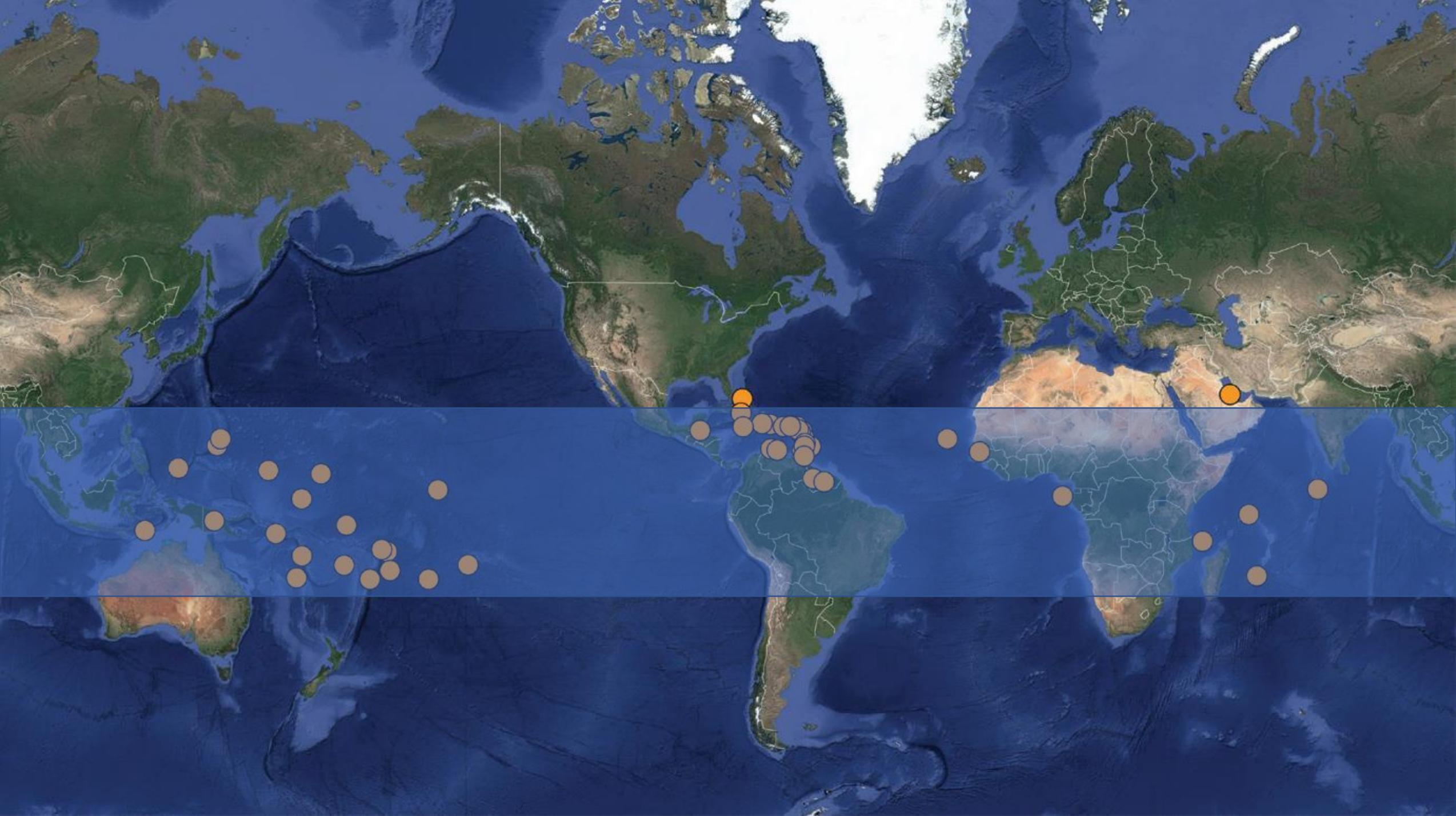
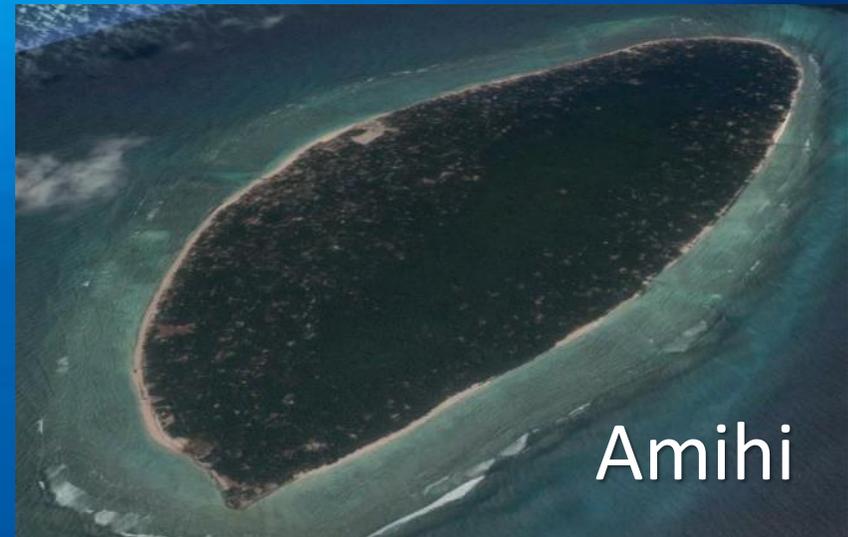


# What future for fisheries?

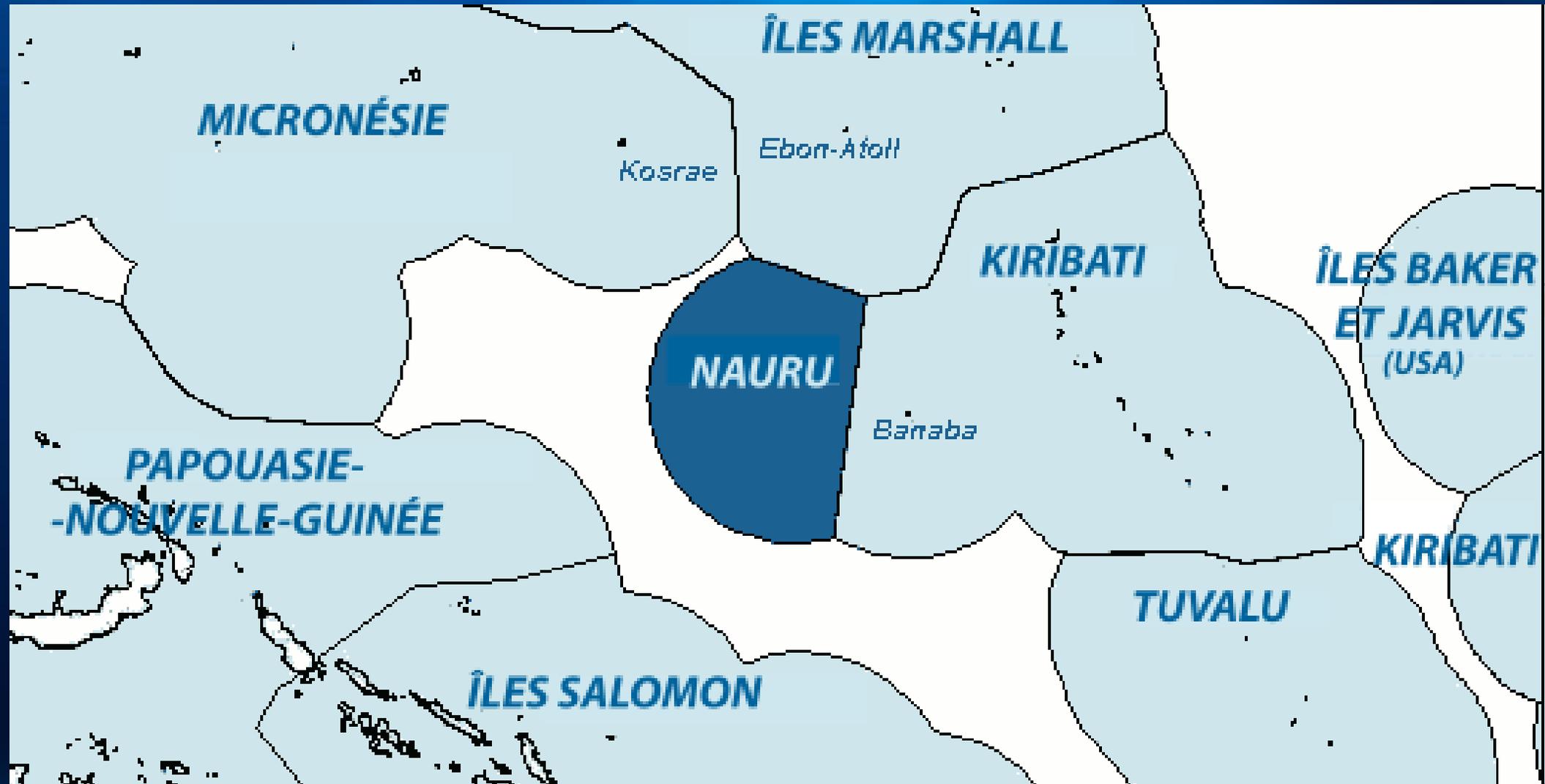
The challenges faced by SIDS small-scale fishers  
in a changing environment



