

Delap Community Majuro, Marshall Islands

Hazard Vulnerability Capacity Mapping Report

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GFDRR
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For more information contact IOM at micronesiaenquiries@iom.int.

Acronyms

CBDRM - Community Based Disaster Risk Management
CVM - Community Vulnerability and Capacity Mapping Exercise and Assessment
EWS - Early Warning System
HVCM - Hazard Vulnerability Capacity Mapping
IOM - International Organization for Migration
MIRCS - Marshall Islands Red Cross Society
NDMO - National Disaster Management Office
RMI - Republic of the Marshall Islands

Table of Contents

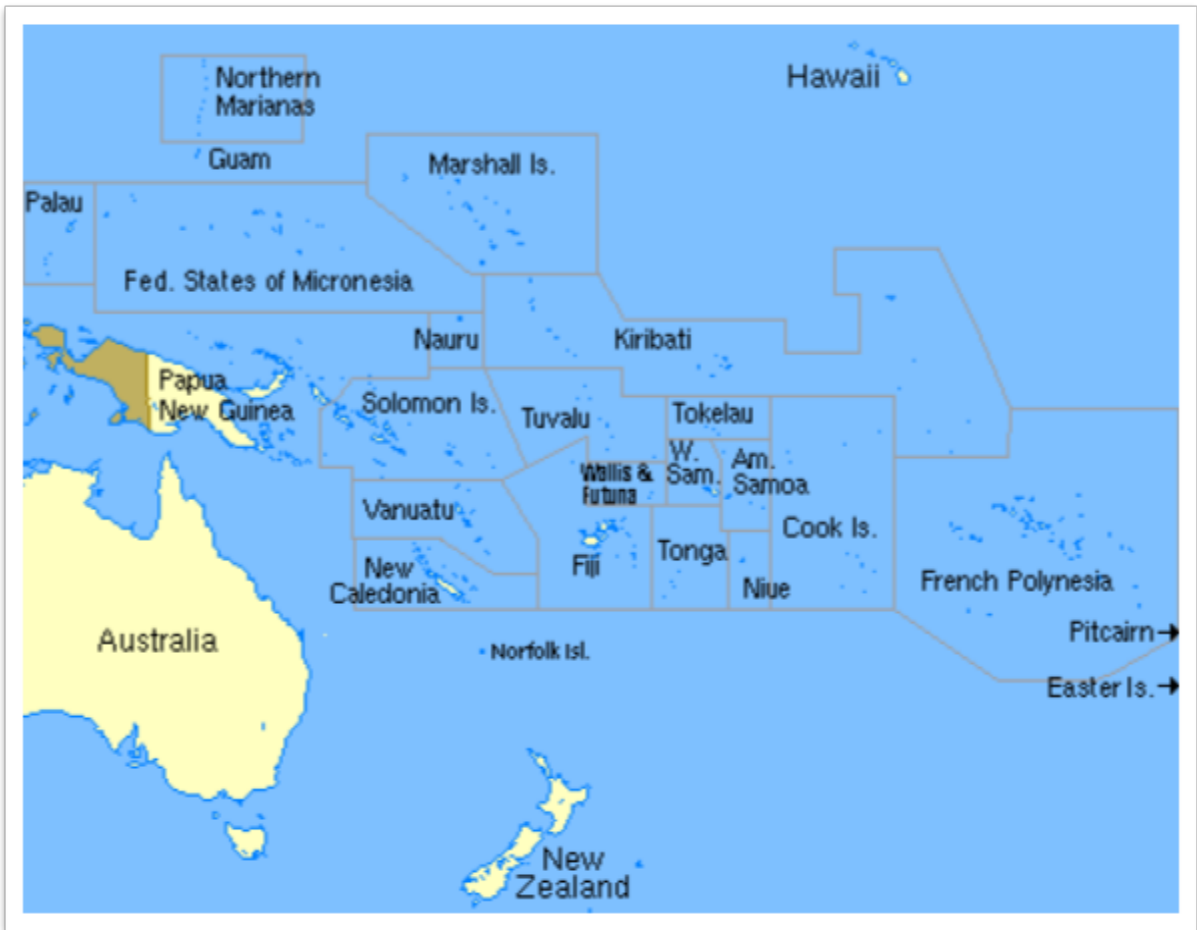
Context.....	
.....	5
Methodology.....	
.....	8
Community:	
Delap.....	
.....	10
Appendix 1: Early Warning System	
Profiles.....	19
Appendix 2: Community	
Poster.....	21
Appendix 3: Community Profile	
Questions.....	22

