Role of Insurance in Protecting Marine Coastal Ecosystems in Asia and the Pacific

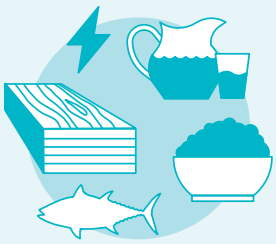
IMPORTANCE OF MARINE COASTAL ECOSYSTEMS

Marine coastal ecosystems (MCEs) provide a myriad of services on which governments, businesses, and society depend. MCEs include coral reefs, mangroves, seagrass, oyster beds and reefs, salt marshes, and sandy beaches and dunes. As of 2020, it was estimated that more than half of the world's total gross domestic product (GDP)—around $44 trillion—depends on nature and its services (WEF 2020). The ocean economy contributes an estimated 3%–5% of global GDP (Spalding, Brumbaugh, and Landis; Millennium Ecosystem Assessment Program 2005; Ferrario et al. 2014).[1]

An important MCE service is disaster risk reduction, particularly in the coastal areas. By 2050, more than 800 million people in those areas are expected to be at risk from the impact of extreme weather events through rising sea levels and storm surges (UCCRN 2018), with an annual average cost of more than $1 trillion to coastal urban areas (Hallegatte et al. 2013).

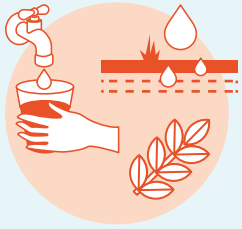
MCEs can reduce the impact of natural hazards, such as floods, storms, storm surges, tropical cyclones, tsunamis, landslides, and long-term sea-level rise, by providing cost-effective, no-regret solutions for disaster risk reduction, possibly complemented with other interventions for that purpose. Unfortunately, the disaster risk reduction services provided by MCEs are rarely quantified and taken into account in the management of coastal disaster risk.

SERVICES PROVIDED BY MARINE COASTAL ECOSYSTEMS



PROVISIONING SERVICES

including providing food, freshwater, fuelwood, energy, carbon sequestration, biodiversity

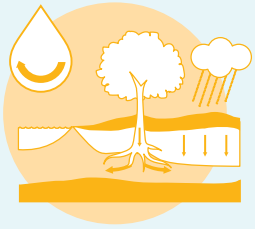


REGULATING SERVICES

including resilience services, regulation of water and soil quality

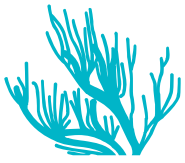
CULTURAL SERVICES

including recreation, tourism, spiritual and religious enrichment



SUPPORTING SERVICES

including soil formation, water cycling, nutrient cycling



Coral Reefs:
Their ecosystem services worldwide are valued at $2.7 trillion per year (ICRI and GCRMN 2021).

Mangroves:
They likewise provide a total of around $2.7 trillion worth of ecosystem services per year ($194,000 per hectare) (Saintilan et al. 2020).

[1] In this publication, "$" refers to United States dollars.

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RISK REDUCTION SERVICES PROVIDED BY MARINE COASTAL ECOSYSTEMS

Mangroves		Reduce wind speed and height of storm surges and waves, and help maintain surface elevation in relation to rising seas
Coral reefs		Reduce wave height and help maintain surface elevation in relation to rising seas
Salt marshes		Reduce wave height and help maintain surface elevation in relation to rising seas
Seagrass beds		Reduce wave height
Rock and shell reefs		Provide natural breakwater and help maintain surface elevation
Sand beaches and dunes		Reduce wave height at the shoreline and regulate temperature

IMPACT ON THE BOTTOM LINE

Mangroves:

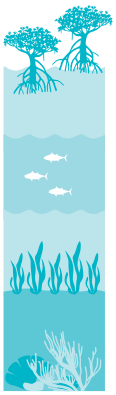
- Every year, they provide **$65 billion** in flood protection and prevent flooding from affecting **15 million people** (Menéndez et al. 2020).
- Without mangroves, **39% more people** would experience flooding yearly, and flood damage would increase by **more than 16%**, or by **$82 billion** (Losada et al. 2018).
- This risk reduction service increases with the intensity of tropical storms. For a 1-in-100-year event, without mangroves, the number of people affected would **increase by 37 million** and property losses would be **$270 billion higher** (Menéndez et al. 2020).

Coral Reefs:

- Across reef coastlines, coral reefs reduce the annual expected damage from storms by **more than $4 billion**.
- For a **1-in-25-year tropical storm**, coral reefs protect around 2 billion people and avert **$36 billion worth** of damage to built capital.
- For a **1-in-100-year tropical storm**, flood damage would increase by 91%, to **$272 billion**, without reefs (Beck et al.).

