PSU) in SPC. The Environmental and Social Safeguards Advisor will oversee and independently audit implementation of the ESMF and RPF. Technical staff will be recruited, as necessary, to support implementation of Components 1 and 2. In particular, a specialized Coastal Engineering Design and Supervision (D&S) Firm, will be recruited by MPW for Component 2. The D&S Firm will work closely with the both the PIU (particularly the PIU Liaison Officer) and MPW, and will be responsible for planning, capacity building, design, environmental and social impact assessment, land access due diligence and documentation, procurement, contract management and supervision of coastal protection works and investments (including the implementation of the Environmental and Social Management Plan). A Civil Engineering Advisor will help MPW procure and oversee the D&S Firm and the CVA activities, review the outputs, audit the construction activities, and help/advise MPW in other matters. Construction of coastal protection works, and any work on the NMDO facilities will be outsourced to appropriate contractors.

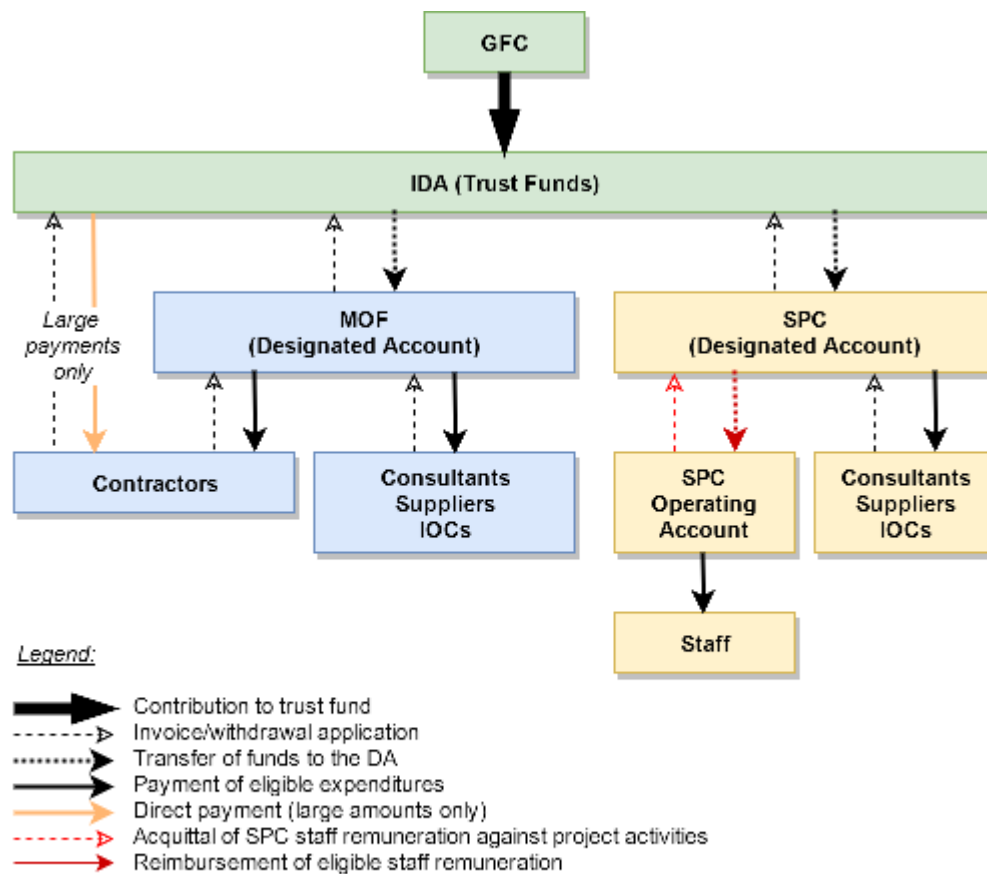
Arrangements for Regional Organizations

120. The general institutional framework for the overall program (Phase I and Phase II) comprises a Regional Steering Committee (RSC), a Regional Coordination Unit (RCU) that has been established within PIFS under Phase I, and a Program Support Unit (PSU) that has been created within SPC.
121. **Regional Steering Committee:** The RSC is responsible for overseeing the overall regional Program and will provide overall oversight and advice, as well as guidance towards achieving Project and Program objectives and better regional integration. It also allows the “resilience agenda” to be dealt with at the highest level of the decision-making process. The composition of the RSC includes representatives from the highest level of decision making for PREP Phase I and it is proposed for Phase II, both at the country and regional level. The Chair of the PREP Phase II National Steering Committees (NSC) will be a member of RSC.
122. **Regional Coordination Unit:** Phase I established a RCU within the PIFS. The RCU ensures strategic alignment between the PREP and the preeminent organization for Pacific leaders to facilitate high level strategic guidance and coordination by PIFS for Program implementation. The RCU includes a Regional Coordinator (RC) who is housed at PIFS, and a small unit that deals with the coordination aspects of climate and disaster resilience initiatives and projects in the Pacific (among which the PREP, and Disaster Risk Financing are included). This RCU acts as the Secretariat to the RSC.
123. **Program Support Unit:** A Program Support Unit (PSU) was established within SPC under PREP Phase I and will provide operational, technical and fiduciary support to the PIU of PREP Phase II. The PSU will also be responsible for the implementation of the regionally implemented technical assistance activities set out in Component 1.2 and 2.2 of the Project. A “Service Agreement” will be prepared and maintained throughout the Project implementation period that clearly sets out the roles and responsibilities between SPC and RMI during the project. The PSU includes: (i) a Project Manager; (ii) an international Procurement Advisor; (iii) a Program Accountant; (iv) Monitoring and Evaluation expertise; and (v) part-time procurement quality assurance. Organization chart of the project

Organizational Chart



Flow of funds



DA = designated account; GCF = Green Climate Fund; IDA = International Development Agency; IOCs = incremental operating costs; MOF = Ministry of Finance (RMI); SPC = The Pacific Community; RMI = The Republic of the Marshall Islands.

Role of World Bank

The World Bank will work closely with both the Government of RMI and SPC, and will be represented by a Task Team Leader, who leads a team of people (known as the "Task Team") with different technical specializations who each contribute in their area of expertise. World Bank responsibilities and tasks include:

- Administering of National IDA, Regional IDA, and GCF funds
- Overall administration of the project and implementation support
- Supervision of all procurement financed under the IDA and GCF Grants
- Overseeing the implementation of the Bank's environmental and social safeguards measures.

The Task Team will also conduct regular supervision and implementation support missions to assist with resolving issues that might be causing delays in achieving the project objectives and to check that the project is being implemented according to the agreed financial, legal and procurement processes. During these missions the Task Team may meet with key stakeholders (both within and outside government) and with project beneficiaries. The Task Team may review legal, financial and procurement records and make suggestions on improvements to procedures.

C.8. Timetable of Project/Programme Implementation

Please provide a project/programme implementation timetable in [section I \(Annexes\)](#). The table below is for illustrative purposes. If the table format below is used, please refer to the activities as numbered in Section H. In the case of outputs, please mark when all the required activities will be completed.

TASK		Year 1				Year 2				Year 3				Year 4				Year 5			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
C1	Institutional Strengthening, Early Warning, and Preparedness																				
	<i>Institutional Strengthening of DRM and CCA</i>																				
C1.1	<i>Improve early warning communications systems</i>																				
	<i>Roadmap and investments for NDMO modernization</i>																				
	<i>Impact forecasting</i>																				
C1.2	<i>NDMO capacity building</i>																				
	<i>Post disaster needs assessment</i>																				
C2	Strengthening Coastal Resilience																				
C2.1	<i>Coastal protection investments</i>																				
	<i>Strengthen integrated coastal risk management</i>																				
C2.2	<i>Sustainable sources of aggregate</i>																				
C3	Contingency Emergency Response																				
C4	Project Management, Monitoring & Evaluation																				

★ Mid-term and final independent reviews

D.1. Value Added for GCF Involvement

124. The project aims to address one of the **most pressing financing gaps for Small Island States: their capacity to invest in climate and disaster resilience**. As these investments do not generate revenue, they do not attract private investors and are unlikely to be financed through market mechanisms. Therefore, without support from the Green Climate Fund, small island states such as RMI will not be able to allocate a sufficient part of their budget to invest in climate resilience, even if such investments would provide significant, non-financial return on investment and social benefits over the long term, and reduce the future burden of climate risks. These countries are also increasingly using limited amounts of development finance for address the current risks of climate change.
125. **Scaling-up and mainstreaming investments in coastal resilience.** The co-financing from the GCF will allow climate change considerations to be fully integrated into this proposed coastal protection and disaster risk management project co-financed by IDA. Co-funding allows a significant, worthwhile project to be delivered, thus avoiding the limitations of small scale operations and a piecemeal approach. Economies of scale will be thus attained, with local capacities being improved, the private sector will be engaged, and incentives for future investments will be improved. The GCF co-financing of technical assistance, provided alongside the investment support, will allow climate resilience to be incorporated into the long-term development planning of RMI. The regional technical assistance, carried out by SPC as part of the project will also benefit the other Pacific Island countries, with studies, tools and guidelines, to be replicated in other PICs.
126. **Addressing financial and technical barrier for adaptation to climate change.** GCF will provide opportunities for RMI to develop and invest in innovative solutions, to overcome the current problems, such as the lack of local building materials and capacity of contractors. Local contractors will have an opportunity to deliver the works, supported by international experts. Coastal adaptation solutions will benefit the current population and following generations. The solutions, the development of a coastal risk information system and the outcomes of the aggregate studies, are expected to set a new standard for coastal risk mitigation in RMI, with direct, cross-over benefits for other atoll countries. Without significant and certain sources of financing, approaches such as the one proposed for RMI under this proposal will always be difficult. The upfront costs are too high for a country such as RMI to finance it on its own. However, with external funding, solutions and support as described in this proposal are cost effective in the long-term after including operational and maintenance costs and the cost of environmental and social degradation.
127. **Building the enabling environment for additional financing.** Even though the coastal resilience component of project will target mainly Ebeye, and to a lesser extent Majuro, the whole country will benefit from the improved dissemination of the early warning systems and strengthened preparedness. The most vulnerable will benefit as currently they have less access to such services because of remoteness and limited access to communication systems. The approach in the long term will cover the whole country and, therefore, will set a pathway for the next set of investments in which coastal infrastructure, improved spatial planning and ecosystem-based solutions will be promoted as appropriate.
128. **Strengthening the knowledge basis to develop long term strategy for climate adaptation.** Without the proper understanding of future impacts of disaster risks and climate change, it is not possible to envisage long term resilient strategies. However, this information doesn't exist yet in RMI to allow the government to plan for the longer term. This project will rely on the existing data and past studies, but also fill the gaps and provide the scientific support for decision making over the longer term.
129. **Transforming adaptation approaches for RMI.** RMI, as any other small islands state, can not follow traditional approaches to build its resilience. GCF will provide RMI through the project with the means to shift paradigms, to go from the current ad-hoc solutions, to an adaptive approach. Starting from an overall analysis of the needs for adaptation, RMI will be able to have a result-driven vision to determine its needs, and define its own priorities. The proposed options to be financed by GCF would provide RMI the flexibility to expand them more if needed in a future, if climate scenario would be more impacting than currently thought, with neither locking the shoreline in a dead-end path nor preventing the use of the environment.