Context

Background of study

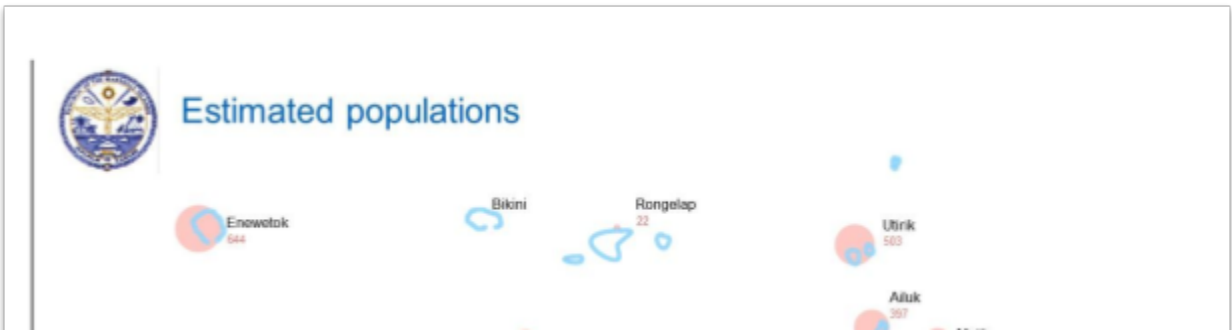
The Republic of the Marshall Islands (RMI) is located in the North Pacific Ocean. The RMI consists of approximately 180 square kilometers of land spread across just under 2,000,000 square kilometers of ocean as seen in Map 1.

The
RMI is



Map 1: Pacific Ocean map

comprised of two parallel island chains of 29 atolls (made up of many islets), and 5 islands. The two island chains are known as Ratak and Ralik chains lie about 200 kilometers apart and extend almost 1300km northwest to southwest. Majuro is the Capital with a population of approximately 27,000, Ebeye on Kwajalein Atoll is the second largest urban center with a population of approximately 15,000 inhabitants. The remaining population of RMI's 54,000 individuals reside in the remote outer islands and atolls as seen in Map 2.



Climate change impacts of notable concern in the North Pacific region include: extreme temperatures, drought, sea level rise, ocean acidification, and heavy rainfall leading to flooding and landslides. Such impacts are threatening fisheries and reef environments, and the communities and livelihoods that depend on them. Some of the low-lying coral atolls in the North Pacific are especially vulnerable to sea level rise, storm surges, coastal inundation and salinization of water lenses. Rising sea levels also exacerbate the pressure on fresh water lenses in these atoll environments and while an overall increase in rainfall is projected, the populations' reliance on water catchments for storage (as opposed to the water lens) will increase. The region has also experienced the cyclical effects of the El Nino/Southern Oscillation (ENSO)-related weather anomalies. Such climate variability is associated with drought; that often leads to: water shortages, crop failures, food shortages, and fires. In the El Niña phase there is an increased risk of secondary hazards, such as landslide.

The most common hazards that have occurred in the RMI in the past 10 years include Drought Disasters in 2013 and 2016, a Drought Emergency in 2017 and a current extra dry season in 2019. In February 2015 wave inundations that destroyed 17 homes in Arno Atoll and caused other damage to infrastructure throughout the country prompting a State of Emergency. In October 2015 Typhoon Nangka passed through the Northern part of the RMI. In January 2019 Tropical Depression TD01W passed through the RMI causing concern, preparatory actions and a State of Emergency. Over the past 10 years there have been numerous small inundations and King-Tides that have caused minor damage across the country.

This report articulates the results of IOM's Hazard Vulnerability and Capacity Mapping (HVCM) exercises that took place in communities throughout the RMI. Each community report highlights the community's profile, key hazard risk concerns, maps, and early warning systems. The reports can be used by community members to then plan a full Community Based Disaster Risk Management (CBDRM) Plan inclusive of an Early Warning Systems (EWS) framework. Appendix 3 has the draft CBDRM methodology that the World Bank project is funding. In addition, the analysis of the EWS survey is currently underway which will provide recommendations to the National Disaster Management Office (NDMO) on an EWS framework.