VULNERABILITY OF MARINE COASTAL ECOSYSTEMS

MCEs are vulnerable to several threats such as coastal development; overexploitation; pollution; natural hazards such as storms, earthquakes, and volcanic eruptions; and global warming, leading to rising sea levels, higher water temperatures, ocean acidification, and changes in weather patterns. MCEs are being lost or degraded as a result, and are less able to support the disaster resilience of governments, businesses, and society.



Mangroves: Total coverage has decreased by 30%–50% in the last 100 years and is being lost faster than almost any other type of forest coverage (Donato et al. 2011). It is estimated that 30%–40% of coastal wetlands and 100% of mangrove forest functionality could be lost in the next 100 years if the loss of coverage continues at the present rate (Giri 2021).

Seagrass Beds: Seagrasses are declining at a global rate of around 7% per year (Waycott et al. 2009).

Coral Reefs: Around 50% of coral reefs around the globe have died in the last 30 years (ICRI and GCRMN 2021).

To ensure sustained risk reduction (and other) MCE services, a comprehensive approach to managing the various risks to MCEs must be adopted. Risk financing tools such as insurance, supplying pre-agreed financing to restore as well as to preserve MCEs, must be an integral part of that approach.[2] Those responsible for coastal management could use a variety of risk financing tools, including the following:

- **Restoration funds**, holding reserves from different sources to be made available for restoration when climate events occur, and for regular conservation to make MCEs less vulnerable to natural hazards.
- **Contingent credit lines**, prearranged borrowing facilities extended by national, regional, or international organizations for rapid funding in case of a climate event.
- **Insurance**, transferring the "insurable risks"[3] to which MCEs are exposed to a third party and paying out claims when a climate event occurs or is forecast.

As part of a comprehensive risk management approach, insurance can help promote MCE restoration and conservation through different pathways:

- **By directly insuring MCEs to finance restoration and conservation after disasters strike.** Insurance against risks, such as tropical cyclones, marine heat waves, cold-water anomalies, stormwater runoff, and tsunamis, can fund the needed repair, restoration, and maintenance of MCEs through nature-based solutions (NbS).[4]
- **By facilitating access to finance for NbS projects that protect MCEs.** Insurance payouts to restore and maintain the NbS after a disaster can de-risk the operations and provide peace of mind to investors and financing entities, thus easing access to finance for the NbS projects.
- **By insuring those who are most affected by the interruption in MCE services, which could help to reduce the stress on MCEs.** Disaster risk payouts can enable coastal communities that depend on MCE services to cope with losses when disasters strike and place less stress on MCEs. For example, support for the communities could limit their fishing activities for a certain period of time.
- **By incentivizing MCE protection,** through better insurance terms offered to governments, businesses, and communities that help, directly or indirectly, to protect MCEs. For example, affordable insurance could be made available to coastal communities engaged in mangrove reforestation, to protect their lives, assets, and businesses. Productive activities that reduce deforestation could be de-risked. Insurance could also promote improvements in MCE protection, for instance, by requiring the adoption of better fishing practices as a precondition for obtaining premium savings.
- **By instilling recognition of the risk reduction services provided by MCEs in insurance practices, tools, and products.** Taking resilience services into account in insurance pricing can lead to premium savings, and thus incentivize the stewardship of MCEs by governments, businesses, and society. The insurance sector, by virtue of its modeling and pricing expertise, could also support the enhanced valuation of the resilience services provided by MCEs.

[2] The financing should cover both the restoration of MCEs to their current condition, as a risk reduction measure, and post-disaster restoration.

[3] Insurable risks are risks that can be covered efficiently by insurers. For efficient coverage, the risk should be random; the likelihood of its occurrence should be calculable and the losses that can result can be quantified; and the risk should not involve a large loss of value not anticipated by the insurer or the policyholder.

[4] NbS are wide-ranging actions that work with, mimic, and enhance nature by securing ecosystem services to help address three central societal challenges: (i) mitigating and adapting to climate change and building disaster resilience, (ii) protecting biodiversity, and (iii) ensuring human well-being.

DESIGN AND IMPLEMENTATION OF INSURANCE FOR MARINE COASTAL ECOSYSTEMS

The design of sustainable insurance schemes to protect MCEs relies on several factors, which are discussed in the following sections:

- Insuring the MCE must be **technically feasible**, and
- A series of minimum **enabling factors** must be present in the country where the insurance scheme is being developed.