D.2. Exit Strategy

130. The project will invest significantly in strengthening capacity and existing institutions in charge of early warning, preparedness and response to hydro-meteorological and geophysical hazards (e.g. National Disaster Management Office and the National Weather Service). Technical operations staff including meteorologists, hydrologists and emergency response specialist will be trained to ensure that staff skills and knowledge is current, and to introduce new techniques to improve forecast warnings and communications. Tools will be developed to monitor and observe, analyse and forecast, and to communicate and disseminate information. The capacity of staff at the Ministry of Public Work, and EPA will also be strengthened in terms of enhanced knowledge of the design, location engineering and construction of coastal protection measures, as well as long term coastal resilience planning.
131. Maintenance of existing coastal protection infrastructure and early warning and forecasting equipment is currently limited (e.g. lack of spare parts, inadequate maintenance for operations and maintenance etc.). The investments in coastal protection will be designed for a lifetime of 30 years and are not anticipated to have significant maintenance requirements. The rock rip rap can also be maintained without the need for heavy equipment and thus can be done locally if necessary. The project will ensure that there is adequate training for regular inspection. In addition, the project will provide guidance to the key Ministries (Finance, Public works) to ensure budget allocation for the maintenance of early warning and forecasting systems and for existing coastal protection infrastructure.
132. Exploring, and if deemed sustainable, developing alternative local sources of aggregates would allow to reduce the costs of maintenance of the proposed infrastructure, yet already designed to withstand strong events, but also facilitate future coastal protection works by both the government and partners.
133. The broader PREP (including Phase I and Phase II) will also strengthen regional cooperation, and create a pool of expertise, that will be critical to ensure the sustainability of the PREP. SPC, in close collaboration with other regional organizations (e.g. US National Atmospheric and Oceanic administration, Fiji Tropical Cyclone Warning Center, the Pacific Tsunami Warning Center in Hawaii, Secretariat of Pacific Regional Environment Program, the Oceania Regional Seismic Monitoring Network, and the UN Office for the Coordination of Humanitarian Affairs etc.), will provide technical and policy guidance.

In this section, the accredited entity is expected to provide a brief description of the expected performance of the proposed project/programme against each of the Fund's six investment criteria. Activity-specific sub-criteria and indicative assessment factors, which can be found in the Fund's [Investment Framework](#), should be addressed where relevant and applicable. This section should tie into any request for concessionality made in [section B.2](#).

E.1. Impact Potential			
Potential of the project/programme to contribute to the achievement of the Fund’s objectives and result areas			
E.1.1. Adaptation impact potential			
<p>134. The project will contribute to the achievement of climate-resilient sustainable development of RMI. Construction of coastal protection works in the most vulnerable coastlines of the country along high value zones will reduce the vulnerability of women and men to future impacts of climate change including typhoon and heightened wave actions that have caused significant damages to lives, livelihoods and economic assets in the past.</p> <p>135. The project development objective is to strengthen resilience to climate change and natural hazards in RMI through improved early warning systems and preparedness, climate resilient investments in shoreline protection, and financial protection.</p> <p>136. The proposed option for coastal protections is selected partly because it is flexible and easy to modify and upgrade with changes in climate within the 30 year lifetime of the infrastructure, but also maintenance through local contractors. It is envisaged that the coastal protection works will result in a reduction of annual damages in the amount of USD 700,000 per year.</p> <p>137. The focus on longer term climate resilient sector and development strategies will ensure that the limited areas available for development and population expansion are used effectively and there is a move away from high risk areas and/or within the zones protected by the investments and/or on the lagoon side.</p> <p>138. The investment solutions, the maintenance budget allocation, and the longer-term changes in planning will contribute to lessons for other islands within RMI and other atoll nations.</p> <p>139. The feasibility studies with engagement of international and regional knowledge hubs and experts has already generated lessons and data that has not existed before. This itself will be the basis of knowledge sharing for small islands such as the through the Small Island States Resilience Initiative (SISRI).</p>			
E.1.2. Key impact potential indicator			
Provide specific numerical values for the indicators below.			
GCF core indicators	Expected tonnes of carbon dioxide equivalent (t CO ₂ eq) to be reduced or avoided (Mitigation only)	Annual	N/A
		Lifetime	N/A
	<ul style="list-style-type: none">Expected total number of direct and indirect beneficiaries, disaggregated by gender (reduced vulnerability or increased resilience);Number of beneficiaries relative to total population, disaggregated by gender (adaptation only)	Total	10,000 (at least 6,000 females) people will be protected by the coastal protection investments
			6,000 (at least 3,000 females) will have access to improved early warning communication systems
			23,800 (at least 11,900 females) will indirectly benefit from the improvement in preparedness and early warning systems

		Percentage (%)	At least 22% of the total population directly, with at least 50% of the women and an additional 70% indirectly,
Other relevant indicators	<ul style="list-style-type: none"> Improved status of disaster communication network JNAP activities are implemented Multi Hazard Early warning systems are established and operating Length of coast with reduced vulnerability to natural hazards and climate change impact 		

E.2. Paradigm Shift Potential

Degree to which the proposed activity can catalyze impact beyond a one-off project/programme investment

E.2.1. Potential for scaling up and replication (Provide a numerical multiple and supporting rationale)

140. The Project will support a paradigm shift for resilience in RMI, through the provision of transformational change to increase resilience and reduce risk. The project promotes a systematic transformation of RMI's coastal management through innovative solutions in the densely populated areas of Ebeye and Majuro. The project will draw on innovative and highly technical modelling of the RMI coastline to inform investments in coastal protection. It will also seek out new means for sourcing sustainable aggregate from atoll islands for use in construction, which will have wider benefits for other atoll nations. In addition, the project will strengthen enabling environments for investments in resilience, through improved planning, effective ecosystem management and prioritization of investments in climate and disaster resilient development.
141. The scale of the proposed GCF/IDA project allows to address coastal resilience in a systematic manner within a programmatic approach that combines national and regional support and address barriers (e.g. local capacity including private sector, land use planning challenges, lack of supply of aggregates) which past interventions have not been able to do.
142. Risk-based management approaches can deliver real benefits, in reducing risks from extreme events, coastal inundation, and sea-level rise, to populations in Ebeye and Majuro. Basing the future developments of both islands on risk assessment, as developed for the preparation of the project and expanded during its implementation, allows to reduce future risks, while not preventing future development. Such an overall, comprehensive approach to think ahead, could be replicated in other countries, in the region, but also globally.
143. The proposed coastal protection solutions would be innovative in the design, and would be the first of its type to be built in low-lying atoll islands in the Pacific. The solution provides the advantages of being adaptive to the potential changes in sea level and will require relatively low cost maintenance and repair. This project could therefore be efficiently scaled-up and replicated to also cover additional coastlines of Majuro and RMI.

E.2.2. Potential for knowledge and learning

144. The project preparation activities have already provided new knowledge on the actual coastal risks Ebeye is and will be facing. This knowledge production and dissemination will be continued during the implementation of the project to expand the assessment to all of RMI's urbanized areas. This process will rely on existing data and information, collection of new information, and modeling to evaluate current and future impacts. Results will be presented via a unique system, developed and managed by SPC, easily accessible and useable by the different stakeholders and decision-makers.
145. An additional benefit of SPC's involvement in the project will be to facilitate the sharing of knowledge and experiences of the countries from the region, which are facing similar challenges. The different solutions developed under the project would help to improve coastal protection practices in the region through the opportunity to share the experience and the results of the proposed project with other partner countries. The analysis of the coastal vulnerability of RMI could be extended to other Pacific Islands Countries, which would improve the general knowledge on climate and disaster resilience in different sectors across PICs.
146. The study on local sustainable sources of aggregate, combined with the analysis of the marine and biological conditions of coastal reefs and ecosystems would also improve the overall knowledge of the islands and their health and environmental and social conditions.
147. Reinforcing preparedness, especially in outer islands, will support learning and awareness raising, dissemination of risk information, and best practices to reduce the risk and prepare the individual houses and assets for extreme events.

E.2.3. Contribution to the creation of an enabling environment

148. The lack of effective mechanisms and institutions to provide guidance, and to develop strategies for climate change adaptation and mainstreaming has so far prevented the adoption of effective short and long term solutions for climate change and disaster risk management in RMI. The refinement of the JNAP framework and its operationalization, will provide the required structure to support the resilient development in all sectors. This new structure will also support decision and policy-makers with comprehensive perspectives of climate related issues, and in turn allow them to take informed decisions (such as on the issue of constrained and legally binding land-use planning, to prevent the installation of future assets and activities in high risk areas).
149. The project will support the development of capacity in climate change adaptation and disaster risk management, and build the capacity of institutions such as the NDMO and EPA. This will be done through in-depth training, including long-term, on-the-job training and mentorship. It will provide the required capacity (both human and materials) for effective collaboration mechanisms for disaster preparedness and response, and long-term strategy planning.
150. The analysis of alternative sources of aggregate aims to identify access to possible local sustainable sources of aggregates, allowing contractors (in the event of suitable outcomes) to further construct and maintain infrastructure with lower cost, enabling the reduction of the marginal cost of resilience investments in the future. This analysis will also contribute to the knowledge of the regulatory agency, in this case EPA, to develop, adopt and enforce regulation to prevent the use of harmful techniques or inadequate locations for the extraction of sand and rocks. In addition, regulatory capacity building and support for the EPA will also be strengthened through the project.
151. The investigation of a new design and construction of an artificial berm in front of the revetment to better manage the increasing risk from changing climate, would test innovative solutions to support the protection of the coastlines, and by doing so, the whole land. Such risk reduction would allow the installation of new activities and infrastructure, and protect lives and livelihoods.

E.2.4. Contribution to regulatory framework and policies

Describe how the project/programme strengthens the national / local regulatory or legal frameworks to systematically drive investment in low-emission technologies or activities, promote development of additional low-emission policies, and/or improve climate-responsive planning and development.

152. The project seeks to strengthen the enabling environment of RMI in a number of ways. A project implementation unit will be integrated into the Ministry of Finance (DIDA) which will include a project manager, project accountant, safeguards officer, and other support as needed. Training on procurement will be made available to government agency staff by SPC under Component 4.2. In addition, Component 1 is targeted at strengthening the institutional capacity of key agencies responsible for disaster preparedness and response, in particular the National Disaster Management Office. Furthermore, the government successfully implementing the project will enable strengthened financial management and safeguards, and in particular will result in improved and systematic approach to coastal protection. The linkages between the national and local governments will enable institutional strengthening at various level and increase the information flow.