Targeted Community: Delap

The project was designed in coordination with World Bank, national leadership, local leadership, and IOM. The project initially targeted a total of 10 communities on Kwajalein Atoll and Majuro Atoll, but will exceed that amount by the close of project. After completing the HVCM in the targeted communities in Kwajalein Atoll, IOM has continued to work with Delap and Namu communities. The first session of the Hazard, Vulnerability and Capacity Mapping (HVCM) and Early Warning System (EWS) exercise in Delap was commenced on June 02, 2019 at Marshall Islands Disabled People Organization Center. A total of 21 community members attended the workshop. A total of 8 Male and 13 Female attended the workshop for Delap Hazard Vulnerability Capacity Mapping and Early Warning System.

Methodology

Hazard Vulnerability and Capacity Mapping with Early Warning Systems

Introduction

The Community Hazard Vulnerability and Capacity Mapping with Early Warning System (HCVM) has been designed to assist communities and facilitators in conducting HVCM exercise and producing HVCM reports as part of the IOM Community Vulnerability and Capacity Mapping Exercise and Assessment (CVM) Project. The objectives and steps taken allow the facilitators to implement in a way that follows facilitators to ensure the communities is leading the process. It acknowledges that each community is unique and certain variations in the methodology are possible; however, the three sessions included are considered the minimal necessary to effectively conduct the exercise. Community members' time is voluntary and valuable and there are many competing pressures, so it is essential that facilitators are always well prepared, efficient and mindful of not wasting time. The minimum time required to conduct all the activities in the HVCM is ten hours of community time. Not all members will be required for all ten hours.

Objectives and Process

Under the objective of the CVM program, IOM and its partners will conduct HVCM exercises in up to 10 communities across the RMI. HVCM is set to complement and inform other community based climate adaptation and disaster risk reduction activities such as:

The specific objective of the HVCM is to increase community members' awareness of disaster risk and the impacts of climate change in their community and help them to plan activities to reduce vulnerability and increase resilience to both slow and fast onset disasters as well as impacts of climate change. HVCM is a participatory, community-led series of activities that provides essential context-specific information on the local impact of climate change and community vulnerability and existing capacities.

In addition to assessing existing disaster preparedness capacity, HVCM can also help us to better understand the communities we work in in order to address their unique concerns. HVCM is an effective entry point to the community and offers an opportunity to allow community members to share their opinions on what is important to them. The results of the exercise can help us to focus future climate adaptation and disaster risk management plans, trainings and disaster mitigation measures towards the specific concerns of the community.

Where feasible, it is preferable for the activities to be conducted in Marshallese. Facilitators are Marshallese and speak both English and Marshallese.

The HVCM exercise will generally require four sessions:

1. Sensitization and Community Profile
2. Physical Mapping and Hazard Vulnerability Matrix
3. Early Warning System Mapping and Profile
4. Summary and Action Plan Generation

In all sessions, we should emphasize to participants that we are here to learn from them; we need them to teach us about their community. Much of the success or failure of the exercise hinges on input and active engagement among participants. In all sessions, it is important to ensure participation of diverse groups in the community including people of all ages and genders as well as people who may be marginalized or 'outsiders' in that community such as immigrants, people living with disabilities, or other under-represented groups. It is essential that the community feel ownership of this process with facilitators only providing structure and guidance. As with all community engagement, it is also important to be very clear at the outset as to what the role of IOM's is and not to set realistic community expectations. Sessions 2 and 3 will require snacks and drinks for all participants. Where possible community contributions such as coconuts or other refreshments should also be encouraged.

Throughout the HVCM, it is important that special consideration be provided to ensure the participation and engagement of traditionally under-represented groups. Ensuring women and youth are actively encouraged to participate is a critical ingredient to the success of the process. Natural disasters have the capacity to disproportionately affect vulnerable groups in society and the mapping exercise should assist the community in appreciating that physically and mentally disabled persons will require additional support in protecting them from the identified hazards. It is therefore a critical outcome of the mapping exercise that these people be identified and their locations identified on the map. If possible ensure their participation in the HVCM exercise.

The following report is the output of the HVCM exercise.

