DEPARTMENT OF ENVIRONMENT, CLIMATE CHANGE AND EMERGENCY MANAGEMENT

# Building Resilience to Disaster and Climate Risks

## Federated States of Micronesia - Yap Outer Islands 2017


This was the first project initiated by the DECCEM to do Assessments and Educational Awareness on Building Resilience to Disaster and Climate Risks in the Outer Islands of Yap. It was fully funded by the FSM Congress.

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## EXECUTIVE SUMMARY

The ***Building Resilience to Disaster and Climate Risks*** was a project initiated by the Department of Environment, Climate Change and Emergency Management (DECCEM). In consultation with the Disaster Coordinating Officers for the States (Yap, Chuuk, Pohnpei and Kosrae) it was agreed to conduct some assessments and do educational awareness on Disaster and Climate Risks in the states beginning with the outer islands. The idea of the project was to reach out to the most vulnerable communities that are located in the outer islands. With the exception of Kosrae, all of the other three states have outer islands. Considering the geographical spread of the Federated States of Micronesia (FSM), it was agreed to work with one State at a time.

Over the last 10 years, the FSM has seen a significant increase on the frequency and impact of natural disasters such as drought and typhoons. Outer islands communities in the states of Chuuk and Yap have seen the worst effects of this, particularly during the devastating effects of Typhoon Maysak (2015) and most recently El Niño induced drought (2016). The project's purpose was to strengthen the capacity of the outer islands to address existing and emerging challenges with regard to the risks posed by natural hazards, climate change and related disasters.

The pilot project started with the Outer Islands of Yap and was fully funded by the FSM Congress. The overall objective was to provide an opportunity for government officials to interact with remote communities who are usually the most affected during natural disaster and assess their current resilience practices and needs, as well as do disaster risk reduction and management initiatives.

The group consists of representatives from the following Departments and Organizations: DECCEM, International Organization of Migration (IOM), FSM Weather Services Organization (WSO), FSM Department of Resource & Development, Yap State Health Services, Yap State Resource and Development, Yap State Governor's Office.

The implementation period of the project started on September 5, 2017 and ended on September 22, 2017. The team visited 17 outer islands in Yap and did the following: *Water Catchment Assessment, Early Warning System Assessment, Public Infrastructure Assessment, Essential of Humanitarian Assistance Training, Agriculture Assessment, Environmental Health and Safety Household Inspection, Aerial Assessment and Educational Awareness on Climate Change and Disaster Risk Reduction*.

The following report has the detailed outcome of each activity implemented. What the project originally proposed to do was accomplished. Based on recommendations after the compilation of each activity report, this project will be beneficial for the other states.

## INTRODUCTION

This project, titled: ***Building Resilience to Disaster and Climate Risks*** was a project initiated by the Department of Environment, Climate Change and Emergency Management to reach out to vulnerable communities in the outer islands.

## BACKGROUND

The high vulnerability of the Federated States of Micronesia (FSM) to a number of environmental and natural hazards is well known. This vulnerability is further exacerbated by its small land areas as well as its narrow, often subsistence-based fragile economies, coupled with physical distance both within and between the islands. Current studies suggest that the FSM remain disaster prone and that the economic impacts of such natural events pose severe development constraints especially in the outer islands.

Disaster Risk Reduction (DRR) measures reduce vulnerability and prevent the loss of lives, assets and livelihoods, thereby, reducing the exposure of governments to divert substantial national resources from development to relief, recovery and reconstruction when disasters strike and to build safety and resilience of their communities. In this regard, the project assisted the communities on the disaster and climate risks impacts in order to build resilience.

## OBJECTIVE

The overall objective was to provide an opportunity for government officials to interact with remote communities who are usually the most affected during natural disaster and assess their current resilience practices and needs, as well as do disaster risk reduction and management initiatives.

## PURPOSE

Over the last 10 years, the FSM has seen a significant increase on the frequency and impact of natural disasters such as drought and typhoons. Outer islands communities in the states of Chuuk and Yap have seen the worst effects of this, particularly during the devastating effects of Typhoon Maysak (2015) and most recently El Niño induced drought (2016).

The project's purpose was to strengthen the capacity of the outer islands to address existing and emerging challenges with regard to the risks posed by natural hazards, climate change and related disasters. It provided an opportunity for government officials to interact with remote communities who are usually the most affected and asses their needs.

The National Disaster Plan approved on December 20, 2016, tasked the DECCEM to fully implement it at the national level down to the community level. The trip provided an opportunity for government officials to establish community focal points for disaster risk management and communications protocols before, during and after a disaster.

## TRANSPORATION

Since it was a government led venture DECCEM requested usage of the FSM Patrol Boat, as well as funding for fuel and provision for the crew and government participants. However, DECCEM was unable to use the patrol boat but was successful in working with Transportation, Communications & Infrastructure (TC&I) to make arrangements on use of the Micronesian Navigators. The total budget for the overall trip was $75,000 (**Refer to Annex 1**).

## STAKEHOLDERS

This project made investments in DRR at the community level and the schools. The Communities benefitted from a better understanding of risks, hazards and warnings via use of effective early warning systems. In addition, it also prepared the local communities for disaster by strengthening their resilience.

## LOCATION

Yap is the westernmost state of FSM, located 885 km southwest of Guam. Yap is consists of a total of 134 islands, 22 of which are inhabited, with four major islands. The state's landmass is a total of 102 km2. Yap is spread across nearly 1000 km of the North Pacific Ocean. Four of the islands of Yap have geology of inactive volcanic origin, with others being outlying islands and atolls. The four main islands are connected by a coral reef, and each of the islands has shores populated with mangroves. Yap is characterized by gentle slopes and substantial swampy lowlands, unlike the other states of FSM which have rugged highlands. The capital of Yap State is Colonia, located on Yap Proper.

## DURATION

The implementation period of the project started on September 5, 2017 and ended on September 22, 2017. A total of 17 out of the 18 outer islands[1] in the in the State of Yap were visited. The team had each designated activities conducted throughout the islands (**Refer to Annex 2**).

## TEAM

In coordination with stakeholders and partner organizations, the DECCEM lead the trip throughout Yap outer islands. Participants from departments and organizations are listed in the following **Table 1** below:

**Table 1.** Participants List

| Name of Department/Organization | No. of Staff |
|---|---|
| DECCEM | 2 |
| Department of Resource & Development | 1 |
| FSM Weather Service Organization | 1 |
| Yap State Governor's Office | 1 |

[1] Ngulu was the only outer island of Yap not visited due to the vessel schedule. It did not include Ngulu.

| | |
|---|---|
| Yap State Resource and Development | 1 |
| Yap State Department of Health | 1 |
| International Organization for Migration | 1 |

## RESULTS AND OUCTOMES

The following results and outcomes indicated below are summaries of assessments, surveys, inspections and observations conducted by each assigned team member based on their fields of experiences.