E.3. Sustainable Development Potential

Wider benefits and priorities

E.3.1. Environmental, social and economic co-benefits, including gender-sensitive development impact

153. This project lies at the heart of sustainable development and poverty reduction by: (i) serving the most vulnerable women and men by supporting the provision of early warning mechanisms and improving disaster risk awareness; (ii) supporting risk-informed planning and investments to reduce disaster impacts on societies, managing residual risks and uncertainties; and, (iii) strengthening the capacity of people and institutions to prepare for and respond to disasters and climate change.

Environment

154. The study of sustainable sources for aggregates, with the associated regulations to ban negative practices, would help promote sustainable, and low-environmental impacts, building practices, reducing the pressure on the coral reef and on the marine ecosystem.
155. Ecosystem-based approaches and reinforcement of marine protected areas would be part of the long term strategy, built on the coastal management framework and the coastal risk assessment, ensuring both the prevention of increase of human assets in exposed areas and reducing the risk through natural solutions. These would have the benefit of reinforcing marine and coastal ecosystems. For both Majuro and Ebeye, landscaping, shade and screen tree planting, marine habitat restoration, and creating recreational spaces will be included as part of any coastal protection works. Some of these activities use simple and appropriate labor-based methods that are gender-sensitive and suitable in the context of RMI. A decision would be made on the suitability and specifics of such approaches during the implementation of the project, following completion of a CVA for Majuro. More extensive ecosystem based approaches will not be suitable for coastal protection on the ocean side of Ebeye due to coastal geography and wave properties. However, additional ecosystem based solutions will be supported for the lagoon side of Ebeye and the Majuro coastline, and may include options for (re)vegetation, creation of shoreline berms (a nourishment approach currently being explored by the RMI Coastal Management Advisory Committee), and improving coral growth to allow them to buffer some of the wave actions. Mangroves plantation at this stage may be a limited solution, as mangroves do not occur naturally in Majuro or Ebeye.
156. The reinforcement and capacity building of the EPA would also provide a co-benefit in terms of strengthened capacity for the assessment of ESIA for coastal protection works and general environmental supervision of works.

Social

157. The construction of coastal protection works will be combined with revegetation for landscaping and improved efficiency of the risk reduction, bringing additional green spaces in Ebeye which will also contribute to socio-economic outcomes.
158. The inclusion of the CERC (Component 3) in the project will reduce the burden of disasters, particularly for the most vulnerable households, by supporting the government with the provision of emergency relief needs. This would reduce the poverty trapping effect from natural disasters, as described in the shock waves report. As women's burdens often increase in the event of a disaster and they are often expected to do unremunerated work in recovery (for example, caring for injured, children etc.), the CERC would contribute to reducing women's burden if a disaster were to strike.

Economic

159. The identification of sustainable aggregate sources would provide opportunity for cost reduction in construction and maintenance activities and also engage the local private sector.
160. Testing of the innovative solutions would provide locally-tested solutions for atoll islands that are increasingly impacted by climate change, and this could have wider benefits for other atoll nations.

Gender Equality and Women's empowerment

161. Women typically outnumber men among people dying from natural disasters. This is often because of cultural and behavioral restrictions on women's mobility and social ascribed roles and responsibilities

such as taking care of children and elderly. Research has identified that women's empowerment is key to build community resilience. In order to achieve the development outcomes of the project, ensuring gender equality and women's empowerment will be key. As informed by the Gender analysis undertaken for the project, women in RMI, have overall lower access to human endowments and economic opportunities. The female participation in decision-making processes are low and gender-based violence is high. These inequalities increase women's risk of being negatively impacted by climate change and natural disasters, as evidence show that inequalities in a society are often amplified at the time of a disaster..

162. Taking these vulnerabilities into account, gender equality will be promoted in the project. The project has identified several actions to reduce the gender gaps addressed above related to mitigation of unanticipated consequences and/or risks that the project creates, ensuring equal opportunities and avoiding potential impact of project activities such as increasing women's work load, access to income or assets and risk of gender-based violence.

E.4. Needs of the Recipient

Vulnerability and financing needs of the beneficiary country and population

E.4.1. Vulnerability of country and beneficiary groups (Adaptation only)

163. RMI is categorized as being a highly vulnerable nation according to the Environmental Vulnerability Index. Climate change poses a serious threat as rainfall patters change, frequency of droughts increase, intensity and frequency of storms increase and sea levels rise. Women and children remain the most vulnerable groups to climate change and natural disasters and in Ebeye 40% of the population is between the ages of 0-14 years old.
164. As a highly vulnerable and low-lying island nation with no major points of elevation above 2 meters, RMI already experiences frequent and serious climate impacts, as well as natural hazard events. These impacts will continue to pose serious challenges across the full spectrum of RMI's development prospects and priorities.
165. 99% of RMI population is living in coastal areas, so is directly exposed to coastal hazard and climate risks. The population has no proper place to retreat to safer areas, and are therefore obliged to face the continuous threats coming from the ocean. Inundation events cause overflow of raw sewage in streets of Ebeye resulting in several areas with high prevalence of waterborne disease particularly amongst children who play in the flooded roads.
166. Like most atolls systems, islands tend to be only a few meters above sea level at most, and often less than a few hundred meters wide, sometimes considerably narrower. Urbanized atolls such as Ebeye can attain high densities of populations. Anthropogenic developments on these islands 'pin' natural atoll island evolution. Unpopulated atolls, in areas where carbonate sediment is plentiful, change shape over time, and island centers may grow higher if affected by major storms or tsunamis. Once roads, buildings, houses, and so forth, are constructed, islands cannot change shape easily, and beach erosion can pose a threat to constructed infrastructure. Tidal changes pose a significant threat, particularly when the sun, moon and earth are aligned in such a manner as to cause the highest (King) tides, due to the strongest gravitational attraction at that moment in time. Such high tides can be further exacerbated by large sea swells which may coincide with times of King tide: at such times the atolls will experience periods of high seawater inundation.
167. Limited and / or weakly enforced urban planning can result in people settling in some of the lowest-lying and historically frequently flooded areas of atolls. Variable efforts at building sea defenses and a range of qualities of seawater defense construction have had mixed results with respect to people and building protection in RMI. Sometimes sea defenses can protect certain areas of coastline, but can also increase coastal impacts in adjacent geographical areas. Atoll beaches or offshore reef may be used for aggregate extraction for the built environment, increasing vulnerability to the impacts of sea inundation.

Sea level rise poses additional increased risks of coastal and atoll flooding and inundation in Ebeye and Majuro, as well as loss of land and coastline.

E.4.2. Financial, economic, social and institutional needs

168. RMI faces many of the challenges common to small remote economies. Its size and remoteness increase the costs of economic activity and make it unable to achieve economies of scale. Remoteness also imposes transport expenses that increase the costs of trade, and fundamentally constrain the competitiveness of exports of goods and services internationally. These same factors also push up the cost and complexity of providing public services and fulfilling the basic functions of Government.
169. These barriers have led to an undiversified economic base and persistent current account deficits. With limited export and domestic production opportunities, public administration and social services constitute the largest share of the economy – 40 percent of Gross Domestic Product (GDP). The current account deficit excluding grants has averaged 47 percent of GDP since 2007.
170. The 2015 GDP per capita figure of US\$3,325 classifies the country as “lower middle-income” although there are substantial disparities in cash incomes, which are high in Majuro and Kwajalein (due to a greater concentration of highly paid public servants) relative to outer atolls. Although the incidence of absolute poverty is low, data indicate high levels of inequality, evidence of malnutrition in urban areas, and limited access to cash incomes in rural areas. Incomes in communities affected by nuclear testing and receiving compensation are significantly higher than those in other islands. Elsewhere, lack of income-earning opportunities has led to concerns over rising unemployment, financial hardship (including declining real incomes and higher levels of consumer debt), and hunger. These factors provide powerful incentives for migration from outer atolls to the two major urban centers, as well as externally to the United States.
171. The Honolulu District U.S. Army Corps of Engineers conducted a field engineering survey of the civil infrastructure on Ebeye and reported that infrastructure is extremely poor and deteriorating rapidly due to a highly corrosive salt environment, lack of consistent maintenance, and deprivation of improvement investment. While electricity is meeting the current needs of the population, all other systems are unable to fully support the community's needs, present significant health risks or are completely non-functioning. The sewer treatment plant has not been in operation in over five years and the water production and distribution systems provide inadequate service. Water rationing has been ongoing for many years with distribution occurring only twice a week for only 45 minutes a day.
172. Rates of Non-communicable disease in Marshall Islands are some of the highest in the world and are the second leading cause of death. Roughly 62.5% of the population is suffering from diabetes, heart disease and/or obesity and related health complications. NCDs cause a substantial drain on economic potential by adversely affecting the four main factors of economic growth: labour supply, productivity, investment, and education. Majuro and Ebeye are two of three tuberculosis hotspots in the Pacific. The Center for Disease Control reported a TB prevalence rate of 466/100,000 population - the highest in the Pacific and one of the highest in the world.

E.5. Country Ownership

Beneficiary country (ies) ownership of, and capacity to implement, a funded project or programme

E.5.1. Existence of a national climate strategy and coherence with existing plans and policies, including NAMAs, NAPAs and NAPs

173. Building climate resilience, especially in coastal areas, is a critical priority of the Government of RMI as highlighted in the Joint National Action Plan on Climate Change and Adaptation Disaster Risk Management (JNAP) which covers the period 2014-2018. This action plan has been developed by the government, with the support and contribution from partners, with SPC playing a key role. This action plan has been built upon the well-established Disaster Risk Management National Action Plan (DRM NAP) as well as National Climate Change Policy Framework (NCCPF). These documents encompass the

adaptation part of the RMI's Intended Nationally Determined Contribution made in 2015 in preparation of the COP22.

174. GCF funds will also help build the long-term capacity of the Government of RMI to address the challenging issues related to climate change, and therefore, enable RMI to implement the priority actions enshrined in its National Climate Change Policy and Joint National Action Plan.

175. Based on discussions with the government (senior government Secretaries and Nitijela Cabinet members), the Project is designed to:

- i. fill a clear gap and critical need in donor supported activities by concentrating on strengthening early warning and preparedness for communities, and coastal protection in vulnerable areas starting in Ebeye (supporting JNAP goals 1, 2, 3, and 5)
- ii. strengthen disaster preparedness and response in RMI, particularly supporting the government's recent initiative to restructure the NDMO (supporting JNAP goal 1)
- iii. provide capacity and financial support for disaster response, providing PDNA assistance if required, and access to funds, with different eligibility requirements, that supplements emergency funding from the Pacific Catastrophe Risk Assessment and Financing Initiative (PCRAFI) insurance program and USAID under the Compact of Free Association (supporting JNAP goal 3)
- iv. integrate governance of, and improve planning for, disaster and climate change management (supporting JNAP goals 1 and 6)

allow RMI to more directly benefit from the established arrangements under PREP I, and thereby the knowledge and resources of SPC and PIFS in disaster and natural hazard risk management (supporting JNAP goals 1, 2, 3, and 5).