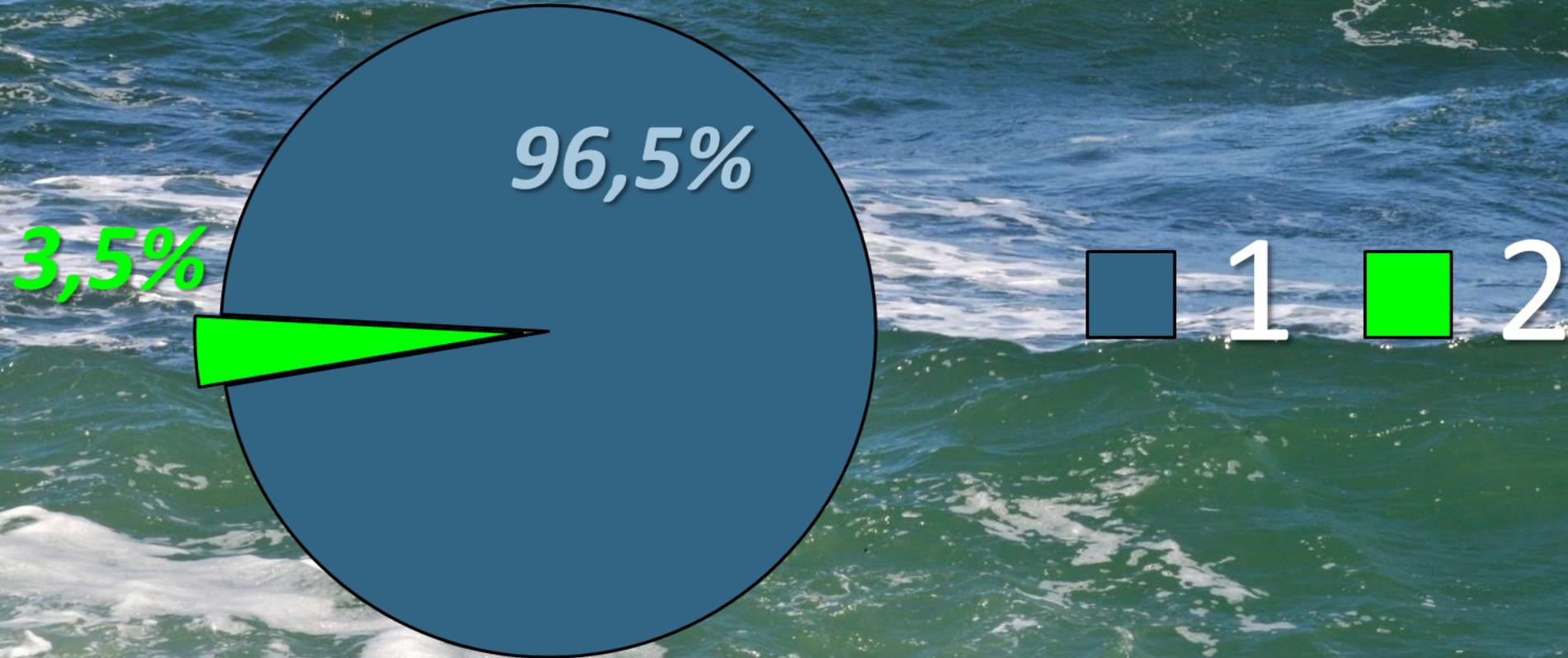
# Small Islands Developing States

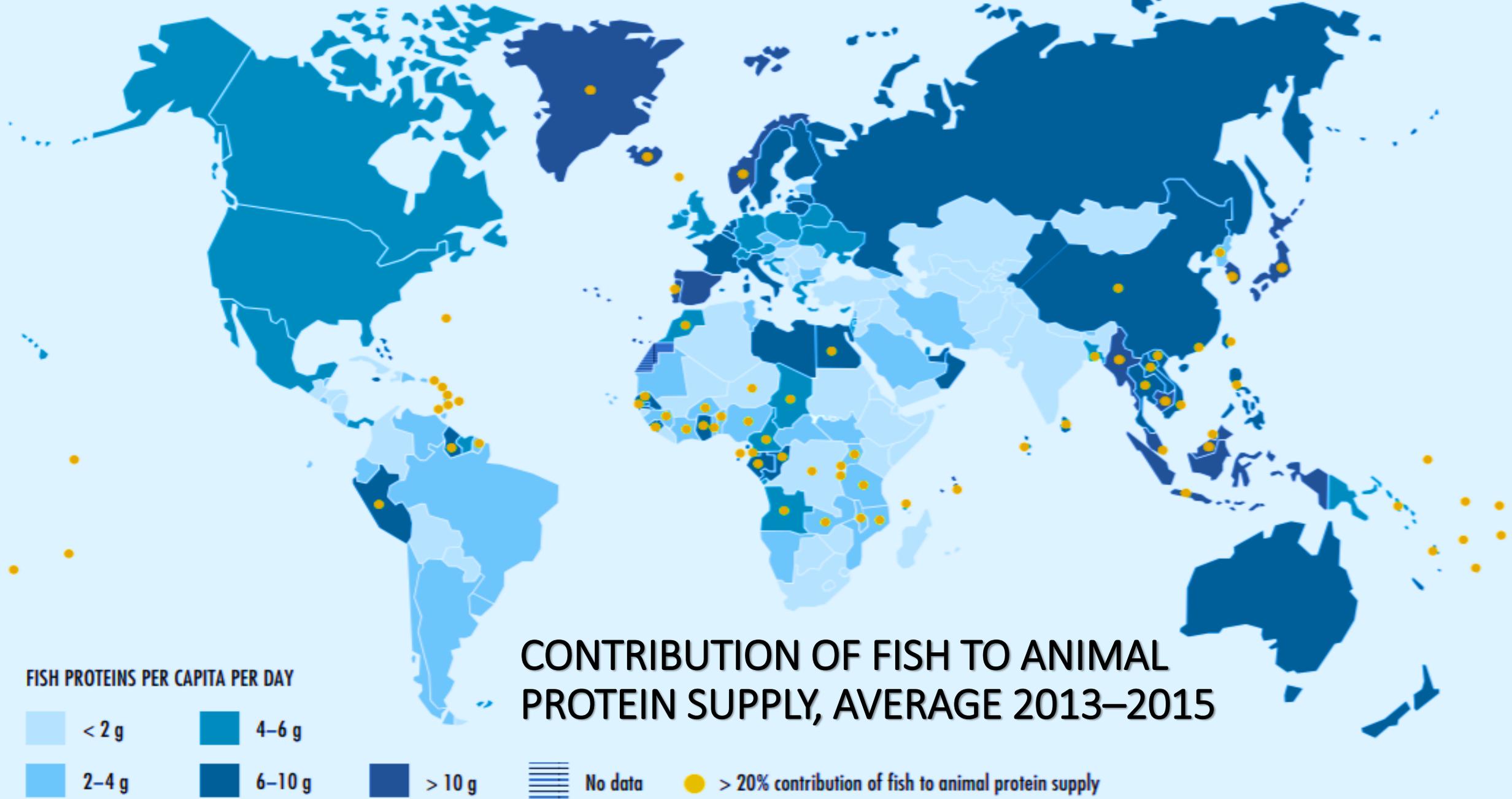


# SIDS are large Ocean States



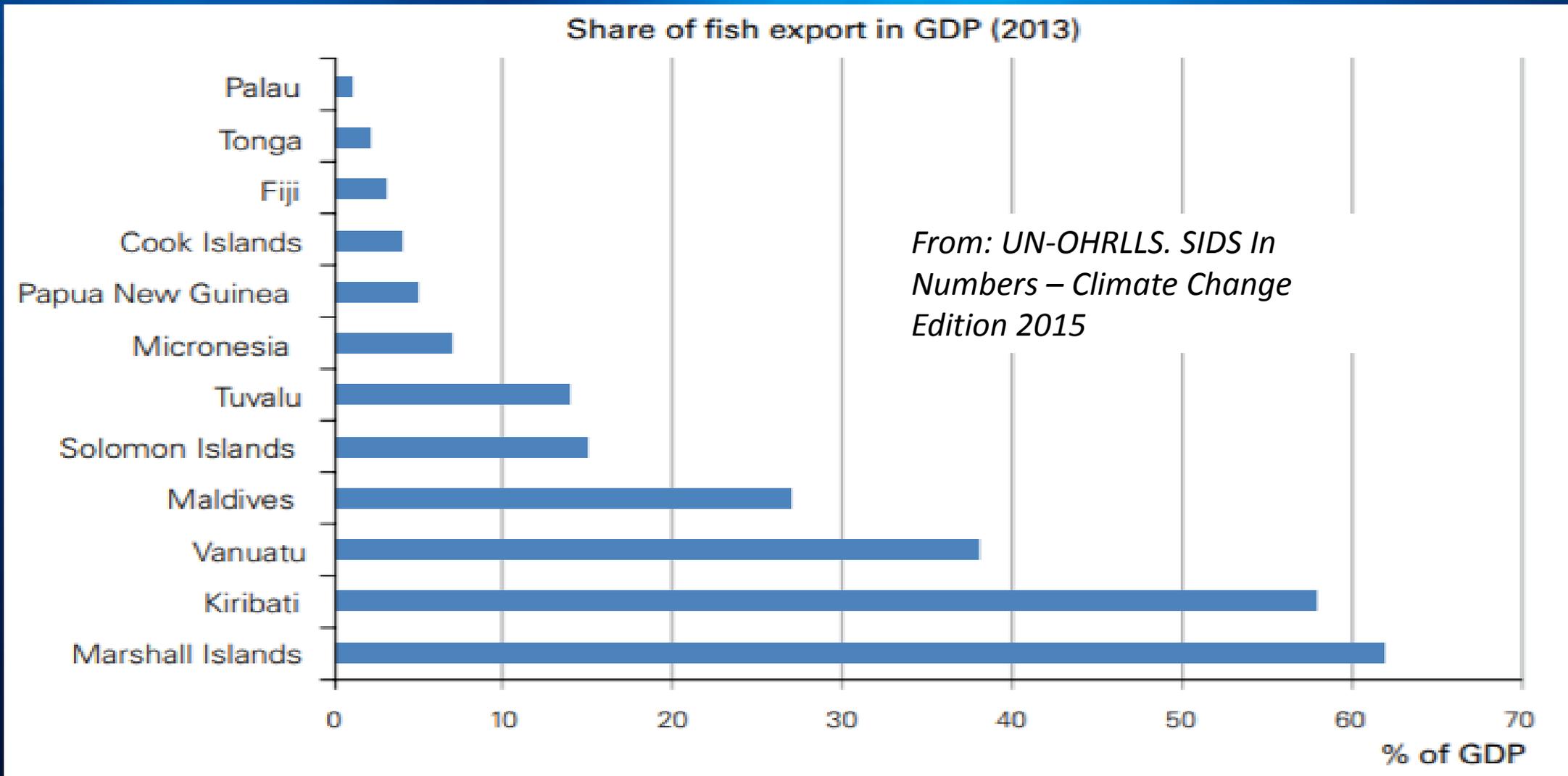
# SIDS are large Ocean States





NOTE: Final boundary between the Sudan and South Sudan has not yet been determined.

# Export in fisheries - a source of income



# THREATS TO FISHERIES IN SIDS

## CLIMATE CHANGE

Warming waters  
