Concept Note Cover Page

Country: The Republic of the Marshall Islands

Location within the country: Jaluit or Wotje, Wotho, Mejit, Ujae, Lae.

Concept focus:

[ ] Climate change adaptation

[ ] Sustainable energy

[x] Both

Project type:

[ ] Type 1 – 200,000 Euro maximum budget

[x] Type 2 – Maximum budget is the country allocation

Total requested budget: 450,000 Euros

Duration of project: 24 months

Contact point:

Mr. Bruce Kijiner
Director, OEPPC
kijinerb@gmail.com
+(692) 625-3445/3213/3233/3660

Support for PDD development:

[x] consultant(s) or organisation(s) to be engaged:

Sherry E. Rone, M.S., Environmental Engineer, or Riyad M Mucadam, Ph.D.

[ ] No

[ ] Undecided

Concept Note – Description

1. Project title: Scientific assessment of groundwater resources, their response to climate and population changes and sustainable provision of freshwater in Marshall Islands.

2. Background and rationale

The Republic of the Marshall Islands (RMI) is one of the most vulnerable countries to the impacts of climate change. The Government has recognised that cross-sectoral planning policy and proactive actions are necessary in order to effectively prepare for, respond to, and cope with these impacts[1]. Evidence-based policy and its implementation through projects is a key element of rational development. Important issues for consideration include the forms of evidence that are of greatest relevance or utility for decision-makers, and the most productive forms of interaction between the producers and the users of research and evaluation findings[2]. The findings of scientific research and engineering, particularly if these are not controversial, provide a forceful relevant and interactive form of evidence for decision making, action and public outreach.

One of the impacts of climate change is the increased occurrence of natural hazards; e.g. typhoons and droughts. Atolls are particularly vulnerable to these hazards. These hazards become disasters when a nation or community is unable to cope with the effects of the hazard. Disaster risk management is the concept and practice of reducing disaster risks through systematic efforts to analyse and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events[3]. Because of the geography of the Marshall Islands, droughts are a grave threat to life & survival. The management of water resources is a crucial element of disaster risk management.

The increasing frequency of droughts that are related to the ENSO and to changing climatic patterns adversely impact human survival, food security and the relatively small economy of the Marshall Islands. In the past, international efforts have been required to help the nation to cope with droughts. These efforts have included assistance through the provision of rainwater tanks, reverse osmosis units and portable desalination units; freshwater has been transported by ship over hundreds of miles to remote atolls. Despite the provision of expensive equipment to alleviate drought, another serious difficulty and burden arises. Very high fuel costs, low availability of fuel, the high power requirements and high costs & maintenance of reverse osmosis units limit the use of these equipment. The essential nature of groundwater resources for survival on atolls is obvious but its development is almost entirely neglected in the outer atolls of the RMI. Rainwater storage tanks are important but are largely rendered irrelevant during extended droughts. There is an urgency to develop another sustainable & efficient method of acquiring equivalent or larger volumes of freshwater as is provided by these methods. In 1998, a preliminary scientific study of the groundwater resources at several atolls was supported by the U.S. Federal Emergency Management Agency (USFEMA). It indicated that groundwater was a sufficient valuable resource that could be mapped in detail and sustainably developed to provide freshwater in large quantities. Since 1998, populations, water quality and climatic patterns have changed in the Marshall Islands. Recent research surveys (IOM) at several atolls have indicated the quality of groundwater through measurement of water quality at existing dug-wells. In this project, the management of groundwater

[1] *Integrated Water Resources Management Plan and Policy* (approved 2014) and, the *National Strategic Plan RMI* (Draft) 2014-2016. p16-18 (Dec 2013), EPPSO, Majuro.

[2] Head, Brian W. "Reconsidering evidence-based policy: Key issues and challenges." *Policy and Society* 29.2 (2010): 77-94.

