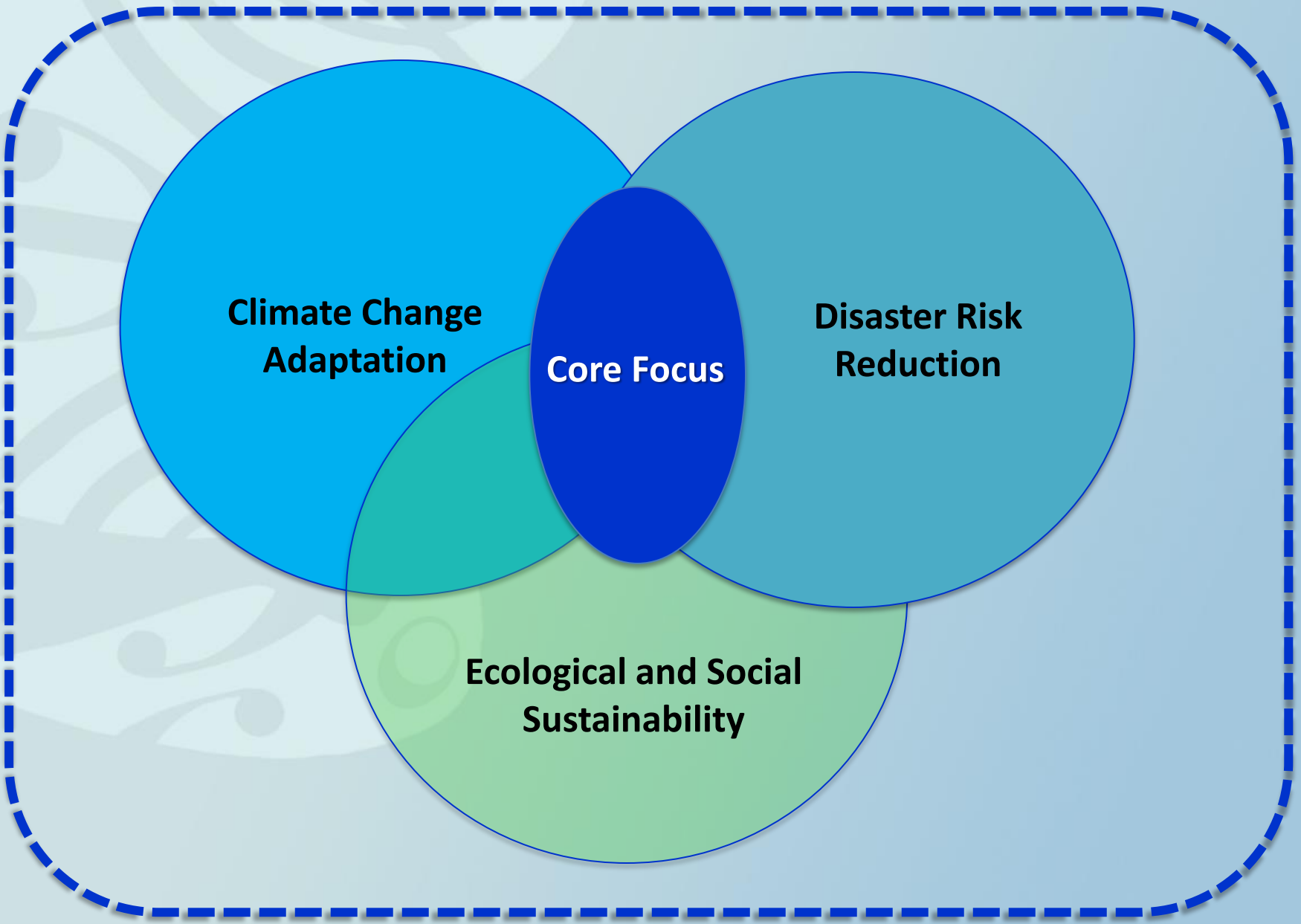
Ecosystem-based Adaptation to Climate Change in the Pacific Islands

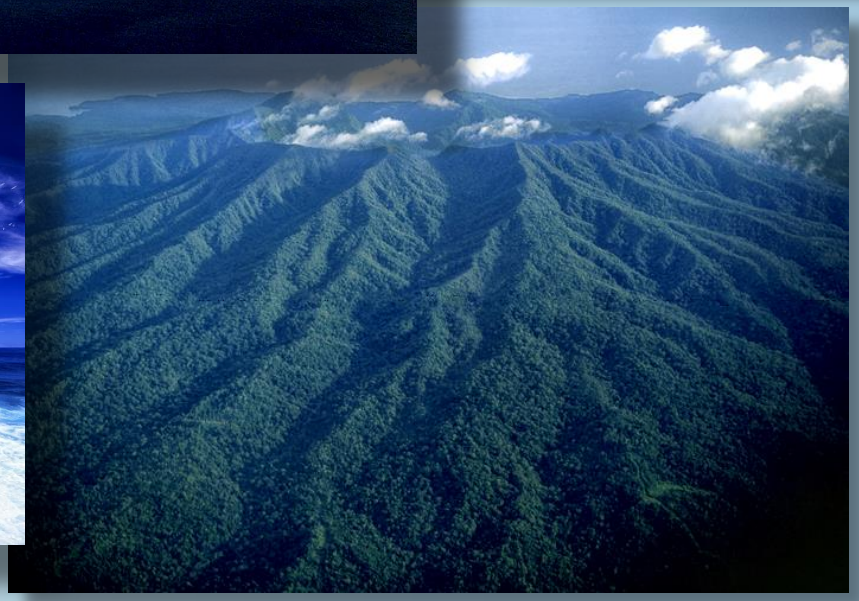
Stuart Chape
Director – Biodiversity and Ecosystem Management Division

Pacific Islands Region: Ecosystem Approach Critical for Climate Change Adaptation

ECOSYSTEM APPROACH



Island Ecosystem Diversity



High Biodiversity Values



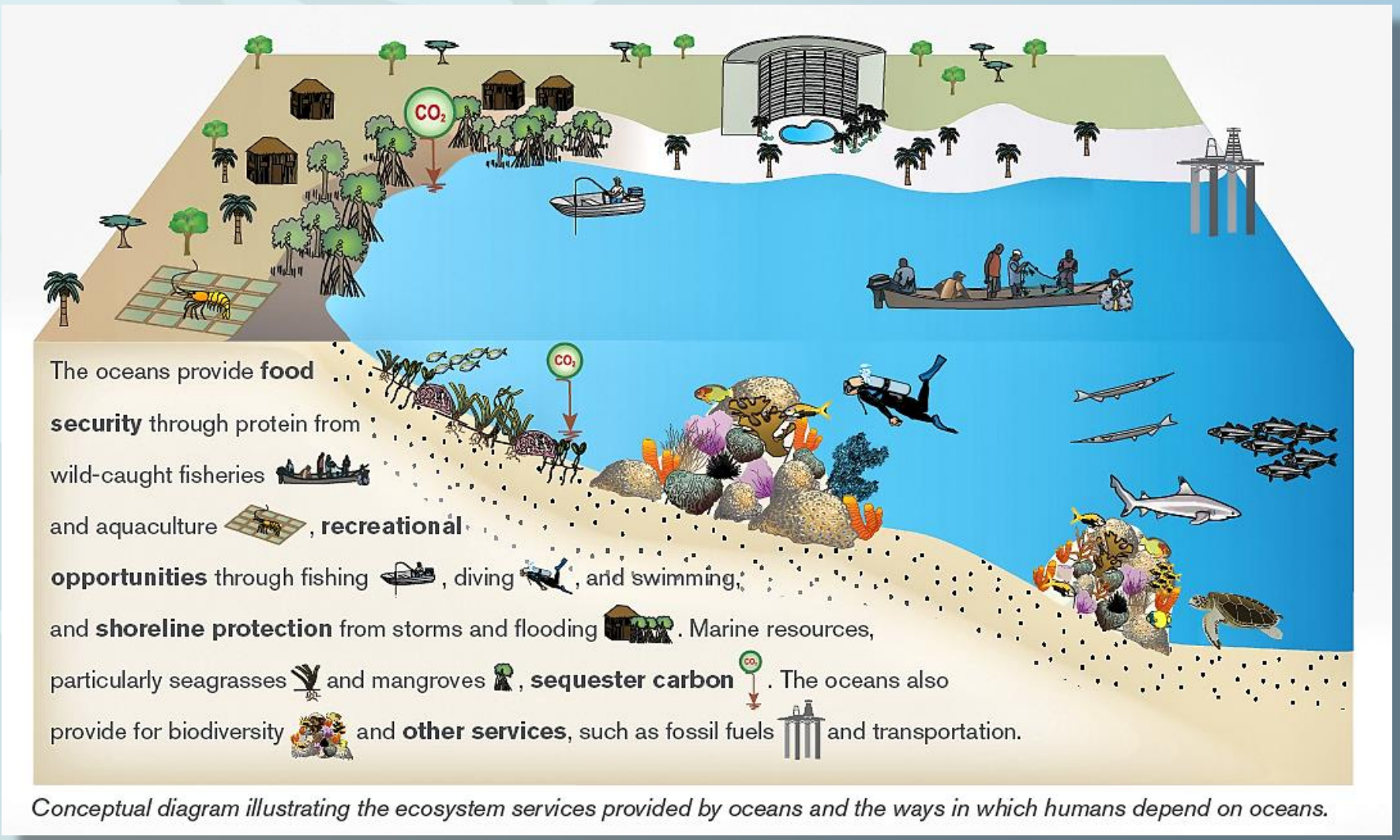




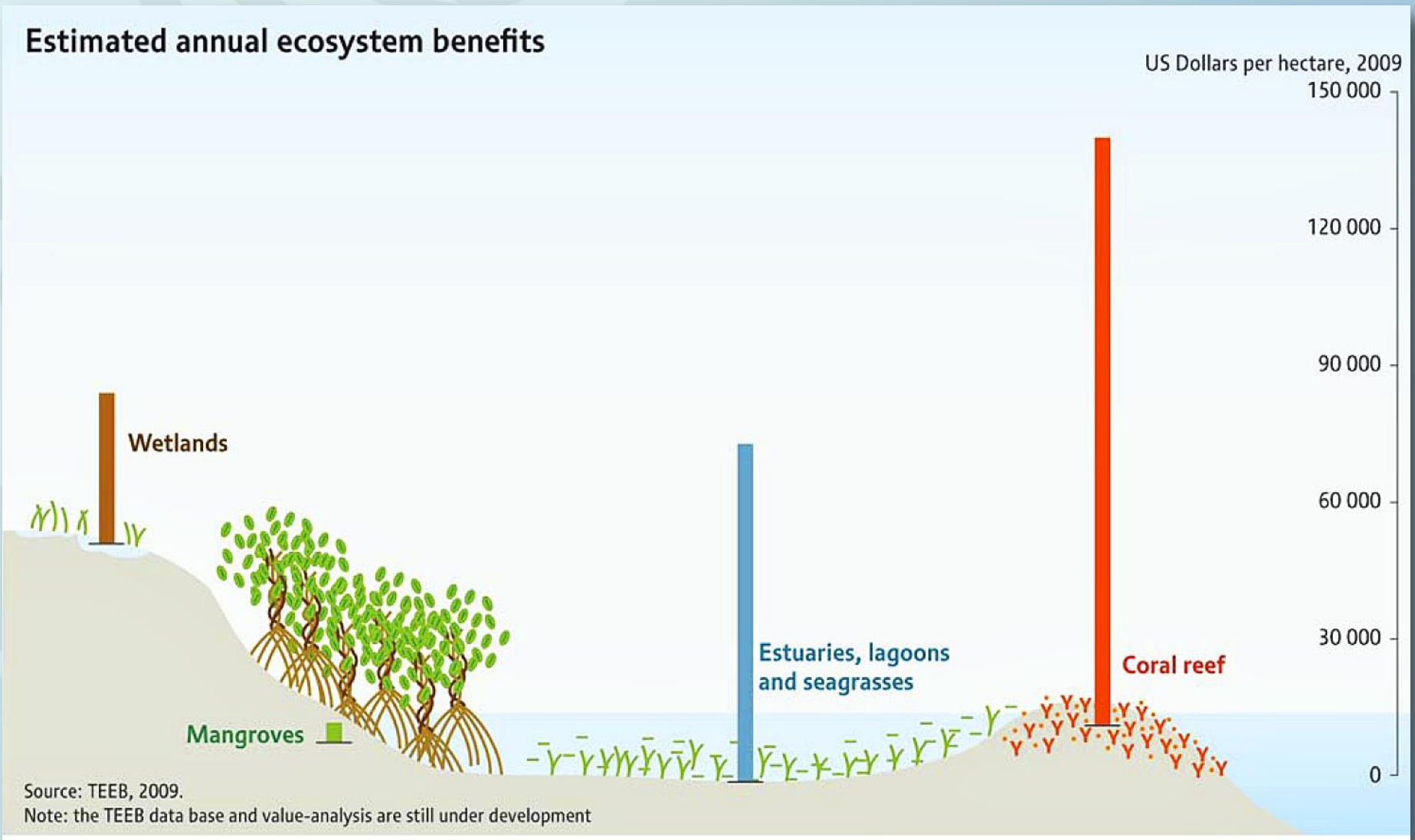



Pacific island people reliant on natural resources

Ecosystem services even more important today



Conceptual diagram illustrating the ecosystem services provided by oceans and the ways in which humans depend on oceans.



