MAR Fund’s Reef Rescue Initiative

Parametric Insurance for Coral Reef Restoration

Why the focus on coral reefs?

Coral reefs are among the most biologically diverse and economically valuable ecosystems on the planet. Among their many ecosystem services:

- Spawning and nursery grounds for fish
- Jobs for local people in fishing, tourism, and recreation
- Protection of coastal communities from storm surges, beach erosion, and wave damage from tropical storms
- "Global public goods"
    - ➢ Biodiversity *(the planet's "medicine cabinet")*
    - ➢ Carbon sequestration

But how do you place a value on these ecosystem services?

- By understanding the stakeholders who benefit from these services

Stakeholders of coral reef ecosystem services

- **Fisheries:** local fishers, boat builders, fishing net makers, fish market employees, tourist fishers, and, importantly, consumers of fish

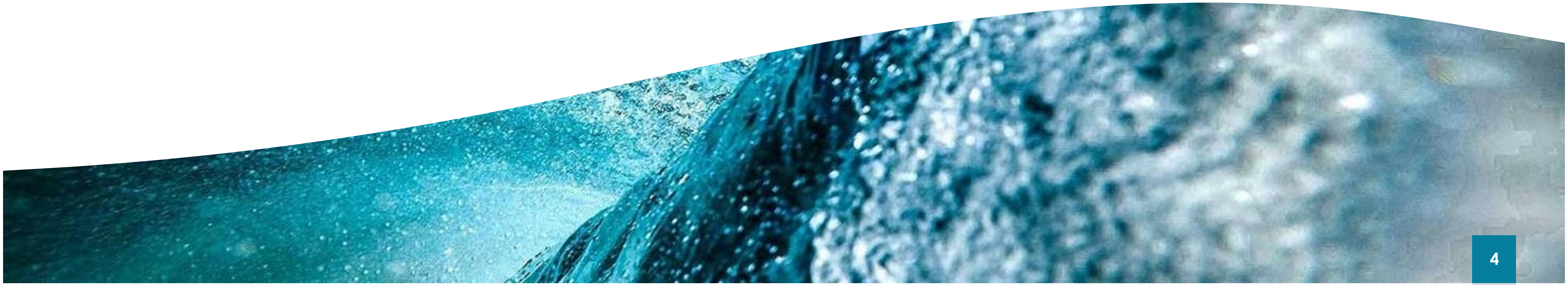
- **Tourism:** hotels, dive shops, coastal restaurants, other tourism services, and, importantly, the local labor force that supports these businesses

- **Shoreline and coastal protection:** coastal residents and businesses, government

- **Global public goods:** all countries, people, and generations, *plus*

  - **Biodiversity:** researchers, academics, pharmaceutical companies

  - **Carbon sequestration/mitigation:** government



Studies have attempted to quantify the value of coral reefs; for example:

On a global basis (2012)

- US$350,000 per year for an "average" hectare of coral reefs
- Up to US$1,000,000 per year per hectare in tourist areas

On a regional basis (the Caribbean, including the Mesoamerican Reef (2004))

- US$2.1 billion per year from dive tourism
- US$700 million to US$2.2 billion per year from shoreline protection
- US$300 million from fisheries

On a local basis (Belize (2009))

- US$150-196 million (12-15% of GDP) per year from reef-associated tourism
- US$120-180 million per year from shoreline protection
- US$15 million from fisheries

But these valuable coral reef ecosystems are under threat, particularly from climate change

- **Trends:** ocean warming and acidification
- **Shocks:** hurricanes, flooding, and storm surges

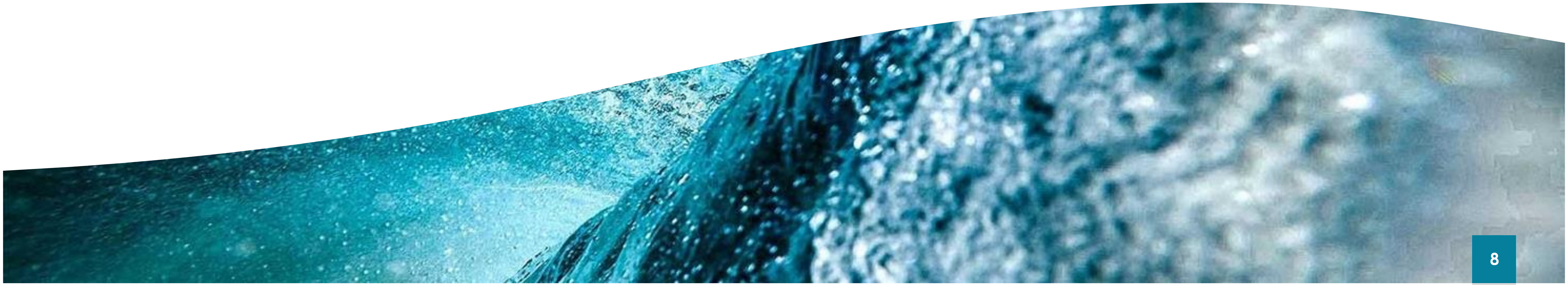
Laying the Groundwork for Sustainable Financing for Coral Reef Protection and Restoration

- Disaster Risk Management Strategy that fully recognizes natural assets, like coral reefs, as public assets
  - Embed steps to protect coral reefs into broader risk management strategy

- Disaster Risk Financing Strategy that includes comprehensive analysis for managing fiscal risks associated with natural disasters
  - Integrate climate change and climate financing into national planning and budgeting processes
  - Perform a disaster risk financing diagnostic

