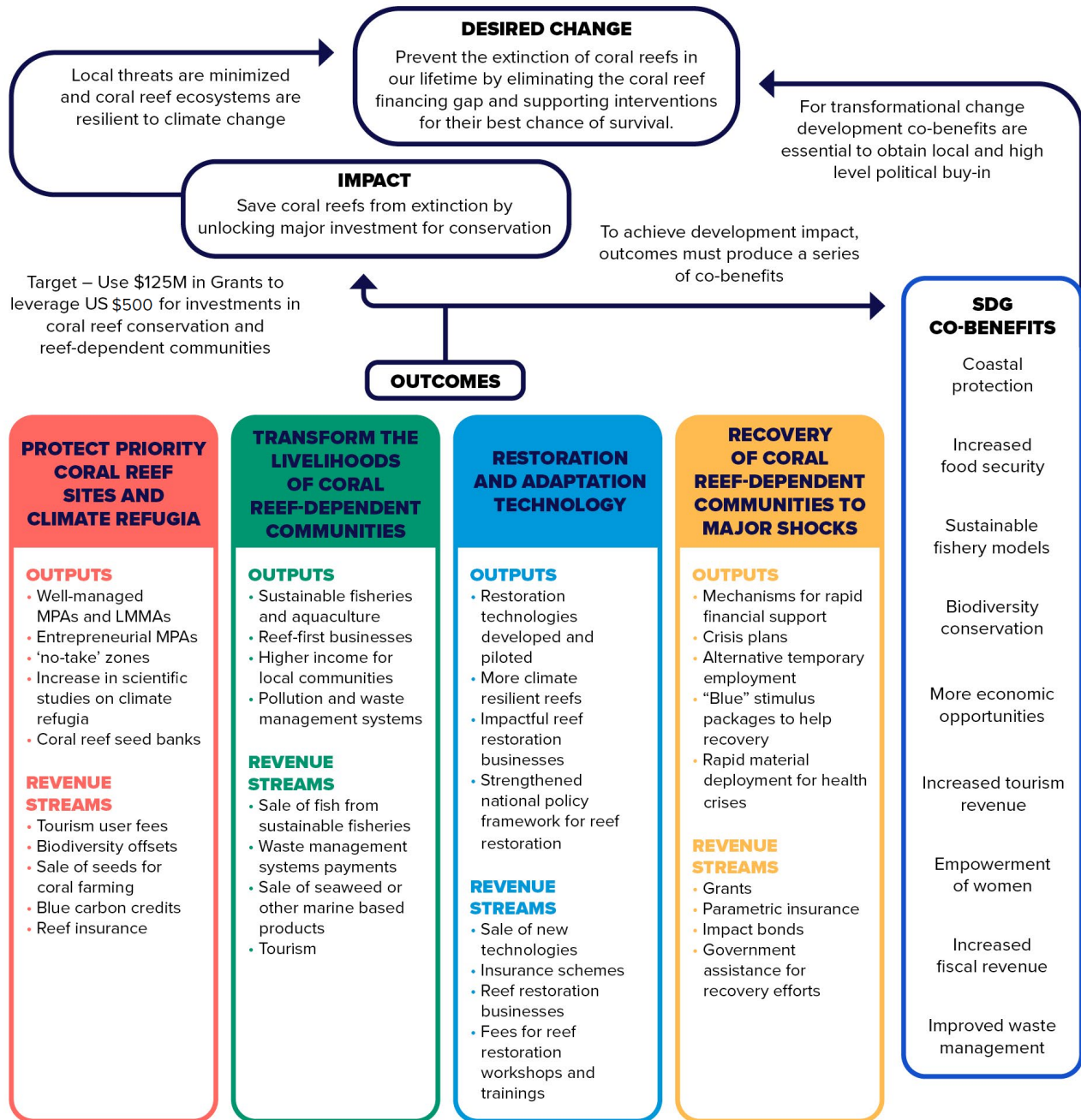




05

**THEORY
OF CHANGE**

THEORY OF CHANGE



LOCAL THREATS					
Overfishing	Rising ocean temperature	Ocean acidification	Nutrient loading	Coastal development	Natural disasters
Derelict fishing gear	Marine plastic	Invasive species	Unsustainable tourism	Sedimentation	Destructive fishing