Estimated annual ecosystem benefits for coastal ecosystems

Non-Climate Change Environmental Challenges

Non-Climate Change Development/Environment Issues

Mining and Logging

Pollution and Waste

Coastal Development

Unsustainable Fishing

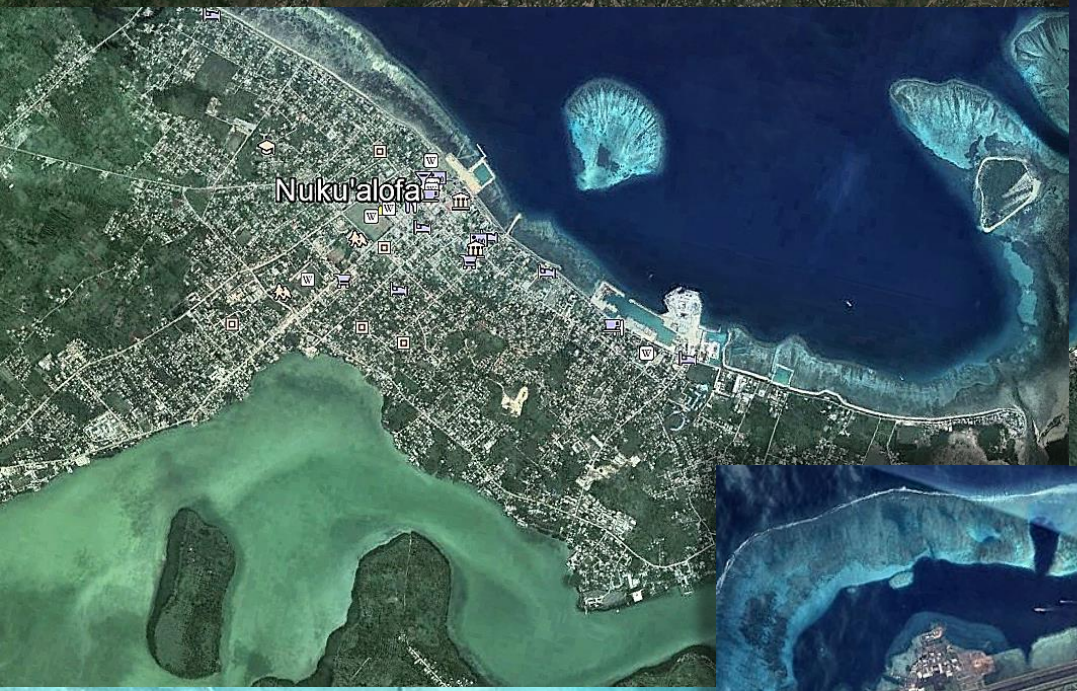
Invasive Species

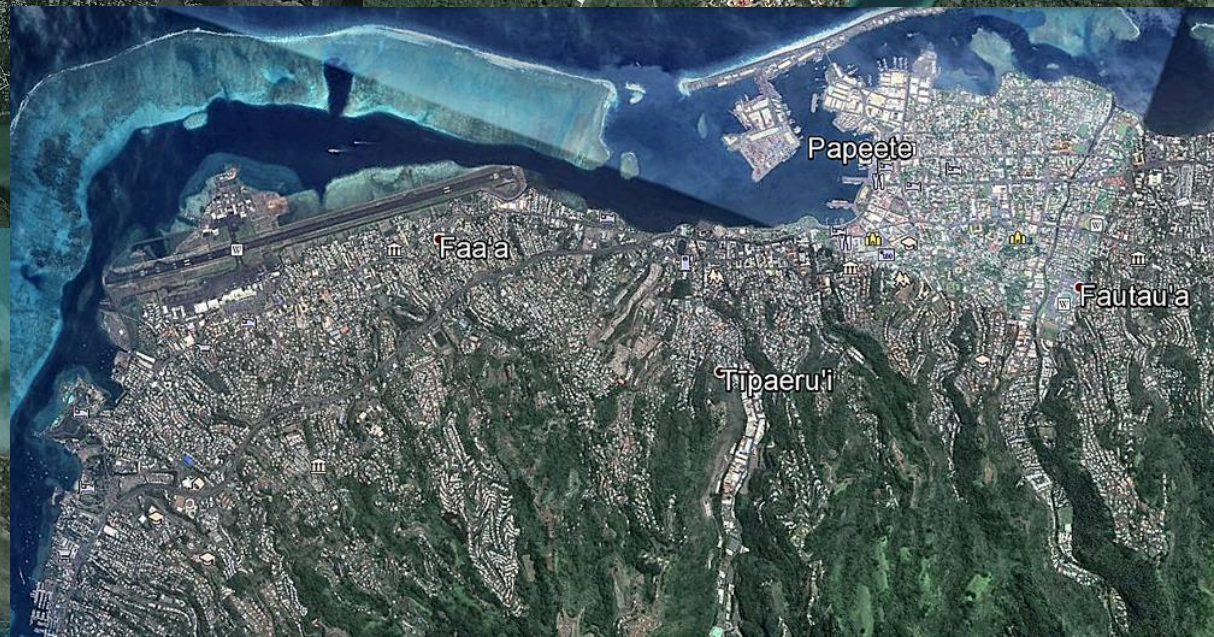
Emerging Uses

Pollution and Waste Management

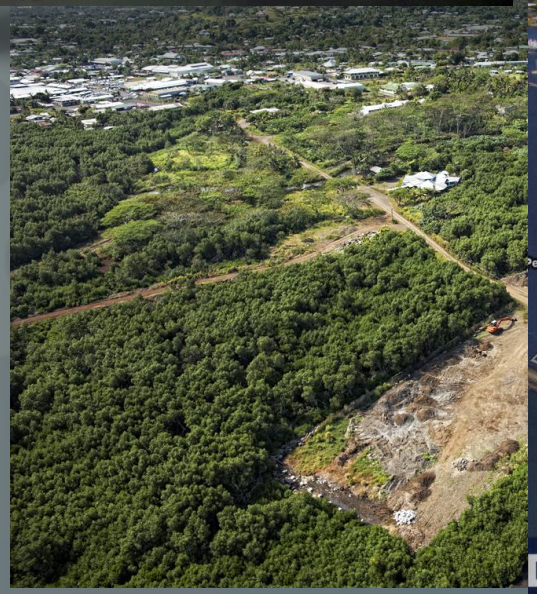
Increasing Urbanisation

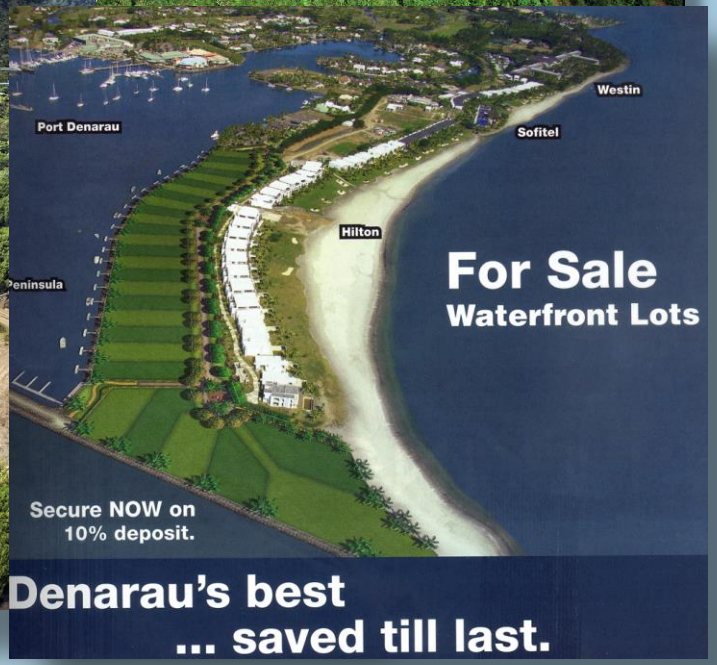
50% region's population is now urban

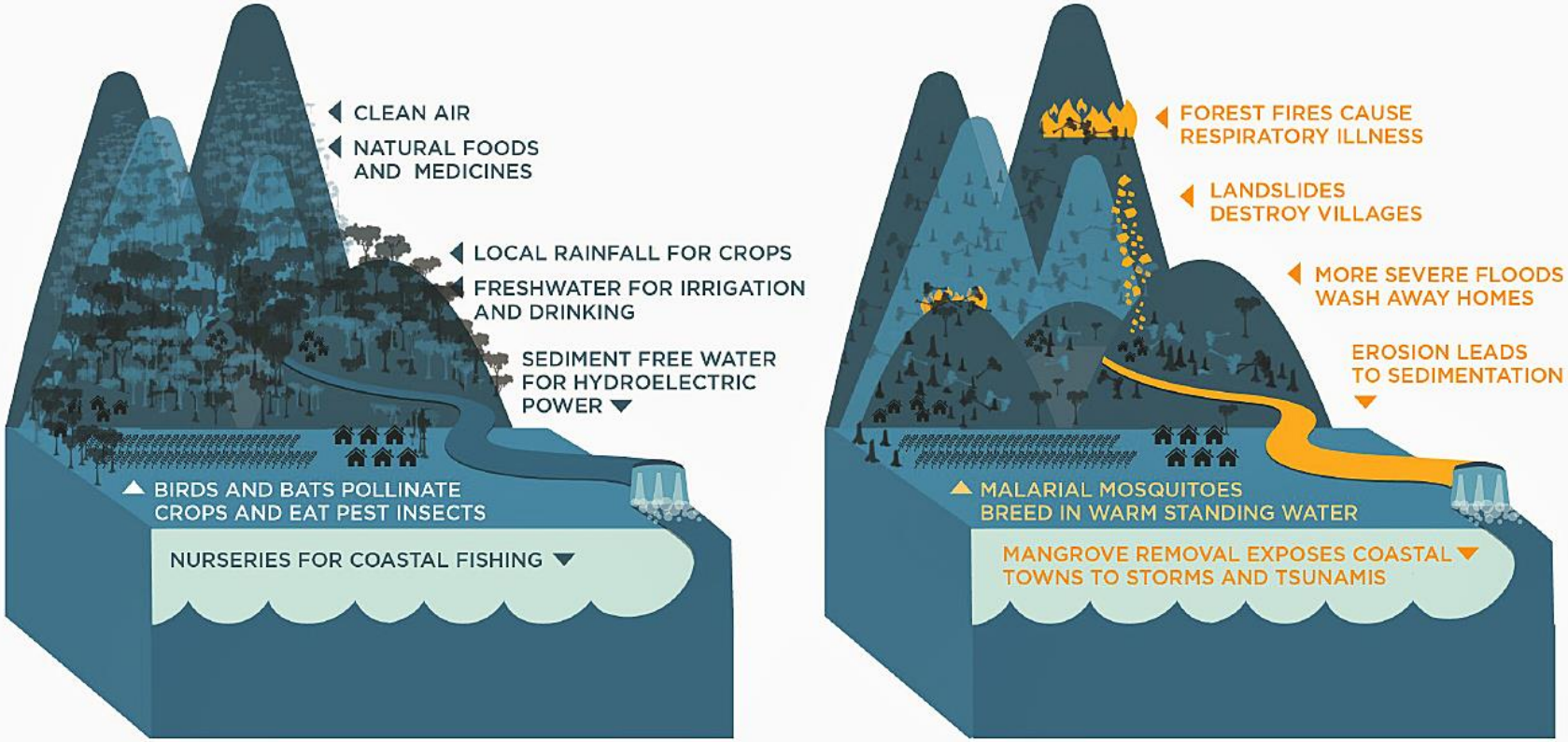




Governance/Natural Resource Management

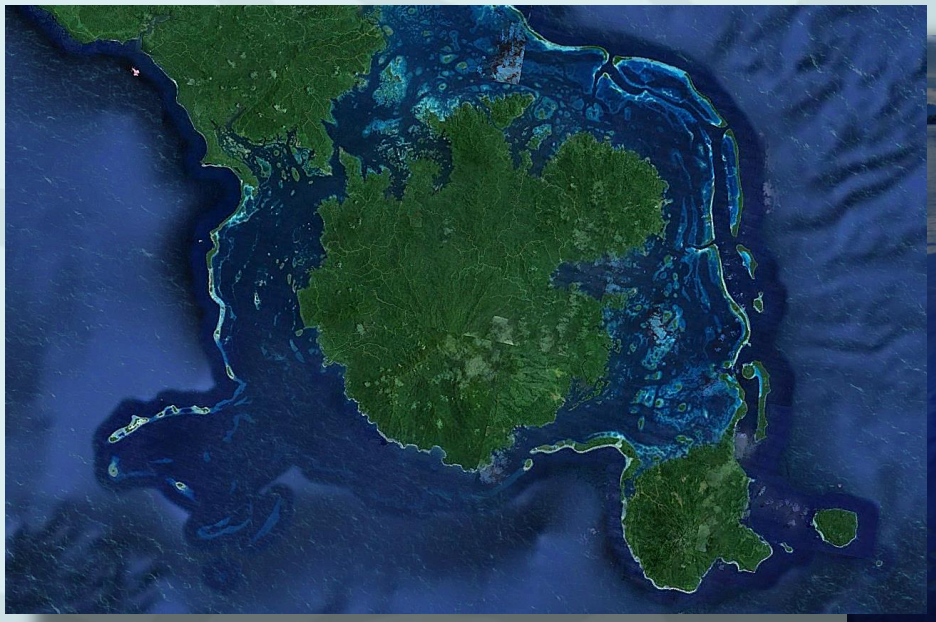


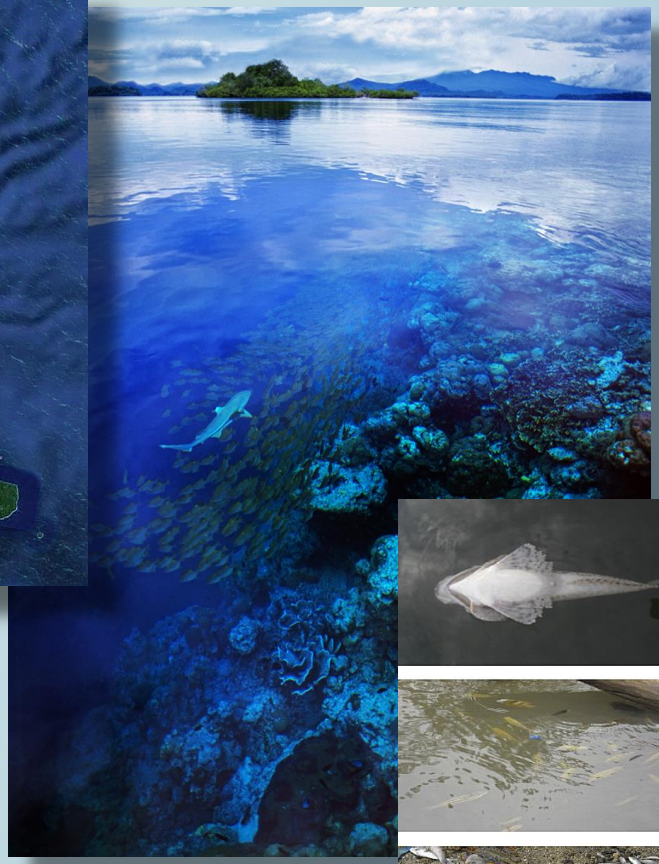


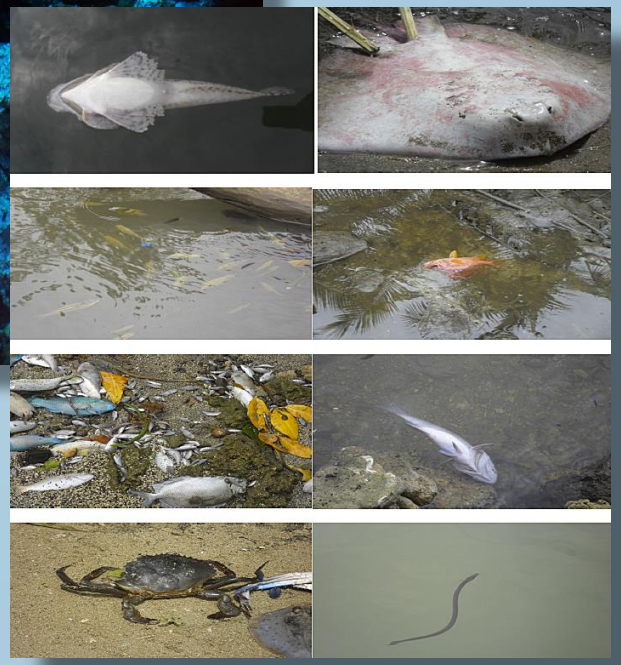

INTACT FOREST
CLEAN AIR
NATURAL FOODS AND MEDICINES
LOCAL RAINFALL FOR CROPS
FRESHWATER FOR IRRIGATION AND DRINKING
SEDIMENT FREE WATER FOR HYDROELECTRIC POWER
BIRDS AND BATS POLLINATE CROPS AND EAT PEST INSECTS
NURSERIES FOR COASTAL FISHING
DEFORESTATION
FOREST FIRES CAUSE RESPIRATORY ILLNESS
LANDSLIDES DESTROY VILLAGES
MORE SEVERE FLOODS WASH AWAY HOMES
EROSION LEADS TO SEDIMENTATION
MALARIAL MOSQUITOES BREED IN WARM STANDING WATER
MANGROVE REMOVAL EXPOSES COASTAL TOWNS TO STORMS AND TSUNAMIS
Center for Global Development