### *Outer Islands Liaison Officer Visit*

The Yap State Governor's Office designated the Outer Islands Liaison Officer to join the team. The Liaison Officer had several duties to do which includes the following:

- Coordinate the Activities Conducted by the Team with the Island Chiefs;
- Distribute the Maysak Food Relief Supplies to the Islands of Ulithi;
- Establish a Radio Communication Plan with the Identified Neighboring Islands Communication Officer(NICO);
- And, follow up on the Desalination Units that were placed on some of those Islands during the El Nino period.

The Liaison Officer assisted the team by coordinating the activities ahead of time. Prior to arrival, he made sure that each island was aware of what will be conducted and how it will be conducted through radio communication. Upon arrival of each island, he made sure that the proper traditional protocols are met for each meeting with the Island Chiefs.

The Maysak Relief Supplies were successfully distributed to the Islands of Ulithi. The Radio Communication Plan was not successful due to the limited time given on each island. However, the Chiefs were made aware of the idea for future reference. Lastly, recommendation was made for the Desalination Units. Installation and trainings are needed for maintenance.

### *Environmental Health & Safety Household Inspection*

The Yap State Department of Health Services utilized the trip to provide much needed awareness on sanitation campaign. They conducted a Household Survey (Refer to Appendix A) in a form of an inspection that was done by an Inspector from the Public Health Division. The survey was the first to be conducted for the outer islands. It focused on environmental surroundings including; premises cleanliness, water source, pig pens and toilet facilities. The households were randomly selected and inspected for each island with an average of six households per island.

The Public Health Inspector was assisted by the community board members and community health workers in conducting the survey. In addition to the survey, they also educate each households selected on prevention methods to keep their surroundings clean in order to eliminate mosquito breeding sites and prevent other diseases. The following **Table 2** below indicates the detailed findings for each island.

The **Table 2.** Findings on Sanitation Survey

| No. | Islands | Findings |
|---|---|---|
| **1** | Ulithi Atoll | ✓ Some households have their own waste disposal pits but no fence. Others dispose their waste in the bushes or close to beach;<br>✓ Some households have flushable or water seal type toilet facilities. Most are still using the beach side or in the ocean;<br>✓ All households with pigs tie them by the beach or inland. |
| **2** | Fais | ✓ No garbage pit available, wastes are being disposed in the bushes or the beach side.<br>✓ No toilet facility available on island;<br>✓ All households with pigs tie them by the beach or inland. |
| **3** | Eauripik | ✓ Some households have their own waste disposal pits but no fence. Others dispose their waste in the bushes or close to beach;<br>✓ No toilet facility available on island;<br>✓ All households with pigs tie them by the beach or inland. |
| **4** | Fallalop Woleai | ✓ Some households have their own waste disposal pits but no fence and it's less than 50 feet from the dwellings. The community pit is not fenced.<br>✓ Some households have some type of toilet facility, while some do not have toilets;<br>✓ All households with pigs tie them by the beach or inland. |
| **5** | Falalus | ✓ No waste disposal pit available, waste is being disposed in bushes or by the beach side;<br>✓ No toilet facility available on island;<br>✓ All households with pigs tie them by the beach or inland. |
| **6** | Ifalik | ✓ Some households have their own waste disposal pits but no fence. Others dispose their waste in the bushes or close to beach;<br>✓ No toilet facility available on island;<br>✓ All households with pigs tie them by the beach or inland. |
| **7** | Faraulep | ✓ No garbage pit available, wastes are being disposed in the bushes or the beach side.<br>✓ No toilet facility available on island;<br>✓ All households with pigs tie them by the beach or inland. |
| **8** | Piige | ✓ Some households have their own waste disposal pits but no fence. Others dispose their waste in the bushes or close to beach;<br>✓ Some have pit latrine type toilet, others are still using the beach side or in the ocean;<br>✓ All households with pigs tie them by the beach or inland. |
| **9** | Elato | ✓ No waste disposal pit available, waste is being disposed in bushes or by the beach side;<br>✓ No toilet facility available on island;<br>✓ All households with pigs tie them by the beach or inland. |
| **10** | Lamotrek | ✓ Some households have their own waste disposal pits but no fence. Others dispose their waste in the bushes or close to beach;<br>✓ No toilet facility available on island;<br>✓ All households with pigs tie them by the beach or inland. |

| | | |
|---|---|---|
| **11** | Satawal | ✓ They have designated community waste disposal pits available and some household have their own but no fence;<br>✓ Most households have some type of toilet facilities, few do not have toilets;<br>✓ All households with pigs were tied either by the beach or in-land. |
| | | |
| | Note | ✓ Due to limited time, the following islands were not inspected: Soliap, Wotegai & Tagaulap. |

**Note: Table was created by Yap State Public Health*

The Inspector acknowledges that all the communities visited were conscious of their environmental surroundings. The community board members and the health workers work with their communities to keep their islands clean. However, there is still a need for improvement. Based on the results of the survey, the following recommendations were made.

- All the islands are in need of toilets, at least one for each village on each island. Preferably, the local Pit Latrine type. This type will not contaminate the water lenses easily.
- All the islands should have a designated dumping area. The designated dumping area/pit should be fenced to keep the trash within its vicinity.

## *Agriculture Assessment*

The Department of Resources and Development (R&D) utilized the trip to follow through on the status of their *Coconut Rehabilitation Project (CRP[2])*. An Agriculture Specialist from their Agriculture Division conducted a follow up inspection/observation on previously distributed planting materials (**Refer to Annex 3**) from October 2016 that was part of the CRP. In addition, the specialist monitored the status of the communities' food security, crop health, disaster and climate change impacts and identified some technical assistance necessary to cope with agricultural impediments.

After visiting the farm sites and speaking with the farmers. The Agriculture Specialist observed that majority of the distributed crops did not survive due to the following:

- Most of the crops did not survive the journey from origin (Pohnpei);
- The drought in 2016;
- Lastly, the farmers are not maintaining their crops properly.

The pictures below showed how the crops are fairing in the outer islands of Yap. Despite the challenges posed, some crops did well as shown in the **Figure 1** and **Figure 2** below.