- The Coral Crisis — 90% of coral reefs could die by 2050 without urgent action
- A billion people worldwide depended on coral reefs for coastal protection, food and income from tourism
- The amount of money needed to save coral reefs needs to be seven times greater than current funding levels
- Impact investment capital is significant and on the sidelines waiting for investment ready blue economy project

5.1

PROGRAMMATIC FRAMEWORK

Global Fund for Coral Reefs | IMPACT STATEMENT

Coral reefs are situated at the frontline of climate change, and since many are found in developing countries and small island nations these countries must be urgently supported. Significant injections of international funding are needed to help stakeholders actively pursue adaptation strategies to protect and restore reefs while also reducing pollution and damage so reefs can fully recover.

This is why the **Global Fund for Coral Reefs** is a *game-changer*. It will unlock major investment towards coral reef conservation and restoration in developing countries, and facilitate transformation of economies and livelihoods to reduce important drivers of coral reef degradation.

Multilateral development banks and private firms are eager to provide low-interest debt financing for blue infrastructure, but require well-conceived projects that already have project equity in place. The GFCR is the middle ground for private sector partners by offering critical risk equity capital, debt swap schemes, and grant funding to deliver exciting and impactful coral reef projects. Using targeted grants and investments to fund initiatives the GFCR can enhance global and local capacities to urgently deliver smart solutions at scale.

5.2

DRIVERS OF CHANGE

Due to the multiple drivers of degradation, interventions are required on several levels. Drivers on coral reefs range from the global (e.g. ocean warming, ocean acidification, increasing human populations) to the local (e.g. natural disasters, overfishing, destructive fishing, pollution, boat anchoring, etc.).

Drivers are defined as direct, those which physically impact coral reef organisms, or indirect, those that do not directly impact coral reef organisms but still lead to their degradation.

DIRECT GLOBAL DRIVERS

Ocean acidification and reduced coral growth

Increasing seawater temperatures and bleaching events

Damage to adjacent ecosystems (e.g., mangroves and seagrasses)

DIRECT LOCAL DRIVERS

Natural disasters (typhoons, tsunamis, flooding, etc.)

Overfishing

Destructive fishing (dynamite, poison, etc.)

Pollution (nutrients, chemicals, etc.)

Tourism

Sedimentation

Land reclamation

Invasive species and disease

Lost and abandoned fishing gear

Increased intensity of storms

Crown-of-Thorns starfish outbreaks

Unsustainable coastal development

Sand and coral reef mining

INDIRECT DRIVERS

Human population growth

Unsustainable consumption patterns

Political apathy

Lack of public awareness

Economic systems that do not take environmental costs into account

5.3

OUTCOMES, OUTPUTS AND RESULTS

The GFCR supports interventions designed to achieve the following four outcomes.

OUTCOME 1: Protection of priority coral reef sites including climate ‘refugia’

Although coral reefs are highly vulnerable to thermal stress and climate change, not all reefs are equally vulnerable. A growing body of evidence shows the existence of ‘climate change refugia’. These coral reefs suffer less degradation in the face of predicted ocean acidification and rising sea surface temperatures. Designated areas of protection for climate resilient coral reefs, such as MPAs, is a highly effective tool for conservation. Well-managed MPAs support greater biomass, higher biodiversity, provide substantial economic benefit and make coral reefs more resilient to damage degradation from climate change. It is an immediate priority to identify top climate resilient coral reef sites that can provide the highest level of ecosystem services and sustain biodiversity.

In a world of finite resources, identifying climate refugia and investing in their protection can yield strategic and global benefits for coral reefs by boosting the resilience of critical ecosystems and providing natural ‘seed banks’ for the repopulation of reefs around the world. Outcome 1 will identify climate change refugia and direct drivers of degradation to determine investment solutions that protect these refugia. Coral vaults would act as gene banks for species faced with extinction.

To help identify priority coral reef sites, GFCR will build on the work of the 50 Reefs initiative, UNEP Coral Futures, WWF Coral Reef Rescue Initiative. These studies and initiatives have worked to identify and assembled global portfolios of the world’s most climate change resilient reefs. It is believed that protecting the identified priority climate refugia coral reefs can help the ecosystems survive the impacts of climate change and may help repopulate neighboring reefs.