Logging impacts on community fresh water supplies and coastal ecosystems

Marovo Lagoon, Solomon Islands 2011





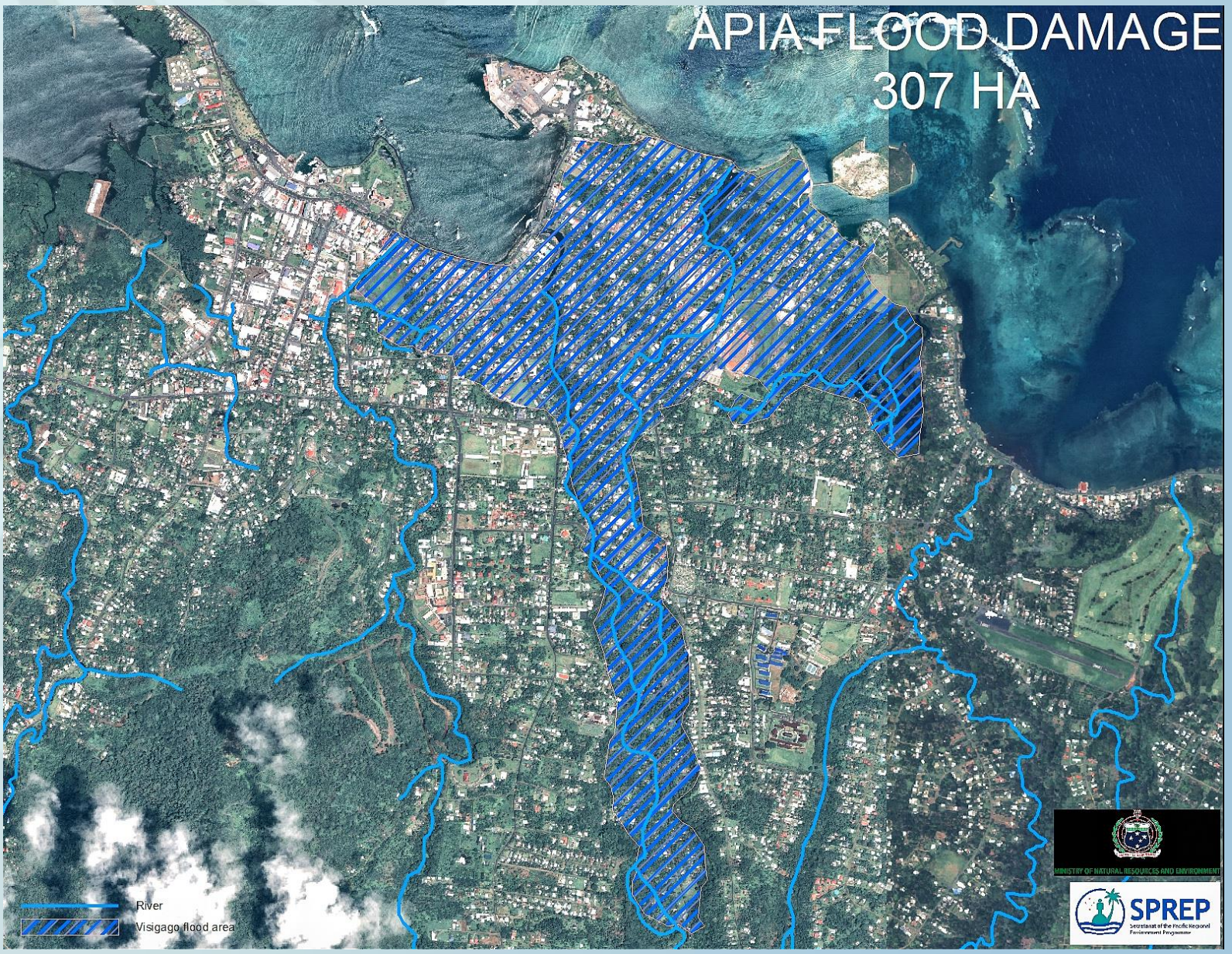


Algal bloom over 50-60 km^2, possibly caused by sedimentation from logging operations

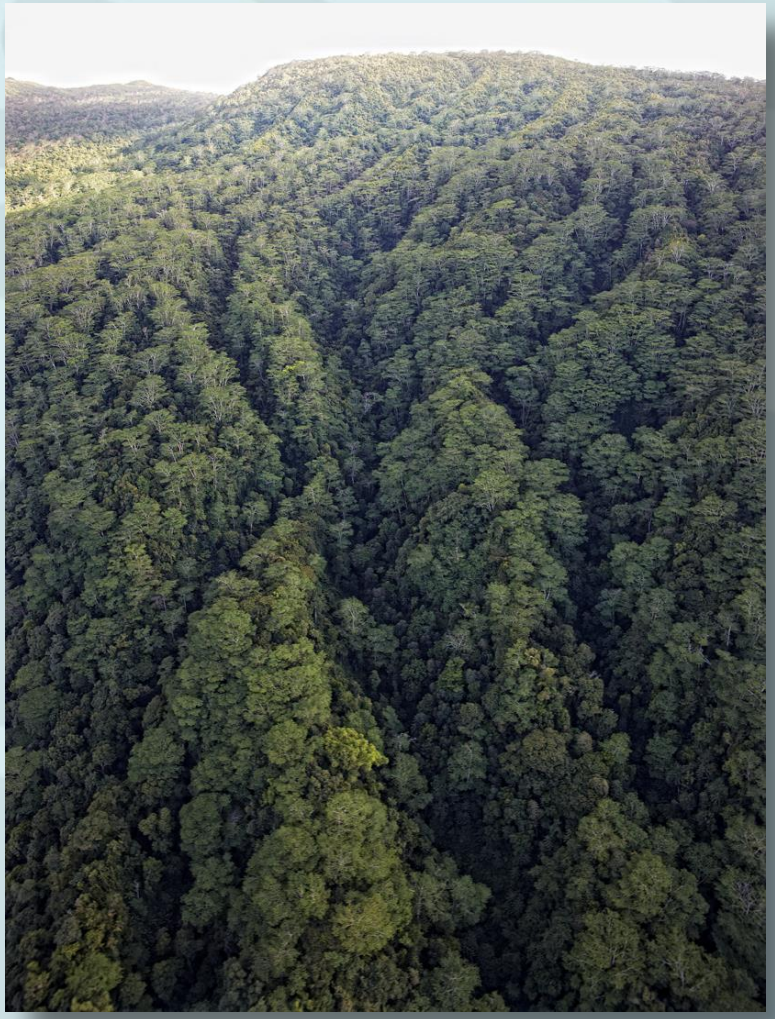
Invasive Species

Natural Disasters

Invasive Species and Disasters

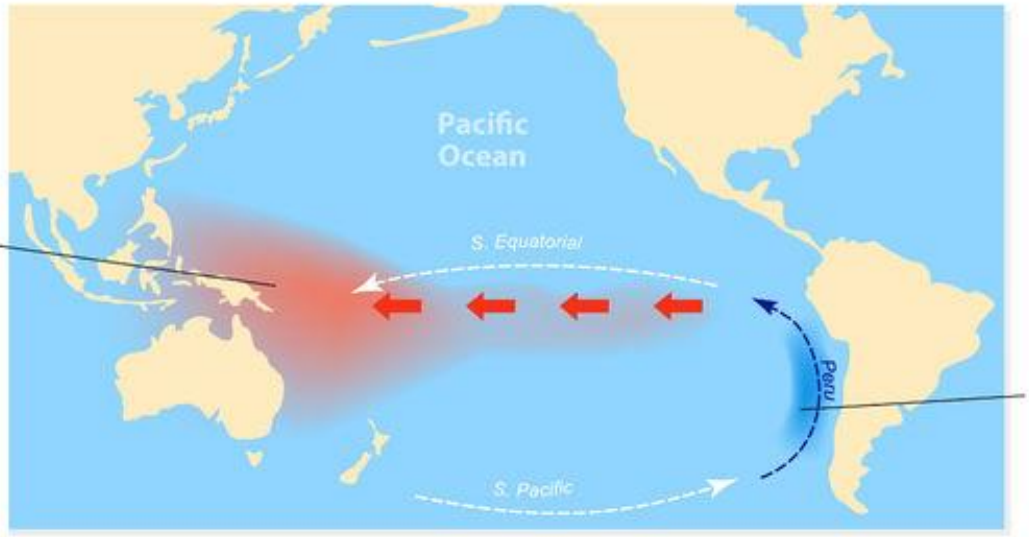


Invasive Species and Disasters



THE EL NIÑO PHENOMENON

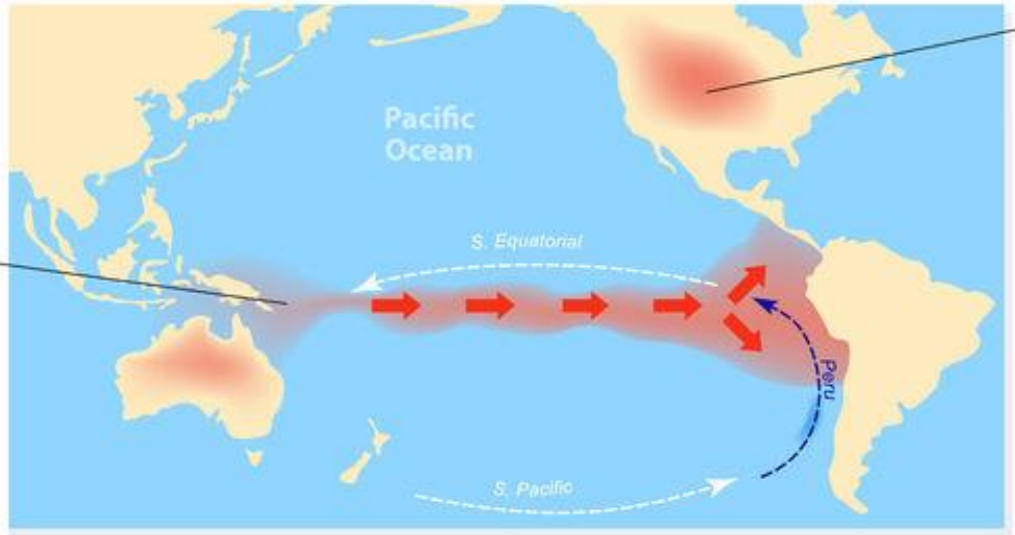
NORMAL YEAR



Equatorial winds gather warm water pool toward the west.

Cold water along South American coast.

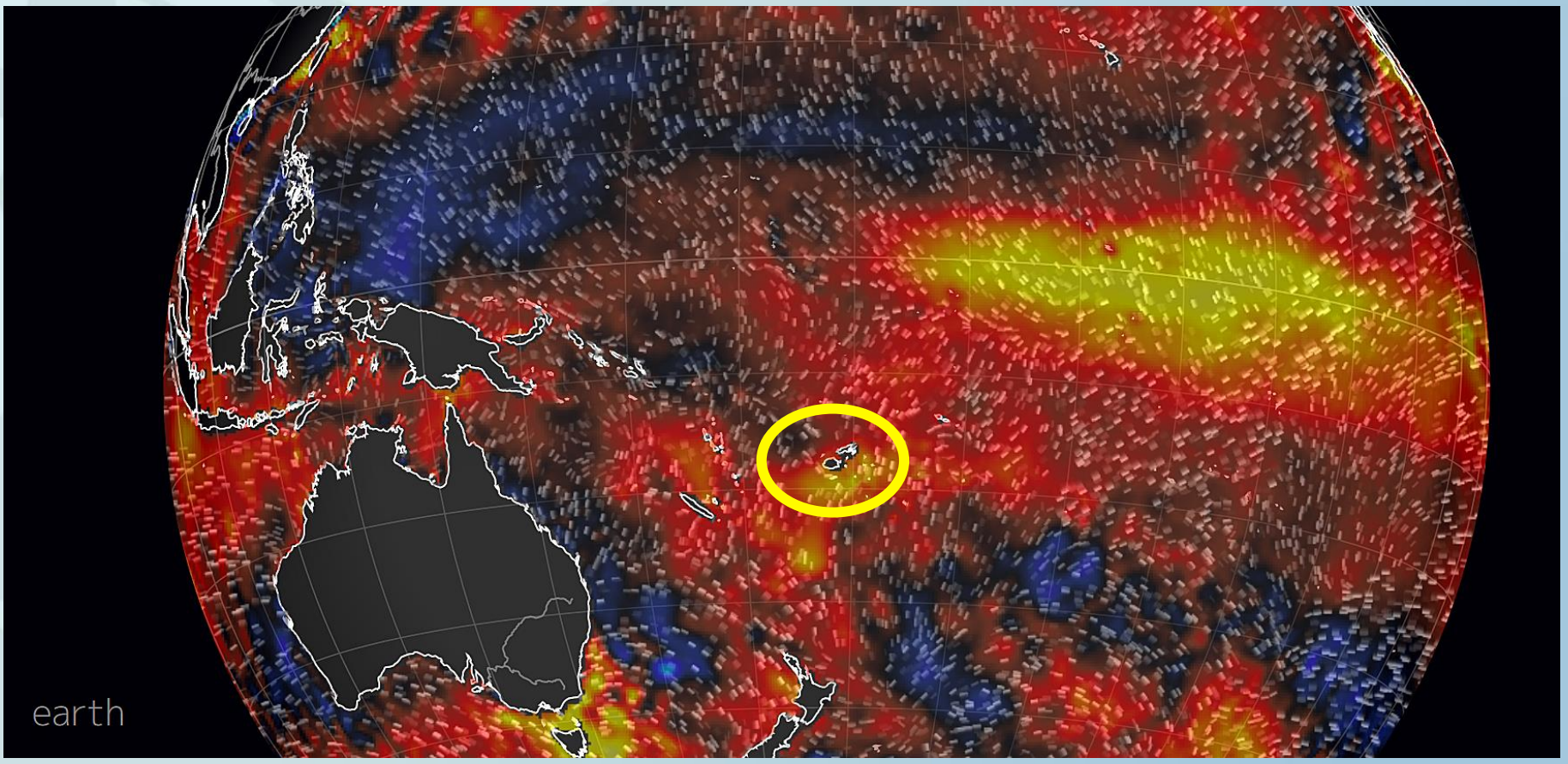
EL NIÑO YEAR



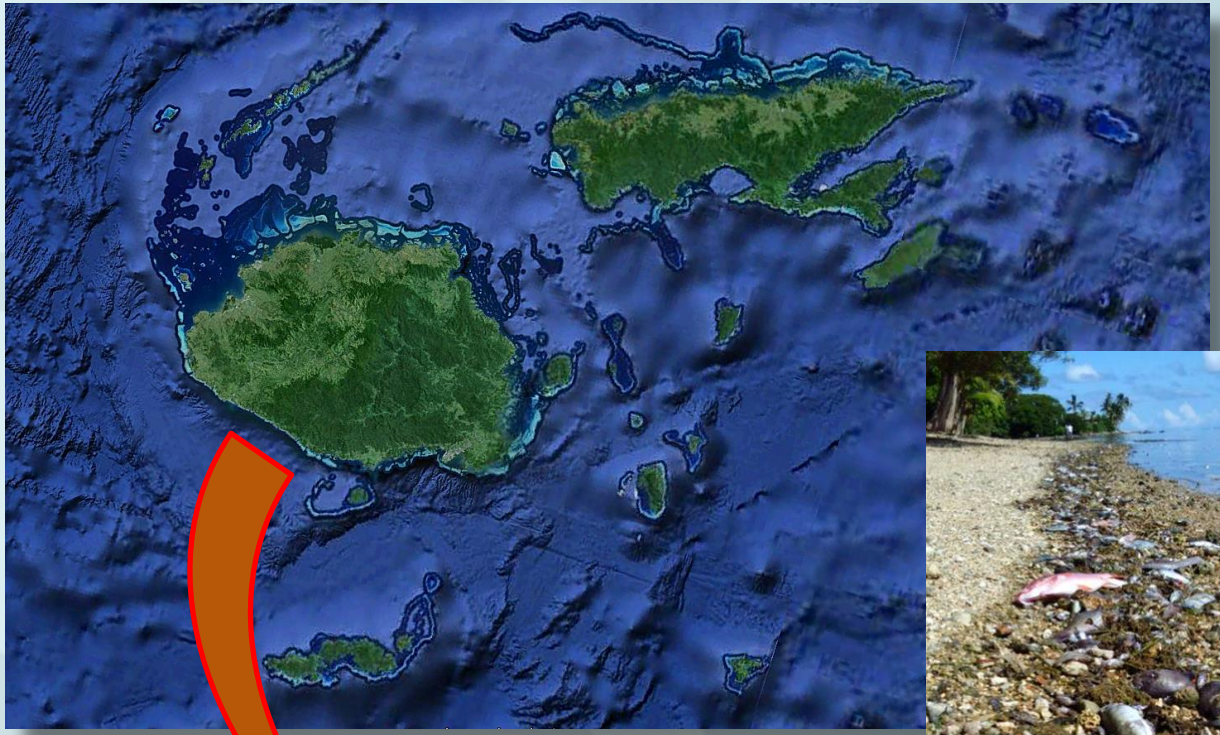
Warmer winter

Easterly winds weaken. Warm water to move eastward.