[2] The CRP is a project funded by FSM Congress. It was proposed by R&D to assist the outer islands in replanting coconuts and other needed crops (breadfruits and bananas).

***Figure 1.*** *Photo of Coconut from the CRP*

***Figure 2.*** *Photos of Samoan Breadfruit varieties from CRP distributed in October 2016*

One of the main food securities that are known in the outer islands is taro. Some of the initiatives under the CRP were to address inundation affecting the taro patches. Some of the challenges faced are impacts of disaster and climate change. As shown in **Figure 3**, some of the taro patches are inundated by brackish water due to High/King Tides and Storm Surges. To address inundation, some of the islands have artificial taro patches build inland. However, some of the islands are not utilizing their artificial taro patches as indicated in **Figure 4**, and some farms have not been maintained and elevated.

***Figure 3.****Photos of Inundated Taro Patches with Brackish Water*

***Figure 4.*** *Photos of Artificial Taro Patches not Unitized*

In addition to artificial taro patches, composting is another method used for planting. The method is used especially for banana trees. It enables a banana tree to bear shoots to grow healthier and reach maturity. It also protects a banana tree from falling when it matures. The **Figure 5** shows the banana trees with or without compost.

***Figure 5.*** *Photos of Banana with compost on left and without compost on right*

As a result of the Agriculture Assessment Follow Up, the Agriculture Specialist made the following recommendations.

- It is essential for the farmers to have the proper tools to upgrade their taro patches.
- To conduct public awareness and education on agriculture and innovative methods of farming that is applicable in the islands.
- Improve the preparation and handling of planting materials for distribution.
- Planting materials for breadfruit is sensitive to longer voyage. Setting up a pilot program in the neighboring islands to nurse them for distribution should be considered.
- Consider a variety of crops that are resistant to climate change impacts, diseases and can grow in the low lying atolls.

## *Essentials of Humanitarian Assistance Training*

The IOM updated their Essentials of Humanitarian Assistance (EHA) curriculum and with the assistance of DECCEM, the States Disaster Coordinating Officers (DCO) and the Department of Education they wanted to roll-out the strategy across FSM. The curriculum includes six modules with different sessions on basic disaster risk reduction, disaster risk management actions and roles & responsibilities. For the

trip, IOM and DECCEM recommended two out of the six modules to be conducted in the outer islands communities. The *Module 3:* The Identification of Safe Shelter and Preparing Emergency Supplies and *Modules 5:* The Initial Damage Assessment Forms (IDA)[3].

The *Module 3* was conducted at the Woleai High School in Yap and Weipat High School in Chuuk with collaboration between DECEM, IOM and WSO staff. Although Weipat High School was not included in the original Planning phase, since the vessel took a detour to pick up students from the Northwest islands in the outer islands of Chuuk, the team agreed to take the opportunity to conduct the public awareness and education on Climate Change and Disaster Risk Reduction. The following activities below were conducted during their sessions with the high schools.

- *Activity 1: Climate Change Presentation* **-** The definition of climate change. What is causing it and its effects on our islands? In addition, how to cope with climate change and how the islanders can adapt to it. The Figure6 is a combination of clips taken during the Climate Change Presentation at the Woleai High School.

***Figure 6.*** *Photos of the Team Presenting to Woleai High School Students*

- *Activity 2: Disaster Timeline* - This depicted all the major disasters that occur in the FSM in the past to the most current. It educates the students that no one can predict a disaster but they can prepare for a disaster.
- *Activity 3: Emergency Kits and Evacuation Kits* - The difference between emergency and evacuation kits. Emergency kits are filled with supplies you may need at home in time of sudden disaster. The evacuation kits are supplies you may need after disaster if you need to leave your home.
- *Activity 4: Evacuation Kit Race* - This was a simulation created to see how prepared an individual is before a sudden disaster.

[3] The IDA Form is a standardized assessment form that is endorsed by the FSM National and State Governments to be used after a disaster. It will be filled out by designated focal points at the Municipal and Community levels.

The *Module 5*- This is about how to fill out the IDA Form (**Refer to Annex 4**). The IDA form was fully implemented in 18 out of the 19 outer islands of Yap and Onoun, an outer island of Chuuk in the Northwest. In addition to implementing the form, the team was able to identify all the disaster focal points (**Refer to Annex 5**) on each island.

The idea of implementing the IDA form is for the islands communities to take ownership. The geographical layout of the FSM and the limited transportation to visit the outer islands has always been a challenge. Since some of the outer islands of Yap can only be accessed by boat, it can take two weeks the latest to reach them. In most cases, the state and national disaster first responders will not get the full extent of damages due to untimely access to the outer islands. Rather than wait for the state and national disaster first responders to come out and do an assessments after a disaster, the communities can conduct the assessment. The **Figure 7** below is a picture of a team member educating the Chief of Fais on the IDA Form.

***Figure 7.*** *Photo of Fais Chief with one of the Team Member*

## *Public Infrastructures, Water Catchments & Early Warning Systems Assessments*

Assessments on the Public Infrastructures, Community & Individual Water Catchments and Early Warning Systems were conducted during the trip as part of DECCEM's current work plan. In addition, the trip complemented the initial efforts of distributed HF radios in selected outer islands in 2016 under the Building Safety and Resilience in the Pacific Project.

The trip also provided an opportunity for DECCEM's staff to verify community information currently being collected through IOM's municipality profiles and Pubic Infrastructure assessments. The results of the assessments are shown in details in the **Table 3** below. The recommendations are indicated on the last column for each island.

**Table 3.** Public Infrastructure, Water Catchment and Early Warning Communication System Assessment

| No. | Name of Island | Population | Male & Female Proportion | No. of Households | Early Warning Communication System | Public Infrastructure | Public Water System | Individual Water System | Recommendations |
|---|---|---|---|---|---|---|---|---|---|
| **1** | Fatharai | 110 | 55% female and 45 % male | 23 | - Fatharai island has an old ICOM model HF radio issued to the island dispensary back in the late 90's and it only transmits and receives on one frequency.<br><br>- The VHF based and the handheld VHF radios funded under the BSRP still in operation. | - The classroom and the dispensary buildings are in good condition and they can be used for typhoon shelters.<br><br>- The building for the women recently completed can also be used for shelter.<br><br>- The Church building is an old structure and cannot be used for typhoon shelter. | - The community depends highly on rainwater as their drinking water and for cooking food.<br><br>- Two big old concrete water catchments one for the school and one for the church both have leaks and are no longer in use. The volumes of the two catchments are roughly 60,000 gallons.<br><br>- There are other plastic water | - Total of 26 individual plastic water catchment capacity of 1,500 gallons each and there are 16 out of the 26 that are in use and the others are damaged. | - Priority or critical need for the island is to improve existing communication system.<br><br>- They also requested for a HF Radio. |