Technical Feasibility of the Insurance Scheme

Insurance schemes should be structured to preserve natural assets, and to protect governments, businesses, and society against interruptions in MCE services resulting from ecosystem loss or degradation. The following conditions are important determinants of the feasibility of the structuring:

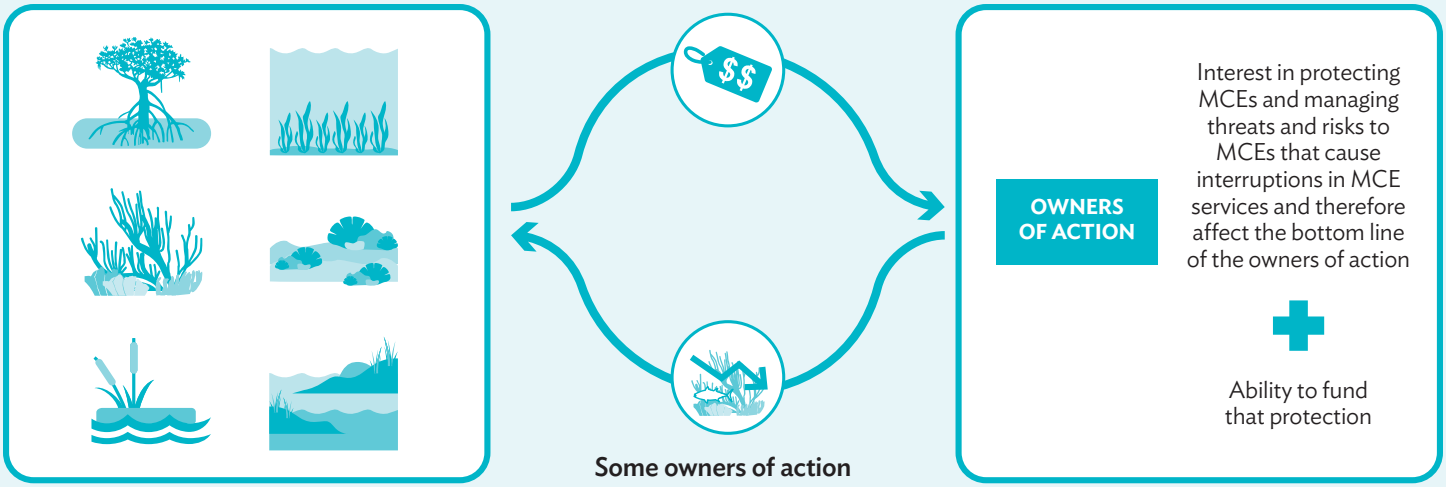
- **The MCE should provide quantifiable services to "owners of action" who are willing and able to pay for insurance.** Governments, businesses, and society may have an insurable interest in protecting MCEs, or can be considered owners of action, because they
  - » benefit directly or indirectly from the services provided by an MCE;
  - » contribute to its loss or degradation; and/or
  - » have a mandate to restore and protect the MCE.

A business case must be made to induce owners of action to pay for insurance. The MCE services and the impact of interruptions in those services on their bottom line must be quantified, and the necessary data must be available.

Some owners of action are willing to pay for insurance but lack the funds to do so. Financial constraints should not stop them from participating. An insurance scheme can be designed to recognize and address their affordability limitations through innovative approaches, for instance, by bringing together various sources of funding. For owners of action engaged in targeted conservation, these funding sources could include in-kind contributions integrated with government levies.[5]

OWNERS OF ACTION AS POSSIBLE PARTICIPANTS IN MCE INSURANCE

"Owners of action" benefit from the services provided by MCEs and are aware of their price tag and the financial impacts of interruptions in these services.



Some owners of action contribute to the loss of MCEs

[5] For instance, levies linked to licenses required for access and concessions for fishing, wildlife watching, coastal development, tourism, aquaculture, and agriculture; payments for ecosystem services and for passage; visitors' fees; and carbon and environmental taxes, tariffs, and mitigation costs.

- **The risks threatening the MCE should be insurable**

  To be insurable, risks must be measurable, occurring at random, and causing loss to the insured party. Insurable risks affecting MCEs include risks such as hurricanes, marine heat waves and cold-water anomalies, stormwater runoff, and tsunamis.

  Insurance products that provide payouts based on forecasts of the insured events could also be developed. The payouts could fund not only the repair of any eventual damage but also the adoption of anticipatory actions to support the conservation of MCEs and to reduce the eventual impact of the event.

