

ADAPTING TO A CHANGING CLIMATE



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The Nature
Conservancy
Protecting nature. Preserving life.



A HEALTHY MICRONESIAN COMMUNITY

A THREATENED MICRONESIAN COMMUNITY



1

1

6

2

3

4

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“Impacts from these threats will likely get worse with climate change”

A HEALTHY MICRONESIAN COMMUNITY



A THREATENED MICRONESIAN COMMUNITY



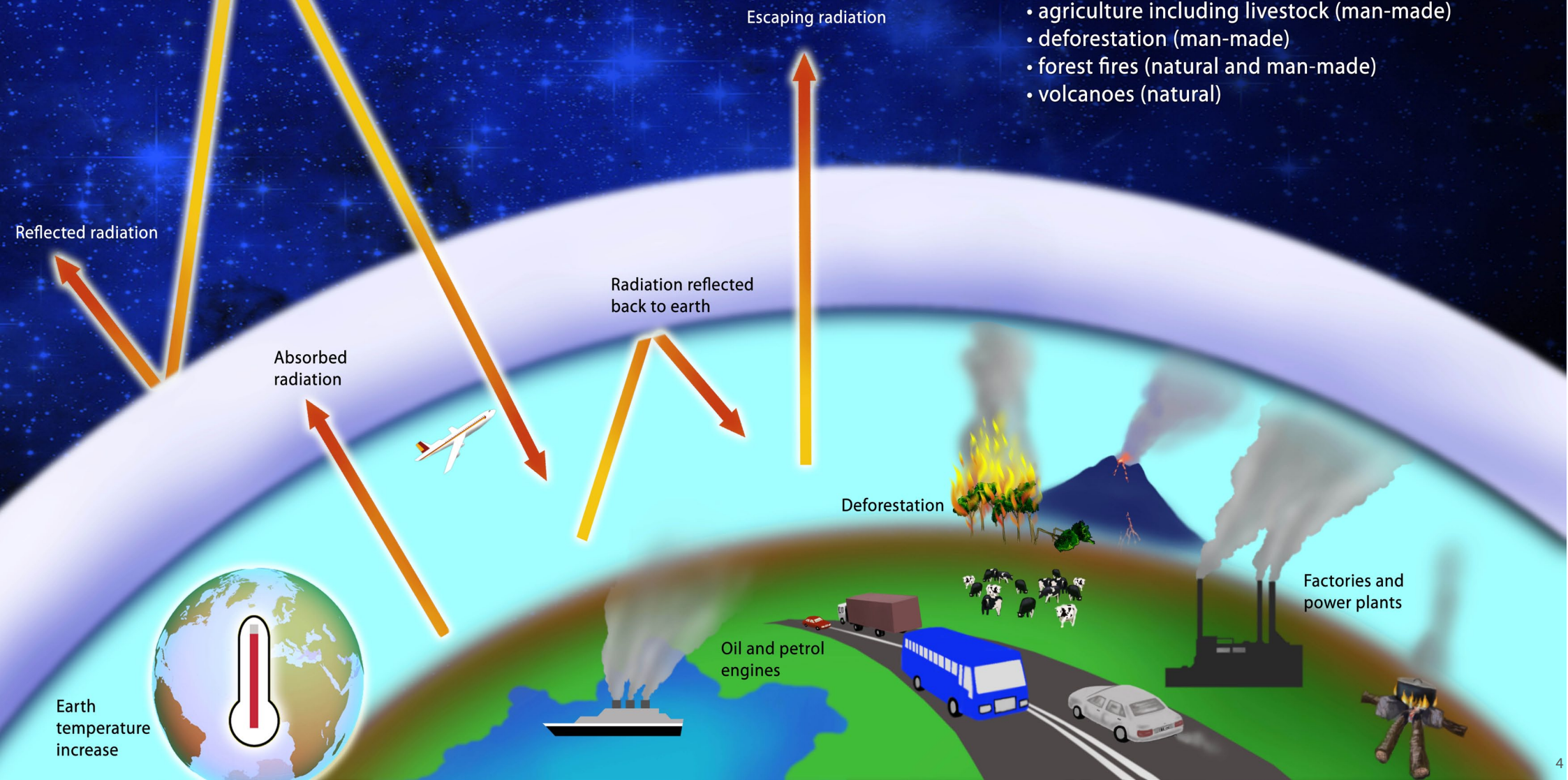
"Impacts from these threats will likely get worse with climate change"

What Is Climate Change?

