

ADAPTING TO A CHANGING CLIMATE



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Adapting To A Changing Climate: Guide To Local Early Action Planning (LEAP) And Management Planning

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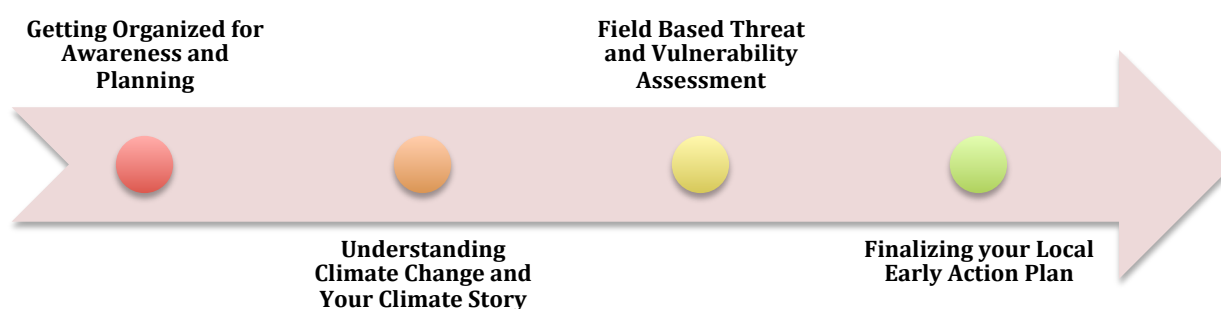
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About This Guide Book

This guide is designed for practitioners working within and with local governments and communities that normally facilitate capacity development at the community or local level. The guide was developed to support facilitators in community-based processes and includes outreach material, key messages, and instructions for group exercises that support awareness and planning.

This community-based Local Early Action Planning (LEAP) process will help you to determine key actions to take to improve health and resilience of natural and social resources and reduce your vulnerability to climate change.



This guide is organized into Four Steps that include getting your team organized, raising awareness about climate change, collecting information about your community, and adaptation planning. Each step will help guide communities through a series of sessions and exercises to develop a Local Early Action Plan that identifies activities that can help to lessen the impacts of climate change on their natural and social resources.

Steps include :

1. Step One: Getting Organized for Raising Awareness and Planning
2. Step Two: Understanding Climate Change and Your Climate Story
3. Step Three: Conducting a Threat and Vulnerability Assessment
4. Step Four: Developing your Local Early Action Plan

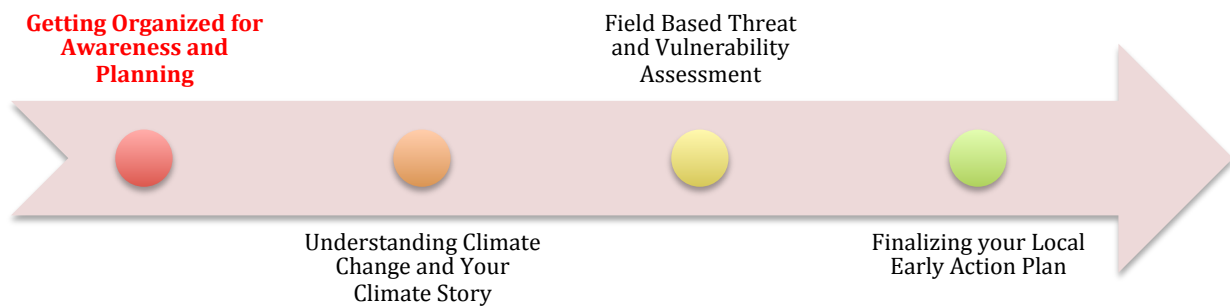
The result of this process will be a Local Early Action Plan or LEAP document. The LEAP is intended to be a simple document of a few pages that can be used to guide actions that a community can take to start addressing existing threats and potential impacts from climate change. There are very likely technical actions that may be identified that a community cannot pursue by itself. We highly recommend seeking expert advice before tackling any technical actions, such as enhancing shoreline protection through any physical structures. This guide does not provide

advice on these issues, but focuses on supporting communities to start to do what they can as early actions.

Some sessions of this planning process should be carried out by the entire community while for other sessions it will be more efficient to carry them out with a planning team only.

Many communities may have already completed some or many of these steps for other planning processes. If your community has completed any of these steps or similar steps be sure to gather this information and utilize it in the LEAP process. You may find it helpful to update materials such as community-maps that were generated during previous planning processes. For example, if you only need to carry out awareness, you can carry out Step Two only. Or if your community has already been through participatory and learning activities (such as mapping) or a resource management planning process (such as problem/solution tree), information and products from those activities can be used to support this process. You should collect and review the information from earlier planning efforts as a foundation for the exercises in this document. In some cases, you might need to collect additional information while in other cases you may find that you already have enough information and can skip an exercise instead of doing it again.

Step One: Getting Organized For Raising Awareness and Planning



Purpose:

Before you begin to conduct outreach or planning within your community, it is important that you have a team of people who are committed to facilitating the process and have adequate information to be effective. This step will help ensure that this team is identified and prepared for success through the following sessions:

1. Session One: Complete the Getting Organized checklist. This session is done with the core planning team only and will help to make sure that a) appropriate leaders and authorities are aware of and support the outreach and planning process, and b) the planning team is organized and ready to facilitate the process.
2. Session Two: Reviewing the Local Early Action Plan (LEAP). This session will familiarize the core planning team with the contents of a LEAP and how each further step in the process supports the completion of the final document.

Below we provide some instructions on how to carry out each of these sessions.

Session One: Completing the Getting Organized Checklist

FACILITATOR INSTRUCTIONS

Exercise – *with core planning team only*

Before you start raising awareness and planning with the whole community, a core “planning team” should be developed who will be committed to facilitating the process and completing the associated documents (for example, writing the climate story and local early action plan). Be sure the core team has the skills, time, and commitment to complete this work.

To make sure the core team is organized and prepared to be successful, review the statements below. Check the boxes YES or NO for all statements and fill in the blanks for those that apply to your situation. It is recommended that all of the getting organized activities at least be discussed and ideally be completed before moving forward.

	Question	YES/ NO	Answer
1.	We have identified a core planning team who are capable of and committed to facilitating community awareness and the VA-LEAP process.		List all members of the team the their role:
2.	Leaders in our community understand the reasons for conducting awareness and developing a local early action plan and want to do so?		Please explain why they want to do a LEAP:
3.	We have identified the geographic boundaries of the area that will be included in the awareness and planning process?		The area is:
4.	We have identified a strong team of local leaders and experts that have agreed to participate in the awareness and planning sessions? Consider experts in hazard management, food security, resource management, water management, health, and communications.		List additional team members and their role in awareness and/or planning:

5.	We have identified key stakeholder groups and how to engage them in the awareness and planning process?		Women Youth Elderly Resource Poor Other
6.	We have the authority or have support from the appropriate people/agencies to make management decisions for the area?		Please Explain?
7.	We have a target date for finishing awareness and planning process?		Target Date for Awareness Completion: Target Date for VA-LEAP Completion:
8.	We know how the final plan will be approved and who has authority to approve it?		How?
9.	We know how the plan will be integrated into existing community plans and projects?		The existing plan(s) are:
10.	We have collected existing information about the area (e.g. management plans, maps, historical photos, social or biological studies, information on climate)?		This includes:
11.	Our team has sufficient time and financial resources to complete our awareness and local early action planning process?		List financial sources:

After reviewing the statements in the checklist, your team should decide if you are prepared with the right information and if now is the right time to initiate awareness raising and the development of a local early adaptation plan OR if you need to carry out more activities before you are ready to start the planning process.

Session Two: Reviewing the LEAP Template

FACILITATOR INSTRUCTIONS

Exercise - *with core planning team only*

If your team is planning to carry out all of the steps in this guide to develop a local early action plan, it is recommended that you first review the LEAP template below to understand what contents will make up the complete document. Different sections of the template can be filled in after finishing different steps in the process so at the end of Step Four you have a complete plan.

The plan can be used to guide actions to improve the health of the communities resources, reduce non-climate threats, and reduce vulnerability of their community to climate change. This plan is also designed in a way to make it easy for planning teams to seek support from funders and resources agencies. If the community already has existing plans they can take any new activities or objectives from the LEAP and integrate these into appropriate plans.

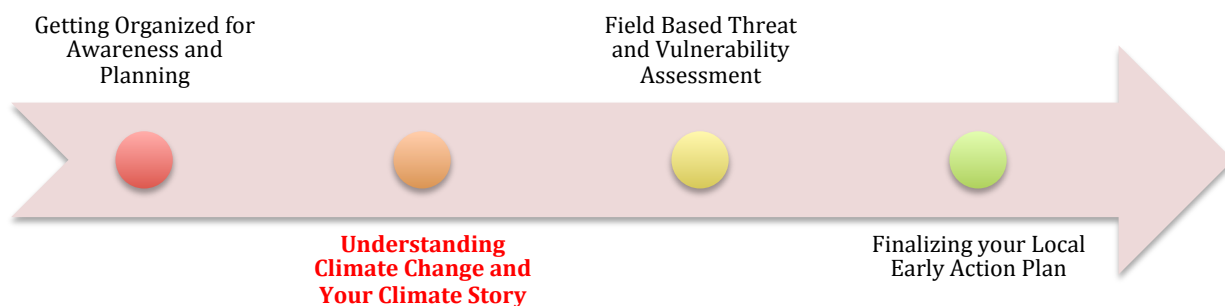
LEAP Template

1. Community Name:
2. Community Climate Story (*Completed in Sub-Step 2.2*)
3. Community Profile: (*Completed in Sub-Step 3.2*)
 - a. Community Background Summary
 - b. Natural and Social Resource Targets and their Current Condition
 - c. Community Map (attach to the LEAP Template)
4. Threat and Vulnerability Assessment (*Completed in Step 3.3*)
 - a. Threats and Root Causes of Threats for Target Resources
 - b. Describe which Resources are Highly Vulnerable to Climate Change Impacts and Why
 - c. Summarize any Existing Resilience/Adaptation Strategies & Community Strengths to Maintain or Build upon
5. Early Actions to Address Climate Change Impacts and Non-Climate Threats (*Completed in Step 4*)

Action	Time-frame	Responsibility	Resources or Support Needed	Priority (High, Medium, Low)

6. Long-term Objectives to Address Climate Change Impacts and Non-Climate Threats (OPTIONAL) (*Completed in Step 4*)

Step Two: Understanding Climate Change And Your Climate Story



Purpose:

This step will help your community understand climate change concepts and future predictions for the area. This information will help them develop a “story” that explains which climate hazards they are most concerned about and why based on past experience and future scenarios.

This Step has three sub-steps each with several sessions:

- 2.1 Understanding Climate Change – this sub-step provides information on raising awareness about climate change concepts, it’s potential impacts, and what communities can do. It also will begin to collect information about past and present climate events that have impacted your community.
- 2.2 Telling Your Climate Story – This sub-step will utilize information collected in the previous sub-steps to write a “story” about the community explaining which climate hazards your community is most concerned about why.
- 2.3 Understanding What Communities Can Do To Reduce the Impacts of Climate Change – This sub-step helps communities understand how local threats can contribute to negative impacts from climate change and what they can do to identify and reduce these threats and impacts

Sub-Step 2.1. Understanding Climate Change

Session Three: Reviewing Factors that Make a Community Healthy or Unhealthy

NOTE: Prior to showing the flipcharts below read the facilitator instructions and complete the exercise with the community.

FLIPCHART#1A - Healthy High Island Community



FLIPCHART#1B - Healthy Low Island/ Atoll Community



KEY MESSAGES

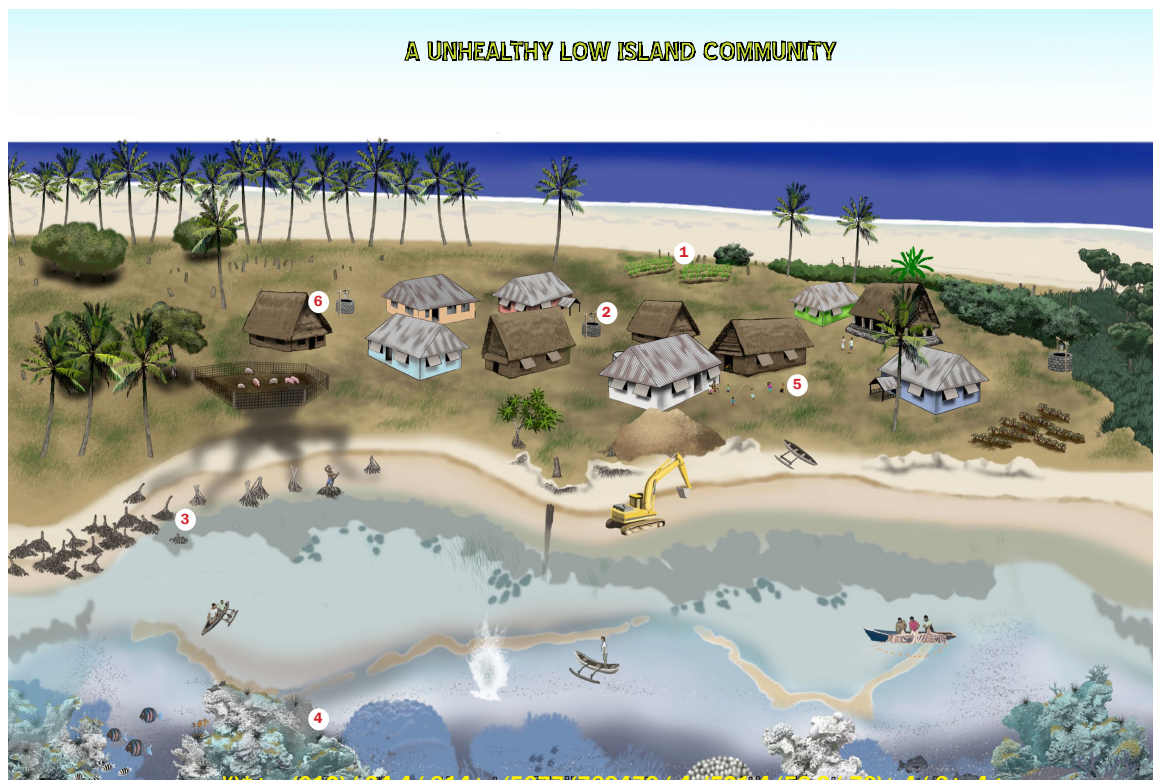
Factors that make this community healthy include:

- **Healthy Forest** - including intact native upland vegetation that provides protection from landslides, prevents sediment from polluting streams, and filters pollutants to keep them from entering freshwater springs and lenses. Intact riparian vegetation (next to rivers/streams) protects water quality by capturing, storing, and filtering water through the soil before it gets to freshwater springs, lenses, rivers, and streams and holds stream bank soils in place and protects them from erosion
 - **Healthy Freshwater Resources** – including clean and unpolluted rivers and streams. Intact freshwater lens, unpolluted and well managed. Wells designed and managed to allow sustainable use. Freshwater catchments, storage, and well-maintained distribution systems. Provides safe drinking and bathing water
 - **Healthy Coastal Vegetation, Mangroves, and Beaches** - provide protection from storm surges, stabilize coastline to prevent or slow rates of erosion, help prevent salt spray from getting inland to crops/homes, provide feeding grounds, nursery, and habitat for important fish and invertebrates, and trap sediment from land and prevent it from getting onto the coral reef
 - **Healthy Seagrass** - protect coastline from currents and therefore reduce erosion, provide critical habitat, breeding grounds and nursery areas, and food for important fish and marine life, trap sediment from land, improving water clarity and preventing it from getting onto the coral reef, and uptake nutrients from land runoff preventing algal blooms
 - **Healthy Coral Reefs** - provide a buffer against storm surges by breaking wave energy, provide nursery areas, habitat, and food for important fish, invertebrates, and other marine life (e.g., turtles, marine mammals)
 - **Healthy People and Children** - People are able to practice their culture, and children can learn about island self-sufficiency through traditional knowledge and evolving cultural practices and have pride in their community. Homes safe from storms and landslides. Safe drinking water systems. Variety of healthy foods available (through agriculture and fishery) Healthy, happy children
- The healthy resources of this community are providing for the livelihood and health of the community members.
 - The healthy resources will help to protect the community against the impacts of climate change. For example, if a community has several areas of healthy coral and coral bleaching happens, it is more likely that some of the corals will survive than if the coral was already weakened. The higher survival rate will help the reefs to recover more quickly. Healthy coral reefs can also better protect the shoreline from erosion in storms.

FLIPCHART#IC - Unhealthy High Island Community



FLIPCHART#ID - Unhealthy Low Island / Atoll Community



KEY MESSAGES

- This community's resources have been degraded by local threats and cannot provide abundant resources for community members.
- Elements of this community include:
 - **Degradation of Forest** - including widespread clearing of native forests/vegetation, no vegetation adjacent to streams, Pollution (e.g., piggeries, trash), and Sedimentation/runoff from cleared land
 - **Degradation of Agriculture** - including poor agricultural practices (e.g., mono-cropping, overuse of fertilizers and pesticides, land clearing, removal of native vegetation)
 - **Degradation of Freshwater Quality and Quantity** from pollutants on the ground that seep into freshwater lens, and people collecting too much freshwater from wells so they are not able to recharge
 - **Threatened Coastline/ Mangroves** from clearing of native vegetation (mangroves/trees/shoreline shrubs) along the shore dredging of sand and loss of seagrass, overharvesting of species that live in these areas, damaging types of coastal development such as seawalls which can increase erosion
 - **Threatened Coral Reefs** including overfishing; taking from spawning aggregations; taking too many herbivores, which can lead to algae smothering coral, destructive fishing practices such as nets with small mesh, cyanide and native plants used to poison fish, breaking small corals, dynamite fishing, scuba/night spearfishing, abandoned gillnets, Destructive tourism practices – walking on or touching the reef, sedimentation from cleared land can smother reefs, and increased nutrients from runoff
 - **Degradation of Community Well Being** because people are not able to sustain their families on the resources and have few sources of income because resources are depleted and other sources of income are not available, homes and infrastructure are located in flood zones, no sustainable, local source of drinking water (bottled water is not sustainable), damaged food crops, lack of food variety, dependency on imported foods, unknown future for children to live/stay in this area, People working together less and lack of community cohesion Health issues
- This community will be more severely impacted by climate change because their resources are already weakened. As a result recovery from climate hazards and other threats will take longer or may not happen.

