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MINISTRY OF TOURISM
REPUBLIC OF MALDIVES



MALDIVES TOURISM CLIMATE **ACTION PLAN**

STRATEGIC PATHWAYS FOR CLIMATE RESILIENCY IN TOURISM

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ACRONYMS AND ABBREVIATIONS

BEC	Blue Carbon Ecosystem
CAP	Climate Adaptation Project
CDM	Clean Development Mechanism
COP	Conference of the Party
CSR	Corporate Social Responsibility
CTF	Conservation Trust Fund
DMO	Destination Management Organization
GAM	Guesthouse Association of Maldives
GCF	Green Climate Fund
GDP	Gross Domestic Product
IPCC	Intergovernmental Panel on Climate Change
IR	Intermediate Result
KBA	Key Biodiversity Area
LDC	Least Developed Countries
MATI	Maldives Association for Tourism Industry
MMRI	Maldives Marine Research Institute
MPA	Marine Protected Area
MSME	Micro, Small and Medium-Sized Enterprise
NbS	Nature Based Solution
NDC	Nationally Determined Contribution
NDMA	National Disaster Management Authority
NBAM	National Boating Association of Maldives
NGO	Non-Governmental Organization
PA	Protected Area
ROI	Return of Investment
REDD+	Reducing Emissions from Deforestation and Forest Degradation
SAP	Strategic Action Plan
UNFCCC	United Nations Framework Convention on Climate Change
USAID	United States Agency for International Development

FOREWORD FROM THE MINISTER OF TOURISM

Tourism is the backbone of our economy. Tourism will continue to foster the economy and the development of the country. I believe that tourism has the power to create positive change, driving economic growth, preserving cultural heritage, and protecting our natural wonders for generations to come.

We are also concerned that the industry is under the looming impacts of climate change. Adapting and mitigating to the impacts is of high priority to us. We ensure that our tourism activities align with our climate goals and contribute to the global efforts to mitigate the impacts of climate change. Tourism has the potential to be both a contributor to climate change and a solution. Decisive action now can create a future where tourism thrives while protecting the natural and cultural assets. We are placing policies and strategies to address these impacts.

This Tourism Climate Action Plan outlines our commitment to developing a sustainable and resilient tourism sector that addresses the challenges of climate change. The plan sets out our vision for harnessing the power of tourism to drive positive change. It has actions for destination resilience, carbon emissions reduction, community engagement, education and awareness, research and innovation and most importantly, actions on collaboration and partnerships. These actions will help to protect our environment while providing unique and memorable experiences for visitors. It will help to maximize the positive impacts of tourism while minimizing its negative impacts on the environment and communities. By implementing this action plan, we envisage achieving long-term economic growth, social well-being, and environmental conservation.

We acknowledge the collective effort from the policy makers, tourism industry experts, local communities, environmentalists, and other important stakeholders' contribution to this action plan. It shows their enthusiasm and encapsulates our collective vision for a thriving tourism sector. I express my heartfelt appreciation to the United States Agency for International Development (USAID) Climate Adaptation Project, for their kind assistance in formulating this action plan.

I am confident that this plan will complement our effort for sustainable tourism. It will bring prosperity to the industry, creating a positive and lasting impact on its environment, communities, and visitors, ensuring prosperity and preservation of our unique resources for generations to come.

EXECUTIVE SUMMARY

Humanity has experienced the hottest temperatures on record during the past decade. The Intergovernmental Panel on Climate Change (IPCC) has warned that we are likely to exceed a 1.5°C average temperature increase, the point at which severe climate disruptions would occur, with significant impacts for humans and nature. In the Maldives, the challenge has never been so apparent. The country is among the most vulnerable on Earth to sea level rise, with more than 80 percent of its islands less than a meter above sea level. With mid-range sea level rise predicted to be between .5-1.2 meters, the Maldives is projected to lose some 77 percent of its land area by the year 2100.^{1,2} More than 90% of all resort infrastructure and 99% of all tourist accommodation are currently within 100m of coastline.³

Attracting a record 1.7 million tourists in 2019, the tourism industry must take action to ensure communities in these destinations can adapt to a changing world. Despite having contributed little to the problem, the Maldives hosts a wealth of potential solutions. In recent years, the Government of the Maldives has made strides towards becoming a beacon of climate leadership for the rest of the world. The tourism industry in the Maldives has the opportunity to do the same—positioning itself as a visionary industry that is not only responsibly reducing its emissions, but actively helping communities to adapt to the inevitable consequences of climate change. Many initiatives across the country have already taken root—innovative waste management practices, seagrass restoration efforts, community-led mangrove conservation, and coral reef rehabilitation have all originated in and been catalyzed by the tourism sector.

Accounting for roughly 28% of GDP and 60% of foreign exchange,⁴ the tourism sector in the Maldives has an opportunity to model what approaches to innovative climate adaptation look like for the rest of the world. The Climate Change Adaptation Action Plan is designed to guide the tourism sector, with the Ministry of Tourism at the helm, through the sea of change climate change will bring over the next generation. This is a piece of visionary thought leadership from the industry, informing an Action Plan that is rooted in practice, underpinned by real people and experiences, and led by the vision of those already seeking change.

This document sets forth a vision for a tourism industry in the Maldives that leads the world in climate change innovation by centering communities and regenerating nature. This vision was informed by research conducted over a year and key conversations with a wide range of stakeholders. Designed to align Goal 4 of the Maldives Fifth Tourism Master Plan— Build Climate Resilience and Protect Natural Assets—the Action Plan outlines five strategic objectives for achieving this vision, including integrating community experiences and priorities, protecting destination assets, regenerating nature, diversifying business models, and aligning with global initiatives. Core actions are presented under each objective, linking to the 10 Business Climate Action Investments presented in Section 3—a “menu” of innovative adaptation solutions businesses can invest in today to increase their resilience for tomorrow—and guidance on financing and practical steps businesses can take to adopt these critical adaptation measures.

Finally, the Action Plan lays out potential financing opportunities for both public and private sector stakeholders in the Maldives, looking at innovative financing opportunities such as Nature-based Solutions and carbon offsetting. These are financing opportunities that will only continue to grow as global demand for these solutions increases. Businesses are well-positioned to take advantage of this nature-positive global shift. Utilizing the strategies and solutions laid out in this Action Plan, businesses can begin their path towards a resilient and equitable future for their visitors, employees, communities, and destinations as a whole.

SECTION I – INTRODUCTION

Tourism has been the bedrock of much of the Maldives’ economic growth over the past several decades. Tourist arrivals have tripled in the last two decades and the industry has been a major driver to Maldives’ economic growth. The National Bureau of Statistics reported that in 2019, about 45,000 people were employed in tourist resorts.⁵ While this represents only 7% of the employed population, tourism in Maldives generated USD 3.17 billion in 2019, accounting for 28% of the country’s GDP and 60% of its foreign exchange.⁵ Tourism also supports other key industries in the Maldives, such as construction of resorts and fisheries to meet tourists’ demand for fish and seafood. These facts present both exciting opportunities for the future of tourism growth in the Maldives, as well as an alarming forecast if climate change impacts are not addressed in future planning scenarios.

Given the importance of tourism to the Maldives, this Action Plan is designed to guide a tourism-specific response to many climate-induced challenges while providing more business-targeted guidance in support of Goal 4—Build Climate Resilience and Protect Natural Assets—of the Maldives Fifth Tourism Master Plan. As tourism continues to grow in its importance and climate change begins to have severe impacts, any delay in a transition to a resilient and future-proof tourism industry becomes more and more costly. However, climate adaptation is not just about costly investments for businesses; it also means developing new ways of doing business that benefit people, the environment, and the economy.

The vision set forth in this Action Plan is encapsulated in the following statement:

By 2030, the tourism industry in the Maldives will be a global leader in responding to challenges imposed by climate change, demonstrating the potential of innovative climate adaptation pathways for other Small Island Developing States (SIDS) and the world. The tourism industry will achieve this by diversifying the tourism economy, integrating community needs and priorities, and regenerating ecosystems and destinations the industry depends upon and seeks to steward.

The objectives and business actions laid out in this Action Plan center around three key components of this vision:



- **Economic Resilience** – Climate impacts can be costly for businesses, and obtaining adequate insurance is an increasing challenge for businesses. Insurance providers, investors, and financial institutions are more likely to insure or finance developments with strict green standards and resilience ratings. Failure to adapt or disclose risk from climate change may lead to liability consequences; thus, understanding the risk to businesses and how to address these risks will be critical.
- **Environmental Stewardship** – Nature underpins the tourism economy in the Maldives; without its white sand beaches and coral reefs, many tourists may choose not to travel. However, nature can also help businesses and destinations adapt to climate change by enhancing food security, protecting coastlines, and diversifying tourism assets and opportunities.

- **Social Responsibility** – Tourism does much more than just create job opportunities; it can help to unite a destination, enhance cooperation, increase workforce development, improve pride in a place, and reduce social vulnerability. Tourism operators in the Maldives can raise the awareness of guests about climate change, making them better stewards not only of the destinations they travel to, but also of the world as global citizens.

This Action Plan is informed by both consultations with public- and private-sector stakeholders, as well as an in-depth analysis of strategies, policies, and regulations relevant to climate adaptation and tourism (See Annex III for detailed analysis). The Action Plan seeks to operationalize the vision set forth in documents such as the Second National Communication of Maldives to the UNFCCC (2016) and the Nationally Determined Contributions of the Maldives (2020). In highlighting adaptation opportunities for tourism, the Second National Communication of the Maldives states that “High priority is given to building resilience of the sector and services including supporting community based adaptation projects in local communities, investing in climate proofing operational infrastructures in tourist operators and contributing to conservation and protection of the bio-diversity.”⁶⁸ The Maldives NDCs go further in recommending:

Understanding the difference between climate adaptation and climate mitigation

Climate mitigation and adaptation can be broadly understood as the process of addressing the causes and consequences of climate change. Climate mitigation seeks to reduce or prevent greenhouse gas emissions (GHGs) such as carbon dioxide (CO₂) from entering the atmosphere that cause climate change. Climate adaptation is the process of adjusting to current and future consequences of climate change, such as sea-level rise, reduced food or water security, or increased storm surges. Climate adaptation also focuses on climate justice: ensuring that those most adversely affected by the consequences of climate change are provided with resources necessary to adapt in a fair and equitable manner.

- Mainstream climate change risks into tourism sector policies to enhance the resiliency and sustainability of the sector.
- Facilitate access to finance to increase the resilience and sustainable environmental management of the sector.
- Mainstream and promote clean energy and energy efficiency technologies to reduce overall emissions.
- Establish an insurance mechanism to reduce the impacts on the tourism sector through risk sharing and risk management.

Incorporating these recommendations, this Action Plan further builds off the recommendations outlined under the reports “Increasing Climate Change Resilience of Maldives through Adaptation in the Tourism Sector” (TAP), completed in 2014, and the “Survey of Climate Change Adaptation Measures in Maldives,” completed in 2015 by the Ministry of Environment and Energy. Among the core recommendations of these reports were sharing of success stories and best practices; increasing awareness of regulations and environment; and raising awareness of the concept, benefits, and effectiveness of “soft” adaptation measures and other avenues for tourism businesses to better adapt to climate change.

This Action Plan is designed to operationalize these broader policy recommendations by empowering tourism businesses with the information necessary to make informed decisions on climate action planning, while providing concrete ideas and guidance on potential investments and financing solutions for those seeking to address climate impacts. The sections that follow outline Five Strategic Objectives for Climate Adaptation in the Maldives Tourism Industry and Ten Business Climate Action Investments that, depending on business context, can help the tourism industry enhance economic resilience, improve environmental stewardship, and deepen social responsibility in each destination.

APPROACH

The vision, objectives, and actions outlined in this report were constructed based upon surveys and interviews with tourism businesses, NGOs, and public sector organizations to understand the current climate change adaptation risks and opportunities facing the tourism sector in the Maldives. These included responses to an online survey, interviews with key tourism stakeholders and thought leaders, site visits, and a six-month engagement with members of an Advisory Committee formed of private and public stakeholders to guide the recommendations laid out in the Action Plan. Survey and interview respondents were selected using purposive and snowball sampling methods. A validation workshop with a variety of stakeholders from NGO, the public sector, and the private sector was held in June 2023 to validate the results of the Action Plan. More details on methodology and survey analysis can be found in Annex I.

SECTION 2 – TOURISM’S ROLE IN CLIMATE ADAPTATION: VISION, STRATEGIC OBJECTIVES, AND ACTIONS

From the national government to local island councils, from guest houses to resorts, from vegetable suppliers to the fishing industry: all stakeholders in the tourism value chain have significant roles to play in catalyzing effective climate adaptation pathways. Even if countries across the world agree to drastically reduce emissions tomorrow, climate change will continue to pose extreme challenges for businesses and communities in the Maldives. This document is designed to highlight concrete objectives and actions for the tourism sector to play a larger role in reducing the emissions that cause climate change, and to increase the resilience of their business and of the communities and ecosystems their business depends upon and stewards.

To do so, climate adaptation must be at the center of tourism planning, from national to local levels. The IPCC defines adaptation to climate change as “an adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities.”⁶ However, “climate adaptation” does not just include building seawalls to protect beaches and coastline. “Adaptive capacity” is the ability of a system, business, or destination to respond effectively to potential change, through adjustments in resources, behavior, or technologies. For instance, diversifying a tourism business’s product offerings and revenue streams can increase adaptive capacity.

Climate change will inevitably cause disruptions in freshwater availability, food supply, natural ecosystems that attract visitors and support communities, and overall business revenue. As the businesses surveyed identified, risks will include flooding, land erosion, destruction of natural ecosystems, saltwater intrusion, reduced food supply, increased storm surges, and more. Risks will vary depending on the size and resources available to the business; for instance, guest houses identified food supply as a major issue, while resorts noted that flooding could be more impactful.

There are many opportunities for increasing public awareness, investing in innovative solutions, and scaling out work already being done to address climate adaptation challenges across the country. The role of the private sector is increasingly important in climate adaptation planning, but surveyed businesses revealed they were unclear on the role they could play. The objectives and actions presented in this section highlight the important role businesses and the industry at large can play in achieving the Tourism Industry Vision and ensuring effective adaptation to the many challenges that lie ahead.



FIVE STRATEGIC OBJECTIVES

Tourism businesses have a significant role to play in helping their communities and destinations respond and adapt to the consequences of climate change. When surveyed businesses were asked what is most needed for their business to respond effectively to climate adaptation challenges, the majority of the participants highlighted the following five areas: 1) guidance and support relevant to business type; 2) knowledge of climate adaptation investment opportunities relevant for businesses; 3) government/international regulation; 4) greater collaboration among stakeholders in business area; and 5) better understanding of commercial benefits of investing in climate adaptation.

The Five Strategic Objectives presented below are designed in response to private sector priorities, while also aiming to provide more targeted guidance for Goal 4 of the Maldives Fifth Tourism Master Plan: Build Climate Resilience and Protect Natural Assets, in addition to other goals and strategies of the Plan. The objectives outline how the tourism industry can enhance business resilience by incorporating community products and experiences; protecting destination assets through natural and built infrastructure; investing in Nature-based solutions for climate adaptation; diversifying business models through innovative financing; and aligning with initiatives, such as the Maldives Climate Smart Tourism Program, designed to increase business investment in climate adaptation. All five Objectives have the same desired goal of adaptation to climate change; therefore, all Objectives are interconnected and reinforce each other. Each of these Objectives links to the Ten Business Climate Action Investments presented in Section 3, with specific guidelines for businesses who seek to invest in climate adaptation. Finally, Section 4 provides an overview of climate adaptation finance available to businesses in the Maldives, including guidelines for accessing this financing on local, regional, and national scales.



OBJECTIVE I— INCORPORATE COMMUNITY EXPERIENCES, PRODUCTS, & PRIORITIES

Destination resilience cannot be achieved in isolation. The IPCC Sixth Assessment Working Group II Report highlights the importance of public awareness raising, government-business-community partnerships, and inclusive decision making in helping destinations and communities adapt to climate change.⁶ Businesses are often an important liaison between communities and government. They can develop relationships by working through Island Councils, participating in trade associations, appointing community liaison officers, community capacity building, and creating long-term consultation processes with local communities.

Incorporating local community priorities into adaptation planning is not only necessary for an equitable and just future; it also makes good business sense. As the assets that underpin most of the tourism appeal in the Maldives—white sand beaches and coral reefs—are threatened due to climate change, investing in community experiences and products will help to diversify tourism offerings and highlight new experiences for guests. Below are some ideas for businesses seeking to incorporate communities and to diversify their products and experiences for guests.

Strategies & Actions

Action 1.1- Integrate Community-led Tours

Many of the resorts surveyed in this report did not actively seek community-based experiences for their guests. Resort managers may be fearful of loss of quality control or a poor experience for guests when sending them out for tours with nearby host communities. However, there are a number of ways to mitigate this risk and make these tours more appealing for visitors (Figure 1). Increasingly, tourists seek authentic, community-based experiences and businesses have an opportunity to deliver something innovative—while demonstrating that they are making a positive, sustainable impact on the local community.

**Business Climate Action
Investments – Objective I Linkages**

4. Mangrove Tour Development
6. Waste Management
7. Clean Drinking Water

**Maldives Fifth Tourism Master Plan
Linkages**

Goal 1: Maximize the benefits of tourism to all atoll communities

Goal 3: Offer new products and experiences

- Strategy 2: Embrace a broader perspective of tourism and lay the foundation for a diversified visitor economy

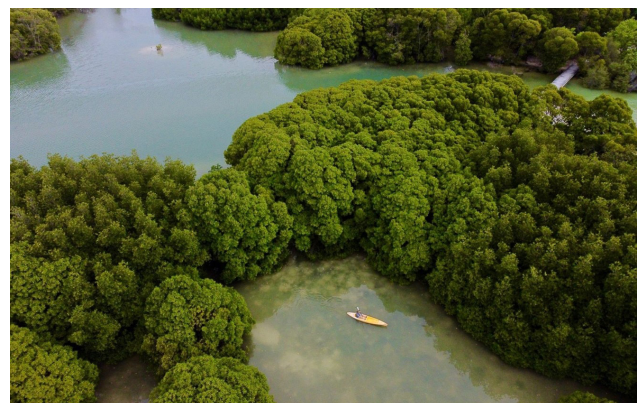


Figure 1: Kayak tour in the Huraa Mangrove Park. Photo by Ibrahim Rishad

The third Business Climate Action Investment presented in Section 3 highlights pathways and support for businesses to develop tours or visitor experiences in mangrove areas, whether they have access to a mangrove ecosystem on their own island or hope to partner with communities in developing a guest experience. This Business Climate Action Investment describes how mangrove tours, a growing trend in the Maldives, can benefit both business revenue diversification and destination resilience in supporting restoration and protection of key ecosystems.

Action 1.2 - Promote Local Agricultural Products

Food security, climate change, and biodiversity are all interlinked: advocating for local food production can help to tackle these challenges. Many resorts, guest houses, and safari boat operators in the Maldives are seeking to promote local agriculture (Figure 2) as a source of economic and food security resilience, in addition to locally sourced seafood. This includes promoting local agricultural produce through local contract farming in the Maldives, such as in Addu Atoll, where regional resorts developed partnerships with the Addu Meedhoo Corporative Society for sourcing food supply. In its Strategic Action Plan, the Government of the Maldives has committed to providing planting materials and necessary training to grow selected crops in 40 major agricultural islands throughout the Maldives.⁷

A permaculture project could be shaped to measurably capture carbon, taking advantage of carbon markets and providing food for hotel guests, a typical expense in hospitality, or to create new value-added products to sell in the hotel store or spa. These interventions also often have intangible benefits—reducing food miles and the hotel’s carbon footprint, preserving local food traditions or agricultural practices, and creating jobs for traditionally excluded populations. These regenerative business models often serve as catalysts for business development, both formal and informal, in surrounding communities.



Figure 2: Local farm on Baa Goidhoo where guests can pick fresh produce and attend a cooking class

Case Study: Goidhoo, Fehendhoo, and Fulhadhoo

Baa Goidhoo, Fehendhoo, and Fulhadhoo are three islands situated in the unique and world-famous Baa Atoll. These islands each offer exceptional visitor experiences, including mangroves, lush greenery, and an abundance of marine life. Local guest houses have worked to develop tours with local communities that go beyond the classic “Sun, Sand, and Sea” offerings, including a mud bath in the mangroves, fly fishing on the Western beaches, crab hunting with locals, or a tour of a local farm followed by a cooking class at sunset. These diverse experiences are both enjoyable for guests and foundational for the resilience of the island and equitable distribution of tourism benefits to local communities.

Action 1.3 – Source from Local Fisheries

For many resorts and guest houses in the Maldives, sourcing local produce is challenging. Many businesses choose to source their food from external markets, such as tuna from Malé or other seafood from international suppliers. While this may make business sense in the short term, these supply chains are at risk, with climate change causing damage to infrastructure or else making produce more expensive over time. Several businesses across the Maldives are beginning to work with local communities to source protein such as fish from nearby islands, with great success. In Laamu Atoll, for example, the Blue Marine Foundation has initiated the Laamaseelu Masveriya project, a new marketplace with a code of conduct for fishers, including no-take species lists and commercial reef size limits. (Figure 3). By working with local fishers to create a new market for fish that was previously exported, the business has both reduced its carbon footprint and enabled a more resilient supply chain and sustainable fisheries practices.

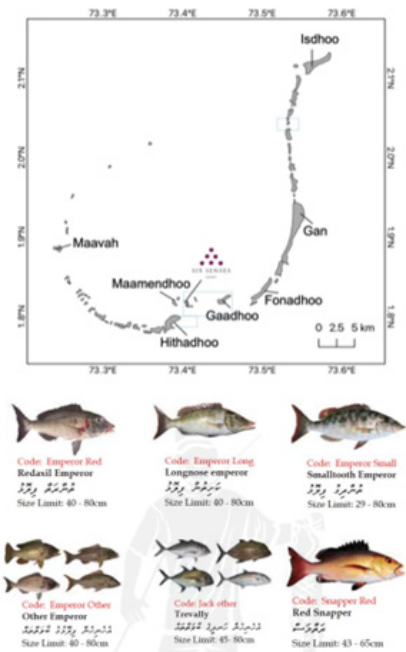


Figure 3: Laamaseelu Masveriya size limits for fish caught locally and purchased for the resort



Fishermen in Fuvahmulah prepare to cast their nets. Photo by Asad Photo Maldives

OBJECTIVE 2 - PROTECT DESTINATION ASSETS

Tourism businesses have traditionally used a variety of solutions to protect their destination assets, including beach nourishment, groynes, elevation of overwater structures, sand or cement bags, and a variety of other solutions. Even with these investments and adaptations, businesses will continue to face a multitude of climate-related risks over the coming decades, particularly in low-lying countries such as the Maldives. Thus, it is critical that businesses have the resources for understanding their climate risk and adjusting accordingly. The United Nations Environment Programme notes that these climatic impacts on the tourism sector will take the form of four categories:⁸

- 1 Direct Climate Impacts** – such as impacts on operating costs, food and water supply, insurance costs, infrastructure damage, or business interruptions
- 2 Indirect Environmental Change** – including changes in water availability, biodiversity loss, reduced aesthetics, altered agriculture production, increased vector-borne diseases
- 3 Impacts of Mitigation Policies on Tourist Mobility** – such as increased transport costs, changed travel patterns or destination choices, or demand for carbon-neutral travel or experiences
- 4 Indirect Societal Impacts** – including climate-induced migration, instability, social unrest, or economic recession

Business Climate Action Investments – Objective 2 Linkages

- 5. Coastal Protection
- 8. Resilient Energy Infrastructure
- 10. Nature-inclusive Resilient Construction

Maldives Fifth Tourism Master Plan Linkages

Goal 4: Build climate resilience and protect natural assets

- Strategy 5: Improve planning guidelines, knowledge sharing, and access to finance to adapt to climate change and build climate resilience into tourism infrastructure



This objective seeks to guide businesses and the tourism industry in understanding climate risk and protecting destination assets in locally appropriate, environmentally sound ways that provide long-term adaptation benefits while also minimizing the environmental impact.