176. Community engagement and consultation will be paramount throughout this project, and communities will be involved in planning, implementation and evaluation of activities to improve early warning capacity, as well as coastal protection works. Community and land owner consultation and engagement will be an integral part of project implementation in regards to coastal protection works to inform the vulnerability assessments, inform the identification and selection of technologies and sites, inform concept and detailed design, to identify the potential social impacts from the works and suitable mitigation options, and to plan for lease arrangements, involuntary resettlement and / or compensation for lost assets. Citizen engagement will also assist with identifying and mainstreaming gender issues into the project. The Safeguards Advisor will be responsible for preparing a Stakeholder Engagement Plan (SEP) and coordinating the implementation. The SEP will document the approach to citizen engagement, consultation, engagement with land owners throughout the project and how the information will flow to and from the community and stakeholders to the PIU and the design/construction team. This will also include how this project will coordinate with citizen engagement programs on Ebeye for other infrastructure and disaster resilience projects (such as water and sanitation, energy), to avoid consultation fatigue and mixed messages. While the PIU will coordinate the SEP, there will be roles and responsibilities for many of the project stakeholders, such as the Kwajalien local government agencies, the PIU, MPWU and the design team. This SEP process will show how the citizen engagement will be integrated into the project implementation process and identify key milestones where information flow is necessary to inform the project outputs. The objective is to ensure that the beneficiaries and affected people are fully informed and have the ability to contribute to the project on their terms.

177. The ESIA process will identify potentially affected people and a more targeted and specific consultation plan will be developed to engage with this group. This targeted process will identify people or groups of people who may be adversely affected by the project, despite best efforts to avoid impacts in design and identify suitable mitigation measures, which may include compensation or other types of support. A Resettlement Action Plan will be prepared to manage the specific impacts on people as a result of temporary or permanent resettlement and / or the loss of assets as a result of land acquisition, as per the Resettlement Policy Framework.

178.

E.5.2. Capacity of accredited entities and executing entities to deliver

179. The World Bank Group Engagement in Resilience in Small Island States is significant. During the period of Fiscal Year (FY) 2011 to 2015, the World Bank's assistance to climate and disaster resilience in Small Island States averaged approximately US\$180 million in annual commitments. IDA credits and grants made up the bulk of resilience financing, often complemented by trust fund grants. Climate and disaster resilience investments have expanded considerably in recent years. Starting with disaster response operations in the 1970s, the World Bank became engaged in ex-ante disaster risk management and adaptation investments in the Caribbean and Pacific, with initial operations in Kiribati, Samoa and St. Lucia in the early 2000s. These investments expanded quickly and now comprise 25 percent the World Bank assistance to Small Island States. This expansion was enabled by three main factors: (a) technical assistance provided through the Global Facility for Disaster Reduction and Recovery (GFDRR), allowing for intensive technical and fiduciary assistance to clients; (b) concentrating program coordination and fiduciary management under a single Government unit, often located in Ministries of Finance or Offices of the President; and (c) developing programmatic operations which combined several sources of funding such as IDA, IBRD or the Pilot Program for Climate Resilience (PPCR) as a core, often complemented by trust funds. Countries benefit from using a single set of procedures and a single coordinating unit, resulting in lower overhead costs and an ability to manage larger sums of funding (thereby also helping to pave the way for direct access). It also has progressively shifted the focus of assistance from ex-post disaster reconstruction to proactive climate and disaster resilience.

E.5.3. Engagement with NDAs, civil society organizations and other relevant stakeholders

180. The National Designated Agency, the Office of Environmental Planning & Policy Coordination (OEPPC) has been involved and consulted from the scoping mission (February 2016) to the pre-appraisal of the project (November 2016). During those missions, including the identification mission in August 2016, stakeholders have been consulted both at the national level and at the atoll level for Kwajeileen, where Ebeye is located. The following institutions and organisms were consulted and their feedbacks have been incorporated in the design of the proposed project:

- Ministry of Finance (MoF)
- Chief Secretary Office (CS)
- Ministry of Public Works
- National Disaster Committee
- Environmental Protection Authority
- Coastal Management Advisory Committee
- Office of Environmental Planning and Policy Coordination (OEPPC)
- National Disaster Management Office
- National Weather Service
- Kwajalein Atoll Local Government (Ebeye)
- Kwajalein Atoll Development Authority (KADA).

181. Senior government leaders have been closely involved in the project design in the course of four missions and numerous exchanges of the project design documents. The project has been discussed, involving presentations and feedback, with the Nitijela Cabinet members on several occasions, and in more detail with the Minister in Assistance, the Minister of Public Works, the Minister of Finance, and the Senator for Kwajalein.

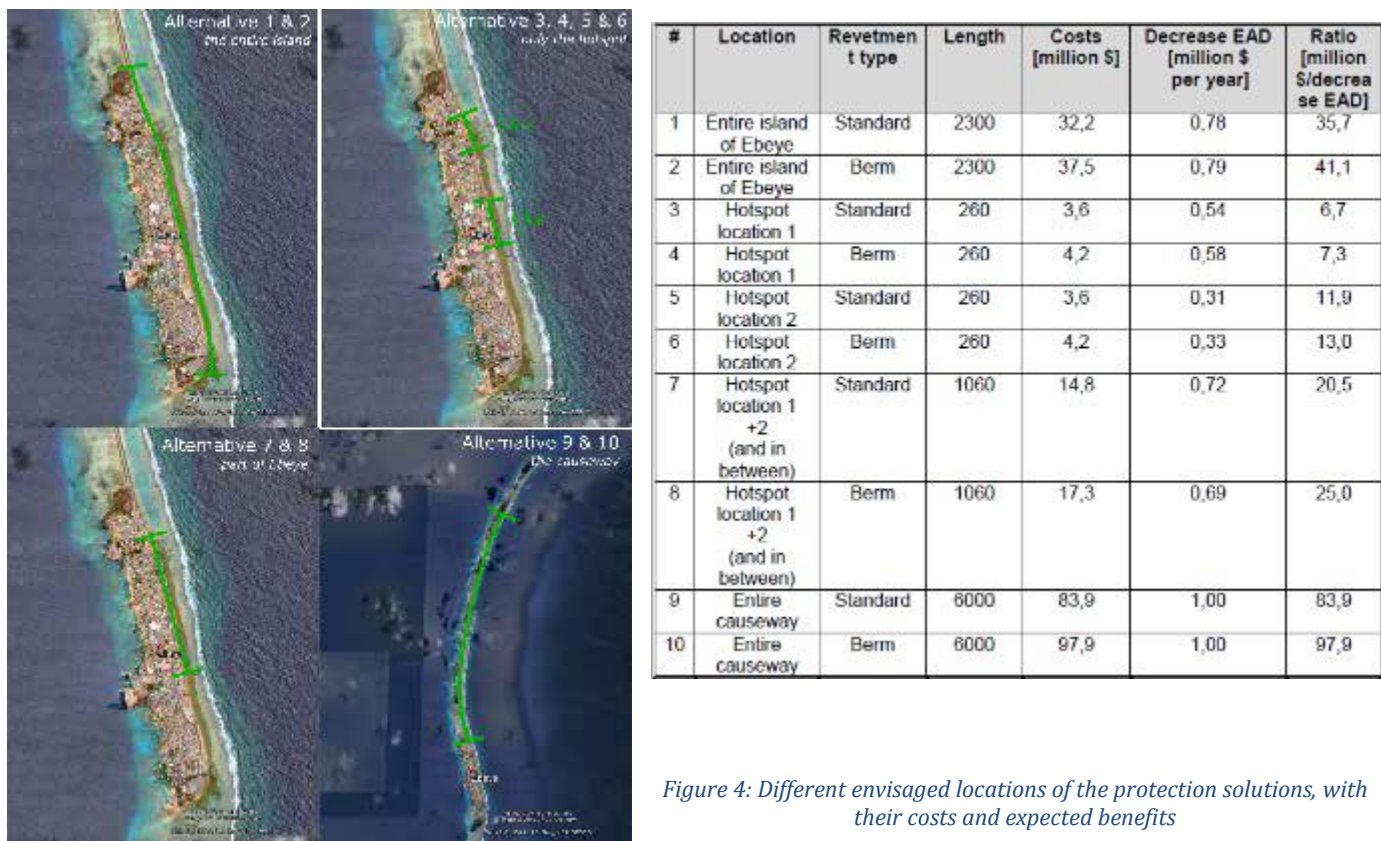
182. The mission also had meetings with development partners and representatives of the civil society, including the International Organization for Migration (IOM), Asian Development Bank and JICA.

E.6. Efficiency and Effectiveness

Economic and, if appropriate, financial soundness of the project/programme

E.6.1. Cost-effectiveness and efficiency

183. Affordable engineering hazard risk reduction interventions across the whole atoll archipelago are unrealistic. Instead, a focus on the more highly populated island of Ebeye (Kwajeilen atoll) is proposed. This will ensure that the 10,000 people in the high density area benefit from the coastal protection but there is also longer-term strategic planning to avoid increased pressure in other high risk areas by focusing on development in safer areas.
184. The effectiveness of the different solutions have been tested using different coastal defense schemes. In addition, the cost-effectiveness of different alternatives has been assessed by comparing the ratio between construction costs and benefits derived from each alternative (i.e. benefits are here described as reduction in Expected Annual Damage EAD) as illustrated below.
185. Constructing a revetment at “hotspot” locations is proven to be the most cost-effective solution (Figure 4). This will result in a decrease in damages due to inundation and land loss due to erosion at locations where risks are the highest (Figure 5). Protecting the causeway is the least cost-effective due to the high construction costs compared to the decrease in risk, but could provide interesting options for long-term planning of the island.
186. However, there has to be a trade-off between protecting only the hotspot areas (1&2) and addressing the increased potential risk of erosion at the extremities of the proposed works. The simulations thus suggest a larger area for protection than just the hotspots.