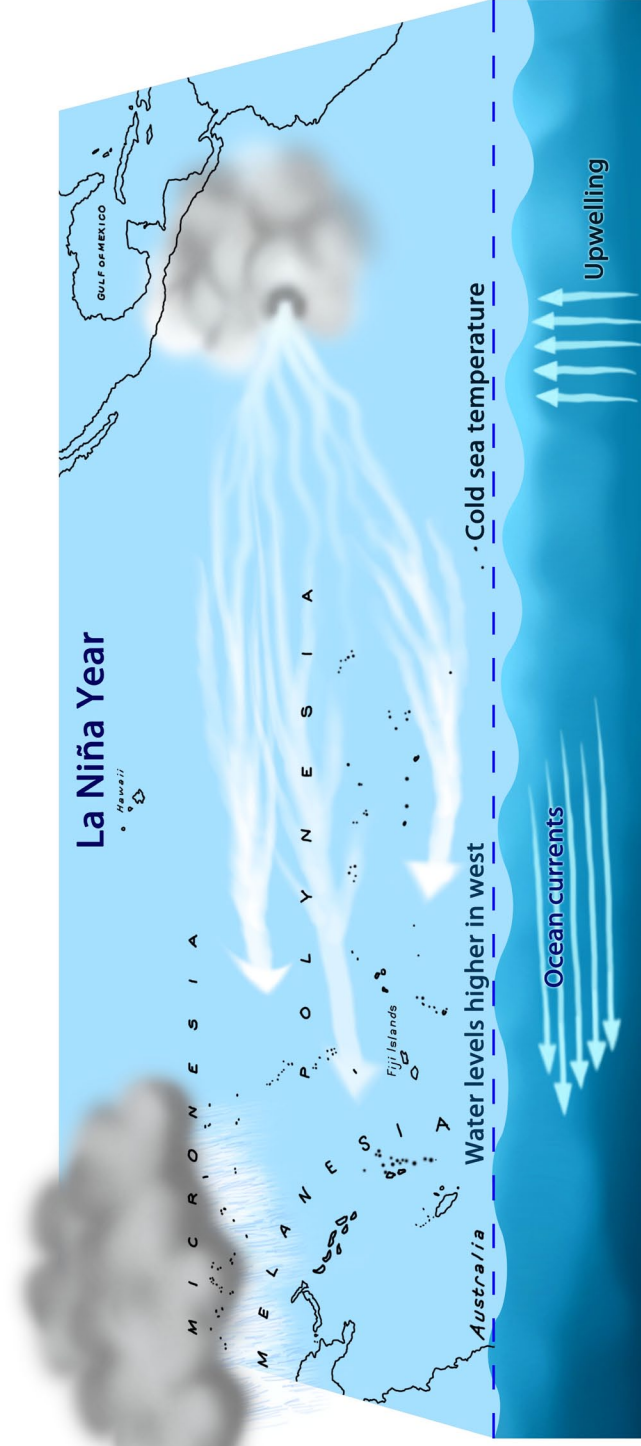
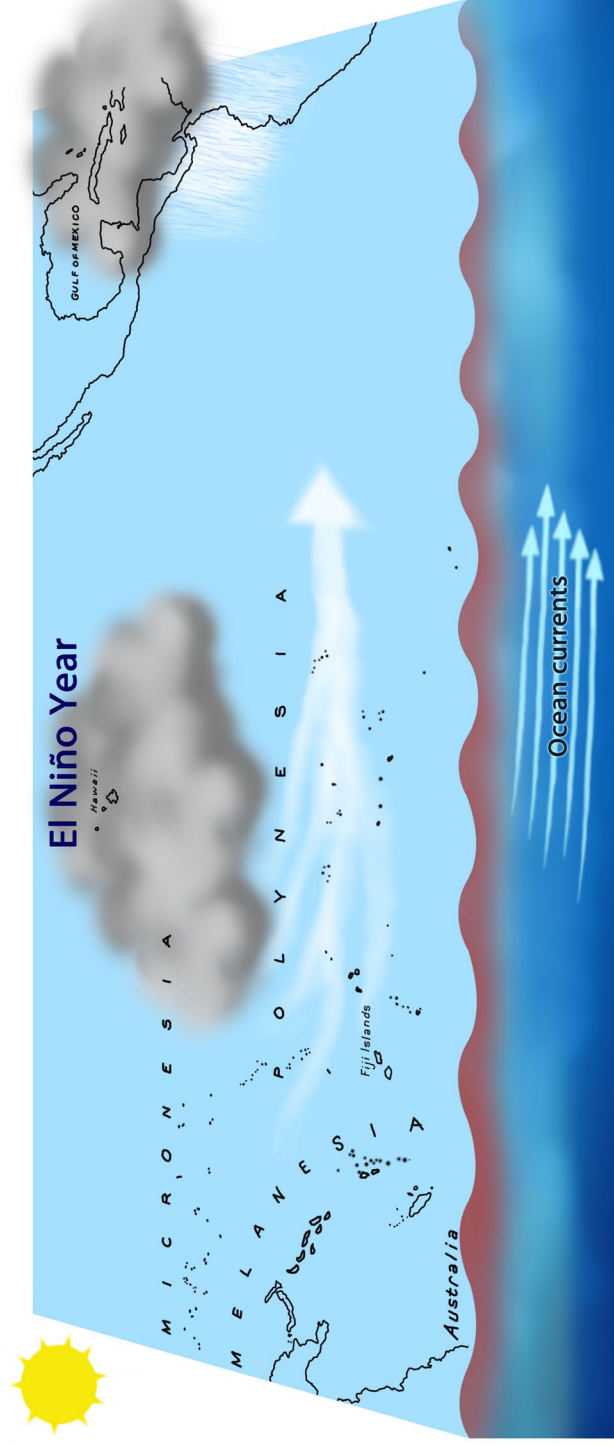
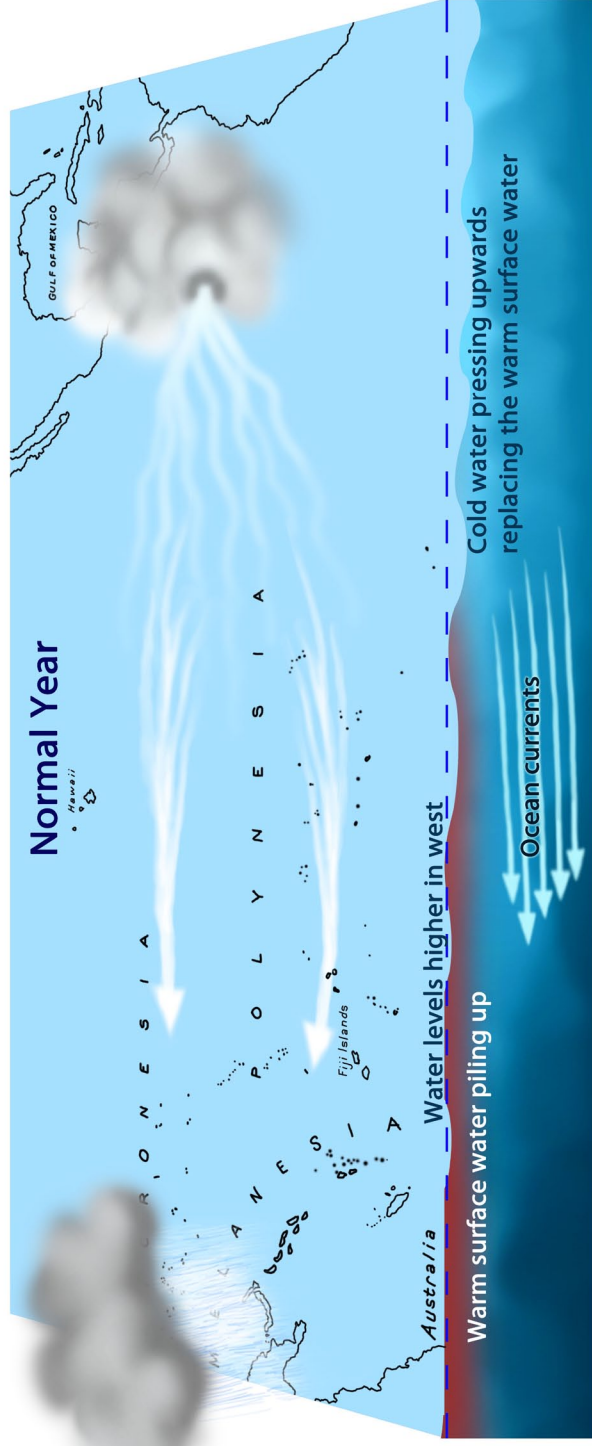
CLIMATE CHANGE IS NOT NEW

CAUSES: Greenhouse gases from burning gas, oil, and coal for things such as:

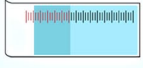
- electricity (man-made)
- automobiles (man-made)
- planes (man-made)
- factories (man-made)
- agriculture including livestock (man-made)
- deforestation (man-made)
- forest fires (natural and man-made)
- volcanoes (natural)



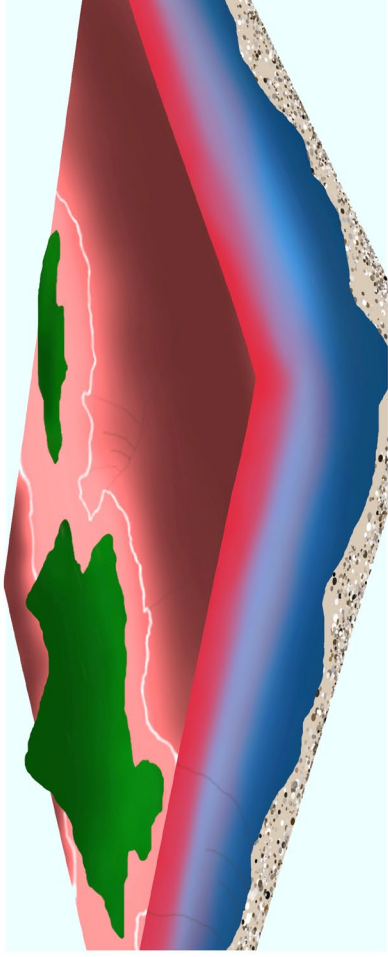
What are El Niño and La Niña?