Performing a disaster risk financing diagnostic

- Step 1: assess the impact of past disasters, explicitly including the impact from damage to coral reefs and marine ecosystems
  - Economic—impact on growth, unemployment, etc.
  - Fiscal—impact on contingent liabilities (explicit and implicit) and foregone revenues
  - Social—impact on the poor and vulnerable
- Step 2: review existing legal and institutional framework for disaster risk financing
  - Nature of relationship and responsibilities between ministries and departments involved in disaster response and financing
  - Examine legal framework for public-private partnerships and trust funds



Performing a disaster risk financing diagnostic (cont'd)

Step 3: review the existing portfolio of disaster financing mechanisms and instruments

Risk layering

- Risk retention
  - Budgetary or debt resources
  - Should be used mostly for low impact, more frequent events
- Risk transfer
  - Insurance
  - Capital markets
  - International donors
  - Should be used mostly for high impact, infrequent events

Ex ante vs ex post financing

- Ex ante
  - Contingency budgets or reserve funds
  - Contingent credit lines
  - Sovereign risk transfer (e.g., insurance)
- Ex post
  - Budget reallocations
  - Tax increases
  - Post-disaster borrowing
  - International donor assistance

Cost-effective approach to financing for disaster risks

	Disaster Risk	Financial Instruments
Risk transfer	**High Risk, Low Probability**: ***e.g., hurricanes, tropical storms, major earthquakes***	**Disaster Risk Insurance**: ***e.g., catastrophe bonds, parametric insurance (Including for coral reefs)***
Risk retention	**Medium Risk, Medium Probability**: ***e.g., floods, minor earthquakes***	**Contingent Lines of Credit**
	Low Risk, High Probability: ***e.g., local floods, landslides***	**Contingent Budgets, Reserves, Annual Budget Allocations**

Reef Rescue Initiative (RRI)

MAR Fund's RRI plans to pilot parametric insurance policies:

- Aimed at funding reef restoration and reconstruction, rather than reimbursing individual losses, after a natural disaster
- Using local workers whose livelihoods may have been impacted by the disaster
- With payout based on a pre-defined trigger ("cat in the box")
    - wind speed, storm surge, or hurricane category
    - in a specific geographic zone

Advantages of parametric insurance vs. indemnity insurance

Advantage	Parametric insurance	Indemnity insurance
Lower premiums	Transaction and admin costs lower	Assessing claims is costly; added to premium
Faster payouts	Based on pre-defined trigger	Need on-the-ground assessment of losses; could take months
Objective and transparent	Calculation of payout totally objective and based on widely-published info	Assessment of loss depends on loss adjustor; exclusions and limitations
Reduction in moral hazard	Payout independent of any actions taken after policy is issued	Policyholders may engage in riskier behavior after policy is issued
Simplified claims	No need for detailed asset values and other info	Requires lots of information about insured asset

The only disadvantage of parametric insurance compared with indemnity insurance is basis risk, that is, the possibility of a mismatch between payout and loss.

But reef insurance *is not aimed at covering losses* per se, but rather quick restoration and reconstruction, so basis risk should be minimal.

Considerations regarding reef insurance

Reef insurance would be viewed as a self-contained component of a larger strategy of disaster risk management.

Diverse set of ecosystem benefits from coral reefs implies diverse potential contributors for the insurance (see table below).

- **Public-private partnership?**
- **Independent trust?**

Prospective purchasers of parametric insurance

Ecosystem service	Strength of evidence	Reef or coastal ecosystem?	Direct stakeholders	Potential insurance purchasers
Fisheries	+++	Reef mainly, but mangrove as nursery	Fishers, fishing industry workers	Government, fishing industry
Tourism	+++	Reef mainly	Hotels, dive shops, other tourism-related businesses, tourism-sector employees	Government, hotels, other tourism industry
Coastal protection	+++	Reef mainly, but coastal system to smaller degree	Tourist infrastructure owners, coastal home owners, government	Government, hotels, coastal businesses and homeowners
Biodiversity	+++	Coastal system, but reef largest contributor	All countries and people; academics, researchers, pharmaceuticals	International NGOs, multilateral development banks, other countries
Carbon sequestration	++	Coastal system, but reefs fundamental to protection of coastal system	All countries and people	Government, international NGOs, multilateral development banks

Challenges for sustainability of reef insurance

Valuing coral reefs

- Understanding the range of ecosystem services provided by coral reefs
- Fully recognizing coral reefs as public assets like other types of government infrastructure
- Incorporating reef insurance into full-fledged disaster risk financing strategy

Earmarking funds for coral reefs

- On *ex ante* basis, government contributing its share to insurance policies, even given competing priorities
- On *ex post* basis, ensuring that insurance payout is used solely for coral reef ecosystem, even in the face of seemingly more urgent needs

Free riders

- Private sector (e.g., hotels) not fully contributing their fair share to reef insurance
- Will depend on robust legislation (e.g., on public-private partnerships, trust funds) and specifics of contributions (tourist taxes, hotel taxes, etc.)

Potential opportunities to lower costs and make reef insurance sustainable:

- Scaling up program over time to other countries to achieve diversification and lower costs;
- Engaging with credit rating agencies to get better credit rating if coastal infrastructure were “insured” via healthy coral reefs;
- Working with domestic insurance companies to price in coral reef health in policies for coastal properties;
- Incorporating costs of protection of coastal ecosystems as part of National Defined Contribution in the Paris Climate Accord for carbon mitigation;
- Encouraging IMF to formally incorporate climate change into its policy dialogue with countries, particularly those most vulnerable to climate change.


THANK YOU