In addition to implementing new MPAs, the GFCR will also support projects that improve management and enforcement of existing MPAs. Although globally there are thousands of designated MPAs, they generally have limited funding, inadequate management and lack enforcement. In some countries, estimates are as high as 80-90% for MPAs that exist on maps but in reality offer very little protection to coral reefs, commonly known as “paper parks”.²⁹ The GFCR will look to support initiatives that transform paper parks into MPAs that generate true benefits for coral reef ecosystems, while involving the local community to take ownership and pride of their natural resources.

OUTCOME

Strategic coral reefs are protected (i.e. reefs with high biodiversity or produce ecosystem services; climate refugia and natural ‘seed banks’ with assigned value to protect intellectual property and patents³⁰) and ecosystem resilience is increased in the face of climate change.

Degradation drivers of coral reefs are mitigated or eliminated.

POTENTIAL OUTPUTS

Increase in well managed and enforced MPAs and LMMAs that protect and promote healthy reefs

Entrepreneurial MPAs

Increase in scientific studies on identifying climate refugia

Water quality/land-ocean interface projects roll-out to protect coral reefs

Elimination of destructive fishing practices and harmful gear from protection sites

Establishment of ‘no-take’ zones and nurseries within protected areas

Legal advice on intellectual property, potential uses and patents related to climate-resilient corals located in refugia