El Nino 2015-2016: SST



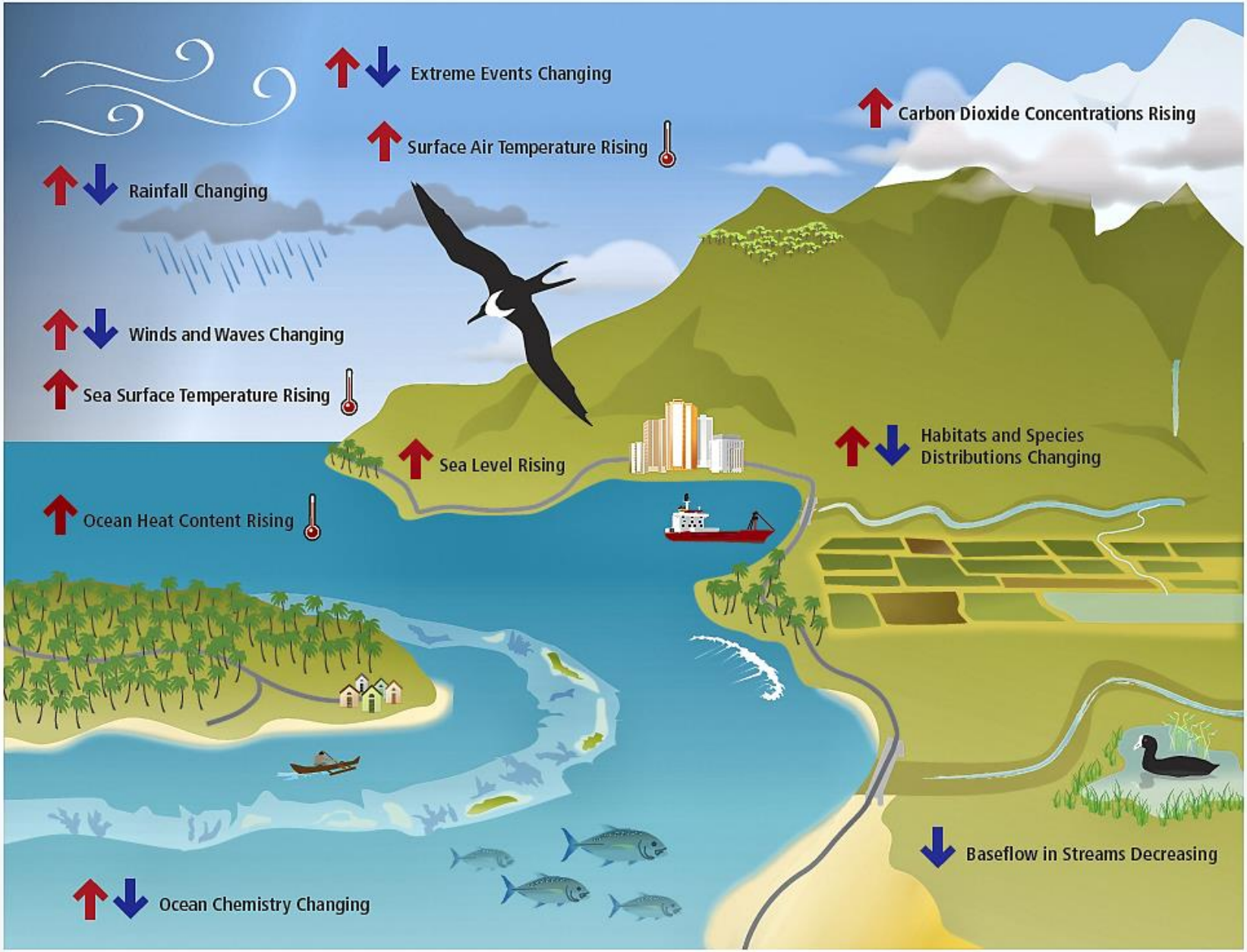
Fiji February 2016: Extreme Sea Temperatures



Major fish die-off

Climate Change Impacts

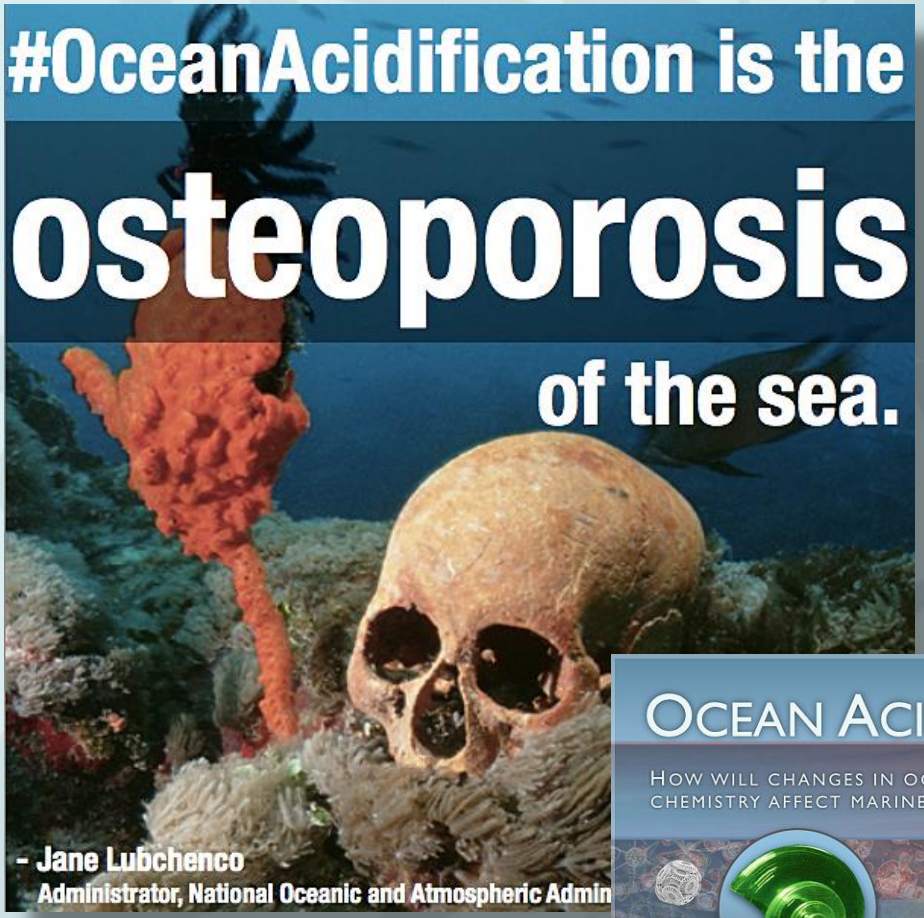
Climate Change in Pacific Islands Region

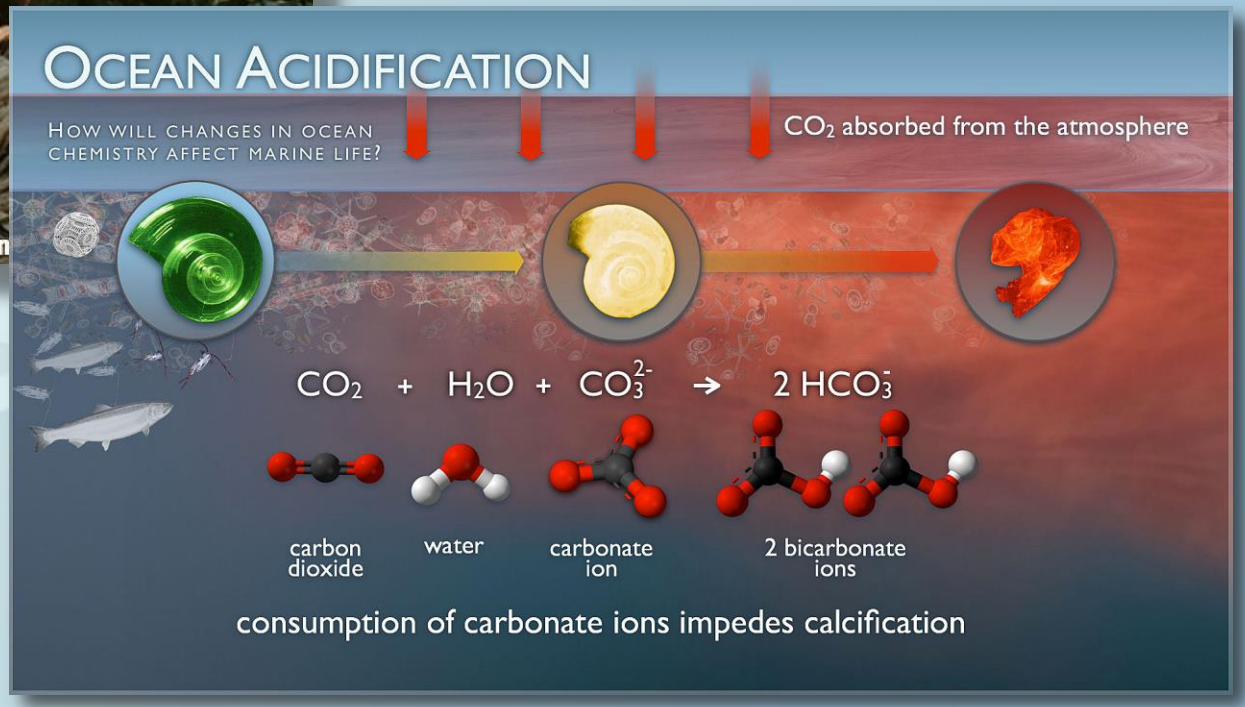


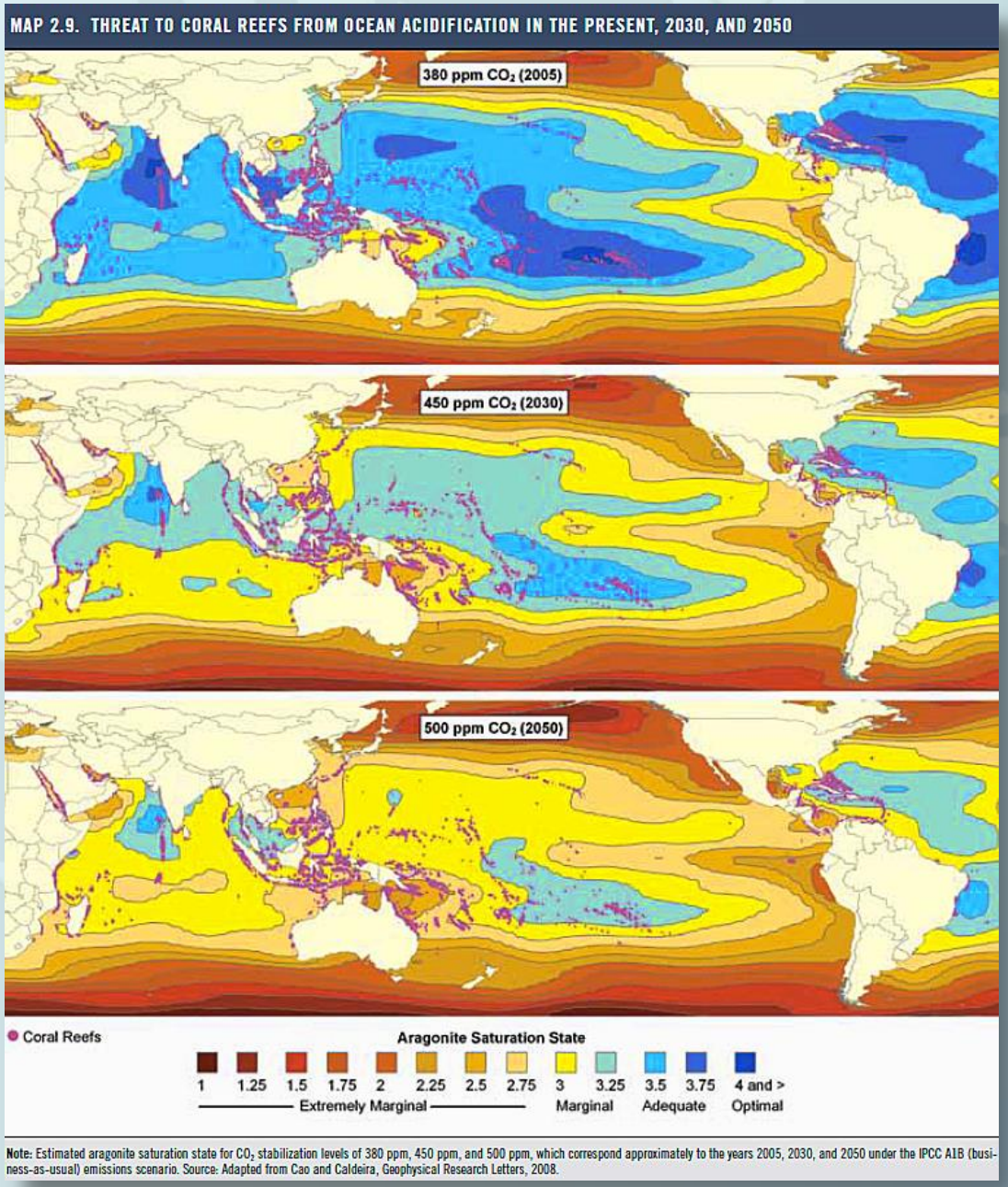
Sea Level Rise

The Marshall Islands Are Disappearing

Ocean Acidification







"…even under good management…coral cover is expected to decrease from the present-day maximum of 40% to 15-30% by 2035 and 10-20% by 2050, matching the rate of decline over the past 30 years.