Ocean acidification  
Sea-level rise  
Extreme weather  
Coastal erosion



## FISHERIES

Biodiversity loss  
Distributional shifts  
of marine species  
Coral reef bleaching  
Habitat loss  
Declining fish catches



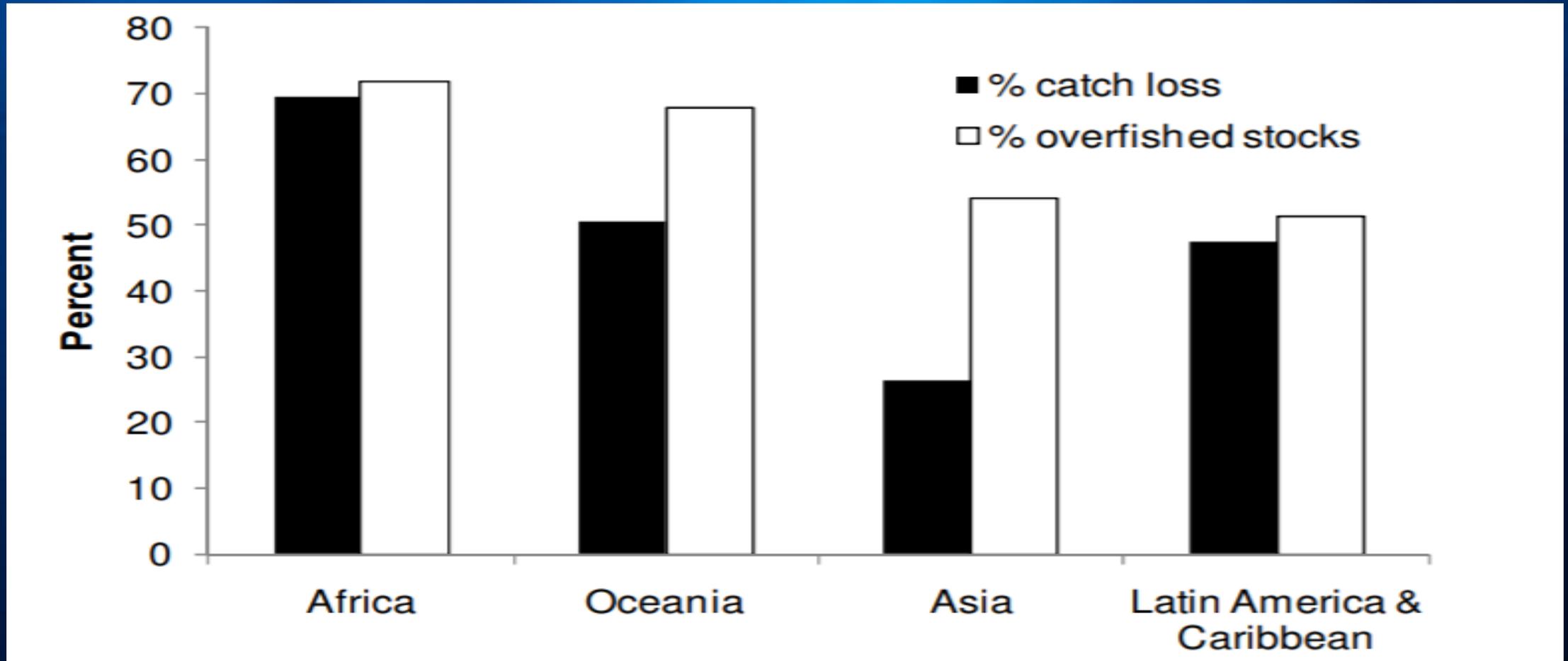
## HUMAN IMPACTS

Over-fishing  
Deforestation  
Habitat destruction  
Waste and toxic pollution  
Nutrient pollution



