

## **Design and Installation of Water Security Measures in Kapingamarangi, Pohnpei State, FSM**



*Kapingamarangi*

### **Background**

In 2017, during the planning of the RENI project in FSM, the Government of FSM requested that while most of the activities will be focused in Yap State, up to USD 50,000 of the funding be set aside for water security measures in Kapingamarangi, Pohnpei State, specifically community water storage tanks and accoutrements for the school and the church.

Kapingamarangi is one of the most remote and inaccessible places in the Pacific. It lies just north of the equator in the Pacific Ocean, 700 kilometres south of Pohnpei, the state capital, and over 1700 kilometres southeast of Guam.

Around 500 people live on this small, flat atoll, which has no runway or airstrip and is serviced just three to four times a year by a government-owned vessel. The only contact with the outside world is via three satellite phones placed in the school, the dispensary and the local council office. With just one primary school, access to secondary education is a challenge, as is responding to health emergencies. The residents of Kapingamarangi are of Polynesian descent, and partly as a result of their isolation and remoteness, they are very resilient.

In normal conditions, islanders rely on rainwater harvesting systems and on shallow wells to supply their water needs. However, because of the shallow nature of the freshwater lens, well water may often be brackish.

The 2016 El Niño drought lasted several months. And despite careful conservation, such as bathing and washing dishes in salt water, islanders faced severe hardships. The water from the well ran low and turned brackish and the water storage tanks emptied. Even coconuts dried out so the option of drinking coconut water was not available.

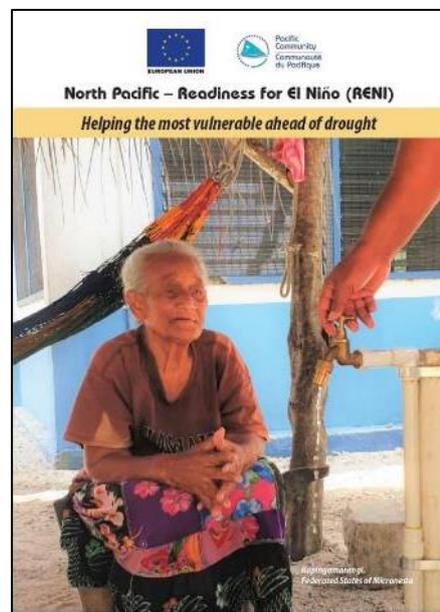
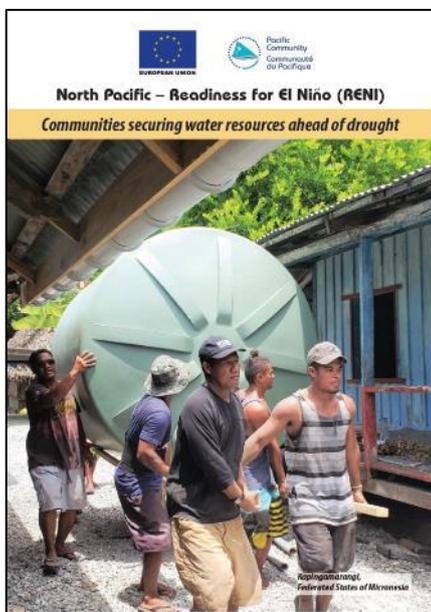
### **Planning Phase for the Water Security Measures**

The planning phase took 14 months, starting in June 2018 and continuing to August 2019. Transportation was one of the major constraints, with the government vessel only making three to four

trips a year from Pohnpei to Kapingamarangi, and a schedule that was subject to change due to the shortage of government vessels catering to the needs of all FSM's outer islands.

In particular, lessons learnt from the impact assessment of a water security project completed in Fais Island, Yap State in 2015, were applied during the planning phase <http://ccprojects.gsd.spc.int/wp-content/uploads/2019/09/Impact-Assessment-of-Water-Security-in-Pacific-Outer-Islands.pdf> . Special attention was paid to the quality of the materials and the involvement of the community in planning, installation and maintenance. These were the two key lessons that emerged from the Fais Island impact assessment, and for Kapingamarangi they were especially important given its remoteness and inaccessibility.