| No. | Name of Island | Population | Male & Female Proportion | No. of Households | Early Warning Communication System | Public Infrastructure | Public Water System | Individual Water System | Recommendations |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | catchments at the school, dispensary and the women buildings. | | |
| **2** | Mogmog | 190 | 55% female and 45 % male | 49 | - The island has an old ICOM HF radio for the Health Services that needs to be replaced.<br><br>- The VHF base and the handheld VHF unit funded under the BSRP is still operational. | - The classroom and the Dispensary buildings are in good condition and can be used as typhoon shelters.<br><br>- The Church building was damaged by typhoon Maysak and it's still under repair. | - Main source of drinking water is the rainwater collected in the catchments.<br><br>- Two concrete catchments about 10,000 gallons each belongs to the school and the church.<br><br>- Two additional plastic catchments roughly about 2,500 gallons each. | - Total of 36 individual plastic water catchment capacity of 1,500 gallons.<br><br>- There are 32 out of the 36 in use. The other 4 are in good condition, only damaged faucets. | - Priority or critical need for the island is to improve existing communication system.<br><br>- Replacement of the HF radio is a priority |

| No. | Name of Island | Population | Male & Female Proportion | No. of Households | Early Warning Communication System | Public Infrastructure | Public Water System | Individual Water System | Recommendations |
|---|---|---|---|---|---|---|---|---|---|
| **3** | Asor | 103 | 60% female and 40% male | 13 | - An old ICOM HF radio for the Health Service needs repair.<br><br>- The VHF based and the handheld VHF radios funded under the BSRP still in operation. | - The classrooms are concrete structure recently completed and the dispensary building is the designated typhoon shelters.<br><br>- The Church building that's recently completed is designated as typhoon shelter. | One concrete water catchment recently completed for the church roughly about 20,000 gallons<br><br>- 1 plastic catchment approximately 2,000 gallons at the School building and one concrete catchment at the Dispensary building with a capacity of 2,000 gallons. | Total of 13 individual plastic water catchment capacity of 1,500 gallons.<br><br>- 11 are in use and the other 2 are damaged. | - Priority or critical need for the island is to improve existing communication system.<br>- Replacement of the HF radio is a priority |
| **4**<br>Ulithi, Fallalop<br>Due to limited time, the team was not able to conduct their assessments. | | | | | | | | | |

| No. | Name of Island | Population | Male & Female Proportion | No. of Households | Early Warning Communication System | Public Infrastructure | Public Water System | Individual Water System | Recommendations |
|---|---|---|---|---|---|---|---|---|---|
| **5** | Fais | 320 | 55% female and 45 % male | 103 | The ICOM HF Radio for Department of Education is old but still operational.<br><br>- The Vertex Standard HF Radio that was issued to Fais funded by the BSRP project is with DECCEM for repair.<br><br>- The VHF Base and the handheld unit are still operational. | - The classroom building recently completed is designated as the typhoon shelter for the community.<br><br>- The Dispensary building structure is in good condition and can be used for typhoon shelter.<br><br>- The Church building is an old structure and cannot be used for typhoon shelter. | - The water system for Fais is one of the best water system in the outer islands.<br><br>- The elementary school buildings have first flush system funded by other grants.<br><br>- The island has underground water system as well as rainwater catchment. | - Total of 26 individual plastic water catchment capacity of 1,500 gallons. | - The HF radio has problems with its receiver and transmitter and it's still with RadioCom for repair.<br><br>- RadioCom advised us that the cost of the repair is roughly about $800.00 and the recommendation is to get a new radio instead of repair the existing one. |

| No. | Name of Island | Population | Male & Female Proportion | No. of Households | Early Warning Communication System | Public Infrastructure | Public Water System | Individual Water System | Recommendations |
|---|---|---|---|---|---|---|---|---|---|
| **6** | Eauripik | 100 | 55% female and 45 % male | 7 | - The HF vertex radio issued to the island still in perfect condition.<br><br>- There are two HF radios, one unit is for the Dispensary and the other one is privately owned. | - The Elementary School building, Dispensary, Church and the community Center are designated as typhoon shelters for the island.<br><br>- The school building is an old building, but the dispensary and the church are new. | There are approximately 18,000 gallons volumes of plastic water catchments on the islands that are in use.<br><br>- One big concrete catchment roughly about 10,000 gallons is no longer in use due to leaks. | All 7 individual plastic water catchment capacities of 1,500 gallons are in use. | The island needs additional water catchments. |
| **7** | Fallalop | 350 (520 including students) | 55% female and 45 % male | 73 | - The VHF based and the portable units are still in good condition. However, the VHF based does not have permanent | - The High School, Elementary School and the Dispensary buildings are designated as typhoon | - Their centralized water system that is not reliable.<br><br>- The community heavily relies | - Total of 52 individual plastic water catchment capacity of 1,500 gallons. | - Communication is one of the most critical requirements.<br><br>- New HF radios for communication are needed. |

| No. | Name of Island | Population | Male & Female Proportion | No. of Households | Early Warning Communication System | Public Infrastructure | Public Water System | Individual Water System | Recommendations |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | power source supply. Both were funded by the BSRP fund. The HF on the island belongs to Education and is located at the classroom building. | shelters. All are in good shape and secure locations. | on the water from the concrete and plastic catchment.<br><br>- Two catchments are for the public. One is located north of the island and one in the south.<br><br>- Total of catchment capacity on the island is roughly 30,000 gallons. | | |
| **8** | Falalus | 135 | 55% female and 45 % male | 15 | - The VHF base radio and the portable unit are operational.<br><br>- There is an HF radio for the school. | - The Elementary School, Dispensary and the community buildings are designated typhoon | - One Plastic and one concrete catchment at the school<br><br>- One plastic and one concrete | - Ten plastic catchments capacity of 1,500 gallons are all in good condition. | - Communication is one of the most critical requirements.<br><br>- New HF radios for communication are needed. |

| No. | Name of Island | Population | Male & Female Proportion | No. of Households | Early Warning Communication System | Public Infrastructure | Public Water System | Individual Water System | Recommendations |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | shelters. All structures are in good conditions and secure locations. | catchment at the dispensary.<br><br>- Four plastic catchments at the community center.<br><br>- Total of 7 plastic catchment with capacity of 2,000 gallons<br><br>- 2 concrete catchment roughly about 6,000 gallons each.<br><br>- Total of 20,000 gallons volume of water if all catchments are filled. | | |