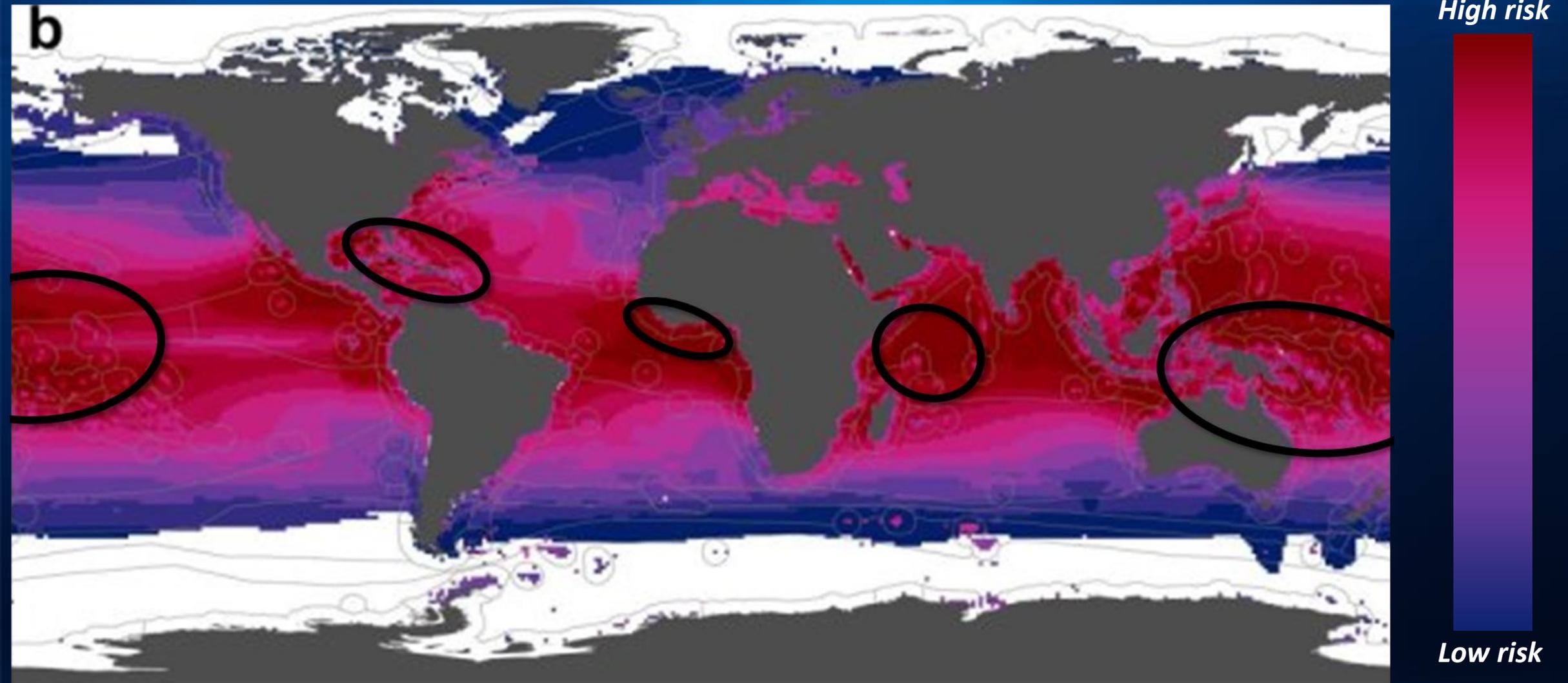
# SIDS lose 50% of catch because of overfishing

(Sumaila et al 2013. Fisheries subsidies and potential catch loss in SIDS EEZs)



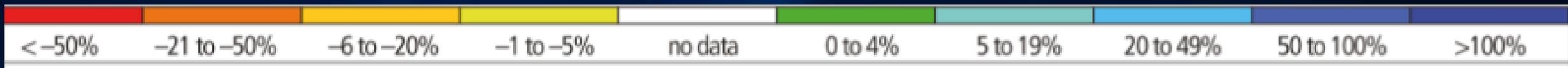
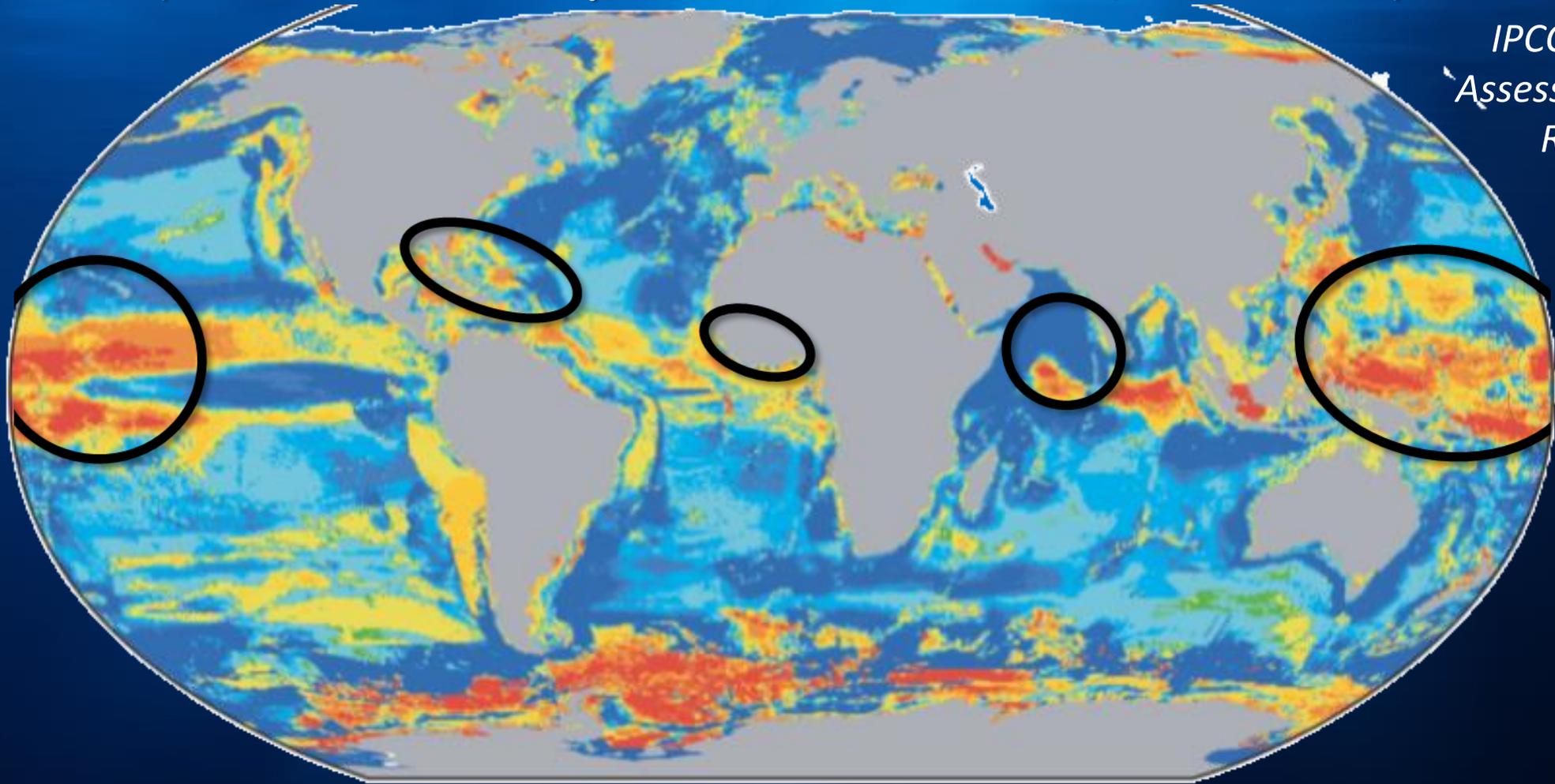