FACILITATOR INSTRUCTIONS

Exercise - with core planning team and community members

The objective of this exercise is for participants to share their perceptions of what factors make a community healthy versus what factors make a community unhealthy. Communities that have more factors that make it healthy will be better able to cope with climate change impacts.

1. Before you show the Flipcharts, ask the group to list the factors that make a community HEALTHY versus the factors that make a community UNHEALTHY. Capture the answers on flipchart paper in two columns (one for Healthy and one for Unhealthy)
2. Next place the Flipchart with healthy community side by side with the one the unhealthy community, where the participants can see them both.
3. Now review the flipchart illustrations and note how the participants' answers are similar to the illustration key messages. Use the illustration to point to healthy or unhealthy resources from key messages.
4. Explain to the group that before we can understand how a community will be impacted by climate change in the future, we must understand how healthy a community and its resources are now. To do this, we will use these communities on the flipchart to understand how climate change will impact them differently.

Session Four: Explanation Of Weather And Climate

FLIPCHART#2: What Is Weather And Climate?



*illustration provided by SeaWeb

KEY MESSAGES

Weather is the day-to-day temperature, wind, and rain activity in a place.

Climate is the average weather in a place over many years. This includes the average temperature, the seasons, wind patterns. While weather changes everyday, climate takes years to change.

FACILITATOR INSTRUCTIONS

1. Explain that before we review how climate change will impact a community we will review; the difference between weather and climate, what is climate change, and why it's happening.

2. Refer to the Flipchart. This Flipchart explains **Weather**. Tell the group something like the following:

“Weather is the day-to-day temperature, wind, and rain activity in an area. Weather is what the forecaster on the radio predicts everyday. The weather in an area changes every day and is very different in different areas around the world each day. As you can see in this Flipchart the weather is different in different areas. Some areas are sunny, some areas are rainy, some areas are colder, and some areas are warmer. Ask the group to describe the weather where they are for that day.

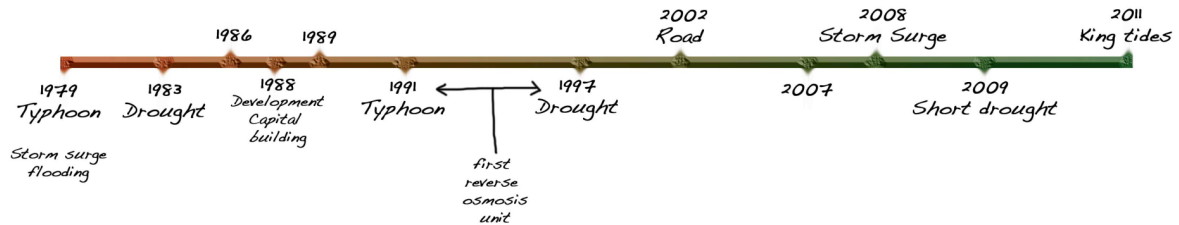
3. There is not a separate Flipchart to explain climate. Tell the group something like the following:

“Climate is the average weather in a place over many years. This includes the average temperature, the seasons, wind patterns. While weather can change everyday, climate takes years to change. The climate of Micronesia tends to be hot and humid in most areas throughout the year with a rainy and dry season. The climate in many areas in North America includes four seasons: Spring, Summer, Fall, and Winter. Summer is much hotter than winter and winter is generally cold with snow in lots of areas of North America.”

4. While climate tends to be generally consistent over many years, extreme events occur periodically. For example, there may be a year that is especially hotter and dryer than most years, or an extreme monsoon event one year. People tend to remember these events because they are “not normal” and can cause severe damage to communities because people are not prepared for them. In the next exercise, we will explore our own climate and extreme weather events that have occurred over time in this area.

Session Five: Historical Timeline

Reviewing Extreme Weather Events In Our Community



Hazards: Drought Surges, King tides \Rightarrow (more frequency / more intense)

IMPACTS

Storm Surge \Rightarrow

- flooding
- property damage
- evacuation to higher buildings



COPING MECHANISMS

-reliance on family members
not impacted

Drought

- people H₂O catchments severely impacted
- passive on social services for water and medicine
- pink eye epidemic
- schools closed
- coral bleaching



Assistance from:

- FEMA - water
- community groups
- churches
- gov't agencies

shelter
clean-up
food
H₂O

HAZARDS OF MOST CONCERN TO MAJURO, RM \Rightarrow 1) DROUGHT
2) STORM SURGES

FACILITATOR INSTRUCTIONS

Exercise - with core planning team and the community

Now that you have reviewed the difference between weather and climate, we are going to explore this communities' history and any extreme or "abnormal" climate hazards that have occurred over the past 50 years. This will help the group to understand major climate and extreme weather events that have happened in the community over the years, and what impacts these events have had on natural and social resources.

1. Prepare a large sheet of Flipchart paper that can be hung up in front of the group.
2. Be sure to involve older people who may know more about the historical climate hazard events than younger people
3. Draw a timeline dating back about 40- 60 years. Draw the line large enough so all the people in the group can all see and give yourself about 30 centimeters of space between each ten year mark.
4. Ask the group the following questions and write their responses on the appropriate place in the flipchart as they answer:

Question One: What is the general/normal climate in this region? Write the answer to this below the timeline.

Question Two: What extreme weather and climate events have happened in your area in last 40 - 60 years? For example: droughts, heavy storms, floods, king-tides, etc. List down the year that each event happened that the group can remember on the time-line.

Question Three: What impacts have these weather or climate events had on the community's natural and social resources? For example, droughts caused crop failures, difficulty in finding fish, and/or coral bleaching (explained on page 34 of this guide). Below the timeline write each climate hazard and their impacts. Also, note if these hazards are increasing or decreasing over time.

Question Four: How did you cope with the impacts of the event? Write the way the community coped with each event and if it was successful next to each of the impacts.

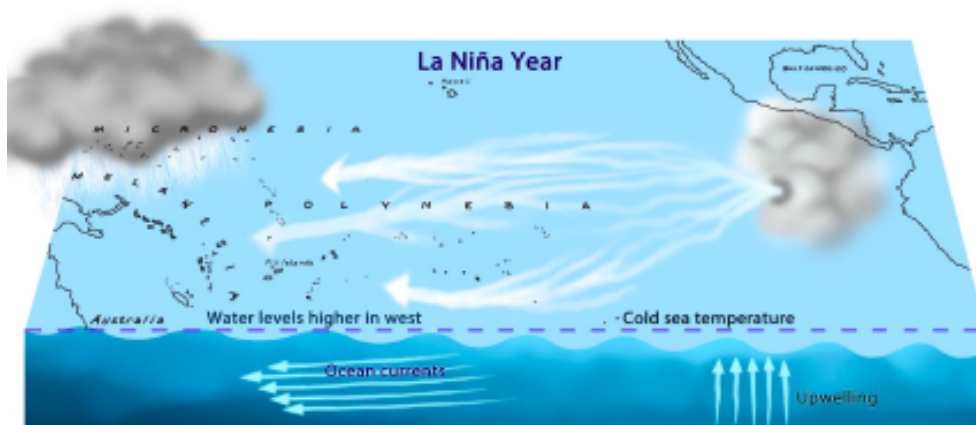
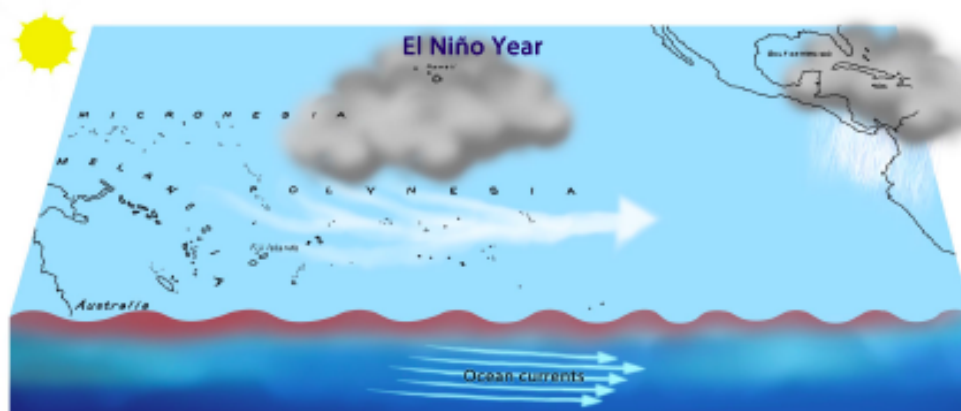
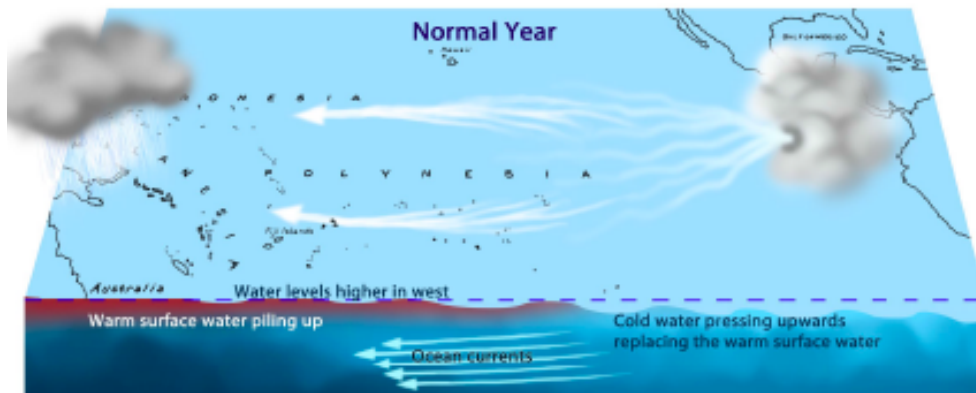
Question Five: Based on past experience, which climate hazards is your community most concerned about happening again in the future? Write these at the bottom of the flipchart.

Please note Earthquakes, tsunamis, and volcanic eruptions are not weather or climate events but can be included in the timeline to show how communities cope with natural disasters.

Session Six: Explaining El Niño And La Niña

FLIPCHART#3 - What Are El Niño And La Niña ?

What are El Niño and La Niña?



KEY MESSAGES

El Niño and La Niña are natural weather patterns and have a big effect on the weather causing lots of impacts such long droughts, heavy rain, and king tides in Micronesia.

Normal Year

- a. In the western Pacific, a pool of warm water makes the water molecules spread farther apart, increasing the water volume so it expands upward, causing the sea level to rise.
- b. The ocean surface is about 1 foot higher in the western equatorial Pacific than in the eastern equatorial Pacific and strong surface winds blowing east to west keep the water piled up in the west.
- c. The warm pool also puts a lot of warm, moist air into the atmosphere. This leads to the routine development of thunderstorms and typhoons in the western Pacific.
- d. Eventually, “Mother Nature” redistributes the heat in the Pacific and sets off actions that initiate an El Niño. El Niño and La Niña are natural weather patterns and have a big effect on the weather causing lots of impacts to weather patterns.

El Niño

- e. During El Niño east-to-west surface winds weaken or become west to east moving warm water in the west toward the eastern Pacific.
- f. As the ocean heat moves eastward, so does the area where thunderstorms and typhoons develop. By March, typhoons may develop around Pohnpei, by April around Kosrae, and around May and June in the Marshall Islands. This is the wet phase of the El Niño. After this wet phase, Micronesia is typically drier during El Niño. Drought begins to set in, and from the following January through April, conditions can be very dry in Micronesia.
- g. As the heat in the western Pacific moves eastward, the ocean volume in the west decreases and the sea level drops, sometimes by as much as a foot.
- h. Drought worsens the occurrences of fires and causes reduced water and food resources on the high islands. Drought is very severe on the low islands. The small aquifers become thinner and thinner. As sea level falls, saltwater eventually gets drawn into the freshwater lens. Eventually, the water becomes too salty to drink and may begin to damage or kill food sources.

La Niña

- i. During La Niña east-to-west equatorial surface winds increase and the warm water is mixed deeper into the ocean in the western Pacific.
 - j. This process shifts thunderstorm and typhoon development west of the normal locations and causes the sea level to rise as the ocean volume expands. The increased easterly surface winds can cause the sea level to rise as much as a foot above normal. This, coupled with high surf events, especially near new and full moon periods, can cause episodes of coastal inundation and flooding.
 - k. La Niña can create very wet conditions across Micronesia from Mili in the Marshalls, to Kosrae, to the southern Mortlocks in Chuuk State, to Satawal and Woleai in Yap State, and to Peleliu in Palau.
- El Niño always happens first and lasts for one year followed by La Niña , which may last for two or more years. Usually, the cycle between El Niño and La Niña happens every 3-

7 years with more normal years in between. Scientists do not yet know how climate change will impact El Niño/La Niña but suspect they may become more frequent.

- Many people assume that climate hazards (e.g. extreme king tides and associated erosion, droughts) that occur during El Niño and La Niña years are due to climate change and are the “new normal”. However, these events are part of natural climate variability. It is good to know if an El Niño and La Niña year is happening so you can understand why some extreme events may be occurring and be prepared for them. If these extreme events begin occurring more frequently over a longer period of time, they may be due to climate change.

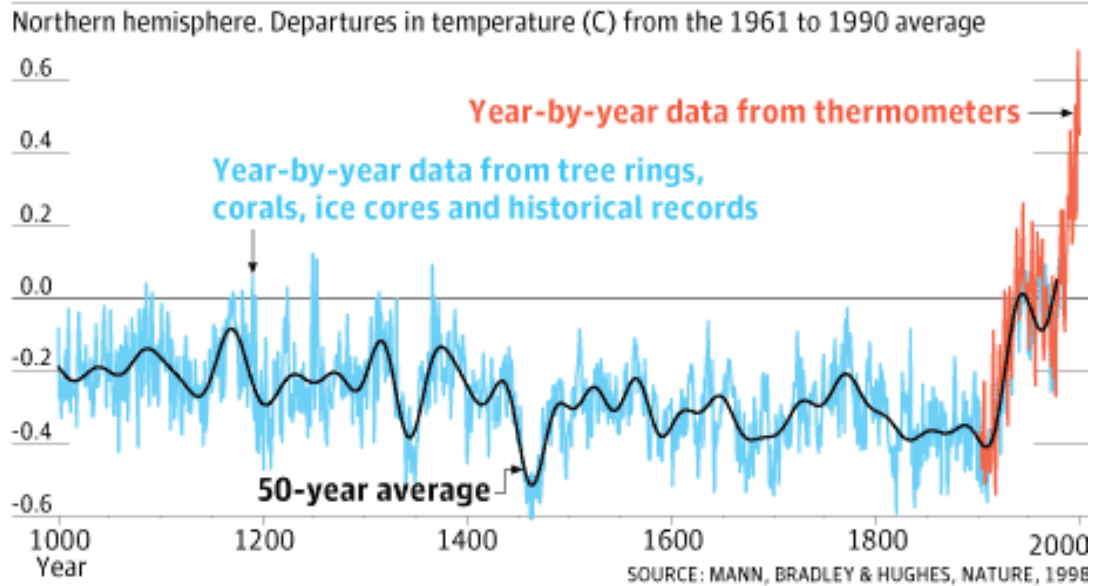
FACILITATOR INSTRUCTIONS

1. Tell the group: In your historical timeline we reviewed some of the extreme climate hazards your community has experienced. Now we will review El Niño and La Niña because they are natural weather patterns that have a very big impact on the weather around the world and specifically in the Pacific Region. And may be the reason for some of the extreme climate hazards you experienced.
2. Ask the following Questions: Who has ever heard of El Niño or La Niña? Can someone explain El Niño?
3. Highlight what was right and what was not right about the response.
4. After the participants have been given a chance to share what they know, the facilitator should go over the key messages referring to the Flipchart.
6. After you have gone over the key messages, refer to the timeline that people created and ask people if they can identify years where there was El Niño or La Niña. If you know the specific years that El Niño and La Niña affected your area you can review them.
7. If you would like to, you can explain that El Niño is a Spanish term meaning “the little boy”. The term started in South America after they noticed a regular extreme weather event every 3-7 years that started in December, near Christmas (birth of Jesus). La Niña is an opposite weather pattern so it’s named this way because it means a “the little girl” in Spanish.

Session Seven: What Is Climate Change?

FIGURE #1

Variations of the Earth's surface temperature



FLIPCHART#4 - What Is Climate Change?



* illustration provided by Indonesia LMMA

KEY MESSAGES

1. Climate Change is a long-term change in average climate patterns all around the world due to an increase in the average temperature of the Earth. In other words, the world is getting hotter and this is causing changes in the climate around the world.
2. Throughout history, the Earth has warmed and cooled over very long periods of time.
3. However, the Earth is now warming at a much faster rate due to human burning of fuels such as oil, wood, and coal.
4. Scientists predict that the earth's average temperature will increase from 2 – 4.6 degree Celsius in the next 100 years. This amount of temperature change will create shifts in normal climate patterns all over the world.