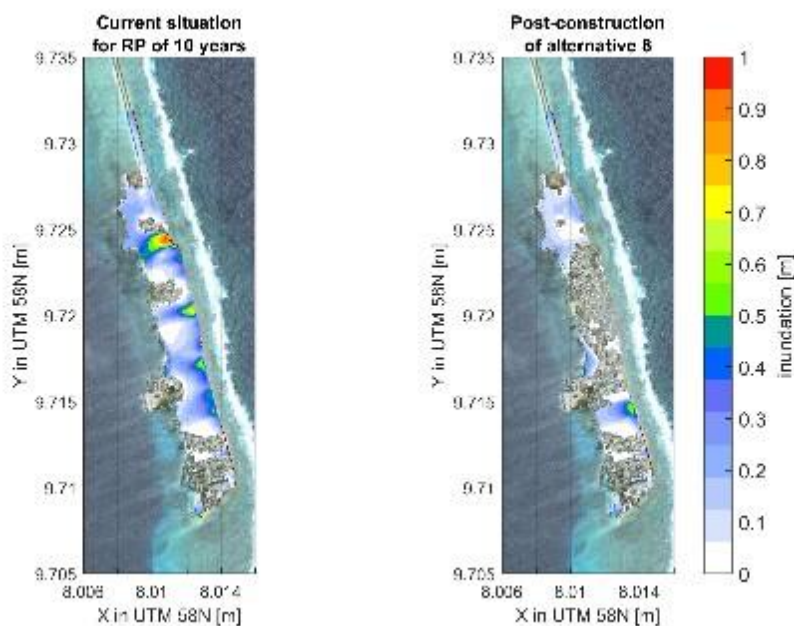


Figure 5: Inundation with a return period of 1/10 years for the current situation (left figure) and after the proposed construction of revetment alternative B with the current sea level (right figure).

E.6.2. Co-financing, leveraging and mobilized long-term investments (mitigation only)

N/A as the project is adaptation only

E.6.3. Financial viability

187. The project will not generate incomes, as neither the population nor the infrastructures operators would pay for the services provided by the different components of the project

E.6.4. Application of best practices

188. Regarding coastal protection works, the best available design will be implemented. The construction of the artificial berm in front of the revetment is a design which has never been used in atolls or low-lying islands, but which has been successfully built in several places and which has the advantages of addressing the challenges of climate change. The solution, yet to be tested through physical modelling to the specific local conditions, would be further refined with detailed design, and informed by stakeholder consultation.

189. In a PRIF/Tonkin & Taylor report (2016) on affordable coastal protection, a study is presented where possible solutions are put forward, and in which the use of local materials and labour is maximized. Different solutions are discussed, in particular, ecological based approaches and low cost-solutions, vertical structures and revetments. Revetments constructed of conventional materials are the most effective at protecting land, and typically have long design lives. Alternatively, low cost-solutions often have a low durability and poor environmental effects, as these solutions deteriorate and fail, and material is then released into the marine environment. Solutions with geotubes for instance, are not durable and are difficult to be replaced once damaged. Solutions with sheet piles require drilling which is very costly in hard rock. Steel solutions suffer from corrosion

which results in either high maintenance or low durability. Pitched block revetments, a solution typically applied in the Netherlands, require strict installation specifications with very strict gravel specifications and are therefore also not recommended for Ebeye Island. Vertical block works are also difficult to install and are not flexible to adapt to updated wave climates of higher standards.

190. An improved and climate-change resilient version of the previous design has been developed by using a berm on the reef that will promote wave breaking. The energy dissipation will result here in a solution with a lower crest level than for a standard revetment alternative. The reduction in overtopping discharge can be up to a factor of 10 as physical model tests have shown. Also, smaller material for both rock and concrete cubes can be used by applying a berm on the seaward side of the structure. Moreover,

Table 2: Performance of the different adaptation options for the different selection criteria (Deltares 2016)

Type of slope protection	Range of wave Climate	Hydraulic performance	Ease of access to shore	Maintenance	Flexibility	Durability (assuming good material)
Rock Armour	All	Good (depending on underlayer)	Difficult (steps or ramps can give local weakness)	Requires crane	High	High
Rip-Rap	Mild and Moderate	Good	Difficult (steps or ramps can give local weakness)	Vehicle access (flatter than 1:4 may 'self-heal')	High	High
Random and Pattern placed concrete armour units	All	Medium to good (depending on underlayer)	Difficult (steps or ramps can give local weakness)	Can be a problem if units break	High	Medium to high, but less so with slender units
(i) small blocks	Mild	Medium	Good	Relatively easy	Medium, will accommodate differential settlement to a degree	High in wave climate
(ii) Larger blocks	Moderate to severe	Medium to good, depending on unit	Difficult	Can be a problem if units break	Medium, will accommodate differential settlement to a degree	Medium depending on slenderness of unit
Flexible armoured revetment systems	Normally mild	Medium (refer to manufacturer)	Fair to good	Well designed, will be low maintenance. Can be difficult to replace individual components	Medium, will accept differential settlement to a degree	Medium
Stone-filled gabion mattresses	Mild	Medium to good	Easy (but leads to problems of durability)	High	Good, will accept differential settlement	Very poor
Open stone asphalt	Mild to moderate	Medium	Easy for pedestrians depending on slope	Limited, but requires regular inspection	Limited	Fair

it is to be expected that sea level rise will result in higher water levels on the reef and therefore in higher wave conditions. This improved design, even when these more critical conditions will occur, will still promote wave breaking. Therefore, the solution can be considered best practice, flexible and easily adaptable, with minimal effort, to these more severe conditions

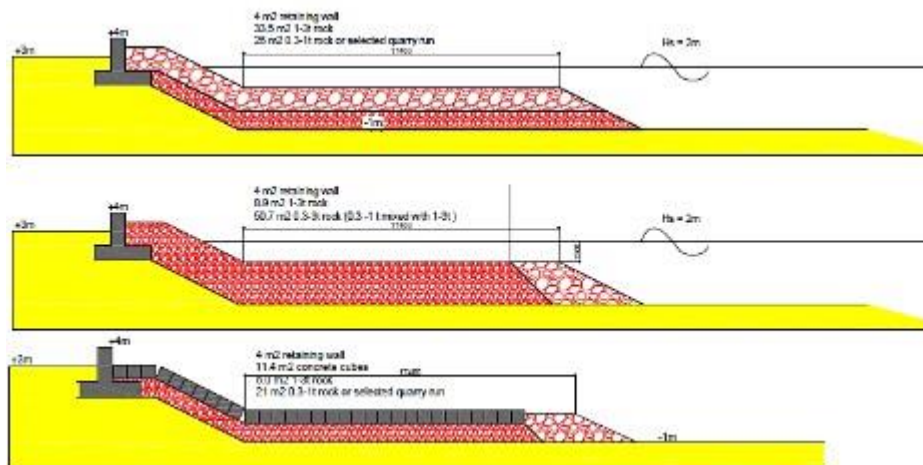


Figure 6: Durable berm type solutions, adaptable to conditions in case of sea level rise

E.6.5. Key efficiency and effectiveness indicators

GCF core indicators	Estimated cost per t CO ₂ eq, defined as total investment cost / expected lifetime emission reductions (mitigation only)	
	(a) Total project financing	US\$_____
	(b) Requested GCF amount	US\$_____
	(c) Expected lifetime emission reductions overtime	_____tCO ₂ eq
	(d) Estimated cost per tCO₂eq (d = a / c)	US\$_____ / tCO ₂ eq
	(e) Estimated GCF cost per tCO₂eq removed (e = b / c)	US\$_____ / tCO ₂ eq
	Not applicable (project only on adaptation)	
	Expected volume of finance to be leveraged by the proposed project/programme and as a result of the Fund's financing, disaggregated by public and private sources (mitigation only)	
	Describe the detailed methodology used for calculating the indicators above.	
	Please describe how the indicator values compare to the appropriate benchmarks established in a comparable context.	
Not applicable (project only on adaptation)		
Other relevant indicators (e.g. estimated cost per co-benefit generated as a result of the project/programme)		

* The information can be drawn from the project/programme appraisal document.

F.1. Economic and Financial Analysis

191. **Economic Analysis:** The economic benefits of the project will comprise avoided losses and damages thanks to the protection effected by investments supported, while the project costs will consist mainly of capital investment costs. Avoided expected damages for large urban assets were estimated using data from PCRAFI (2015) and used to calculate the internal rate of return (IRR) and benefit cost (B/C) ratios. Additionally, the reduction in the expected number of persons affected was also estimated. This metric also serves as a proxy for indirect tangible and intangible damages that are caused by large inundations but are difficult to value in economic terms, as well as the psychological impact of living with the persistent threat of inundation.

192. **Component 1** (Institutional strengthening, early warning and preparedness) will enhance the government's ability to save lives and reduce economic damage and losses when natural disasters strike. As such, the component will benefit the entire population of the Republic of Marshall Islands (RMI). These benefits are mostly qualitative due to the incremental nature of the interventions and the multiplicity of other factors that help bring about these benefits.

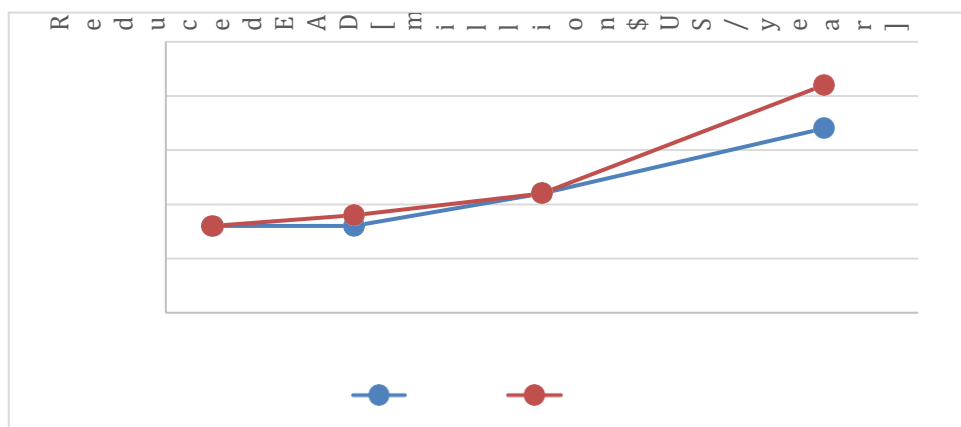
193. **Component 2** (Strengthening Coastal Resilience) has undergone conventional deterministic cost benefit analysis of ten options under the current conditions (without climate change induced sea level rise), which showed that a 1,060m long revetment with or without a berm, along the ocean side, covering hotspot areas and in between, would yield not only an acceptable economic internal rate of return (EIRR) for the Marshall Islands (4.1% and 2.6%), but also the highest reduction in the number of expected annual persons affected on Ebeye. A scenario analysis was carried out to examine the impact on the investment's feasibility of deep uncertain variables, notably sea level rise due to climate change, cost of materials, as well as interest rate. This results of the analysis are summarized as follows:

- Option 7 - standard revetment. The net present value (NPV) is positive if the cost of aggregates does not exceed 170% of the baseline estimate and the discount rate is lower than 10%.
- Option 8- revetment with berm. The NPV is positive if the cost of aggregates does not exceed 170% of the baseline estimate and the discount rate is lower than 9%.
- These conditions hold regardless of the values the other the other uncertain variables, including deeply uncertain sea level rise level and avoided indirect tangible and intangible damages, take on.
- Given that the standard discount rate used to evaluate investment operation for RMI is 2% and the baseline cost estimates are conservative, there is little risk of a negative NPV and the option is robust.
- The fact that both options meet the feasibility criteria in the no sea level rise scenario indicating that they are no regret investments.