Strategies & Actions

Action 2.1 – Incorporate “Soft” Adaptation Measures

The recent “Survey of Climate Change Adaptation Measures in Maldives,” completed in 2015 by the Ministry of Environment and Energy, highlighted that many older resorts choose to rely on “hard” engineering solutions rather than “soft” engineering solutions, while newer properties are more eager to employ softer solutions.⁹ Soft engineering methods are typically methods that attempt to enhance natural features or processes as an adaptation option; typically they are more cost-effective and cause less damage to the surrounding natural environment. Generally, there is a need to increase awareness of the importance of these measures and the ways they could be utilized to protect destination assets.

The most commonly used soft adaptation measures in the Maldives are beach replenishment; construction of temporary sea walls or groynes using sandbags; ad hoc seawall and ridges built from construction debris; coastal vegetation retention; construction of coastal structures on stilts; creation of artificial reefs; and preservation of natural areas such as seagrass beds and mangroves to prevent coastal erosion (Figure 4). These soft measures often rely upon local and indigenous knowledge found throughout the Maldives, as island communities have learned to adapt to changing weather patterns and monsoons. Traditional practices such as raising of floor levels and elevated barriers, known as “olhigandu,” have the potential to be combined with other adaptation measures to ensure that destination assets are protected for generations to come.

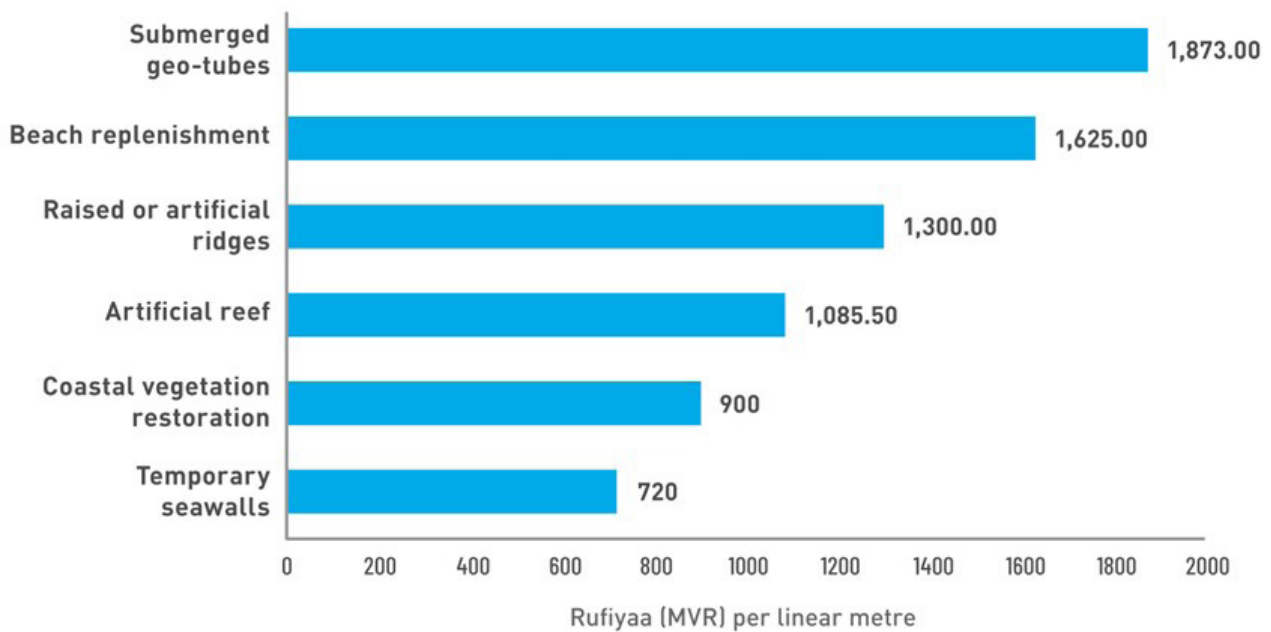


Figure 4: Engineering solutions and their cost. Chart from Ministry of Environment and Energy (2015)

In contrast, “hard” engineering measures are seen as traditional civil engineering projects designed to lessen natural impacts, typically associated with erosion control and prevention and rainfall flood mitigation measures. These measures are traditionally more expensive, with armoring structures—designed to stop the retreat of existing shorelines—such as “tetra pods,” sand-cement bags, armor rock, or geo-tubes ranging in cost from Rf 30,000 to Rf 64,000 per linear m (in 2011 prices).⁹ Hard engineering solutions often face challenges such as poor design and construction and a mismatch between site condition and design.

Action 2.2 – Increase Insurance Coverage for Business Assets

There are several climate financing options available to tourism businesses, but many are unaware of what is available for the protection of destination assets. A survey of tourism businesses in 2014 found that only 69 percent of resorts, 62 percent of safari boats, and 50 percent of tour operators have insurance schemes in place.¹⁰ Insurance options can cover a range of climate-related risks for tourism businesses, including medical, accidents, pest infestations, coral bleaching, pollution, erosion, salinity intrusion, drought, storms, fire, storm surge, and flooding. Following the 2004 tsunami, many resorts opted for Comprehensive Cover; however, insurance packages often do not cover beach erosion, coral bleaching, or holiday interruption due to bad weather. Guest houses are also afforded specific coverage under many of the insurance programs in the Maldives. Taking additional risk management steps, such as those laid out in this document, or developing risk surveys for properties can help reduce insurance premiums.¹¹ Adaptation measures and proactive management of business interruption risks can also help improve creditworthiness.¹¹

The insurance industry in the Maldives is currently regulated by the Maldives Monetary Authority under the MMA Act (1981). The Insurance Industry Regulation (2004) and insurance guidelines currently provide the criteria for authorization to undertake business as insurers and insurance intermediaries in the Maldives. The industry consists of five insurance companies, eight insurance brokers, and 41 insurance agents, which can be viewed [online here](#).

Insurance companies in the Maldives will be impacted by climate-related risks as underwriters, as investors, and as corporate citizens. Insurers will be impacted both by changes in climate and biodiversity and by transition risks affecting the risks they insure or the investments they make. Insurance can promote adaptation in three key ways: (1) asset protection; (2) liability reduction; and (3) facilitation of capital inflow from the financial markets. However, policymakers and regulators need to do more to incentivize market participation in insurance solutions. A 2022 World Bank report highlights the importance of pricing biodiversity risk, which is notably separate from public accounts; Strategic Objective 3 lays the groundwork for how the tourism sector can be an active participant in accounting for the economic value of natural assets.¹² These risks have not been linked to the core public accounts of nations, including the Maldives, and more progress needs to be made in this sector while ensuring that more businesses have sufficient insurance coverage. Ultimately, while insurance can incentivize investments in adaptation and facilitate access to rapid liquidity, it will not address all risk.

Action 2.3 – Share Resources for Businesses to Understand Their Climate Risk

Climate adaptation is often not one prescriptive solution; the right answer for each business and destination will depend upon a variety of factors, including access to resources, vulnerability, ability to adjust, and external support. Technological advances have enhanced the capabilities of many countries and destinations to monitor climate-related hazards. The potential impact of hazards such as sea-level rise (at both medium and high emissions projections) can be visualized using interactive maps and other tools. This can help destinations to understand risks, find appropriate evacuation areas, and develop instant risk assessments.⁶

Figure 5 shows the Climate Reset & Risk Assessment tool from Green Destinations, which has forecasts for individual atolls and islands in the Maldives under projected global warming scenarios.

There is no one right answer for businesses; thus, the table below (Table 1) presents the most up-to-date collection of potential climate adaptation resources for businesses. The Ministry of Tourism and other actors can assist in socializing these resources and ensure that tourism businesses are aware of where they can access relevant resources to understand their climate risk.



Figure 5: Climate Reset & Risk Assessment Tool

Table 1: Resources for Business Climate Adaptation

Category	Description	Examples and Links
General Climate Information	Climate data and projections of change	<ul style="list-style-type: none"> • Economic Costs and Benefits of Climate Change Impacts and Adaptation to the Maldives Tourism Industry – 2015 TAP report on Increasing Climate Change Resilience of Maldives through Adaptation in the Tourism Sector • Baseline Analysis of Adaptation Capacity and Climate Change Vulnerability Impacts in the Tourism Sector – 2015 TAP report on vulnerability of tourism to climate change • Survey of Climate Change Adaptation Measures in Maldives – 2015 UNDP report on current adaptation measures in the Maldives

		<ul style="list-style-type: none"> • Integrating Tourism into Adaptation to Climate Change in the Maldives – 2008 MoEE report • ADB Climate Risk Country Profile • World Bank Climate Risk Data
Risk assessment and resilience building	Tools for different stages of risk planning	<ul style="list-style-type: none"> • Introduction of Financial Instruments to Cover and Transfer the Risks of Climate Hazards in the Sector of Tourism for the Maldives – 2015 report highlighting financial instruments for climate hazards • Climate Change Adaptation and Mitigation in the Tourism Sector: Frameworks, Tools and Practices – UNEP report for general recommendations in tourism • Adaptation Scotland – Resources for businesses on how to adapt and increase business resilience
Adaptation planning	Helping businesses to identify climate impacts and potential vulnerabilities	<ul style="list-style-type: none"> • Maldives Nationally Determined Contribution • Maldives Second National Communication • Maldives GCF Country Programme • Gaps and Disincentives that Exist in the Policies, Laws and Regulations which Act as Barriers to Investing in Climate Change Adaptation in the Tourism Sector of the Maldives – 2013 UNDP Report highlighting gaps and disincentives that exist in the Maldives for investing in adaptation. • Marine Protected Area Rapid Vulnerability Assessment Toolkit • Adaptation to Climate Change Using Green and Blue Infrastructure: A Database of Case Studies - Includes 15 in-depth case studies from around the world demonstrating the use of green and blue infrastructure for climate change adaptation. • Climate Adaptation Explorer – Online tool for different habitats.
Coastal risks, inundation, and sea-level rise	Maps and planning resources for coastal inundation and sea-level rise	<ul style="list-style-type: none"> • World Bank Climate Knowledge Portal • Earth.org Climate Flood Map • Green Destinations Climate Reset & Risk Assessment Tool • Multihazard Risk Atlas of Maldives by ADB 2020 • Guidance Manual for Climate Risk Resilient Coastal Protection in the Maldives
Nature-based solutions for climate adaptation	Overview of using Nature-based solutions for climate adaptation	<ul style="list-style-type: none"> • The Global Value of Mangroves for Risk Reduction - Provides information about specific areas where mangroves provide the most value to people and property • World Wildlife Fund Adaptation to Climate Change Toolkit – Includes adaptation measures that could reduce the vulnerability of sea turtles and their habitats to climate change • Mapping Ocean Wealth: Website that includes resources such as the Atlas of Ocean Wealth, a collection of information about the economic, social, and cultural value of marine and coastal habitats • Managing Mangroves for Resilience to Climate Change – IUCN report with useful tools for mangrove management. • Managing Seagrass for Resilience to Climate Change – IUCN report on managing seagrass for resilience-based outcomes. • Nature-Positive Travel and Tourism – WTTC Report on nature-positive travel • Climate Action through Regeneration: Unlocking the Power of Communities and Nature through Tourism – Guidelines and examples for developing NbS in tourism • National Marine Sanctuary Climate Impacts Profiles

OBJECTIVE 3 - REGENERATE NATURE

Globally, Travel & Tourism is one of six economic sectors with over 80 percent of its goods and services highly dependent on nature.¹³ Past surveys in the Maldives have indicated that 30 to 40 percent of guests come for snorkeling- or diving-related activities.¹⁴ However, natural ecosystems are not just good for the guest experience; they are critically essential to helping businesses adapt to the challenges of climate change.



Figure 6 IUCN Global Nature-based Solutions Standard. Graphic from IUCN.

The natural ecosystems of the Maldives—especially seagrass, mangroves, coral reefs, and beaches—all help protect coastlines from storm surges while providing critical habitats for key species consumed within tourism businesses. In Mexico’s Bacalar Lagoon, for example, mangrove forests, for example, mangrove forests provide an annual US\$70 billion to the economy through storm protection, fisheries support, and ecotourism.¹³ Investing in nature-based solutions, defined by the IUCN (Figure 6) as actions that “protect, sustainably manage, and restore nature while simultaneously addressing societal challenges,”^{15,16} will be key to climate adaptation.

The UN State of Finance for Nature Report (2021) argues that investment in NbS must triple by 2030, which represents US\$8.1 trillion worth of total investment, or US\$536 billion in funding each year;¹⁷ investments already surpassed US\$133 billion in 2020.^{15,16} There are multiple funding avenues for NbS, ranging from climate funds like the Green Climate Fund (GCF) to targeted NbS funds like the IUCN Kiwa Initiative or Global EbA Fund.¹⁸ Section 3 of this report provides specific avenues for businesses seeking investment in NbS. Private NbS financing is predicted to increase substantially, increasing from 14 percent to 40 percent by 2030.¹⁷ Businesses are well poised to take advantage of this growing interest in NbS financing to increase the resilience of both ecosystems and enterprises, diversifying revenue streams while improving health of surrounding ecosystems.

Business Climate Action Investments – Objective 3 Linkages

1. Seagrass Protection & Restoration
2. Coral Reef Restoration & Protection
3. Coastal Vegetation
4. Mangrove Tour Product Development

Maldives Fifth Tourism Master Plan Linkages

Goal 4: Build climate resilience and protect natural assets

- Strategy 8: Develop a framework to renew and rejuvenate coconut palms and native vegetation

Action 3.1 – Protect, Manage, and Restore Vital Ecosystems

In many parts of the world, tourism has become a significant source of revenue for the protection, management, and restoration of nature. The platform Linking Tourism & Conservation estimates that just 0.5 percent of the annual global tourism turnover would be needed to fund a complete network of protected areas.¹⁹ Tourism is a place-based, yet global, industry with the power to harness international resources for local-scale protection, management, and restoration of ecosystems vital to climate adaptation. In contrast with concrete-based solutions, NbS are more cost-effective and adaptable to changing climate conditions such as sea level rise, while also delivering a diversity of additional benefits. For tourism businesses that seek to implement NbS, these solutions can include:^{20–22}

- Climate change adaptation and disaster risk reduction – i.e., providing shelter from storm surges, preventing coastal erosion, or reducing insurance premiums
- Recreation opportunities for residents and visitors – i.e., enhancing the beauty of natural ecosystems or involving visitors or residents in restoration or monitoring of ecosystems
- Human health – i.e., by improving air or water quality, reducing the transfer of diseases caused by habitat destruction, or enhancing education or mental health benefits
- Food security – i.e., by protecting critical fish nurseries, regenerating soil, or providing more nutritious food due to improved agricultural practices
- Water security – i.e., better capturing rainfall in soil through natural water retention methods or reducing pathogens in seawater
- Climate change mitigation – i.e., by restoring ecosystems such as mangroves or seagrass that naturally capture carbon dioxide emissions

A recent study highlighted that NbS represent a promising area of climate adaptation action in more than two thirds of the islands in the Maldives, with multiple benefits that will reduce coastal risks and increase NbS effectiveness in the future.²³ Table 2 provides some examples of nature-based solutions relevant to tourism businesses in the Maldives.

Table 2: Examples of Nature-based Solutions for Tourism Businesses in the Maldives

Examples of Nature-based Solutions		
Solutions that Protect Ecosystems	Solutions that Manage Ecosystems	Solutions that Restore Ecosystems
Marine Protected Areas	Community-led Natural Resource Management	Coral Reef Restoration
Protection of Mangrove Habitats	Sustainable Management of Local Fisheries	Seagrass Restoration
Avoided Construction Near Fragile Coral Reef Ecosystems	Management of Coastal Erosion Using Native Coastal Vegetation	Mangrove Restoration

Based on the survey of 52 businesses in the Maldives, 80 percent said they were putting some or significant effort into restoring, protecting, or managing natural ecosystems. Most (42 percent) had invested under \$10,000 total, while 23.8 percent had invested \$10,000–\$50,000 and 23.8 percent indicated \$50,000–\$250,000. A total of 52 percent of businesses said they were interested in increasing their investment in NbS if presented the right opportunity. It is important to ensure that businesses adhere to the mitigation hierarchy laid out in (Figure 7). For example, the most desirable outcome for ecosystems is for effective protection and management

at the outset, and for tourism businesses to avoid creating potential negative impacts in the first place. If these impacts cannot be avoided, then they should be minimized as much as possible. Finally, businesses can focus on restoring ecosystems that may already be degraded (due to tourism development or otherwise), or on offsetting to compensate for adverse impacts. Ultimately, it is most important to protect healthy ecosystems and manage them to ensure their longevity, given that restoration projects do not always succeed.

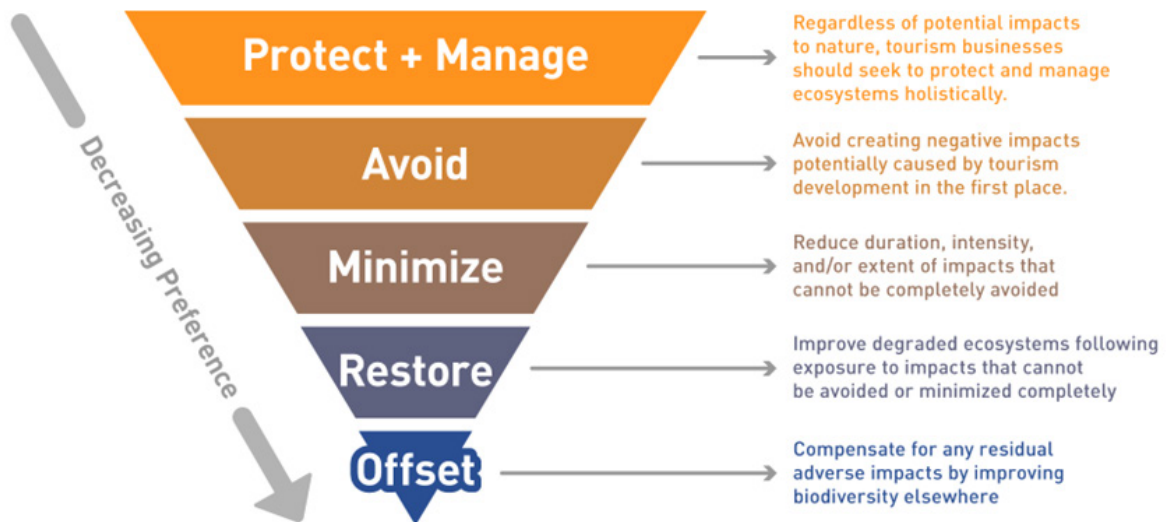


Figure 7: The “Mitigation Hierarchy” Applied to Nature-based Solutions

Action 3.2 – Value and Account for Ecosystem Services Generated by Nature-based Solutions

One of the largest barriers to implementation and investment in NbS, according to the survey of tourism businesses in the Maldives, is the challenge of “valuing” NbS. Consider the value of mangrove ecosystems at multiple scales, for example: while present only on some 70 islands in the Maldives, their existence provides valuable protection from storm surges at the local level, nourishes fisheries at the regional level, improves air quality at the national level, and sequesters carbon emissions at the global level. These overlapping “values” make it difficult to quantify value and make investment in NbS attractive for the private sector. Thus, this action echoes a growing body of research that calls for local organizations and institutions to use diverse methods of ecosystem valuation to better capture value and appeal to multiple audiences.²⁴⁻²⁶

In order to effectively value nature-based solutions, it is essential to understand the “audience” that may be demanding the NbS in the first place. Demand comes from several different directions:

- Public sector, including policymakers who observe their benefits for the environment, human health, social well-being, and climate adaptation;
- Private sector, including private firms, developers, insurance companies, or financiers who predict economic gains or development opportunities; and
- Third-sector, including citizens, nonprofits, community groups, and charities that perceive NbS as opportunities to address local problems.

In a tourism context, demand also originates from visitors to a destination. Tourism can help to finance NbS initiatives—for example, charging a small visitor fee for the protection of a marine area or asking guests to donate to contribute to local seagrass or mangrove restoration efforts. In order to communicate the value of NbS to both visitors and potential investors, this action recommends that the potential impacts of these projects be valued by actors at the local level using standard methodologies described in this section. This can then enable national or local governments to use this valuation to rate projects in terms of attractiveness for private sector investors, public investment, and hybrid investment.

So how can tourism operators work to “value” nature-based solutions? There is a rich body of research that has developed to value and account for “ecosystem services” that result from NbS interventions. Coastal and marine ecosystem services are estimated to be essential for approximately 28 percent of the global population currently residing in coastal areas.²⁷ Ecosystem services broadly fall into four categories: provisioning, regulating, cultural, and supporting (Table 3). The Intergovernmental Panel on Climate Change (IPCC) underscores the advantage of drawing upon ecosystem services for reducing the vulnerability of coastal communities and destinations, increasing resilience and long-term adaptability.²⁸

Table 3: The Four Categories of Ecosystem Services and Examples Relevant to Tourism Businesses in the Maldives^{29,30}

Ecosystem Service Classification	Description	Example relevant to tourism context
Provisioning services	Related to products of economic value obtained from ecosystem	Fish, genetic materials, raw materials for construction, etc.
Regulating services	Related to benefits obtained from natural ecosystem processes	Climate regulation, carbon storage, coastal protection, etc.
Cultural services	Related to <i>nonmaterial</i> ecosystem benefits	Recreation, education, research, spiritual significance, etc.
Supporting services	Support other ES	Nutrient cycling, soil formation, etc.

The capacity to benefit from value generated by NbS through market transactions or policy instruments is defined as “value capture.”³¹ There are many different methodologies for the valuation of ecosystem services generated by NbS. All valuation methods have advantages and disadvantages that businesses should weigh accordingly. Indeed, value does not just mean economic value for the purpose of facilitating investment—it can also communicate cultural, spiritual, or other significance to stakeholders and society at large. Research by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), conducted by 80 scientists over four years using more than 13,000 sources, found that there are over 50 methods for “valuing” nature; however, studies involved local stakeholders only 1 percent of the time. Thus, incorporating more than just monetary values that resonate with local communities will be critical to communicating the true value of the NbS.

Implementing this Action is complex but essential for scaling investment in nature-based solutions. This [Online Toolkit](#) for businesses is designed to guide businesses in articulating the “value” of ES to potential investors, stakeholders, and society. The Online Toolkit seeks to break down different value “typologies,” use and non-use values that form “Total Economic Value,” valuation methods, and various metrics and protocols.