Community: Delap

Community profile statement

Background

Delap is one of the communities of Majuro, Marshall Islands. Majuro Atoll is located in the Ratak chain and the city of Majuro is the capitol of the Marshall Islands. Delap community is the largest community on Majuro.

The population of Delap is 20,301 according to the census of 2011. A community profile questionnaire (Appendix 3) was conducted with the people of Delap community. The results of the questionnaire emphasize the dependence of community income from paid employment. The questionnaire also investigated how decisions are made in the community. Decisions are made and carried out by traditional leaders, councilman, and mayor with help from community members from time to time.

Primary social concerns expressed by Delap leaders are finding ways to strengthen the livelihood of Delap community members through awareness raising programs and workshops. Delap leaders reported that they are open and happy to take part in other activities, projects and programs that continue to seek ways to bring resources as and improve people's lives.

Geography and Location

Hazard: Through a participatory mapping activity of disaster timelines, community members listed all the disasters that have happened on Delap from the past 100 years. Participants from Delap community also ranked the hazards, choosing the two hazards of greatest concern to their community. Drought and King tide were the greatest concerns.

Effects of Climate Change on hazards: Community members reported that they are affected by climate change. The President of Marshall Islands has declared a state of emergency on Dengue Fever. Mumps, chicken konia, Pink eye, Zika Virus, are also diseases that are associated with climate change and throughout the years, these diseases have also taken a toll on majority of Delap population just as it has taken impact in neighboring communities and throughout Marshall Islands. The community mapping exercise shows that sea-level rise has taken parts of Delap on both the lagoon and ocean sides. During the last drought, many students and workers missed school or work due to severe coughing, pink eye, and diarrhea which negatively impacted their livelihoods.



Figure 1 Delap community members presenting their community map

Delap participants reported that disease has also spread widely as a result of draught, due to lack of resources for medication at the hospital, and limited awareness of drought impacts and mitigation. In addition to this, the community also reported that drought conditions are compounded by lack of home water catchment tanks and limited ground water available for use.

Capacities: The capital city of the Marshall Islands is located in Delap community where most of the important buildings are and in the HVCM exercise, participants identified those buildings as a strength. Important buildings include Majuro's biggest shopping center, the atoll's only hospital, energy center, wharf, fishing industry, gas stations, and so on.

Hazard vulnerability risk mapping

The hazard vulnerability risk mapping process is when the community is split into different groups, usually men and women separately, and the young people. They take flip chart paper and draw a map of their community and identify key areas or infrastructure, such as churches and evacuation centers, and docks. Then they identify the risk, where it floods and disaster-prone areas. The groups then present to each other and have a discussion on similarities and differences between the maps and make additions as identified. The drawn maps (from all the groups) can then be transferred to a digital format using Google Earth.

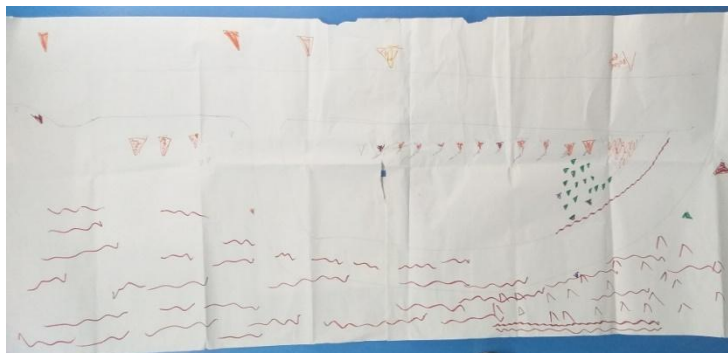


Figure 2 Map drawn by participants

of

On the Delap maps below you can see that the community has identified where there are fire risk either based on locations of previous fires or other local knowledge. They have also located the key community locations like the Irojlaplap (Traditional leaders house), and other evacuation locations.





Figure 3: The Google Earth maps combine information provided by the hand drawn from Delap community members to identify significant places; including the main road, inundated areas and areas at risk of disappearing, and areas that are usually flooded as well as evacuation shelters, homes of people with disabilities, schools, churches and stores.