FACILITATOR INSTRUCTIONS

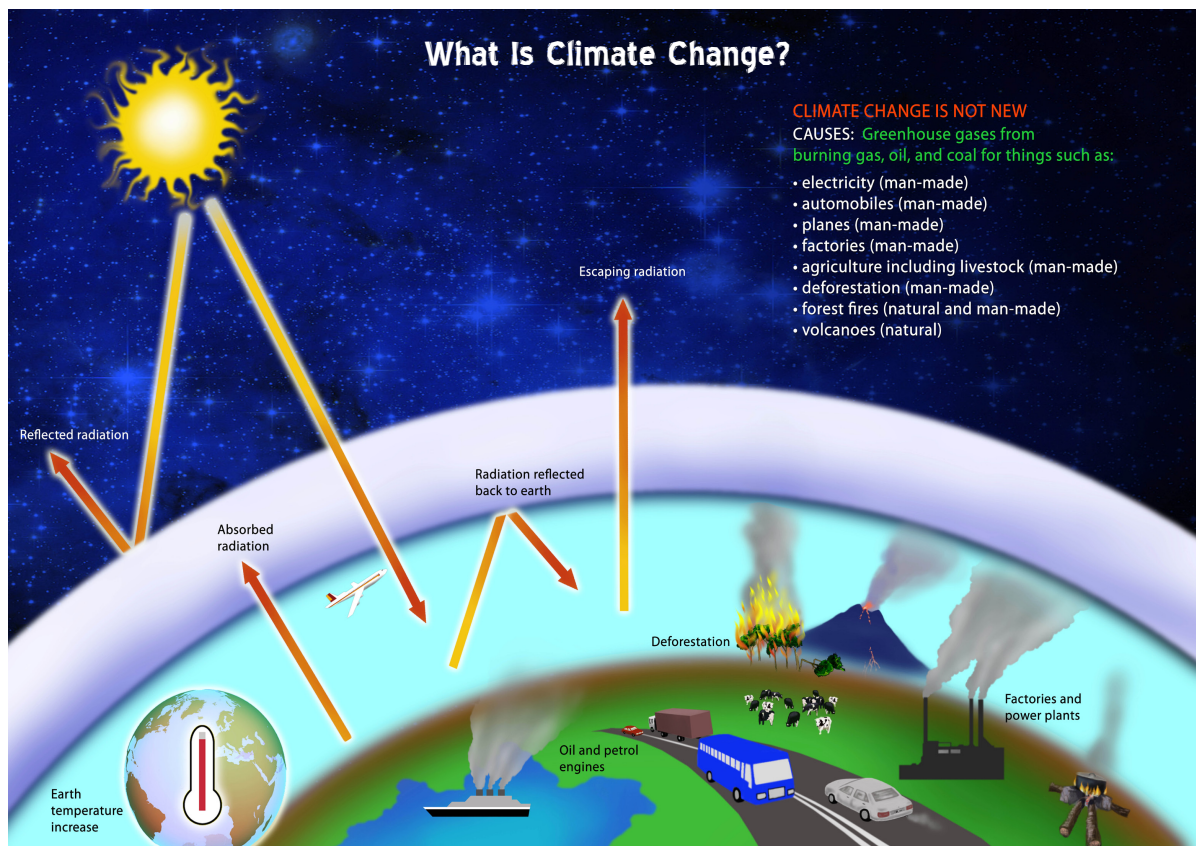
1. Go over the key messages with the group.
2. Refer to the Figure and Flipchart and tell the group the following:

Figure 1: You may have to draw a simplified version of this on a flipchart to explain it to the group. The graph in Figure 1 (on the top) shows the average global temperature over the past 1,000 years. For the first 900 years there is little variation. Then, in the 20th century, comes a sharp rise due to human burning of fuels such as oil, wood, and coal.

In the next image you can see there was more snow and ice on Punjak Jaya (in Papua, Indonesia) in 1850, 1936, 1942, etc. than there is today. This is because since then the temperature of the earth has increased causing the snow to melt. Scientist predict that the temperature of the Earth will continue to increase continuing to cause climate change and impacts to communities. We will explain these impacts later.

Session Eight: Why Is Climate Change Happening?

FLIPCHART #5 – What is Climate Change?



KEY MESSAGES

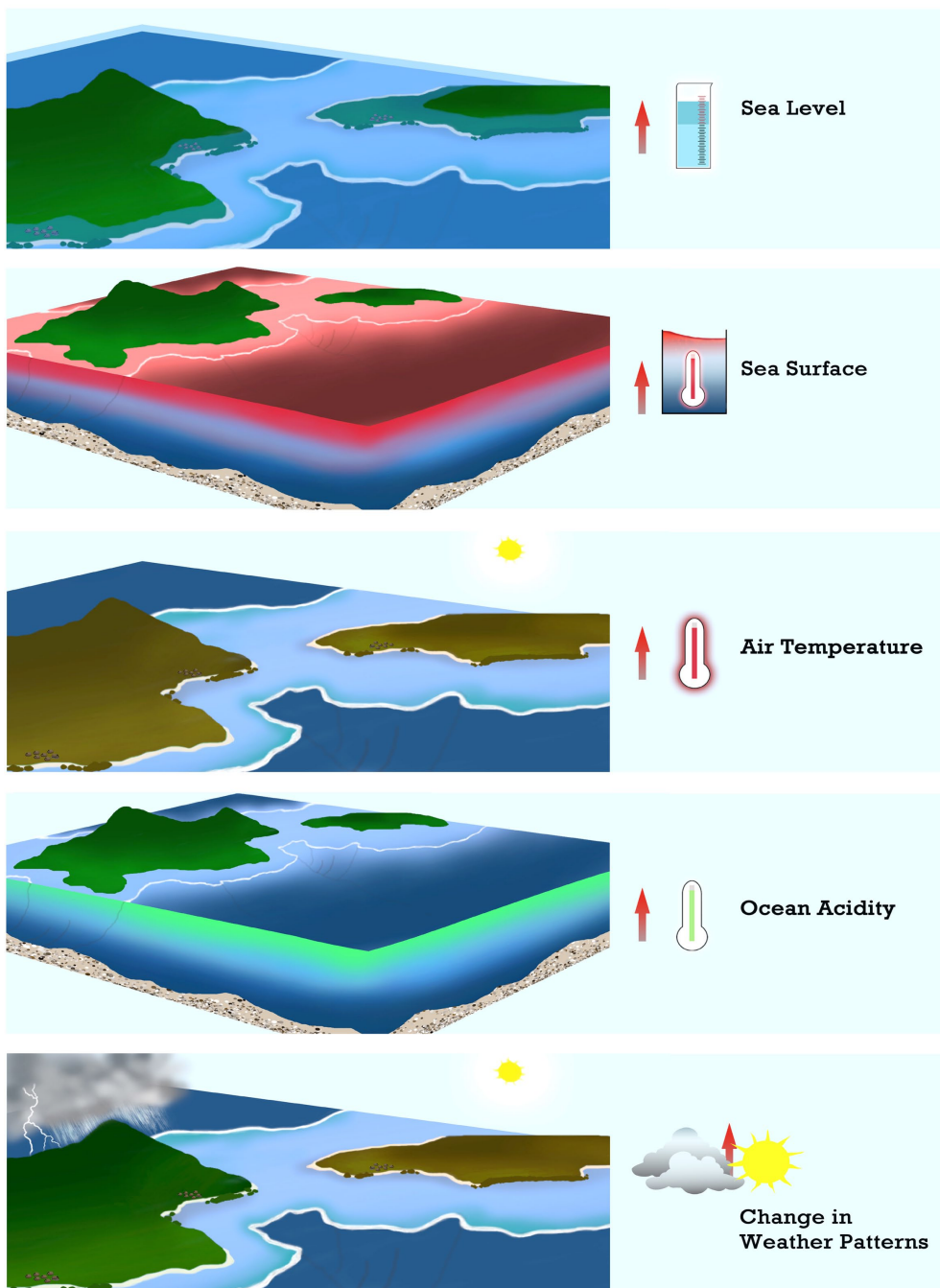
1. Human and natural activities are causing the Earth's temperature to increase, which is causing climate change.
2. Human causes are related to the burning of fuel, coal, oil, wood, etc. to power cars, trains, planes, factories, and agriculture which cause the release of gases that accumulates in the atmosphere.
3. Natural causes include forest fires and volcanic eruptions, which also release gases.
4. Once in the atmosphere these gases form a sort of blanket that traps the heat from the sun. This warms the entire planet much like a how a car parked in the sun with the windows rolled up gets hotter.
5. This increase in temperature causes changes in climate patterns around the world called "climate change". This may include noticeable changes in the seasons in specific areas. For example the rainy season may come later or be shorter as climate patterns change.
6. The climate has always changed over long periods of time in the earth's history.
7. However, as the human population and industry has grown in the last 200 years, humans have burned more fuel thus releasing more gas. As a result, the amount of gas trapped in the atmosphere has increased, and the rate of warming has increased more rapidly than it would naturally. Humans are the main cause for this rapid change in temperature we are now experiencing.

FACILITATOR INSTRUCTIONS

1. Using Flipchart 5 go over key messages.

Session Nine: What Changes And Impacts Are We Likely To See From Climate Change

FLIPCHART#6: What Changes Will We See On Land And Sea



KEY MESSAGES

Over the long term (40+ years) climate change will gradually cause:

- a. The average air temperature will increase as the earth becomes hotter. This will cause shifts in normal weather patterns. For example, some areas may become drier while others may become wetter.
 - b. The average temperature of the sea surface will increase as the earth becomes hotter. This may cause coral bleaching and changes in the fish distribution.
 - c. Sea level will rise. This is due to the melting of land ice in Antarctica and other areas. This will mean that the water that was previously frozen on the land will now move into the sea raising the sea level. Warmer sea temperature will also cause water to expand and rise. As the level of the sea rises, this may impact the coastline and increase intensity of storm surges.
 - d. Weather patterns including storms, drought, rainy seasons, and dry seasons will vary depending on the region. Scientists are trying to understand projections for specific locations but it is not clear. Review local projections for the most up to date information.
 - e. It's unclear how storm events will change. However, as sea levels rise, any storm events that occur could bring greater storm surges.
 - f. There is evidence some locations (e.g., Marshall Islands) are getting less rainfall. We don't know if this is part of a normal cycle (natural variability) or a result of global climate change.
 - g. Based on a range of models, it is likely that future tropical cyclones (typhoons and hurricanes) will become less frequent but more intense when they occur, with larger peak wind speeds and heavier precipitation associated with ongoing increases of tropical sea surface temperatures.
- a. We don't know how climate change will affect the El Niño and La Niña.
 - b. Fortunately scientists are usually able to predict when El Niño or La Niña will come. When El Niño or La Niña is predicted to come, it's important for communities to prepare. For example to store water and food when El Niño is predicted because it will bring long dry periods and to secure homes and crops and store food when La Niña is predicted because it will cause heavy rain and higher seas/ king tides.

FACILITATOR INSTRUCTIONS

1. Referring to Flipchart 7, review the key messages with the participants.
2. As you review the key messages, point out that brown color land is drier, green color land is wetter, red color water is hotter, and blue color water is cooler

FLIPCHART#7 - Examples Of The Impacts From Climate Change

POTENTIAL IMPACTS



"CLIMATE RELATED HAZARDS WE'RE ALREADY EXPERIENCING"



KEY MESSAGES

Climate change can impact our communities because of changes in weather patterns and seasons, and potential increases in extreme climate events. Island communities are already noticing the impacts of climate change. Potential impacts include:

- Sea level rise can cause
 - Stronger storm surges, flooding, saltwater inundation and intrusion, and coastal erosion.
 - This can cause a loss of and damage to crops, homes, and coastal infrastructure, health hazards, loss of food and livelihoods, and problems with community services
- Increased sea surface temperature of the ocean can cause
 - Coral bleaching, which can make corals weak or die
 - This can lead to a loss of habitat and nursery ground for fish and marine life, and loss of coastal protection, loss of food and/or income sources for community members who are dependent on fisheries and a loss of coastal areas where homes and farms may be located.
- Increased air temperature can cause
 - Increased stress on plants, crops, and people
 - This can cause a loss of food and/or create a health hazard
- Changes in weather patterns can cause
 - Droughts if less rain or flooding/landslides if more rain
 - This can damage or destroy crops, homes, and infrastructure, and cause health problems from water- and vector-borne diseases.

Climate hazard impacts communities are already experiencing that could get worse include:

- a. Flooding during king tides and high sea levels, or extreme rains from that damage the coast line and buildings;
- b. Coastal erosion from king tides, higher sea levels and storm surges;
- c. Salt water getting into wells and fields from king tides and higher sea levels and storm surge;
- d. Water shortages from long dry seasons/drought periods,
- e. Crop failures from long dry seasons or too much rain,
- f. Changes in fruiting and growing seasons for key crops.
- g. Bleaching of coral reefs during long dry seasons and times of higher sea surface temperature; threatening local fisheries.*

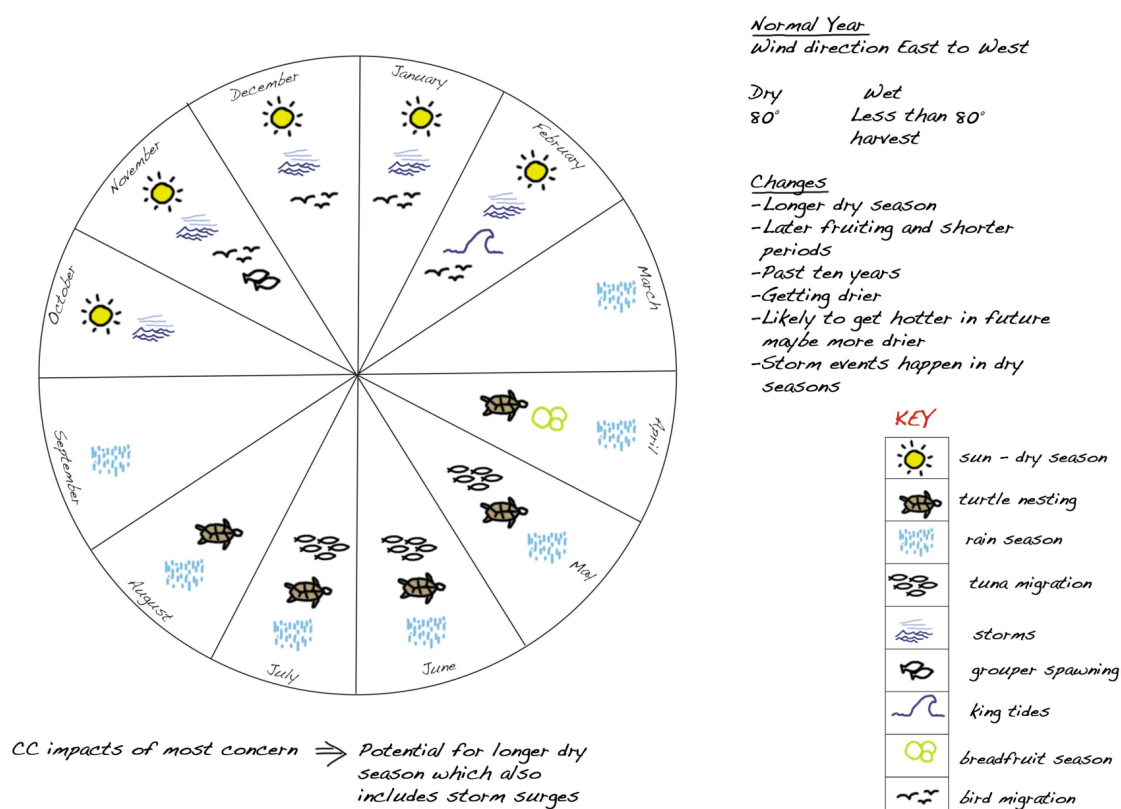
***Coral Bleaching:** When water temperatures become warmer than normal many corals will lose their color and become white. This happens because the colorful algae that lives in the coral and provide food for corals, moves out of coral when they are stressed with high temperatures. If the coral remains stressed and the algae stay out for too long, the coral will die because they cannot get enough food. If the water conditions get cooler the algae will move back into the coral. However, if the conditions do not improve, the algae will not return to the coral and the corals can die especially if larger algae or seaweed begins to grow on top of the coral. Corals can also be stressed by local threats such pollution or sediment which may cause them to bleach faster with warmer sea surface temperature. Additionally, nutrients in the water may cause larger algae to grow quickly and grow on top of the coral, decreasing the coral's ability to recover after they have bleached.

FACILITATOR INSTRUCTIONS

1. Referring to the photos in Flipchart Seven and the key messages, point out the types of impacts from Climate Change that communities will potentially experience and events communities are already experiencing that could get worse.
2. Tell the group that you can review changes your community is noticing by doing the next group exercise the "seasonal calendar"
3. Before wrapping up this flipchart page, review that in order for the community to understand how severely it will be impacted by climate change they have to look at the existing condition of the natural resources and the social situation like they did in the first two flipcharts. In the planning process, we will explore the health of their natural resource and social targets to determine the potential impacts of climate change on their community. They will also talk about how to prepare for many of the potential impacts in later steps.

Session Ten: Seasonal Calendar (Optional)

What Changes And Impacts Are We Noticing In our Community



FACILITATOR INSTRUCTIONS

Exercise - with core planning team and the community

The objective for this exercise is that people review the normal seasons and the major social and ecological events that happen in each season to understand changes in these seasons that may be occurring and the ecological and social impacts they are having. These types of changes may become more common as climate change continues.

- I. Tell the group that you this exercise will explore how climate change may be changing the normal seasons in their area and how those changes might impact important social and natural resource targets.

2. Divide into small groups of 5 to 10 people each. Be sure to involve older people who may know a lot about the normal seasons. Each group should have Flipchart paper and pens.
3. Prepare a large circle divided into 12 pieces. First divide the circle in four and then divide each of these into 3.
4. Ask each group to answer the following questions and capture the information on their calendars:

Question One: What are the normal seasons throughout the year? On the calendar, draw or list the normal weather conditions that dominate each season (rainy, dry, windy, waves, etc.) and other natural or social events that happen during each season (fruiting, turtle nesting, fish migration, harvesting).

Draw what happens in each month on the calendar. They may want to use a symbol for each type of event, like a picture of rain for the rainy season. Be sure to make a legend. Be sure to include all major climate/weather events and other seasonal events such as fruiting, turtle nesting, fish migration etc.

Question Two: What changes have you noticed in the seasons? List any changes that they are observing next to the calendar on the Flipchart paper.

Question Three: How might these changes impact things such as food, livelihoods, and health? Write these on the flipchart.

Question Four: What changes are of most concern and why? For example, the dry season lasts longer, or mango season is shorter which is a concern because it is a key crop for the community. Also note how long these changes have been noticed. Write these answers below the calendar.

5. Have each group present back their Seasonal Calendars and discuss if the groups agree or if there are any differences. Try to resolve any differences and prepare one calendar as the final Season Calendar for the community. Save this as we will use this later in the planning process.

Session Eleven: What Future Changes In Climate And Associated Impacts Are We Most Concerned About In Our Community?

FACILITATOR INSTRUCTIONS

Exercise - with core planning team and the community

This exercise will help the community consider how future climate change scenarios may impact the communities natural resource and social targets.

1. Review the known projections for your area.
2. Break into four groups (below) and review the local projections for that climate hazard:
 - a. Air temperature
 - b. Sea level rise
 - c. Sea surface temperature, and
 - d. Change in storms/precipitation patterns
3. Using flip chart paper, have each group identify the likely impacts to natural and social resources from projected changes in climate. List all the impacts on flipchart paper. Discuss which climate hazards and impacts might become worse or better with future climate projections. Don't forget to discuss potential positive impacts. For example, more rain events may provide an opportunity for community members to collect more drinking water from rain catchments but also may create more sedimentation onto the reef and damage fisheries.
4. After each group is complete, have each group report back to the larger group on the impacts they identified.
5. After all groups have reported back, ask each person to review the various impacts listed on all flipchart pages and pick 2-3 impacts to the community they are most concerned about. They can use a marker to check the impacts.
6. When everyone is finished prioritizing the impacts of concern, the facilitation team will need to see which impacts are of highest priority to the group. The facilitator should list the impacts of highest concern back to the group and ask them to confirm those priorities. This list will inform the vulnerability assessment process.