Action 3.3 – Measure and Monitor Results

In order to demonstrate a change in the value of ecosystem services as a result of NbS interventions, businesses must be prepared to measure and monitor their interventions over time. There are countless resources available for businesses to monitor NbS and the ecosystem services they produce; the [IUCN Nature-based Solutions Self-Assessment Tool](#) is well-designed to guide businesses across all 8 criteria and 28 indicators relevant to NbS interventions. The Natural Capital Protocol (Figure 8) provides a more detailed decision-making framework that enables organizations to identify, measure, and value these impacts and dependencies on nature. The Protocol generally recommends that organizations follow a sequential approach that identifies costs and/or benefits 1) qualitatively (i.e., increase in recreation opportunities, decrease in fish stocks); followed by

2) quantification (i.e., changes in number of visitors, changes in tons of fish stocks); and 3) monetization (i.e., change in dollar amount of visitor income generated, dollar cost to protecting fish breeding areas).

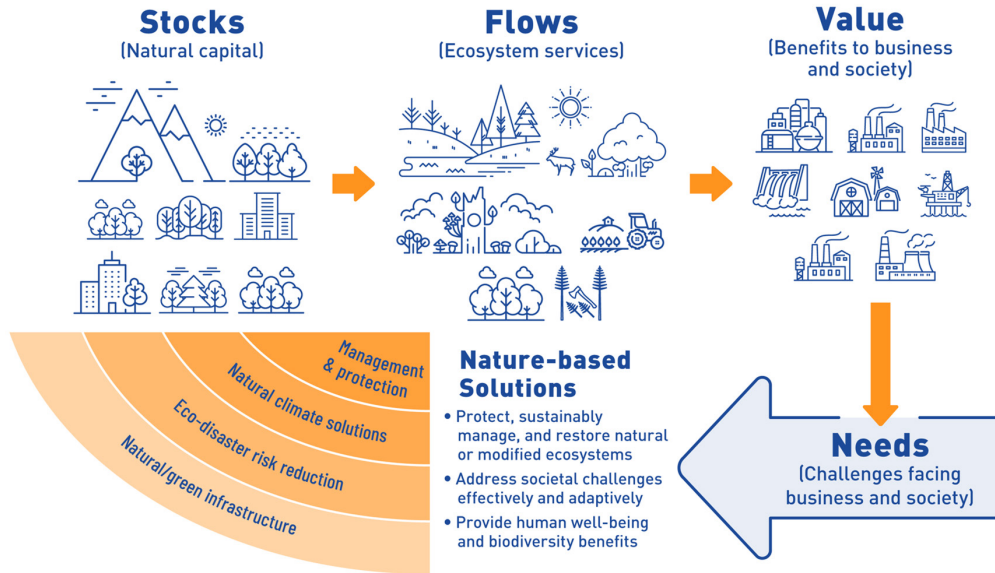


Figure 8: Visualizing Natural Capital and Ecosystem Services Flows via Nature-based Solutions (Adapted from Capitals Coalition and We Value Nature).

While these protocols are often complex, they can help provide businesses with transparent indicators of cost-benefit and return on investment in nature. “Adaptive management”—ensuring that organizations learn from and adapt to both positive and negative outcomes and feedback loops in the NbS intervention—is essential. It is critical to involve communities in co-creating NbS interventions and learning from their impacts to understand where and how to adapt. The [Online Toolkit](#) for businesses provides detailed protocols for monitoring and evaluating such interventions; this Action recommends that businesses also involve visitors, employees, and residents in the monitoring of NbS through citizen science. This can include involving visitors and employees in collecting data for the Maldives Marine Research Institute [coral bleaching data protocol](#) or encouraging guests to upload photos of charismatic megafauna to NGO databases such as the Manta Trust, Whale Shark Trust, or Olive Ridley Project.

Businesses can incorporate monitoring and evaluation into the operationalization of NbS through the following ten core steps:

- 1 Define the Problem – What societal challenge is the NbS seeking to solve? What is the main problem facing the business, community, destination, and/or ecosystem?
- 2 Determine Objectives – Set SMART Objectives (Specific, Measurable, Actionable, Realistic, Timely) and the place(s) where the project will be implemented. It is critical to understand how the intervention may contribute to national policy directives or frameworks, as well as the UN Sustainable Development Goals, Maldives Nationally Determined Contributions (NDCs), or Paris Agreement (for both Step 2 and 3).
- 3 Assess Demand and Potential NbS Financing – At this stage, businesses may identify that they do not have suitable financing for implementing the NbS; thus, assessing demand (public sector, private sector, NGO, visitors, etc.—see Action 3.2) will help determine where potential financing may originate from. For example, are guests or a parent company interested in offsetting their carbon? The business can then ensure that carbon sequestration is included in e(valuation) criteria and communicated to guests and/or investors, while seeking project verification on a voluntary carbon market.
- 4 Set E(valuation) Criteria – Determine how the ecosystem services resulting from the NbS intervention will be both evaluated and valued; using the Online Toolkit, businesses can evaluate the success of the intervention (square meters of seagrass restored, coastal vegetation planted, etc.) and value it to communicate more effectively to stakeholders or potential investors (amount of carbon sequestered by seagrass restoration, increase in dollar value of recreation to restored coastal sites, etc.).
- 5 Co-Design NbS Intervention – Engage multiple stakeholders and the wider public to co-design and co-develop the NbS.
- 6 Test and Demonstrate NbS – Choose a small project site to test the effectiveness of the chosen method and NbS.
- 7 Implement the NbS – Based on the learnings from Step 6, implement the NbS in collaboration with local stakeholders and visitors.
- 8 Monitor the Effectiveness of NbS – Using the criteria set in Step 4, engage visitors, residents, and employees in the long-term monitoring of the NbS at regular intervals and with appropriate study design.
- 9 E(valuate) – Determine any changes in ecosystem services over time as a result of the NbS, and the resulting cost/benefits or trade-offs between people and nature. At this stage businesses can use the value to communicate to potential investors, visitors, or society at large.
- 10 Adjust – If trade-offs resulted from the NbS intervention (for example, if local fishers lost access to a fishing ground due to a Marine Protected Area closure, did the NbS result in an increase in fish biomass or in the market price of fish sold from the area?)



Figure 9: Cycle of Operationalizing and Implementing NbS for Tourism Businesses (Adapted from Kumar et al., 2020)

OBJECTIVE 4 - DIVERSIFY BUSINESS MODELS

The greater the diversity of a natural ecosystem, the better it withstands external pressure or sudden shocks— a vibrant reef that is home to hundreds of species of coral and fish bounces back from a bleaching event faster than a less diverse reef.^{32–36} There is increasing evidence that diversity of business strategies also improves enterprise resilience, particularly during unpredictable shocks and crises like those caused by climate change and the COVID-19 pandemic.^{37,38} In addition to working with communities to develop diverse products and experiences for guests, tourism operators can diversify their business models in three key ways: through value chains, marketing and employment opportunities, and new nature-based financing opportunities. Diversification of business strategies must ensure that they work with and capitalize on the unique natural ecosystems in every island rather than creating one model for every island; there is no one-size-fits-all approach to develop a business model that can be replicated to match the different characteristics, needs and situation of every island in the Maldives.

Business Climate Action Investments – Objective 4 Linkages

1. Seagrass Protection & Restoration
2. Coral Reef Restoration & Protection
4. Mangrove Tour Product Development

Maldives Fifth Tourism Master Plan Linkages

Goal 2: Communicate the full potential of the Maldives to new and existing audiences

Goal 8: Accelerate investment and innovative finance

Action 4.1 – Create Nature-Positive Value Chains

As the climate changes, sourcing of essential items becomes more challenging and riskier. Additionally, investors are increasingly looking to businesses that have sustainable value chains and sourcing practices. This means understanding the risk of both upstream and downstream value chains. “Upstream value chain” refers to activities and materials that are sourced, such as building materials, energy, or water; “downstream value chain” refers to the way in which products and services are consumed.¹³ For example, sourcing fish and fish products from Malé or from an international supplier could prove riskier than sourcing locally, although local sourcing may not be sufficiently regular. Understanding how to create a “nature-positive” value chain (Figure 10) can help businesses de-risk their supply chains and appeal more broadly to customers and investors.

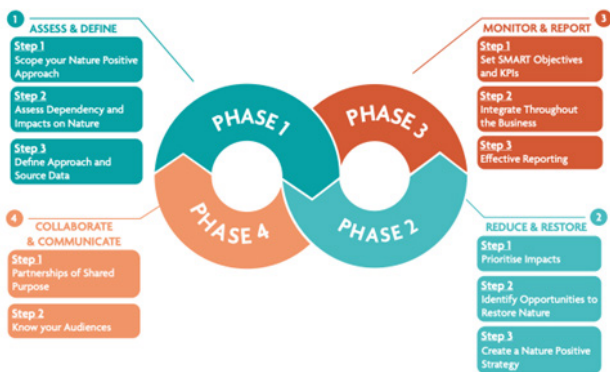


Figure 10: The “nature-positive” business toolkit from WTTC

Tools for Businesses: Making Your Business Value Chain “Nature Positive”

In the summer of 2022, the World Travel and Tourism Council released its “Nature Positive Travel and Tourism” report, outlining practical steps for businesses seeking to be nature-positive and align their value chains in harmony with nature. [The Nature Positive Travel and Tourism Toolbox](#) provides a step-by-step approach to assessing approaches businesses can take, leading to more positive outcomes for nature and business resilience.

Action 4.2 – Diversify Marketing + Employment Opportunities

When thinking about how to diversify business risk to respond to climate change, many businesses fail to acknowledge two of the most fundamental aspects of any tourism business: visitors and employees. As the COVID-19 pandemic demonstrated, tourism is a fragile endeavor. Over the pandemic, many businesses saw their markets shift to cater towards domestic visitors, while they used the pause in visitation to train their employees in other essential skills such as conservation or construction. Research has also shown that businesses that create policies and practices promoting social equity tend to have a more resilient workforce, strong internal culture, enhanced reputation, and overall stronger value proposition.^{39–41}

To attract more people to travel experiences that help to regenerate nature and destinations, businesses should consider which audiences likely are engaged (or not) via their marketing, partnerships, and product design. Developing operations and marketing that serves and speaks to a diversity of audiences is not only good business—it is essential to building equity in the travel industry and local communities. Inclusion of sustainable practices of islands as a core part of the marketing strategy is essential to reach the growing sustainability audiences.

Action 4.3 – Incorporate Nature-based Financing

Global markets such as carbon, biodiversity, and impact finance are providing new tools to fund and transform business operations at every scale (Figure 11). Tourism businesses are well positioned to tap into these new sources of funding, and doing so will enable them to diversify revenue streams and enhance long-term business resilience. Generally, this funding is earmarked for work where there is a credible threat to an ecosystem, requiring protection, or a degraded ecosystem that can be restored. Globally, total public finance—including government budgets and taxation, natural infrastructure, and official development assistance—is estimated to be between US\$105.5 and 114.3 billion annually, while total private and public-private financing—such as biodiversity offsets, natural climate solutions and carbon markets, green financial products, and sustainable supply chains—are estimated between US\$18.1 and 28.6 billion annually (Deutz et. al, 2020). With an estimated annual global nature financing gap of US\$824 billion, investors and public institutions are increasingly earmarking funds for nature, and tourism businesses can be important implementors of projects that protect and restore nature and biodiversity.

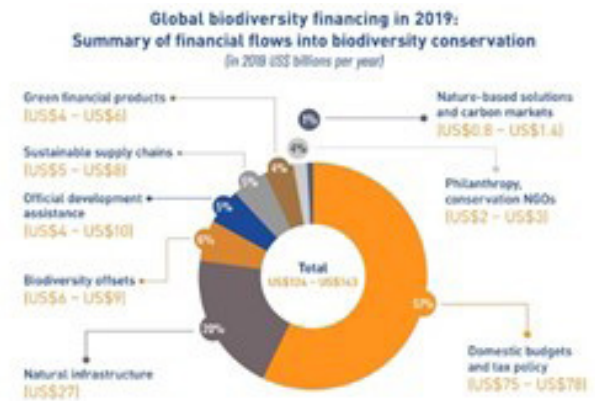


Figure 11: Summary of financial flows into biodiversity conservation. Source: Financing Nature: Closing the global biodiversity financing gap (2020).

There are growing opportunities available in private financial markets, and tourism businesses, NGOs, and other private enterprises are poised to take advantage of the US\$379 trillion available in the financial markets—a sum of assets across banks and central banks, pension funds, insurance firms, and stock markets that are increasingly being earmarked for climate and biodiversity financing.⁴² New blended finance instruments such as the Global Fund for Coral Reefs, launched in September 2020, aims to raise US\$500 million in public and philanthropic funding to catalyze private investments to protect and restore coral reef ecosystems. Carbon markets, Environmental, Social, and Governance (ESG) programs, impact investing, and others—like the 51 percent of asset managers in 2020 who sought investment opportunities in blue carbon⁴³—are all seeking to increase investment in these ecosystems. Tourism businesses are well poised to channel this interest into projects that support climate *adaptation* and *mitigation*.

Increasingly, funders are requiring projects in their portfolio be designed with both a “community co-benefit” and a long-term, on-the-ground partner. These community co-benefits can be designed with and for local communities; for example, resorts could recruit carbon experts from local or international universities to conduct carbon inventories of seagrass restoration efforts, applying for carbon certification through schemes such as PlanVivo. If the project is approved, 60 percent of financing could go towards addressing community needs such as waste management or water filtration. Nature-based financing is covered further in Section 4.

OBJECTIVE 5 - ALIGN WITH NATIONAL AND GLOBAL INITIATIVES

The objectives described in this Action Plan cannot be achieved in isolation. The tourism industry must collectively address the impacts that climate change poses to lives and livelihoods and create coordinated approaches to managing these challenges. There are several existing initiatives at the global and national scale that the tourism industry can better align with, including the Glasgow Declaration on Climate Action in Tourism and ongoing research under the Maldives Marine Resource Institute. Joining and contributing to both of these initiatives will enable more effective sharing of lessons learned, collection of important data relevant to climate adaptation, and promotion of participating businesses to international audiences. The Maldives Climate Smart Tourism Program will additionally facilitate resources available to businesses to invest in climate adaptation, while promoting climate leaders and case study examples across the country.

**Business Climate Action Investments
– Objective 5 Linkages**

9. Citizen Science & Data Collection

**Maldives Fifth Tourism Master Plan
Linkages**

Goal 11: Whole-of-government prioritization of tourism

- Strategy 2: Expand Ministry of Tourism capacity for tourism industry development and marketing

Action 4.1 – Create Nature-Positive Value Chains

In 2021, the Glasgow Declaration on Climate Action in Tourism was launched to raise the climate ambition of tourism stakeholders, define a sector-wide approach to climate action, and begin to define pathways to transform the tourism sector to achieve net zero emissions. This includes a “Regenerate” pathway focused on protecting and restoring nature to achieve climate adaptation goals. The Declaration acknowledges the tourism sector’s contributions to climate change: without accelerating decarbonization, greenhouse gas emissions are expected to rise 25 percent or more by 2030, compared to 2016.⁴⁴

In response, industry organizations have begun to develop guidance around greenhouse gas inventories, mitigation, and strategies for adaptation action. With 80 percent of the travel and tourism sector composed of Small and Medium-Sized Enterprises (SMEs), developing targeted guidance for small businesses is critical. One Planet has compiled tools and resources for tourism SMEs to begin this process as part of their work around the Glasgow Declaration. Over 600 signatories, including businesses, countries, tourism stakeholders, and destinations have pledged:

We declare our shared commitment to unite all stakeholders in transforming tourism to deliver effective climate action. We support the global commitment to halve emissions by 2030 and reach Net Zero as soon as possible before 2050. We will consistently align our actions with the latest scientific recommendations, so as to ensure our approach remains consistent with a rise of no more than 1.5°C above pre-industrial levels by 2100.

The Glasgow Declaration invites businesses in the Maldives to join and help to shape the guidance offered under the Regenerate pathway, promoting business efforts to an international audience of fellow tourism businesses and potential visitors and investors. Joining and contributing to this initiative will enable businesses and the tourism industry at large to shape what adaptation resources may be made available under global climate finance mechanisms, particularly for initiatives—like those laid out in this document—that regenerate destinations and enhance overall resilience.

Maldivian businesses that sign the Glasgow Declaration will be invited to future webinars discussing the role of tourism businesses in adapting to climate change. Further initiatives and their benefits for businesses are described in Table 4. All initiatives indicated below are free to join.

Table 4: Global Initiatives for Tourism Businesses to Join. These initiatives can help businesses gain access to resources and position their business and destination as climate leaders while learning from others in the industry.

Name of Initiative	Description	Benefits for Businesses	Links and Resources
Glasgow Declaration on Climate Action in Tourism	The Glasgow Declaration is a catalyst for increased urgency about the need to accelerate climate action in tourism and to secure strong commitments to support the global goals to halve emissions over the next decade and reach net zero emissions as soon as possible before 2050.	The Initiative supports its signatories by sharing knowledge and resources to better implement their commitments; fostering and supporting the work at destination level to develop and implement climate action plans ; tracking and disclosing progress implementing the commitments; and providing international recognition and visibility.	Sign the Glasgow Declaration Recommendations for the Transition to a Green Travel and Tourism Economy One Planet Vision for a Responsible Recovery of the Tourism Sector
Tourism Action Coalition for a Sustainable Ocean (TACSO)	The Tourism Action Coalition for a Sustainable Ocean brings together business, financial sector, NGOs, and IGOs, leading the way towards a sustainable tourism ocean economy. These leaders are committed to collective action and knowledge sharing to achieve the TACSO vision.	As a part of TACSO you will be connected to like-minded organizations seeking to build resilient destinations. It opens the opportunity for joint action, building public-private partnerships in the destinations you work, provides access to knowledge and information sharing.	Join TACSO TACSO Resource Portal
Blue Recovery Hub	The BRH seeks to work with Small Islands Developing States (SIDS) and other targeted countries.	The Hub provides COVID-19 recovery resources for building business resilience.	Blue Recovery Resource Hub
Tourism4SDGs	Tourism4SDGs helps partners align their values with the United Nation’s Sustainability Development Goals.	Increases brand awareness and advocacy for internationally known commitments, provides resources, trainings and networking for knowledge sharing and partnerships.	Learn – Tourism for SDGs (tourism4sdgs.org)

Global Sustainable Tourism Council (GSTC)	Provides global standards for sustainable travel and tourism through international accreditation.	Assists organizations and businesses in creating sustainable policies and practices and provides trainings and resources for guidance.	Global Sustainable Tourism Council (GSTC): Criteria, Standards, Certifications (gstcouncil.org)
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Action 5.2 – Collect and Share Data with Relevant NGOs and Government Institutions

Tourism businesses are often the first to notice when the ecosystems they utilize each day begin to change. Thus, businesses can become the “eyes on the ground” for many national institutions and NGOs working to monitor and respond to changes in these ecosystems. For example, the Maldives Marine Research Institute, founded in 1984, is the research arm of the Ministry of Fisheries and Agriculture (MoFA). MMRI is mandated to undertake research on living marine resources and to provide scientific advice on marine resource management and on the state of the marine environment. They actively encourage tourism businesses—particularly those with a house reef or those that frequently take guests for snorkeling or diving activities—to collect and submit data on coral reef health to enable better accounting at a national scale. While MMRI conducts national surveys throughout the Maldives each year, their data and programs would be far more effective if all tourism businesses in the Maldives chose to report data on reef health.

Currently, very few businesses in the Maldives monitor and report on marine research data to MMRI. This Action recommends that businesses collect and report data on reef health and other factors to MMRI at least twice per year. It also recommends that businesses adopt the following steps:

- 1 Work with staff members who have diving experience or familiarity/background in marine biology to conduct coral reef monitoring assessments;
- 2 Familiarize staff with [relevant forms for data collection](#), such as the simplified Coral Bleaching Protocol;
- 3 Create and sign up for an account on [the MMRI portal](#);
- 4 Twice per year (or more frequently if coral bleaching is observed), lay transects in the same area of reef using the protocol to collect relevant data; and
- 5 Synthesize and submit data to MMRI.

Measuring and monitoring the impacts of climate change on local ecosystems will be essential to understanding how best to adapt and when more drastic interventions may be needed. This is an important opportunity for businesses to engage employees, local communities, and guests in collecting data, an activity known as “citizen science” that is both educational for participants and a helpful data collection tool for businesses. More opportunities for scaling citizen science programs in tourism are described in Business Climate Action Investment #8, with reference to additional NGOs and initiatives that businesses can support by collecting data.

Action 5.3 – Join and Promote the Maldives Climate Smart Tourism Program

Climate Smart Tourism Maldives is an initiative designed to increase *awareness* of the risks that climate change poses to tourism businesses and destinations while increasing *action* taken by the private sector to address potential climate change adaptation challenges. Following extensive research on the risks facing the tourism sector in the Maldives, this program lays out concrete steps that businesses can take to increase their resilience to future climate change stresses. The initiative is designed to position the Maldives tourism industry as a leader in climate adaptation while providing concrete, actionable steps for businesses to take to increase their resilience to climate impacts.

Specifically, the Maldives Climate Smart Tourism Program aims to promote the Ten Business Climate Action Investments laid out in Section 3, which in turn support the Five Strategic Objectives laid out in this document. The program is designed to provide guidance, best practices, case study examples, and financing support to businesses seeking to adopt one of the ten investment opportunities. All of the opportunities are designed to respond to climate adaptation challenges, but their applicability and success will depend upon the business in question.

Benefits of Becoming a Climate-Smart Tourism Business Include:Program

- Potential financing and technical support for chosen climate investments
- Opportunities to beautify your property and increase natural infrastructure
- Marketing and promotional opportunities for joining
- Reduce emissions and energy bills
- Diversify business revenue streams and enhance climate resilience
- Elevate existing Corporate Social Responsibility (CSR) initiatives or internal sustainability programs

Businesses who sign up for the Climate Smart Tourism Maldives program are eligible to receive potential co-financing and technical assistance in investing in one of the Ten Business Climate Action Investments described in Section 3. Businesses can receive an audit, recommendations based on their selection, assistance in selecting a vendor or contractor, and potential co-financing support.

SECTION 3 – BUSINESS CLIMATE ACTION INVESTMENTS

What does it mean to invest in climate adaptation? This is the question facing local communities, businesses, and Small Island Developing States (SIDS) on the front lines of climate change around the world. The Five Strategic Objectives outlined in this report thus far aim to provide a roadmap for the tourism industry to help businesses better understand their risk and create plans for increasing business resilience in the future. This section outlines Ten Business Climate Action Investments designed to support each of the Five Strategic Objectives in the Action Plan, highlighting specific investments that can help businesses adapt in the near- and short-term while also benefiting the triple bottom line: improving revenue, benefitting communities, and protecting and restoring nature.

These Business Climate Action Investments will be promoted and supported by the Maldives Climate Smart Tourism Program, a joint initiative of the Ministry of Tourism and the USAID Climate Adaptation Project. For a select period, the program will support businesses by providing co-financing and technical support, including assistance in identifying potential vendors and finding solutions relevant to businesses. Broadly, the program is designed to provide a “menu” of innovative adaptation solutions to interested businesses that may not know where to begin on their climate adaptation journey.