What Changes Can We Expect to See in the Region?



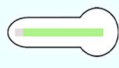
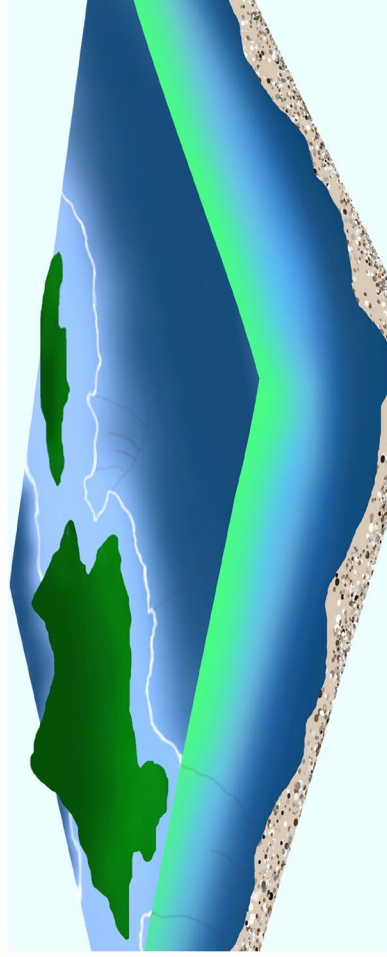
Sea Level



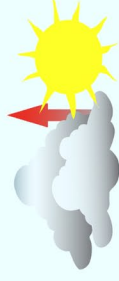
Sea Surface



Air Temperature



Ocean Acidity



Change in
Weather Patterns

Why Should Our Community Care about Climate Change?

Potential impacts

Livelihood and food security



Community health and safety



Changing weather patterns

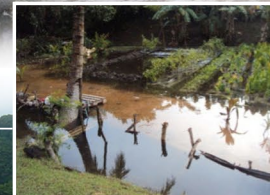


Impacts we're already seeing

Flooding from storm surges or extreme high tides



Saltwater inundation/intrusion



Increased coastal erosion



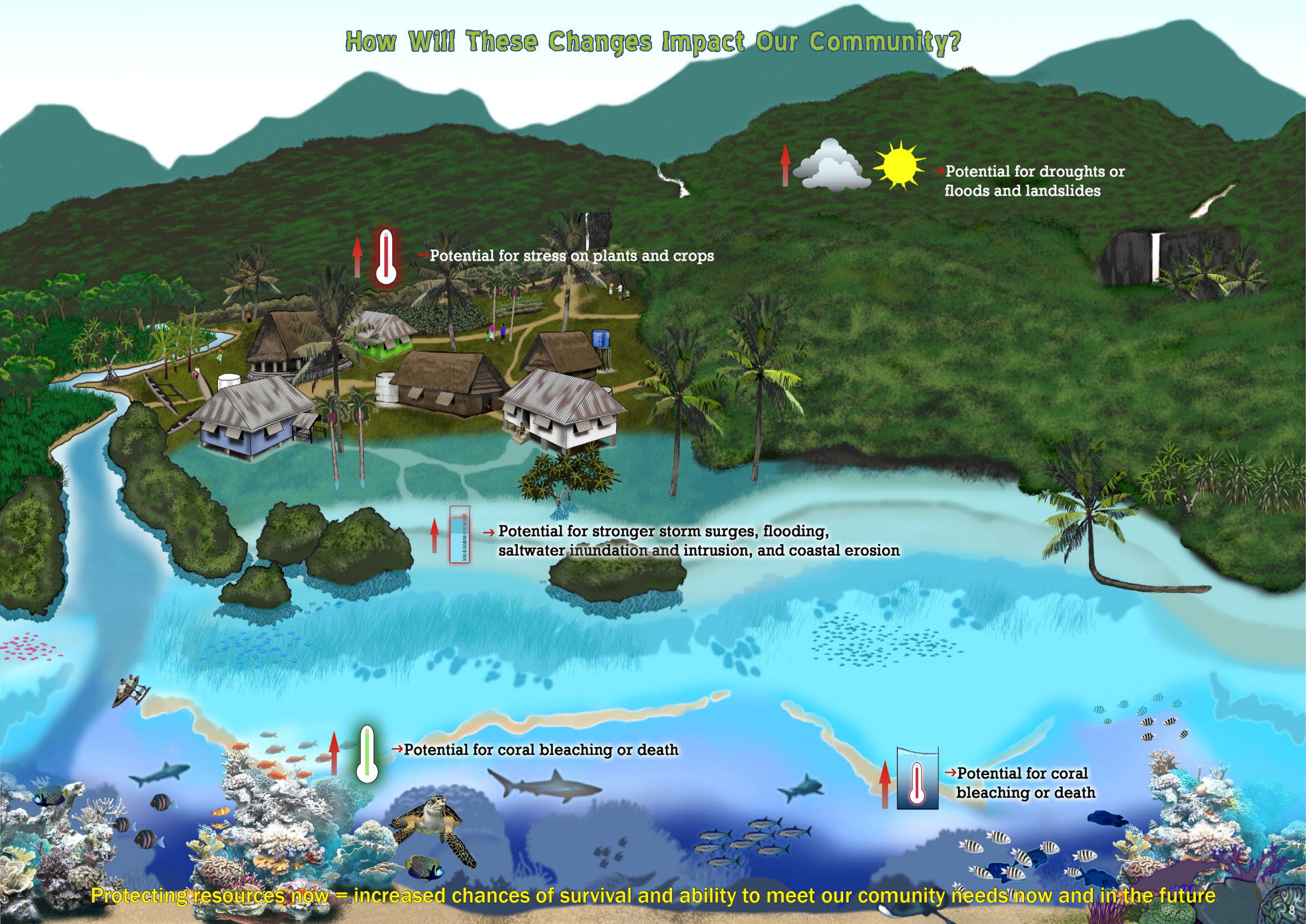
Bleaching of coral reefs



Severe drought



How Will These Changes Impact Our Community?