# Ocean warming drives fishes polewards: Risk that marine fish could exceed their thermal limits by the year 2070

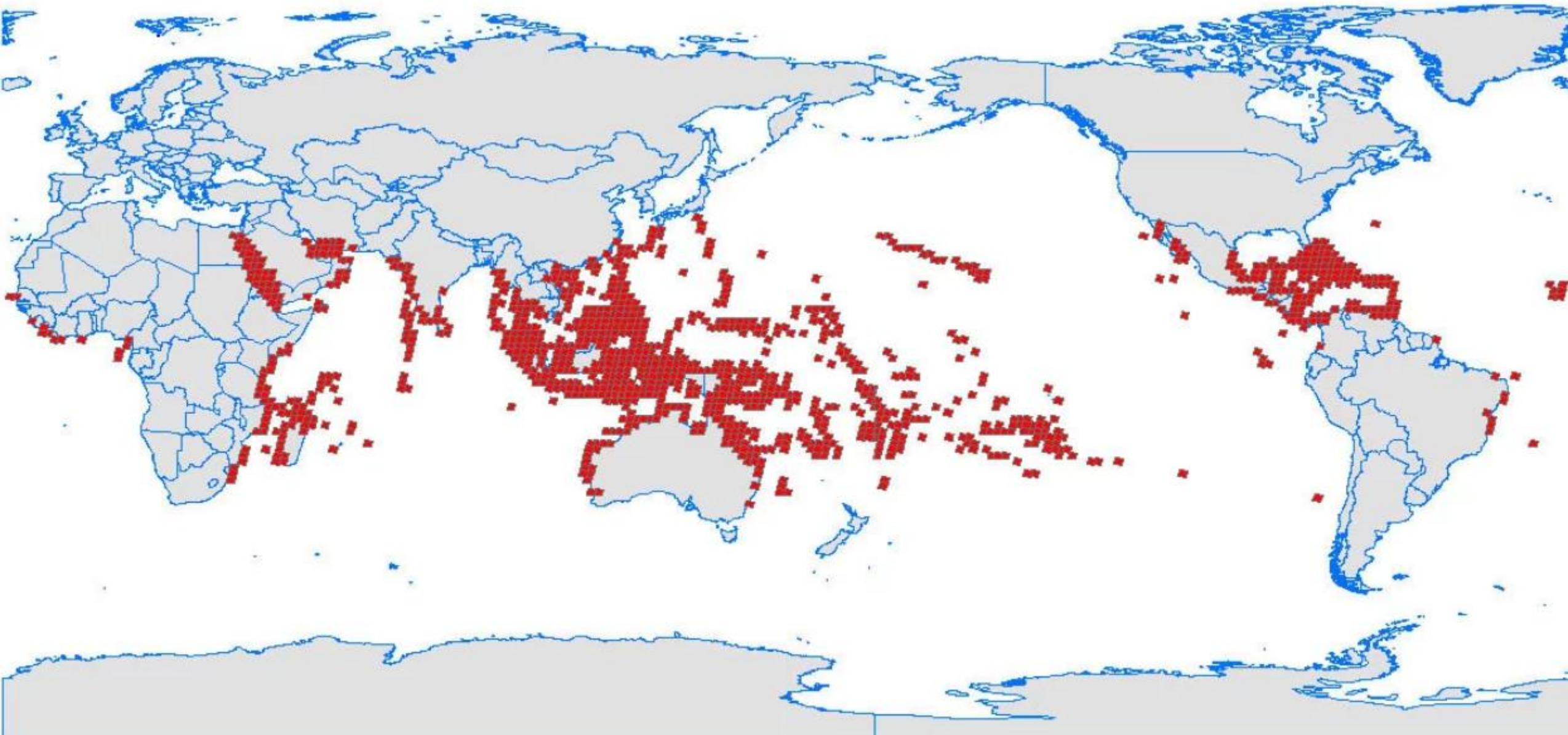


# Change in maximum catch potential (2051-2060 compared to 2001-2010, SRES A1B)

*IPCC Fifth  
Assessment  
Report*



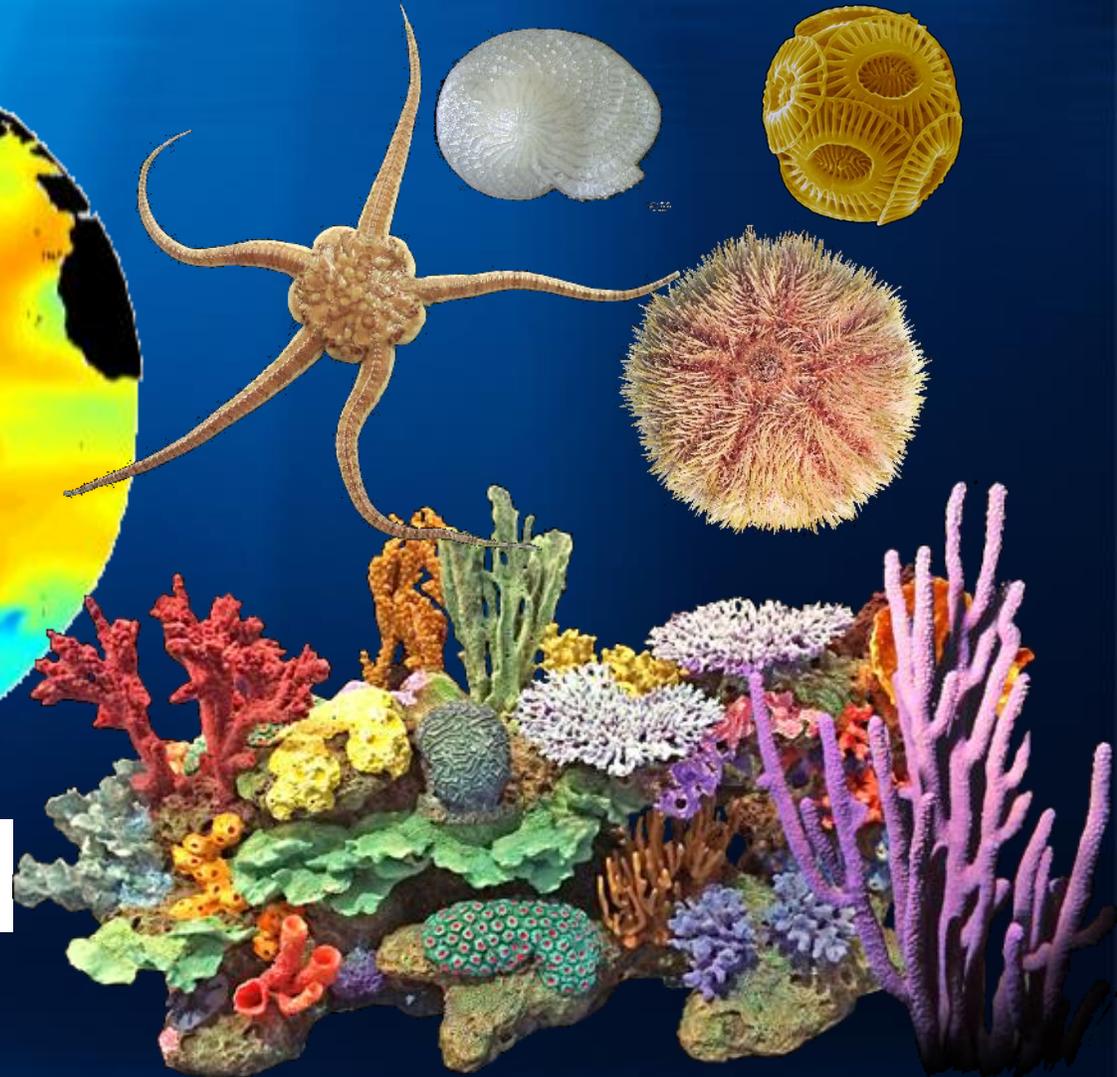
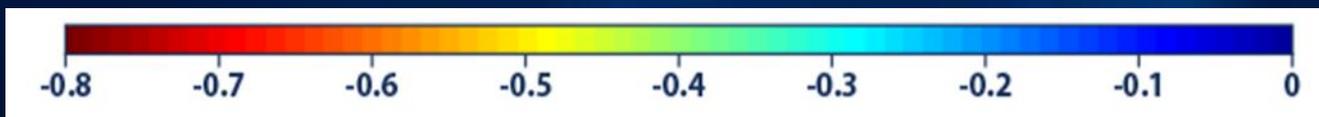
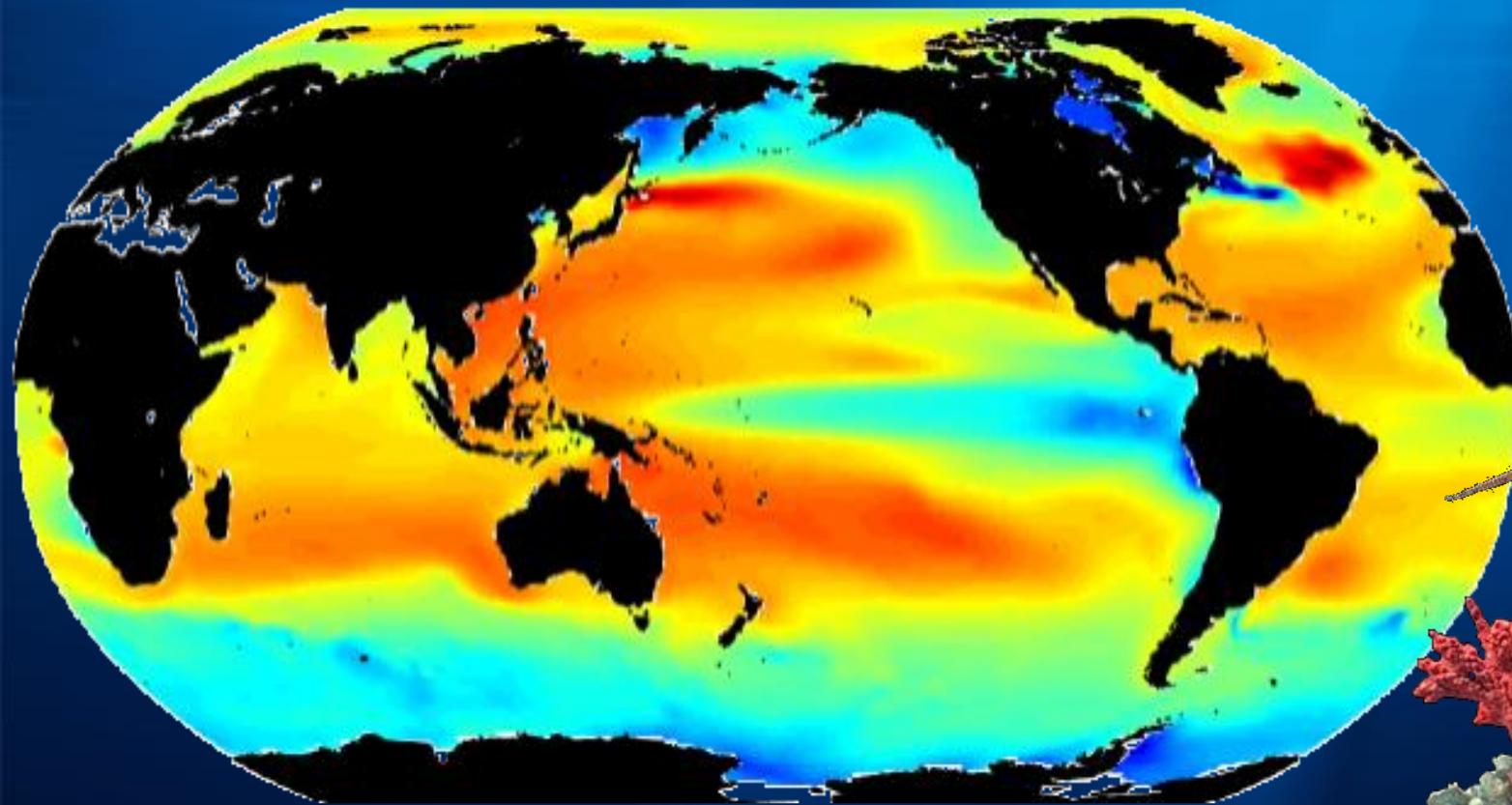
# SIDS – home to coral reefs