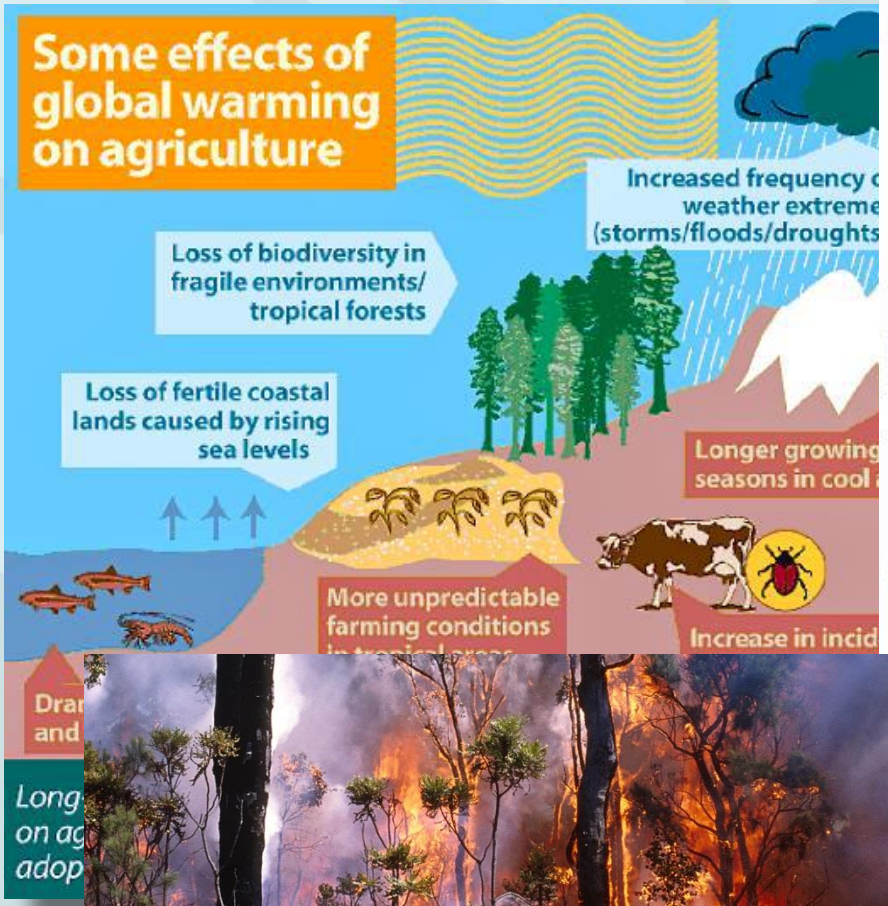
As coral cover decreases, the ability of corals to compete with macroalgae (seaweed) for space will be reduced, potentially leading to 40% seaweed cover on reefs by 2035". (Bell et al 2013)

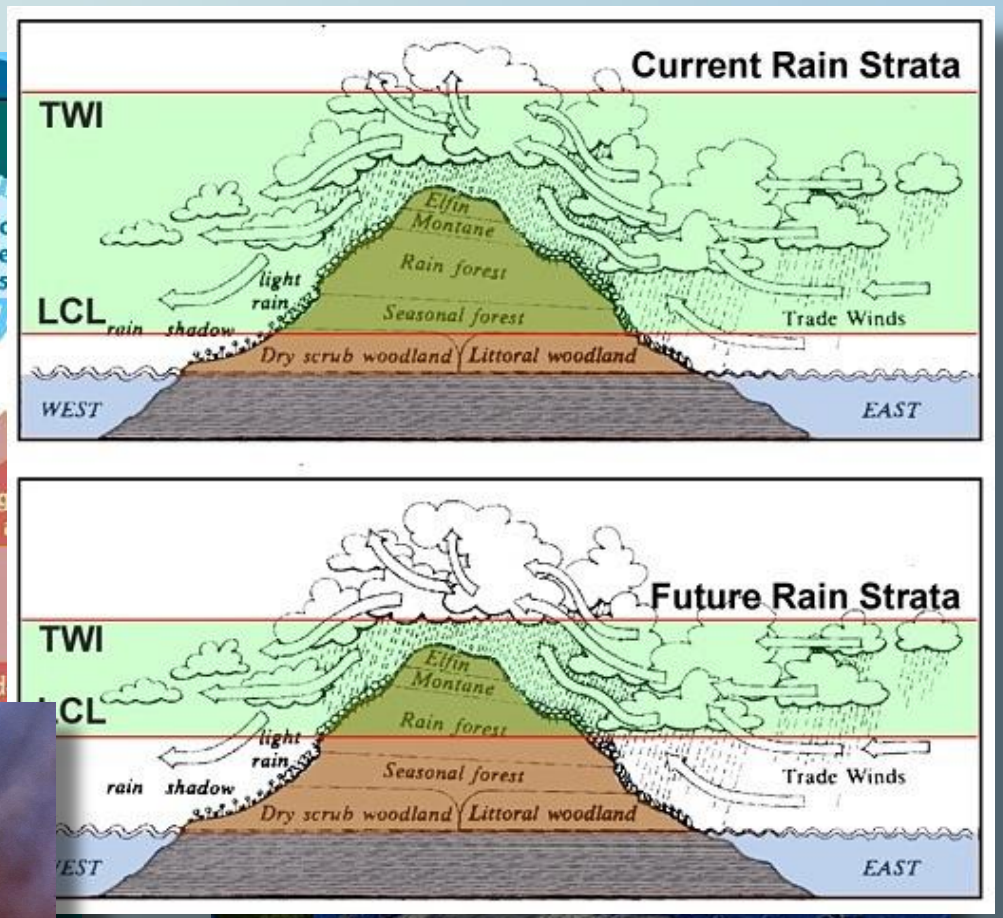
El Nino

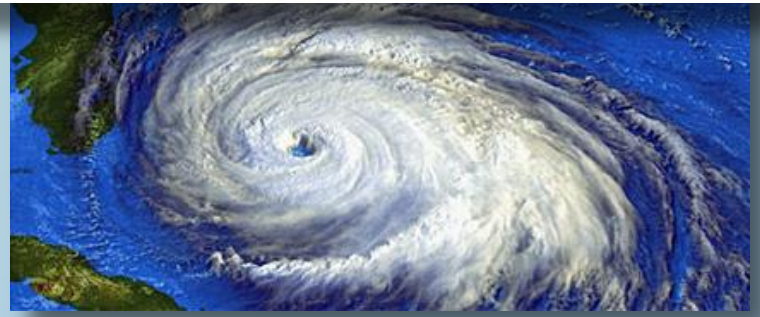
Ocean Acidification

?

Changing Rainfall Patterns and Weather Events







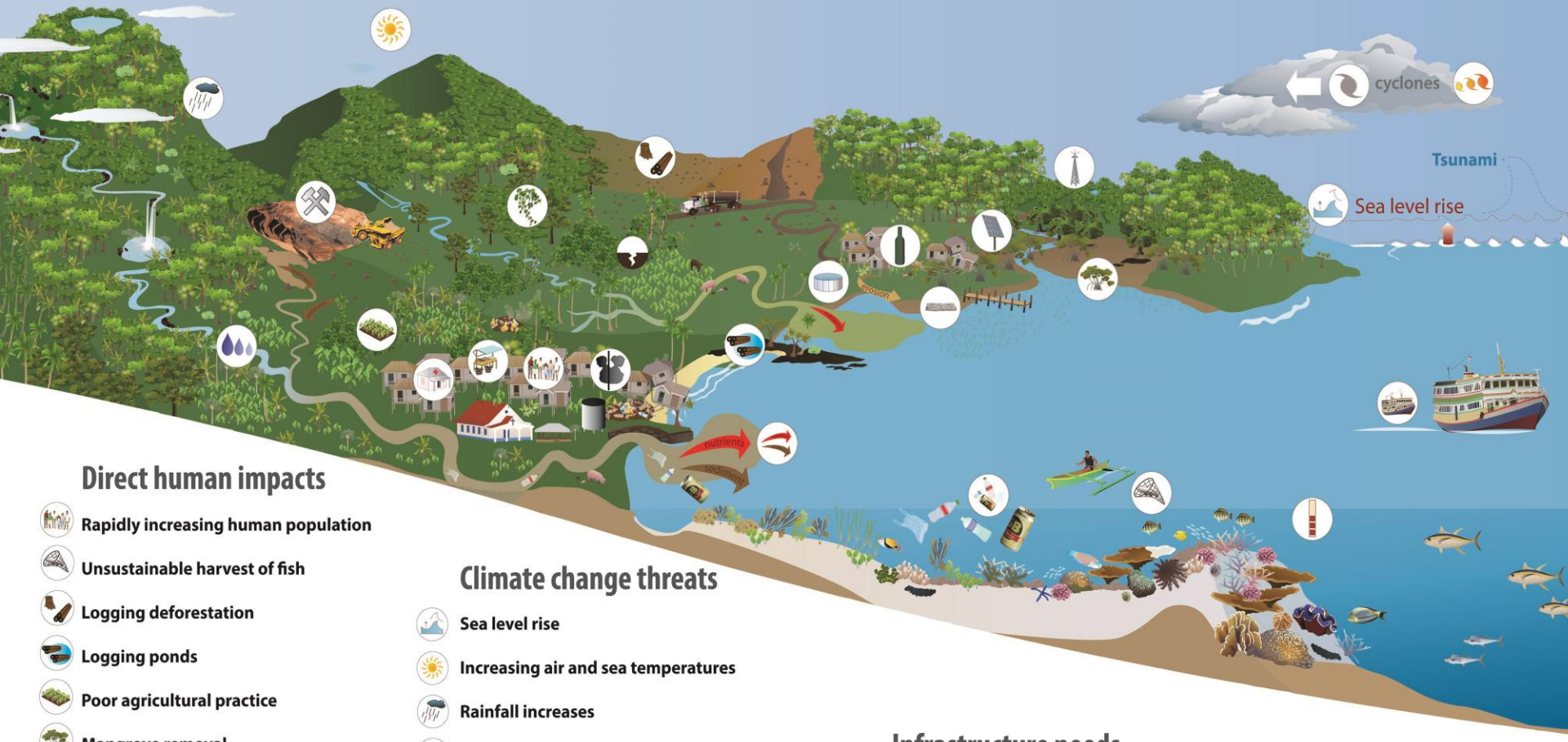
Lower Capacity for Resilience

Non-CC Impacts

Climate Change Impacts

Lower Capacity for Resilience

Threats identified by Choiseul communities + other known issues



Direct human impacts

- Rapidly increasing human population
- Unsustainable harvest of fish
- Logging deforestation
- Logging ponds
- Poor agricultural practice
- Mangrove removal
- Inappropriate coastal defences
- Proposed mining operations
- Invasive species
- Nutrient and sediment flow
- Inappropriate rubbish disposal

Climate change threats

- Sea level rise
- Increasing air and sea temperatures
- Rainfall increases
- More intense tropical cyclones
- Ocean acidification

Natural disasters

- Cyclones and tsunamis
- Drought
- Earthquake

Infrastructure needs

- Limited access to fresh water
- Lack of communication infrastructure
- Distance to markets
- Limited basic services
- Limited energy generation

Social challenges

- Reduced self reliance
- Cultural transition
- Gender inequities
- Foreign logging workers

Ecosystem-based Adaptation:

*By **taking into account the ecosystem services** on which people depend for their **livelihoods and social and economic security**, EbA **integrates sustainable use of biodiversity and ecosystem services in a comprehensive adaptation strategy*** (CBD 2009)

Need to fully integrate non-climate change issues

Benefits of Ecosystem-based Adaptation

- Aligns with and enhances **poverty alleviation** and **sustainable development strategies**
- **More accessible to rural and poor communities** – cost effective
- **Increases local engagement and action**, drives resource management to rural communities
- Enables **vulnerable communities** to **participate** directly in **resource management decisions**

Benefits of Ecosystem-based Adaptation

- **Precautionary** and addresses risk management – ensures that long-term **natural resources** that **provide resilience** are **not destroyed by short-term or emergency responses** to crisis
- **Provides** both **protective** and **provisioning services**
- Can **contribute** to **climate change mitigation**
- Builds on existing investments in **biodiversity conservation**

Need to Implement Good National Climate Change Policy that is Inclusive of EbA

Solomon Islands

National Climate Change Policy: ***"healthy and functioning ecosystems are crucial for the achievement of adaptation and mitigation objectives"***

Fiji

National Climate Change Policy: Adaptation Objective 5.5 *"support the* ***ecosystem-based approach throughout Fiji****, recognising that* ***ecosystem services****, such as food security, natural hazard mitigation and physical coastal buffer zones,* ***increase resilience****"*

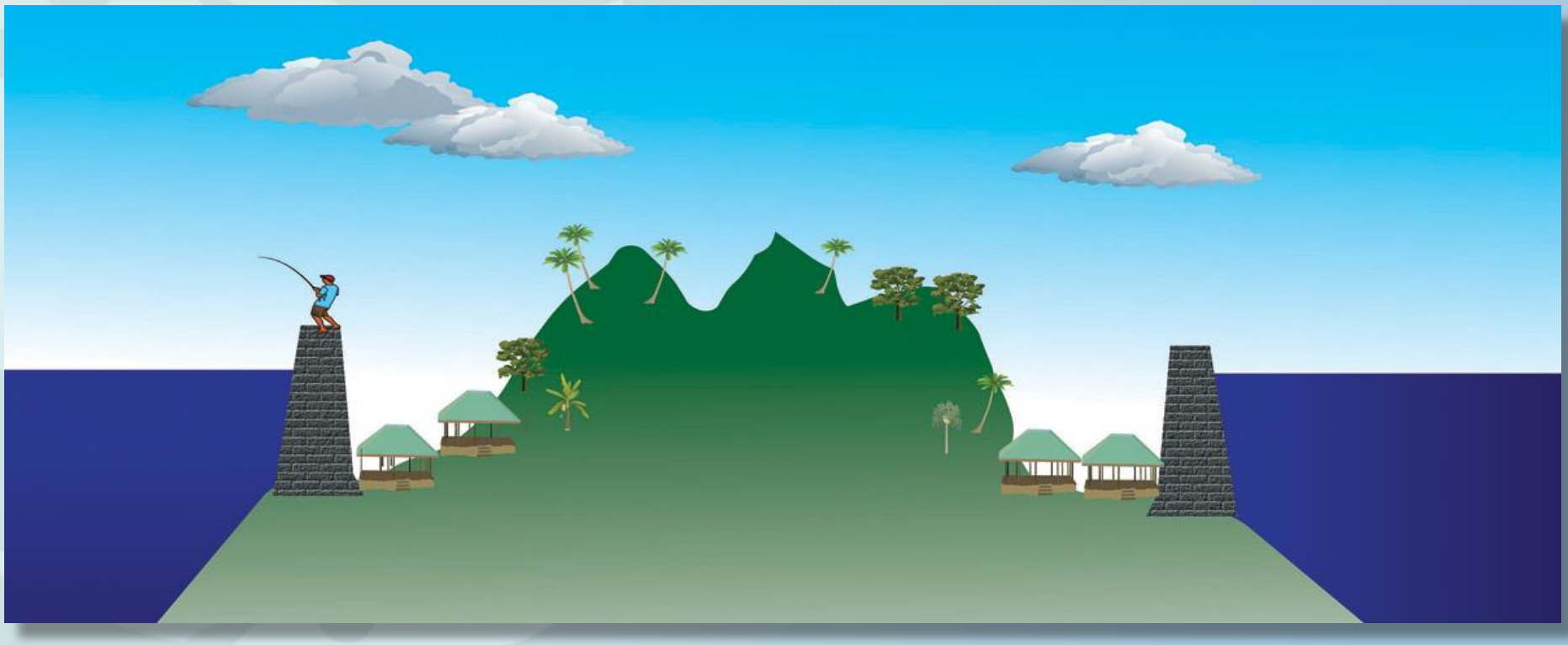
Vanuatu

Climate Change and Disaster Risk Reduction Policy : *"**effective natural resource management** can minimize the threat of climate change to ecosystems whilst enhancing livelihoods resilience….*
***Embedding action and planning within an ecosystem**, strengthening all interrelated parts and components (social, biological, economic)"*