Each of the Ten Business Climate Action Investments presented in this section outline core information that businesses need to select their preferred option, including:

- Relevance of the investment/innovation to climate adaptation
- Potential benefits and costs for businesses
- Indicative time line and time to ROI
- Potential financing mechanisms
- Case study examples
- Additional resources



The solutions below provide immense detail about the benefits, costs, challenges, and additional resources needed for businesses to get started. Businesses should refer to the Maldives Climate Smart Tourism Program online to see a detailed breakdown of products, services, and technical support available to businesses through the program, including potential vendors that the program can assist in procuring.

I. SEAGRASS ECOSYSTEM PROTECTION AND RESTORATION

Why are seagrass ecosystems important for climate change adaptation?

Seagrass ecosystems are found on every continent other than Antarctica, spanning 300,000 km² across 159 countries and supporting one billion people worldwide.⁴⁵ They are estimated to store 18 percent of ocean organic carbon.⁴⁶ However, they are declining at a rate of 7 percent per year on average^{47,48}—as much as a football field every 30 minutes⁴⁹—and their degradation is estimated to lead to a release of 0.65 GtCO₂ per year,⁴⁶ roughly approximate to the annual emissions from the global shipping industry.

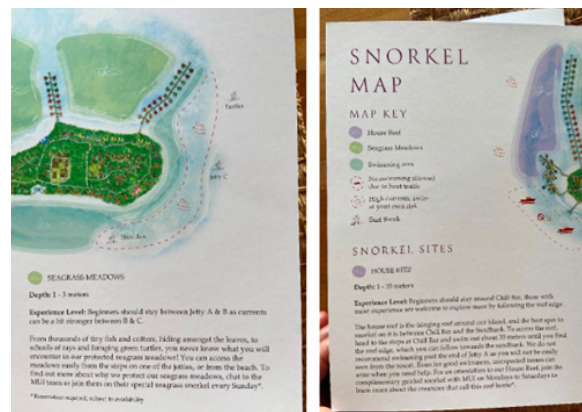
Seagrass ecosystems also provide a wealth of other benefits for coastal communities, including critical nursery habitat to over 20 percent of the world’s 25 largest fisheries,⁵⁰ reduction of pathogens and bacteria in seawater by 50 percent,⁵¹ and protection of coastlines by reducing wave energy by 40 percent.^{52,53} Seagrasses have also been traditionally utilized for a variety of purposes, including pharmaceuticals, fertilizer, food, and even Japanese sake.⁴⁹ They are critical ecosystems for climate adaptation, protecting food security, mitigating storm impacts, and making our oceans a safer and cleaner place to swim in.

Why are seagrass ecosystems important for climate change adaptation?

In the Maldives, it was once common practice for tourism businesses to lay mats atop seagrass beds to kill them, as businesses saw seagrass washing to shore as a nuisance for visitors. This tide is changing, however, thanks in part to campaigns such as #ProtectMaldives-Seagrass campaign that convinced more than a quarter of all Maldivian resorts to commit to the protection of 830,000+ m² of seagrass. If a healthy “donor bed” remains within an area, it is possible to allow seagrass to be restored through natural processes. Other ways of restoring seagrass include propagation via seeded bags, transplanting with frames, stapling, use of anchored and unanchored sprigs, plugs, peat pots, and transplanting of individual mature plants.

Case Study: Maldives – Maldives Underwater Initiative

In 2018, Six Senses Laamu formed the Maldives Underwater Initiative (MUI) to unite the efforts of the resort and their three partner NGOs—The Manta Trust, Blue Marine Foundation and The Olive Ridley Project—under one banner. The MUI team pursues marine conservation goals, through research, guest education and community outreach, with the overarching aim of protecting Laamu’s natural resources. MUI is funded by Six Senses’ Sustainability Fund. MUI and Six Senses committed to restoring their seagrass beds through natural propagation in 2018, and their seagrass beds have since thrived. They have turned this into an opportunity to increase guest awareness, offering snorkeling tours over the seagrass bed once a day to customers and creating signage signaling the importance of this ecosystem. They are also exploring ways to unlock blue carbon financing by inviting university partners to conduct a carbon accounting of seagrass meadows.



Indicative Total Cost
US\$10.50/m² of seagrass

Indicative Time Line
6–12 months initial consultation and assessment
5–10 years to ROI

What are the costs for businesses?

Seagrass restoration costs vary widely across countries and ecosystems, from US \$9,000 to over \$1 million per hectare. A recent estimate placed the median restoration cost at US\$106,782 per hectare based on 64 published studies.⁵⁴ However, in the Maldives many of the seagrass ecosystems that are still intact can be restored via passive restoration, which costs businesses almost nothing.

What are the benefits to businesses?

Seagrass ecosystems offer numerous adaptation benefits to businesses and local communities, including fisheries production, wave attenuation, enhanced water quality, carbon sequestration, erosion control, cultural value for local communities, food for charismatic megafauna (dugongs, sea turtles), compost fertilizer, and education and recreation values, to name but a few. Based on an analysis and systematic review of 56 seagrass ecosystem valuation studies, seagrass ecosystems are valued on average at \$9,687.77/ha/year. A recent study by the Nature Conservancy puts the potential value of fish protected by a single hectare of seagrass at just over \$US20K per year. Thus, businesses could recoup the cost of active restoration (\$100,000/ha) in five to ten years.

How can businesses finance seagrass restoration and protection?

Not only can businesses recoup their investment in seagrass over five to ten years; they can also benefit *financially* from investing in seagrass protection given a multitude of funding opportunities linked to biodiversity conservation. Financing options available to businesses include:

- Biodiversity offsets
- Carbon offsets
- Biodiversity-related investment risk management
- Natural Asset Companies
- Environmental, social, and corporate governance programs (ESG)
- Corporate Social Responsibility (CSR) programs
- Voluntary contributions or taxes from guests

For additional resources and guidance on seagrass restoration, see below:

- [ICRI Forum Restoration Guidelines](#)
- [Guidelines on Seagrass Ecosystem Restoration for the Western Indian Ocean Region \(UNEP – UN Environment Programme\)](#)
- [Seagrass Restoration Handbook](#)
- [Catchment Based Restoration Handbook](#)
- [Seagrass transplantation for transitional Ecosystem Recovery](#)
- [Successful case study](#)

For full descriptions of these instruments and guidelines for how to communicate value to customers, communities, and potential investors or financing institutions, [please utilize the online tool here.](#)

2. COASTAL VEGETATION PROTECTION AND RESTORATION



Why is coastal vegetation important for climate change adaptation?

Coastal vegetation acts as a natural protection measure against winds, waves, and sea spray, and plays a major role in reducing the exposure and impacts of natural hazards in the Maldives.⁹ The Maldivian government recognizes the importance of preserving coastal vegetation and discourages removal through guidelines that require any built infrastructure to be a minimum of five meters inward from the vegetation line.⁵⁵ However, human activities such as constructing new infrastructure or clearing vegetation to create unobstructed views for guests are degrading vegetation. While removing coastal vegetation may be more aesthetically pleasing, it is indirectly making shorelines and built infrastructure more susceptible to flooding, erosion, saltwater intrusion, and damage from waves.

Indicative Total Cost
US\$120/m²

Indicative Time Line
6–12 months initial consultation and assessment
2–5 years to ROI

Maintaining coastal vegetation is an extremely effective soft adaptation measure that can reduce an island's exposure to high winds, coastal flooding, and erosion. According to recent surveys, the main barriers to protecting and restoring coastal vegetation are mainly cultural and social constraints.⁵⁵ Locals and businesses alike prefer unobstructed views and clean beaches, which are seen as important tourist commodities.

Additionally, coastal vegetation buffers can reduce land availability, which is already a scarce resource in the Maldives. When faced with the decision of building additional infrastructure for residents or tourists or maintaining coastal vegetation, the first is often prioritized.

How can businesses protect, manage, and restore coastal vegetation?

There are many ways businesses can better protect, manage, and restore coastal vegetation. The first is by preserving existing vegetation and ensuring its health through regular maintenance. This can be done by following guidelines and regulations when building new infrastructure and ensuring that systems are not damaged through the removal of too much undergrowth. Businesses can further invest in the protection of these ecosystems through in-house initiatives aimed at educating guests on their importance and diversifying sustainable tourism practices. The replanting of coastal vegetation is also an option, especially in areas where beach replenishment or reclamation takes place.⁹

What are the costs for businesses?

Costs to businesses vary according to a variety of factors, including level of degradation, area to be restored, and type of plant species used. Recent studies by the Ministry of the Environment estimate that restoration costs approximately US\$120 per m², assuming a density of one to two trees per square meter and a 30 meter (98-foot)-wide vegetation belt.⁹ Once vegetation is mature, maintenance costs are very low.

What are the benefits to businesses?

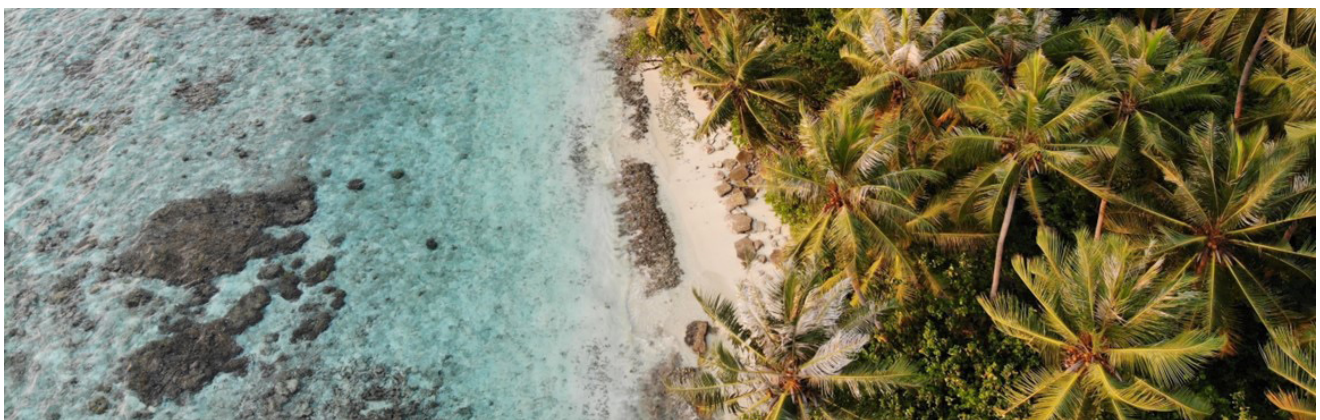
Coastal vegetation preservation provides many protection measures, reducing flood risks and saltwater intrusion, among other benefits. Having a natural barrier can reduce significant costs for businesses if damages occur. There are also many ecological and social benefits from maintaining healthy vegetation. This includes better island aesthetics and increased biodiversity through improved bird and wildlife habitats. Coastal vegetation areas are also often nesting areas for sea turtles and aid in natural processes like the formation of new sandbanks.⁹

For additional resources and guidance on coastal vegetation restoration, see below:

- [The role of coastal plant communities for climate change mitigation and adaptation](#)
- [Restoring habitat-forming species in coastal and marine areas as a nature-based solution](#)
- [Shelter from the storm? Use and misuse of coastal vegetation bioshields for managing natural disasters](#)
- [Island-wide coastal vulnerability assessment of Sri Lanka reveals that sand dunes, planted trees and natural vegetation may play a role as potential barriers against ocean surges](#)
- [Nature-based flood protection: using vegetated foreshores for reducing coastal risk](#)

How can businesses finance coastal vegetation restoration?

- Voluntary guest donation fees
- Insurance risk reduction mechanisms
- Disaster risk insurance and reduced insurance premiums through adoption of green measures
- Private equity funds supporting biodiversity



3. MANGROVE TOUR DEVELOPMENT AND RESTORATION

Why are mangrove ecosystems important for climate change adaptation?

Mangroves provide critical and dynamic ecosystem services and are important for economic, cultural, social, and ecological reasons. With 136,000 km² of coverage worldwide, mangrove ecosystems are home to a rich fauna, including 341 internationally threatened species, and provide vital support for fisheries with an estimated 4.1 million mangrove fishers globally.⁵⁶ Mangroves also deliver coastal defenses, as they reduce flooding and provide natural adaptations from wind, waves, and storm surges.

Annually, mangroves prevent more than \$65 billion in property damages, while reducing flood risks for 15 million people worldwide.⁵⁶ The benefits of mangrove ecosystems are complex. They support livelihoods, provide coastal protection, as well as critical services such as carbon sequestration. According to the State of the World's Mangroves 2021 report, mangroves convert carbon dioxide to organic carbon at higher rates than almost any other habitat on earth and currently store over 21 gigatons of CO₂. Direct human impact is responsible for over 60 percent of mangrove loss, with primary causes including conversion to farmland, aquaculture, and urbanization.

As the importance of mangrove ecosystems becomes better understood, as does the prioritization for protection. Globally, efforts to protect mangroves have increased with approximately 42 percent of today's total mangroves existing in designated protected areas. Growing efforts toward ecosystem restoration add to this positive impact, and are supported by estimations that over 6,600 km² of mangrove ecosystems are considered highly restorable using backed scientific techniques.⁵⁶ Increased action to protect the world's mangroves is also apparent in the Maldives, with the aim of protecting 20 percent of Maldivian wetlands and mangroves by 2025. This goal, outlined in the Maldives' Ministry of Environment and Energy *National Biodiversity Strategy and Action Plan (2016–2025)*, by illustrates the strong potential in linking mangrove conservation with tourism.

In the Maldives, mangroves provide significant coastal protection and reduce erosion. Local community members rely on mangroves as a source of food, fuelwood, timber and indigenous



Mangrove forest in Baa Goidhoo

Indicative Total Cost

US\$10,000 (development of tour product/guest experience in mangrove ecosystem)

\$.50/m² (restoration of mangrove ecosystem)

Indicative Time Line

3–6 months for tour product consultation and development

6–12 months for tour ROI, depending on average guest usage

medicine.⁵⁷ The mainstays of the Maldives economy are fisheries and tourism, both of which are dependent on maintaining healthy mangrove ecosystems and the overall biodiversity of life in marine environments. Mangroves create balance in the ecosystem as they provide the grounds for the breeding and nesting of birds and sharks, and are nursery areas for the larval stages of shrimps and fish species—further fueling the fisheries industry. Studies indicate that there are 14 species of mangroves present on 74 islands in the Maldives, all contributing valuable ecosystem and socioeconomic services.⁵⁸ However, development activities in the Maldives such as harbor dredging and land reclamation have resulted in severe damage to marine ecosystems, especially mangroves. Improper disposal of solids and sewage have also had a negative cumulative impact on these ecosystems.

Case Study: Huvadho Atoll, Maldives – Tourism and Mangrove Conservation

During the construction of the harbor, sand from the lagoon was dumped into the mangrove forest off Huvadho Atoll, in an attempt to eliminate the breeding site of mosquitoes. However, in the following monsoon, the taro fields—so far protected by monsoons—were flooded, making the community realize the value of their mangrove forest. The community then pressured local authorities to remove the sand and restored the mangroves, resulting in successful community-driven mangrove restoration in 2017. Eco cottages have also been built near the mangroves, creating the first instance of linking mangrove restoration with tourism in the Maldives.

How can businesses protect, manage, and restore mangrove ecosystems?

Considering that mangrove ecosystems are not present on all islands in the Maldives, this Business Climate Action Investment recommends that businesses partner with local communities to develop mangrove tourism products and experiences that simultaneously provide financial resources to Island Councils for the conservation and restoration of mangrove areas. Visitors can experience the unique environments that Maldivian mangrove ecosystems foster through day tours, wildlife tourism, bird watching, and cultural exchanges with local peoples. The ongoing protection of mangroves can also provide opportunities for economic growth and diversification via tourism.

What are the costs and benefits to businesses?

Mangrove restoration costs can range between US\$225/ha and US\$216,000/ha; a recent study found the median restoration cost of mangroves to be \$3,000/ha.⁵⁴ The benefits of successful restoration for businesses and destinations are immense: an analysis by the World Bank values mangrove ecosystems between \$21,000 all the way to \$70,000 per hectare per year, depending on the role specific mangroves ecosystems play in providing ecosystem.⁵⁹ Tourism activities can also provide businesses with the unique opportunity to diversify their portfolio of experiences offered to guests, sharing another side of the Maldives through cultural and nature-based activities.

How can businesses finance seagrass restoration and protection?

- Carbon offsetting
- Biodiversity offsetting
- Private equity funds supporting biodiversity
- Corporate Social Responsibility (CSR) programs

For additional resources and guidance on mangrove restoration, see below:

- [Global Mangrove Watch](#)
- [The State of the World's Mangroves Report 2021](#)
- [Restoration Guidelines](#)

4. CORAL REEF PROTECTION AND RESTORATION

Why are coral reef ecosystems important for climate change adaptation?

Coral reefs provide numerous ecosystem services to over one billion people worldwide, including food, medicine, habitat, storm surge protection, erosion control, pollution abatement, carbon sequestration, education, recreation, and tourism². Increasing mass bleaching events, where ocean temperatures get too hot for corals to survive, threaten coral reefs worldwide and it is estimated that 50 percent of reefs have already been lost¹. With global warming of 1.5°C, coral reefs would decline by 70 to 90 percent, and virtually all would be lost with 2°C⁵ of warming.

How can businesses protect, manage, and restore coral reef ecosystems?

Coral reefs are critical to climate adaptation. When coral reefs decline, coastal erosion accelerates, and reefs are less effective at dissipating wave energy and safeguarding atolls and island from changes in volume and elevation.⁶⁰ The protection and effective management of coral reefs is the most important priority for businesses: pollution, reef destruction, or sediment accumulation due to development can undermine the reefs' ability to protect destination assets.⁶¹ However, in areas where reefs have already been degraded, restoration—with tourism as a catalyst—is possible.

There are several resorts in the Maldives that implement coral restoration into their sustainable tourism practices. These programs are offered as philanthropy activities, providing guests the opportunity to sponsor a coral frame or adopt a coral fragment and monitor its growth. Several resorts, including Four Seasons Resort Maldives at Landaa Giraavaru and Constance Moofushi, collaborate with a marine biology consulting company, Reefscapers. There is currently no standardized guidance for the implementation of coral restoration projects. Typically, resorts have their own coral restoration programs and on-site marine biologists. These include the Anantara brand's coral restoration program, Holistic Approach to Reef Protection (HARP), and the JOALI Maldives resort's Reef Restoration program.

Coral reef restoration is a vital marine conservation strategy. However, it is important to note that coral restoration projects with no regulatory oversight may involve some amount of greenwashing or incorrect reporting. This ultimately results in projects that either fail to deliver conservation outcomes or may result in adverse ecological impacts on marine ecosystems in the long-term. Therefore, it is critical to regulate these projects through key guiding principles that involve standardized monitoring and reporting mechanisms.



Indicative Total Cost
US\$40/m² (restoration of reef)

Indicative Time Line
6–12 months for initial consultation and causal
threat assessment
5–15 years (highly variable) to ROI

What are the costs for businesses?

Median costs of restoration estimated at US\$400,000 per hectare (e.g., US\$40/m²).⁶² However, many efforts are underway to develop low-cost coral gardening methods, such as the rope nursery, where cost of restoration is under US\$1 per coral outplanted.⁶³

What are the benefits to businesses?

Coral reef restoration can play a role in guest education and awareness of the effects of climate change on coral reefs, while providing an area of coral nursery where guests can enjoy snorkeling and diving. By participating in the growing effort to restore coral reefs globally, businesses can contribute to scientific literature and best practices for future restoration projects in the Maldives. Following successful restoration projects, benefits may include enhanced biodiversity, increased biomass of reef species and ecosystem productivity, and a natural recovery of the reef from human and climate impacts.

Some risks of restoration projects include:⁶⁴

- Meaningful gains in reef species biomass or ecosystem productivity are rarely achieved by active restoration techniques because of their small spatial scale
- Project design, resourcing, and financing need to reflect growth rate of species and likely timescale of recovery, which may vary from five years to decades depending on the severity and spatial scale of the impacts.
- Long-term management/maintenance is required, as it may take decades before a highly diverse and resilient community of colonies can be established and multiple recruitment seasons are usually necessary to allow for buildup of fishery biomass.
- Choice of site may be based on tourism value rather than likelihood of restoration success.

Case Study: Queensland, Australia – Reef Credits

The Australian state of Queensland and HSBC recently announced they would be the first purchasers of publicly and privately produced reef credits. These credits quantify the value of conservation activity undertaken to improve the quality of water flowing into the Great Barrier Reef. These investments, in addition to similar investments made by the U.S. Army Corps of Engineers to protect coastal ecosystems that prevent coastal flooding, show that investments in conserving biodiverse habitats can have direct benefits to communities, either through protecting ecotourism revenue or protecting natural resources.

How can businesses finance coral reef restoration?

Many resorts in the Maldives have implemented adopt-a-coral programs, which involve guests in small-scale financing of reef restoration, but these have little long-term impact or scalability. Some options for large-scale financing coral reef management and conservation include:

- Charge, fee, and taxation systems
- Payment for ecosystem services
- Biodiversity offsets
- Conservation Trust Funds (CTFs)

For additional resources and guidance on coral reef restoration, see below:

- [UNEP Coral Reef Restoration Guide](#)
- [Maldives National Marine Research Institute \(MMRI\) Restoration Guidelines](#)
- [Maldives Coral Institute](#)
- [Coral Reef Restoration Guidelines](#)
- [Resilient Reefs Initiative](#)

5. COASTAL EROSION PREVENTION

How is erosion prevention relevant to climate adaptation?

Recent reports indicate that 97 percent of inhabited islands in the Maldives are experiencing beach erosion.⁶⁵ With 75 percent of the country's land in use, coupled with an increasing population, the scarcity of available land underscores the importance of its protection. Coastal erosion increases the risk for flooding, saltwater intrusion, and storm damage. Coastal erosion can also damage built infrastructure and reduce the amount of habitable land for future development and leisure activities, such as tourism. Yet protecting natural ecosystems—such as seagrasses, coastal vegetation, coral reefs, and beaches—can help reduce these climate-related risks in the long-term.

Traditional “hard” engineering solutions are often more costly to maintain and less likely to withstand increased pressure from weather hazards caused by climate change.²¹ A 2015 study from the Ministry of the Environment and Energy in the Maldives analyzed the cost of various “hard” and “soft” engineering solutions, finding that soft solutions such as beach nourishment and coastal vegetation were often more cost-effective for businesses.⁹ A recent study highlighted that NbS could provide important coastal protection in more than two thirds of the islands in the Maldives, with multiple benefits that will reduce coastal risks and increase NbS effectiveness in the future.²³ Beach replenishment, a method frequently utilized by many resorts, is also a possible NbS—but businesses must ensure that sand is collected from areas that won't disturb other ecosystems.

How can businesses increase coastal protection?

There's no single solution to increased coastal protection or erosion prevention. Existing ecosystems such as coral reefs, seagrasses and mangroves have the innate ability to act as “buffers” through wave dissipation.⁶⁶ Maintaining the integrity of these natural systems can be an effective measure for coastal defense, but it alone may not be enough. Hard engineering solutions like vertical concrete seawalls pose an environmental cost, including the depletion of intertidal habitats and the loss of other ecosystem services. Living seawalls are an alternative to concrete seawalls in that they mimic natural foreshores and can provide and maintain key ecosystem services. It is a separate but complementary strategy for coral gardening: coral grown in land-based nurseries can be outplanted onto seawalls to create self-regenerating coastal protection.