194. **Fiscal Impacts:** The key impact will be in the form of avoided expenditures to remediate damaged infrastructure and public buildings. The government's annual budget for such expenditures is \$200,000, which is matched by a US government disaster response budget support of an equal amount. Currently, this amount is used to cover post-disaster expenditures and to a lesser extent, to build and repair coastal protection structures prior to strong whether events that are likely to lead to inundations. To the extent such activities currently take place on Ebeye, they will no longer be necessary after the revetment is constructed. As no maintenance is expected to be needed for the revetment, there will be no additional public expenditures.

195. **Conclusions:** The economic analysis indicates that the project is economically feasible considering RMI's limited growth prospects during the next 30 years. The selected coastal protection option in Component 2 is economically feasible at the chosen discount rate of 2% (Table 3).

#	Location	Revetment type	Length [meter]	Estimated Costs [M \$]	Reduced EAD [M\$/year] (2016 prices)	B/C (d=2%)	NPV [M\$] (2016 prices)	IRR	Reduced Expected annual affected persons
Preferred 1	Hotspot location 1 +2 (and in between)	Standard	1,060	14.8	0.77	0.88	4.55	4.1%	2,192
Preferred 2	Hotspot location 1 +2 (and in between)	Berm	1,060	17.3	0.74	0.72	1.48	2.6%	2,089



disruption of economic activities. Lack of available data on possible losses due to delayed and absent emergency response has limited this analysis to a qualitative benefits.

F.2. Technical Evaluation

197. The outer island communication technologies expected to be adopted under Component 1 are standard and are already used in RMI. However, systems adopted to-date are *ad hoc*. Therefore, developing a roadmap is vital to ensure the systems deployed are appropriate, and allow for important issues such as power consumption, usability, maintenance, and training.
198. In preparing Component 2 of the project, a detailed Coastal Vulnerability Assessment and Management Plan has been conducted. This has been used to quantify the natural hazard risks, including climate change impacts, in Majuro and Ebeye, and develop concept designs and costs for coastal protection works in Ebeye. This work will be used to define the priority areas for coastal investment in Ebeye, from which final engineering designs will be developed during the implementation phase of the project. Stakeholder engagement and impact assessment will inform the final designs.
199. The wave climate for Ebeye Island coastal defence is mild to moderate due to the wave breaking on top of the flat reef. It is recommended to develop solutions with a cross-section that has a good hydraulic performance for this specific wave climate. Moreover, because of local contractor capacity for maintenance, it should be durable, easily repairable, and also installation should not be too complex. Finally, in case the wave climate will change (i.e. due to climate change) or the functional requirements will modify over time, the structure should be (easily) upgradable. Rock armour and concrete units score in this respect high.
200. The proposed coastal works will therefore involve heavy civil engineering construction using, largely, imported aggregates and rock armour (rip-rap). Although there may be scope for a local contractor to be able to carry out the works, it will be essential to attract wider interest. Because of challenges with remoteness, site access, aggregate handling facilities, and storage, a constructability review has been carried out to ensure that construction issues and constraints have been fully considered. Because of remoteness and difficult site conditions, an approach that allows early contractors involvement before the designs are completed will be explored as part of the preparation of the Project Procurement Strategy for Development, to optimize costs and allow for construction constraints.
201. There are no currently known, proven, sustainable aggregate sources in the Kwajalein atoll. Limited aggregate sources may be available in the Majuro atoll. Therefore, further work will be undertaken to investigate aggregate sources suitable for construction works. However, for the purposes of the project design, it has been assumed that all aggregates will be imported from sustainable sources in countries such as Guam, Hawaii, Nauru, Fiji, or, possibly, China.

F.3. Environmental, Social Assessment, including Gender Considerations

Environment

202. The proposed coastal resilience investments involve coastal protection works that will have potential impacts on the foreshore and marine environments of Ebeye and Majuro. There are no mangrove environments on either atoll, and the reef systems are degraded from urbanization, untreated waste water discharges, reef rock mining, waste dumping and ad hoc reclamation and sea walls. Small scale coastal protection works are likely to have minor cumulative impacts in addition to these baseline threats, however larger scale coastal protection works may have wider geographical impacts. World Bank Safeguard Policies OP4.01 Environmental Assessment and OP4.04 Natural Habitats are triggered and an Environmental and Social Management Framework has been prepared which sets out the processes that the MPW will go through to identify impacts and suitable mitigation measures. The project is classified as Category B as the impacts are not irreversible or unprecedented and can be mitigated and remedied.
203. An Environmental and Social Impact Assessment and Environmental and Social Management Plan will be required for any coastal protection works. The scoping of the area of influence will also identify and assess the impacts of any mining or quarrying that will occur as a result of the demand for aggregates on

this project. Where rock will be imported, due diligence will be undertaken on the source. The ESIA and ESMP will inform the detailed design. Contractors will be required to prepare and implement Contractor's ESMP, which will detail how the Contractor will achieve the requirements of the Project ESMP.

04. The ESMF also outlines how social and environmental safeguards will be integrated into any technical advisory funded by the project, such as vulnerability assessments, and capacity building / technical training.

Social

205. The project is expected to have long term social benefits from improving the resilience of the communities across RMI to natural hazards and climate change. Due diligence during project preparation has identified that access to land is complex because of the hierarchical customary land tenure system and the inability to buy and sell land. Customary traditions relating to land ownership are enshrined in the Constitution, with a hierarchy of 'Iroij' 'Alap' and 'Dri Jerbal' (the Iroij being the paramount chief and highest power within the Marshallese land owning hierarchy). The Land Acquisition Act 1996 makes 'provision for the acquisition of lands and servitudes for public use' including payment of compensation, but in practice the Government does not compulsorily acquire land because the Iroij hold customary power which is highly respected. The Government and land owners instead engage in leases and Memoranda of Understanding for public infrastructure. Many public infrastructure projects are delayed or abandoned because the Government cannot secure the rights to occupy land or create encumbrances or easements.
206. On Ebeye islet there are no land disputes and land ownership is clear. There are three senior land owners that are responsible for all permissions of land use, each representing one layer of the customary land owning hierarchy. A Master Lease between the Government and the land owners was finalized in January 2017. It covers a wide variety of land requirements for public infrastructure (school buildings, health clinics, water supply and waste water) on the atoll and this lease will be an opportunity to engage with land owners to secure the rights to undertake the coastal protection works.
207. In addition to the land owner approvals, there are tenants and informal land users that may be affected and will require extensive consultation and engagement during project implementation. In some instances, households or businesses may require temporary relocation or may lose small areas of gardens, yards, fences or other assets as a result of civil works.
208. World Bank Safeguard Policy OP4.12 Involuntary Resettlement is triggered due to the requirement for land and the potential for involuntary resettlement and compensation for lost assets as a result of the coastal protection works. In accordance with the Resettlement Policy due diligence assessment of land ownership and land use will be carried out by the MPW and an Action Plan will be prepared, if required, to document the plan for lease arrangements, involuntary resettlement and / or compensation for lost assets. Community and land owner consultation and engagement will therefore be an integral part of project implementation.
209. World Bank Safeguard Policy OP4.09 Physical Cultural Resources (PCR) has been triggered as there are a number of grave sites on or near the foreshore that may be affected by coastal protection works. Under the ESIA process, more PCR may be identified at specific locations. Under each ESMP there will be a plan for the avoidance, removal or relocation of PCR that will be based on extensive community and stakeholder consultation.

F.4. Financial Management and Procurement

210. **Budgeting Arrangements.** RMI has a Budget Coordinating Committee which develop, formulate, and coordinate the government budget process. This committee is made up primarily of Ministry of Finance staff who have strong skills in budget preparation and monitoring of the budget. Project funds will be included in the estimates and in-year reporting subject to the timely notification to the government. The budget section of the Ministry of Finance is responsible for the monitoring of the government budget throughout the year and will be requested to also assist in the budget preparation and monitoring of this project. The government accounting system will be able to compare budgeted to actual costs to assist the monitoring of the budget.

211. Budgeting will be on an activity basis summarized by component and category, and should be reviewed at least every six months by both the budget section of the MOF and the project team.
212. **Accounting Arrangements.** The Republic of the Marshall Islands uses the accounting system 4Gov developed by iDC, a US based Software Company. The system has an extensive chart of accounts, and transactions or line items can be further classified by cost center, organization (department/division) and geography if required. This system is capable of maintaining accounting records that meet the Bank's reporting requirements for this project. The project accounts will be maintained on the government system. It is possible the current package may be replaced; if that occurs, interim project accounting arrangements may be needed during the transition. It is yet to be established if the Project Accountant will be able to input directly into 4gov and what access this officer will be provided. As the capacity within MOF is quite limited, with a relatively small number of staff (less than 100), the project will finance a Project Accountant for the life of the project to avoid additional strain on the current resources.
213. **Internal Controls.** A Standard Operations Procedure Manual outlines the internal controls and procedures. However, compliance within agencies has often been poor. This risk should be mitigated by ensuring the Project Accountant is aware of the manual's requirements, and that compliance is included in the terms of reference of the position. To enhance the controls, all project Purchase Orders will be approved by the Secretary of Finance prior to release. There is currently no Internal Audit Service within the MOF.
214. **Flow of Funds.** Funds will flow from the World Bank directly into the (the designated account or DA to be opened at a commercial bank. This will be subject to additional assurances from the Ministry of Finance. This will enable expenditure payments to be tracked through government accounting system. For larger payments, Direct Payments can be used where funds will flow directly from the World Bank to the supplier. Where direct payments are used as the disbursement method, the transactions must be incorporated into the project accounts.
215. **Financial Reporting.** Financial reporting will be fully integrated into the government accounting system. The project will be allocated a cost center, and sub accounts will be created to reflect the specific activities. Reports will be generated from the 4Gov accountingsystem.
216. The project will prepare semester Interim Financial Reports (IFRs) in a format agreed to with the Bank. They will be required to be submitted not later than 45 days after the end of the reporting period. The IFRs will be prepared by the Project Accountant in consultation with MOF.
217. **External Audit.** The audit of project funds will be incorporated in the National Accounts and hence will be disclosed as a note to the accounts of the National Accounts, with submission due nine months after the end of the fiscal year. Currently the audit of the National Accounts is subcontracted by the Public Auditor to a private contractor. MFR, the Public Auditor and the Bank will negotiate the information required to be disclosed.
218. That National Accounts will be published on the Office of the Auditor General's website.
219. **Procurement:** Procurement of this project will be implemented by DIDA (Components 1, 3, and 4), and the Ministry of Public Works (MPW, Component 2), coordinated by MOF in close collaboration with the Chief Secretary Office, and the PSU within Pacific Community. The terms of reference for the RMI Project Manager set out that Procurement experience is a requirement for the position. The Project Manager will be responsible for procurement activities under Component 1, 3 and 4, and the Design and Supervision firm recruited under Component 2 will be responsible for procurement activities under Component 2. A Procurement Advisor is already in place in the Regional PSU, and will provide procurement support and advice to the Project Implementation Unit in RMI. As the project proceeds, a procurement consultant may be hired by DIDA if needed.