→ Potential for stress on plants and crops

→ Potential for droughts or floods and landslides

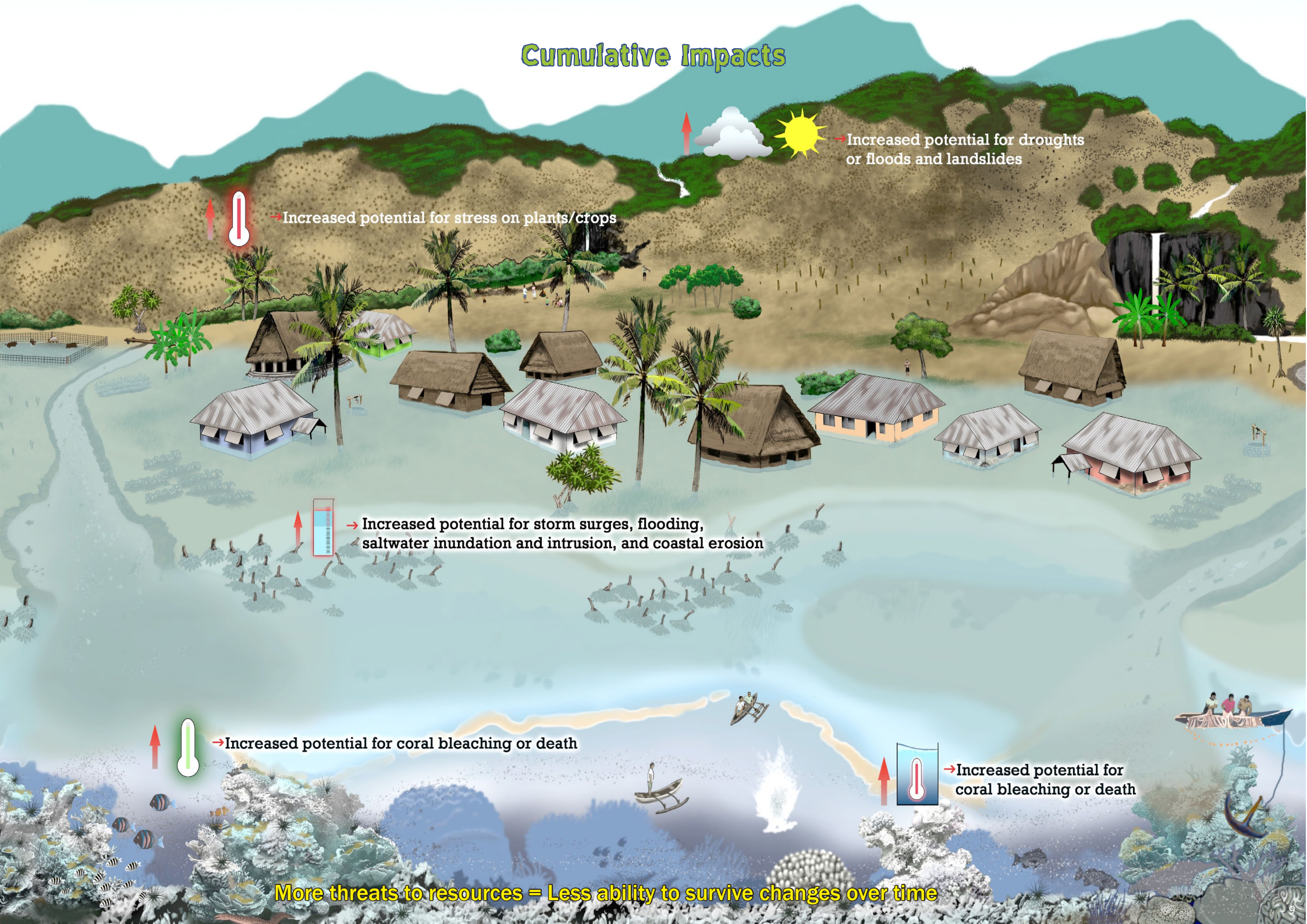
→ Potential for stronger storm surges, flooding, saltwater inundation and intrusion, and coastal erosion

→ Potential for coral bleaching or death

→ Potential for coral bleaching or death

Protecting resources now = increased chances of survival and ability to meet our community needs now and in the future

Cumulative Impacts



→ Increased potential for stress on plants/crops

→ Increased potential for droughts or floods and landslides

→ Increased potential for storm surges, flooding, saltwater inundation and intrusion, and coastal erosion

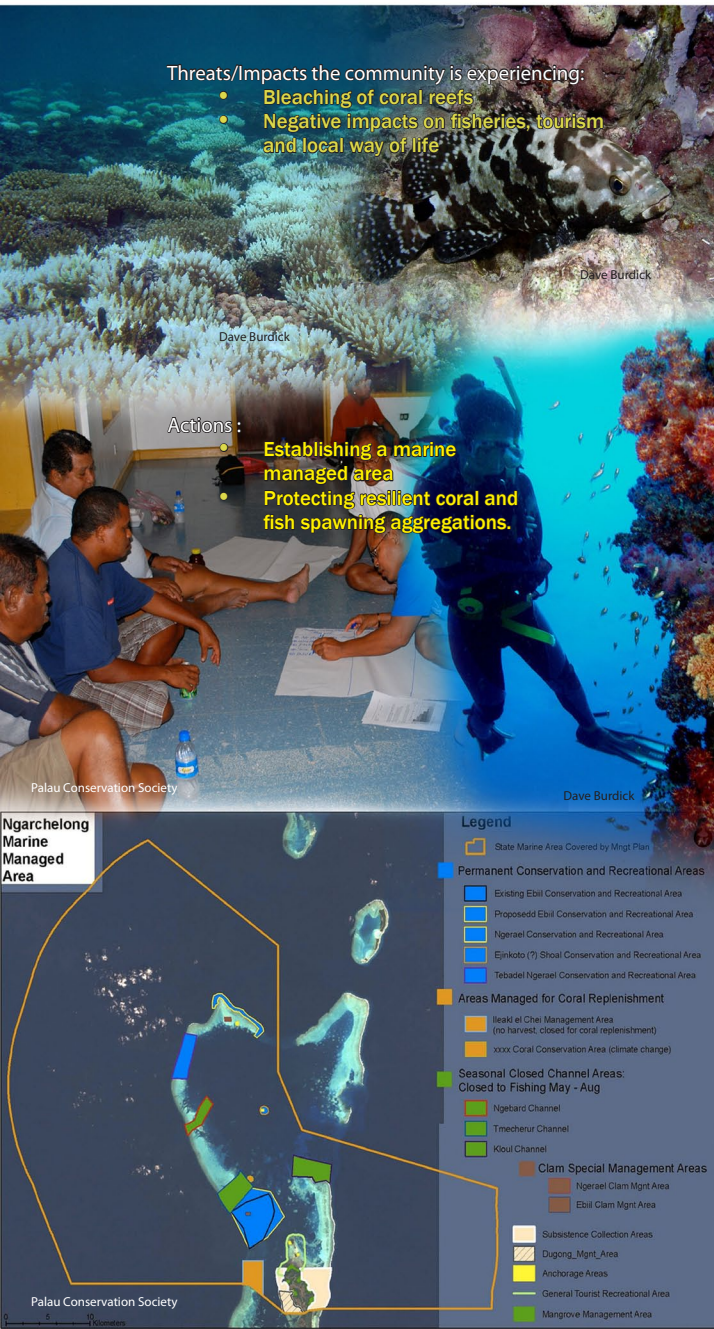
→ Increased potential for coral bleaching or death

→ Increased potential for coral bleaching or death

More threats to resources = Less ability to survive changes over time

What Can Communities Do to Make a Difference?