Sub-Step 2.2 Telling Your Climate Story

This section will draw from information you've collected in the previous sub-steps to develop a climate story that reviews the history of climate events in the community and future climate scenarios to try to get an understanding of:

- What climate events have happened in the past?
- How climate events and seasons are changing in the community?
- What resources have been impacted by climate events?
- What is likely to happen in the future?
- What climate events are of most concern to community members?

Session Twelve: Writing Your Climate Story

FACILITATOR INSTRUCTIONS

Exercise - *with the planning team only*

This exercise will guide your planning team in writing a short description about the climate hazards the community has experienced in the past, changes to season the community is noticing in the present, and future climate impacts they are most concerned about and why.

To complete the Climate Story, hang the following on the wall so everyone can see:

- Historical Timeline and the Seasonal Calendar created during the Outreach session (include flipcharts with written information)
 - The Community Map (if you have one)
 - Information on projected changes in climate for the region or area.
1. Review the Historical Timeline, Season Calendar, and Future Predictions to refresh the planning teams memory as to the climate history in your area, changes that have been observed in the seasons, and likely changes in the future. Be sure to note the impacts to natural and social resources of these past, current, and future events.
 2. The Planning Team should write the Community Climate Story in the box below. Include three paragraphs on the following:
 - PAST: Write a paragraph summarizing the communities' normal seasons, and climate events and impacts your community is most concerned about based on historical experience. Also include how your community coped with the impacts of these events in the past and if that was successful.
 - PRESENT: Write a paragraph summarizing changes the community is noticing to normal weather and season patterns. Note how these change are impacting important natural resource and socio-economic factors.
 - FUTURE: Based on the future predictions, write a paragraph summarizing the climate related hazards and impacts the community is most concerned about.

Local Climate Story:

Past:

Present:

Future:

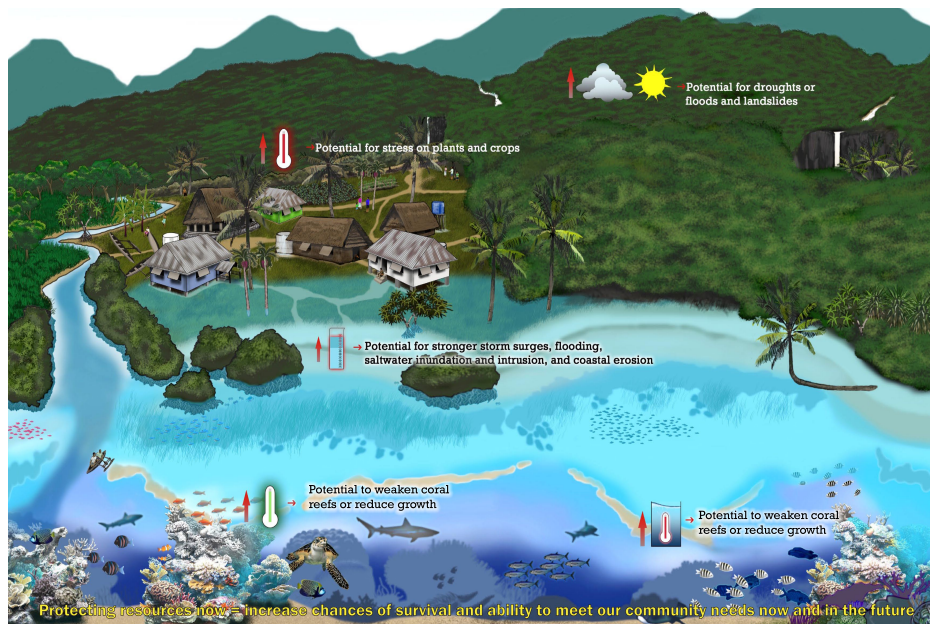
**Upon completing the information above, add Community Climate Story
into the LEAP Template.**

Sub-Step 2.3 Understanding What Communities Can Do To Reduce Local Threats and Impacts of Climate Change

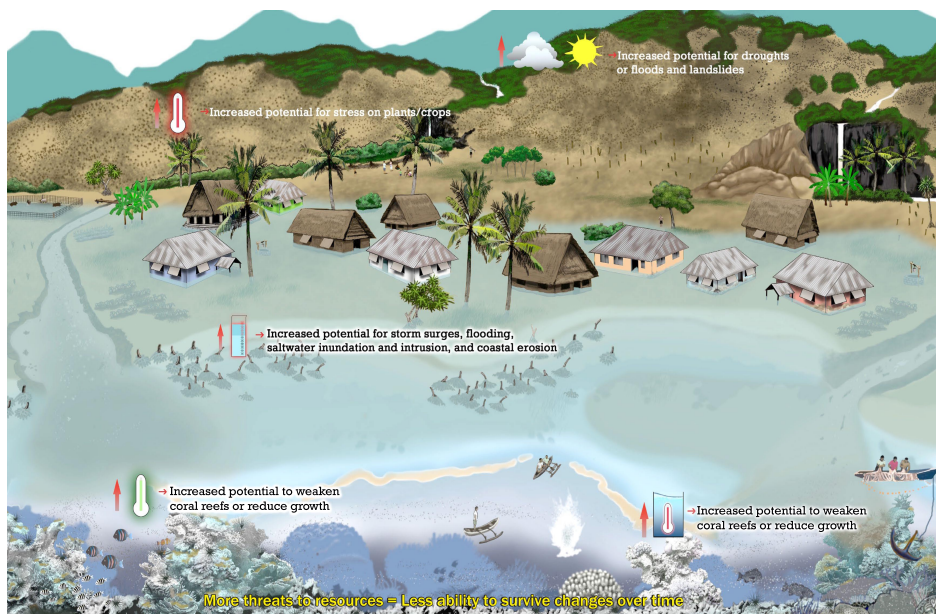
Session Thirteen: How Will Climate Change Impact A Healthy Community And An Unhealthy Community?

NOTE: Prior to showing the flipcharts below read the facilitator instructions and complete the exercises with the community.

FLIPCHART #8 – How Will These Changes Impact A Healthy Community?



FLIPCHART #9 – How Will These Changes Impact An Unhealthy Community?



KEY MESSAGES

- Both communities with healthy and unhealthy resources will be impacted by these changes.
- For example, as air temperature rises plants may become stressed in both communities. As sea temperatures rise, both communities may experience coral bleaching. As sea levels rise and if storms become more severe, both communities will experience storm surge.
- However, the community with healthier resources will be able to either withstand or recover from these impacts more successfully. This is called **RESILIENCE**. For example, plants in the healthy community may recover from heat stress while plants in the unhealthy community may die, more corals in the healthy community may survive coral bleaching where as the unhealthy community has weakened coral and less coral survival, and storm surges will cause more flooding and erosion in the unhealthy community due to lack of coastal vegetation to buffer the surge. The unhealthy community is more **VULNERABLE** to the impacts of climate change because the social and natural resources are already weakened.
- Having healthy resources does not guarantee that these resources will survive the impacts of climate change; however, it provides a much higher chance that the resources can withstand or recover from impacts thus helping to protect and provide benefits to the community in the long-term.

FACILITATOR INSTRUCTIONS

Exercise - with core planning team and the community

The objective of this exercise is that participants understand how climate change will have different levels of impact on communities with healthy resources versus communities with unhealthy resources by using every day examples such as people with the flu.

1. Divide the participants into two groups:

Group One: A group of healthy people. They eat healthy food, get plenty of rest, are very organized and up to date with their work, and are physically active daily.

Group Two: A group of unhealthy people. They don't eat well, they don't rest enough, they have too much to do and are stressed at work, and they rarely do physical activity.

2. Prepare a Flipchart page with two columns. Group One (Healthy) and Group Two (Unhealthy). Ask the following questions:
 - a. If both groups are exposed to the flu, what are the likely impacts for Group One as compared to Group Two?
 - b. Why is there a difference in how the flu impacts these two groups?
3. Provide the participants time to answer and record their answers on the Flipchart. Ask them to present back. Make sure they cover at least the following points and review the overall answers with the participants.

Group One (Healthy)	Group Two (Unhealthy)
1. Less likely to get the flu but can still get the flu	1. More likely to get the flu because their immune system is weaker
2. If they get the flu they are likely to recover more quickly because they have a stronger immune system	2. They are more likely to recover slowly because their immune system is already weak

4. Explain that the healthy person is more RESILIENT to the flu and the unhealthy person is more VULNERABLE.
5. Once the participants have discussed the example using the Flu, tell them we will now go through the same type of exercise using examples from the communities with Healthy Resources and Unhealthy Resources.

Exercise - with core planning team and the community

The objective of this exercise is for participants to share their perceptions of what a community with healthy resources looks like versus one with unhealthy resources. Communities with healthy resources will be better able to cope with climate change impacts.

1. Place the Flipchart #1A or #1C with healthy resources side by side with the Flipchart #1B or #1D with unhealthy resources, where the participants can see them both.
2. Divide into five small groups. Each group should look at both the healthy and unhealthy communities and each group should answer ONE of the following questions:

	Question	Community with healthy resources?	Community with unhealthy resources?
Group 1.	If the air temperature increases, how will it impact the:		
Group 2.	If the sea water temperature increases, how will it impact the:		
Group 3.	If the Sea level rise how will it impact the:		
Group 4.	How will Increased storms impact the:		
Group 5.	How will increased drought impact the:		

3. Ask each group to share their answers and discuss all together using flipcharts #8 & #9 to point out their answers. Be sure to cover the all key messages.

FLIPCHART #10 – What Can Communities Do To Make A Difference?

Key Messages

There are lots of things that a community can do to improve the health of their natural and social resources and reduce the impacts of Climate Change. These communities are taking action:

1. **Namdrik Atoll, Marshall Islands:** Threats the community is experiencing are accelerated rates of coastal erosion, severe droughts in the past ten years that threaten drinking water supplies, and decline in fisheries. Actions the community is taking are: 1) completed a “vulnerability assessment” and “management and adaptation planning” process, 2) Planted vegetation around coastline to stabilize the shoreline, 3) Installed household water tanks to catch rainwater for consumption and 4) Establishing marine protected areas to protect important food fish and other marine life that are important to them.
2. **Ngarchelong Community, Palau:** Threats the community is experiencing are mass bleaching of coral reefs occurred in ‘97/98, concerns that high water temperatures and bleaching coral could lead to the large-scale death of coral reefs and have a negative impact on the fisheries, tourism, and local way of life. Actions the community is taking include working with State government, local conservation groups, and scientists to establish a marine managed area that is designed to support the resilience of the coral reef and fisheries over time. The community planning team is considering climate change in the design and planning of the MMA, recommending additional levels of protection to areas that have shown resilience and/or recovery to past bleaching events, as well as important fish spawning aggregations.
3. **Tegua Community, Vanuatu:** The community of Tegua was located very close to the high-water mark on a low-lying atoll. The community had to stay in the same area as they shared one water tank and relied on freshwater springs at low tides despite the fact that these sources did not supply sufficient water for consumption and bathing. Threats the community experienced include regular inundation from tidal surges, increased erosion of the islands, flooding that created health problems from mosquitoes and water-borne diseases, and water scarcity because they had only one water tank and depended on freshwater springs at low tide for drinking and bathing water. Actions the community is took; the community relocated to higher ground and rebuilt homes. The community is confident in their decision to relocate to higher grounds and have no regrets. They no longer experience any of the flooding or water shortages like they did in the old location. They also installed several water tanks in the community, which resulted in an increase in the freshwater supply per family and health benefits from the ability to bath regularly in fresh water.

FACILITATOR INSTRUCTIONS

1. Referring to the photos in Flipchart 10 and the key messages, point out the types of impacts from Climate Change that communities will potentially experience and changes communities are already noticing

FLIPCHART#I I: Undertaking A Threat And Vulnerability Assessment And Developing A Local Early Action Plan To Reduce Climate Change Impacts

Take Action: Community Vulnerability Assessment, Local Early Action Planning and Implementation



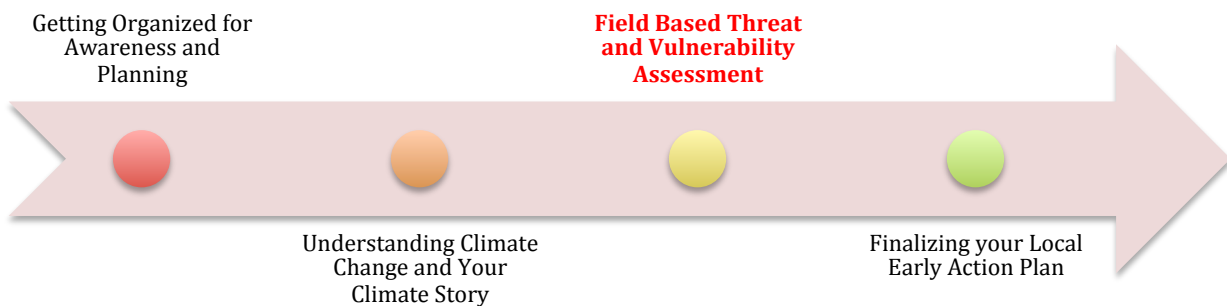
KEY MESSAGES

1. This flipchart shows a community that has degraded its natural and social resources but wanted to reduce their vulnerability to climate change and improve their overall resilience.
2. As a result they undertook a Vulnerability Assessment (VA), which helped them to figure out which resources are the most vulnerable to climate change impacts and why they are vulnerable.
3. They have determined that a large number of their natural and social resources are in poor condition and are therefore more vulnerable to climate change than if they were healthy. This includes: degraded reefs and fish populations from overfishing, destructive fishing methods such as dynamite, and dredging for lime and building materials, cleared forests and coastal vegetation such as mangroves, poor water quality from piggeries being too close to the ocean and sedimentation, and limited sources of fresh water. The community is also vulnerable to climate change impacts because their houses are more exposed to coastal storms without healthy coastal vegetation and reefs to protect the shoreline. Additionally, they are vulnerable because they are highly dependent on fisheries as their main source of food and income with few alternatives. So if these resources are lost due to climate change they will not have a good source of protein.
4. Next they developed a Local Early Action Plan (LEAP) to identify actions that they can do to reduce their vulnerability and make their community and its resources healthier and more resilient to withstand existing and future impacts of climate change.
5. Key actions this community is pursuing include: prohibiting the use of destructive fishing methods, prohibiting the harvesting and dredging of corals, replanting forests and coastal vegetation, moving their piggeries and crops away from the coast, building water catchments, establishing a fish replenishment zone to enable fish to grow large and reproduce, getting the community organized by forming a community action group to undertake these actions and prepare for changes, and working with nearby communities to share information and resources.
6. Most of these actions are just good practices that reduce both direct threats from human activities and reduce the community's vulnerability to climate change by strengthening the health of their natural and social resources.

FACILITATOR INSTRUCTIONS

1. Review the key messages as summarized above and point out the specific actions that this community is taking to help reduce their vulnerability and increase their resilience by improving the health of their natural and social resources.
2. Be sure to tell the participants that by improving the health of their natural and social resources, the community is reducing their vulnerability to climate change impacts and building their overall resilience to climate change and other threats.
3. Ask the participants if they can think of any other actions that may be appropriate for their community, based on the examples provided and the list they have already brainstormed.

Step Three: Carrying Out A Field Based Threat And Vulnerability Assessment



Now that you have developed your climate story, it's time to use that information to help carry out a threat and vulnerability assessment for your social and natural resource targets. To complete the vulnerability assessment your group will go through four sub-steps:

- 3.1 *Understanding Factors that Contribute to Vulnerability* - this sub-step can be done with the planning team only and with members of the community, if appropriate. This session describes key terms used to understand and describe vulnerability to climate change and other threats and demonstrates their relationship to one another. Understanding these terms are needed to complete the vulnerability assessment. Terms include exposure, sensitivity, potential impact, adaptive capacity, vulnerability, and resilience.
- 3.2 *Developing a Community Profile* – this sub-step will help the community collect background information about the community that can help to assist with completing the vulnerability assessment. After completing this sub-step information can be directly added to the LEAP template.
- 3.3 *Field-based threat and vulnerability assessment* – this sub-step provides the community with an engaging way to undertake a simple assessment of vulnerability for their key resources. This assessment will not be based on scientific data but more on the community's knowledge and experience, and known climate predictions for the future. We have purposely kept this process fast and simple so the planning process will not take too long and we can quickly move from planning to action.

3.4 *Developing a Vulnerability and Threat Action Model*- this sub-step is aimed at a developing a visual way for the community to view the information collected in the field based threat and vulnerability assessment. It will also help people see how different threats, vulnerabilities, and their root causes are connected. This sub-step will also help the community to identify and decide on actions to take to address root causes of threats and vulnerability by looking at the short, medium, and long-term results expected from those actions.

NOTE: This is a good time to invite technical experts to join the process. There may be specific resources of concern that could utilize expert opinion to help understand changes over time, potential future impacts, as well as determining effective actions.

Sub-Step 3.1 Understanding Factors that Contribute to Vulnerability

Session Fifteen – Reviewing Factors that Contribute to Vulnerability

FACILITATOR INSTRUCTIONS

Exercise - with core planning team and/or the community (if appropriate)

The objective of this exercise is for the planning team and/or community members to understand key terms used to understand and describe vulnerability to climate change and other threats and demonstrates their relationship to one another. These terms are critical for the planning team to understand well as they will be used throughout the vulnerability assessment. It is less important for the community members to understand these terms but at a minimum the following exercise should be carried out with the planning team to ensure everyone is comfortable with the terms prior to completing the vulnerability assessment.

1. Review the following the vulnerability model on a piece of flipchart paper, explaining each term's definition in the model and how they interact together, as well as the term resilience.