| No. | Name of Island | Population | Male & Female Proportion | No. of Households | Early Warning Communication System | Public Infrastructure | Public Water System | Individual Water System | Recommendations |
|---|---|---|---|---|---|---|---|---|---|
| **9** | Wotegai | 160 | 55% female and 45 % male | 18 | - The VHF based and the portable are still in better shape.<br><br>- The VHF base does not have a permanent power source.<br><br>- There is an HF radio that belongs to the Education and is at the school. | - The Elementary School, Dispensary and the Community Center are designated typhoon shelters. All structures are in good condition and secure locations. | - Main source of drinking water is rainwater collected in the catchments.<br><br>- One concrete catchment is at the school about 5,000 gallons capacity.<br><br>- One for the dispensary and the community center. Both are plastic catchments about 2,500 gallons each. | - 16 plastic water catchments capacity of 1,500 gallons. All are in good condition. | - Communication is one of the most critical requirements.<br><br>- New HF radios for communication are needed. |

| No. | Name of Island | Population | Male & Female Proportion | No. of Households | Early Warning Communication System | Public Infrastructure | Public Water System | Individual Water System | Recommendations |
|---|---|---|---|---|---|---|---|---|---|
| **10** | Soliap | 90 | 55% female and 45 % male | 10 | - The VHF base and the portable are still in better shape.<br><br>- The VHF base does not have a permanent power source.<br><br>- There is a HF radio that belongs to the school and it's located at the school. | - The Elementary School, Dispensary and the Community Center are the designated typhoon shelters. All structures are in good conditions and secured locations. | - The main source of drinking water is the rainwater collected in the catchments.<br><br>- Two concrete catchment for the school and the dispensary about 8,000 gallons each.<br><br>- Two additional plastic catchments roughly about 2,500 gallons each. | - 8 plastic catchments capacity of 1,500 gallons each, all are in use. | - Communication is one of the most critical requirements.<br><br>- New HF radios for communication are needed. |
| **11** | Tagaulap | 108 | 55% female and 45 % male | 12 | - The VHF based and the portables are still in better shape.<br><br>- The VHF base | - The Elementary School, Dispensary and the Community Center are | - The main source of drinking water is the rainwater collected in the | - 10 plastic catchments capacity of 1,500 gallons. All are in use. | - Communication is one of the most critical requirements.<br><br>- New HF radios for communication |

| No. | Name of Island | Population | Male & Female Proportion | No. of Households | Early Warning Communication System | Public Infrastructure | Public Water System | Individual Water System | Recommendations |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | does not have a permanent power source.<br><br>- One HF radio for the school is located at the school. | the designated typhoon shelters. All structures are in good conditions and secured locations. | catchments.<br><br>- The Community Center has a concrete catchment. It has 10,000 gallons capacity.<br><br>- The School has a concrete catchment that has 4,000 gallons capacity.<br><br>- There are two additional plastic catchments roughly about 2,500 gallons each. | | are needed. |

| No. | Name of Island | Population | Male & Female Proportion | No. of Households | Early Warning Communication System | Public Infrastructure | Public Water System | Individual Water System | Recommendations |
|---|---|---|---|---|---|---|---|---|---|
| **12** | Ifalik | 575 | 60% female and 40% male | 54 | - Only one HF radio is operational on the island. It belongs to the school and it's located at the School.<br><br>- The one for the DCO is with RadioCom for repair. | - The Elementary School and the Dispensary are the designated typhoon shelters. All structures are in good conditions and secured locations. | - The main source of drinking water is the rainwater collected in the catchments.<br><br>- One concrete catchment at the school building size is 20x24x9.<br><br>- 3 plastic catchments are at the church about 2,000 gallons each. | - There 55 plastic catchments capacity of 1,500 gallons and there 45 units are in use and 10 are damaged. | - The HF radio has problems with its receiver and transmitter. They are still with RadioCom for repair.<br><br>- RadioCom advised us that the cost of the repair is roughly $800 and the recommendation is to get a new radio instead of repair the existing one. |
| **13** | Faraulep | 110 | 60% female and 40% male | 24 | - Only one HF radio is operational on the island. It belongs to the school and it's located at the School. | - The Elementary School and Dispensary are the designated typhoon shelters. All structures are | - Approx. 15,000 gallons of plastic water catchments on the island that are in use. Three are plastic | - Total of 13 individual plastic catchment capacity of 1,500 gallons.<br><br>- Six old | - Communication is one of the most critical requirements.<br><br>- New HF radios for communication are needed. |

| No. | Name of Island | Population | Male & Female Proportion | No. of Households | Early Warning Communication System | Public Infrastructure | Public Water System | Individual Water System | Recommendations |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | - The DCO's HF Radio has problem with the transmission and receiver. | in good conditions and secured locations. | catchments and one is concrete catchment. | ferrocement with capacity of 3,000 gallons. | |
| **14** | Piige | 118 | 60% female and 40% male | 22 | - There is no HF radio on the island.<br><br>- A VHF base and a portable unit was issued to them and are still in operation.<br><br>- The chief and the principal requested for a HF Radio. | - The Elementary School and Dispensary are the designated typhoon shelters. All structures are in good conditions and secured locations. | - Approx. 12,500 gallons volume of water catchment on the island.<br><br>- One concrete catchment at the Church need repair to patch up the leaks. | - Total of 8 individual plastic water catchment capacities of 1,500 gallons and all in use. One ferrocement catchment volume is 3,000 still in good condition. | - Communication is one of the most critical requirements.<br><br>- New HF radios for communication are needed. |
| **15** | Elato | 114 | 55% female and 45% male | 18 | - Three HF radios on the island belong to the DCO, the dispensary and the school. All radios are working and all in good | - The School building is designated as the typhoon shelter. The structure is in good condition and in high and | - 2 twin concrete catchment capacity of 26,000 gallons each.<br>- 1 plastic catchment capacity of | - Total of 26 individual plastic catchment capacity of 1,500. | None |