Ngarchelong Community, The Republic of Palau



Namdrik Atoll, The Republic of Marshall Islands



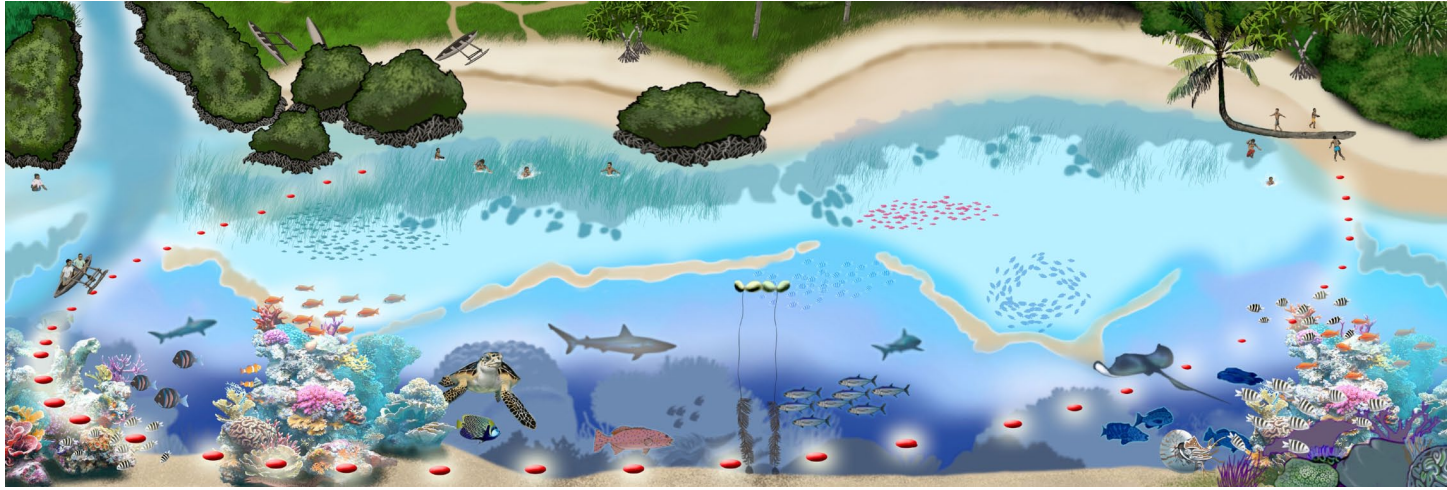
Tegua Community, Vanuatu



Adaptation Strategies to Build Resilience of Coral/Fisheries and Coastal Vegetation

The best way to prepare for climate change and avoid negative impacts to important resources is to keep these resources as healthy and strong as possible

Coral Reefs and Fisheries Adaptation Strategies



1. Establish a Locally Marine Managed Area (LMMA) that includes:
 - Protection of herbivorous fish that eat algae and prevent algae from smothering and killing bleached corals
 - Protection of spawning aggregations
 - Protection of coral reefs near upwelling, flushing, and shading
 - Protection of a range of habitats (beach, mangrove, seagrass, coral)
2. Pelagic fish aggregation devices to reduce pressure on reef fish
3. Small pond aquaculture
4. Develop supplementary or alternative livelihoods that are less dependent on reefs

Coastal Land and Vegetation Adaptation Strategies



1. Replanting native coastal vegetation (mangroves, trees)
2. Establish community rules to protect mangroves, coastal vegetation, and seagrass beds (e.g. set-backs of homes and coastal infrastructure)
3. Coastal protection
 - a. "Hard options" – concrete, stone, seawall
 - b. "Soft options" – vegetation, sand bags
4. Work with local and national governments to ensure buildings and roads are not built on shorelines where they are susceptible to sea level rise
5. Reduce cutting of vegetation by using appropriate fuel or renewable energy sources for cooking

Adaptation Strategies to Build Resilience of Terrestrial and Water Resources

The best way to prepare for climate change and avoid negative impacts to important resources is to keep these resources as healthy and strong as possible

Terrestrial Adaptation Strategies



1. Establish community rules to protect native upland vegetation and riparian zones, and prevent introduction of invasives
2. Eradicate and manage invasive species
3. Apply wise agricultural practices
4. Restore native upland vegetation

Water Resources Adaptation Strategies



1. Fix leaky pipes
2. Install household or community water catchment and tanks
3. Protect reservoirs
4. Ensure that reservoirs and freshwater lenses are free from pollution and managed to avoid evaporation
5. Ensure wells are designed and managed to allow sustainable use
6. Use solar water filters to filter out contaminated well water
7. Use solar distillation systems to supplement drinking water in remote areas

Adaptation Strategies to Build Resilience of Agriculture and Community Well-Being

The best way to prepare for climate change and avoid negative impacts to important resources is to keep these resources as healthy and strong as possible

Agriculture Adaptation Strategies



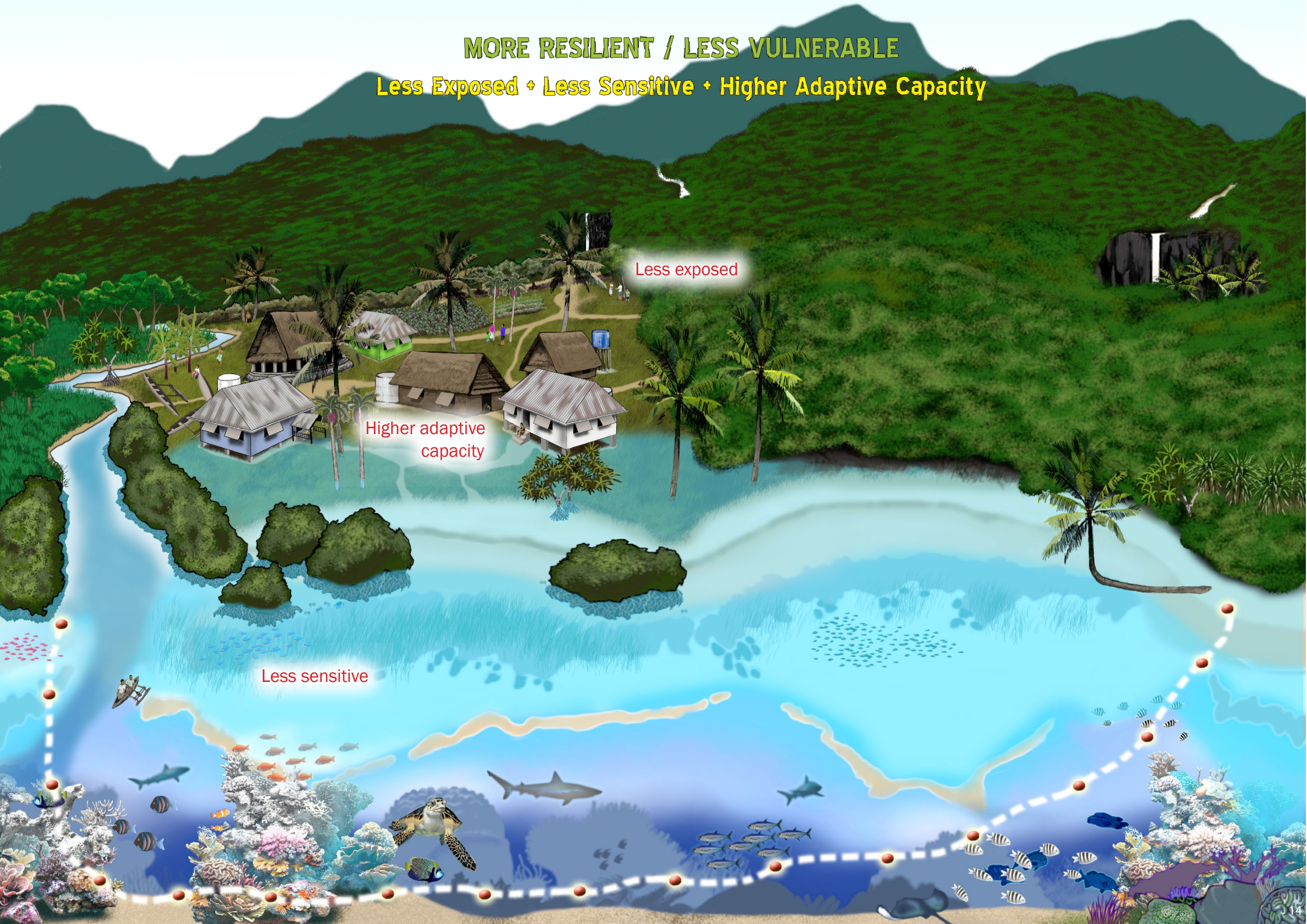
1. Diversify agriculture and move crops inland or up, away from inundation areas
2. Use food preservation methods
3. Salt-tolerant species are being explored
4. Utilize and enhance traditional food preservation methods
5. Avoid clearing forests and monocropping
6. Use traditional and native crops
7. Eat locally produced and more nutritious traditional foods "Go Local!"
8. For low-lying islands, raise taro patches through traditional practices of filling with compost or concrete beds