Warming and acidification leads to coral bleaching and reduced growth



# Ocean acidification harms shells and skeletons: Changes in Aragonite Saturation of the World's Oceans, 1880-2012



Rising sea level/flooding

Severe Weather Events

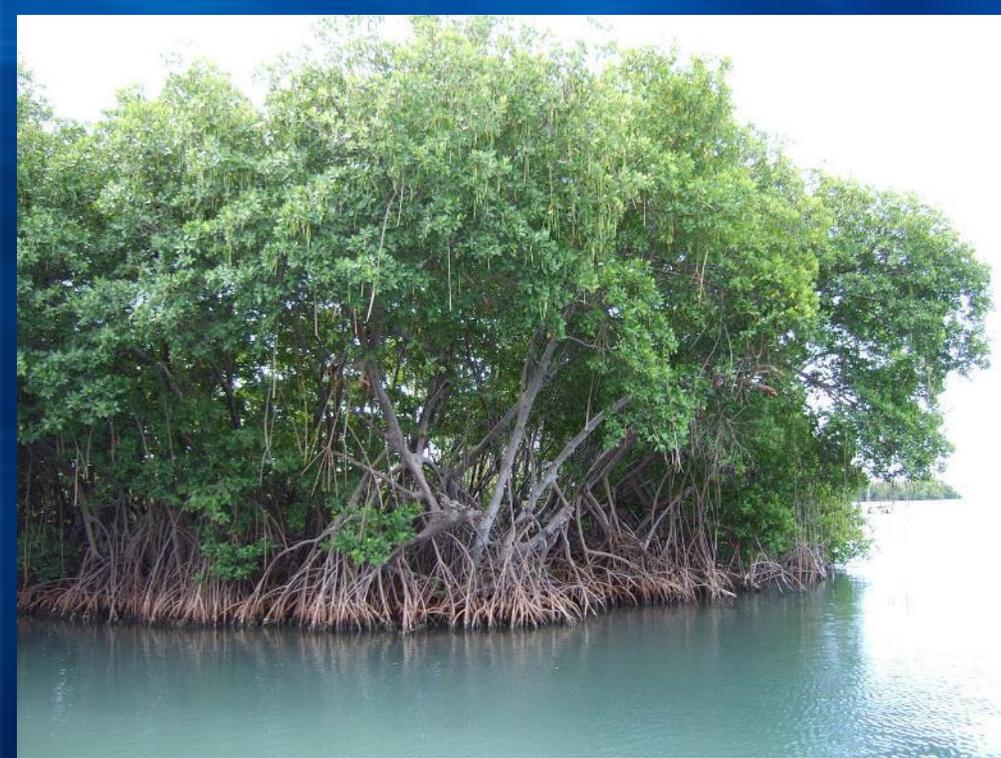


Coastal erosion

Amplified by deforestation

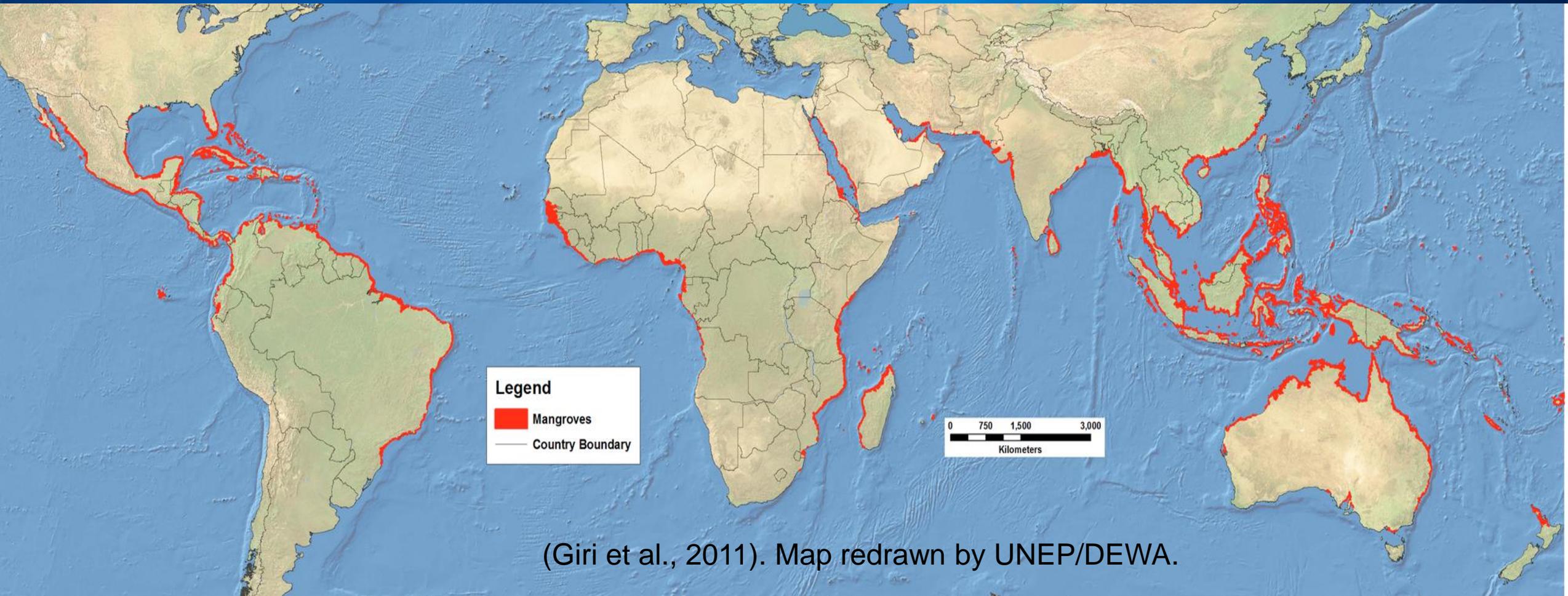


# Mangrove forests provide shelter, food and coastal fortification

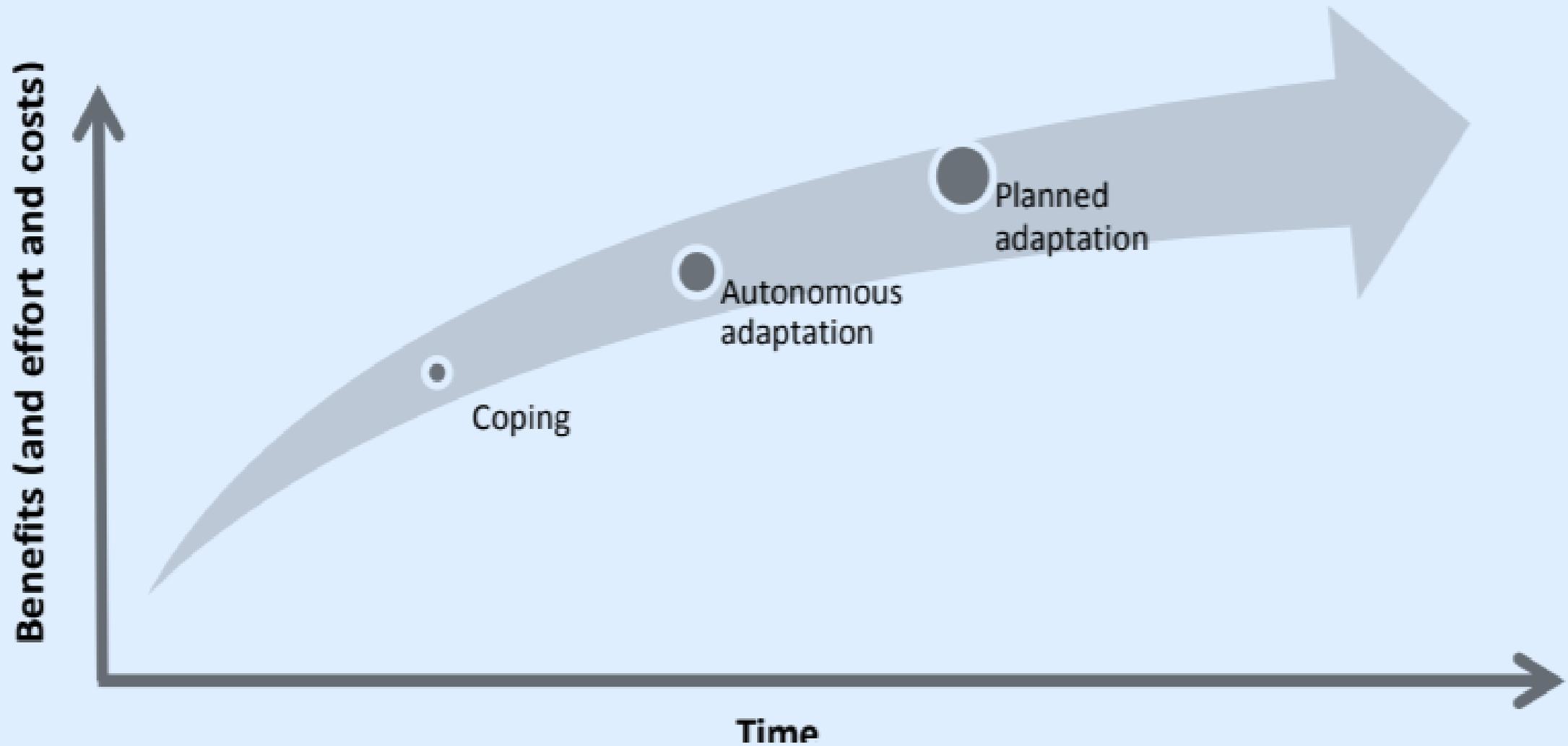


<http://mangroveactionproject.org/wp-content/uploads/2015/02/Mangrove-Action-Project-Highlights.jpg>

# The world's mangrove forests in 2000



# Types of adaptation (Shelton 2014).





Mangroves are  
threatened and need to  
be restored

# Reef fortification and coral nurseries

## Innovative coral reef restoration in Palawan Biosphere Reserve, Philippines



©Thomas Pavy - Sulubaii Foundation Pagatalan Isla



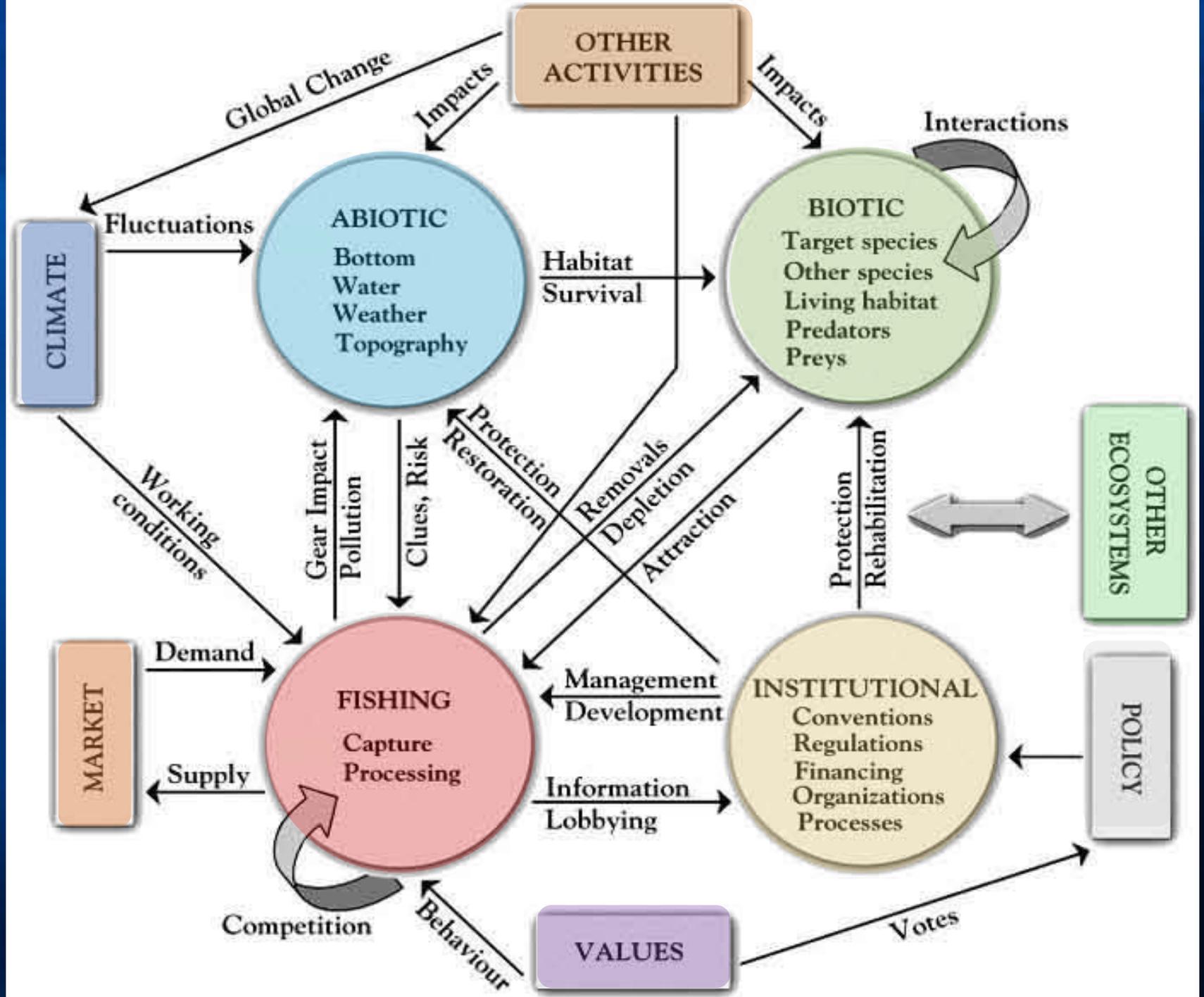
# Artificial reefs for fisheries, biodiversity enhancement and erosion barriers



# Alternative to capture fisheries: Aquaculture with plants and herbivores



# Simplified diagram of an ecosystem and its components (FAO 2003)



### Aquaculture

- Income and jobs
- Deforestation+pollution impact resilience
- Fisheries & Agriculture Departments

### Coastal development

- Potential source of income and jobs for local area
- Clearing of coastal vegetation for hotel development can increase climate change hazard risk
- Land Use Planning Unit; Private Developer

### Agriculture

- Subsistence and cash crops for local community
- Agriculture on slope may cause soil erosion
- Agricultural Extension Officers

### Marine Protected Area

- Community managed, source of jobs
- Can protect reef, fisheries and tourism
- Community Management Group

### Forest

- Source of timber
- Forestry practice can lead to increased run-off, soil erosion and transfer of sediment downstream
- Forest Department

### Fishing

- Important livelihood for local community
- Overfishing can impact reef resilience
- Fisheries Department; Fishers Association