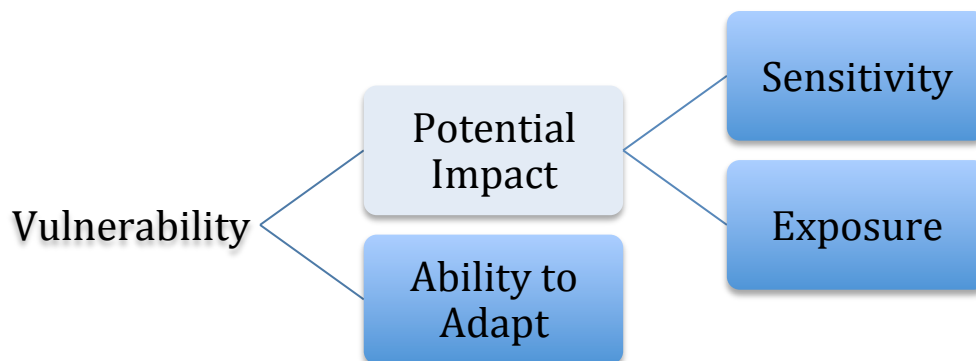


Figure 1. Vulnerability as a function of Sensitivity, Exposure and Adaptive Capacity (Marshall et. al., 2009)

Vulnerability: is the degree to which a resource or community is susceptible to, or unable to cope with, adverse effects of climate change. Vulnerability is a function of exposure, sensitivity to climate impacts and related adaptive capacity.

Exposure: the extent to which a resource comes into contact with climate hazards or specific climate impacts.

Sensitivity: the degree to which a resource or community is negatively affected by changes in climate conditions (e.g. temperature and precipitation) or specific climate change impacts (e.g. sea level rise, increased water temperature).

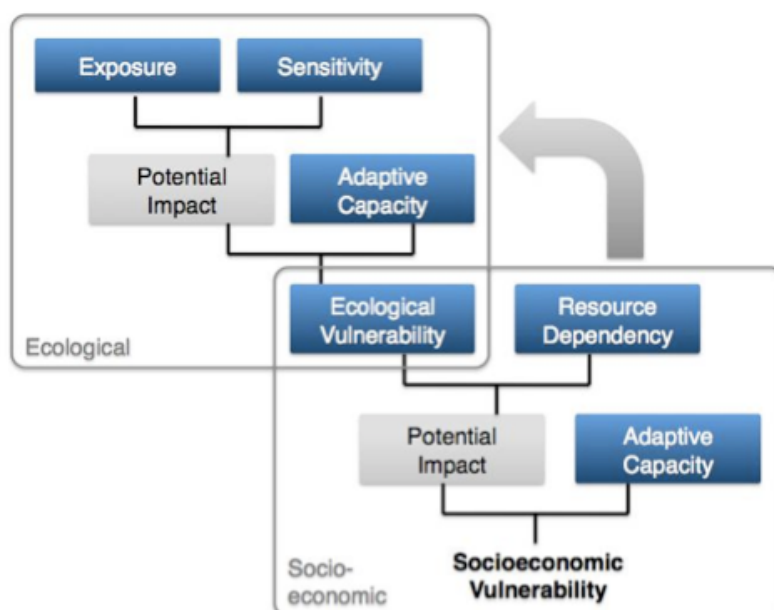
Potential Impact: Exposure and Sensitivity combined will tell you how big the potential impact might be or to what degree the community could experience negative impacts from climate change. The greater the exposure and/or sensitivity the greater the potential impact may be.

Adaptive capacity: potential, capability, or ability of a resource or community to adapt to impacts of climate change and variability with minimal potential damage or cost.

Resilience: ecological and social capacity to cope with, adjust to and recover from external stresses and disturbances. It is the flip side of vulnerability. Therefore, if you increase resilience of a community or resources, you will decrease their vulnerability.

Community/Social Vulnerability: is the degree to which a community is susceptible to, or unable to cope with, adverse effects of climate change on the target being assessed.

2. Next, review the model below of community vulnerability or social vulnerability. The level in which the *community* will be vulnerable is based on the vulnerability of the natural resource or social target, how dependent your community is to using that target, and the community's ability to adapt with changes in that target.



The co-dependency of ecological and social systems means that their vulnerabilities cannot be reliably evaluated without reference to the other. (Marshall et. al, 2009)

3. After reviewing the terms, go back to the illustrations of the healthy and unhealthy communities (Flipcharts # 1A, 1B, 1C, 1D) and discuss them using these new terms. Be sure to review the following:

Unhealthy Community:

- Resources in the unhealthy community are exposed to impacts of climate change such as rising sea surface temperature, sea level rise, and changes in weather patterns. This community is **MORE** exposed to some of these impacts. For example they are more exposed to sea level rise because there is no vegetation on the shoreline to protect it the homes and coastline. Also the land and soil in their community is more exposed to rainfall because the forest vegetation has been cleared exposing the land and increasing chances of landslides.
- Resources in the unhealthy community are sensitive to the impacts of climate change because they are already weak and unhealthy so the impacts from climate change will be more severe. For example, the coral reefs (habitat for important fish) have several existing threats including destructive fishing practices and overharvesting which make them weak so increased sea surface temperature can cause extreme bleaching events and possible coral death. This community is also highly dependent on their resources for food and livelihood with very few alternatives so they are more sensitive to negative changes in their resources.
- Natural resources often have very little natural ability to adapt to the impacts or changes in climate. The unhealthy community has a lower ability to adapt because they do not have access to resources to be able to adapt to these changes and reduce their dependence on the resources. They are also not aware of the likely impacts and are not working together to prepare for the changes.
- Because of the high exposure and sensitivity, and low adaptive capacity the unhealthy communities natural resources and community are more vulnerable to the impacts of climate change.

Healthy Community:

- Resources in the healthy community are also exposed to impacts of climate change such as rising sea surface temperature, sea level rise, and changes in weather patterns. However, the healthy community is less exposed to some of these impacts. For example they are less exposed to sea level rise because there is vegetation on the shoreline to protect them from things like sea level rise and coastal storms. They also have healthy vegetation and forests, which reduce the exposure of the land to increased rainfall events. As such, they are less likely to have landslides.
- Natural resources in the healthy community are less sensitive to the impacts of climate change because they are healthy and strong so the impacts from climate change will be less severe. For example, the coral reefs are healthy and fisheries are abundant. These corals will have a better chance of withstanding or recovering from coral bleaching from increased sea surface temperature. This community is also less dependent on resources for food and livelihood because they have many sources of income and food so they are less sensitive to changes the resources.
- Natural resources in this community also have very little ability to naturally adapt to the impacts or changes in climate. The mangroves may be able to keep up with sea level rise however because there are no buildings right behind them so they may be able to move inland. The healthy community itself has a higher ability to adapt because they have access to resources such as information and technical assistance to help them adapt to these changes and reduce their dependence on the resources. They are working together to plan for the changes.
- Because of the lower exposure and sensitivity, and higher adaptive capacity the healthy communities natural and social resources are less vulnerable to the impacts of climate change. They are more resilient.

Sub-Step 3.2 Developing Your Community Profile

The community profile describes the social situation in the community and the resources and that are important to community members both written and visually. The community profile is developed through the following Sessions:

- Session Sixteen: Collecting Background Information on Your Community
- Session Seventeen: Prioritizing Natural and Social Resources
- Session Eighteen: Mapping Your Community

You can develop your Community Profile in any of the following ways:

1. A large group meeting for all of the activities. This will take the longest but ensures the greatest amount of participation
2. Small groups work different activities and then present back to the entire group. This will be the fastest method.
3. You do some activities by small groups and some as a large group.

If you do any sessions by small group, all information should be presented back to the entire group for them to have a chance to provide input.

Session Sixteen: Collecting Background Information About Your Community

FACILITATOR INSTRUCTIONS

Exercise - with core planning team and the community (if appropriate)

The objective of this exercise is to collect important background information about the community that can provide a better understanding of vulnerability to climate change and other threats. This information will also be used in the LEAP Template to share basic demographic information about the community as an introduction to the LEAP.

1. Facilitate the participants to answer the following questions about their community. You can capture their answers on flipchart papers for the group to see. After all the questions have been answered the Planning Team should write a short summary covering all the answers provided above and include it in the LEAP template

Community Background Questions	Answer
Where is your community located?	
About how many people live in your community?	
What are the major occupations (income generating and subsistence activities) of community members?	
What are the main stakeholder groups in your community?	
How are decisions made in your community? Who has authority?	
What social groups are currently active and what purpose do they serve?	

What are the main strengths of your community?	
What aspects of resource management and quality of life are working well?	
Please explain 1-3 major resource management threats or problems your community is facing. Provide details.	
Please explain 1-3 social threats or problems your community is facing. Provide details.	
Are there any community improvement initiatives underway or planned? (e.g., development, capacity, transportation)	

Community Background Summary:

Transfer the Community Background Summary Statement to the LEAP Template

Session Seventeen: Prioritizing Natural Resource and Social Targets

FACILITATOR INSTRUCTIONS

Exercise - with core *planning team and the community*

This exercise guides the planning team and community members in deciding which natural resource and social targets they are most concerned about being negatively impacted by climate change. They will use these targets to complete the threat and vulnerability assessment.

1. Draw the following table on a piece of flipchart paper:

Natural Resource Targets & Associated Social Targets	Priority Ranking (1,2,3,4, ...) and Why	Current Condition and Why
1. Coral reef ecosystems including reef fisheries		Coral Reefs: Fish: Invertebrates:
2. Shoreline ecosystems (including mangroves/ wetlands) and coastal infrastructure		Beach: Mangrove/Wetland: Infrastructure:
3. Water resources and community health		Wells: Catchments:
4. Agriculture, food security, and livelihoods		Specific Crops:
5. Other (?)		

2. Begin the session by reviewing the Community Climate Story developed in **Session Sixteen**. Specifically, review the priority concerns identified in the climate story to identify the target resources they have biggest concern about for climate change. Based on the climate story, review the natural resource targets and associated social targets that are listed in the table above and rank them in order of priority of importance. Explain that the priorities will be used to complete a threat and vulnerability assessment and develop actions to reduce impacts to these natural and social resources. If there is a specific target not captured in the list above, add it to the list.

Continue to fill in the table and write out the current condition of these resources. It is best to try and complete vulnerability assessments for all the resources listed in the table unless they are truly not important or relevant to the community.

Transfer this information into the LEAP template

Session Eighteen: Mapping Your Community

FACILITATOR INSTRUCTIONS

Exercise

This exercise is aimed at developing a visual tool that the community can use to discuss natural resource and social targets and the existing and potential threats they are facing. It will be used throughout the threat and vulnerability assessment to support discussions and decision-making.

If you already have a resource map for your community, there is no need to create a new one. Just review the existing map with the participants and make sure you have it available for the entire planning process. If you don't have a resource map, you should prepare one on large sheets of flip chart paper. Then, with your community, answer the questions below and use the answers to draw features on your map. Be sure to create a legend so the definitions of any symbols are clear. Additional written information collected can be captured on flipchart paper.

1. Identify and mark the key habitats and species on the map. Include terrestrial, aquatic, and marine habitats and species (e.g. mangroves, coral reefs, forests, grouper, etc).
2. Write the condition of each key habitat on the map (e.g. good reef areas, damaged reef, healthy streams, polluted streams, etc).
3. Identify and mark the areas that are important for key species on the map (e.g. turtle nesting beaches, dugong feeding areas, bird nesting, spawning aggregations).
4. Identify and mark the important social and cultural features on the map, such as fishing shrines, houses, fishponds, churches, etc.
5. Draw the roads, bridges, buildings, schools, hospitals/clinics, churches, evacuation routes, water reservoirs or tanks, on the map.
6. Mark where the key social and economic activities are carried out, on the map. Include things such as farming (including type), fishing (including type), harvesting, boating, diving, snorkeling, etc.
7. Note how has land use and/or development changed over time.
8. Mark how past climate events and hazards (for example, storm-related flooding, bleaching) impacted specific areas. Note if certain areas been more impacted than others by past climate events.
9. Include any other features that are important to your community



When you complete the final map, you can attach the Community Map as an Appendix to the LEAP Template.

Keep the Community Map available as we will use it and update it throughout other Sessions. If possible, take digital pictures of your map

Sub-Step 3.3 Threat and Vulnerability Assessment

BACKGROUND INFORMATION FOR FACILITATORS

This Sub-Step provides background information and guidance for community facilitators on how to understand the key components of vulnerability for four target areas of a community:

1. Coral reef ecosystems including reef fisheries (Session 19)
2. Shoreline ecosystems (including mangroves) and coastal infrastructure (Session 20)
3. Water resources and community health (Session 21)
4. Agriculture, food security, and livelihoods (Session 22)

Facilitator information in this sub-step is intended for facilitators of community processes as a quick reference for understanding vulnerability of these targets for the purpose of guiding discussions with communities. **Session worksheets** are also provided for each target and should be completed with community members/stakeholder groups.

Complete the vulnerability assessment worksheet for each target area that the community has identified as a target of concern through the climate story process. To do this, focus groups should be used. Focus groups involved selected individuals from the community (about 8-20) who represent a specific sector of the community. Each focus group should have a different stakeholder groups represented (i.e. men, women, youth, elders) as well as ensuring that there are representatives that have to most knowledge about the specific target (e.g. history and condition of the resource) being discussed. For example, someone who knows about how the area's mangroves have changed over time should be in the shoreline group. If you have more than 10 people involved, break up the group into two components and have one sub-group focus on the natural resource and the other focus on the social system.

The worksheets are meant to guide the discussion and ensure all the information needed to understand vulnerability is captured. However, focus groups are intended to be more like a discussion so the facilitator can probe for information and ask follow up questions to clarify answers or gain further input. Consider the process more of a discussion rather than a survey.

NOTE: This is a good time to invite technical experts to join the process. There may be specific resources of concern that could utilize expert opinion to help understand changes over time, potential future impacts, as well as determining effective actions.

Session Nineteen: Understanding Vulnerability of Coral Reef Ecosystems Including Reef Fisheries

FACILITATOR INFORMATION

The “coral reef ecosystem” includes mangroves, seagrass beds, coral reefs and associated fish, and invertebrates.

Climate Hazards of Concerns – Coral reef ecosystems are exposed to:

- Increased sea-surface temperatures,
- Increased storm intensity,
- Changes in sea level
- Ocean acidification, and
- Changes in Rainfall

Exposure - All Reef Ecosystems will be exposed to the climate hazards above. Reef areas near land will be impacted from rain events due to increased sediment and nutrient run-off.

Sensitivity - Reef ecosystems are naturally sensitive to slight changes to the environment, especially to sea temperature and ocean acidity. However, a major factor affecting the sensitivity of a reef ecosystem is its current health. A degraded system experiencing severe human-related threats (i.e. sedimentation, pollution, destructive fishing, overfishing) will be much more sensitive than a healthy one that has few threats and is diverse.

Understanding the sensitivity (or condition and existing threats) of your reef is one of the key ways to understand how vulnerable it is to climate hazards.

Adaptive Capacity - The adaptive capacity of reef ecosystems is naturally fairly low. While reefs may be able to adapt to some changes, it will depend on how fast changes occur and how extreme the changes are. For example, reefs may be able to keep up with anticipated sea-level rise, however increases in sea-surface temperature and ocean acidification will be harder for them to cope with. Mangroves may be able to adapt to sea-level rise if nothing is blocking them from the ability to move inland and if they have access to sufficient sediment (to accrete vertically to keep pace with sea-level rise). Management of resources can also impact their ability to adapt. Strong and effective management that considers long-term climate scenarios and reef resilience principles will improve adaptive capacity. For example, protecting areas behind

mangroves to allow them to move inland, or designing rules and zones of marine managed areas based on reef resilience principles.

Vulnerability - Because of the high exposure to several climate hazards, moderate to high sensitivity, and generally low adaptive capacity of reefs - the vulnerability of all coral reef ecosystems is moderate to high. ***A key factor influencing the degree of coral reef ecosystem vulnerability is its sensitivity based on its current health, degree of existing threats, and current management. Taking actions that reduce sensitivity is critical to reducing vulnerability.***

Resilience – Some reefs have certain factors that help them to resist or recover from impacts from climate change and other threats. These reef ecosystems are considered more “resilient” and are important to protect, as they may be able to help nearby damaged areas recover over time by providing a secure source of larvae. Factors that indicate coral reef resilience include:

- areas that have bleached and recovered
- areas with healthy and diverse herbivore populations
- areas that have high biodiversity and structural complexity
- areas with strong coral recruitment with good connectivity to healthy source reefs areas with broad size-class distribution of corals (indicating a range of ages of corals)
- areas with good water quality
- areas with low human impacts (e.g., fishing pressure)
- areas that have good substrate availability for corals to settle
- areas with high coral cover

Identifying areas that have high resilience potential and using zones and rules to protect these areas of your reef is one of the key actions people can take to build resilience of reefs.

Community Vulnerability – The degree of social vulnerability to negative impacts on reefs is mainly based on 1) how dependent community members are on healthy coral reef ecosystems and to resources they provide and 2) what options are available for alternatives to these resources.

Dependence – Community members who are more dependent on reefs and fisheries for food and income will be more vulnerable than those who have options for earning income and/or non-reef related food.

Social Adaptive Capacity - The adaptive capacity of the community includes all of the information, knowledge, skills, and resources that your community can access to adapt to changes in the target resource. It depends upon a variety of social, political, economic, technological, and institutional factors (e.g., access to social capital, social networks, institutions and governance supporting adaptation). For example, if there are income or food generating opportunities available to the community that are not based on taking from reef systems, and they will not place major stress on social or environmental systems, then adaptive capacity would potentially be high (depending on other supporting factors such as political will, and resources to shift into new livelihood approaches).

Reviewing any past events that impacted reef ecosystems and fisheries and how community members dealt with these events (successfully or not) can help to assess dependence on coral reef resources and adaptive capacity. It is important to consider cultural, economic, and social values and needs when considering the alternatives to these resources. For example, imported foods may be available to replace food from a fishery which is negatively affected by climate change,. however, reliance on imported foods could create social problems (e.g. decreased health and/or increased stress in paying for these foods), thus not a viable long-term solution. Assessing adaption options should be explored through a generational approach. For example, the current generation may be able to rely more heavily on reef ecosystems, but in one or more generations, shifts should be made to alternative and/or supplemental approaches.