Adaptation Strategies that Support Community Well-being

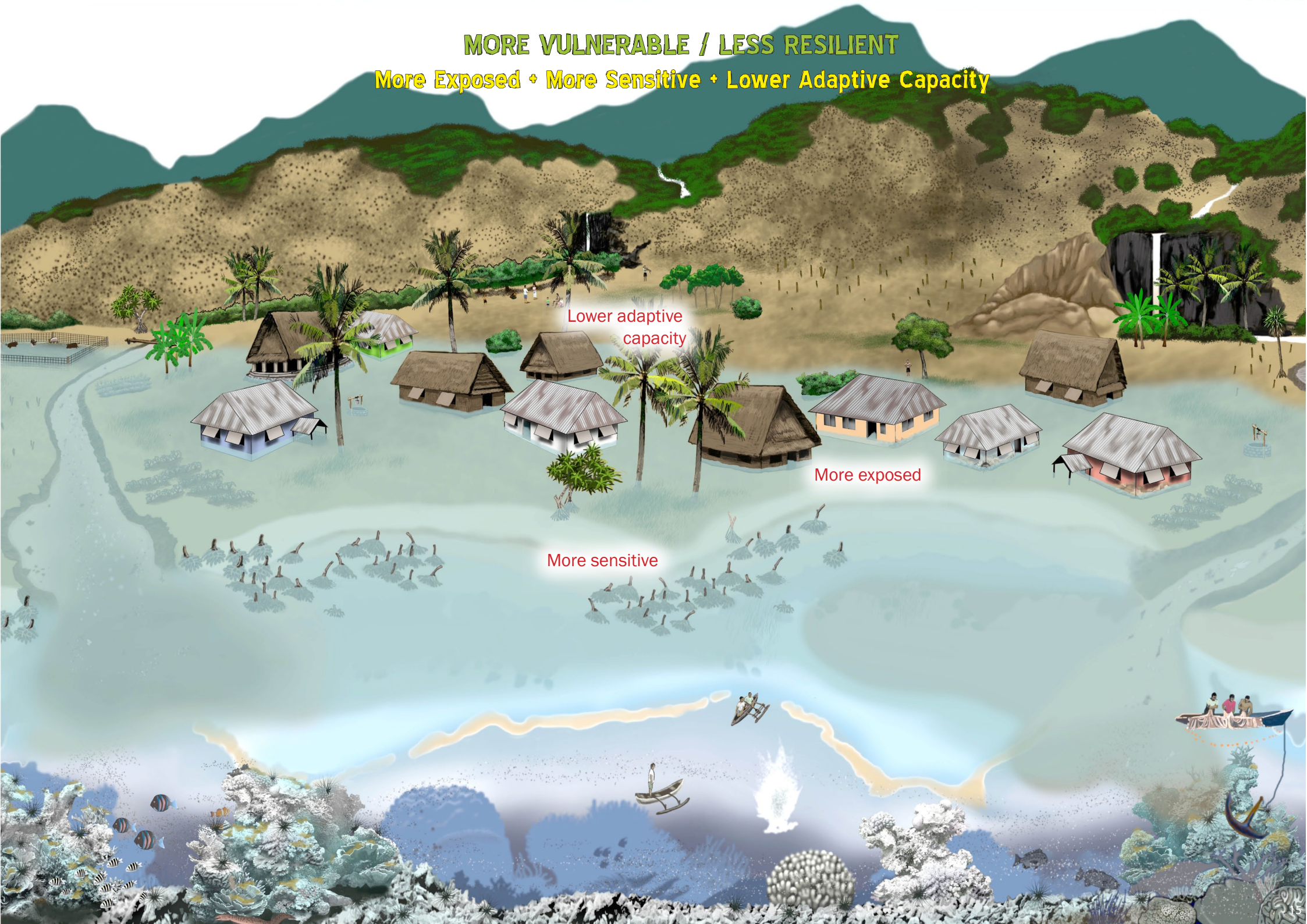


1. Apply traditional and local knowledge
2. Provide climate information and build awareness for better preparedness
3. Provide access to emergency services and transportation
4. Provide access to health services
5. Develop alternative livelihoods, providing know-how
6. Develop partnerships with other communities and local organizations
7. Organize the community
8. For low-lying areas (and low-lying atolls) put new buildings on stilts to prevent flooding

MORE RESILIENT / LESS VULNERABLE
Less Exposed + Less Sensitive + Higher Adaptive Capacity



MORE VULNERABLE / LESS RESILIENT
More Exposed + More Sensitive + Lower Adaptive Capacity