| No. | Name of Island | Population | Male & Female Proportion | No. of Households | Early Warning Communication System | Public Infrastructure | Public Water System | Individual Water System | Recommendations |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | condition.<br><br>- Several portable VHF radios are privately own. | secure location. | 2,000.<br><br>- One 8,000 gallons concrete catchment located at the school. | | |
| **16** | Lamotrek | 325 | 55% female and 45% male | 49 | - The DCO and the School HF Radios are in good conditions.<br><br>- The other radio for the dispensary is not working.<br><br>- There are few privately own portable VHF radios as well. | - The School and the ECE building are the designated typhoon shelters. Both structures are sturdy and in secure locations. | - Approx. 14,500 gallons volumes of water on the island.<br><br>- One concrete catchment at the Church.<br><br>- One plastic catchment at the Elementary School and 1 plastic catchment at the ECE bldg. | 30 plastic catchment capacities of 1,500 gallons and all are in use.<br><br>- Six circular ferrocement catchment about 2,000 gallons each. | None |
| **17** | Satawal | 600 | 55% female and 45% male | 135 | - The DCO and the school radios are still in good | - The School and the ECE building are the | - The School has a plastic catchment about 2,000 | - 80 plastic catchments on island. 60 units are | - Satawal HF radio power sources (Batteries) are not working properly. |

| No. | Name of Island | Population | Male & Female Proportion | No. of Households | Early Warning Communication System | Public Infrastructure | Public Water System | Individual Water System | Recommendations |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | conditions0.<br><br>- The other radio for the dispensary is not working.<br><br>- There are several privately own portable VHF radios as well. | designated typhoon shelters. Both structures are sturdy and in secure locations. | gallons.<br><br>- The dispensary has 2 plastic catchments one 3,000 gallons and one 1,000 gallon. One concrete that's 3,000 gallons and a plastic catchment at the church about 1,500 gallons. | in use, 20 units are damaged.<br><br>- Roughly about 12 ferrocement catchments are in good conditions. | - Replacements are needed for batteries. |

## *Aerial Footage and Chatty Beetle Assessment*

FSM National Weather Service Organization (WSO) took the opportunity to check the condition of their Chatty Beetles[4] that were distributed in the outer Islands of Yap. The islands that were designated as Second Order Synoptic Station for the FSM NWS were equipped with Chatty Beetles. It is an alternative source for communication should their HF radios malfunction.

The orange Chatty Beetle unit comes equipped with a cable antenna that is set up to log on to available orbiting satellites in order to transmit or receive text messages. Even with a fifteen to thirty minute lag between transmissions, the Chatty Beetle is a vital source of communication during an emergency or a disaster.

In addition, the WSO Technician operated a quad copter drone to take aerial photos of all the atolls visited during the trip. The photos taken on each island are aerial photos of each island focusing on the Public Infrastructures: schools, dispensaries, churches, and other concrete buildings that are used for typhoon shelters. In addition, aerial footage of community water catchments and their main food security crop which is the taro patches (natural and manmade) were also captured.

The following **Figures8 - 38** are some of the aerial footages taken from all the islands visited on the trip. The drone not only took aerial photos but also locked in coordinates for all the Public Infrastructures including each islands main crop locations. The coordinates and footages taken will be uploaded on DECCEM's geo-portal after it's been reviewed.

***Figure 8.*** *Photo of Ulithi Atoll - Fatharai Community Church with Water Catchment*

[4] A Chatty Beetle is essentially a customized Pelican case that houses a simple two-way texting computer that transmits and receives messages via satellites.