The RENI project focuses on communities securing food and water resources ahead of drought, and in Kapingamarangi the most vulnerable groups - the youth, the sick and the elderly – were identified as priorities. So water security measures were planned for the school and the island's dispensary. During the course of installation, and at the suggestion of the Mayor, a water tap was installed at the residence of the oldest lady on the island, Ms Bomakaran Borong.



Key components of the planning phase were as follows:

- Two visits were made to Kapingamarangi, in June 2018 and January 2019, for consultations with the community and for planning and design of the measures.
- The Mayor of Kapingamarangi and the Senator responsible for Kapingamarangi were involved throughout the process from initial planning to completion.
- The engineering design was completed in November 2018, and the materials for the tank bases were procured and transported to Kapingamarangi in January 2019.
- During the first part of 2019, tanks, appurtenances, fence materials and equipment were procured and stored at the port of Pohnpei. Meticulous care had to be taken to ensure every item, from bags of nails to the tanks themselves, was correctly purchased, as there would be no opportunity to go back for forgotten items.
- In April 2019 a Memorandum of Understanding was signed with the Environmental Protection Agency, Pohnpei State, FSM, formalising the project's activities. This also defined the community's role in providing land usage rights and undertaking the management and maintenance of the measures once installed.

- From June 2019 onwards the schedule for the government vessel was disrupted due to the need for repairs. This posed a serious setback for the project. Eventually it was decided to charter a vessel to transport the materials and the team to install the water security measures. The team comprised the Project Engineer and Project Coordinator, the Mayor and the Senator, and a plumber from Pohnpei. The installation team needed a minimum of 14 days to complete the installation. The most cost effective solution was to charter a larger vessel to take the team and the materials to Kapingamarangi (cost US\$ 35,000) and to charter the smaller, sustainable sea transport vessel, Okeanos, to return the team to Pohnpei 14 days later (US\$ 10,980).



*The vessel on the left transported the team and the materials to Kapingamarangi and the sustainable sea transport vessel on the right returned the team to Pohnpei*

- The final part of the planning was to arrange individual contracts and payment for 21 labourers and 3 leading hands from the Kapingamarangi community to help with the installation.

### **Installation of the Water Security Measures**

- In September 2019 the chartered vessel transported the team and the materials to Kapingamarangi.
- During the installation period:
  - Contracts with the workers were signed
  - Exact sites for the installations confirmed
  - Concrete bases were constructed and then the water systems were installed.
  - The water storage systems were properly secured with fences, gates and padlocks, to facilitate management and rationing of water during times of drought. Three labourers, Public Work personnel on the island and the Principal for the Elementary School were trained to manage and maintain the systems.
  - The project used additional spare parts to connect an old 39,494 US gallons concrete tank to the roof catchment. The tank had been repaired by the Adaptation Fund project but not connected to the catchment. The RENI team also provided proper water access points (taps) to the concrete tank.
- Overall the RENI Project provided 48,494 US gallons of water storage to the people of Kapingamarangi.
- In October 2019, the Okeanos transported the project team back to Pohnpei.

### **Final Maintenance and Handover Phase**

- In late February 2020, a final visit was made to Kapingamarangi, via the Okeanos sea transport, to deliver some final maintenance tools and kits, correct a few minor installation issues, provide

a recap training on maintenance, and ensure the community leaders and Public Works representative took ownership of the system and its continued maintenance.

### **Immediate Impact**

- During the February 2020 visit, the community of Kapingamarangi informed the Project Coordinator that during the dry period, which lasted from December 2019 to mid-February 2020, most of the households ran out of water. Community members then utilized the newly installed community systems to provide drinking water during this period.
- This finding was confirmed by the national government's Department of Environment, Climate Change and Emergency Management (DECEM) in June 2020, who confirmed that there had been no need to deliver emergency water supplies to Kapingamarangi during the recent 2019-2020 dry period.

### **Total Cost of Materials, Transportation and Installation**

- The total cost of the materials, transportation and installation was US\$ 161,842.
- The initial cost estimate based on an assessment made during the first visit in June 2018, and not accounting for any charter costs was US\$ 93,500.
- The costs initially identified by the Government of FSM was US\$ 50,000.
- The final overall cost was 3.2 times the amount initially identified by the Government of FSM for Kapingamarangi (this cost does not include the Project team's time).