POTENTIAL REVENUE STREAMS

Ecotourism user fees

Debt-for-nature/adaptation swaps

Eco-resorts

Special use permits

Visitor centers

Biodiversity offsets

Blue carbon credits

Impact bonds

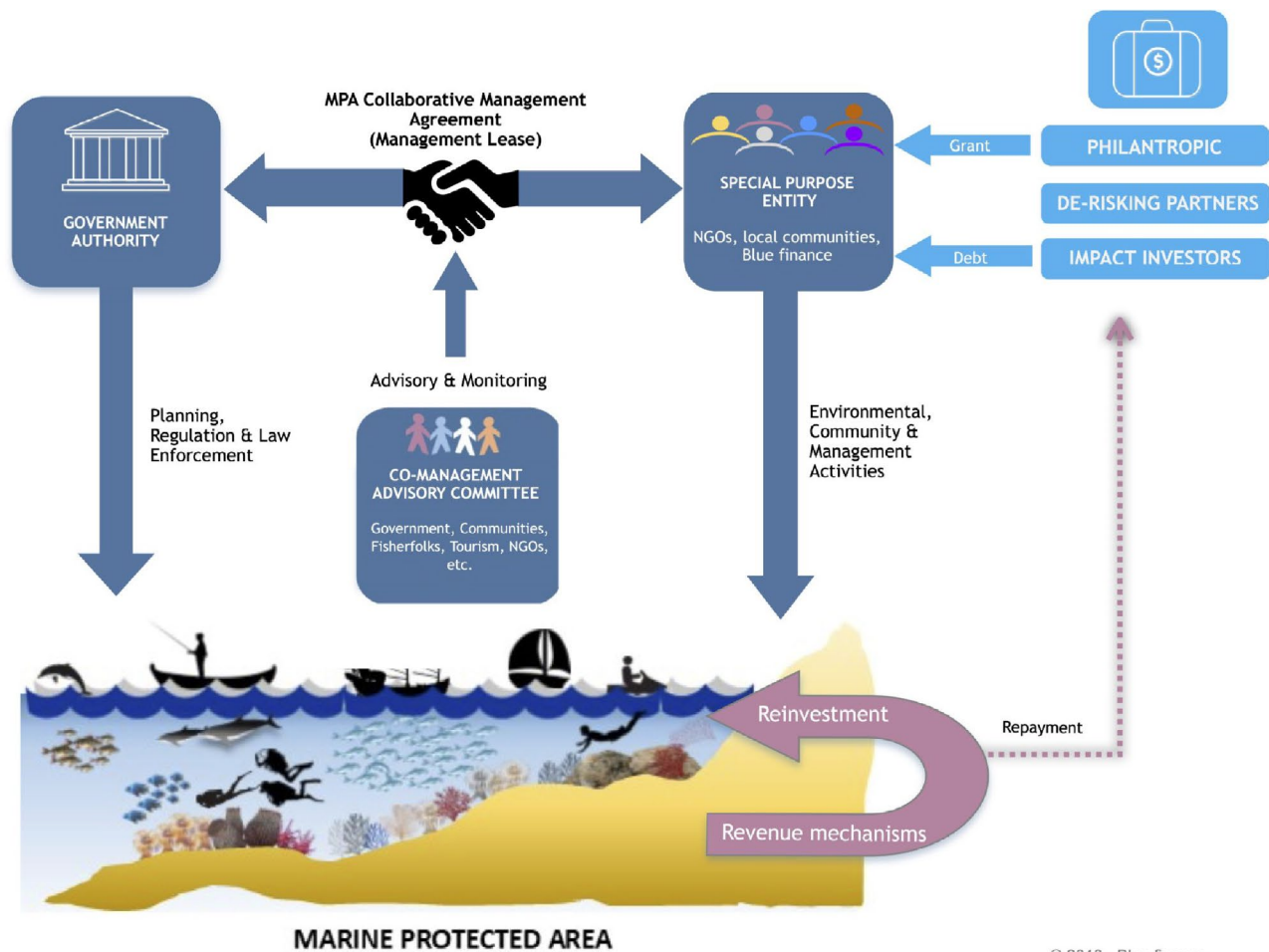
Patents

Provision of legal advice and expertise

Sale of seeds and fragments, storage of seeds and fragments, and coral farming

MPAs form an important part of the GFCR investment pipeline to protect priority coral reefs. MPA projects will be supported where there are functioning basic infrastructure and governance but working capital is required to improve services, enforce boundaries, increase community engagement and ultimately strengthen value chains to spur revenue generation.

Research commissioned by the World Wildlife Foundation (WWF) in 2015 found that expanding and effectively managing MPAs for habitat protection—protecting even 10% to 30% of marine or coastal areas—can result in benefits worth three times more than the cost of implementation.³¹ Benefits can be in the form of improved fish biomass and biodiversity, as well as density. The same study found the economic rate of return in expanding networks of MPAs to be as high as 24% (range 9% to 24%), and greater than the discount rate (3%) across every scenario. Authors of *The Coral Reef Economy* found the potential return on investment for the expansion of a no-take MPA in Mesoamerica would be 44:1. Returns in protection are proportional to the size of the investment; the larger the injection of capital the greater the levels of protection and the greater benefits achieved, including financial returns.



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Figure 5: The Blue Finance model.

Source: http://blue-finance.org/?page_id=2321

One approach for making MPA management more effective and bankable through blended finance is using the Blue Finance model (Figure 5). Blue Finance facilitates the adoption of co-management agreements for public-private partnerships of MPAs. The model offers investors a minimum 8.5% Internal Rate of Return (IRR), after typical capital expenditures of \$3.5 million US dollars on the MPA with an investment spread over a two-year period. Blue Finance structures co-management agreements between the government and a non-profit Special Purpose Entity (SPE) governed by local stakeholders from locally-based NGOs, hotels, tourism businesses, fishery cooperatives and others from the MPA adjacent community. The SPE is responsible for MPA management and tourism enhancement activities such as compliance, community engagement, livelihood enhancement, and support to sustainable tourism. The SPE manages investments from impact investors and funnels them into revenue generating activities such as dive operators, visitor centers, or glass-bottom boats tours. Businesses conducting tourism within the MPA charge visitors a fee. Revenue is pooled under the SPE for MPA management and restoration, with a percentage set aside for repaying impact investors. The government’s role in co-management agreement is to enforce MPA boundaries.

Another investment vehicle to protect priority coral reef ecosystems is the Entrepreneurial Marine Protected Area (EMPA). This is where a protected area is primarily supported by profit-bearing businesses, most associated with blue sustainable tourism. Marine areas protected by entrepreneurial enterprises are considered impact investments because models are designed to produce ecological, social and economic benefits. Sustainable tourism entrepreneurs seek ecological business opportunities dependent on conservation outcomes and strong social and political relations with governments, civil society groups, and local communities. With sound business models and knowledge of the tourism market (e.g. existing infrastructure, tourism demand, risk, etc.) sustainable tourism in MPAs can generate significant revenue for coral reef conservation through the collection of ecotourism and entrance fees. Funds collected can be applied to management, enforcement and restoration efforts.