In Indonesia's Karangjaladri village, for example, the Oceanography Program of Bandung Institute of Technology piloted the use of coconut husk, reclaimed fishing nets, and wooden pegs as alternative seawall building material in an area with sloping beaches and high waves, prone to erosion. Hong Kong ran a pilot test by retrofitting parts of an artificial concrete seawall with eco-engineered panels and tiles—made from byproducts or recycled materials, called EConcrete—that create ridges and crevices for marine life to grow, breed, and hide.

Case Study: Netherlands – Beach Nourishment

In the Netherlands, the “Building with Nature” program is an innovative partnership between government, the private sector, and academia. A hallmark project of this partnership is the Delfland Sand Engine, a large-scale experiment in concentrated beach nourishment that was designed to use wind and currents to protect the coast for 20 years.

Source – [*Nature-based Solutions to Enhance Coastal Resilience*](#)

Indicative Total Cost

US\$100–250/m²

Indicative Time Line

6–12 months (installation of feature)
Time to ROI highly variable dependent on local conditions, ranging from 1–10 years

Case Study: Port Everglades, Florida – The use of EConcrete blocks to augment the shoreline

In the Netherlands, the “Building with Nature” program is an innovative partnership between government, the private sector, and academia. A hallmark project of this partnership is the Delfland Sand Engine, a large-scale experiment in concentrated beach nourishment that was designed to use wind and currents to protect the coast for 20 years.

Source – *Nature-based Solutions to Enhance Coastal Resilience*

Marine biodiversity along the retrofitted seawalls was reported to have doubled, as compared to the non-retrofitted sections. Hong Kong’s Tung Chung area has now incorporated the city’s first eco-shoreline in its land reclamation and housing project.

From a tourism perspective, living shorelines could create enriching snorkeling and diving experiences for visitors to the Maldives while doubling as a climate adaptation solution. Several organizations are gaining momentum and funding in recent years, including ARC Marine, eConcrete, SubCon, and Living Sea Walls. Their design can be paired with coral restoration projects like CoralVita that enhance the long-term viability of this natural solution.

What are the costs and benefits to businesses?

Costs and benefits for businesses are highly variable depending on what coastal protection measures are chosen. Figure 12 shows the cost breakdown for several soft engineering approaches; in contrast, hard engineering such as seawalls, groynes, or breakwater range from MVR 3,280 to 64,000 per linear meter.⁹ Living sea walls—such as pocket rock pools retrofitted onto vertical walls or eco-engineered concrete armor—vary in cost, but are most viable on projects of over 300m².

How can businesses finance coastal erosion prevention?

- Insurance risk mitigation measures
- Localized PES (guest voluntary fees)
- Biodiversity offsetting
- Grants, subsidies, and payments for results

For additional resources and guidance, see below:

- [The Biodiversity of Marine Artificial Structures](#)
- [Glasgow University - Greening the Grey: A Framework for Integrated Green Grey Infrastructure \(IGGI\)](#)
- [Mumbles Sea-Hive Project](#)
- [World Harbours Project](#)
- [Working with natural processes to reduce flood risk](#)

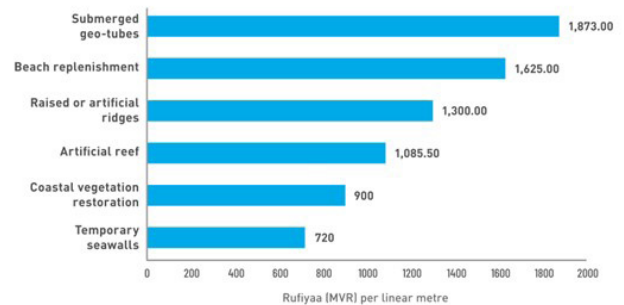


Figure 12: Cost of “soft” adaptation solutions. From the Ministry of Environment (2015)

6. WASTE MANAGEMENT

How is waste management relevant to climate adaptation?

Waste management—and plastic waste in particular—has been a growing issue around the world, and many private businesses and governments have committed to tackling this issue by reducing and recycling their waste. However, its connection to climate adaptation in the Maldives may not seem immediately apparent. The Greater Malé and neighboring outer islands generate approximately 860 metric tons per day (MTD) of solid waste.⁷ According to a 2013 study, 134 MTD were recorded from tourism resorts and 8 MTD generated from safari vessels.⁵⁵ A 155 percent increase in waste generation was seen in the Greater Malé region over the past decade, and a 57.6 percent increase was seen on nearby atolls.⁷

As climate change impacts threaten to inundate islands with flooding and potential loss of land area, human living space could diminish rapidly. Additionally, as fresh water becomes less available on islands, more people may come to depend on bottled water—thus increasing the need for proper waste infrastructure. While government has an important role to play in providing this infrastructure, businesses can also help to catalyze innovation in this sector.

How can businesses improve their waste management practices?

There are currently four main methods of waste disposal on resort islands depending on the type of waste generated. These include: 1) disposing of food waste and food materials by dumping into the sea; 2) incinerating garden, yard and paper debris; 3) discarding recyclable materials at the Thilafushi landfill or exporting them; and 4) reusing or disposing of residual waste such as construction and demolition debris, glass, textiles, rubber and hazardous waste at the Island Waste Management Center at the Thilafushi Landfill.⁵⁵

Further complications exist regarding waste management on liveboard vessels and in inhabited island communities. In both cases, the lack of solid waste disposal requires that waste be transported to the Waste Management Center at the Thilafushi landfill. However, the costs and complexities of ocean transport often result in an inability to properly dispose of waste.⁵⁵ In these situations, the illegal dumping or burning of waste occurs, resulting in discarded waste in the sea, on beaches and in low-lying woody areas—all negatively impacting both ecosystems and tourist experiences.



Indicative Total Cost

US\$500–1000 (compost)

\$20,000– \$65,000 (anaerobic digester)

Indicative Timeline

2–5 months (initial consultation)

3–6 months (installation of compost)

6–12 months (installation of anaerobic digester)

Time to ROI variable dependent on volume of waste produced

Several businesses in the Maldives are beginning innovative projects to turn waste to wealth, such as constructing concrete blocks from smashed glass bottles, using biogas digesters to create energy from food waste, creating simple worm composters, creating social enterprises that incentivize waste recovery, or ensuring that packaged goods are made with Mycelium foam derived from mushrooms. Food waste in particular will be a key issue for businesses since, beginning in 2023, they will no longer be allowed to dump their waste at sea.

Waste management policies and regulations need to incorporate user responsibility as a critical component. While complications exist regarding what to do with waste, the key should be reducing the waste generated in the first place. Users need to be more aware of their role in waste generation and take measures to minimize it. By promoting and encouraging practices such as waste reduction, recycling, and composting, users can play a significant role in waste management. With increased awareness and responsibility, waste generation can be minimized, and the waste that is generated can be managed more effectively.

What are the costs and benefits to businesses?

There are a variety of innovative vendors that can deliver waste-management solutions, including anaerobic digesters, compost facilities, plastic compaction units, and glass crushing facilities. Anaerobic digesters range from US\$20,000 to \$65,000 for machines to be purchased and installed, some of which can produce biogas that can help power stoves within properties, providing cost-saving in the long-term. Compost facilities are more affordable to establish, ranging from \$500–\$1000. Considering new regulations requiring businesses manage their food waste on-site, these investments could spare businesses significantly in the long term.

How can businesses finance waste management?

- Social enterprise establishment
- Government / public budget
- International funds (loans, grants, in-kind assistance from bilateral donors and foundations)
- Blended finance

Case Study: Soneva – Sustainable Waste Management

Pioneering eco-resort brand Soneva has created Eco Centros across its properties, recycling 90 per cent of its waste through an innovative waste management strategy. Soneva Fushi has worked with Precious Plastic to become the first company in the Maldives to recycle plastic into new products, using open-source machines made from locally available, low-cost materials.

Starting in the neighbouring local islands of Baa Atoll, a successful pilot CSR project led to the creation of Soneva Namoonā NGO. This has been established to empower zero waste communities across the Maldives, moving away from open burning towards more sustainable waste management practices. To date, over 400 tonnes of waste (60 percent of which is recyclable) have been collected from Namoonā islands implementing the [Namoonā Sustainable Waste Management Model and Levels of Sustainability framework](#). The NGO is also working with 7 islands in Baa and 6 islands in Noonu Atoll on the Alun Balun Resale Market for secondhand goods, and operating water bottling plants in Baa Maalhos and Noonu Kudafari. Both initiatives focus on the reduction of waste through more sustainable consumer choices.

Looking at the achievements of the Soneva Resorts and Soneva Namoonā's various trials and learnings, there are clearly opportunities for all resorts to improve the segregation, processing and packing of waste. This will minimize storage requirements on the island, increase the conversion of waste to resources, and increase recycling, while at the same time reducing waste transportation costs and dumping charges at the regional waste management facilities.

For additional resources, see:

- [Hotel Kitchen Toolkit](#)
- [Rocket Composter Maldives Case Study](#)
- [Precious Plastic](#)
- [Plastic Drawdown](#) - A rapid, user-friendly tool to help decision-makers identify and deliver effective pollution mitigation strategies.

7. CLEAN DRINKING WATER

Why is water security important for climate change adaptation?

Island communities in the Maldives depend primarily on rainwater for drinking purposes, and groundwater for most other domestic/non-potable uses. Rainwater is tapped from roofs, collected, and stored in various types of tanks. All the islands have individual household as well as community tanks.⁶⁵ A prolonged dry period imposes potential water security threats to the islands depending on rainwater. The 2009 drought caused several water shortages on 55 islands in the Maldives, including Addu Atoll and parts of Raa and Baa Atolls.⁶⁷ Approximately 76 percent of the total households in Malé use bottled water as their drinking water source, while 10 percent of the households in the outer atolls have the same preference.⁶⁸

The projected climate change impacts will likely exacerbate water stress. The IPCC Sixth Assessment Working Group II Report states that freshwater systems on small islands are exposed to dynamic climatic impacts and are among the most threatened on the planet. An 11 to 36 percent reduction is estimated in the volume of fresh groundwater lens of the small atoll islands (area < 0.6 km) of the Maldives due to sea level rise. Additionally, projected changes in aridity are expected to impose freshwater stress on many small islands, especially SIDS. It is estimated that with a warming of 1.5C or less, freshwater stress on small islands would be 25 percent less as compared to 2.0C.⁶

The Vulnerability and Adaptation Assessment undertaken for the National Adaptation Programme of Action (NAPA) classifies water resources as a high-risk sector in the Maldives.³ Deterioration of groundwater quality is mainly owed to increase in population, mechanization of water extraction methods, saltwater intrusion, and contamination from untreated waste disposal and seepage from septic tanks.⁷ Currently, the Maldives is moving towards an integrated water resource management (IWRM) approach.

Case Study: Gulhi, Kaafu Atoll, Maldives – Desalinated Drinking Water from Waste Heat

In February 2014, the government of Maldives joined representatives from Aquiva Foundation, Memsys, Aquaver, and the local power company STELCO for the official commissioning of a desalination facility on the island of Gulhi in Kaafu Atoll. The goal was for the desalination plant to produce up to 10 tons of quality water per day from seawater for drinking, cooking and hygienic purposes.

A small island, 600 by 300 meters, Gulhi is home to about 1,200 residents and a growing number of guesthouses. Before the commissioning of this facility, Gulhi relied primarily on imported water for drinking because its only freshwater source is seasonal rain, which does not provide an adequate year-round water supply.

The desalination system uses a vacuum multi-effect membrane distillation process, developed and provided by Memsys, which uses the waste heat of the generators to create an efficient and environmentally friendly desalination process. Aquaver and Memsys support the foundation by providing their vacuum multi-effect membrane distillation technology and plants on an at-cost basis. The water is distributed through taps at communal water kiosks and must be collected by citizens in reusable 1.5–20-liter containers. With the new desalination system, kiosks can provide the drinking water for about US\$0.05–\$0.07 per liter on a sustainable basis. This means a significant reduction in the cost of drinking water; as bottled water costs between \$0.25 and \$0.50 per liter on inhabited islands, and often \$2.50 or more per liter in the resorts. The plant now produces up to 10,000 liters of drinking water per day.

How can businesses enhance water security?

Many tourist resorts have desalination plants that allow production of clean water, including drinking water. Section 6.1 of the Regulation on the Protection and Conservation of Environment in the Tourism Industry mandates that every resort have a desalination plant to provide clean and safe water for tourists and staff at the resorts. However, these desalination systems increase energy usage and are difficult to implement on local islands.⁵⁵ Some of the islands (e.g., Gulhi in Kaafu Atoll) are implementing innovative strategies to increase access to clean and safe water that can be replicated by businesses, such as the use of waste heat or solar heat, or the integration of renewable energy.

<p>Indicative Total Cost US\$200–300 (household water filters) ~\$50,000 (desalination systems)</p> <p>Indicative Time Line 1–2 weeks (water filter installation) 6–12 months (desalination system installation)</p>
--

Tourism businesses, including resorts and guesthouses operating near local communities, can lead the way to adapt to water stress through innovative, cost-effective, and sustainable long-term strategies to ensure that they continue to have access to quality water. Improved water quality and reliability through innovative water supply techniques across all inhabited islands are critical to increasing resilience to climate variability and changes in the tourism sector and in tourism-dependent communities.

What are the costs and benefits to businesses?

Costs for businesses vary; companies such as [RO Maldives](#) provide household water purifiers for US\$ 200–300 each, meaning that costs for a guest house or small operation could be recouped after just 400 refills (with bottled water costing an average of \$.50). The cost for full installation of desalination systems can range from \$20,000 to \$50,000. Proposed adaptation solutions to water shortages, especially during prolonged dry periods, ensure that tourism businesses and dependent communities have continuous access to safe and secure freshwater in the face of climate change risks.

How can businesses finance to enhance water security?

Some financing options may include:

- Government / Public Budget
- International funds (loans, grants, in-kind assistance from bilateral donors and foundations)
- Blended finance

For additional resources, see below:

- [RO Maldives](#)
- [Remote Waters](#) - Offers a sustainable low-cost water desalination system that can be powered by solar energy. The small-scale, off-grid system can be set up in three months, requires low maintenance, and offers the possibility for modular expansion. This innovative solution secures clean water for drinking as well as for cleaning, irrigation, and animal consumption, directly supporting the livelihoods of rural communities.
- [Oceanus Power and Water](#) - A combination of pump hydro and desalination infrastructure to generate potable water and renewable energy through its Integrated Pumped Hydro Reverse Osmosis Clean Energy System (IPHROCES).

8. RESILIENT ENERGY INFRASTRUCTURE

Why is resilient energy infrastructure important for climate change adaptation?

While many people may traditionally think of solar energy or other renewables as being essential for reducing emissions and combatting climate change, alternative energy infrastructure is also critical for another reason. Reliance on 100 percent diesel power can result in brittle infrastructure and supply chains that are more vulnerable to disruptions such as global increases in fuel prices or transport issues due to climate-related hazards. Resilient energy infrastructure sits at the nexus of climate mitigation and adaptation, and decisions must look at these two issues together rather than separately. However, the Maldives has limited available land space for installation of solar panels, and the push for renewables also has trade-offs and potential consequences for vulnerable ecosystems. Thus, businesses must explore opportunities to integrate distributed power generation solutions within the existing infrastructure and framework of high-volume power.

What can businesses do to adopt resilient energy infrastructure?

Given that only a few businesses in the Maldives have begun to incorporate renewables into their portfolio due to the lack of available land for solar power, innovation must be made in this sector—and rapidly. In 2019, the Maldives imported more than 700,000 metric tons of fuel, with diesel accounting for 80 percent of the total. Gradually, renewable energy capacity has increased across the country from 1.5 megawatts to 17.5 megawatts, a number that is expected to grow to at least an additional 41.5 megawatts by 2025.⁶⁹ However, for many countries, purchasing off-the-shelf power solutions funded via bank loans is a recipe for failing power solutions and mounting debt. Additional innovations exist that can help businesses reduce energy costs, increase the resilience of their power supply, and better integrate within existing high-volume power systems. Indeed, with the solutions identified in this report, resorts can become power exporters and export cost-effective power to local communities.

What are the costs and benefits to businesses?

Based upon the identified vendors for this Business Climate Action Investment, businesses could save between US\$500,000–\$600,000 per megawatt by transitioning to these resilient energy solutions. CapEx pricing (project assessment, design, and build through commissioning) falls between \$6.75 and \$13.75 per watt. For example, if a 500kW project was determined to be \$8 per watt it would be calculated as: $> 500 \text{ kilowatts} \times 1,000 \text{ watts} = 500,000 \text{ watts} \times \$8.00 \text{ per watt} = \text{US\$4M}$.

Power would be sold through a PPA. Vendors would carry the responsibility for system operation, maintenance, and upgrades.

Case Study: South Ari Atoll, Maldives – Floating Solar

The resort Lux in the South Ari Atoll became the first property to partner with SwimSol to provide its patented SolarSea system, the world's largest solar power plant at sea, to help power the island resort. The SolarSea technology helps gather solar energy to power the island and is resilient to any potential weather that may cause service disruptions. The property's solar capacity increased by 40 percent and reached 678 kWp—enough to power all the resort's guest villas at peak times. This amounts to saving more than 260,000 liters of diesel annually.

Indicative Total Cost

CapEx pricing (project assessment, design, and build through commissioning) falls between US\$6.75 to \$13.75 per watt

Indicative Time Line

3–6 months for initial consultation period
6–12 months for installation
Business savings of US\$500,000–\$600,000 per megawatt

This CapEx range of \$6.75 to \$13.75 per watt is based on three primary factors:

1. The SLA (Service Level Agreements) – Clients can choose their degree of uninterrupted power using standard industry metrics. For example: 99.95 percent Uptime is equal to 4.38 hours of downtime per year; 99.999 percent Uptime is equal to 5.26 minutes of downtime per year. Up to 100 percent uptime is available, it simply requires additional system components and redundancies.

2. Extended energy storage capacity – Vendor systems include sufficient energy storage to accommodate surge needs and for power transition needs (such as the swap-out of a generator). Storage capacity can be added as needed to maximize auxiliary green sources to augment primary fuel sources.

3. Unique objectives/challenges at the client site – Vendor platforms enable clients to choose how “green” they want to be, and when, while meeting the delivery of power defined in the SLA. This drives the mix of input sources, which directly impacts the costing. Additionally, the Site Evaluation Assessment (SEA) that the vendor teams will perform in conjunction with the local O&M team will identify any special obstacles or challenges that must be overcome to meet the project specifications.

How can business finance energy infrastructure?

The Maldives has become an attractive renewable energy investment destination; over 61 global investors showed interest in a 21-megawatt solar project the government proposed during COVID-19. Many potential vendors of this technology are willing to cover the cost of installation and maintenance for businesses, making the switch to alternative energy sources very attractive. Businesses are encouraged to learn more about potential vendors identified in the research of this report for exploratory calls and financing opportunities.

For additional resources, see below:

- [A Brighter Future for Maldives Powered by Renewables: Road Map for the Energy Sector 2020–2030](#)
- [Maldives Poised on the Road to Renewables](#)
- [Making the Energy Sector More Resilient to Climate Change](#)

9. CITIZEN SCIENCE + CLIMATE DATA COLLECTION

Why are citizen science and data collection important for climate change adaptation?

Globally, citizen science programs have engaged millions of people and provided billions of dollars in contributions towards monitoring and conservation programs.⁷⁰ Research is critical to learning about the natural world, understanding the complex challenges we face, and developing effective solutions to climate adaptation. Academia has limited capacity to conduct all of the research necessary to understand climate adaptation, so citizens have an important role to play in contributing valuable data to scientific research.

How can businesses engage citizens in science and data collection?

Citizen science is not only a valuable approach for climate adaptation; it is also a fun and engaging experience for guests. The Maldives Marine Research Institute encourages businesses to collect data on their house reefs on an annual basis and has developed protocols for doing so. However, there are also additional opportunities for businesses to contribute data on key megafauna sightings like manta rays, whale sharks, and turtles through NGO collaboration with the Manta Trust, Whale Shark Trust, and Olive Ridley Project all operating within the Maldives. Businesses like Six Senses have developed their own data collection protocols using apps like In-put, which helps dive guides record species viewed on a dive in a simple and easy manner. Businesses can also:

- Hire and train in-house marine biologist(s), sustainability managers, energy specialists, etc.
- Partner with local/international NGOs with certain expertise (coral bleaching, marine megafauna, energy efficiency, waste management, etc.)
- Involve guests in data collection as part of educational experience
- Create “voluntourism” packages that attract travelers looking to exchange volunteer hours for room and board
- Community events, such as International Coastal Cleanup and beach cleanup data submission to Ocean Conservancy
- Contribute data to Maldives Marine Research Institute - coral bleaching data collection protocol
- Collect island-specific data (e.g., coastal dynamics, reef characteristics, hazard exposure) to build a long-term dataset that can inform coastal dynamic modelling exercises in future coastal projects.

Case Study: The Manta Trust

The Manta Trust initiated the Maldivian Manta Ray Project (MMRP) nearly 15 years ago, to monitor the Maldives’ manta ray population and how it is being impacted by tourism and human activities. It works via a network of divers, biologists, communities, and tour operators, who report sightings and photos via an online submission form IDtheManta. This citizen science effort has allowed the Maldives’ resident manta ray population to be studied extensively, including the impact of tourism and human interaction, and in 2012, the Maldives Environmental Protection Agency (EPA) enforced sustainable tourism practices in their primary feeding area in the Hanifaru Bay. These practices include limits on the number of tourists and boat trips, bans on fishing and diving, speed limits, specific entrance and exit routes in the bay, and the presence of EPA rangers to monitor these regulations.

<https://www.mantatrust.org/maldives>

Indicative Total Cost

Free (for participation in Manta Trust or Whale Shark Research Programme) - US\$10,000 (for development of customized citizen science dashboard via In-put app)

Indicative Timeline

3–6 months for initial training in NGO citizen science approaches
6–12 months development of customized data dashboard in In-Put

Case Study: Maldives – The Maldives Whale Shark Research Programme

The Maldives Whale Shark Research Programme (MWSRP) is using citizen science to monitor the population and habitat of the whale shark. Through workshops across the country, MWSRP has trained tour guides to photo-ID whale sharks and upload them to an online database. In exchange, guides can access the identified shark’s life history and share it with curious guests. They also receive access to real-time social media updates on whale shark sightings for better trip planning. In 2016, MWSRP took their citizen science efforts to the next level by releasing an app accessible to everyone visiting the Maldives, to report whale shark sightings and track the individual sharks they’ve spotted – including its most critical habitats! Following a successful pilot of the app in the Maldives, it has now drawn the attention of scientists around the world, keen to link local sightings to global databases.