Hazard vulnerability matrixes

The below matrix is the result of the prioritization process where the community of Delap identified drought, king tide, and fire as their hazards and identified king tide as the greatest concern. Drought and king tide have impacted the lives of the participants and members of their community. Participants identified how drought impacts the wellbeing and livelihoods of their community by negatively impacting hygiene and sanitation, destroying crops, damaging the environment, and causing people to miss work and school. They also identified important resources in the community for addressing drought including their culture, church, and government, as well as some weaknesses in the community which are closely associated with the identified needs. There is a significant need for increased water catchment, water treatment, awareness programs, and emergency kits.

People expressed concerns about the impacts of king tides as well, which also negatively impacts hygiene and sanitation, destroys crops, and damages the environment. Additional impacts of the king tide are the destruction of homes, injuries, salinization, loss of land, and psychological impacts were also noted. Sea walls and other infrastructure were listed as community strengths, as well as communication channels. Money, knowledge of how to prepare or respond, as well as lack of prayer were listed as weaknesses and the needs identified were to elevate both homes and sea walls, stock food, and acquire radios.

Finally, the impacts of fires were explored. Participants listed the health and environmental impacts of fires and fumes and also that power outages have resulted from fires. They listed community mobilization to extinguish fires as strengths and lack of water and firefighting equipment as a weakness, identifying a need for tools and resources.

Hazards	Impacts	Strength	Weaknesses	Needs
MORA (drought)	Sickness Thirsty Destroy crops Dusty environment No water Students skip school Workers skip work No water for laundry, washing dishes, and cleaning the house	National Government Local Government Hospital Schools Offices Church Disaster Office Community Leaders Culture Public water catchment	Not enough water catchment Not enough money Not enough groundwater No medication to ease the spread of disease No Hygiene Kits No emergency kit No transportation to help bring water Lack of information and knowledge of the disaster	Water catchment Water Ground water Awareness Program Emergency kit Transportation Cement water Kit to clean water Medicine

Hazards	Impacts	Strength	Weaknesses	Needs
King tide	Destroy homes Trash everywhere Destroy crops and water catchment Sicknesses People are wounded People worried and sad of not knowing	Sea wall Transportation Radio Police Cellphones Helping each other Hospital Church	Money Seawall Too much spending and playing with money We don't pray We don't know what to do during typhoon	Elevate houses Elevate seawalls Radio Food Donation Water catchment Life jackets Emergency First

	where their other family members are Land grew smaller Salt water infiltration into everything on land from the environment to houses to every available important water everything is salty	School Government		Respond training Emergency Kits
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Hazards	Impacts	Strength	Weaknesses	Needs
Fire	Power plant was shut down for 1 and half day Fumes from the smoke was not good destroyed the environment Sickness	A lot of people to help with the damage Policeman Fire -fighter Fire truck Leaders Churches help Hospital Water	Not enough truck, ground water, water catchment , fire drill, And fire equipment	Tools Additional water catchment Emergency kit Training CPR Fire Truck Train more fire fighters

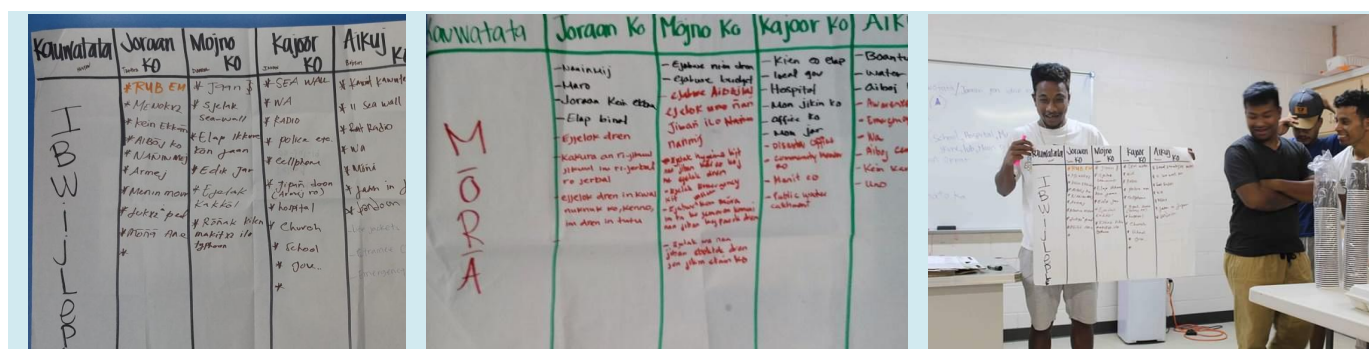


Figure 1.4: Delap Community Members listing the impacts, vulnerability and weaknesses of the identified hazards.