One of the first EMPAs was Chumbe Island Coral Park (CHICOP), established in 1991 in Zanzibar, Tanzania. The eco-lodge continues to provide ecological, socio-cultural, and economic benefits. The initial investment to establish CHICOP was \$1.2 million US dollars for managing terrestrial and marine conservation through an official concession from the government, and allowed the eco-lodge to operate within the protected area. After three years the occupancy rate increased by 60% and jumped to 85% after nine years. CHICOP generates incomes of approximately \$600,000 US dollars from 4,000 to 6,000 visitors each year. Importantly, the eco-lodge coral reef sanctuary is a protective breeding ground for fish, coral, and other species that go on to repopulate nearby overfished and degraded areas.

A similar example of an EMPA is the Misool Eco-Resort established in 2005 by private investors as an EMPA in Raja Ampat, Indonesia. The project had the support of the local community, along with national recognition and backing from partnerships with several international conservation non-profit organizations. The site is surrounded by an MPA that is managed by the eco-resort through a marine conservation agreement with the government and local communities. The eco-resort sets high rates for tourists who seek an all-inclusive experience of diving, snorkeling, observing baby turtle releases, or day tours. In addition to preserving the eco-resort island's coral reefs, the Misool Foundation uses its revenue to implement other environmental projects across Indonesia that include a marine reserve, community education, and recycling programme.

In addition to the Blue Finance model and EMPAs, we envision revenue streams that come from biodiversity offset credits (habitat banking), impact bonds, sale of climate resilient coral fragments.

OUTCOME 2: Transformation of the livelihoods of coral reef-dependent communities and sectors

The current global economic system does not take into account the cost of economic activities on the environment and thus tends to promote unsustainable behaviors and ecosystem degradation. Experts are calling for mass transitions to greener (or bluer) economies. Strategic investments made in highly reef-dependent communities can reduce local drivers of reef degradation and bolster the resiliency of coral reef ecosystems and adjacent communities to climate change.

As the goods and services coral reefs and their ecosystems decline with reef degradation, the impact on reef-dependent societies needs to be understood and managed. Coastal community livelihoods have to transform to protect their reefs and futures by applying sustainable practices and reducing dependence on coral reef resources. Public and private investments in education, skills-building, SMEs, mariculture and sustainable fisheries can help in this transition. GFCR support for developing sustainable fisheries can boost fishery yield and create opportunities for local fishers to sell catch at a premium. NGOs can remove inefficiencies from the market to connect local fishers to the consumer, providing more income and reducing the need for unsustainable fishing. Similarly, projects that develop mariculture for sustainable farming of fish, invertebrates, and seaweed can relieve fishing pressure on the reef and provide new sources of income. Seaweed farming and value chain establishment, as well as recycling nets, can all provide new types of livelihood and complement other revenue sources. Further, GFCR efforts to support eco-tourism projects and reef-first SMEs can address additional drivers of reef degradation while providing new economic opportunities for local communities who otherwise rely only fishing for income and subsistence.

OUTCOME

Reduced reliance and unsustainable practices in coral reef ecosystems as people are made aware of the crisis and motivated to make and support pledges to take positive action at scale.

Transition to sustainable fisheries and tourism. Private sector-led investments funneled into alternative livelihoods and reef-first businesses.

POTENTIAL OUTPUTS

Community-based projects for sustainable fisheries, seaweed farms, aquaculture, tourism, etc.

Sustainable value chain development and educational programmes to build skills for alternative careers and livelihoods

Women empowered through capacity building and safety nets

Reef-first businesses

Economic valuation of coral reefs and ecosystem services

Communication and educational campaigns to drive and sustain behavioral change

POTENTIAL REVENUE STREAMS

Sustainable fisheries (e.g. export sales from high value fish products including premiums for sustainability)

Sale of seaweed or other marine based products

Eco-tourism SMEs

Waste management systems

Bioprospecting

An excellent illustration of transforming a fishery to be sustainable is Blue Ventures' management approach for an octopus fishery in southern Madagascar that led to economic and environmental benefits. The octopus fishery in Madagascar accounts for 70% of the value of marine resources purchased by regional and exported companies. Blue Ventures helped establish temporary fishing bans during important octopus life-history periods in degraded reef areas. Research of the project showed a 461% increase in median recorded landings and 120% increase in catch-per-unit-effort. The mean catch per fisher doubled from 2.3kg per day to 5.9kg. Established in the early 2000s, it was one of the first community-based management systems where costs were covered by increased profits. The model has since been replicated throughout the region.