Actions to Reduce Reef Ecosystem Vulnerability	
<p><i>*Links to guidance on how to do this included at the end of this section.</i></p>	
Reduce Sensitivity/ Build Resilience:	Check Actions
<p>Raise awareness of community members to ensure that all stakeholders understand what the reef and fisheries need to remain healthy and abundant so they can continue to provide community benefits. It is advised that this be taken as a first step for any target resource. **</p>	
<p>Develop actions for effective management that reduces root causes of existing non-climate threats. For example an assessment could reveal root causes of over-fishing includes 1) lack of rules on taking certain undersized fish, and 2) lack of awareness of MPA boundaries. As such, actions that could be developed to reduce the threat of over-fishing could include developing size regulations and implementing MPA boundary markers.</p>	
<p>Design rules and zones for your marine resources to protect key areas of resilience and ensure target species are achieving what they need to have healthy, abundant, and resilient populations. Requires additional process to complete LMA zoning/rule process, MPA design process, or relative resilience assessment. Include actions like</p> <ul style="list-style-type: none"> • Eliminating destructive practices to protect habitats important for target species throughout their life cycle • Rules and zones to ensure target species can successfully reproduce (e.g. size limits) • Areas under protection that are large enough to support target species • Use of no-take zone 	
<p>Improve compliance and enforcement of existing rules and zones through more outreach, patrolling and surveillance of the area, collaborative enforcement with appropriate agencies, training and skills building of</p>	

conservation officers.	
Install near-shore pelagic fish aggregation devices.	
Develop small pond aquaculture (this is only recommended for areas with high populations that do not have healthy resources that can be sustainably managed)	
Use traditional management practices that support sustainable use of resources and minimize negative impacts	

Actions to Reduce Social Vulnerability/ Improve Community Resilience	
<i>Reduce Dependence/ Build Adaptive Capacity</i>	<i>Check Actions</i>
Raise awareness of community members to ensure that all stakeholders understand climate change risks and potential impacts to target resources and the community.	
Develop short-term (within 5 year) and long-term (for the next generation) actions toward supplemental livelihoods or food sources that are not dependent on target resource. This can include skills development for specific alternatives. For example, building skills of fishermen to guide eco-tours, or carry out aquaculture activities.	
Develop ways to reduce expenses for communities so that less income is required to live. Consider ways to reduce everyday expenses on food and energy that are more sustainable and self-reliant. Examples include local gardens, food preservation, and solar power.	

Develop actions that improve organization, planning, or social services in time of natural disaster.	

Additional Tools for Designing Management Actions that Support Reef Ecosystem Resilience

1. *Designing Effective Locally Managed Areas in Tropical Marine Environments: Guidance to Help Sustain Community Benefits through Management for Fisheries, Ecosystems, and Climate Change* -
[http://www.coraltriangleinitiative.org/sites/default/files/resources/9_Designing%20Effective%20Locally%20Managed%20Areas%20in%20Tropical%20Marine%20Environments_Facilitators%20Guide%20\(English\).pdf](http://www.coraltriangleinitiative.org/sites/default/files/resources/9_Designing%20Effective%20Locally%20Managed%20Areas%20in%20Tropical%20Marine%20Environments_Facilitators%20Guide%20(English).pdf)
2. The Reef Resilience Program is a partnership effort led by The Nature Conservancy that builds the capacity of reef managers and practitioners around the world to better address the local impacts on coral reefs from climate change and other stressors. Information includes:
 - a. Resilient MPA Design: <http://www.reefresilience.org/coral-reefs/resilient-mpa-design/>
 - b. Monitoring and Assessment for Reef Resilience: <http://www.reefresilience.org/coral-reefs/monitoring-and-assessment/assessing-and-monitoring-reef-resilience/>

Worksheet – Vulnerability and Threat Assessment for Coral Reef Ecosystems & Associated Reef Fisheries

FACILITATOR INSTRUCTIONS

(To be completed through facilitated discussion with community groups)

1. Explain that the following key points for understanding target coral reef ecosystem vulnerability:
 - The “coral reef ecosystem” includes mangroves, seagrass beds, coral reefs and associated fish, and invertebrates.
 - All reefs will be exposed to climate hazards, most importantly, increases in sea-surface temperature and ocean acidification. Coral reefs are sensitive to slight changes in temperature and acidity.
 - Healthy reef ecosystems have a much better chance of withstanding these changes.
 - Some reefs will be more able to withstand changes more than others. As such, carefully designed management (i.e., rules and zones) are important to build resilience of reef ecosystems.
2. Complete the following questions with community focus groups to identify key information to understanding vulnerability of the target resource and community. The questions are meant to guide the discussion and ensure all the information needed to understand vulnerability is captured. However, focus groups are intended to be more like a discussion so the facilitator can probe for information and ask follow up questions to clarify answers or gain further input. Consider the process more of a discussion rather than a survey.

Vulnerability of Coral Reefs And Associated Reef Fisheries

The main factor that will influence the degree of vulnerability (or how they will be impacted by climate change) is the current health, severity of non-climate threats, and level of management.

(E = Exposure, S = Sensitivity, NAC = Natural Adaptive Capacity)

<p>(S) How has the resource changed over time? Consider reefs, seagrass beds, mangroves, and fisheries.</p>	<p>Decline / Same/ Improved</p> <p>Describe the reason for your ranking:</p>
<p>(S) What is the current condition of the coral reef ecosystem? Consider reefs, seagrass beds, mangroves, and fisheries.</p>	<p>Poor/ Fair / Good / Excellent</p> <p>Describe the reason for your ranking:</p>
<p>(S) What non-climate change threats are severely impacting your targets? List root causes of threats. Root causes can be determined by identifying</p>	<p>Identify Threats</p>

<p>threats and asking “why is this happening”. Keep asking this question until you reach an answer that cannot be further answered.</p>	<p>Which threats are the most severe?</p> <p>Identify Root Causes of Threats</p> <p>Example: Sedimentation due to → poor land use practices due to → lack of land use regulations due to → lack of political will due to → lack of informed policy makers on environmental issues</p>
<p>(NAC) How effective is current management?</p> <p>Consider traditional practices, policy, awareness, compliance, enforcement or other actions being taken.</p>	<p>Poor/ Fair / Good / Excellent</p> <p>Describe what’s working and what isn’t:</p>
<p>(NAC) Are the rules and zones designed to build resilience of the reef ecosystems?</p>	<p>Yes/No</p>
<p>The following rankings provide general guidance about how to determine vulnerability ranking.</p>	

Low:

- The reef ecosystem is in good to excellent condition (health)
- There are few threats
- Management actions are being implemented and are effective at reducing root causes of severe threats
- Zones and rules are designed to improve resilience
- Local stakeholders (e.g., community members, government officials) are very engaged in management efforts and/or Political will is high to manage natural resources

Moderate:

- The reef ecosystem is in fair condition
- There are some severe threats.
- Management actions are reducing some root causes of severe threats
- Zones and rules are not designed to improve resilience
- Some engagement of local stakeholders (e.g., community members, government officials) in management efforts and/or Political will is moderate to manage natural resources

High:

- The reef ecosystem is in poor condition
- There are several severe threats
- Management actions are not being implemented to reduce root causes of severe threats
- Zones and rules are not designed to improve resilience
- Local stakeholders (e.g., community members, government officials) are not engaged in management efforts and/or Political will is low to manage natural resources

If you have moderate or high vulnerability it's necessary to take actions to reduce vulnerability.

Vulnerability of the Community

Social vulnerability will depend on how much of the community is dependent on a healthy resource and what alternatives are available to them if that resource is negatively impacted.

(D = Dependence, SAC = Social Adaptive Capacity)

(D) What percentage of the community is dependent on reefs as a main source of income?	
(D) What percentage of the community is dependent on reefs as a main source of food?	
(SAC) What options are available for those dependent on the resource for food or income if it was negatively impacted from increased climate hazards?	<p>Alternative income/food options available:</p> <p>*consider past events and how people coped with negative impacts – were they successful/sustainable?</p>
(SAC) Does the community have the knowledge and skills to develop alternatives either now or in the future?	Describe (consider information and skills e.g., access to seasonal forecasts and other climate information; climate change awareness trainings):
(SAC) Does the community have access to resources, and/or support to develop alternatives either now or in the future?	Describe (consider partnerships, funding, social networks):

<p>(SAC) What are the main expenses for families?</p> <p>Are their options available to reduce household expenses so less income is needed? (i.e. growing food, renewable energy, etc)</p>	<p>Expenses:</p> <p>1. _____</p> <p>2. _____</p> <p>3. _____</p> <p>4. _____</p> <p>Options for reducing expenses:</p>
<p>The following rankings provide general guidance about how to determine vulnerability ranking.</p> <p>Low:</p> <ul style="list-style-type: none"> • Low dependence (less than 25%) • Alternative income/food options available and sustainable • High ability to access alternatives through existing skills and resources <p>Moderate:</p> <ul style="list-style-type: none"> • Moderate dependence (26- 50%). • Some alternative income/food options available • Moderate ability to access them with existing skills and resources. <p>High:</p> <ul style="list-style-type: none"> • High dependence (more than 50%) • No to few alternative income/food options available • Low ability to access them with existing skills and resources. <p>If you have moderate or high vulnerability it's necessary to take management actions to reduce vulnerability. Even if dependence is low, actions should be taken to address those who are dependent and don't have options or alternatives.</p>	

3. Review the outreach section on actions that can help reduce vulnerability of the reef ecosystems and associated fisheries
4. Review your answers above with community groups to develop an initial list of actions that could be taken to reduce vulnerability of the target resource and community. To reduce vulnerability of reefs consider ways reduce the root causes of non-climate threats, and building resilience through site rules and zones. To reduce social vulnerability, consider ways to reduce dependence, reduce expenses, or improve adaptive capacity (knowledge, skills, resources, etc)

Session Twenty: Understanding Vulnerability of Shoreline Ecosystems (Including Mangroves) & Associated Coastal Infrastructure

FACILITATOR INFORMATION

The shoreline is the area of land that directly interacts with the sea and is dynamic (changes over time). It includes the beach area, which extends from or below the low-tide mark to where the biggest waves run up, including wave overwash from periodic large storms. Generally, there are three types of shorelines found in the tropics: beaches (made of sand, gravel or rubble), mangrove shores, and rocky shores. The type of shoreline will influence how quickly it changes shape over time. Natural defenses (e.g. coral reefs, seagrasses, beaches, mangroves, wetlands, and upland forests) are components of a healthy coastal ecosystem that in combination can slow the rate of shoreline change and limit the amount of coastal flooding, as well as provide other socioeconomic benefits to communities (e.g. food, income).

Climate Hazards of Concerns - Shorelines will be exposed to:

- Sea-Level Rise
- Increased Storm Intensity
- Changes in rainfall patterns including less rainfall and increased intensity during rain events

Exposure – All low-lying shorelines will be exposed to these climate hazards.

However, in areas where there is a lot of seismic activity (i.e. earthquakes) the land can rapidly move up or down after an earthquake. This activity can quickly change how much of a coastal area is exposed to sea level rise. Land that is lifted will be less exposed and land that has sunk will be more exposed to higher sea levels.

Sensitivity – There are a series of natural defenses that protect shorelines and associated buildings from wave energy and/or add sediment to shorelines. These include reefs, seagrass beds, mangroves, beaches, swamps, rivers/streams, forests. The main factors that influence the sensitivity of a shoreline is 1) the type of shoreline (e.g. rocky, mangrove, sandy beach) and 2) the current health of the natural defenses. If any of the natural defenses is degraded and/or altered by human actions, they will cause the shoreline to be more sensitive. ***Understanding the condition and existing threats of the natural defenses is one of the key ways to***

understand how vulnerable your shoreline will be to climate hazards and actions you can take to reduce vulnerability.

Shoreline Adaptive Capacity - The adaptive capacity of many low-lying shorelines is generally low. However, mangroves are more adaptable than sandy beaches and may be able to cope with sea-level rise if nothing is blocking them from the ability to move inland and they have access to sufficient sediment to vertically accrete to compensate for sea-level rise. Management of resources can also impact their ability to adapt. Strong and effective management that considers long-term climate scenarios and resilience principles will improve adaptive capacity. For example, protecting areas behind mangroves to allow them to move inland, or designing rules and zones of marine managed areas based on reef resilience principles.

Shoreline Vulnerability - The main factors that influence the degree of vulnerability are: 1) its exposure (based on the height and slope of the shoreline) and 2) the sensitivity (based on the type of shoreline and condition of natural defenses), and 3) management effectiveness at reducing existing non-climate threats to natural defenses.

Resilience – Protecting and Enhancing Natural Defenses provides the best protection from coastal flooding and erosion. Actions that protect and enhance natural defenses are optimal and can provide long-term benefits to the community through coastline protection as well as benefits derived from these habitats, such as fisheries and other marine resources. Many of these can be implemented with relatively small costs and little-to-no drawbacks. These actions are recommended by coastal scientists as the highest priority for actions to be taken by communities.

Community Vulnerability - Social vulnerability will be determined by how much of the community is living within the active shoreline, how much critical infrastructure is placed within the active shoreline, and what alternatives are available to relocate families and infrastructure now and into the future.

Dependence: Buildings and/or infrastructure located near active shoreline areas and that are low-lying are more dependent on shorelines and natural defenses being healthy. If these areas are already experiencing flooding and/or erosion, they will experience more in the future with climate change. It's important to identify which buildings and infrastructure are currently affected by climate impacts and hazards now and will in the future as they intensify.

Social Adaptive Capacity - The adaptive capacity of the community includes all of the information, knowledge, skills, and resources that your community can access to adapt to changes in the target resource. For example, if there will be more flooding of many homes or access roads in the future due to increased sea level and storm surges, the community may know that this change is coming and work with local leaders to develop building plans that require new homes to be farther from the shoreline, raised on stilts, address land tenure issues to allow people in highly vulnerable locations to re-locate to higher ground, and re-locate access roads.

Raising awareness and establishing community agreements or development rules that consider where and how to build are effective ways to build resilience to existing and future coastal hazards such as flooding and loss of land. These ensure that development that occurs now will be less vulnerable to coastal hazards and sea-level rise over the long term (over the next two to four generations). In some cases a managed retreat plan should be developed to relocate families or infrastructure that are located in harms way. This issue can be considered over a generational approach. The current generation may be able to continue to live and use the shoreline but plans for future generations would be made to use safer areas. These actions are recommended by coastal scientists as a high priority for actions to be taken by communities.

There are situations when hard defenses are necessary and have to be put in place to protect critical infrastructure that cannot be move elsewhere (e.g. a road that cannot be moved inland due to steep land). Coastal scientists only recommend hard defenses as the last option, and usually only for critical infrastructure that cannot be moved.

Action to Reduce Shoreline Ecosystem Vulnerability	
<i>Reduce Sensitivity/ Build Resilience:</i>	<i>Check Actions</i>
Raise awareness of community members to ensure that all stakeholders have a good understanding of 1) the benefits of natural defenses in helping to manage the sediment balance and protect coastlines, and 2) the differences they can make by avoiding activities that impact on these natural defenses.	
<p>Develop community agreements or rules, where needed, to prohibit destructive practices and other threats to natural defenses including:</p> <ol style="list-style-type: none"> 1. damaging coral reefs (e.g. destructive fishing practices, pollution, sedimentation) 2. nearshore dredging or beach mining 3. clearing or filling mangroves/wetlands 4. clearing upland forests 5. blocking or changing natural waterways 	
Develop a Locally Managed Area (LMAs) and LMA networks that are multi-purpose, not only to protect and enhance local marine resources but also to protect and enhance coastal protection from natural defenses such as reefs, mangroves, seagrass beds, wetlands, and upland forests. LMAs can also be used to enhance fisheries' benefits to communities.	
Develop buffer zones along the coast by planting native coastal vegetation (including mangroves) in areas where it historically grew. Allow space landward of mangrove areas to enable them to adapt naturally to sea-level rise. Enhancing native vegetation in areas it previously grew can help to stabilize coastlines and reduce the loss of land.	
Develop buffers of natural vegetation around rivers and streams and protect the natural functions of river and stream catchments and wetland areas.	

Actions to Reduce Social Vulnerability to Shoreline Change	
<i>Reduce Sensitivity/ Build Resilience:</i>	<i>Check Actions</i>
Raise awareness of community members to ensure that all stakeholders have a good understanding of 1) the benefits of developing in safe areas, away from low-lying coastal areas or the active shoreline, 2) the differences they can make by considering long-term coastal changes in choosing where and how to build.	
Develop community agreements or rules to ensure that development activities consider long-term changes in coastal zones. These include agreements on where to build new developments to avoid hazardous areas such as those that experience erosion or flooding (or will in the next one or two generations). It also includes guidance on how to build structures so they are safe from hazards and do not disturb natural processes.	
Develop disaster response plans that ensures community members are aware of what to do in case of specific disasters (e.g. hurricanes, droughts) and that the resources are put in place to ensure safety of community members and minimize damage to people, infrastructure, and natural resources.	
Develop a long-term managed retreat plan that helps community members discuss and identify which buildings, homes, infrastructure, water resources, and agriculture may be further impacted by coastal change and should be relocated away from hazardous areas. The plan would include where relocation could occur over the next few generations and incentives for people to move to these safer areas.	
Develop rules to ensure that hard defenses are designed, implemented, and maintained wisely when there are no other options determined to be	

sufficient to protect critical infrastructure that cannot be moved. Rules should ensure that hard defenses are 1) designed by an expert, 2) implemented to have the least impact to natural coastal processes, and 3) maintained over the long term.	
Carry out photo documentation: take photos of the shoreline over time, from the same location OR beach profiling to monitor changes over time	

Worksheet: Vulnerability and Threat Assessment for Shoreline Ecosystems & Associated Coastal Infrastructure

FACILITATOR INSTRUCTIONS

To be completed through facilitated discussion with community groups

1. Explain the following key points for understanding shoreline vulnerability:
 - Shorelines naturally change shape over time so will not always look the same. Mangrove and rocky shorelines are relatively stable and do not change position or shape quickly. Beaches can be highly active, consisting of loose sediment that can be constantly shifting in response to the combinations of wind, waves, tides, storms —and the effects that humans have on the active shoreline.
 - Most shorelines will be exposed to climate hazards, most importantly sea-level rise and an increase in frequency and/or intensity of storm events and rain events. Sea-level rise will increase the frequency and intensity of flooding to low-lying areas. Where flooding occurs now, it will get worse in the future. This is especially true during storm events where flooding may move further inland. Storms can also cause a rapid loss or gain of sand onto the shoreline.
 - A healthy shoreline ecosystem is made up of “natural defenses” (i.e. coral reefs, seagrasses, beaches, mangroves, wetlands, and upland forests) that in combination can slow the rate of shoreline change and limit the amount of coastal flooding and erosion, as well as provide other socioeconomic benefits to communities (e.g. food, income). Healthy natural defenses will reduce the impacts to a shoreline by climate change.
 - Human alterations to natural defenses will increase the negative impacts to shorelines from climate change. These alterations include: sand mining; placing buildings, roads, and hard structures (e.g. seawalls, groins, piers) on active shorelines; clearing mangroves or forests; damage to reef systems from pollution and over-fishing.
2. If possible, develop a perception map during the discussion to help identify specific areas that are vulnerable. Directions for developing a perception map can be found in the “Mapping Community Section” of this tool.
3. Complete the following questions with community focus groups to identify key information to understanding vulnerability of the target resource and community. The questions are meant to guide the discussion and ensure all the information needed to understand vulnerability is captured. However, focus groups are intended to be more like a discussion so the facilitator can probe for information and ask follow up questions to clarify answers or gain further input. Consider the process more of a discussion rather than a survey.