The Delap community created an achievable action plan for addressing drought and King-tides. For each of these hazards they have identified what can be done, who is responsible from within the community, who is responsible from outside the community, if funding is required and how, if technical support is required and how, and who in the community and by when the action will take place. The community was not always able to identify the technical support and funding source. Below is the table with the full community action plan.

Hazard	What can be done?	Community Focal Point	Focal Point from outside community	When can it be done?
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Drought	Water catchment Groundwater	Community Leaders (ALAPS) Councilman	MIRCS National Gov't NDMO IOM	January 2020
King tide	Seawall Food and Water	Community Leaders (ALAPS) Councilman	MIRCS National Gov't NDMO IOM	January 2020

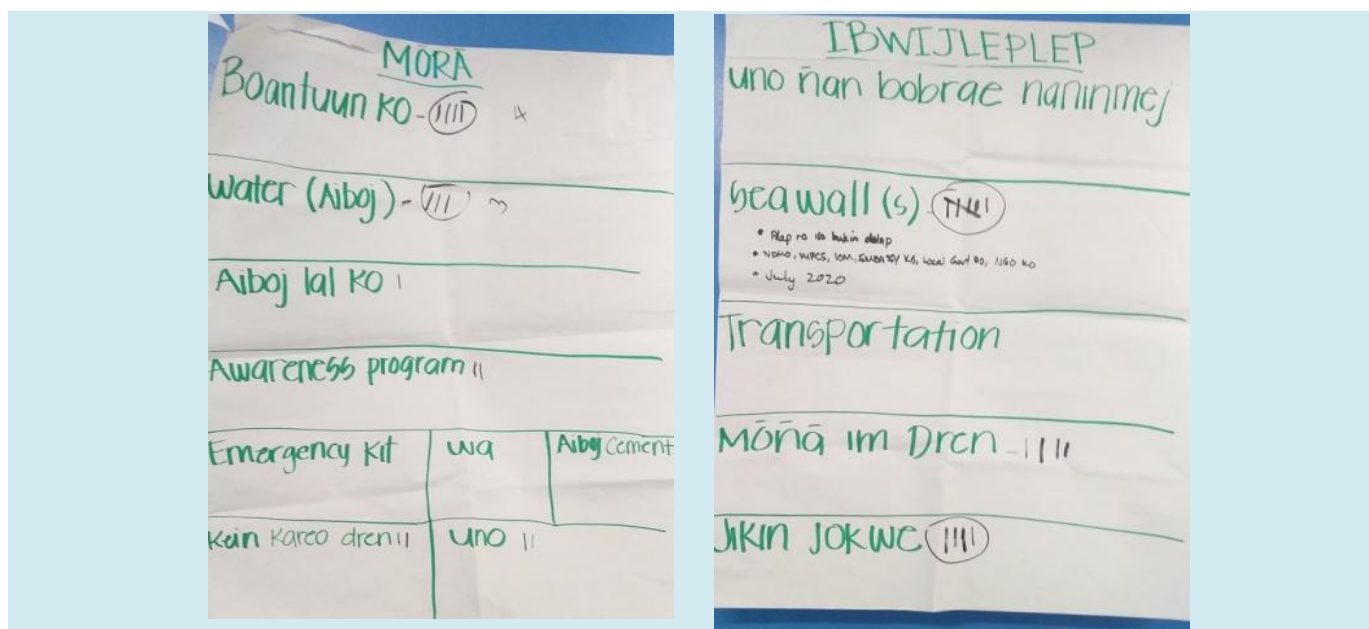


Figure 1.5: Flip charts handwritten by Delap Community- The impacts and needs that can help build or strengthen the community in Delap in times of disaster

Community Early Warning System

When discussing the current EWS at the community level in Delap, the participants decided to draw out the system as they understand it on flip chat paper and the IOM team completed the table in Appendix 1. The community has identified that they heavily depend on word of mouth for early warning, but that also police provide warning and that announcements are also made at churches. The community does not have an alarm system but the community expressed a need for a bell or siren as well as whistles and transportatoin. When people do receive early warning they prepare by taking shelter, acquiring food, medicine, and emergency kits and they mostly rely on community leaders for that. There was also concern about elderly or disabled people as well as mothers and children receiving early warning.