Another example of the potential for sustainable fisheries to yield environmental and economic benefit is Encourage Capital's 2016 blueprint for making small-scale fisheries in the Philippines more profitable and sustainable.³² The project targets 40 fishing communities and 19,000 fishers. An investment of \$11.7 million US dollars is being made over 10 years in equity and grants in fishing management strategies and seafood companies. The model assumes that consumers are happy to pay a 15% premium on sustainably sourced fish and that the managing fishery overexploitation will lead to a 20% increase fish biomass. Following a 10-year period, Encourage Capital believes its investors could gain a 20.7% targeted ROI on their Philippines sustainable fishery project.

Other investments to reduce drivers of degradation and transform the livelihoods of coastal communities can be made into blue tourism, recycling programs and wastewater treatment systems. For example, mitigating wastewater pollution in underserved areas creates jobs, benefits the health of the community and improves the quality of the coral reef ecosystem. To generate revenue and repay investors, a wastewater treatment company can collect service payments from the community, tourism sector, or government.

Furthermore, education investments that build local skills can diversify employment prospects and build an understanding of resource management and conservation in coastal populations. Job training in artisanal crafts, agriculture, or technology offers new economic opportunities for a community and steers people away from unsustainable coral reef ecosystem resource extraction activities.

OUTCOME 3: Restoration of coral reefs through new technologies and adaptive approaches

Given current climate and population growth projections we can expect most coral reefs around the world to experience considerable degradation. Preservation and restoration techniques are under development, but a greater number of investments must be made to increase the scalability and cost-efficiency of these mechanisms if there is to be large-scale impact for ecological resilience and adaptation. To date, restoration techniques have failed to keep pace with rates of decline. Technologies that might benefit from targeted investment include coral restoration; new technology to restore at scale; assisted coral evolution; coral gardening; direct transplantation; artificial structures; larval enhancement, and substrate stabilization.

To be successful, these technologies must be applied in areas with conditions that can support coral growth measures such as ample light, appropriate temperatures, and good water quality. To ensure the best possible conditions the effective parallel mitigation of local drivers, protection and management of restoration areas is a prerequisite for funded initiatives.

OUTCOME	POTENTIAL OUTPUTS	POTENTIAL REVENUE STREAMS
<p>Coral reef restoration and adaptation technologies are made scalable, cost-efficient, and applicable to a variety of regional contexts; with proven outcomes for ecological resilience.</p>	<ul style="list-style-type: none"> Restoration technologies developed and piloted Strategies for high-impact restoration Strengthened national policy frameworks based on robust business cases for coral reef restoration and maintenance Restoration guidelines and training on coral reef restoration 'In situ' water restoration projects Identification of priority restoration sites within targeted MPAs 	<ul style="list-style-type: none"> Fees for workshops and training for reef restoration and on new technologies Sale of new technologies Green-grey solutions for coastal and beach protection Fee for services to apply and provide technology training Insurance schemes Reef restoration ecotourism Biodiversity offsets Debt-for-nature/adaptation swaps Payments for ecosystem services

Initial grants and investments will go into developing the capacities of reef restoration businesses so they can be hired by local stakeholders to restore degraded reefs. Outcome 3 will generate benefits for local communities due to increased fish biomass, ecotourism, and enhanced coastal protection from greater live coral cover. Restoration companies could be remunerated through biodiversity offsets applied when developers purchase biodiversity equalizers for projects to compensate for damaging actions. The funds raised from biodiversity offsets may go into conservation and/or restoration activities.

Where appropriate, opportunities can be explored to duplicate restoration efforts and support groups like 1000 Mermaids and Mars Assisted Reef Restoration System. These initiatives help promote coral recruitment and growth by placing artificial structures in the water like "reef stars" and other man-made structures.

Repairs for a reef damaged by a severe storm must be implemented quickly to enhance the possibility of reef recovery. First responder “brigades” can be trained to assess damage, remove debris, make initial repairs, collect broken coral for future reattachment, and design repair strategies. Investments made in developing and advancing preservation and restoration techniques and technologies can be applied in a variety of regional contexts. By piloting and scaling up reef restoration efforts, we prove coral reefs can be restored and be more resilient to the impacts of climate change.