***Figure 9.*** *Photo of Ulithi Atoll - Fatharai School, Library and Water Catchment*

***Figure 10.*** *Photo of Ulithi Atoll - Asor: Men's House, Church, Dispensary and Community*

***Figure. 11.*** *Photo of Ulithi Atoll - Fallalop Airstrip and Community*

***Figure 12.*** *Photo of Ulithi Atoll - Fallalop: Men's House, Dispensary, Main Community and Main Channel*

***Figure 13.*** *Photo of Fais Atoll School, Library and Solar Panels*

***Figure 14.*** *Photo of Fais Atoll Community*

***Figure 15.*** *Photo of Eauripik Atoll*

***Figure 16.*** *Photo of Eauripik Atoll - Main Taro Patch*

***Figure 17.*** *Photo of Eauripik Atoll - Community*

***Figure 18.*** *Photo of Woleai Atoll - Fallalop Island Airstrip*

***Figure 19.*** *Photo of Woleai Atoll - Fallalop Church with Catchment System*

***Figure 20.*** *Photo of Woleai High School*

***Figure 21.*** *Photo of Woleai Atoll – Falalus Elementary School*

***Figure 22.*** *Photo of Woleai Airstrip*

***Figure 23.*** *Photo of Woleai Elementary School*

***Figure 24.*** *Photo of Woleai Power Plant*

***Figure 25.*** *Photo of North of Ifalik Atoll*

***Figure 26.*** *Photo of Ifalik School in the Center and Community*

***Figure 27.*** *Photo of Faraulep Atoll*

***Figure 28.*** *Photo of Feraulep Atoll Main Taro Patch*

***Figure 29.*** *Photo of Piige Atoll Community*

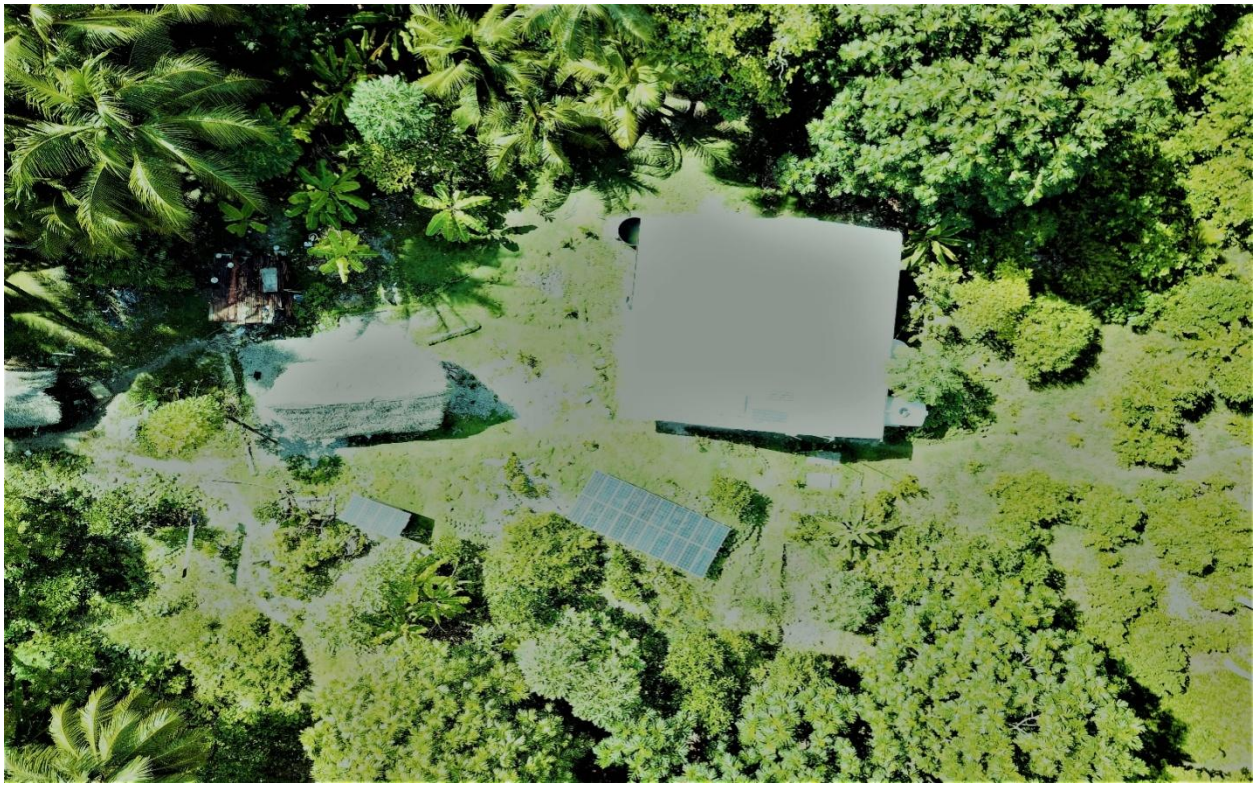

***Figure 30.*** *Photo of Piige Dispensary and Solar Panels*

***Figure 31.*** *Photo of Piige School and Solar Panels*

***Figure 32.*** *Photo of Elato Atoll*

***Figure 33.*** *Photo of Elato Atoll Taro Patch*

***Figure 34.*** *Photo of Lamotrek School and Solar Panels*

***Figure 35.*** *Photo of Lamotrek Taro Patch*

***Figure 36.*** *Photo of Satawal: School, Church, Dispensary, Solar Panels and Community*

***Figure 37.*** *Photo of Satawal Elementary School*

***Figure 38.*** *Photo of Satawal Atoll Main Taro Patch*

# ANNEXES

## *Annex 1 - Budget*

**Budget**

The **Table 4** indicates the budget breakdown charges for the overall trip. OEEM covered the following charges not highlighted (Fuel, Provisions, Airfare and Per Diem) which in total is $75,000.00.

**Table 4** Budget Breakdown

| **BUDGET** | |
|---|---|
| Item | **Project Cost** |
| Fuel - ($3.64G) | $36,400 |
| Provisions ($25/ per person) 11 + 14 Crew | $13,750 |
| Airfare, Per Diem for 9 people (FSM Reps & State Reps) | $25,000 |
| Total | **$75,150** |

## *Annex 2 - Scheduled Activities*

**Activities**

*The **Table 5** indicates the schedule of all the activities conducted during the trip.*

**Table 5** Schedule

| **IN-LAND SCHEDULE** | | |
|---|---|---|
| **Hours in-land** | **TEAM A** | **TEAM B** |
| HR1 | Introductions / Respects to traditional leaders & elders | |
| HR2 - 3 | Early Warning System Assessment, Public Infrastructure Assessment and Water Catchment Assessment. | Environmental Safety and Household Inspection. |
| HR 2- 3 | Drone Flight Time | Agriculture Assessment |
| HR4 | Break / Meal | |
| HR5 | EHA Module 3 & 5 | |
| HR6 | Wrap-up | |

## *Annex 3 - Planting Materials Distributed (2016) & Follow up Results (2017)*

The table below shows the number of breadfruit and banana planting materials distributed on each island in October of 2016 and the results of the follow up trip from September of 2017 on the ones that survived.

**Table 6** Planting Materials Distributed in October 2016 and Follow up Results in September 2017

| **Islands** | **October 2016** | | **September 2017** | |
|---|---|---|---|---|
| | **No. of Breadfruit Planting Materials** | **No. of Banana Planting Materials** | **Breadfruit** | **Banana** |
| Lamotrek | 150 | 150 | 20% | 35% |
| Elato | 150 | 150 | 10% | 40% |
| Satawal | 150 | 150 | 35% | 60% |
| Gaferut | 2 | 2 | 0% | 100% |
| Pikelot | 150 | 150 | 40% | 70% |
| Faraulep | 150 | 150 | 35% | 60% |
| Ifalik | 150 | 150 | 15% | 40% |
| Sorol | 2 | 2 | N/A | N/A |
| Woleai (Fallalop) | 150 | 150 | 30% | 70% |
| Falalus | 150 | 150 | 40% | 60% |
| Eauripik | 100 | 100 | 20% | 60% |
| Fatharai | 50 | 50 | 40% | 40% |
| Fais | 150 | 150 | 20% | 40% |
| Ulithi (Fallalop) | 150 | 150 | 20% | 50% |
| Asor | 150 | 150 | 0% | 60% |
| Mogmog | 100 | 100 | 40% | 50% |
| Ngulu | 50 | 28 | N/A | N/A |
| Yap Proper | 10 | 0 | N/A | N/A |
| **TOTAL** | **1964** | **1932** | | |

*Note: Table was created by FSM R&D (Agriculture Division)*

## *Annex 4 - A Copy of the Initial Damage Assessment Form*

The Form below is a copy of the FSM standardized IDA form. This form is filled out by the designated disaster focal points after a disaster. Once the form is filled out, it is communicated to the States Disaster Coordinating Officers. This form has been implemented the outer islands of Yap.