What Needs to Change

- **Integration** of **climate change adaptation options** with the **ecosystem approach**
- **Holistic** – all **adaptation options** reviewed in the context of **sustainability**: **livelihoods, ecosystem services protected**
- **Non-climate change issues receive equal weight** in government policy and its implementation
- Donors to fund holistic **national level approaches**
- Governments need to undertake **national scale long-term resilience-focused scenario planning**
- **Ecosystem and socio-economic resilience analysis and mapping (ESRAM)** completed to integrate CC and non-CC threats into **ecological and social vulnerability *and opportunity*** assessments as a basis for adaptation planning at national, provincial and community levels

Understand the Options



Understand the Implications

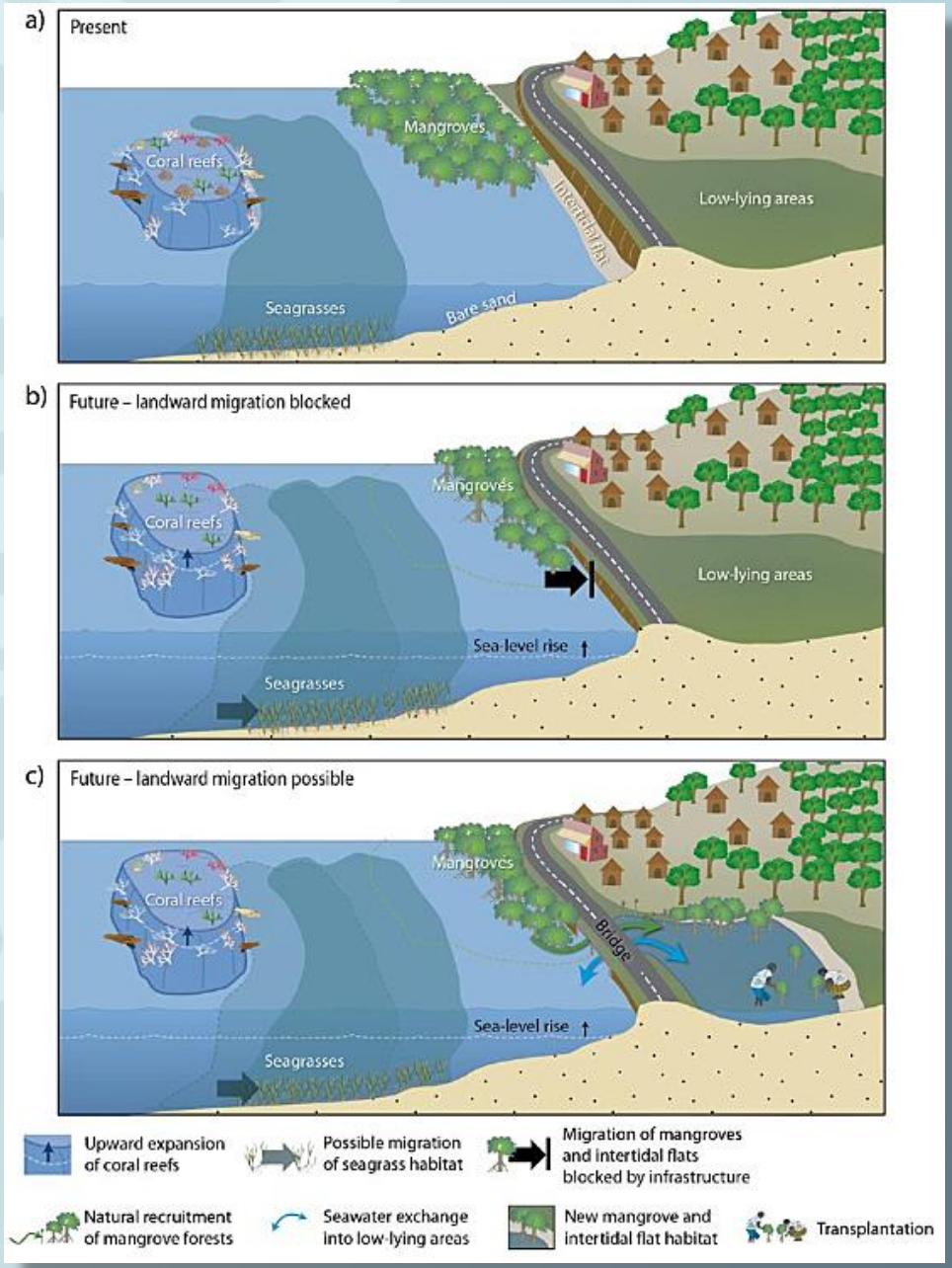
Avoid cheap and nasty ‘protection’ measures

Understand Infrastructure Construction and Maintenance Costs

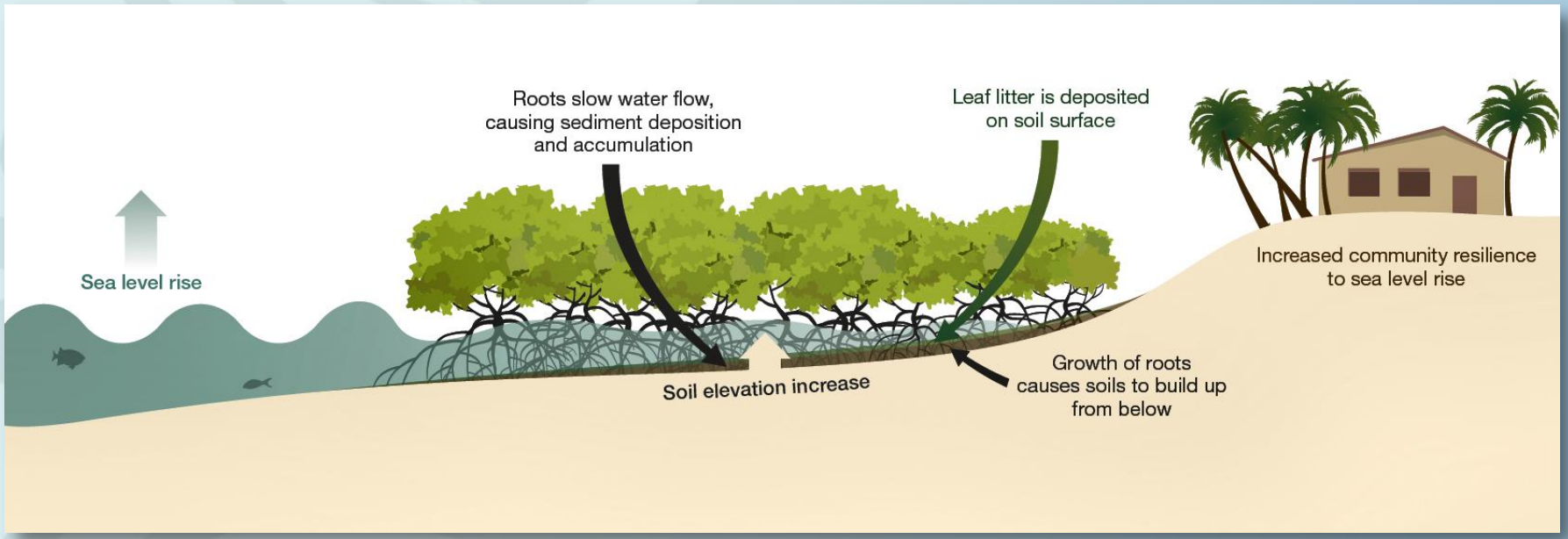
Maldives

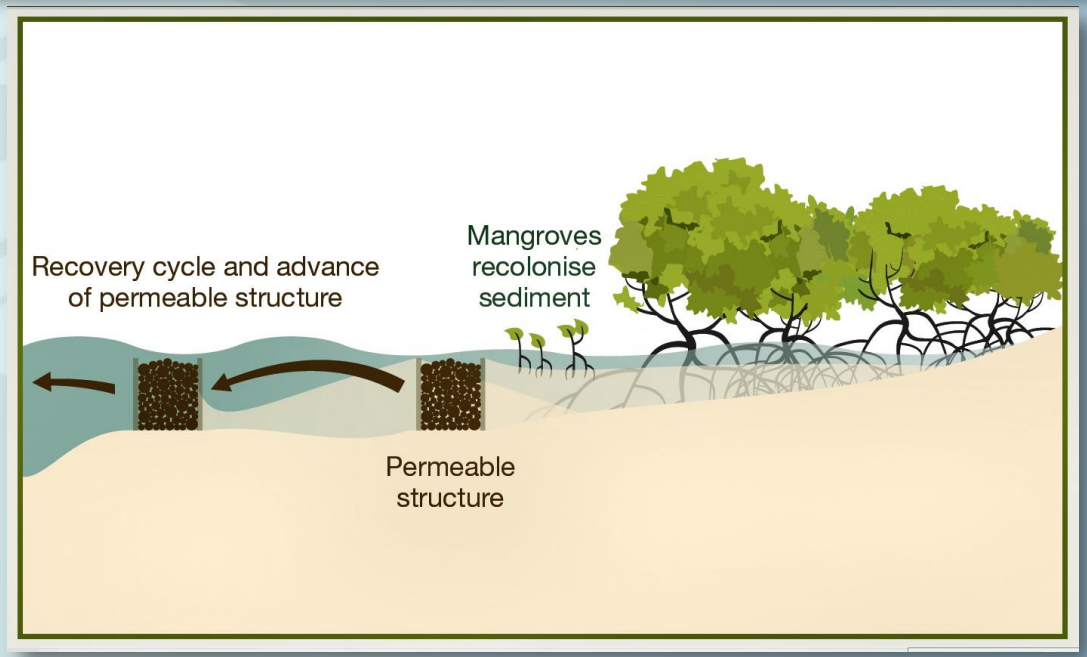
Sea wall around Malé cost $54 million, or $12.4 million per km.
Maldives has 2,002 km coastline – seawall $24.8 billion enterprise.
With current annual GDP, it would take more than three decades to raise the funds