### Local community

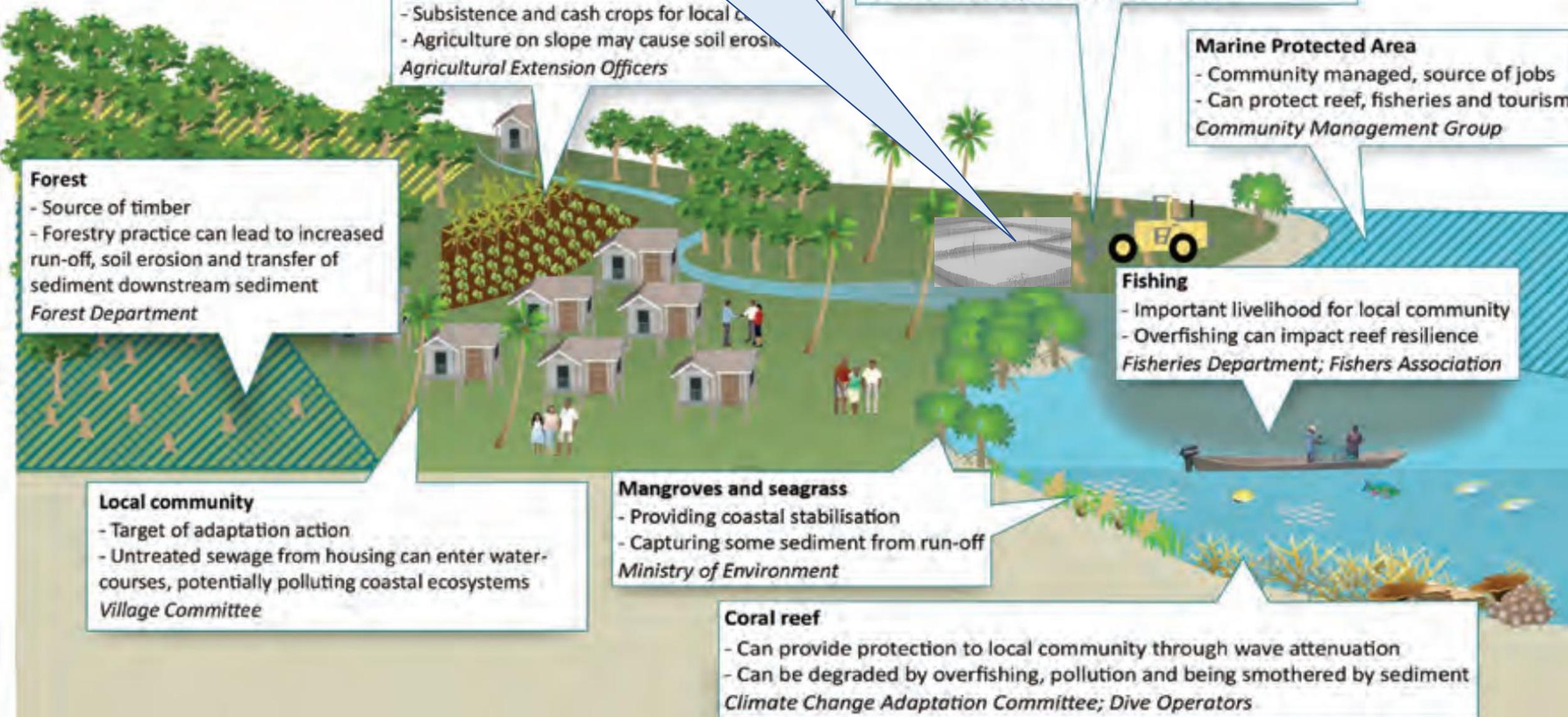
- Target of adaptation action
- Untreated sewage from housing can enter water-courses, potentially polluting coastal ecosystems
- Village Committee

### Mangroves and seagrass

- Providing coastal stabilisation
- Capturing some sediment from run-off
- Ministry of Environment

### Coral reef

- Can provide protection to local community through wave attenuation
- Can be degraded by overfishing, pollution and being smothered by sediment
- Climate Change Adaptation Committee; Dive Operators

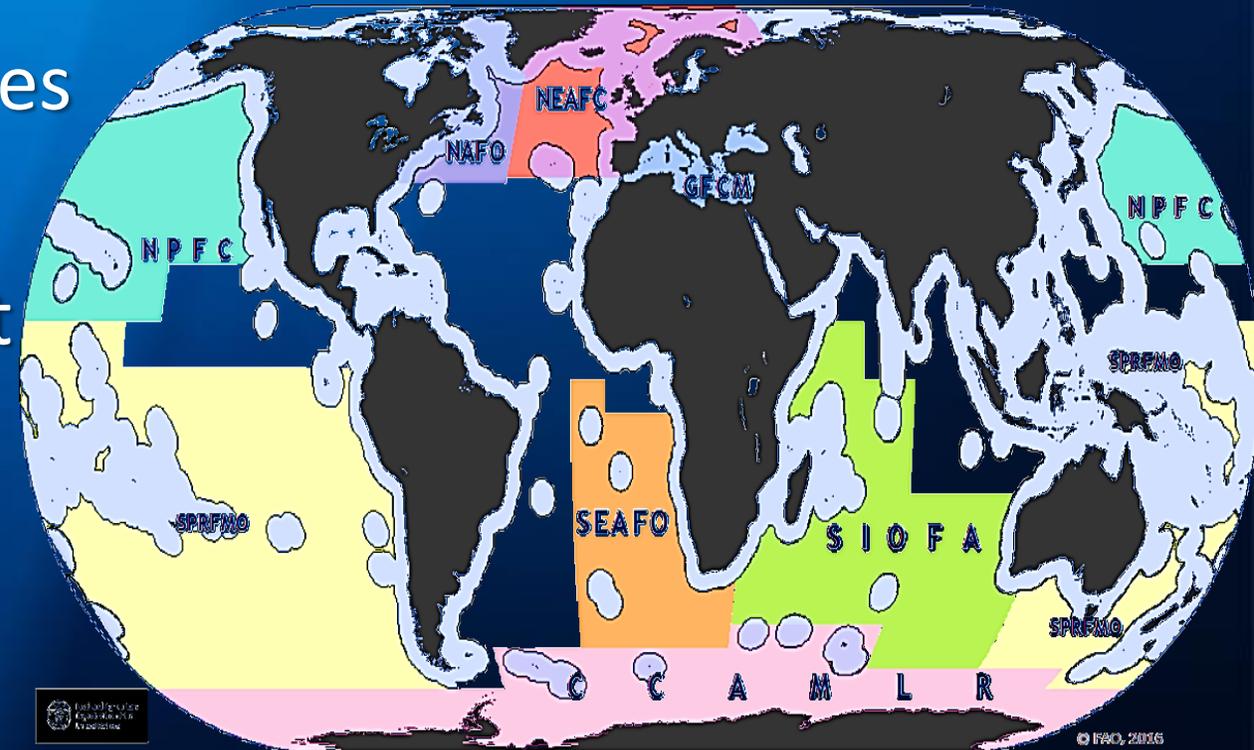


# Local knowledge and fisheries management

- All fisheries and ecosystem management must include fishers and their knowledge.
- Fisheries management and decision-making should follow an interdisciplinary approach based on the social, economic and ecological dimensions of the fisheries system as a guiding principle for sustainability.
- Management design and implementation should provide a space for knowledge exchange among stakeholders that enables or encourages active participation, capacity-building, and empowerment, while creating a learning platform where knowledge is co-produced and imbalances in power are minimized by providing everyone with an equal voice.

# Regional cooperation through RFMOs – potential benefits to coastal States:

- Incentives for and assistance assist with establishing best fisheries management practices
- A forum to address concerns, issues and achievements
- Support for capacity development
- Sharing of knowledge and data
- Assistance with control and monitoring



# Success factors for fisheries management

- **Mutual trust, transparency, fair distribution of benefits**
- **Well defined user rights**
- **Well organized, educated and confident fishers**
- **Fishers' involvement in all management processes**
- **Participatory research and regular exchange with scientists**
- **Adaptability and flexibility of all parties**
- **Supportive legal and administrative framework**
- **Effective monitoring and enforcement of fishery regulations**
- **Regional cooperation on fisheries management and control**



# Conclusion: There is a future for fisheries in SIDS but it depends on the implementation of best practices

- Apply the Ecosystem Approach to Fisheries
- Use local knowledge of fisheries and ecosystems
- Involve stakeholders in fisheries management
- Restore key habitats (e.g. mangroves, reefs)
- Collect data and promote a flexible/adaptable resource use
- Implement and enforce conservation measures
- Eliminate harmful subsidies
- Engage in regional cooperation on fisheries