Summary Delap Community

During the Hazard Vulnerability Capacity Mapping and Early Warning System session, drought and King tide were identified as the two main hazards that community members are most concerned about which pose risks to the health and livelihood of community members.

An underlying theme in the action plan is recognition that laws, programs and plans are already in place, but education, participation, and implementation are needed.

In conclusion, the HVCN and EWS Mapping Exercise for Delap Community was successful and the process has made clear that the community must take ownership of the action plan and that the initiative builds on their existing capacities to address their concerns.

It is anticipated that with the commencement of the CADRE, the communities will be better prepared and improved their capacity to identify appropriate community actions to deal with the hazards.

In terms of the community prioritization process, possible short-term Climate Adaptation/Disaster Mitigation activities that were identified include the following:

- Rehabilitation of the community evacuation centre to ensure minimum standards and safety measures
- Further training and awareness raising with community members on enhancing disaster response capacity
- Formation of community working group to further develop these initiatives.

The option of relocating to higher ground should be considered by high risk households and explored further with local government.

The strengthening of individual homes could be facilitated through the development and printing of a how-to manual giving homeowners specific instructions.

Appendix

1. Early Warning System Profile

Community Early Warning System Mapping

Type of hazard	King tide
How does early warning (EW) information reach the community?	Where does the EW message come from? Anyone who heard or seen on technology (king tide) We hear from around town (king tide) Those who had seen it first (fire)
	Who in the community receives the EW message Those who are closer the ones who are able to receive the message
	How is the EW message sent? Variety of ways The police man but it usually goes to the church for announcement Community members inform each other
How does the EW message get passed to the rest of the community?	Does the community have an alarm system? Apology but we have never had a alarm system
	If so, what type of alarm is it? (List any that apply).
	If so, how many community members can hear the alarm system? Circle all that apply. Few Some Most All Other: only those who have technology
	Does the community have a word-mouth-system? None
	If so , is there a plan for contacting every community member? None
After receiving the EW message, how does your community prepare?	How many hours/days before this hazard would the community receive the EW message? 24 hours 1 week
	What type of preparations do families do for this specific hazard? Food and Drinks Shelters Medicine Lights

	Emergency kits
	<p>What type of preparations would community leaders be responsible for?</p> <p>Food and Drinks</p> <p>Shelters</p> <p>Medicine</p> <p>Lights</p> <p>Emergency kits</p>
<p>Does your community early warning system adequately warn all community members?</p>	<p>Please describe whether or not you believe all community members receive early warnings?</p> <p>Find a way to help the disable before we can evacuate</p>
	<p>Are there any groups in your community that may not receive early warnings?</p> <p>Elderly, disable, mothers, children</p>
	<p>Are there special considerations for vulnerable groups, like people with disabilities or the elderly?</p> <p>None but we want to include them</p> <p>Find a way to help the disable before we can evacuate</p>
<p>How could your community's early warning system improve?</p>	<p>Would equipment like sirens or alarms help? If so which specifically and why?</p> <p>Yes</p> <p>Transportation</p> <p>Bells</p> <p>Whistle</p>
	<p>Would better early warning coordination and planning help? If so, how do you think this could be achieved?</p> <p>Yes</p> <p>Create a EWS and practice it.</p>

2. Community Poster

Delap Community
Developed July 2019

Action Plan & Early Warning System



ACP-EU Natural Disaster Risk Reduction Program
An initiative of the African, Caribbean and Pacific Group, funded by the European Union and managed by GFDRR