<https://maldiveswhalesharkresearch.org/>

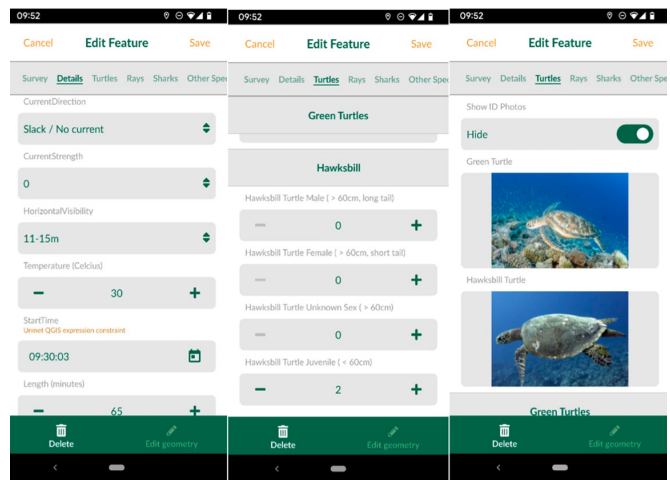
How can businesses finance citizen science?

Often, guests feel more empowered and interested as visitors when they feel they are contributing positively to their surroundings, or else part of a larger endeavor beyond their trip. Many businesses fund citizen science programs using guest donation fees or a portion of sales in a restaurant. Businesses should communicate clearly to guests what their money is doing and how it is helping to improve information about vulnerable ecosystems.

What are the costs and benefits for businesses?

Other than staff training, it costs almost nothing for businesses participating in programs offered by the Whale Shark Research Programme or Manta Trust. If a business is interested in developing their own database and simplified data monitoring system—such as the In-put app used by Six Senses Laamu Atoll—then total consultation and training fees may cost around \$7,000.

Businesses that have a citizen science program can gain a more holistic understanding of the natural environment surrounding them and will be better equipped to identify challenges and develop effective solutions. Data collected can also be analyzed and used for marketing material, guest education, and staff training. If submitted to national or international organizations, data collected may contribute to larger scientific studies and enable the government to respond to coral bleaching events more effectively. Costs to businesses are minimal and often only include the staff time taken to input and upload data effectively.



In-put app utilized by Six Senses Laamu Atoll to record citizen science data and monitor habitats over the long-term

10. NATURE-INCLUSIVE BUILDING DESIGN AND CONSTRUCTION

Why is nature-inclusive building design and construction important for climate change adaptation?

The Maldivian tourism industry, as well as its communities, are heavily reliant on the wealth of its coastal natural capital. Almost 80 percent of the country's total revenue is generated from tourism and fisheries, both of which are based on the health and productivity of the marine ecosystems.³ Protecting these ecosystems is essential to ensure the successful continuity of the economy and to mitigate the risks associated with climate change. However, coastal modification practices such as land reclamation, including for the construction of new tourist resorts, often causes severe impacts to these ecosystems. Lack of binding land reclamation regulation and broader coherent coastal protection guidelines further weakens this process. Given this gap in policy, the tourism industry can set an example for others by incorporating climate risk and resilience into the Environmental Impact Assessments for all their coastal modification projects (e.g., suspend work during coral-bleaching events/coral-spawning seasons).

Land is also one of the scarcest resources in the Maldives, making up only 1 percent of the total area of the country.⁷¹ Some 90 percent of all resort infrastructure and 99 percent of all tourist accommodation are also within 100m of the coastline.⁷¹ Thus, the tourism industry must go forward with nature in mind, ensuring that businesses can be more resilient to future impacts while helping to protect ecosystems in turn.

How can businesses incorporate nature-inclusive design and climate-resilient construction?

Businesses can adopt a number of innovative approaches in creating tourism products that incorporate elements which help to preserve and enhance the adaptive capacity of ecosystems. The use of biophilic designs help bring aspects of nature indoors by using complementary, connected and integrated concepts that coexist with the natural surroundings rather than stand-alone structures.⁷² When designing structures, such as resorts and guest service buildings, consideration from a biodiversity perspective will help increase the adaptation capacity of the finished building and create room for inclusion of more plants and animals in the space.⁷³

Investing in resilient buildings can provide refuge from harsh environmental conditions outside. Incorporating strategic designs that consider the surrounding environment can eliminate the need for adaptive measures that might arise later on. For example, architecture that is intentionally designed to withstand extreme weather events can help reduce the damage caused to buildings during severe storms.⁷⁴ This type of measure can help to minimize the damage to property during extreme weather conditions such as flooding. This can help businesses avoid loss that will otherwise consume precious capital resources.

Case Study: Fiji – Built Standards for Coastal Resorts for Adaptation to Extreme Events

To prevent damage from storm surges and sea-level rise, resorts are now built at least 2.6 m above mean sea level and 30 m off the high tide mark (these standards might be reviewed in the future). The building code prescribes that structures need to withstand wind speeds of 60 km per hour. Before the start of the cyclone season, individual businesses (at least the larger resorts) should establish evacuation plans, insurance coverage, and procedures such as staff training, water and food storage, first aid kits, trimming of trees and a direct line to the Meteorological Service for early warnings. These efforts are being developed and implemented in coordination with government departments and tourism businesses.

What are the costs and benefits for businesses?

The cost of investment in nature-inclusive design and climate-resilient construction is largely determined by the context in which the investment is undertaken; however, factoring long-term risk into building construction can help reduce insurance premiums and attract potential investors. Structures that integrate climate resilience principles during construction can better withstand strong winds, heavy flooding, and more. This can help businesses save millions in disaster mitigation efforts.

How can businesses finance nature-inclusive design and climate-resilient construction?

- Ecosystem service fees
- Green financing mechanisms
- Government incentives such as tax exemption to save on costs for projects that preserve and enhance surrounding ecosystems and encourage sustainability
- Private finance
- Tailored blended finance mechanisms
- Impact investment finance

For additional resources, see below:

- [Building with Nature](#)
- [A Practical Guide to Climate-resilient Buildings & Communities](#)
- [Delivering Climate Responsive Resilient Building Codes and Standards](#)
- [Maldives Building Regulatory Capacity Assessment](#)



SECTION 4 – CLIMATE FINANCING OPPORTUNITIES

The Maldives is a country of immense natural wealth: with its ocean territory nearly ten times larger than its total land area (some one million km²), capitalizing on the “blue economy” resources of the country is a priority for both the Government of the Maldives and the communities who steward and depend upon its health. Tourism, fisheries, aquaculture, maritime transport, and energy all make up the blue economy, and each of these sectors has the power to unlock new and innovative financing opportunities for businesses and government.

The Five Strategic Objectives outlined in this report outline ambitious strategies for improving the resilience of tourism businesses and the tourism sector in the Maldives as a whole. Many of these objectives—and the Ten Business Climate Action Investments supported by the Maldives Climate Smart Tourism Program—lay the foundation for a tourism industry that invests in nature as a core business asset. Investing in nature helps to both diversify business revenue beyond tourism while enhancing resilience to climate risks in the future. Increasingly, governments, financial institutions, and corporations are interested in increasing investments in nature.

3.1 – THE STATE OF CLIMATE FINANCING

Internationally, several key outcomes for the Maldives arose from the COP26 negotiations in Glasgow in 2021. This included a reevaluation of finance for climate adaptation, with greater contributions earmarked for Least-Developed Countries (LDCs) and SIDSs. Previously, developed countries had pledged US \$100bn annually to support climate adaptation and mitigation; however, most of these resources currently are directed toward mitigation, and in 2019 only US \$79.6 bn of the pledge was fulfilled.

At COP26, countries reaffirmed the 100 billion pledge and committed to updating the pledge goal by 2025, as adaptation costs in developing countries are rising. As most funding is currently directed toward mitigation, COP26 initiatives aim to double the amount of funding directed toward adaptation (20–25 percent in 2019) by 2025 (to 40 bn). In addition, US\$350 million was pledged to the Adaptation Fund, which enables “developing countries [to] build resilience and adapt to climate change.” Notably, a funding mechanism for losses and damages of nations severely impacted by climate change was an additional agenda that entered COP26 negotiation. Although this was not formally accepted, several countries contributed donations.

New loss and damage pledges, totaling more than US\$230 million, were made to the Adaptation Fund at COP27. The Sharm el-Sheikh Implementation Plan highlights that investments of US\$4–6 trillion a year will be needed to complete a global transformation to a low-carbon economy, which will require deep engagement and transformative approaches from the global financial system. From central banks to institutional investors, many are seeking to solve the challenge of how to mobilize this finance to countries, like the Maldives, that are most in need. The UN Climate Change’s Standing Committee on Finance has already been requested to prepare a report on doubling adaptation finance for consideration at COP28 next year.

So, how can tourism businesses access these funds?

Most of the local environmental trusts (e.g., Maldives Green Fund, Addu Conservation Trust Fund, Fuvahmulah Conservation Trust Fund) are currently 100 percent capitalized by public revenues with no co-finance components. At present, these environmental funds have some limitations as funds are disbursed only for government projects and cannot transfer to private commercial banks.

However, climate adaptation finance, in general, is available through the following sources:

- Bilateral development cooperation providers
- Multilateral Development Banks
- Dedicated climate funds
- Private foundations
- Other international philanthropic foundations
- SME Development Finance Corporation (SDFC), established in 2019, provides specific loan products for Capital Expenditures (CAPEX) and Operating Expenditures (OPEX) purposes for critical economic areas, including local tourism. SDFC is also in the process of becoming the first Maldivian organization to be accredited to the Green Climate Fund (GCF).
The Green Loan Scheme from the Bank of Maldives covers sustainable projects, including energy efficiency (US\$1.3 million portfolio).

The following resources provide information on accessing climate adaptation finance:

- [Climate Funds Inventory](#) - Prepared for the G20 Climate Finance Study Group, this inventory contains information on about 91 climate funds, including type of the fund (e.g., multilateral/bilateral); the size of the fund; fields of activity (e.g., mitigation, adaptation, capacity building); eligible sectors (e.g., agriculture, forestry, energy efficiency); and regions.
- [UNFCCC's Funding for Adaptation Interface](#) – A platform to screen available funding options for adaptation globally, providing a summary of adaptation funding options available from various sources.
- [OECD Toolkit to Enhance Access to Adaptation Finance](#) – Annex 2 contains detailed information on various funds, including LDCF, the SCCF, the GCF, the Adaptation Fund, the Adaptation for Smallholder Agriculture Programme (ASAP), and the Global Climate Change Alliance.

However, businesses often face barriers directly accessing public and international financing sources due to lack of accreditation, or because the funds are earmarked for governments directly. Often, climate change funding becomes available through additional budget allocated by governments following allocation from international funds. Businesses must make the case that their investment aligns with the [Maldives National Adaptation Program of Action](#) (NAPA)—such as the objectives and action investments highlighted in this document. Additionally, businesses have the ability to influence the climate change priorities of the government by engaging with the NAPA and other strategies like this Action Plan.

Ultimately, climate adaptation still only receives roughly 25 percent of total available climate finance. Available climate adaptation finance will need to increase rapidly to fill the annual adaptation costs in developing economies, estimated in the range of US\$155 to \$330 billion by 2030.⁷⁵ This is despite the evidence that there is tremendous value to investing in adaptation. The Global Commission on Adaptation estimated that investing US\$1.8 trillion from 2020 to 2030 could generate US\$7.1 trillion in total net benefits in five areas: early warning systems, climate-resilient infrastructure, improved dryland agriculture crop production, global mangrove protection, and more resilient water resources.

The Strategic Objectives and Business Climate Action Investments presented in this report seek to demonstrate the business case for these solutions, from resilient energy infrastructure to mangrove protection to resilient water resources. This section homes in on one of the most immediately accessible sources of climate adaptation finance available to businesses: nature-based solutions financing.

3.2 THE ROLE OF NATURE-BASED SOLUTIONS IN FINANCING ADAPTATION

Perhaps more than any other, the tourism industry is best poised to take advantage of growing interest in Nature-based solutions and deploy these solutions in the destinations they steward to enhance overall destination resilience. In 2020, US\$133 billion was invested in NbS, with 86 percent in the form of domestic government expenditures and international aid. Private finance accounted for only 14 percent, including capital mobilized through sustainable agricultural and forestry supply chains, private equity investments, biodiversity offsets, philanthropic capital, private finance leveraged by multilateral organizations, and carbon markets.¹⁷

Meanwhile, capital flows into climate investments such as low-carbon transport, renewable energy, and energy efficiency reached over US\$632 billion on average over 2019–2020, according to a Climate Policy Initiative report (2021).⁷⁶ Private actors provided 49 percent of total climate finance, an average of US \$310 billion—a 13 percent increase from the 2017–2018 period.⁷⁶ Climate finance is becoming well understood by commercial banks, investment banks, and institutional investors, while NbS investments often lack sufficiently predictable, long-term revenue streams. However, one investment instrument in NbS—carbon markets—is becoming increasingly sophisticated and robust, presenting a repayable investment opportunity for potential investors that tourism businesses can take advantage of.

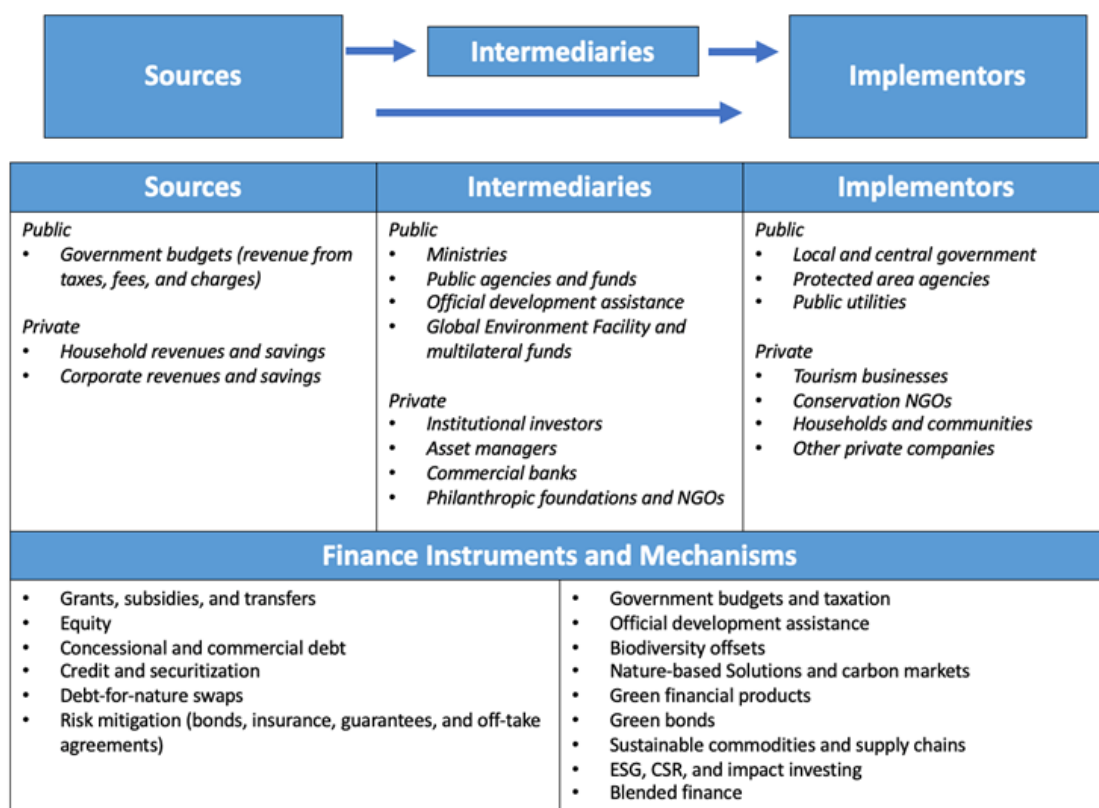


Figure 13: Financing landscape for nature-based solutions (Adapted from Hainaut et al., 2018 and OECD, 2020).⁷⁷ For more details, refer to the [Online Tool for NbS Valuation and Financing](#).

Strategic Objective 3 in this Action Plan, Regenerate Nature, provides steps and resources for businesses wishing to value nature and to communicate the value of NbS to visitors, potential investors, and society at large. This objective and its guidance is in line with the UN State of Finance for Nature Report (2021) that encourages industry and government to work together to create standard metrics, baselines, and common characteristics for NbS to facilitate the creation of a new asset class.¹⁷ The [Online Tool](#) available with this Plan is a resource for businesses seeking to do so; Tab 5 also presents all available NbS financing frameworks and

instruments, including annual financial estimates, examples, and potential relevance to businesses. However, given the novelty of NbS investments and challenges in accessing adaptation financing generally, the section below seeks to outline future pathways for one of the financing instruments with the greatest potential in the Maldives: blue carbon.

3.3 BLUE CARBON ACCOUNTING AND FINANCING

Blue Carbon Ecosystems

Coastal wetlands, including mangrove forests, sea-grass meadows, and salt marshes, collectively known as blue carbon ecosystems (BCEs), are among the most productive ecosystems on the planet. BCEs act as carbon sinks, as they have the capacity to sequester atmospheric carbon dioxide and store it as organic carbon, thereby contributing to climate change mitigation.⁷⁸ Carbon is stored in their living biomass above and belowground (leaves, stems, roots) and the dead biomass (litter and dead wood), but a more substantial amount is stored in their soil,⁷⁹ where it can remain locked over millenary time, making them a nature-based carbon sequestration solution even more powerful than terrestrial forests.^{80,81} A recent study estimated global blue carbon wealth at over US\$190 billion per year due to carbon sequestration benefits alone.⁸²

Additionally, these ecosystems provide significant adaptation-relevant ecosystem services, including shoreline protection, fisheries enhancement, water quality regulation, and biodiversity conservation, all of which support communities and enhance national economies.⁸³ There is increasing recognition, backed by strong scientific evidence, of the conservation and restoration of coastal ecosystems as efficient NbS with win-win benefits of mitigation and adaptation.⁸⁴

Despite their broad significance, these coastal vegetated habitats are among the most affected and rapidly degrading environments worldwide.⁸⁵ BCEs continue to face many direct and indirect pressures, ranging from land use changes and coastal development to sea level rise and habitat disruption, with the rate of loss four times faster than that of rain forests.⁸¹ Degradation of BCEs can also cause the release of stored carbon and diminish further sequestration.⁸⁴



Tourists enjoy a tour in a mangrove forest in Laamu Atoll. Photo by Maldives Underwater Initiative (MUI) by Six Senses Laamu Atoll

BCEs in the Maldives

BCEs are especially significant for a country like the Maldives with its extreme climate vulnerabilities and high dependence on the coastal zone to support livelihoods. BCEs in the Maldives include mangroves and seagrasses. There has been very limited research on BCEs and little effort to create an inventory of the habitats in the Maldives. There are few existing studies that state that mangroves grow in only 74 of the ~1192 islands of the Maldives,⁵⁷ making conservation of these habitats a high priority. In the case of seagrass meadows, they are common in shallow lagoons across the country. Seagrass research is similarly scarce and outdated. Six species of seagrass were recorded by a recent study done on Laamu Atoll.⁸⁶ Additionally, mangroves and seagrasses of the Maldives face increasing threats from anthropogenic activities, especially coastal modification.⁵⁷

The coastal ecosystems are significant for small island developing states (SIDS) as the majority of their communities and infrastructure is located in coastal zones. BCEs are important economic and ecological assets for SIDS with the well-being of many small island communities directly linked to the ongoing function and productivity of BCEs.⁸⁷ The Maldives has pledged to achieve net zero emissions by 2030. Therefore, BCEs present the Maldives with a natural and cost-effective climate mitigation solution with co-benefits of adaptation that can also generate important monetary benefits, especially through carbon-offset markets.⁸⁸ Investment in these nature-based solutions sets them apart from others as they promote other essential ecosystem services such as food security and biodiversity and is proven to be more cost-effective than hard infrastructure like seawalls.^{84, 89}

Blue Carbon Markets

The role of BCEs in removing carbon emissions by capturing and storing CO₂ from the atmosphere, along with the idea of markets to finance their protection, has gained traction. Carbon markets for natural carbon sinks are based on the idea that carbon stored in these ecosystems can be quantified using scientific methods and can be sold as credits. Projects restoring these ecosystems generate “credits” based on the tonnes of carbon captured and stored. The credits are then sold to global buyers, such as businesses that want to offset their own carbon emissions. This method is also known as carbon trading.

Blue carbon markets are relatively new compared with markets for carbon sequestration on land, such as tree planting. However, the Taskforce on Scaling Voluntary Carbon Markets (TSVCM) of the Institute of International Finance (IIF) predicts that demand for carbon credits will increase by fifteen-fold from 2020 and will be worth up to US\$50 billion by 2030. So far, very few projects are certified to sell blue carbon credits.

Case Study: Mikoko Pamoja, Kenya

Mikoko Pamoja is a community-led mangrove restoration and reforestation project being implemented in Gazi Bay, Kenya. It is financed by voluntary carbon credits. The project includes 117ha of nationally owned mangroves with the potential to grow. The Gazi Bay community depends on the mangroves for their livelihood; 80 percent making their living from fishing-related activities.



The community entered into a Payment for Ecosystem Services (PES) agreement with Edinburgh organization Plan Vivo, which manages the credit, and research on carbon storage potential was conducted over 5 years (Abdalla et al., 2014). The price of these credits ranged from US\$6.50 to \$10 for 2013–2014. The credits can be bought by any public or private entity. The annual sale of carbon credits to date after factoring in a risk buffer of 30 percent has been US\$12,500.⁹⁰

Revenues from the sale of credits has gone to project implementation (one full-time staff member) and to community development projects (it funded a school construction project, the purchase of books, and the installation of water pumps). The local community has further benefited from diversifying sources of mangrove-related income, such as beekeeping and ecotourism related to “Gazi Bay Boardwalk” (ibid).

Specialist offset-certification companies [Plan Vivo](#) and [Verra](#) sell these credits on the voluntary carbon market, with prices currently high as demand vastly outstrips supply. Mangrove projects have so far been the focus of blue carbon projects. They are the most understood of the three BCEs, both in terms of scientific understanding of the carbon flows and of the operation of carbon projects for their restoration.

Compliance Market versus Voluntary Market

Carbon credits are verified by a certain standard, which includes accounting, monitoring, verification, and certification standards, and registration and enforcement systems (Figure 14). The credits are then sold on either the compliance market or the voluntary market. The credits verified under the compliance market can be sold on the voluntary market, but not vice versa.⁹¹ The United Nations Framework Convention on Climate Change (UNFCCC) mechanisms that use the carbon market, such as Reducing Emissions from Deforestation and Forest Degradation (REDD+) or the Clean Development Mechanism (CDM), fall under the compliance market. CDM is a mechanism through which developed countries, under the Kyoto Protocol, can implement development projects in developing countries, and receive carbon offset credits for those projects. REDD+ runs similarly to CDM but focuses more on the land-use sector and reducing emissions from land-use change.

Case Study: Iberostar – Mangrove Restoration and Carbon Credits

Global resort chain Iberostar announced in October 2020 their strategy to offset their carbon footprint by protecting and restoring nature in destinations where the companies’ resorts and hotels are operating. The company plans to achieve carbon neutrality by 2030 in line with the Science Based Targets Initiative Business Ambition for 1.5°C, increasing energetic efficiency and sourcing increasing renewables. Instead of focusing on traditional carbon credits, Iberostar plans to reinvest in their destinations by focusing on the protection and restoration of mangroves and other seascape ecosystems. In line with Iberostar’s current carbon footprint, that represents up to 1,400 hectares of mangroves protected per year, with a fifth of that portfolio located in the Riviera Maya in Mexico—one of the world’s largest remaining and highly threatened mangrove ecosystems. Iberostar sees this as a critical step towards recovery from the COVID-19 pandemic to build more climate resilience.