[3] *Guidelines: National Platforms for Disaster Risk Reduction, United Nations International Strategy for Disaster Reduction*, United Nations International Strategy for Disaster Reduction, Geneva, 2007.

using established engineered solutions and the introduction of new pilot technologies is proposed. It is proposed that the evidence for groundwater development be strengthened; where it is possible, policy action and economic options should be rationalised with the evidence.

3. Objective (s): The objective of the project is to decrease the vulnerability and risk of several atoll communities in the Marshall Islands to the impacts of the increasing frequency of droughts, proactively ensure the supply of potable water, and improve governance & management of water resources. Specifically, this project will aim to research the groundwater lenses with recent scientific methods, display the results for public outreach, develop wells at identified best locations for potable freshwater supply, and test new commercially available freshwater producing technology. This aligns with and proposes to implement the RMI's Water and Sanitation Action Plan 2014 - # 2 Policy Issue, Desired Outcome and Actions Re: Resource sustainability-groundwater & alternate sources. It aligns with the EU-GIZ ACSE Programme's objectives related to health water sanitation and renewable energy interventions for adaptation projects.

4. Expected project outcomes

1. Improvement of information generation, data collection, management and dissemination, promotion of evidenced based decision making and enhanced monitoring, evaluation and learning good governance, conservation measures and management of water use;
2. Development and improvement of sustainable water systems and their maintenance;
3. Reduced risk of the impact of natural hazards, more economic (i.e. less fuel consumption) methods of potable water production.

5. Targeted outputs

Output 1:

1.1 Field assessment of select groundwater lenses: 3-dimensional quantitative geophysical study (electrical resistivity) & water quality

1.2 Groundwater lens response to rainfall, usage & sea level change available at website for outreach and management through 3D interactive simulation based upon #1 (above)

Output 2:

2.1 Solar-powered pump-filter system and community well installed at best output sites (based upon #1.1) to produce potable water during drought; example of solar pump: http://us.grundfos.com/products/find-product/sqflex.html

2.2 Pilot EU technology for producing potable water from air (humid) installed at selected school site. http://www.eolewater.com/gb/our-products/our-expertise.html

2.3 Solar stills water purifier systems installed at public facilities in outer atolls e.g. airstrip terminal, school. http://www.fcubed.com.au/aspx/about-fcubed.aspx

6. Beneficiaries

The direct beneficiaries are the rural populations of the RMI. These have the lowest incomes and are most vulnerable owing to their remote locations and very high cost of fuel at those locations. The demographic changes in the RMI during the past 15 years have shown that these communities have higher numbers of older persons and young (<15years) children as a proportion of their populations than the urban areas [4]. Increasing the resilience of the people of RMI, especially the vulnerable poor, women and children is the core goal of RMI's climate change policies and this project will help some of the most vulnerable communities in the RMI. Other direct beneficiaries would be the participants of the WASH group: their technical skills would be enhanced. On-site persons who would participate in the installation of equipment would benefit similarly; women would be encouraged to participate in the installation of solar powered pumps & filters.

[4] RMI Household and Population Census Report (2013).

Indirect beneficiaries would include the disaster management agencies and infrastructure of the RMI. The development of groundwater resources may allow a more efficient and economical approach than has been exercised when coping actions have been taken after a disaster has occurred. Other indirect beneficiaries would include possibly other atolls where such activities could be replicated. Policy makers in the RMI and the region could also benefit from the increased information and its dissemination in a format that permits evidence based policy. The larger interested global audience would benefit from new data and information about the status of the groundwater lenses at these atolls and their responses to climate change.
When selecting staff to receive training, gender balance and background will be important considerations to ensure that benefits are evenly distributed.