Shoreline Ecosystem Vulnerability

The main factor that will influence the degree of vulnerability of the shoreline are 1) the type of shoreline (mangrove, cliff, beach), 2) the current health of natural defenses, 3) the severity of non-climate threats (e.g. beach mining or building hard structures on the shoreline), and 4) management effectiveness in protecting natural defenses.

(E = Exposure, S = Sensitivity, NAC = Natural Adaptive Capacity)

The main factor that will influence the degree of vulnerability of the shoreline are 1) the type of shoreline (mangrove, cliff, beach), 2) the current health of natural defenses, 3) the severity of non-climate threats (e.g. beach mining or building hard structures on the shoreline), and 4) management effectiveness in protecting natural defenses.

(E = Exposure, S = Sensitivity, NAC = Natural Adaptive Capacity)

<p>(S) What type of shoreline do you have (mangrove, beach, rocky)? And where does your sediment come from?</p>	<p>Shoreline type</p> <p>Sources of Sediment</p>
<p>(S) Identify and map your natural defenses (e.g. upland forests, streams, swamp, beach, mangroves, seagrass, reefs) and their current condition (Degraded, Fair, Healthy, Very Healthy)</p>	<p>Natural Defense and Condition (list all):</p>
<p>(S) How has the shoreline changed over time? Identify areas where sediment has been lost or gained. Note natural cycles of change if known.</p>	<p>Describe areas that changed (map if possible)</p>
<p>(S) Are there any areas where there have been changes to natural defenses over time, such as reefs, seagrass, beaches, mangroves, streams, swamps, or upland forest?</p>	<p>Changes to natural defenses over time (map if possible)</p>

<p>(S) What non-climate change threats (or human alterations) are severely impacting your natural defenses? List root causes of threats.</p>	<p>Threats (map if possible) and Root Causes</p>
<p>(NAC) How effective are current management efforts to protect natural defenses?</p> <p>Consider traditional practices, policy, awareness, compliance, enforcement or other actions being taken.</p>	<p>Poor, Fair, Good, Excellent</p> <p>Describe what's working and what isn't:</p>
<p>The following rankings provide general guidance about how to determine vulnerability ranking.</p> <p>Low:</p> <ul style="list-style-type: none"> • The shoreline is steep • Natural defenses are good to excellent condition (health) • There are few threats to natural defenses • Management actions are being implemented and are effective at reducing root causes of severe threats <p>Moderate:</p> <ul style="list-style-type: none"> • The shoreline is low-lying and made up primarily of mangroves • Natural defenses are in fair condition • There are some severe threats to natural defenses 	

- Management actions are reducing some root causes of severe threats

High:

- The shoreline is low-lying and made up primarily of beach
- Natural defenses are in poor condition
- There are several severe threats to natural defenses
- Management actions are not being implemented to reduce root causes of severe threats

Social Vulnerability (Buildings and Infrastructure Along the Shoreline)

Social vulnerability will depend on how much of the community is living within the active shoreline, how much critical infrastructure is placed within the active shoreline, and what alternatives are available to relocate families and infrastructure now and into the future.

(D = Dependence, SAC = Social Adaptive Capacity)

(D) What percentage of the community lives on the active shoreline that currently is, or will be exposed to flooding or erosion within the next 10 years?

Percentage:

Map if possible

<p>(D) Is any major infrastructure placed in the active shoreline and currently or will be exposed to flooding or erosion within the next 10 years?</p>	<p>List all: Map if possible</p>
<p>(SAC) What knowledge, skills, resources, and/or support are available to the community to address flooding and erosion issues?</p> <p>*consider past events and how the community coped with negative impacts to the shoreline – were they successful/sustainable?</p>	<p>Describe:</p>
<p>(SAC) What options and resources are available for families, and infrastructure to be relocated?</p> <p>These could include assets (funding, equipment), people (partners, staff, volunteers, experts, social networks), and/or information (data, outreach).</p>	<p>Options and resources available:</p> <p>Map if possible</p>
<p>(SAC) Are community agreements or rules in place to ensure safe development practices that consider climate impacts</p>	<p>Yes/No</p> <p>Describe what's working and what isn't:</p>
<p>The following rankings provide general guidance about how to determine vulnerability ranking.</p>	

Low –

- Low dependence (less than 25% living in active shoreline).
- No critical infrastructure or culturally significant sites such as emergency access roads, medical buildings, churches, schools, graveyards, in active shoreline.
- Alternative options available to relocate families and infrastructure in hazardous areas or ability to access them through existing skills and resources.
- Community agreement or rules are in place to prevent future development of buildings in low-lying areas prone to flooding, erosion, and storm surge.

Medium –

- Moderate dependence (26- 50% families living in active shoreline).
- Few to no critical infrastructure or culturally significant sites such as emergency access roads, medical buildings, churches, schools, or graveyards in active shoreline
- None to few alternative options available to relocate families and infrastructure in hazardous areas or ability to access them through existing skills and resources.
- Some community agreement or rules are in place to avoid future development of buildings in low-lying areas prone to flooding, erosion, and storm surge.

High –

- High dependence (more than 50% families are located in active shoreline)
- Critical infrastructure or culturally significant sites such as emergency access roads, medical buildings, churches, schools, or graveyards are located in active shoreline
- None to few alternative options available to relocate families and infrastructure in hazardous areas or ability to access them through existing skills and resources.
- None to few community agreement or rules are in place to prevent future development of buildings in low-lying areas prone to flooding, erosion, and storm surge.

4. Review your answers above with community groups to develop an initial list of actions that could be taken to reduce vulnerability of the target resource and community. To reduce vulnerability of shoreline, consider ways reduce the root causes of non-climate threats, and improve management to protect them. To reduce social vulnerability, consider rules about where and how to build to ensure people are not exposed to future flooding and loss of land, including moving homes, infrastructure, and agriculture away from hazardous areas. Hard options (e.g. sea walls) should only be considered as the last option, and only for critical infrastructure that cannot be moved and with technical expertise to ensure design does not do more damage than good.

Session Twenty-One: Understanding Vulnerability of Water Resources and Associated Community Health

FACILITATOR INFORMATION

Climate Hazards of Concerns – Water resources may be exposed to:

- Changes in rain frequency and/or Intensity (e.g. droughts, flooding) - Drought can threaten freshwater sources. Increased rainfall frequency and/or intensity may provide benefits to water systems as long as flooding does not occur and pollutants do not enter the system.
- Increased storm intensity and associated contamination from saltwater or pollutants
- Sea level rise can cause saltwater intrusion into freshwater sources

Exposure –

- All freshwater sources (e.g. wells, tanks, reservoirs, and streams) will be exposed to lack of rainfall/drought and/or increased frequency and intensity of rainfall
- Most freshwater systems (e.g. wells, tanks, reservoirs, and streams) will be exposed to increased storm intensity which can cause damage or contamination. Freshwater wells that are near the shoreline or on low-lying islands/atolls will be more exposed to storm surge.
- Freshwater wells that are near the shoreline or on low-lying islands/atolls where water comes from a freshwater lens may be inundated with saltwater over time due to sea-level rise and storm surge. This is especially true if there are already occurrences of these events.

Sensitivity – Freshwater resources (for the purposes of human consumption and use) are naturally sensitive to slight changes to the environment, especially to salinity and pollutants. Small changes in salinity and/or pollutants can make water unusable for human consumption or use with agriculture and can cause serious health risks. Vegetation provides protection to natural water sources by preventing evaporation and filtering contaminants and sediment from entering the system. Loss and/or degradation of vegetation near freshwater systems will cause water resources to be more sensitive.

Adaptive Capacity - Natural water resources, such as underground water lenses (wells), rivers, streams, and reservoirs, may be highly vulnerable to climate change. Once contaminated, water can take a long time to be safe for consumption again, and in some cases, may never be safe. Water captured in tanks has a greater adaptive capacity because they can be directly managed (e.g. fixed, cleaned) by people. It is critical that humans manage their freshwater

resources and nearby vegetation to ensure that saltwater and pollutants do not get into the system and that clean freshwater is not wasted (e.g. leaky pipes). In areas prone to drought, every drop counts!

Vulnerability – *The vulnerability of water sources is based on several factors including the extent of exposure to climate hazards (i.e. location,) the sensitivity based the source of water (e.g. wells, tanks, etc), and adaptive capacity based on how people manage the water and protect nearby vegetation.*

Community Vulnerability – Social vulnerability is based on 1) how dependent community members are on various water sources, and 2) ability for community members to access adequate sources of water in times of need. In most communities, water resources can be managed to withstand periods of low to moderate drought. However, management includes maintaining tanks and gutters, wells, and pipes (e.g. fixing leaky pipes), as well as preventing pollutants from entering the system by protecting vegetation surrounding areas of wells/streams/etc. and prohibiting contaminants that can enter the system.

Dependence – All humans depend on clean water. However, some water systems may be more vulnerable than others such as water wells near shorelines (which may be contaminated by flooding, salt spray, saltwater intrusion, etc). Therefore, community members who are dependent on water sources that are more vulnerable to climate hazards (e.g. low-lying wells on the shoreline) will be more vulnerable.

Social Adaptive Capacity - The adaptive capacity of the community includes all of the information, knowledge, skills, and resources that a community can access to adapt to changes in the target resource. For example, if there are ways the community can improve management and monitoring and equitable allocation of water resources and diversify sources of water, then adaptive capacity is likely high. If not, the adaptive capacity will depend on the ability to develop these types of alternatives through knowledge, skills, resources, and/or support.

Action to Reduce Water Vulnerability	
<i>Reduce Sensitivity/ Build Resilience:</i>	<i>Check Actions</i>
Develop buffers of natural vegetation around rivers and streams to filter sediment and pollutants, which can contaminate these systems.	
Protect and maintain healthy forest cover in upland areas to reduce sedimentation that can enter into aquifers.	
Create terrestrial protected areas for freshwater systems such as aquifers, ponds, streams, and rivers. Prohibit development or other destructive practices that could cause sediment or contaminants to drain into those areas.	
Eradicate and manage invasive species of upland/ terrestrial systems that cause damage to native species that hold soil together and protect water systems.	

Action to Reduce Drinking Water Vulnerability	
<i>Reduce Sensitivity/ Build Resilience:</i>	<i>Check Actions</i>
Raise awareness of community members to ensure that all stakeholders have a good understanding of potential impacts of climate change to water systems.	
Build skills of community members to ensure that all stakeholders can manage/ conserve water systems (e.g. well, tanks, pipes, etc)	
Install household AND community catchment tanks. Community tanks and water sources should have formal agreements on access and use rights.	

Fix leaky pipes/gutters or any other structural areas where water resources are being lost – every drop counts!	
Ensure wells are designed for sustainable use – including getting technical support where needed	

Worksheet: Vulnerability and Threat Assessment for Water Resources & Associated Community Health

FACILITATOR INSTRUCTIONS

To be completed through facilitated discussion with community groups

1. Explain that the following key points for understanding resource and social vulnerability:
 - All freshwater systems (e.g. wells, tanks, reservoirs, and streams) will be exposed to drought and/or increased frequency and intensity of rainfall as well as increased storm intensity. Low-lying sources may be impacted by flooding, and saltwater intrusion and by sea-level rise.
 - All humans are dependent on clean water. In most communities, water resources can be managed to withstand periods of low to moderate drought. However, good management includes maintaining tanks, wells, and pipes (e.g. fixing leaky pipes, gutters), as well as protecting vegetation around natural sources to prevent pollutants and sediment from entering the system.
2. If possible, develop a perception map during the discussion to help identify specific areas that are vulnerable.
3. Complete the following questions with community focus groups to identify key information to understanding vulnerability of the target resource and community. The questions are meant to guide the discussion and ensure all the information needed to understand vulnerability is captured. However, focus groups are intended to be more like a discussion so the facilitator can probe for information and ask follow up questions to clarify answers or gain further input. Consider the process more of a discussion rather than a survey.

Vulnerability of Water Sources

The main factor that will influence the degree of water resource vulnerability is the type of system (e.g. well, tank, etc) and how well it is managed.

(E = Exposure, S = Sensitivity, NAC = Natural Adaptive Capacity)

<p>List the sources of water your community uses for drinking and other uses (e.g. bathing/cleaning, agriculture, etc)</p>	<p>Sources of Drinking Water:</p> <p>Sources of other Fresh Water and Use:</p> <p>Map all sources if possible</p>
<p>(S) What is the current condition of the water resources?</p>	<p>Drinking Water:</p> <p>Plenty, Sufficient but no extra, Periodically low</p> <p>Other Water Sources</p> <p>Plenty, Sufficient but no extra, Periodically low</p> <p>Map condition if possible</p>
<p>(E) What climate hazards will these sources of water be exposed to (e.g. drought, extreme rainfall)</p>	<p>List Sources of Water and Climate Hazards:</p>

Medium:

- The area where some water sources are located will be exposed to saltwater intrusion or contamination
- The projections indicate the same to less rainfall in the future
- Some management actions are being implemented but there are more that can be done (i.e. to avoid loss of water and protect water from contaminants)

High:

- The area where all water sources are located will be exposed to salt water intrusion or contamination
- The projections indicate the same to less rainfall in the future
- Few management actions are being implemented (i.e. to avoid loss of water and protect water from contaminants)

Vulnerability of the Community

Social vulnerability will depend on how much of the community is dependent on water resources that could be negatively impacted and what alternatives are available to them.

(D = Dependence, SAC = Social Adaptive Capacity)

(D) What percentage of the community is dependent on water resources that are moderately or highly vulnerable? Are there any specific community members or groups who would be more impacted by negative changes to this target?

% Dependent:

Specific groups:

(SAC) Are alternative sources of water available for those dependent on vulnerable water sources?	Alternative Sources Available:
(SAC) Does the community have the knowledge, skills, resources, and/or support to develop alternative sources of water now or in the future?	Skills and Resources Available:
(SAC) Does the community have the knowledge, skills, resources, to manage water resources to avoid loss of water and protect from contamination? For example, fixing leaky pipes, cleaning water tanks, installing gutters for catchment, protecting nearby vegetation of natural sources.	Skills and Resources Available:
<p>The following rankings provide general guidance about how to determine vulnerability ranking.</p> <p>Low:</p> <ul style="list-style-type: none"> • Low dependence on water sources that will be negatively impacted (less than 10%) 	

- Alternative sources of water available now
- High ability to access alternatives through existing skills and resources
- High ability to manage water resources to avoid loss of water and protect water from contaminants

Medium:

- Moderate dependence (10- 50%).
- None to few alternative on water sources available
- Moderate ability to access them with existing skills and resources.
- Moderate ability to manage water resources to avoid loss of water and protect water from contaminants

High:

- High dependence (more than 50%)
- None to few alternative water source options available
- Low ability to access them with existing skills and resources.
- Low ability to manage water resources to avoid loss of water and protect water from contaminants

4. Review your answers above with community groups to develop an initial list of actions that could be taken to reduce the vulnerability of the target resource and community.
 - a. To reduce vulnerability of water sources, consider ways to protect natural water sources from threats and manage other water systems (including fixing leaky pipes and other ways to conserve).
 - b. To reduce social vulnerability, consider ways to knowledge, skills, and resources to improve collection and management of water resources.

Session Twenty-Two: Understanding Vulnerability of Agriculture, and Associated Food Security and Livelihoods

FACILITATOR INFORMATION

Climate Hazards of Concerns – Agricultural resources may be exposed to:

- Increased air temperatures – Higher air temperature may cause stress to crops that may need more water due to increased evapotranspiration. Changes in temperature can also change growing season length, timing and optimal crops.
- Changes in rain frequency and/or intensity (e.g. droughts, flooding)
- Increased storm intensity – Wind, rain, and storm surge can cause contamination from saltwater or damage to crops
- Sea-level rise - In cases where agriculture is located near the shoreline or on low-lying islands/atolls saltwater and salt spray can contaminate crops

Exposure – The exposure of agriculture to climate hazards will vary based on location and type of agriculture. Consider the following:

- Agriculture located near the shoreline will be more exposed to sea-level rise and storm surge events
- Agriculture that is open (not shaded/covered) will be more exposed to sun, higher air temperatures, and storm damage.
- All agriculture will be exposed to periods of drought, extreme rainfall events, and higher air temperature

Sensitivity – The sensitivity of agricultural resources to climate events is dependent on the specific type of crop and method of agriculture. Some crops are highly sensitive to changes in water, temperature, and or sunshine. Others are more robust and can withstand longer periods of drought, sun, rain, or even salinity. Good management practices that maintain healthy crops, diversify crops, and reduce exposure to sunlight/strong winds/flooding (e.g., by planting away from vulnerable areas, shade-grown crops), can reduce sensitivity of crops.

Adaptive Capacity - Plants require certain conditions to thrive (e.g., sufficient soil, water, and sunlight). Their adaptive capacity will be based on management practices that the community uses to ensure plants maintain conditions that they need to survive. This includes planting in areas that are less prone to hazards, using methods that protect plants such as shade-cropping or agro-forestry, or using species that are more tolerant to environmental changes (e.g., salt-tolerant varieties of taro). A variety of best management practices to support agriculture in different climate change scenarios is being explored.

Vulnerability – The type of crops that are grown, location they are placed, and management practices used will be the main factors that influence the degree of vulnerability (low to high).

Using best management practices in areas that are less prone to climate hazards is a critical step to reducing vulnerability.

Community Vulnerability –Social Vulnerability is based on 1) how dependent community members are on certain crops as food or income sources, and 2) peoples knowledge, skills, and access to alternative sources of food/income.

Dependence – Community members who are more dependent on agriculture for food and income will be more vulnerable than those who have options for food sources or earning income.

Social Adaptive Capacity - The adaptive capacity of the community includes all of the information, knowledge, skills, and resources that a community can access to adapt to changes in the target resource. If the community has the ability to diversify agricultural food sources or change methods of growing food that improve their ability to grow in future climate scenarios, then they have a higher adaptive capacity than a community without such skills. For example, the ability to relocate vulnerable gardens, use shade-cropping methods, and/or change species that are more tolerant to salinity, drought, or high temperatures are important to support increased adaptive capacity. Adaptive capacity depends on the ability to develop such alternatives through knowledge, skills, resources, and/or support.