- **Insurance should be a cost-efficient tool for MCE restoration and protection**

  Insurance should be purchased only when doing so would be cost-effective, compared with the cost of repairing the MCE. Several other factors will promote the sustainability of the insurance structure developed for a given MCE:

  - **Sites where MCEs provide services to a myriad of owners of action.** Having a larger group of owners of action that are willing and able to pay for insurance to protect MCEs makes it more likely that the insurance scheme will be sustainable. For instance, a single mangrove site could provide risk reduction services to coastal areas, as well as tourism and recreation, food provisioning, carbon sequestration, and other services.
  - **Sites recognized globally for the services provided by MCEs**. Insuring sites that are recognized as marine protected areas, heritage sites, or United Nations Educational, Scientific and Cultural Organization protected sites could increase the chances of scheme sustainability, particularly where fewer owners of action are willing and able to pay for insurance. Cases where MCEs do not provide easily quantifiable tourism services despite offering robust risk reduction services are prime examples. In such cases, the sustainability of the insurance scheme will depend on the integration of a wider range of global, regional, and national stakeholders, who may contribute toward the insurance premium.
  - **Sites with available data quantifying the services provided by MCEs and the impact of their loss**. Valuations made of the ecosystem and disaster risk reduction services will facilitate product design and also raise awareness of the economic value of the services and the financial cost of losing them. Sites where valuation data are available are generally those where owners of action already recognize the value of protecting the MCEs.
  - **Sites with existing restoration and conservation projects.** The availability of capacity to support the operation of the scheme is thus ensured.

Success Factors

The successful design and implementation of an insurance scheme for MCE protection depends on the presence of factors relating to supply, demand, and an enabling environment in the country where the scheme is being developed.

- **Supply.** Favorable supply conditions depend on the level of development of the insurance market and of the restoration and conservation programs operating in the country.
  - Supply conditions are favorable when the insurance market
    - is ready to test innovative approaches to building resilience against climate and disaster risks;
    - has technical tools and data available to support the development and implementation of innovative insurance products and approaches; and
    - has an enabling policy, regulatory, and supervisory framework.
  - MCE restoration and conservation is facilitated by
    - the existence of robust projects promoting the restoration and conservation of MCEs;
    - clear, transparent, and appropriate regulations promoting MCE restoration and conservation;
    - skilled and financially capable national, regional, and international stakeholders engaged in MCE restoration and conservation in the country; and
    - restoration and conservation structures that are transparent and strong, and can facilitate the design of insurance schemes as well as their implementation, such as the existence of coastal management funds.

- **Demand.** Favorable demand conditions stem from the presence of a wide range of owners of action in the selected sites with the willingness and ability to pay for the insurance products. Demand conditions are favorable when the owners of action
  - » are aware of the resilience services provided by MCEs, and the impact of MCE loss and degradation on their bottom line;
  - » are aware of, understand, and trust insurance as a suitable and cost-efficient tool for managing the risks to MCEs;
  - » consider the insurance as part of, and complementary to, a more comprehensive risk management approach; and
  - » have disposable resources to purchase insurance.

- **Enabling environment.** Countries with enabling environments are those that have, or abide by, policy, regulatory, and self-regulatory frameworks providing mandates to owners of action to act. Specifically, the mandates recognize the role of governments, business, and society as owners of action and create incentives for their participation in restoring and conserving MCEs. Compliance with these mandates can be mandatory or voluntary.

  The range of mandates could include the following:

  - » **Mandates relating to disaster risk financing,** such as frameworks recognizing the need to strengthen the disaster resilience of governments, businesses, and society by integrating risk-layering approaches that combine different risk financing tools. These mandates could include international, regional, and national instruments, policies, and commitments aimed at disaster risk reduction, climate change adaptation, shock-responsive social protection, and financial inclusion.
  - » **Mandatory and voluntary frameworks that encourage businesses and communities to report and manage climate risks better,** such as the Task Force on Climate-related Financial Disclosures (TCFD).
  - » **Mandates relating to ecosystem restoration and conservation,** such as frameworks that encourage the restoration and conservation of ecosystems by addressing the threats and risks to MCEs. These mandates include international, national, and regional policies intended to protect MCEs, recognize the services they provide, and promote the assessment and quantification of those services; establish clear frameworks for the design and implementation of impactful restoration and conservation projects; and support the design of financial instruments to promote restoration and conservation, such as payments for ecosystem services and carbon markets. Mandates at the international, regional, and national levels to safeguard marine protected areas and heritage sites are also included.
  - » **Mandates directed at owners of action that contribute to MCE loss and degradation, prompting them to do otherwise.** These include international, regional, and national incentives to fight threats such as pollution, overfishing, unsustainable coastal development, and careless tourism.

The Asia-Pacific Climate Finance Fund (ACliFF) supports the innovative use of financial risk management products to unlock capital for climate investments and improve resilience to the impact of climate change.

In September 2022, the Asian Development Bank (ADB) approved technical assistance support under the ACliFF to quantify the risk reduction services provided by coral reef ecosystems in selected locations across Indonesia and the Philippines, and in Fiji and Solomon Islands. Engaging with public and private sector stakeholders, the project seeks to build a risk financing and insurance scheme to promote and finance coral reef conservation.

For more information on the ACliFF, visit the fund's website at **www.adb.org/acliff.**

For more information on the ADB technical assistance project, visit ADB's website at **www.adb.org**.

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