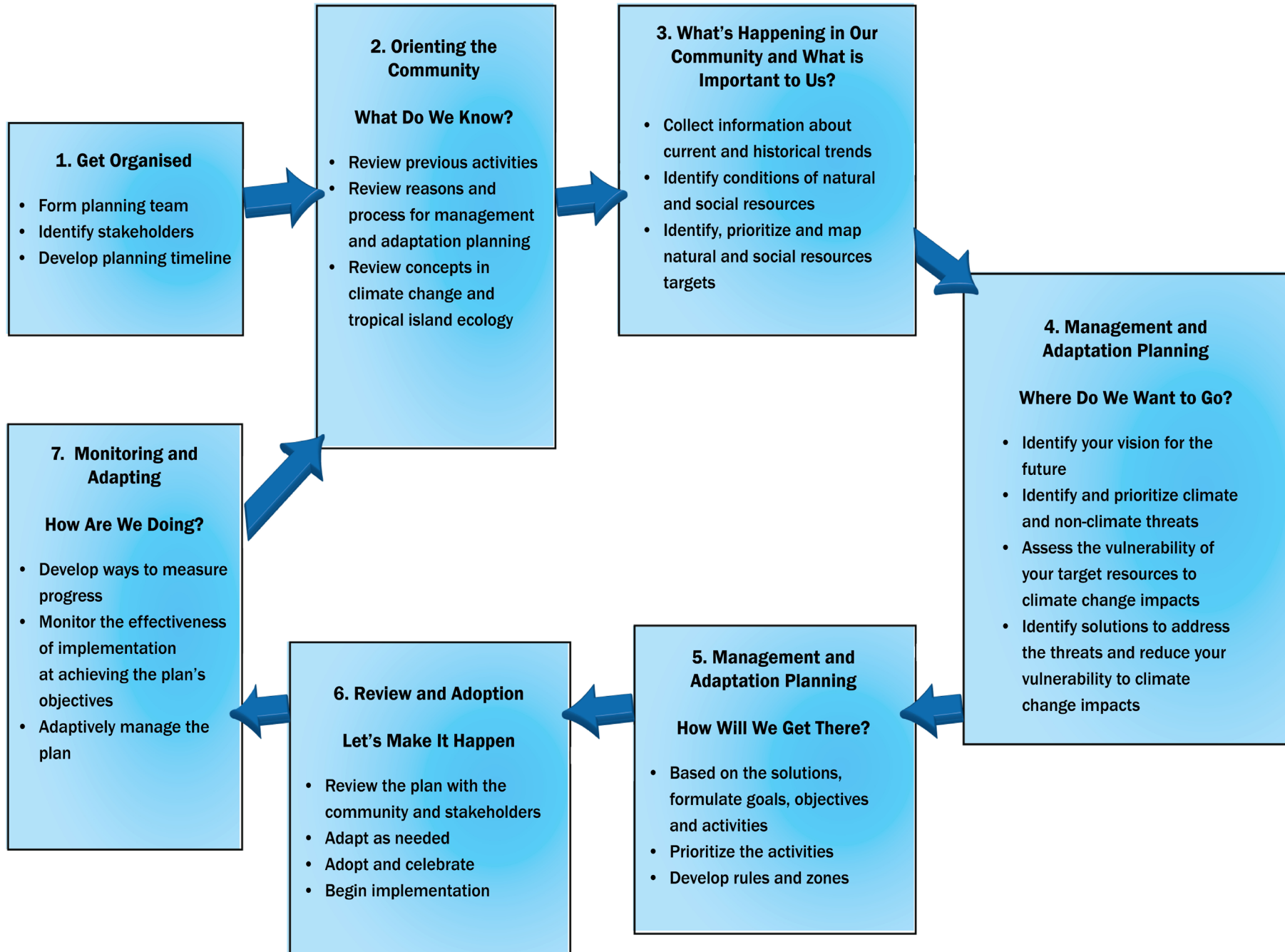


Lower adaptive
capacity

More exposed

More sensitive

What Can We Do in Our Community to Prepare for These Changes?



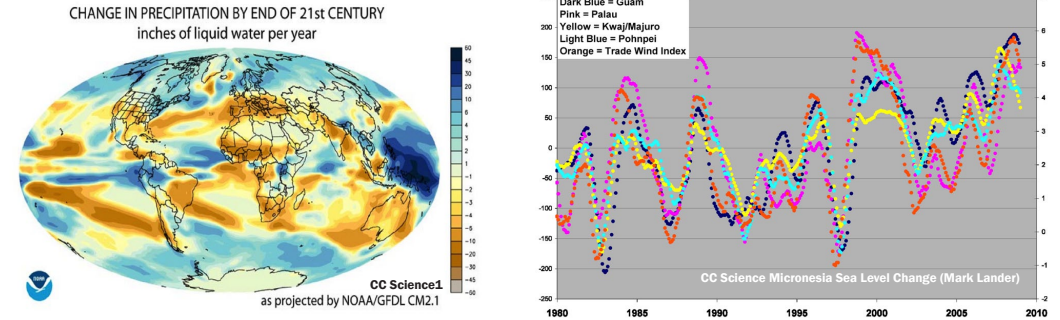
VULNERABILITY MATRIX

TARGET RESOURCES	THREATS (climate and non-climate)	EXPOSURE	SENSITIVITY	IMPACTS	ADAPTIVE CAPACITY (Natural Resources)	ADAPTIVE CAPACITY (Social Capacity)	VULNERABILITY
What social and natural resource targets are most important to your community?	What are the climate and non-climate threats to your priority social and natural resource targets?	How much area of your target resource are affected by climate change events? Specify which events (All/ Most/ Some/ Little/ None)	How severely will your target resources be impacted by increased climate events? And why? (Severely/ Moderately/ Hardly)	What are the current and likely impacts from these events to your target resources and your community?	How would you rate the ability of your target resources to cope with impacts from climate change events? (High/ Medium/ Low)	How would you rate the ability of your community to cope with potential impacts to target resources from climate change events? (High/ Medium/ Low)	Rate the vulnerability of each target resources (High/ Medium/ Low)
Water resources	Drought, contamination, lack of storage	Most	Severely by drought because we don't have good storage	Little drinking water, loss of health	Low – if humans don't manage water resources they will not be around in times of drought due to evaporation and salt water contamination	Low – we have experienced emergencies in the recent past. Gov't was needed to support community and provide fresh water	HIGH
Coral reef	Dynamite fishing, over fishing, bleaching	All - to sea surface temperature rise	High for the near shore reef because it is threatened by dynamite fishing and overfishing so it is not healthy now	Loss of income, loss of food	Medium – some reefs in the past came back after bleaching events	Medium – some fishermen are able to grow crops when fishing is not good	MEDIUM

SWOT ANALYSIS

	Internal	External
Positive	Strengths <ul style="list-style-type: none"> Strong culture and traditional knowledge Lots of technical capacity Tourism provides funding Community leaders are well informed about CC and potential impacts Existing re-vegetation efforts Community has shared vision Experience with climate events such as saltwater inundation and flooding 	Opportunities <ul style="list-style-type: none"> Watershed Association Increased tourism potential with new protected area Partnerships with local natural resource agency Partners with hazard management agency National Gov't providing support for CC adaptation Community College Nearby health clinic Micronesia Challenge Other communities doing adaptation
Negative	Weaknesses <ul style="list-style-type: none"> Capacity - lack of human capacity to implement and enforce Not enough education & outreach, different levels of awareness No opportunities for community volunteers No alternative livelihoods for those dependent on fisheries Lack of knowledge about how to deal emergencies 	Threats <ul style="list-style-type: none"> Easy for poachers/night fishing Natural disasters Poor economy Unreliable transportation Need for gov't support in times of emergency