Reviewing past events that impacted agriculture and how community members dealt with these events (successfully or not) can help assess community dependence on target crops and their adaptive capacity. It is important to consider cultural, economic, and social values and needs when considering the alternatives to these resources. For example, if there are options to use imported foods if this target is negatively impacted, yet this could create social problems such as decreased health and/or increased stress in paying for these foods, then this option should not be considered optimal.

Actions to Reduce Vulnerability of Agricultural Resources	
<i>Reduce Sensitivity & Exposure/ Build Resilience:</i>	<i>Check Actions</i>
Use crop diversification methods, intercropping, crop rotation, and/or multiple sowing dates	
Use shade cropping methods to conserve water/ maintain moisture	
Protect forests, trees, and wetlands to help regulate and conserve ground water and reduce flooding	
Relocate or raise gardens/crops into higher beds to reduce exposure to coastal or inland flooding	
Explore the use of crops that are resistant or tolerant to saltwater, drought, or excessive water	

Actions to Reduce Social Vulnerability/ Improve Community Resilience	
<i>Reduce Dependence/ Build Adaptive Capacity:</i>	<i>Check Actions</i>
Raise awareness of community members to ensure that all stakeholders understand climate change risks and potential impacts to target resources. It	

is advised that this be taken as a first step for any target resource.	
Build skills of farmers to carry out best management practices. For example diversifying crops, using agro-forestry practices or salt-resistant crops, methods to reduce over-exposure to sun and extreme rainfall with shade crops, water conservation methods).	
Develop short-term (within 5 year) and long-term (for the next generation) supplemental livelihoods or food sources. This can include skills development for specific agricultural methods.	
Use food preservation methods to maximize harvests and plan for times of low harvest due to climate changes.	
Develop ways to reduce expenses for communities so that less income is required to live. Consider ways to encourage sustainability and self-reliance by reducing expenses on food and energy (e.g., through local gardens, food preservation, and solar power).	
Develop actions that improve organization, planning, or social services in time of natural disaster.	

Worksheet: Vulnerability and Threat Assessment for Agriculture & Associated Food Security and Livelihoods

FACILITATOR INSTRUCTIONS

(To be completed through facilitated discussion with community/stakeholder groups)

- I. Explain that the following key points for understanding vulnerability of agriculture:
 - Agriculture systems are going to be exposed to higher air temperatures and changes in precipitation (drought and extreme rainfall events). Low-lying agriculture near the shoreline may also be exposed to flooding or saltwater intrusion due to sea-level rise.
 - Some crops will be able to withstand changes more than others. Additionally there are management practices that can reduce vulnerability of agriculture. Therefore a combination of using resilient crops and management practices can improve resilience of agriculture systems.
 - Improving community awareness about climate change hazards and providing skills to carry out agricultural methods that provide crops the best chance of growing within future conditions is one of the best ways to improve social resilience.
2. Complete the following questions with community focus groups to identify key information to understanding vulnerability of the target resource and community. The questions are meant to guide the discussion and ensure all the information needed to understand vulnerability is captured. However, focus groups are intended to be more like a discussion so the facilitator can probe for information and ask follow up questions to clarify answers or gain further input. Consider the process more of a discussion rather than a survey.

Vulnerability of Agriculture

The main factor that will influence the degree of vulnerability to climate hazards (or how they will be impacted by climate change) is the type of crops, location, and method of agriculture.

(E = Exposure, S = Sensitivity, NAC = Natural Adaptive Capacity)

The main factor that will influence the degree of vulnerability to climate hazards (or how they will be impacted by climate change) is the type of crops, location, and method of agriculture.

(E = Exposure, S = Sensitivity, NAC = Natural Adaptive Capacity)

List your most important crops:	Important Crops:
(E) What climate hazards are your crops exposed to?	Climate hazards:
(S) What other threats are your crops exposed to and what are the root causes?	Threats and Root Causes:
(NAC) Does management of agricultural methods consider ways to reduce exposure to climate hazards and other threats (e.g. extreme heat, drought, flooding, saltwater intrusion)?	Describe method of agriculture Describe what's working and what isn't:
Are all crops harvested and utilized by community (e.g., is their waste)?	

<p>The following rankings provide general guidance about how to determine vulnerability ranking.</p> <p>Low:</p> <ul style="list-style-type: none"> • Crops are located in areas that will not be exposed to flooding, storm surge, or saltwater intrusion • Best management practices are being used (e.g. conserving water and protecting crops from exposure to climate hazards, soil conservation, etc) • Climate resilient crops are being used • Most crops are used or preserved <p>Moderate:</p> <ul style="list-style-type: none"> • Some crops are located in areas that will be exposed to flooding, storm surge, or salt water intrusion • Some best management practices are being used conserve water and protect crops from exposure to climate hazards • Climate resilient crops are being explored • Some crops go to waste and are not preserved <p>High:</p> <ul style="list-style-type: none"> • Most crops are located in areas that will be exposed to flooding, storm surge, or salt water intrusion. • Best management practices are not being used conserve water and protect crops from exposure to climate hazards • Climate resilient crops are not being explored or used • Many crops go to waste and are not preserved 	

- Review the outreach section and checklists on actions that can help reduce vulnerability of the agriculture and associated food security/ livelihoods.

Vulnerability of the Community

Social vulnerability will depend on how much of the community is dependent on a local agriculture that is vulnerable and what alternatives are available to them if that resource is negatively impacted.

(D = Dependence, SAC = Social Adaptive Capacity)

(D) What percentage of the community is dependent on agriculture as a main source of income?	Percentage:
(D) What percentage of the community is dependent on agriculture as a main source of food?	Percentage:
(SAC) What options are available for those dependent on the resource for income if it was negatively impacted from increased climate hazards?	Supplemental income options available: *consider past events and how people coped with negative impacts – were they successful/sustainable?
(SAC) What options are available for those dependent on the resource for	Options available:

food if it was negatively impacted from increased climate hazards?	*consider the sustainability of these options and any negative impacts that would result from using them.
(SAC) What knowledge, skills, resources, and/or support does the community have to improve management of agriculture to reduce climate impacts either now or in the future? These could include assets (funding, equipment), people (partners, staff, volunteers, experts, social networks), and/or information (data, outreach).	Describe:
(SAC) What are the main expenses for families? What ways are available to reduce household expenses so less income is needed? (i.e. growing food, renewable energy, etc)	Expenses: Options for reducing expenses:
<p>The following rankings provide general guidance about how to determine vulnerability ranking.</p> <p>Low:</p> <ul style="list-style-type: none"> • Low dependence (less than 10%) • Alternative income/food options available and sustainable • High ability to access alternatives through existing skills and resources <p>Medium:</p> <ul style="list-style-type: none"> • Moderate dependence (10- 50%). • Alternative income/food options available but may not be sustainable in the long term • Moderate ability to access them with existing skills and resources. 	

High:

- High dependence (more than 50%)
- None to few alternative income/food options available or not be sustainable in the long term
- Low ability to access them with existing skills and resources.

4. Review your answers above with community groups to develop an initial list of actions that could be taken to reduce vulnerability of the target resource and community.
 - a. To reduce vulnerability of agriculture consider ways to improve method of agriculture to build resilience of crops.
 - b. To reduce social vulnerability, consider ways to reduce dependence, reduce expenses, or improve adaptive capacity of farmers (knowledge, skills, resources, etc.) to have supplemental income or improve methods of agriculture.

Session Twenty-Three: Results Chain and Finalizing Actions

FACILITATOR INSTRUCTIONS

Exercise - with core planning team and the community (as appropriate)

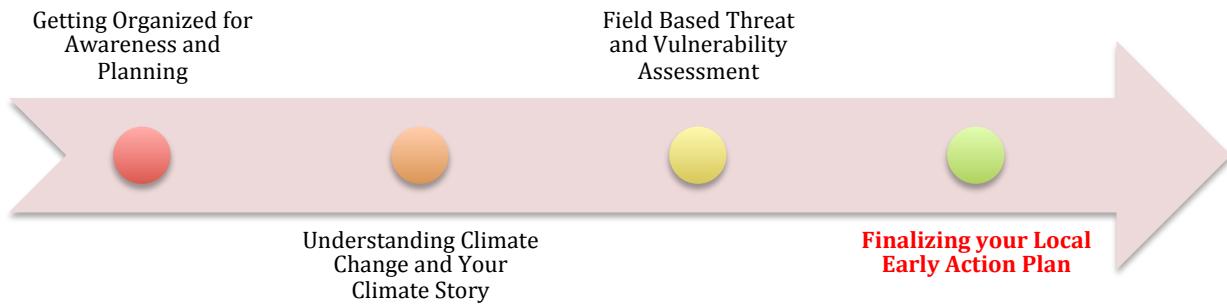
Now that the group has decided what actions they want to take to address the root cause of threat and vulnerability, they can examine short, medium, and long-term results they want to achieve from those actions. This exercise is particularly helpful in helping the group recognize which short and medium results might be more feasible to see prior the final result they aim to achieve.

1. To explore the realistic results the group is likely able to achieve over time, first draw the following table on a piece of flipchart paper.

ACTIONS	SHORT-TERM RESULT (1-2 yrs)	MEDIUM-TERM RESULT (3-7 years)	LONG-TERM RESULT (8-15 yrs)

2. Begin with one action and ask the group the following making sure the answers are realistic:
 - a. What will be the result of this action in the short term? (record the answer on the flipchart)
 - b. Based on the short term result, what will happen in the medium term? (record the answer on the flipchart)
 - c. Based on medium term result, what will happen in the long term? (record the answer on the flipchart)
 - d. If we take this action, are we achieving the short, medium, and long term results we are looking for or do we have to do something else?
3. After reviewing all of the actions, the whole group should then decide which actions will be included in the Local Early Action Plan. All actions chosen should be those that will best help reduce the vulnerability of the resource and the community. Include as many actions that the community sees important to reduce vulnerability by reducing threats. While some actions may require additional resources or technical expertise, it is important to include these if they will significantly reduce vulnerabilities. These may require additional actions to find resources and technical support to complete them.
4. If there is time to review actions developed for resources that are less vulnerable, these should also be included. All actions that seem feasible for the community to carry out can be included in the LEAP document. However be sure to balance the number of actions with what is realistic to do and what is most important to do. Additionally be sure that the actions address the root causes for the most vulnerable resources and community members.

Step Four: Finalizing Your Local Early Action Plan



The LEAP document is intended to be a simple document of a few pages that can be used to guide actions that a community can take to start addressing climate change impacts. It will not provide technical solutions to major climate change questions such as what to do about physical structures for shoreline protection. It focuses on supporting communities to develop and pursue a simple set of actions that can be initiated by communities themselves to start to address climate change impacts. However, some actions may also be included that identify needs for additional resources or technical expertise, if those actions will significantly help reduce vulnerabilities. Communities may use the LEAP to help find support from external agencies and organizations that can assist with completing these actions.

At this stage, the last remaining elements to be developed are the details to support your early actions and your long-range objectives. Once you have completed these you will have all the information that you need to complete the LEAP Template. We suggest that the template be completed by a planning team rather than a larger community group.

Session Twenty-Four: Developing Your Local Early Action Details

FACILITATOR INSTRUCTIONS

Exercise - with core planning team and the community (as appropriate)

This exercise will help the planning team write a short but effective LEAP document by providing key information needed for implementation.

- I. With your planning team develop the following elements for each of your main early actions and write them in the table below:

Action	Time-frame	Responsibility	Resources or Support Needed	Priority (High, Medium, Low)

- **Timeframe** - specify when this action will be completed (provide month/year)
- **Responsibility** – specify who will be responsible for completing this action. List all those involved and their role.
- **Resources or Support Needed** – specify any funds, technical expertise, equipment, or any other resources needed to ensure this action can be completed.
- **Priority** – specify if this action is either a high/medium/low priority for the community based on the following rankings:
 - a. High priority actions address threats and root causes of vulnerability that are urgent and severe. If nothing is done now, the impacts may not be reversible down the road and will have devastating consequences.
 - b. Medium priority actions address threats and root causes that are pressing but will not have the most impact in reducing vulnerability. These actions are important to consider but do not require immediate action.

- c. Low priority actions will have little impact on addressing the root cause of threats and vulnerability. These actions may be easy but will not build significant resilience of the community and resources over time.

Note: even if your priority actions that address the most urgent and severe causes of threats and vulnerability require extensive resources and support, it is still important to identify and include them in your plan because your community will need to work toward them to reduce vulnerabilities over time. Be sure to also include “quick wins” that the community can begin with little to no resources or support. These actions can be “no regrets” actions, which mean that under any future climate scenario (i.e. negative or not), these actions can provide benefits to the community. For example, protecting mangroves from development can provide benefits to local fisheries and provide shoreline protection. These actions, although they may not be the highest priority will help engage people and keep up things moving.

Once you have developed the details include the table into the LEAP template.

Session Twenty-Five: Developing Your Local Early Action Plan

FACILITATOR INSTRUCTIONS

Exercise - *with core planning team and the community (as appropriate)*

At this point you should have all the information you need to complete your LEAP. You have already been filling out several parts of the LEAP Template as you have been going through the sessions of this guide. Now simply complete any remaining sections and you are done.

1. Review the sections of the LEAP that have already been added to the LEAP template and complete any remaining gaps.
2. Once you have completed your LEAP, be sure to share it with local stakeholders and ask for their input. Local stakeholder groups may include village government, local institutions, church, youth groups, women's groups, fishermen groups, and village tourism management board. As appropriate for each community you may want to have a formal adoption process.

LEAP Template

7. Community Name:

8. Community Climate Story *(Completed in Sub-Step 2.2)*

9. Community Profile: *(Completed in Sub-Step 3.2)*

d. Community Background Summary

e. Natural and Social Resource Targets and their Current Condition

f. Community Map (attach to the LEAP Template)

10. Threat and Vulnerability Assessment *(Completed in Step 3.3)*

d. Threats and Root Causes of Threats for Target Resources

e. Describe which Resources are Highly Vulnerable to Climate Change Impacts and Why

f. Summarize any Existing Resilience/Adaptation Strategies & Community Strengths to Maintain or Build upon

11. Early Actions to Address Climate Change Impacts and Non-Climate Threats *(Completed in Step 4)*

Action	Time-frame	Responsibility	Resources or Support Needed	Priority (High, Medium, Low)

12. Long-term Objectives to Address Climate Change Impacts and Non-Climate Threats (OPTIONAL) *(Completed in Step 4)*

Session Twenty-Six: Developing SMART Objectives (Optional)

FACILITATOR INSTRUCTIONS

Exercise - with core planning team

This activity is optional and should be done if your planning team is already comfortable developing objectives. These can help to provide guidance on the outcomes your Actions will strive to achieve in the future and help you measure success. We suggest that you identify objectives for three to five years and that you follow the SMART criteria S- Specific, M – Measurable, A- Achievable, S- Specific, and T – Time-bound as outlined below

Objectives are practical translations of the medium-term and in some cases short-term outcomes that you wish to achieve by pursuing each of your actions. If you achieve your objectives you will overcome your threats, and your community and its resources will be healthier and more resilient in the long-term.

Each key action from the VA Threat Assessment can be translated into one or more objectives by using the table below. After you have developed all the objectives that you think you need, you should go back and make sure that if you achieve these objectives you will overcome the threats to the resources that you are trying to manage and reduce vulnerability.

We recommend that your planning team develop the objectives and then share them with major stakeholders to seek their input.

TABLE FOR WRITING SMART OBJECTIVES:

Simply answer the questions in the table for each action from your Threat - Action model and you will have a SMART objective like the example below. Note each action may have more than one desired outcome and some actions may contribute to more than one outcome.

	Action	Outcome the ACTION is trying to achieve? (develop an objective for each Outcome)	Where?	When?	Target Level of Change
1.	Enforcement	- Reduction in violations of marine resource regulations	- In the waters surrounding our community	In the next year	50%
2.	Enforcement	- Increase abundance of target fish species	- In three villages where there is good fish habitat	In the next three years	Any Increase over baseline level

						Now lets write an Obj
3.	Education Campaign	Local community members voluntarily comply with rules	In the LMMA area	In the next 2 years	All	

ective for Number 1 and test it against the SMART Criteria.

OBJECTIVE #1: Increased fish abundance within three years in communities where there is good fish habitat

- **Is it Specific?** **Yes** - Local communities, three villages, good fish habitat
- **Is it Measurable?** **Yes** - Increased abundance of target fish species, three years
- **Is it Achievement or Outcome Oriented?** **Yes** - Increase fish abundance
- **Is it Realistic?** **Yes** - The communities are interested. Fish populations can increase in three years.
- **Is it Time Limited?** **Yes** - Three years

IT IS A SMART OBJECTIVE!

Session Twenty-Seven: Updating Existing Management Plans (Optional)

FACILITATOR INSTRUCTIONS

Exercise - *with core planning team*

Many communities will already have existing management plans or action plans to help guide their efforts to conserve resources and improve management in their communities. If your community already has a plan, whether it's informal or formal, we recommend that you integrate the results of the VA-LEAP process into this plan.

If your community does not have a management plan, the LEAP can serve to function as a management plan. If you need to develop a management plan to comply with government requirements, the LEAP can provide a lot of key information to be included in for more formal management plans.

1. With your planning team review your existing management plan with a focus on objectives and actions.
2. Adjust or add objectives based on the results of the VA-LEAP process.
3. Add any specific actions based on the results of the VA-LEAP process.
4. Review your objectives and actions and ask the following questions:
 1. If we successfully pursue the actions we have outlined will we achieve our objectives? If not, you may need to add additional actions or activities.
 2. If we achieve all the objectives and/or actions we have outlined will we overcome the threats and their root causes, reduce our vulnerability to climate change impacts and as a result improve the condition and resilience of our resources and community? If you don't feel confident answering yes, you should go back and decide if you need to develop additional objectives or actions.

Once you have updated your existing plans the process is complete. Congratulations and good luck implementing your plans.

Appendix One: References

- Gombos, M., Ramsay, D., Webb, A., Marra, J., Atkinson, S., & Gorong, B. (Eds.). (2014). *Coastal Change in the Pacific Islands, Volume One: A Guide to Support Community Understanding of Coastal Erosion and Flooding Issues*. Pohnpei, Federated States of Micronesia: Micronesia Conservation Trust.
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