Community Early Warning System Mapings	
Type of hazard	How it is
How does early warning (EW) information reach the community?	What data do the EW message come from? Where was the message sent, how (medium, timing, title)? How was the message sent, how (medium, timing, title)? Where was the message sent from (location, time)?
	Who in the community receives the EW message? Those who are closest to the source who are able to receive the message.
	How is the EW message sent? Variety of ways. The message must reach all nearby goes to the church for an announcement. Community members inform each other.
	How the community reacts to an alarm signal? Agreement that we have agreed had a alarm system. If so, what type of alarm is it (if not, any that apply). If so, how many community members can hear the alarm signal? Circle and fill in apply. How many people? Circle and fill in apply. Other: others: those who have technology.
How does the EW system get passed to the rest of the community?	How the community has a work-around system? None.
	If so, in what a plan not continue every community? None.
After receiving the EW message, how does your community act?	How many households before the hazard would the community receive the EW message? 24 hours.
	What type of preparations do households do for this specific hazard? Food and Drink Shelters Medicine Lifeline Rescue/Relief kits.
	What type of preparations would community leaders be responsible for? Food and Drink Shelters Medicine Lifeline Rescue/Relief kits.
	Please describe whether or not your household community members receive early warning? Find a way to help the hazard before we can escape.
Does your community early warning system equipment work as community members?	Are there any groups in the community that may not receive early warnings? None.
	Are there disabled, members, children.
	What would community members do if the community groups, like people with disabilities or the elderly? None but we can include them.
	Find a way to help the hazard before we can escape.
How could you community early warning system improve?	What community services or teams help? If so, which ones? None. Preparation: Skills Welfare.
	Would better only warning coordination and planning help? If so, how do you think that could be achieved? Yes. Create a EWIS and practice it.

Community Vulnerability Mapping

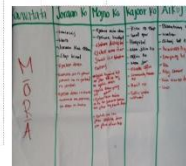
Delap Community, Majuro



Theme Keyphrase Ko	Person Ko	Subject Ko	Major Ko	Unit Ko
MORAL	Address	National Government	No enough water sanitation	Water sanitation
	Delivery report	Local Government	No enough water sanitation	Water sanitation
	Delivery improvement	Local Government	No sufficient to use the	Government Programme
	No waste	No enough to dispose the risk	no enough to dispose the risk	Sanitation Risk
	National Risk	Church	and evidence	Unsanitary
	No waste due to waste	Health Office	no hygiene risk	Control waste
	No waste the cleaning	Community center's culture	no transportation	Sanitation in clean waste
		Public waste sanitation	Lack of information and knowledge on what to do during and in between disaster	Medicine
Living Safe	Delivery houses	Sanitary	Many	Delivery houses
	Trash everywhere	Transportation	Sanitary	Reduce animals
	Delivery report and waste sanitation	Police	Use trash everywhere and play with waste money	Food
	No diseases	Police	Use trash everywhere and play with waste money	Food
	People are worried	Police	Use trash everywhere and play with waste money	Food
	People control and not risk knowing where their families	Police	Use trash everywhere and play with waste money	Food
	Control control	School Government	Use trash everywhere and play with waste money	Food
	No threat and from any emergency	School Government	Use trash everywhere and play with waste money	Food
	People packing the transportation	School Government	Use trash everywhere and play with waste money	Food

Action Plans

Hazard	What can be done?	Community Focus	Local Fund Focus (usually community)	What can be done?
Drought	Water conservation Gardens/roofs	Community Leaders Committee	WRC's National Government NDAO ROM	January 2022
King tide	Seawall Flood and Water	Community Leaders Committee	WRC's National Government NDAO ROM	January 2023



3. Community Profile

Community Profile Questions

Delap

About how many people live in your community?	20,301
What are the major occupations of community members? (income and subsistence activities)	People on Delap depend on their jobs for a living. The types of jobs varies base on the level of education. There are those who works has receptionist, retailer, janitor, supplier, lawyers, cashier, teller at the banks, security, etc.
What local resources does your community depend on? Explain why.	Because everyone is busy working there seems to be no time to plan and the soil is not very rich for planting.
How are decisions made in your community? Who has the authority?	Traditional Leaders, Local Government
What social groups are active and what purpose do they serve?	Church group Club ko an kora Youth Male club It varies there are friends that forms clubs since high school and still meet up. For instance classmate of 2004 still meet up and contribute during graduations.
What natural hazards affect your community?	Community members identified King tide, fire, and drought.
What are the social problems your community is facing?	Under age drinking
What are the main strengths of your community?	Family, community leaders, the police and also having all the important building on Delap. For instance the main hospital is here and is easy for us to visit the hospital when needed without worrying about taxi fare.
Are there any new community improvement projects planned?	None
Is the community participating in programs to improve natural protective barriers? (Mangrove, Steep slopes, rivers)	No
What natural disasters have occurred here in the past 100 years?	Drought and King tide
Are there many people of different heritage in the community?	Yes