G.1. Risk Assessment Summary

220. The overall risk rating is Substantial. More information on specific key risks that have been identified for the project is provided below.

Technical and Operational

Sector Strategies and Policies

221. While climate and disaster resilience is being increasingly recognized as a key development challenge in PICs, integration of risk sensitive approaches into sectoral policies and coastal zone management and protection measures (particularly greener/softer options) is still widely lacking in RMI. The sectoral context is complex because: (i) the resilience agenda cuts across multiple sectors; (ii) coordination across sectors is in early stages; and (iii) the capacity of DRM/climate resilience institutions is generally weak and lacks political support. To manage this risk, the Program recognizes the key role of the Office of the Chief Secretary and aims to strengthen the interface between the Ministry of Finance, the Ministry of Works and the key DRM/climate resilience agencies.

Technical Design of Project

222. PREP II is technically and operationally complex, with many stakeholders, including technically specialized agencies. To manage the technical risks, the Project design: (i) adopts three components involving activities that can proceed substantially independently, each involving a smaller group of stakeholders, although the NSC maintains oversight and agencies will carry out their normal regulatory or leadership functions; (ii) involves SPC in leading activities that utilize its core strengths and builds on other SPC activities in RMI; (iii) uses the results of a detailed Coastal Vulnerability Assessment (CVA) for Ebeye, carried out by the consulting firm Deltares during project preparation, from which the scope of Component 2 has been substantially based giving a good understanding of risks and technical issues¹²; (iv) includes appointment of two, key technical appointments under a project preparation advance (i.e. Construction Risk Advisor and Civil Engineering Advisor) who will further identify and help develop management actions for technical and procurement risks and uncertainties early in the Project; (v) includes appointment of a specialized, multi-disciplinary coastal engineering and construction supervision firm to manage and help deliver the technically complex coastal protection works covering more than 60% of the project costs; and (vi) draws in lessons and experience from PREP Phase I and other projects, packaging activities together in larger contracts wherever feasible.

Institutional Capacity for Implementation and Sustainability

223. Implementation capacity in RMI is relatively weak, particularly due to limited human resources. There are several other large projects in progress or in the pipeline that will stretch the government of RMI's capacity. The capacity and implementation risks will be managed by: (i) Creating the Project Implementation Unit (PIU) attached to DIDA with personnel dedicated to the PREP II Project, supported by other dedicated resources, including the Civil Engineering Advisor based in MPW and the SPC-based PSU; (ii) Maintaining and applying a detailed Project Procurement Strategy for Development (PPSD), which includes risk management actions for procurement and implementation; (iii) Involving SPC to lead procurement and delivery of several, substantial activities under Components 1 and 2. Also, the SPC-based PSU (created under PREP I) will support the Project Manager and PIU, providing guidance, direct assistance, training, and capacity development to relevant staff for various aspects of the project; (iv) Hiring a Coastal Engineering Design and Supervision (D&S) Firm to provide specialized implementation support for Component 2; (v) Involving the RCU, created and housed in PIFS during PREP Phase I, to ensure strategic alignment between Project and Pacific Leaders' priorities; and (vi) Ensuring the World

¹² The CVA will be improved and expanded under the Project. Deltares will be sole sourced to carry out this expanded scope, thereby building on the approach already adopted, which has been well received by the RMI government, using the same team.

Bank team maintains a close dialogue with the regional coordinator, program manager, and country level Project Manager. The Bank will conduct regular implementation support missions to oversee progress of PREP II and identify what is working well and what could be improved, providing or arranging additional capacity building or support if warranted.

Financial

224. Primary fiduciary functions will need to be performed by each implementing agency. However, there is relatively weak fiduciary capacity in RMI. Mitigation measures agreed from a financial management (FM) and procurement assessment will be implemented, including provision of technical assistance, recruitment of a Project Accountant to the PMU, and compliance with World Bank Procurement and FM requirements, with strong internal financial controls and regular independent audits. The World Bank will monitor this through implementation support missions which will include reviewing the effectiveness and compliance with internal financial controls, reviewing interim financial reports for accuracy, and following up on issues raised in audit reports. One full-time Project Manager (with procurement experience) is in the process of being hired under the Project Preparation Advance, and a procurement expert will be included in the team of consultants selected to work with the MPW of Public Works.

Social and Environmental

225. Land ownership in RMI is a hierarchical, customary system enshrined by the Constitution. Land owners hold customary power which is highly respected. In theory the Government Land Acquisition Act 1996 makes 'provision for the acquisition of lands and servitudes for public use' including payment of compensation, but in practice the Government does not compulsorily acquire land because of the respect for the customary land tenure system. Some public infrastructure projects are delayed or abandoned because the Government cannot secure the rights to occupy land or create encumbrances or easements. To mitigate this the Ministry of Finance and PWD will engage with land owners early in the process, including them in the assessment of priority areas for development and concept design. Coastal protection works will only be prioritized and implemented in areas where land owner agreements have been secured. There are clear benefits to land owners of coastal protection works, and this is another mitigating factor. Coastal protection works will have potential negative impacts on the foreshore and marine environments of Ebeye and Majuro which will be carefully assessed and appropriate mitigation measures included in the design and construction phase.

Other

226. RMI is hazard-prone and disasters occur frequently. Should a significant disaster event occur during implementation of the PREP Phase II, the attention of the implementing agencies could easily be diverted from the requirements of the project to the immediate disaster response and recovery needs of the country. In order to mitigate this, a Contingency Emergency Response Component (CERC – Component 3) has been incorporated into the Project in addition to the *ex-ante* disaster risk financing and insurance mechanism supported by the PREP Phase I. This should provide flexibility and minimize disruption to the Project in the event of a disaster occurring.

G.2. Risk Factors and Mitigation Measures

Selected Risk Factor 1

Description	Risk category	Level of impact	Probability of risk occurring
Reluctance from sectors to integrate disaster risk and climate change adaptation approaches into their sector development	Technical and operational	Medium (5.1-20% of project value)	Low

Mitigation Measure(s)			
The Office of the Chief Secretary has been recognized as a key supporter to move this agenda forward, and will act as the interface between the key ministries and agencies (e.g: Ministry of Finance, Ministry of Public Work and the agencies in charge of Disaster risk reduction and climate change adaptation) in support to the objective of the JNAP.			
Selected Risk Factor 2			
Description	Risk category	Level of impact	Probability of risk occurring
The project will be complex both from a technical and operational perspective, with involvement of multiple stakeholders, and might cause difficulties during implementation.	Technical and operational	High (>20% of project value)	Low
Mitigation Measure(s)			
To manage this risk, technical support will be provided at a regional level by SPC, and will focus on a core set of activities that will include: (i) institutional and systems strengthening for early warning and preparedness; and (ii) technical assistance in coastal resilience planning. In addition, the consulting firm Deltares was hired to conduct a Coastal Vulnerability Assessment of Ebeye which will contribute to coastal planning and future investments based on a good understanding of risks. Where possible, activities will draw from lessons and experience from PREP Phase I, and activities will be packaged together in larger contracts wherever it is feasible to do so.			
Selected Risk Factor 3			
Description	Risk category	Level of impact	Probability of risk occurring
Limited capacity of DIDA and MPW for implementation	Technical and operational	High (>20% of project value)	Low
Mitigation Measure(s)			
This risk will be mitigated through the recruitment of a full time Project Manager by MoF/DIDA, who will manage the day-to-day implementation, including procurement activities for Component 1, 3 and 4. The Project Manager will also be supported by the PSU, and significant training and capacity development will be provided to relevant staff through various aspects of the project. Technical staff will also be recruited to support implementation of Components 1 and 3. A consulting firm will be recruited by the MPW to implement Component 2. The World Bank will maintain a close dialogue with the PSU and Project Manager, and will conduct regular implementation support missions to oversee progress.			
Selected Risk Factor 4			
Description	Risk category	Level of impact	Probability of risk occurring
Limited capacity of local market for the design and construction of coastal protection works	Technical and operational	High (>20% of project value)	Low
Mitigation Measure(s)			
The project will target international consultants and contractors so as to achieve an acceptable quality of investment. The national contractors can also participate in bidding (as contractor or sub-contractor subject to meeting the qualification requirements) so that their capacity will also be strengthened.			
Selected Risk Factor 5			

Description	Risk category	Level of impact	Probability of risk occurring
Weak coordination between DIDA and MPW.	Technical and operational	High (>20% of project value)	Low
Mitigation Measure(s)			
The Office of the Chief Secretary will act as the interface between DIDA and Public Work and the agencies in charge of Disaster risk reduction and climate change adaptation. In addition, the project manager in DIDA will coordinate and monitor all the procurement activities under the whole project, including consolidation of the procurement plans and using the Systematic Tracking of Exchanges in Procurement (STEP).			
Selected Risk Factor 6			
Description	Risk category	Level of impact	Probability of risk occurring
Uncertainty regarding source of construction materials and design	Technical and operational Social and environmental	High (>20% of project value)	High
Mitigation Measure(s)			
Clear specifications in line with the recommendation of the ESMF/ESIA will be included in the bidding document regarding technical requirements of aggregates so that bidders can be involved in the procurement process to propose technical solutions. In addition, SPC will undertake a study to identify appropriate and sustainable sources of aggregate for future works.			
Selected Risk Factor 7			
Description	Risk category	Level of impact	Probability of risk occurring
Weak fiduciary capacity in RMI	Financial	Low (<5% of project value)	Medium
Mitigation Measure(s)			
Mitigation measures agreed as a result of financial management (FM) and procurement assessments will be implemented, including provision of technical assistance, and compliance with World Bank Procurement and FM requirements, including strong internal financial controls and regular independent audits. The World Bank will monitor this through implementation support missions which will include reviewing the effectiveness and compliance with internal financial controls, reviewing interim financial reports for accuracy, and following up on issues raised in audit reports. The World Bank Procurement Regulations for IPF Borrowers and related guidance notes will be disseminated to concerned agencies early on in project preparation.			
One full-time Project Manager (with procurement experience) will be hired under the Project Preparation Advance, who will work with DIDA to:			
<ul style="list-style-type: none"> conduct procurement processes under Components 1, 3 and 4 as well as procurement of consulting services (including those under PPA); update the PPSD and procurement plan when necessary; provide procurement training to DIDA staff; 			

- prepare a detailed procurement manual as a part of the POM; and
- Provide support to MPW when necessary.

A procurement expert will be included in the team of consultants selected to work with the MPW of Public Works, and the main tasks are the same as above.