Allow for Ecosystem Shift in Development Planning



Maintain and/or Restore Coastal Ecosystems

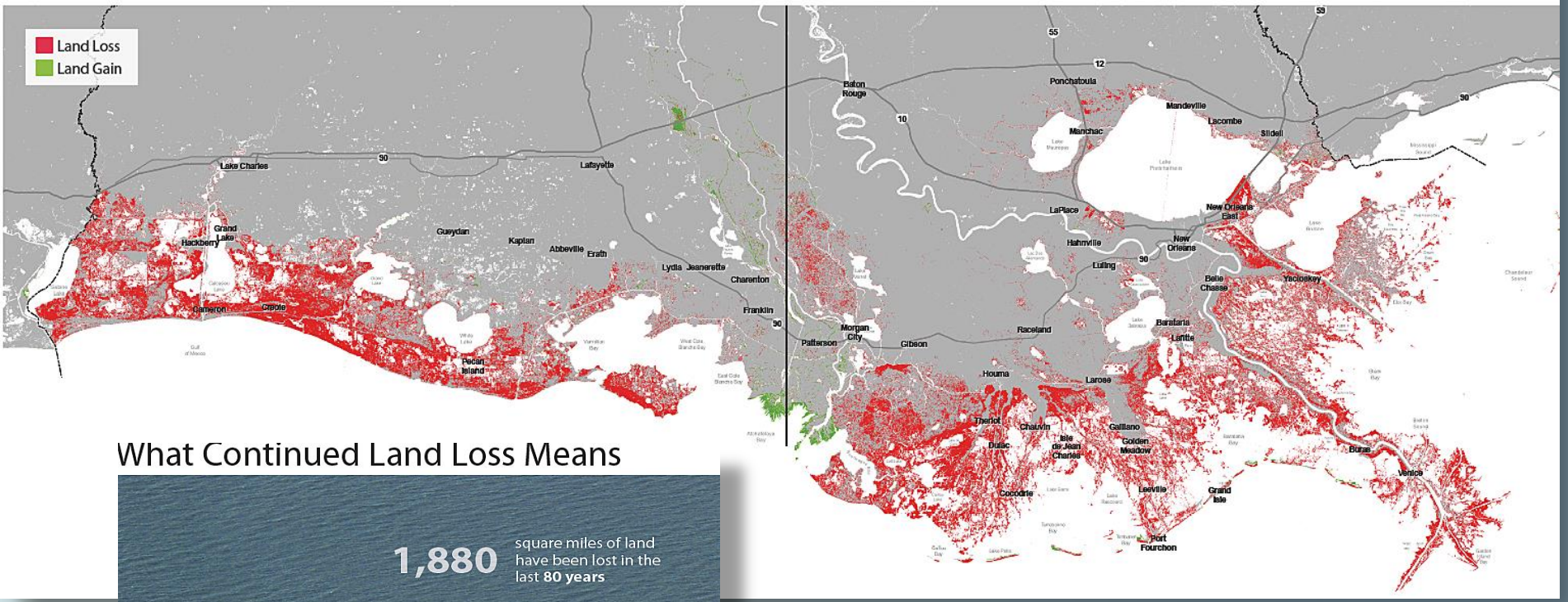




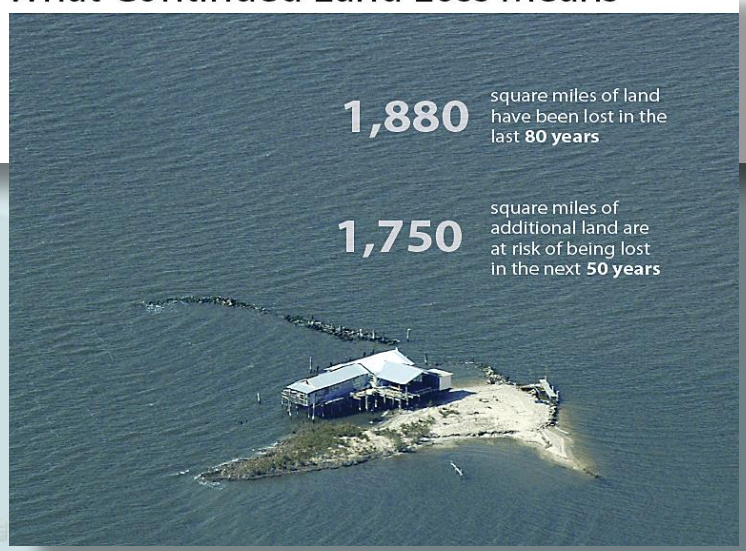
Louisiana, USA

Louisiana is Experiencing a Coastal Crisis

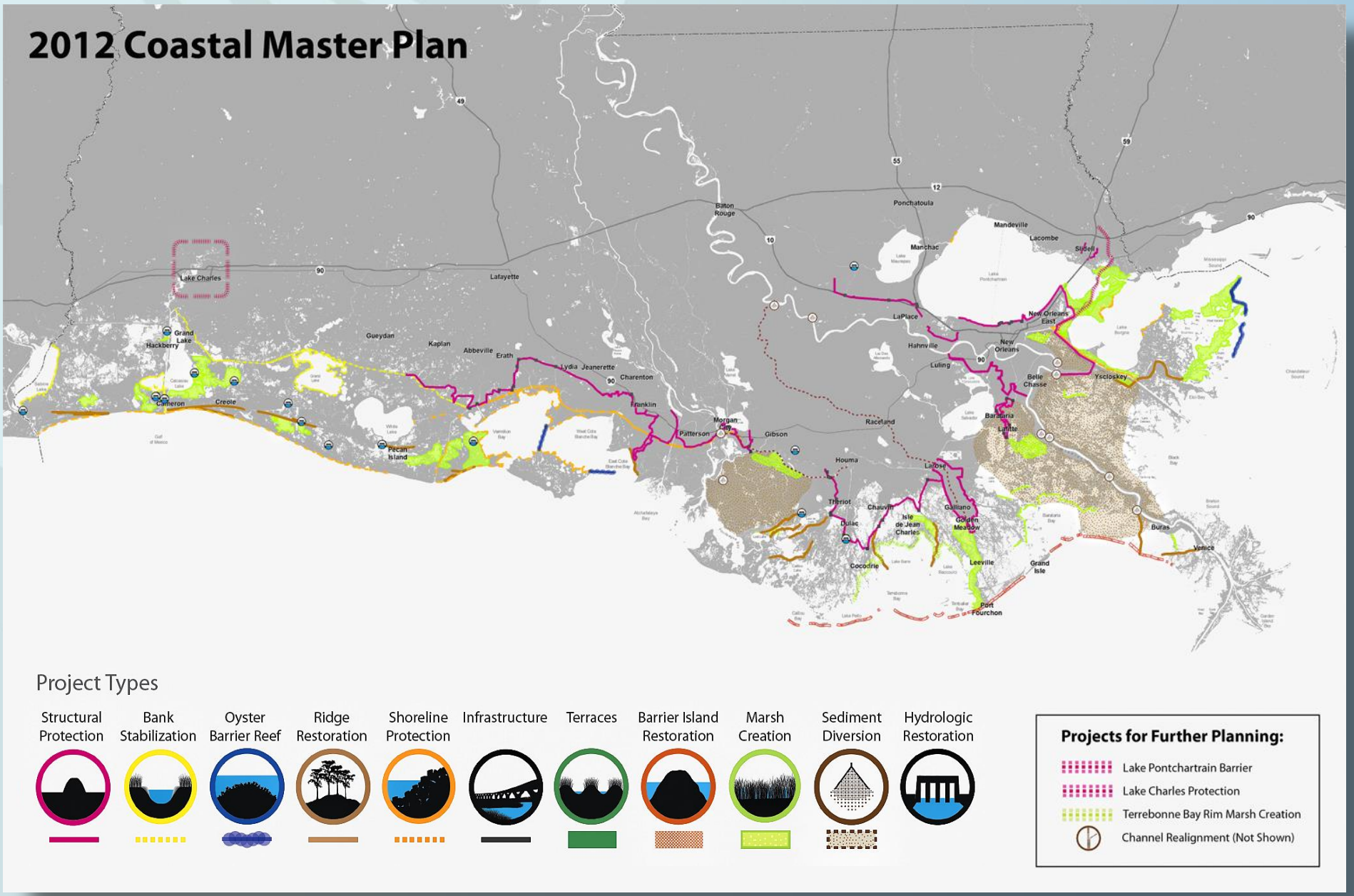
Predicted Land Change over the Next 50 Years



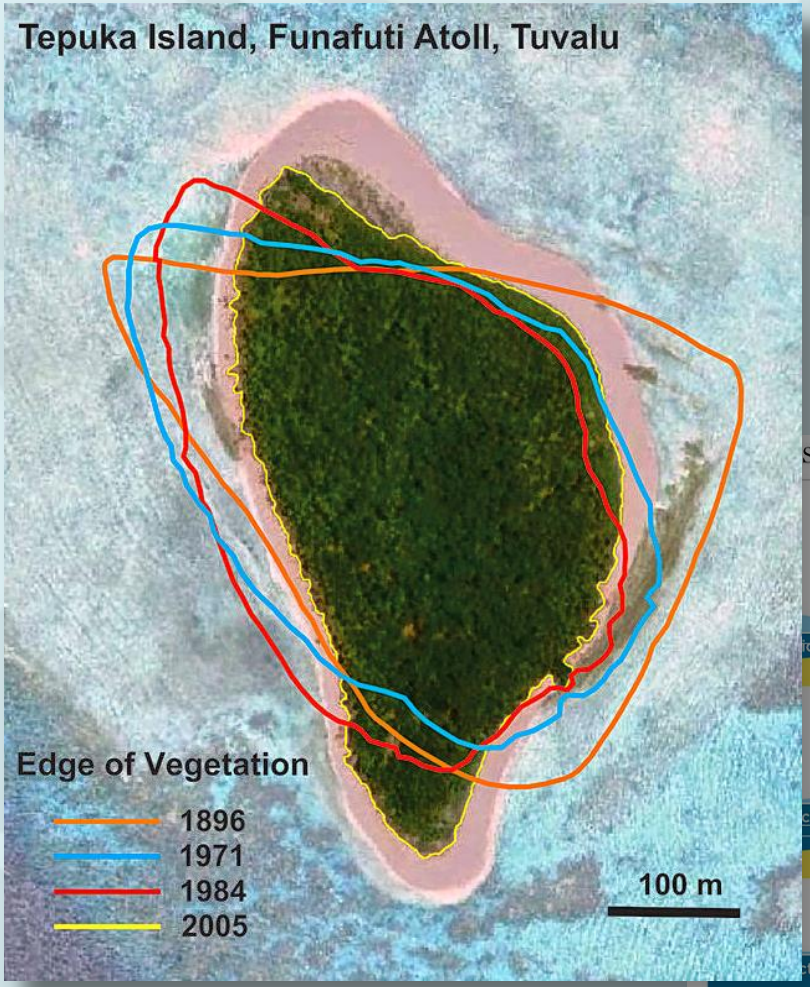
What Continued Land Loss Means

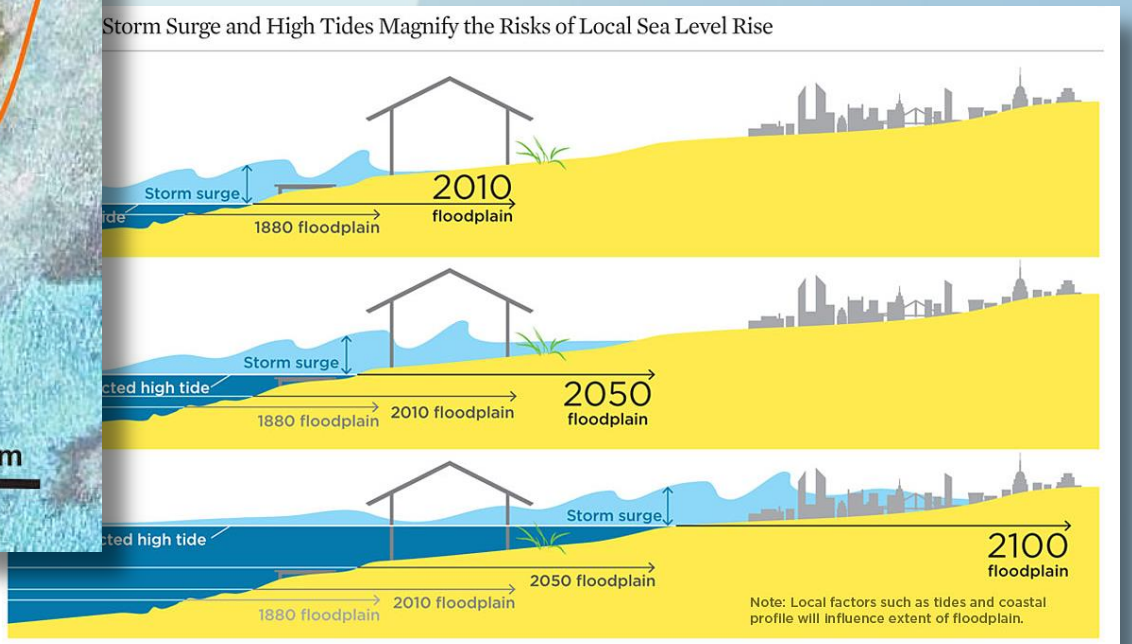


Louisiana, USA



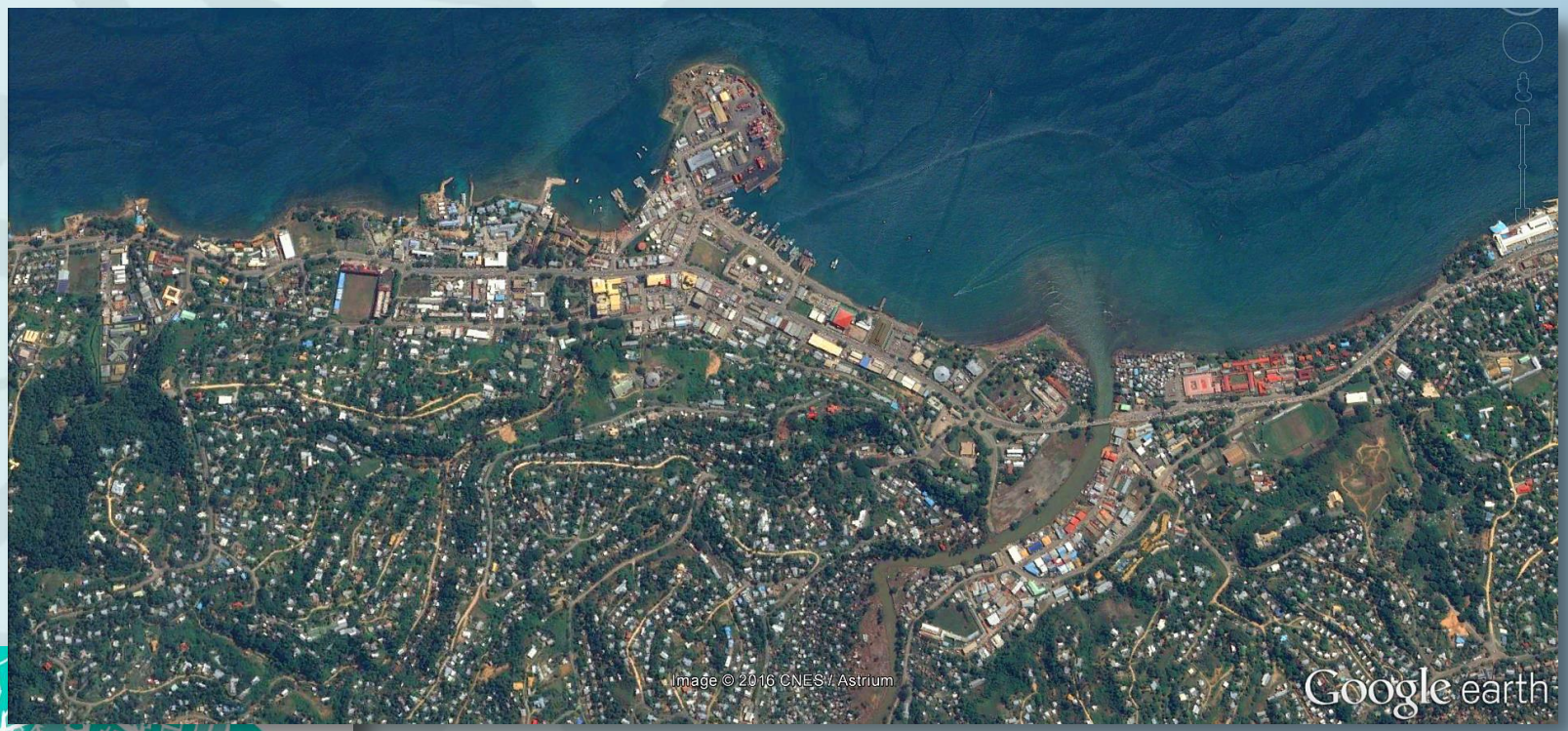
Apply Good Analytical Science to Underpin Decisions

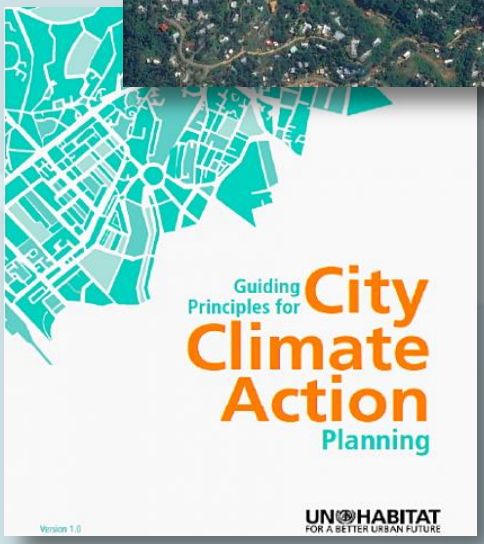




Sea level sets a baseline for storm surge—the potentially destructive rise in sea height that occurs during a coastal storm. As local sea level rises, so does that baseline, allowing coastal storm surges to penetrate farther inland. With higher global sea levels in 2050 and 2100, areas much farther inland would be at risk of being flooded. The extent of local flooding also depends on factors like tides, natural and artificial barriers, and the contours of coastal land.