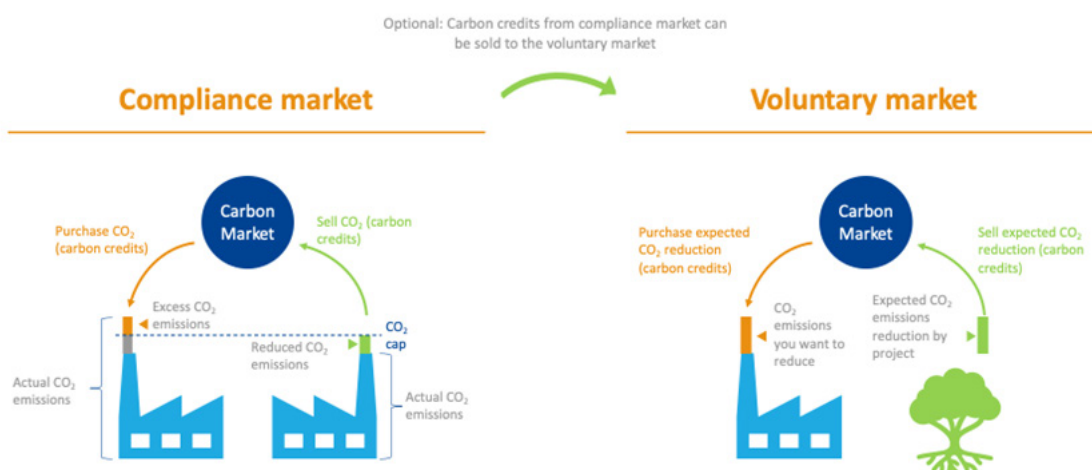


Figure 14: Compliance vs. Voluntary Carbon Market

Alternatively, a blue carbon project could be financed by carbon credits sold on the voluntary market, using methodologies such as Plan Vivo or the Verified Carbon Standard (VCS). These methodologies have proven much simpler to implement due to the diversity and flexibility of different voluntary standards, as well as the lower costs of the required carbon accounting

verification and certification. The costs associated with submitting a voluntary carbon market are lower than complying with one of the UNFCCC mechanisms, which require working directly with and through national governments' processes in developing countries as well as within UNFCCC.⁹⁰ Additionally, UNFCCC projects may have a minimum threshold that is difficult for small coastal projects to reach due to the rigorous requirements needed to achieve a compliance standard. For example, a project under CDM must sell about 5,000 metric tons of carbon to justify the transaction costs,⁹¹ and the successful community-led blue carbon project in Kenya (see case study) only sells 2215 credits (each equal to one metric ton of carbon) per year.⁹⁰

Way forward for the Maldives

BCEs of the Maldives present the country with a cost-effective NbS solution with co-benefits of adaptation and mitigation. IPCC's standard methods can be used for measuring carbon to quantify the carbon stored in coastal blue carbon ecosystems. Therefore, inventorying these habitats can be the first step in measuring existing carbon stocks and advancing restoration of these ecosystems to increase sequestration, which in turn would allow the Maldives to meet its net zero emissions target and climate adaptation goals. Some initial steps on the way forward include:

1. **Establishing an inventory of BCEs in the Maldives.** Efforts by NGOs such as the Maldives Underwater Initiative to map seagrass meadows are ongoing. These efforts could be supported by the government, businesses, or private sector to widen its scope and scale, especially through local councils and communities (Figure 15). At the same time, a comprehensive mangroves database needs to be established. Citizen science is a cost-effective and participatory approach to help achieve this target (as explored in the next section).
2. **Targeted Research.** Following the completion of BCE inventories, research needs to focus to conduct an extensive assessment to quantify the carbon content held within the Maldives' mangroves and seagrass ecosystems. It is important to engage with regional and international partners; Seychelles is currently undertaking mapping exercises from which the Maldives can learn.
3. **Building local capacity and engaging stakeholders at all levels.** Undertake actions around outreach and education with local communities to build both understanding and practical programs of activities to promote the concept of blue carbon and manage the BCEs. Valuation of BCEs can provide a good basis for convincing local communities about the ecological and economic value of BCEs, as well as about the consequences of their loss. The traditional knowledge of local communities is fundamental to fully understand BCEs, and the backing of communities is important to the long-term effectiveness of interventions.

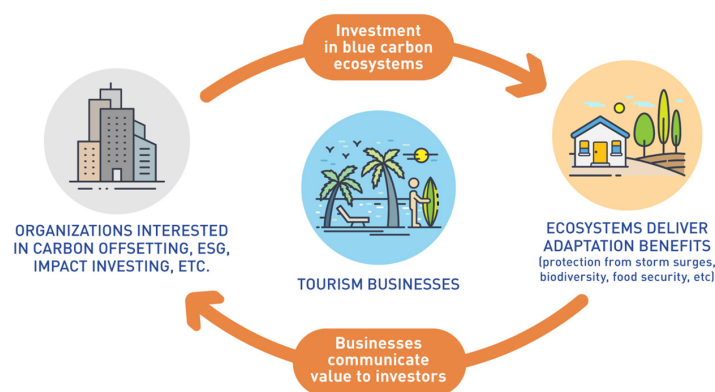


Figure 15: Role of tourism businesses in facilitating investment in nature

CONCLUSION

The Maldives is one of the countries most vulnerable to the impacts of climate change: rising sea levels, mass coral reef bleaching, coastal erosion, and food and water shortages are all likely to be locally exacerbated by global emissions in the coming years. While the Maldives has contributed little to the global problem of climate change, it hosts a wealth of potential solutions. The tourism industry in particular is well poised to spur innovation in climate adaptation, as the many case studies and examples in this Action Plan have shown.

The Five Strategic Objectives outlined in this report—including incorporating community experiences, protecting destination assets, regenerating nature, diversifying business models, and aligning with global initiatives—were informed by consultations with over 60 tourism businesses across the Maldives to understand what challenges they are facing with regard to climate adaptation, and what innovations and adaptation pathways already exist that could be scaled more effectively. These objectives focus on every aspect of adaptation, from social responsibility to environmental stewardship to economic resilience. While not a prescription for every business, each with unique challenges, these strategies are designed to be a guide and spark for businesses seeking solutions.

The Ten Business Climate Action Investments are designed to support the Five Strategic Objectives in multiple ways, while also giving tourism businesses an accessible menu of adaptation options from which to select the one that is best suited to their needs. The Maldives Climate Smart Tourism Program goes further, presenting the co-financing and technical support available to businesses interested in investing in these solutions. Businesses are encouraged to express their interest in these solutions via the Maldives Climate Smart Tourism Program.

Businesses are encouraged to actively share their experiences adapting to climate change and implementing these objectives and investments, and these efforts will be promoted to national and international audiences as leading examples in climate adaptation. The launch of the Action Plan and Maldives Climate Smart Tourism Program will be followed by further engagement with the tourism sector over the coming year.

Despite the many climate-induced challenges the Maldives will face in the coming decades, the innovation happening today—in the tourism sector of the Maldives and around the world—is a source of hope and inspiration for the future. The Maldives can become a beacon of climate leadership for other island countries and developing economies to demonstrate that adaptation is possible. May tourism businesses and entrepreneurs continue to lead the way.

ANNEX I – REPORT METHODOLOGY

The primary authors of this report interviewed and surveyed over 65 individuals representing organizations ranging from tourism businesses to NGOs to government agencies, including four site visits to Fuvahmulah, Baa Goidhoo, two islands in Laamu Atoll, and Kaafu Huraa. Surveys and interviews were conducted between February 1 and October 15, 2022, and included tourist resorts, guest houses, hotels, and NGOs.

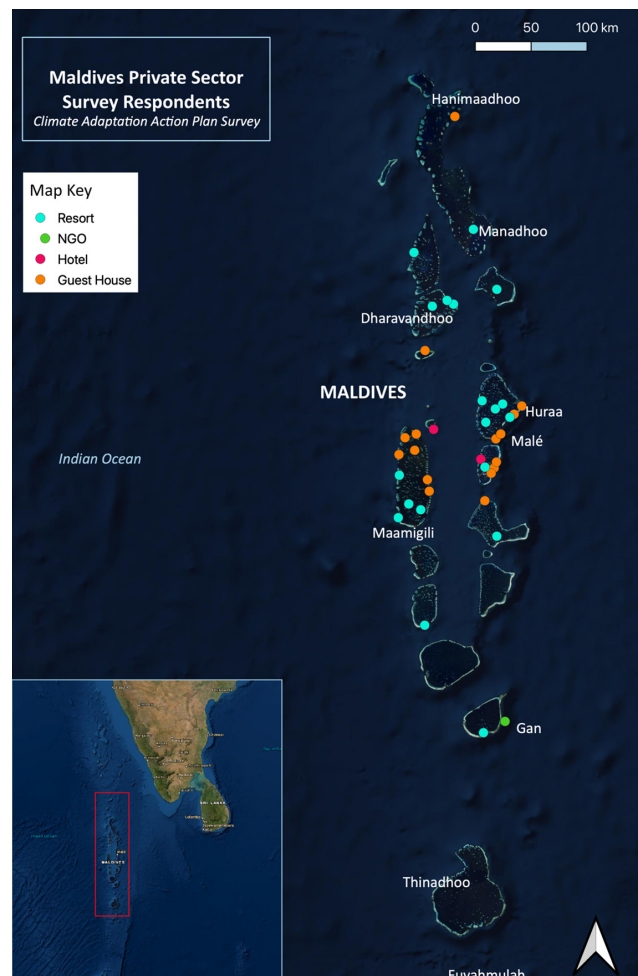
Survey and interview respondents were selected using purposive and snowball sampling methods. Initially, a list of tourism businesses in the Maldives was created, with contact information for relevant organizations; this list endeavored towards an even location distribution across the Maldives, with at businesses represented at reach atoll. An online questionnaire and request for interviews was sent to over 220 tourism businesses included in this final list. A total of 52 businesses responded to the online survey, with a further 13 opting for interviews, representing a 29.5 percent total response rate.

The survey sought to expand upon the Baseline Analysis conducted by the project Increasing Climate Change Resilience of Maldives through Adaptation in the Tourism Sector (TAP) in 2014, which surveyed a total of 27 tourism operators. This survey sought specifically to assess:

- Level of awareness and understanding of climate change and its impacts among businesses and host communities;
- Climate change-induced impacts experienced by businesses;
- Level of effort input into adaptation by businesses thus far;
- Potential and desire for private sector investment in innovative climate adaptation solutions;
- Current engagement with nature-based solutions as a potential avenue for climate adaptation; and
- Needs and priorities of businesses to effectively adapt to climate change and increase business and destination resilience.

A mixed-methods approach was adopted to present a narrative review of findings following statistical and thematic analysis of data, with close-ended survey responses analyzed in Excel and thematic analysis employed for interviews, and open-ended questions to understand emerging trends, challenges, and opportunities for businesses regarding climate adaptation.⁹² The most important challenges facing businesses and ranked priorities for climate adaptation directly informed the Strategic Objectives and Actions in this Action Plan.

The survey results are discussed more in detail in a separate document available online [here](#).



Location of Surveyed Businesses in the Maldives

ANNEX II – ADVISORY COMMITTEE AND CONSULTATION PROCESS

The Climate Adaptation Action Plan for the Tourism Sector in the Maldives has been generously supported by numerous organizations a range of backgrounds that served as Advisory Committee members to inform the evolution and creation of this Action Plan. Many others have contributed to this visionary document, and we are grateful for their input, including the more than sixty (60) private sector operators who provided input and feedback to our Climate Adaptation Survey, informing the basis of this plan. These actors took the opportunity to shape sustainability in the tourism sector at the highest levels of government, having their voices heard in influencing positive progress in the sector. We are especially grateful to the Advisory Committee Members listed below:

Organization
USAID Climate Adaptation Project
Maldives Coral Institute
Six Senses
Maldives Marine Research Institute
Soneva Fushi
Soneva Namoonaa
Maldives Resilient Reefs
Blue Marine Foundation
Laamu Atoll Guest House
Maldives Underwater Initiative
Island Zephyr Guest House Baa Goidhoo
TW Corp
Noo Raajje Maldives
Ministry of Tourism
Maldives Marketing & PR Corporation (MMPRC)

We are also grateful to the additional agencies and individuals that provided further feedback through in-person consultation processes in December 2022:

Organization
Maldives Association for Tourism Industry (MATI)
Guesthouse Association of Maldives (GAM)
Environmental Protection Agency (EPA)
Ministry of Environment, Climate Change and Technology
National Disaster Management Authority (NDMA)
National Boating Association of Maldives (NBAM)

ANNEX III – MALDIVES NATIONAL ADAPTATION ACTIONS AND COMMITMENTS

In addition to consultations with private and public sector stakeholders, the writing of this report began with detailed research into all relevant national adaptation actions and commitments in the Maldives that pertain to tourism. While references to these are made throughout the report, this Annex highlights all relevant national laws and strategies that informed the creation of the Action Plan. Below is a table of the major government commitments, laws, and regulations; a narrative section follows describing some of these and their relevance to tourism in detail:

Acts	Associated Regulations	Policy/Strategy/Plan
Environment Protection and Preservation Act (4/1993)	<ul style="list-style-type: none"> • Environmental Impact Assessment Regulation (2012) • Regulation on Cutting, Uprooting, Removing and Transfer of Palms and Trees between Islands • Regulation for Determination of Penalties and Obtaining Compensation for Damages Caused to the Environment (2011) • Regulation Governing Reclamation and Dredging of Islands and Lagoons of Maldives (2013) • Regulation for the Protection and Preservation of Areas Surrounding Baa Atoll Hanifaru Island (2012) • Regulation for Protection and Preservation of Island Vegetation and Flora in the Maldives (2022) • Protected Species Regulation (2021) • Protected Areas Regulation (2018) 	Strategic Action Plan 2019–2023 National Resilience and Recovery Plan 2019–2023 Maldives Climate Change Policy Framework, 2015 National Adaptation Action Plan (NAPA) 2007 Maldives National Determined Contributions Global Climate Facility (GCF) Pipeline
Maldives Tourism Act (2/1999)	<ul style="list-style-type: none"> • Regulation on the Protection and Conservation of Environment in the Tourism Industry (2006) • Guest House Regulation (2009) • Tourist Hotel Regulation (2013) • Regulation for Determining the Lagoon Boundary for Islands Leased for the Development of Tourist Resorts, Tourist Hotels, Tourist Guesthouses and Yacht Harbours (2012) • Regulation on the Development of Integrated Tourist Resorts (2021) • Regulation on the Development of Private Islands (2021) • Regulation on Safety and Security Standards at Tourist Establishments (2015) • Maldives Recreational Diving Regulation (2003) • Yacht Marina Regulation (2005) 	Fifth Tourism Master Plan (Draft)
Climate Emergency Act (9/2021)		

The key legal instrument for environmental governance in the Maldives is the Environmental Protection and Preservation Act (4/1993). The EPPA provides an overarching framework for environmental regulations relating to protected areas and natural reserves; environmental impact assessment regulations; waste disposal, including hazardous such as oil, paints and medical waste; penalties for breaching the law and damaging the environment; and compensation claims for environmental damage. There have since been three amendments to this law: 1) in 2014, with details of what constitutes protected environment added; 2) in 2021, with the addition of single-use plastic issues; and 3) in 2021, with the decentralization of environmental protection introduced.

The Maldives Tourism Act (2/1999), with its 11 amendments, is the main law governing the operation of the tourism industry in the Maldives. Development and operational controls for the tourism sector from an environmental and conservation perspective, particularly for tourist resorts, are primarily defined in two regulations: Regulation on the Protection and Conservation of Environment in the Tourism Industry (2006) by the Ministry of Tourism and Environmental Impact Assessment Regulation (2012) by the Environment Protection Agency (EPA). The former was introduced based on the Maldives Tourism Act (2/99) and provides guidelines for planning, construction, and operation of tourist facilities in a sustainable manner. The EIA Regulation provides specific controls for high-impact developments through mandatory impact mitigation measures. It also provides a framework for undertaking and submitting environmental monitoring throughout the project life cycle.

Several other regulations have also been introduced to reduce and mitigate significant environmental impacts from tourism-related development activities (see Table above). Some of them include:

- Level of awareness and understanding of climate change and its impacts among businesses and host communities;
- Climate change-induced impacts experienced by businesses;
- Level of effort input into adaptation by businesses thus far;
- Potential and desire for private sector investment in innovative climate adaptation solutions;
- Current engagement with nature-based solutions as a potential avenue for climate adaptation; and
- Needs and priorities of businesses to effectively adapt to climate change and increase business and destination resilience.

The Strategic Action Plan (SAP)⁷ 2019–2023, launched in October 2019, is the central policy and planning document of the government of Maldives. The SAP consolidates the current government's manifesto pledges with existing sectoral priorities and serves as the main implementation and monitoring tool to track progress of the delivery of the Government's policies and development priorities. It sets out holistic strategy and programs for an inclusive and sustainable economy, articulating five priority areas in 33 subsectors with time-bound prioritization of actions and measurable targets. The priority area directly related to tourism is the Blue Economy, focusing on expansion and diversification of existing tourism products, including integrating eco-tourism into existing and upcoming products. A key priority of this subsector also involves expansion of the emerging guesthouse tourism sector in the Maldives and increasing the benefits of tourism for locals through increased partnerships between hotels and local communities.

The priority area *Jazeera Dhiriulhun* has crosscutting subsectors with the tourism sector as well. For example, the Environmental Protection and Preservation subsector addresses issues of natural resource management and pollution,⁷ and Clean Energy subsector focuses on the reversal of the Maldives' dependence on imported fuel and investment in renewable energy.⁷ The Waste as a Resource subsector includes the Government's strategy for dealing with waste management in the country and establishing waste management centers.⁷ Recently, a regulation was introduced that will ban the open-ocean dumping of food waste by resorts by the end of 2022.

The National Resilience and Recovery Plan 2019–2023 (NRRP) was launched in 2021 as a way forward to recover from the economic downturn following the COVID-19 pandemic. The time line of the development projects outlined in the SAP was revised and some projects were reprioritized in the NRRP. One of the key focus areas under the economic sector includes investing in tourism sector growth and sustainability.

Key documents in the Maldives, such as the National Adaptation Programme of Action (NAPA) (2007), Second National Communication of Maldives to the United Nations Framework Convention on Climate Change (2016), and National Determined Contributions (NDCs) (2021), inform the basis of climate adaptation policy in the country. In outlining adaptation strategies for the tourism sector, the Second National Communication of Maldives states that “High priority is given on building resilience of the sector and services including supporting community-based adaptation projects in local communities, investing in climate-proofing operational infrastructures in tourist operators and contributing to conservation and protection of the bio-diversity.”⁶⁸

Under the UNFCCC, the Maldives Nationally Determined Contribution emphasizes the realization of a Blue Economy that promotes sustainable economic growth while safeguarding the oceans by banning single-use plastic and protecting at least one island, one reef, and one wetland from each atoll. The NDC emphasizes the overall country commitment towards achieving resilient development through ongoing initiatives such as the Climate Smart Resilient Island Initiative, launched by President H.E Ibrahim Mohamed Solih at the U.N. Climate Action Summit in 2019. This Action Plan seeks to align with these initiatives, including the introduction of the Maldives Climate Smart Tourism Program, to increase tourism business participation in adaptation and resilience initiatives.

At the national level, current policies and development strategies are gradually being integrated into all sectors of development. The comprehensive Maldives Climate Change Policy Framework (MCCPF), which sets forth five broad policy goals, was developed in 2015. Institutionally, the government seeks to mainstream climate change and sustainable development across sectors and to implement the MCCPF holistically.⁹³

The newly enacted Climate Emergency Act establishes the legal and Institutional framework and guidelines for addressing climate change in the Maldives; the Act also includes actions to address the climate emergency resulting from the severity of the impacts from climate change. The Act includes a framework for the Maldives’ target to achieve net-zero carbon emissions by 2030. Another key pledge alongside net-zero policy is to phase out single-use plastic by 2023.

The Maldives also works with several international donors and financiers on projects that directly concern climate change adaptation and mitigation. The first Biennial Update Report (BUR) of the Maldives to the UNFCCC estimates that approximately 30 percent of the donor finance received was allocated towards adaptation, while 59 percent went towards mitigation efforts from the donor-funded climate support for the period 2014–2017. Overall, 35 percent of the financing of climate change related actions and investments stem from the national budget of the Maldives. The annual climate finance attribution corresponds to about 2.4 percent of GDP (US\$4.6 billion in 2017) and the direct national budget allocations correspond to 0.8 percent of Maldives’ GDP in 2017 (MoE, 2019).