Selected Risk Factor 8

Description	Risk category	Level of impact	Probability of risk occurring
Difficulties to secure the rights to occupy land or create encumbrances or easements and potential adverse effects of protection works on the coastal environment	Social and environmental	High (>20% of project value)	Low

Mitigation Measure(s)

To mitigate this the Ministry of Finance and PWD will engage with land owners early in the process, including them in the assessment of priority areas for development and concept design. Coastal protection works can be prioritized in areas where land owner agreements are secured. The land owners will receive clear benefits from the coastal protection works, and this is another mitigating factor. Coastal protection works will have potential negative impacts on the foreshore and marine environments of Ebeye and Majuro which will be carefully assessed as part of the ESMF/EIA process and appropriate mitigation measures included in the design and construction phase.

Selected Risk Factor 9

Description	Risk category	Level of impact	Probability of risk occurring
A significant disaster event occurs during implementation of the PREP Phase II, diverting attention and resources of the implementing agencies to the immediate disaster response and recovery needs of the country	Other	High (>20% of project value)	Low

Mitigation Measure(s)

In order to mitigate this, a Contingency Emergency Response Component (CERC) has been incorporated into the Project in addition to the *ex-ante* disaster risk financing and insurance mechanism supported by the PREP Phase I. This should provide flexibility and minimize disruption to the Project in the event of a disaster occurring, by providing funds to assist the government with their response and recovery needs.

Other Potential Risks in the Horizon

None not already included above.

** Please expand this sub-section when needed to address all potential material and relevant risks.*

H.1. Logic Framework.

Please specify the logic framework in accordance with the GCF's [Performance Measurement Framework](#) under the [Results Management Framework](#).

H.1.1. Paradigm Shift Objectives and Impacts at the Fund level¹³

Paradigm shift objectives

<i>Increased climate-resilient sustainable development</i>	The project development objective is to strengthen early warning systems, climate resilient investments in shoreline protection, and to provide immediate and effective response to an Eligible Crisis or Emergency.				
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Expected Result	Indicator	Means of Verification (MoV)	Baseline	End Target	Assumptions
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Fund-level impacts

<i>A1.0 Increased resilience and enhanced livelihoods of the most vulnerable people, communities and regions</i>	1.1 Reduced expected annual damage due to coastal protection works	Coastal risk assessment Modeling	0.0	700,000 USD/year	<p>The reduced expected average annual damage (EAD) will be generated by the risk model developed for the coastal vulnerability assessment</p> <p>Assuming the assets and their value would remain identical as in the inventory from the PCRAFI inventory.</p> <p>Assuming that no event with a return period above the design period occurs, which would result in potential damage to the coastal protection works, and that the design has been properly followed during the construction works</p>
	1.2 Length of coast with reduced vulnerability to flooding and storm surges	Project reports	0.0	1500.00 m	This indicator relates to the length of coastline protected by coastal protection works and does not include ecosystem based measures.

¹³ Information on the Fund's expected results and indicators can be found in its Performance Measurement Frameworks available at the following link (Please note that some indicators are under refinement):
http://www.gcfund.org/fileadmin/00_customer/documents/Operations/5.3_Initial_PMF.pdf

					The final Environmental and social impact assessment is approved on time to allow the completion of the work.
	1.3 Number of people with reduced risks to coastal hazards and the effects of climate change	Annual Survey	0.0	10,000	<p>Data for this indicator will be disaggregated by gender. Target for female beneficiaries will be 50% of total.</p> <p>The population remain identic in Ebeye.</p> <p>Assuming that no event with a return period above the design period occurs, which would result in potential damage to the coastal protection works, and that the design has been properly followed during the construction works</p>

H.1.2. Outcomes, Outputs, Activities and Inputs at Project/Programme level

Expected Result	Indicator	Means of Verification (MoV)	Baseline	Target	Assumptions
Project/programme Outcomes	Outcomes that contribute to Fund-level impacts				
A5.0 Strengthened institutional and regulatory systems for climate-responsive planning and development	5.1 The government has developed and adopted procedures to clarify the governance mechanisms of the JNAP (including role of NC3, NDC and working group)	Project Reports, surveys and interviews with key government stakeholders	Procedures have not yet been developed and/or adopted to clarify the governance mechanisms of the JNAP	Procedures have been developed and adopted to clarify the governance mechanisms of the JNAP	The government of RMI would continue its engagement towards the implementation of the JNAP
	5.2 Women and men understand and are prepared to respond to impact based forecasting (financed by IDA)	Annual survey	No impact based forecasting exists	People reached by Impact based forecasting know how to react	Impact based forecasting models are developed soon enough in the project so that people can be taught how to use their results
	5.3 NDMO facilities modernized and operating in accordance with pre-agreed performance standards (Regional IDA)	Annual Survey	No	Yes	Equipment procured for NDMO is only used by NDMO
	5.4 NDMO staff is reinforced and better qualified to fulfill its mandate (Regional IDA)	Annual report	Only 2 staffs at NDMO	NDMO is staffed accordingly to the roadmap	Skill staff remain at NDMO (turnover is not too high)

	5.5 Post-Disaster Need Assessment would be delivered quickly, in case a disaster happens (regional IDA)	PDNA delivered after an event	No procedure exists	PDNA procedure exists and staff is trained	Possibility to monitor only if a disaster occur Trained persons are available after the disaster
A 6.0 Increased generation and use of climate information in decision making	6.1 A long-term coastal security strategy is developed and adopted by the key central and atoll government agencies (funded by regional IDA)	Strategy document adopted	No long-term coastal strategy	A long-term coastal strategy exists	The government will coordinate the perspective of each sector
	6.2 Collection of sex-disaggregated data and gender-specific disaster impact data	Report of disaster impacts	Gender-data are poorly collected in disaster impact assessment	Disaster impact assessment contain gender specific data	Importance of gender aspects in disaster impact to be understood
A7.0 Strengthened adaptive capacity and reduced exposure to climate risks	7.1 % of communication stations operating in line with Standard operating procedures (SOPs) in outer island network	Annual survey	0%	60.0 %	Equipment is properly maintained and don't suffer any irreversible damage.

	7.2 Number of people who can receive timely and actionable hazard forecast and warning messages	Annual Surveys	30%	70%	<p>Data for this indicator will be disaggregated by gender. Target for female beneficiaries will be 50% of total.</p> <p>Coverage refers to the people who can receive hazard forecast and warning messages through an improved warning system</p> <p>Equipment is well maintained, and with enough energy to function correctly</p>
	7.3 Inspection and maintenance of coastal protection work is improved	Regular inspection reports	No procedure for inspection of work	Staff follow the inspection procedure	<p>Additional staff is recruited and trained to inspect and maintain coastal protection work</p> <p>Trained staff remained (turnover not too high)</p> <p>Maintenance continues to be part of the government budget</p>

Project/program outputs	Outputs that contribute to outcomes				
1. A framework for governing disaster and climate change management is	Integrated NDC and NC3 framework is approved by Cabinet	Project reports	No	Yes	

established and operating	Integrated committee and working groups have terms of reference and are operating	Project reports	No	Yes	Members of the groups have availability in their work program to attend the meetings
	Annual government activities are overseen by the committee and working groups under the framework	Project reports	No	Yes	
2. Increased coverage of forecast and warning messages to Outer Island populations at risk	Communications roadmap is prepared and adopted	Project reports	No	Yes	An agreement between the different actors of their respective responsibilities is reached.
	Communications equipment is procured and operating, with maintenance arrangements in place, and users are trained	Project reports/ contracts	No	Yes	
	User communities receive timely early warning messages and advice	Drills	No	Yes	Instruments are properly maintained, or didn't suffer un reversible damage. Communities listen to the warning
3. Sources of aggregates are identified (financed by IDA)	Sustainable sources of aggregate, and methods of extraction, are identified and quantified in Kwajalein and Majuro atolls	Reports and maps	No local sources of aggregates are identified for sustainable exploitation	Potential sources are studied and sustainability is assessed	Such sources might not exist, so the study might only give the reason why not to exploit the local sources
4. Project management and governance is effective	The National Steering Committee (NSC) meetings and provides	Annual progress report	0 per year	1 per year	Members of the NSC are not overloaded with other activities, and have dedicated

	effective oversight and governance.				time for the NSC meeting
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H.2. Arrangements for Monitoring, Reporting and Evaluation

- 227.** The monitoring and evaluation (M&E) plan of PREP Phase II is based on the key indicators detailed in the Results Framework presented in section H 1.2. The key indicators have been chosen taking into account the information they provide, as well as the costs and feasibility for any additional data gathering. The baselines for these indicators have been established on the best available data, but will in some cases be re-refined over the first two years of implementation. Results indicators will be gender disaggregated when feasible.
- 228.** Responsibility for monitoring and evaluation of progress towards the objectives and outcomes will be the responsibility of the implementing agencies of the different component, (with support from the PSU). The PREP Phase II will support monitoring and evaluation training and expertise as part of the implementation, ensuring that a focal point is assigned to oversee and be responsible for M&E. Furthermore, the PREP Phase II will directly support the actual costs of data collection and analysis, as part of each of the three technical components.
- 229.** A midterm, independent, review will be carried out within 24 months after the effectiveness of the PREP Phase II and no later than December 31, 2019, to assess: (i) progress under Phase II of the Program; (ii) coherence in the implementation of Phase II and progress with preparation of subsequent phases; (iii) achievement of overall objectives; (iv) the role of the different partners; and (v) reorientation of the PREP Phase II if necessary to ensure that it achieves its objectives.
- 230.** At the same time, it will allow the incorporation of lessons learned in the design of subsequent phases. The Regional Steering Committee through the RCU will be responsible for preparing the necessary documentation for the review and for planning the midterm review meeting.

I. Supporting Documents for Funding Proposal

- ☒ NDA No-objection Letter (NDA_No-objection Letter)
- ☒ Feasibility Study (Annex B_Deltares_2016_Feasibility_study_Coastal_risk_assessment_RMI)
- ☒ Integrated Financial Model that provides sensitivity analysis of critical elements (xls format, if applicable) (Annex_C_CB Analysis1_GCF)
- ☐ Confirmation letter or letter of commitment for co-financing commitment (If applicable)
- ☐ Project/Programme Confirmation/Term Sheet (including cost/budget breakdown, disbursement schedule, etc.) – *see the Accreditation Master Agreement, Annex I (Annex E)*
- ☐ Environmental and Social Management Framework. Including the stakeholder engagement framework (section 9.) (Annex F)(annex F)
- ☐ Appraisal Report or Due Diligence Report with recommendations (If applicable) (Annex G)
- ☐ Evaluation Report of the baseline project (Non applicable - *Phase I of the PREP Phase I was only launched during June 2016, and as such, is still approximately 18 months away from the mid-term review*)
- ☒ Map indicating the location of the project/programme (Annex H)
- ☒ Timetable of project/programme implementation (Annex I)
- ☒ Budget (Annex J)
- ☒ Procurement Plan (Annex K)

** Please note that a funding proposal will be considered complete only upon receipt of all the applicable supporting documents.*