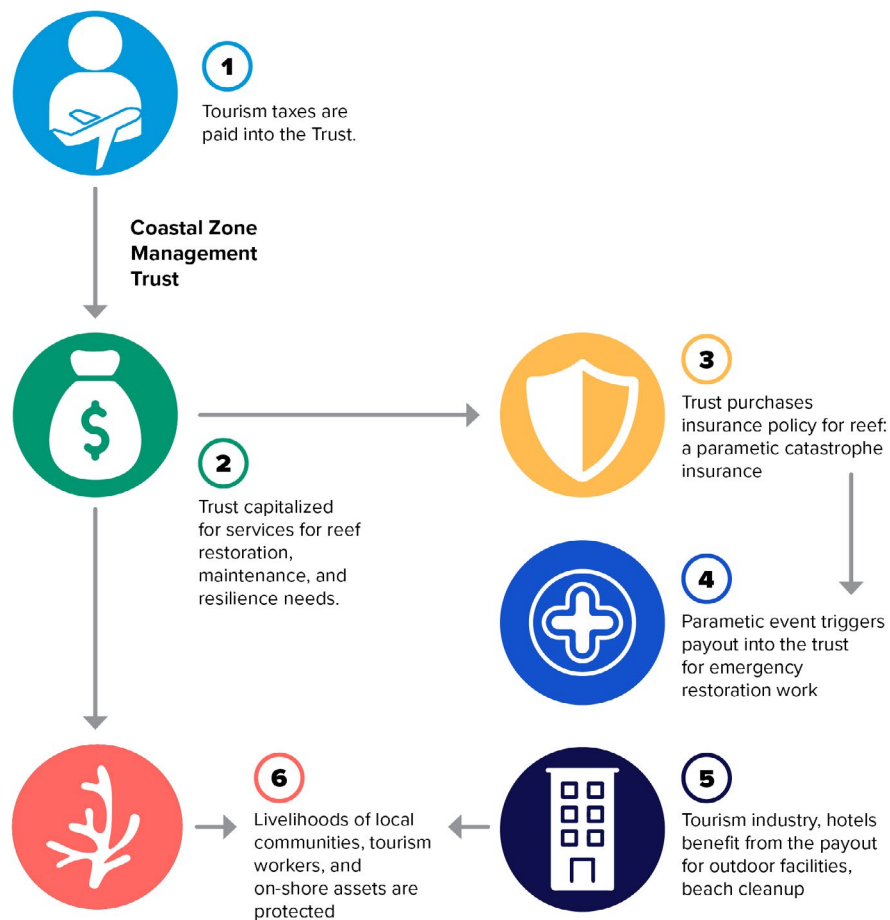


Figure 6: Parametric reef insurance.

Another potential means for generating revenue under Outcome 3 is parametric reef insurance. Coral reefs provide valuable services but can be damaged by natural disasters that reduce the reef’s ability to provide those services. Identifying insurable risks associated with a reef that protects on-shore assets (e.g. tourism assets, property, and communities) are essential components for structuring reef insurance. Current reef insurance models use parametric triggers to determine payout (e.g. hurricane wind speed). The cost of restoring reefs after a storm is less than the lost ecosystem services due to reef destruction.

By capitalising the local vehicle buying the insurance (a trust) it is possible to not only to have a payout in the case of disasters, but to also create a revolving loan vehicle for lending to on-shore facilities so they can disaster proof, mitigate ocean waste, and restore degraded reefs. Parametric insurance instruments can incentivize sound planning, management, and risk reduction through lowered premiums, while also ensuring rapid payouts in response to impacts.

To ensure that reef restoration efforts do not fail, GFCR will assess whether sites have proper environmental and enforcement conditions for success. Environmental impacts assessments are required before funds are disbursed and restoration can commence. Reef restoration technology is a dynamic space that GFCR plans to monitor following ICRI guidelines. Our technical committee will oversee grant investment decisions relating to reef restoration science.