REFERENCES

1. Woodworth, P. L. (2005). Have there been large recent sea level changes in the Maldive Islands? *Global and Planetary Change* 49(1–2), 1–18. <https://doi.org/10.1016/j.gloplacha.2005.04.001>
2. Tol, R. S. J. (2007). The double trade-off between adaptation and mitigation for sea level rise: an application of FUND. *Mitigation and Adaptation Strategies for Global Change*, 12, 741–753. <https://doi.org/10.1007/s11027-007-9097-2>
3. Moosa, L., Saeed, S., Shiham Adam, M., Naseer, A., Moosa, S., & Shaig, A. (2007). *Maldives national adaptation programme*. Ministry of Environment, Energy and Water, Republic of Maldives. <https://unfccc.int/resource/docs/napa/mdv01.pdf>
4. PwC. (2022). Republic of Maldives. *Worldwide Tax Summaries Online*. <https://taxsummaries.pwc.com/republic-of-maldives>
5. National Bureau of Statistics Maldives. (2019). *Employment in Tourist Resorts*. <http://statisticsmaldives.gov.mv/nbs/wp-content/uploads/2020/06/Resort-Employee-Survey-2019-1.pdf>
6. Intergovernmental Panel on Climate Change. (2022). *Climate change 2022: Impacts, adaptation and vulnerability. Contribution of working group II to the sixth assessment report of the Intergovernmental Panel on Climate Change*. <https://www.ipcc.ch/report/ar6/wg2/>
7. Government of Maldives. (2019). *Maldivian Strategic Action Plan 2019–2023*, p. 444. <https://presidency.gov.mv/SAP/>
8. United Nations Environment Programme. (2008). *Adaptation and mitigation in the tourism sector: Frameworks, tools and practices*. <https://wedocs.unep.org/handle/20.500.11822/9681>
9. Shaig, A. (2015). *Survey of climate change adaptation measures in Maldives: Integrating climate change risks into resilient island planning in the Maldives Project*. Ministry of Housing and Environment and United Nations Development Programme. <https://www.undp.org/maldives/publications/survey-climate-change-adaptation-measures-maldives>
10. Shareef, A., Waheed, A., Ali, A., Aishath, L., Mohamed, M., Asif, M., Khaleel, Z., Riyaza, F. (2015). Baseline analysis of adaptation capacity and climate change vulnerability impacts in the tourism sector. Ministry of Tourism Maldives. <https://archive.tourism.gov.mv/downloads/publications/Baseline.pdf>
11. Scholer, M. & Schuermans, P. (2022). *Climate change adaptation in insurance*. Springer Climate (Springer International Publishing). https://link.springer.com/chapter/10.1007/978-3-030-86211-4_22
12. Cook, S. J., & Holliday, S. C. (2022). *Insuring nature's survival: The role of insurance in meeting the financial need to preserve biodiversity* (English). The World Bank Group. <http://documents.worldbank.org/curated/en/099850304272234140/IDU02b17904f04af504b8f087f708041ff6d79d4>
13. World Travel & Tourism Council. (2022). *Nature positive travel & tourism: Travelling in harmony with nature*. <https://wtcc.org/Portals/0/Documents/Reports/2022/Nature-Positive-Travel-And-Tourism.pdf>

14. Westmacott, S. & Rijsberman, F. (2000). Cost-effectiveness analysis of coral reef management and protection: A case study of the Republic of the Maldives. *Integr. Coast. Zo. Manag. Coral Reefs Decis. Support Model.* 67–81.
15. United Nations Environment Programme. (2021). Emissions gap report 21. <https://www.unep.org/resources/emissions-gap-report-2021>
16. United Nations Environment Programme & International Union for the Conservation of Nature. (2021). Nature-based solutions for climate change mitigation. <https://www.unep.org/resources/report/nature-based-solutions-climate-change-mitigation>
17. United Nations Environment Programme. (2021). State of finance for nature. <https://www.unep.org/resources/state-finance-nature-2021>
18. Sibanda, C., Chiang, K., Ogallah, S., & Jattansingh, S. (2021). Accelerating financing for nature-based solutions to support action across the Rio Conventions. Commonwealth Secretariat Discussion Paper 28. <https://doi.org/10.14217/ComSec.942>
19. Linking Tourism & Conservation. Why LT&C? – Linking tourism & conservation. <https://www.ltandc.org/why-ltc/>
20. Moraes, R. P. L., Reguero, B. G., Mazarrasa, I., Ricker, M., & Juanes, J. A. (2022). Nature-based solutions in coastal and estuarine areas of Europe. *Frontiers in Environmental Science*, 10, 829526. <https://doi.org/10.3389/fenvs.2022.829526>
21. Kumar, P., Debele, S. E., Sahani, J., Aragão, L., Barisani, F., Basu, B., Bucchignani, E., Charizopoulos, N., Di Sabatino, S., Domeneghetti, A., Edo, A. S., Finér, L., Gallotti, G., Juch, S., Leo, L. S., Loupis, M., Mickovski, S. B., Panga, D., Pavlova, I., Pilla, F., ... Zieher, T. (2020). Towards an operationalisation of nature-based solutions for natural hazards. *The Science of the total environment*, 731, 138855. <https://doi.org/10.1016/j.scitotenv.2020.138855>
22. Morris, R. L., Konlechner, T. M., Ghisalberti, M., & Swearer, S. E. (2018). From grey to green: Efficacy of eco-engineering solutions for nature-based coastal defence. *Global Change Biology*, 24(5), 1827–1842. <https://doi.org/10.1111/gcb.14063>
23. Duvat, V. K. E. & Magnan, A. K. (2019). Contrasting potential for nature-based solutions to enhance coastal protection services in atoll islands. In C. Klöck & M. Fink (Eds.), *Dealing with climate change on small islands: Toward effective and sustainable adaptation* (pp. 45–75). University of Göttingen Press. <https://doi.org/10.17875/gup2019-1211>
24. Seddon, N., Sengupta, S., Hauler, I. & Rizvi, A. R. (2019). Nature-based solutions in nationally determined contributions: Synthesis and recommendations for enhancing climate ambition and action by 2020. IUCN. <https://portals.iucn.org/library/node/48525>
25. Kooijman, E. D., McQuaid, S., Rhodes, M. L., Collier, M. J., & Pilla, F. (2021). Innovating with nature: From nature-based solutions to nature-based enterprises. *Sustainability*, 13, 1–17. <https://doi.org/10.3390/su13031263>
26. McQuaid, S., Kooijman, E., Rizzi, D., Andersson, T., Schanté, J. (2022). The vital role of nature-based solutions in a nature positive economy. European Commission, Directorate-General for Research and Innovation. <https://data.europa.eu/doi/10.2777/307761>

27. Chakraborty, S., Gasparatos, A., & Blasiak, R. (2020). Multiple values for the management and sustainable use of coastal and marine ecosystem services. *Ecosystem Services*, 41(6). <https://doi.org/10.1016/j.ecoser.2019.101047>
28. Barkdull, J. & Harris, P. G. (2019). Emerging responses to global climate change: ecosystem-based adaptation. *Global Change, Peace & Security*, 31(1), 19–37. <https://doi.org/10.1080/14781158.2018.1475349>
29. Potts, T., Burdon, D., Jackson, E.L., Atkins, J.P., Saunders, J.E., Hastings, E.M., & Langmead, O. (2014). Do marine protected areas deliver flows of ecosystem services to support human welfare? *Marine Policy*, 44, 139–148. <https://doi.org/10.1016/j.marpol.2013.08.011>
30. Garcia Rodrigues, J., Conides, A., Rivero Rodriguez, S., Raicevich, S., Pita, P., Kleisner, K., ... Villasante, S. (2017). Marine and coastal cultural ecosystem services: Knowledge gaps and research priorities. *One Ecosystem*, 2. <https://doi.org/10.3897/oneeco.2.e12290>
31. McQuaid, S., Rhodes, M.L., Andersson, T., Croci, E., Feichtinger-Hofer, M., Grosjean, M., Lueck, A. E., Kooijman, E., Lucchitta, B., Rizzi, D., Reil, A., & Schanté, J. (2021). From nature-based solutions to the nature-based economy. White paper for consultation. Network Nature. <https://networknature.eu/sites/default/files/images/NBE%20White%20Paper%20final%20.pdf>
32. Ling, S. D. & Johnson, C. R. (2012). Marine reserves reduce risk of climate-driven phase shift by reinstating size- and habitat-specific trophic interactions. *Ecological applications* :A publication of the Ecological Society of America, 22(4), 1232–1245. <https://doi.org/10.1890/11-1587.1>
33. Smith, M. K. S., Smit, I. P. J., Swemmer, L. K., Mokhatla, M. M., Freitag, S., Roux, D. J., & Dziba, L. (2021). Sustainability of protected areas: Vulnerabilities and opportunities as revealed by COVID-19 in a national park management agency. *Biological Conservation*, 255, 108985. <https://doi.org/10.1016/j.biocon.2021.108985>
34. Folke, C., Carpenter, S., Walker, B., Scheffer, M., Elmqvist, T., Gunderson, L., & Holling, C. S. (2004). Regime shifts, resilience, and biodiversity in ecosystem management. *Annual Review of Ecology, Evolution, and Systematics*, 35(1), 557–581. <https://doi.org/10.1146/annurev.ecolsys.35.021103.105711>
35. Adger, W. N. (2000). Social and ecological resilience: are they related? *Progress in Human Geography*, 24(3), 347–364. <https://doi.org/10.1191/030913200701540465>
36. Oliver, T. H., Heard, M. S., Isaac, N. J. B., Roy, D. B., Procter, D., Eigenbrod, F., Freckleton, R., Hector, A., Orme, C. D. L., Petchey, O. L., Proença, V., Raffaelli, D., Suttle, K. B., Mace, G. M., Martín-López, B., Woodcock, B.A., & Bullock, J. M. (2015). Biodiversity and resilience of ecosystem functions. *Trends in ecology & evolution*, 30(11), 673–684. <https://doi.org/10.1016/j.tree.2015.08.009>
37. Cave, J. & Dredge, D. (2020). Regenerative tourism needs diverse economic practices. *Tourism Geographies*, 22, 503–513. <https://doi.org/10.1080/14616688.2020.1768434>
38. Biggs, R., Schlüter, M., Biggs, D., Bohensky, E., BurnSilver, S.B., Cundill, G., Dakos, V., Daw, T.M., Evans, L., Kotschy, K., Leitch, A.M., Meek, C.L., Quinlan, A., Raudsepp-Hearne, C., Robards, M.D., Schoon, M.L., Schultz, L., & West, P.C. (2012). Toward principles for enhancing the resilience of ecosystem services. *Annual Review of Environment and Resources*, 37, 421–448. <https://doi.org/10.1146/annurev-environ-051211-123836>

39. Deloitte Global. (2018). Connecting for a resilient world. https://www2.deloitte.com/global/en/pages/about-deloitte/articles/connecting-for-a-resilient-world.html?icid=wn_#path-to-resilience
40. White, N. (2020, September 28). Four ways DEI can help manage business risk. Entrepreneur. <https://www.entrepreneur.com/growing-a-business/4-ways-dei-can-help-manage-business-risk/356203>
41. Hill, E. (2017). Rethinking diversity, equity and inclusion as a value proposition. WS Social Impact. <https://impact.webershandwick.com/rethinking-diversity-equity-and-inclusion-as-a-value-proposition-701bfca89973>
42. Bardouille, P. & Wilkinson, E. (2020, October 23). Opinion: To finance resilience in small states, governments and development partners must take some risks. Devex. <https://www.devex.com/news/opinion-to-finance-resilience-in-small-states-governments-and-development-partners-must-take-some-risks-98343>
43. Credit Suisse. (2020). Investors and the blue economy. <https://www.credit-suisse.com/media/assets/microsite-ux/docs/2021/decarbonizingyourportfolio/investors-and-the-blue-economy-en.pdf>
44. United Nations World Tourism Organization. (2021). Glasgow declaration on climate action in tourism. <https://www.unwto.org/the-glasgow-declaration-on-climate-action-in-tourism>
45. Small, C. & Nicholls, R. J. (2003). A global analysis of human settlement in coastal zones. *Journal of Coastal Research* 19, 584–599.
46. Intergovernmental Panel on Climate Change. (2022). Impacts of 1.5°C Global Warming on Natural and Human Systems. In *Global Warming of 1.5°C: IPCC Special Report on Impacts of Global Warming of 1.5°C above Pre-industrial Levels in Context of Strengthening Response to Climate Change, Sustainable Development, and Efforts to Eradicate Poverty* (pp. 175-312). Cambridge University Press. <https://doi.org/10.1017/9781009157940.005>
47. Short, F.T. & Wyllie-Echeverria, S. (1996). Natural and human-induced disturbance of seagrasses. *Environmental Conservation*, 23(1), 17–27. <https://doi.org/10.1017/S0376892900038212>
48. Waycott, M., Duarte, C. M., Carruthers, T. J., Orth, R. J., Dennison, W. C., Olyarnik, S., Calladine, A., Fourqurean, J.W., Heck, K. L., Jr, Hughes, A. R., Kendrick, G.A., Kenworthy, W. J., Short, F.T., & Williams, S. L. (2009). Accelerating loss of seagrasses across the globe threatens coastal ecosystems. *Proceedings of the National Academy of Sciences of the United States of America*, 106(30), 12377–12381. <https://doi.org/10.1073/pnas.0905620106>
49. United Nations Environment Programme. (2020, August 20). Opportunities and challenges for community-based seagrass conservation. <https://www.unep.org/resources/report/opportunities-and-challenges-community-based-seagrass-conservation>
50. Unsworth, R. K. F., Nordlund, L. M., & Cullen-Unsworth, L. C. (2019). Seagrass meadows support global fisheries production. *Conservation Letters*, 12, 1–8. <https://doi.org/10.1111/conl.12566>
51. Lamb, J. B., van de Water, J.A., Bourne, D. G., Altier, C., Hein, M.Y., Fiorenza, E.A., Abu, N., Jompa, J., & Harvell, C. D. (2017). Seagrass ecosystems reduce exposure to bacterial pathogens of humans, fishes, and invertebrates. *Science*, 355(6326), 731–733. <https://doi.org/10.1126/science.aal1956>

52. Fonseca, M. S., & Cahalan, J.A. (1992). A preliminary evaluation of wave attenuation by four species of seagrass. *Estuarine Coastal and Shelf Science*, 35, 565–576. [https://doi.org/10.1016/S0272-7714\(05\)80039-3](https://doi.org/10.1016/S0272-7714(05)80039-3)
53. Christianen, M. J. A., van Belzen, J., Herman, P. M. J., van Katwijk, M. M., Lamers, L. P. M., van Leent, P. J. M., Bouma, T. J. (2013) Low-canopy seagrass beds still provide important coastal protection services. *PLoS ONE* 8(5): e62413. <https://doi.org/10.1371/journal.pone.0062413>
54. Bayraktarov, E., Saunders, M. I., Abdullah, S., Mills, M., Beher, J., Possingham, H. P., Mumby, P. J., & Lovelock, C. E. (2016). The cost and feasibility of marine coastal restoration. *Ecological Applications*, 26, 1055–1074. <https://doi.org/10.1890/15-1077>
55. Hosterman, H. & Smith, J. (2015). Economic costs and benefits of climate change impacts and adaptation to the Maldives tourism industry. Ministry of Tourism Maldives. <https://archive.tourism.gov.mv/downloads/publications/Economic.pdf>
56. Spalding, M. D. & Leal, M. (Eds). (2021). The State of the World's Mangroves 2021. Global Mangrove Alliance. <https://www.mangrovealliance.org/wp-content/uploads/2021/07/The-State-of-the-Worlds-Mangroves-2021-FINAL.pdf>
57. Saleem, A. & Nileysha, A. (2003). Characteristics, status and need for conservation of mangrove ecosystems in the Republic of Maldives, Indian Ocean. *Journal of the National Science Foundation of Sri Lanka*, 31, 201. <https://doi.org/10.4038/jnsfsv31i1-2.3033>
58. Dhunya, A., Huang, Q., & Aslam, A. (2017). Coastal habitats of Maldives: Status, trends, threats, and potential conservation strategies. *International Journal of Scientific and Engineering Research*, 8(3), 47–62.
59. Zarate-Barrera, T. G. & Maldonado, J. H. (2015). Valuing blue carbon: Carbon sequestration benefits provided by the marine protected areas in Colombia. *PLoS ONE*, 10(5): e0126627. <https://doi.org/10.1371/journal.pone.0126627>
60. Quataert, E., Storlazzi, C., van Rooijen, A., Cheriton, O., & van Dongeren, A. (2015). The influence of coral reefs and climate change on wave-driven flooding of tropical coastlines. *Geophysical Research Letters*, 42(15), 6407–6415. <https://doi.org/10.1002/2015GL064861>
61. Hughes, T. P., Barnes, M. L., Bellwood, D. R., Cinner, J. E., Cumming, G. S., Jackson, J. B. C., Kleypas, J., van de Leemput, I. A., Lough, J. M., Morrison, T. H., Palumbi, S. R., van Nes, E. H., & Scheffer, M. (2017). Coral reefs in the Anthropocene. *Nature*, 546(7656), 82–90. <https://doi.org/10.1038/nature22901>
62. Bayraktarov, E., Stewart-Sinclair, P., Brisbane, S., Boström Einarsson, L., Saunders, M., Lovelock, C., Possingham, H., Mumby, P., & Wilson, K. (2019). Motivations, success, and cost of coral reef restoration. *Restoration Ecology*, 27(5), 981–991. <https://doi.org/10.1111/rec.12977>
63. Levy, G., Shaish, L., Haim, A., & Rinkevich, B. (2010). Mid-water rope nursery—Testing design and performance of a novel reef restoration instrument. *Ecological Engineering*, 36(4), 560–569. <https://doi.org/10.1016/j.ecoleng.2009.12.003>
64. Fisk, D. & Edwards, A. (2010). Managing risks in reef restoration projects. In A. J. Edwards (Ed.), *Reef Rehabilitation Manual* (pp. 29–47). Coral Reef Targeted Research & Capacity Building for Management Program.

65. World Bank & Asian Development Bank. (2021). Climate risk country profile: Maldives. <https://www.adb.org/sites/default/files/publication/672361/climate-risk-country-profile-maldives.pdf>
66. Linham, M. M. & Nicholls, R. J. (2010). Technologies for climate change adaptation: coastal erosion and flooding. UNEP Risø Centre on Energy, Climate and Sustainable Development. <https://www.osti.gov/etdeweb/servlets/purl/1010716>
67. United Nations Environment Programme. (2013). Climate Risk Management in Maldives. Bureau for Crisis Prevention and Recovery (BCPR), UNDP.
68. Minza, M., Shareef, A., Khaleel, Z., Husny, M. M., Niyaz, A. A., & Abdulla, A. (2016). Second national communication of Maldives to the United Nations Framework Convention on Climate Change. Ministry of Environment and Energy, Maldives. https://unfccc.int/sites/default/files/resource/MLV__2nd%20NC__13%20Oct%202016_0.pdf
69. World Bank. (2022, April 20). De-risking investments to build a green Maldives. World Bank. <https://www.worldbank.org/en/news/feature/2022/04/20/derisking-investments-to-build-a-green-maldives>
70. Hesley, D., Burdeno, D., Drury, C., Schopmeyer, S., & Lirman, D. (2017). Citizen science benefits coral reef restoration activities. *Journal for Nature Conservation*, 40, 94–99. <https://doi.org/10.1016/j.jnc.2017.09.001>
71. Shaig, A. (2007). Climate change vulnerability and adaptation assessment of the Maldives land and beaches. Centre for Disaster Studies, School of Tropical Environment Studies and Geography, James Cook University. <https://ndmc.gov.mv/docs/Maldives%20Land%20&%20Beaches.pdf>
72. Kellert, S. (2015, October 26). What is and is not biophilic design? *Metropolis*. <https://metropolismag.com/viewpoints/what-is-and-is-not-biophilic-design/>
73. Nextcity.nl. (2019). First guide for nature inclusive design.
74. United Nations Environment Programme. (2021). A practical guide to climate-resilient buildings & communities. <https://www.unep.org/resources/practical-guide-climate-resilient-buildings>
75. United Nations Environment Programme. (2021). Adaptation Gap Report 2021. <https://www.unep.org/resources/adaptation-gap-report-2021>
76. Buchner, B., Naran, B., Fernandes, P., Padmanabhi, R., Rosane, P., Solomon, M., Stout, S., Strinati, C., Tolentino, R., Wakaba, G., Zhu, Y., Meattle, C., & Guzmán, S. (2021). Global landscape of climate finance 2021. Climate Policy Initiative. <https://www.climatepolicyinitiative.org/publication/global-landscape-of-climate-finance-2021/>
77. Organisation for Economic Cooperation and Development. (2020). A comprehensive overview of global biodiversity finance. <https://www.oecd.org/environment/resources/biodiversity/report-a-comprehensive-overview-of-global-biodiversity-finance.pdf>
78. Duarte, C. M., Sintes, T., & Marbà, N. (2013). Assessing the CO₂ capture potential of seagrass restoration projects. *Journal of Applied Ecology*, 50(6), 1341–1349. <https://doi.org/10.1111/1365-2664.12155>

79. Mcleod, E., Chmura, G.L., Bouillon, S., Salm, R.V., Björk, M., Duarte, C. M., Lovelock, C. E., Schlesinger, W. H., & Silliman, B. R. (2011). A blueprint for blue carbon: toward an improved understanding of the role of vegetated coastal habitats in sequestering CO₂. *Frontiers in Ecology and the Environment*, 9(10), 552–560. <https://doi.org/10.1890/110004>
80. Vanderklift, M.A., Gorman, D., & Steven, A. D. L. (2019). Blue carbon in the Indian Ocean: A review and research agenda. *Journal of the Indian Ocean Region*, 15(2), 129–138. <https://doi.org/10.1080/19480881.2019.1625209>
81. Duarte, C. M., Middelburg, J. J., & Caraco, N. (2005). Major role of marine vegetation on the oceanic carbon cycle. *Biogeosciences* 2, 1–8. <https://doi.org/10.5194/bg-2-1-2005>
82. Bertram, C., Quaas, M., Reusch, T. B. H., Vafeidis, A. T., Wolff, C., & Rickels, W. (2021). The blue carbon wealth of nations. *Nature Climate Change*, 11(8), 704–709. <https://doi.org/10.1038/s41558-021-01089-4>
83. Quevedo, J. M. D., Uchiyama, Y., & Kohsaka, R. (2021). Linking blue carbon ecosystems with sustainable tourism: Dichotomy of urban–rural local perspectives from the Philippines. *Regional Studies in Marine Science*, 45(1), 101820. <https://doi.org/10.1016/j.rsma.2021.101820>
84. Herr, D. & Landis, E. (2014). Coastal blue carbon ecosystems: Opportunities for nationally determined contributions. Policy brief. International Union for the Conservation of Nature & The Nature Conservancy. <https://portals.iucn.org/library/sites/library/files/documents/Rep-2016-026-En.pdf>
85. Lotze, H. K., Lenihan, H. S., Bourque, B. J., Bradbury, R. H., Cooke, R. G., Kay, M. C., Kidwell, S. M., Kirby, M. X., Peterson, C. H., & Jackson, J. B. (2006). Depletion, degradation, and recovery potential of estuaries and coastal seas. *Science*, 312(5781), 1806–1809. <https://doi.org/10.1126/science.1128035>
86. Roe, P. (Head Biologist & Research Coordinator). (2020). Six Senses Laamu seagrass monitoring 2020. Maldives Underwater Initiative & Six Senses Laamu. https://static1.squarespace.com/static/5cd121afd7456285f1c0a9f9/t/5f657c5eea19332049bc8501/1600486520949/Six+Senses+Laamu+Seagrass+Monitoring+2020_+Website.pdf
87. Nurse, L., Mclean, R., Agard, J., Briguglio, L., Duvat, V., Pelesikoti, N., & Tompkins, E. (2014). Small islands. In *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Intergovernmental Panel on Climate Change. <https://www.ipcc.ch/report/ar5/wg2/>
88. Palacios M. M., Waryszak, P., Costa, M. D. P., Wartman, M., Ebrahim, A., & Macreadie, P. I. (2021). Literature review: Blue carbon research in the tropical Western Indian Ocean. A report submitted to the Seychelles Conservation & Climate Adaptation Trust (SeyCCAT). Deakin University, Australia. https://seycat.org/wp-content/uploads/2020/01/BlueCarbonLab_LitReport_Seychelles_20210301_final.pdf
89. Delgado-Gallego, J., Manglani, O., & Sayers, C. (2020). Innovative options for coastal blue carbon initiatives in small island developing states. Cornell University Global Climate Change Science and Policy Course Project with Elisabeth Haub School of Law at Pace University and Conservation International. https://cpb-us-e1.wpmucdn.com/blogs.cornell.edu/dist/1/7755/files/2020/12/AOSIS_CI-Policy-Report-Blue-Carbon_Final.pdf

90. Wylie, L., Sutton-Grier, A. E., & Moore, A. (2016). Keys to successful blue carbon projects: Lessons learned from global case studies. *Marine Policy* 65, 76–84. <https://doi.org/10.1016/j.marpol.2015.12.020>
91. Kollmuss, A., Zink, H., & Polycarp, C. (2008). Making sense of the voluntary carbon market: A comparison of carbon offset standards. Stockholm Environment Institute and Tricorona. https://www.global-carbonproject.org/global/pdf/WWF_2008_A%20comparison%20of%20C%20offset%20Standards.pdf
92. Schwandt, T. (1994). Constructivist, interpretivist approaches to human inquiry. In N. K. Denzin & Y. S. Lincoln, Eds., *Handbook of qualitative research* (pp. 118–137). Sage Publishing.
93. Abdulla, A., Waheed, A., Shareef, A., Husny, M. H., Asif, M., & Khaleel, Z. (2015). Maldives climate change policy framework. Ministry of Environment and Energy, Maldives. <http://www.environment.gov.mv/v2/wp-content/files/publications/20150810-pub-maldives-cc-policy-framework-final-10aug2015.pdf>