Apply Ecosystem/Environmental Approaches for Resilient Cities and Settlements





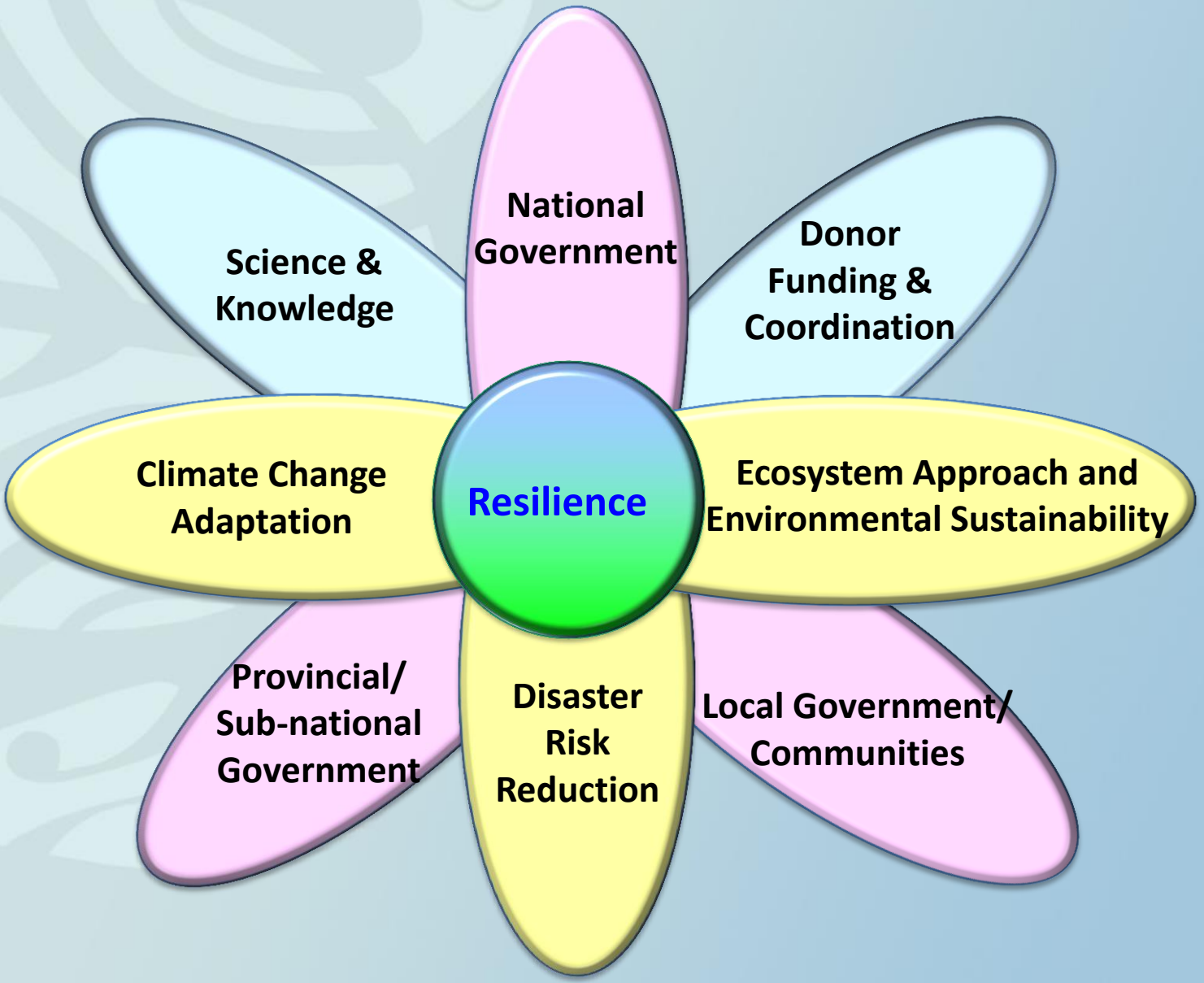
Trees for Cities

Policy to Implementation:
Landscape Scale that includes Community and Ecosystem Focus

National policy implementation ⟷ **Sub-national policy implementation** ⟷ **Community engagement**

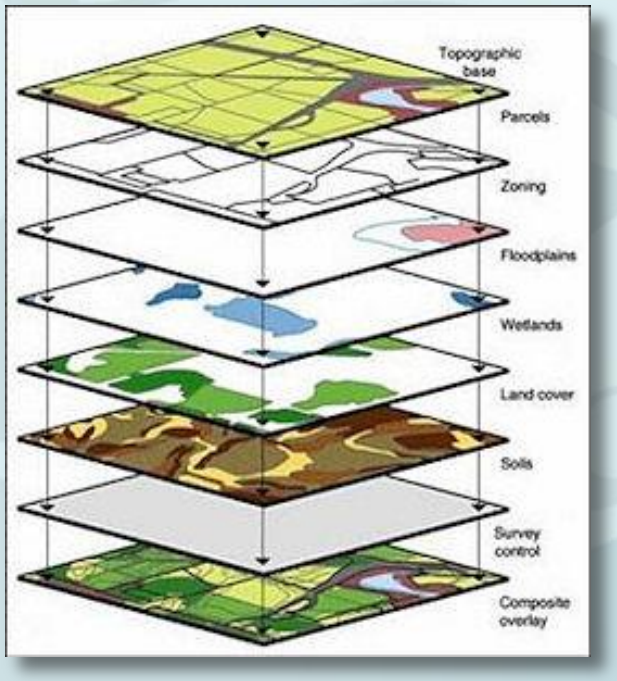
Country-wide integrated planning

Whole-of-island integrated planning, ridge to reef approach, watershed management, etc


National Government
Donor Funding & Coordination
Ecosystem Approach and Environmental Sustainability
Local Government/ Communities
Disaster Risk Reduction
Provincial/ Sub-national Government
Climate Change Adaptation
Science & Knowledge
Resilience

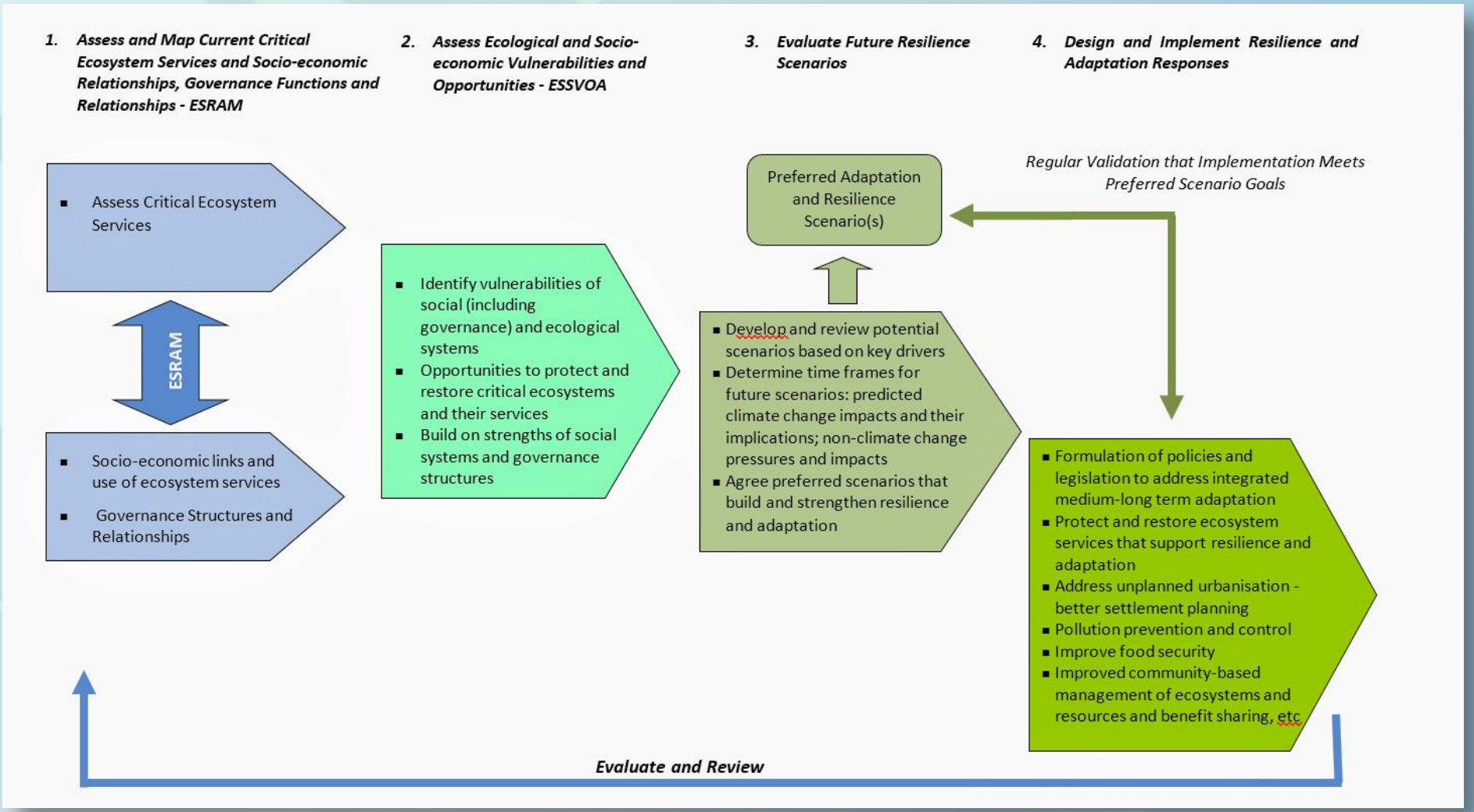
Undertake Ecosystem and socio-economic resilience analysis and mapping (ESRAM)

- ESRAM to integrate climate change and non-climate change threats into vulnerability assessments as a basis for adaptation planning at national, provincial and community levels

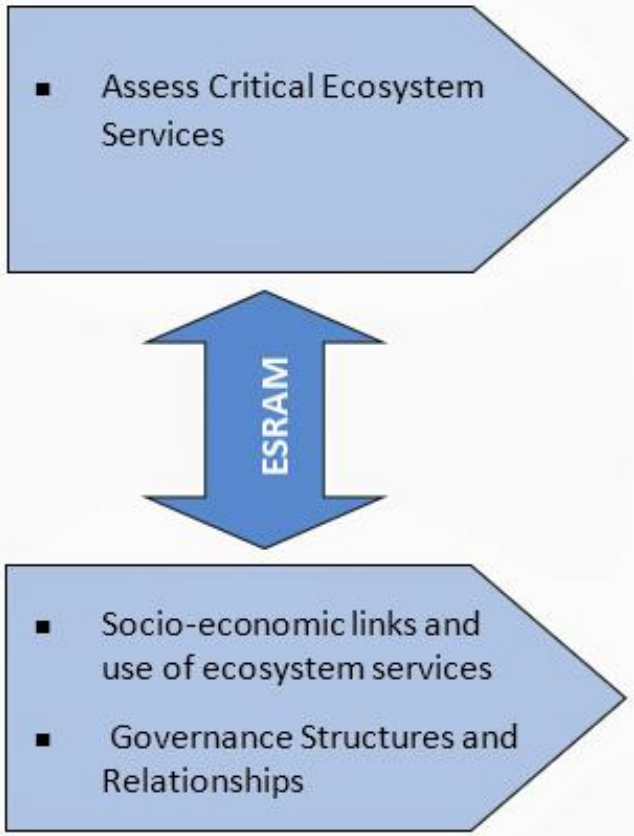


Ecosystem services and Socio-economic Vulnerability and Opportunity Assessments (**ESSVOA**)

More effective adaptation planning and implementation at all scales

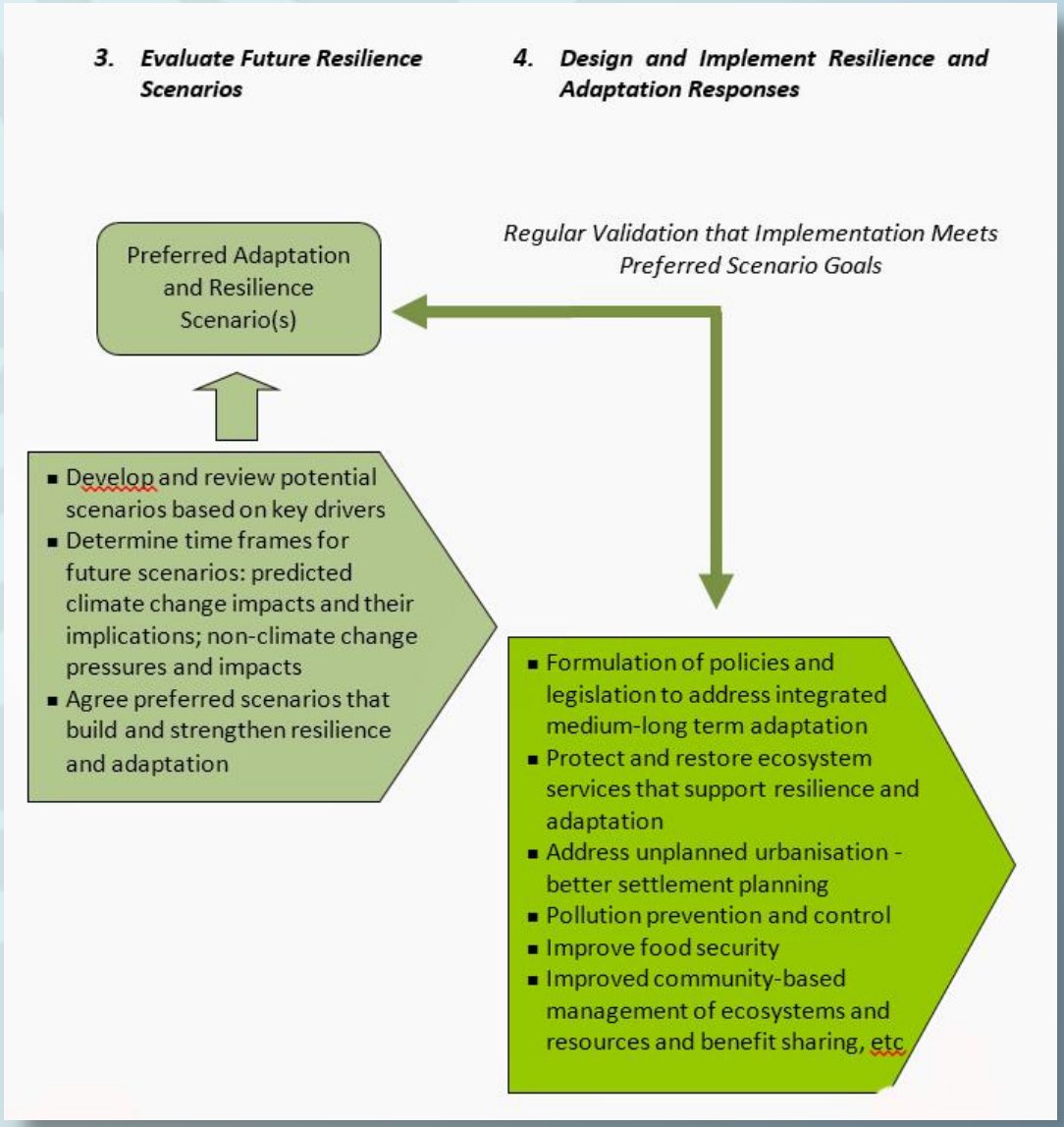

1. Assess and Map Current Critical Ecosystem Services and Socio-economic Relationships, Governance Functions and Relationships - ESRAM
2. Assess Ecological and Socio-economic Vulnerabilities and Opportunities - ESSVOA
3. Evaluate Future Resilience Scenarios
4. Design and Implement Resilience and Adaptation Responses
Assess Critical Ecosystem Services
ESRAM
Socio-economic links and use of ecosystem services
Governance Structures and Relationships
Identify vulnerabilities of social (including governance) and ecological systems
Opportunities to protect and restore critical ecosystems and their services
Build on strengths of social systems and governance structures
Develop and review potential scenarios based on key drivers
Determine time frames for future scenarios: predicted climate change impacts and their implications; non-climate change pressures and impacts
Agree preferred scenarios that build and strengthen resilience and adaptation
Preferred Adaptation and Resilience Scenario(s)
Regular Validation that Implementation Meets Preferred Scenario Goals
Formulation of policies and legislation to address integrated medium-long term adaptation
Protect and restore ecosystem services that support resilience and adaptation
Address unplanned urbanisation - better settlement planning
Pollution prevention and control
Improve food security
Improved community-based management of ecosystems and resources and benefit sharing, etc
Evaluate and Review

1. ***Assess and Map Current Critical Ecosystem Services and Socio-economic Relationships, Governance Functions and Relationships - ESRAM***



2. *Assess Ecological and Socio-economic Vulnerabilities and Opportunities - ESSVOA*

- Identify vulnerabilities of social (including governance) and ecological systems
- Opportunities to protect and restore critical ecosystems and their services
- Build on strengths of social systems and governance structures


3. Evaluate Future Resilience Scenarios
4. Design and Implement Resilience and Adaptation Responses
Preferred Adaptation and Resilience Scenario(s)
Regular Validation that Implementation Meets Preferred Scenario Goals
Develop and review potential scenarios based on key drivers
Determine time frames for future scenarios: predicted climate change impacts and their implications; non-climate change pressures and impacts
Agree preferred scenarios that build and strengthen resilience and adaptation
Formulation of policies and legislation to address integrated medium-long term adaptation
Protect and restore ecosystem services that support resilience and adaptation
Address unplanned urbanisation - better settlement planning
Pollution prevention and control
Improve food security
Improved community-based management of ecosystems and resources and benefit sharing, etc

Thank You!