CLIMATE SCIENCE INFORMATION



COMMUNITY MAPPING



BIOPHYSICAL ASSESSMENTS



SOCIAL ASSESSMENT



HISTORICAL TIMELINE / SEASONAL CALENDAR



Take Action: Community Management & Adaptation Planning & Implementation

COMMUNITY MANAGEMENT AND ADAPTATION PLAN SUMMARY

Resource Targets

Water resources, food fish as grouper and bumphead parrotfish, marine turtles, coral reefs, community agriculture, traditional use of natural resources

Vision: A healthy community with intact natural resources providing food, jobs, and quality of life

Non - Climate Change Threats and Impacts

1. Overfishing resulting in shifts in population structure and loss of predators and herbivores
2. Destructive fishing (using chemicals and explosives) destroying reef and marine life populations
3. Pollution from piggeries causing too many nutrients on the reef, which promotes algae growth, and also contaminates the fresh water

CC Threats and Impacts

1. Increased extreme rainfall events causing runoff and sedimentation
2. Increase in sea surface temperature causing coral bleaching
3. Increase in air temperature with long dry periods causing drought and limiting water supplies
4. Sea level rise causing coastal erosion and inundation

Vulnerability (HIGH)

1. High Exposure to CC Impacts: Homes and crops are near the shore
2. Highly Sensitive to CC Impact: The ecosystem is degraded due to non-climate change threats
3. Limited Adaptive Capacity: The community has limited understanding of effective management

Solutions

Reduce Exposure

1. Move crops away from coastal areas
2. Build new homes on stilts

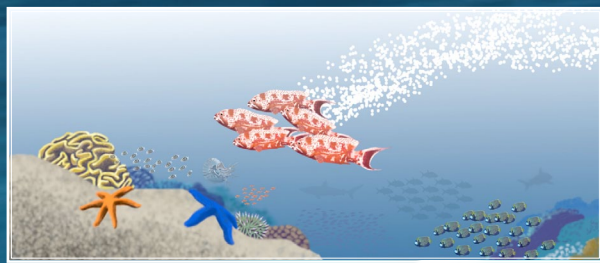
Reduce Sensitivity

1. Restore and protect mangroves to protect against coastal erosion
2. Restore and protect native vegetation
3. Moves piggeries away from the shore
4. Create a managed area to protect spawning aggregations and populations of herbivorous species
5. Install community rainwater catchments

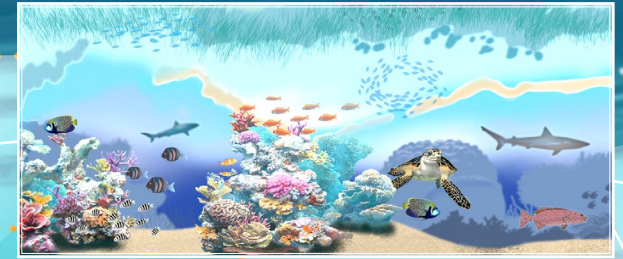
Increase Adaptive Capacity

1. Provide awareness programs on how to reduce threats and prepare for climate change impacts
2. Partner with health organizations to prepare for increased heat events and water-borne illness
3. Work with adjacent communities to protect resources and apply for grant funding

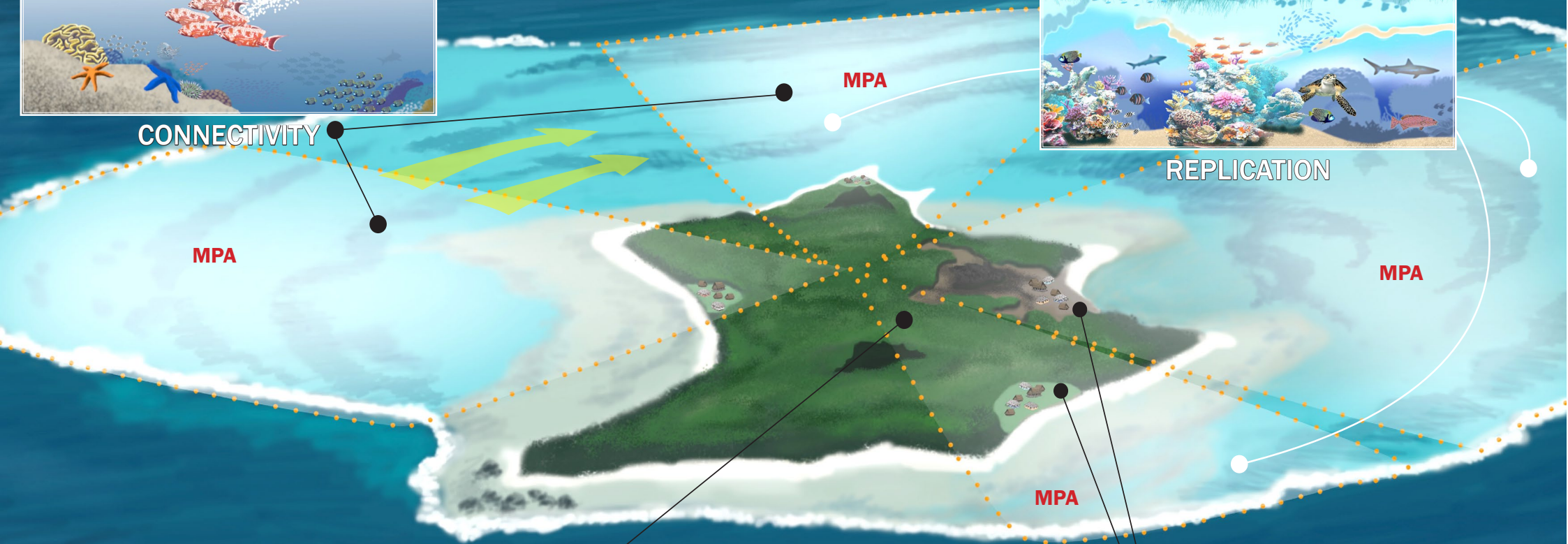




CONNECTIVITY

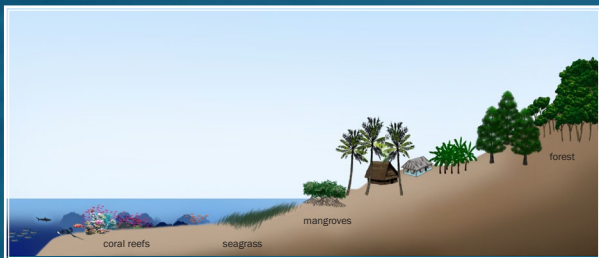


REPLICATION



REPRESENTATION

SHARING & LEARNING



PROTECTED AREA NETWORKS

Is There Any Help for Our Community to Adapt to Climate Change?

The following organizations and initiatives provide support to communities for natural resource management and climate adaptation planning and implementation

The Micronesia Challenge

Micronesia Conservation Trust

National Government (Policy and Agencies)

Local Organizations

- *Health*
- *Hazard/Disaster Management*
- *Resource Management and Conservation*
- *Education and Research*
- *Meteorological Services*

Community Groups