OUTCOME 4: Recovery of coral reef-dependent communities in the face of major shocks and insecurity

The severe global health, social and economic impacts of COVID-19 are stark examples of risks associated with nature loss and degradation of natural ecosystems. The pandemic has brought much of the world to a sudden stop. Like COVID-19, climate change and nature loss are realities that countries must face today and tomorrow. Many similarities unite these two challenges. Like COVID-19, climate change will expose how multiple economic, social and institutional drivers exacerbate environmental risks, and lead to impacts on the availability of natural resources and the security of millions of livelihoods.

COVID-19 crisis has clearly demonstrated how governments, production systems and communities are unprepared to face multiple, major and simultaneous shocks. Social safety nets proved to be inadequate across the world as millions have lost their livelihoods. Additionally, protected areas, many of which rely heavily on tourism for financing, are encountering formidable challenges to continue enforcement and management activities as tourism revenue has plummeted. MPAs management authorities in many regions are struggling to pay staff, a problem compounded by regional loss of livelihoods and disruption of supply chains leading to more people fishing unsustainably in protected areas to feed their families and generate income. To mitigate this issue the GFCR will implement initiatives that apply a diverse set of business models in various sectors to avoid overreliance on tourism to fund conservation efforts.

Outcome 4 of the Fund will include safety net systems to activate during periods of crisis. Shocks to trigger Outcome 4 include major bleaching events, large storms, health crises, disruption of supply chains and others. The shocks must exhibit clear and demonstrable impacts on GFCR supported coral reef ecosystems to trigger Outcome 4 responses. Impacts include:

- MPA management and enforcement operations are weakened due to lack of tourism based financing.
- Food insecurity - extraction of coral reef ecosystem resources (e.g. fish, coral heads and other invertebrates) increases significantly.
- Energy insecurity - mangrove degradation increases significantly as people harvest fuelwood.
- Livelihood insecurity – SMEs supported by the GFCR experience significant challenges due to shocks induced by supply chain disruptions, leading to lay-offs and pay-cuts (e.g. sustainable seafood producers have difficulty getting product to consumers)

OUTCOME

Reef-dependent community livelihoods are more resilient to shocks, avoiding a resurgence of drivers of degradation for coral reef ecosystems. MPA management and enforcement operations are equipped to continue functioning during periods of crisis.

POTENTIAL OUTPUTS

Mechanisms in place for rapid financial support to reef-first SMEs and MPAs impacted by shocks. This includes the use of parametric reef insurance.

Crisis plans in place to mitigate impacts from supply chain disruptions, bleaching events, health crises, etc.

“Blue” stimulus packages to help recovery after shocks.

Alternative temporary employment during periods of crisis to aid recovery efforts and provide sources of income for those that have lost their livelihoods.

Rapid material deployment to deal with crisis

POTENTIAL REVENUE STREAMS

Grants

Parametric reef insurance

Impact bonds

Government assistance for recovery efforts

A safety net for reef-dependent communities will not only provide assistance to some of the most vulnerable people during shocks, but also reduce the need for affected people to return to unsustainable activities in coral reef ecosystems. If and when a crisis hits a coral reef site supported by the GFCR, already developed action plans will serve as a roadmap to guide the recovery process. Plans may include how to repurpose financial, material, and human capital in a disaster response setting. For example, after a large storm damages important infrastructure along the coastline, employees in GFCR supported tourism and fishery/aquaculture sectors can be temporarily reassigned to support the rebuilding effort.

The GFCR will consult with on-site implementing partners on the needs of the affected area to determine if and how much grant capital should be deployed to the site to ensure food security, energy security, and health during times of crisis and recovery periods. The GFCR and implementing partners will assist businesses with maximizing positive impact from “blue” stimulus packages provided by the GFCR or other stimulus packages from the national government.

Additionally, parametric reef insurance will be incorporated into GFCR initiatives at priority coral reef sites. As discussed in Outcome 3, reef insurance will help support reef restoration activities but can also help cover financial losses to local businesses and MPAs who experience shocks. Further, in the case of a health crisis such as COVID-19, the GFCR will use grants to support efforts to deploy adequate equipment to impacted communities.

In addition to Outcome 4 outputs, the GFCR will work with its partner financial institution BNP Paribas to design flexible, crisis-conscience loan terms for borrows. In the event of a crisis, GFCR borrowers would have the option of deferring payments and/or freezing interest accrual until business operations can return to normal.