7. Indicative budget

Item	*Indicative budget (Euro)*
Implementation Activities	
Output 1.1	150,000
Output 1.2	50,000
Output 2.1	50,000
Output 2.2	50,000
Output 2.3	50,000
subtotal	350,000
OEPPC Project management 2 yr	50,000
Project assistant 2 year	27,000
Monitoring and evaluation	3, 000
Communication	10,000
Office space 50%	10,000
subtotal	100,000
Total	450,000

8. Project management
The lead national and implementing agency for this project is the Office of Environmental Planning and Policy Coordination. The OEPPC will be in charge of financial, accounting and technical arrangements and will report to the GIZ. The Director of OEPPC will provide project oversight, a project manager at OEPPC (implementation & narrative reporting) and a project assistant (implementation & admin.) at OEPPC or RMIEPA shall be in charge of implementation. RMIEPA's accounting and finance division staff shall provide accounting & financial reporting with joint oversight by IslandECo, a research and technology organisation in collaboration with personnel from the Victoria University of Wellington's Earth Sciences-Geophysical division shall implement Activities 1.1-1.2-2.2 http://www.victoria.ac.nz/scps/about/staff/malcolm-ingham; OEPPC will implement 2.1 & 2.3 and provide the associated technical reports and outputs. The proposed steering structure of the project is that the Wash group (WAter Sanitation and Health) an, interagency working group in Majuro, consisting of OEPPC, the RMIEPA, and the Water utility (MWSC) will have overall monitoring and evaluation responsibilities. The GIZ development technical assistant to the RMI who is based the RMIEPA is also a member of the WASH working group.

The OEPPC has successfully implemented a range of climate change and environmental projects such as: International Water Programme (IWP-GEF) and it is currently the implementing entity for

the Pacific Adaptation to Climate Change Project (PACC) which has a significant water component (solar still water purifiers were installed at the medical health centres at numerous outer atolls) and the Global Climate Change Alliance (GCCA) project which also is implemented at an outer atoll.

9. Complementarity and replicability

This project will complement already existing projects such as the PACC and GCCA project which both aim to increase resilience to climate change by increasing capacities of Pacific Island countries to adapt to climate change. It will build upon the preliminary groundwater research supported by US FEMA and the water quality surveys conducted by the IOM. This project's outputs are plainly relevant and are replicable at other atolls in the RMI and other atoll nations in the Pacific.

10. Sustainability and risks

The project's activities – Outputs 2.1, 2.2, 2.3 are largely installation of relatively unsophisticated and robust equipment as compared to reverse osmosis units. The equipment to be deployed through activities 2.1 and 2.3 are very well tested. These are commercially available and extensively deployed in numerous geographically diverse remote locations. These (only 2.1) do require some maintenance. Small scale solar PV technology is widespread in the Marshall Islands. These (battery-free) water pumping systems are relatively sustainable for long periods. An indicator of sustainability would be the adequate performance of an installed system at least 1 year after installation. Activity 2.3 presents some risk; its performance has not been tested in the Marshall islands. However it is commercially available. Its proponents specifically suggest it is designed for remote locations. The deployment of one unit is an attempt to minimize that risk. It is offset by the value of pilot-testing the innovative and entirely independent (of existing water resources) characteristic of the technology. Another risk is that an identified best site for groundwater abstraction may be some distance from a populated area. However, in the event of a drought this certainly presents a lessor effort and related expense than transporting water by ship or the expense of gasoline to power generators or to purchase membranes for desalination equipment. Actions taken towards educating the community of the benefit-costs of these options will minimize this risk.

11. Indicative Timeline for planned measures

Activity/Month		3	6	9	12	15	18	21	24
PDD	x								
PMU setup		x							
Technical team setup		x	x						
Mobilize technical team O.1.1				x	x	x		x	x
Tech team O.1.2				x	x	x			
PMU O.2.3			x		x	x			
PMU O.2.1						x	x		
Tech team O.2.2					x	x	x		
Tech team O1.2								x	x
Financial reporting			x		x		x		x

12. Stakeholder engagement in concept note development (maximum three sentences)

The parties (RMIEPA-MWSC) listed in section 8 and the Mayors of outer atoll have been consulted during the conception of the proposed project.