FSM Standardized Initial Damage Assessment Form (IDA)
FSM Department of Environment, Climate Change & Emergency Management (DECCEM)

| | |
|---|---|
| State: | |
| Island: | |
| Municipality: | |
| Village: | |
| Assessment Date: | |
| Assessment Time: | |

Disaster Name: _____ Assessor Signature: _____

Disaster Date: _____ Assessor's Full Name: _____

| | | | | | | | | | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|
| **1** | **Means of access***(check all that apply)* | ☐ | Road Access | ☐ | Boat access | ☐ | Air | ☐ by foot only | |
| **2** | **Means of Communications** | ☐ | HF/VHF | ☐ | Cellular | ☐ | Satellite | ☐ EPIRB | |
| 2.1 | Primary Points of Contact (Mayor/Chief) | _____ | | | | | | | |
| **3** | **Local Demographics***(write how many)* | ___ | **Total Population** | | | ___ | **Total Households** | | |
| 3.1 | Immediate Wellbeing | ___ | Sick/ ill | ___ | Injured | ___ | Missing | ___ Dead | |
| 3.2 | Population*(write how many)* | ___ | Infant/child (<5) | ___ | Adolescent (< 15) | ___ | Adults | ___ Elderly (>55) | |
| 3.3 | Persons w/ disabilities or special needs | ___ | Pregnant | ___ | Blind/Deaf | ___ | Immobile | ___ Other | |
| 3.4 | Main dwelling houses | ___ | In Total | ___ | No/Minor Damage | ___ | Major Damage | ___ Destroyed | |
| 3.5 | Displaced households *(not at home)* | ___ | with Relatives | ___ | at a Church | ___ | Shelter/School | ___ Left the Village | |
| **4** | **Water Supply***(Circle Yes or No)* | **Affected?** | | **Enough Available?** | | **Safe to Drink?** | | **Safe to Bathe?** | |
| 4.1 | Catchments | YES | NO | YES | NO | YES | NO | YES NO | |
| 4.2 | Ground Well | YES | NO | YES | NO | YES | NO | YES NO | |
| 4.3 | Stream Water | YES | NO | YES | NO | YES | NO | YES NO | |
| **5** | **Agricultural Damage***(select 1 for each)* | **A little Damage** | | **Half Damaged** | | **Majority Damaged** | | **All Damaged** | |
| 5.1 | Banana | ☐ | | ☐ | | ☐ | | ☐ | |
| 5.2 | Breadfruit | ☐ | | ☐ | | ☐ | | ☐ | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 5.3 | Cassava/Tapioca | ☐ | ☐ | ☐ | ☐ | |
| 5.4 | Coconut | ☐ | ☐ | ☐ | ☐ | |
| 5.5 | Taro & Yam | ☐ | ☐ | ☐ | ☐ | |
| 5.6 | Livestock | ☐ | ☐ | ☐ | ☐ | |
| 5.7 | How long the food supply will last? | ☐ 1 week or less | ☐ 2 weeks | ☐ 3 weeks | ☐ 4 or more weeks | |
| **6** | **Infrastructure** | **Functional** | **Impaired Function** | **Major Damage** | **Totally Destroyed** | |
| 6.1 | School Buildings | _____ | _____ | _____ | _____ | |
| 6.2 | Church Buildings | _____ | _____ | _____ | _____ | |
| 6.3 | Community Hall | _____ | _____ | _____ | _____ | |
| 6.4 | Government Buildings &Dispensaries | _____ | _____ | _____ | _____ | |
| 6.5 | Primary Transportation | _____ | _____ | _____ | _____ | |
| 6.6 | Normal Electric Supply / Fuel | _____ | _____ | _____ | _____ | |
| **7** | Security Concerns / Issues | ☐ None | ☐ Few Issues | ☐ Major Issues | ☐ Not Secure | |
| **8** | Overall Coping | ☐ Strong | ☐ Moderate | ☐ Weak | | |

The Purpose of this form is to collect the important information which will provide an overview of the situation at the village level following a disaster. If possible, please include any photographs of the Damages, as this will be very helpful. More details assessments will follow if needed.

This Form Should be completed and submitted to your State Disaster Coordination Office within 12 to 24 hours following a disaster or severe event.

| EXPLANITORY NOTES: | | COMMENTS *(Continued from Page 1)* |
|---|---|---|
| **3.1** Immediate Wellbeing | Number sick, missing or dead. If any sickness indicate type in comments column. *(e.g. Coughing, Diarrhea, Fever.)* | Please use the line number to indicate which line your comments are for. ***Example:* 3.1 following the disaster there were many instances of Diarrhea.** |
| **3.3** Persons w/ Disabilities or Special Needs | Pregnant women, elderly, young without family, cannot walk, cannot hear, and cannot see. | |
| **3.4**Main Dwelling houses | **Total**= the total number of occupied households before the event: **No/Minor Damage**= the family can still safely occupy the home. **Major Damage**= the family can still safely occupy a portion of the home, but a portion of the home is not safe to occupy. **Destroyed** = The home is not safe to be occupied. | |
| **3.5**Displaced Households | The number of households that have had to leave their primary home because the event has made it unsafe to occupy. | |
| **7.**Security Concerns/Issues | Is there likelihood or threat of unrest/violence/stealing? Violence against women? | |
| **8.** Overall Coping | What is the overall mood? Are community members helping each other? Are they sharing food and water? Have they started to make repairs? | |

## *Annex 5 - Neighbor Islands Communications Officers (NICO)*

The **Table 7** below indicates the focal points for all the outer islands. The following focal points were designated by the island Chiefs of each islands. They are responsible to complete the IDA form and transmit the information via radio communications to the State Disaster Coordinator.

**Table 7** Names of the Neighbor Islands Communications Officers

| No. | Island | Primary Focal Point | Secondary Focal Point |
|---|---|---|---|
| **1.** | Fatharai | Martine Yolbuwey | None |
| **2.** | Mogmog | Stanley | None |
| **3.** | Asor | Andrew Yolopiy | None |
| **4.** | Ulithi, Fallalop | Lawrence Yaimamgruw | John Rulmal Jr. |
| **5.** | Fais | Chief Louis Mangdar | John Gil |
| **6.** | Eauripik | Carlos Mailmog | None |
| **7.** | Woleai, Fallalop | Francisco Yarofalipiy & Eddy Hasuroilug | Allentino Ruiguifmal |
| **8.** | Falalus | Manno Buchoitil & Joseph Joe Haleyalwei | Fabian Yarofaisheng |
| **9.** | Wotegai | Francis Chalifelmeng | Jophen Tashibeisap |
| **10.** | Soliap | Simion Yaitemai | Simion Mangregmang |
| **11.** | Tagaulap | Chief Fransico Mairal & Dominic Iwetmai | Justin Yangemai |
| **12.** | Ifalik | Robert Hachibeisap | Samuel Yangireluwe |
| **13.** | Faraulep | Thomas whichilbuch | John Etiyang |
| **14.** | Piige | Celino Taiwelyaro | Santus Urbemo |
| **15.** | Elato | Fransic Taweryan | Vincent Hachiglou |
| **16.** | Lamotrek | Xavier Yarofalyango | Esther Sugwemal |
| **17.** | Satawal | Thomas Reity | Wayne Pekalpiy |