

# Coastal Wetlands and Mangroves: A Natural Climate Solution Pathway to Climate Change

*A joint submission to the Talanoa Dialogue by the Global Mangrove Alliance, founded by Conservation International, The Nature Conservancy, Wetlands International, World Wildlife Fund, and the International Union for Conservation of Nature, to build a global moment to jointly work towards the ambitious goal of increasing global mangrove cover by 20% in 2030.*

This submission builds on a previous Talanoa Dialogue joint submission focused on the potential for [Natural Climate Solutions](#) – including the protection, restoration and sustainable management of terrestrial and coastal ecosystems and landscapes such as forests, grasslands, agricultural lands and wetlands – for climate change mitigation and adaptation. Nature has an untapped mitigation potential that can offer up to 37 percent of the solution for keeping global temperatures increase to 2 degrees Celsius or below by 2030, making nature essential to achieving climate stability.<sup>1</sup> In addition, natural climate solutions provide essential social and environmental benefits, including clean air and water, sustainable food production, increased habitat for biodiversity, and increased resilience to the impacts of climate change.

This submission focuses on one pathway outlined in the Natural Climate Solutions submission: mangrove restoration and conservation. The recently published IPCC report “Global Warming of 1.5°C” is a reminder of the urgency we face and the climate impacts that can be avoided by limiting warming to 1.5 degrees instead of 2 degrees. This urgency demands that we use all of the tools at our disposal. Wetland pathways offer 14% of the mitigation potential from nature and 19% of low-cost natural climate solutions.<sup>2</sup> In light of the inclusive, participatory and transparent approach of the Talanoa Dialogue, this submission reflects on the science and economics of natural climate solutions, with an emphasis on mangroves, to further emphasize the mitigation potential of nature in answering all three of the questions in the Talanoa Dialogue with a focus on the third: Where are we? Where do we want to go? How do we get there?

## **Key Messages:**

- 1) Mangrove restoration is an underutilized natural climate solution, as mangroves and other terrestrial and coastal ecosystems are an important sink and natural tool for climate mitigation. Many countries can demonstrate more ambitious efforts to address climate change by strengthening their NDCs with more information on mangrove restoration activities and related detailed mitigation targets in 2020.
- 2) Adaptation is another contribution to the climate solution that mangrove ecosystems play in their communities. Mangrove forests provide critical ecosystem services, such as coastal protection and food security. Enhancing ambition can also include strengthening the adaptation section of an NDC utilizing ecosystem-based adaptation in policies and plans.
- 3) Mangrove restoration may be considered a win-win investment, providing mitigation and adaptation solutions to climate change while also supporting the implementation of other international pledges and agreements for the SDG Agenda 2030.
- 4) There is an urgent need for coordinated partnerships that ensure good science, sound environmental policies and practices, and adequate funding in place for the enhancement, restoration and protection of natural climate solutions. One example is the Global Mangrove Alliance which provides a platform to take action on mangrove conservation and restoration towards climate mitigation and adaptation.
- 5) Natural climate solutions can play a key role in achieving the goals of the Paris Agreement, and is a largely untapped area of mitigation potential in current NDCs thus providing an opportunity for enhanced commitment and action.

<sup>1</sup> Griscom, B., et al. (2017) Natural Climate Solutions. *Proceedings of the National Academy of Sciences*. 114: 11645–11650.

<sup>2</sup> Ibid.

## Introduction

Mangroves are some of the most important and productive ecosystems on our planet. As nurseries of the sea, they sustain rich fisheries and provide critical habitat to a wealth of coastal and marine species. Located where the sea meets land, mangroves serve as nature's insurance policy against climate change by providing a natural barrier for coastal communities and whole ecosystems from storm surge, flooding and erosion. They filter the air we breathe, the water in which we swim and fish in.

Alongside their living biomass, mangrove soils are carbon-rich, sequestering and storing carbon at great depths. While mangroves cover a significantly smaller area compared to tropical forests, they are incredibly efficient carbon stores, as they can sequester up to 3-4 more carbon on an area basis than their terrestrial counterparts, and remain stable for long geologic timescales if undisturbed.<sup>3</sup> Mangrove loss can equally lead to carbon being emitted back to the atmosphere. Between 2000 and 2012, 2% global mangrove carbon was lost through deforestation, equivalent to 317 million tonnes of CO<sub>2</sub> emissions.<sup>4</sup>

Despite their many ecosystem services and benefits, mangroves are one of the most endangered ecosystems on Earth, disappearing at higher rates than tropical rainforests. An alarming 50% of mangrove forests have been lost or degraded worldwide from a wide range of human threats including coastal development like ports and resorts and unsustainable aquaculture and agricultural practices like shrimp farming and palm oil extraction.<sup>5</sup> A staggering 20% of this loss has occurred since 1980 alone.<sup>6</sup> If this trend continues, all unprotected mangroves could be gone within the next 100 years. This will destroy critical fishing grounds, increase our vulnerability to coastal hazards, and cause massive carbon emissions and loss of some of our most unique biodiversity.

## 1. Where are we?

### Progress made so far on incorporating mangroves in NDCs

The importance of the carbon sequestration benefits from mangrove forests and other terrestrial and marine systems are engrained in the Paris Agreement, specifically in Article 5.1 stating, "Parties should take action to conserve and enhance, as appropriate, sinks and reservoirs of greenhouse gases as referred to in Article 4, paragraph 1(d), of the Convention, including forests."

In a 2016 study it was found that 151 countries are home to at least one blue carbon ecosystem (seagrass, saltmarshes or mangroves) and 71 countries have all three.<sup>7</sup> In order to identify opportunities and challenges for conserving and restoring mangroves in these countries, an NDC review was conducted by several organizations. These analyses resulted in the following findings on mangroves which can guide countries as they revise and implement natural climate solutions at the national level<sup>8</sup>:

- 28 countries' NDCs include a reference to coastal wetlands in terms of mitigation;
- 59 countries include coastal ecosystems and the coastal zone into their adaptation strategies. Adaptation actions utilizing blue carbon ecosystems have mitigation co-benefits and can be reflected in a country's mitigation goals, as appropriate.

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<sup>3</sup> Mcleod, E. et al. (2011) A blueprint for blue carbon: toward an improved understanding of the role of vegetated coastal habitats in sequestering CO<sub>2</sub>. *Frontiers in Ecology and the Environment* 9-10: 552-560.

<sup>4</sup> Hamilton, S. and Friess, D. (2018) Global carbon stocks and potential emissions due to mangrove deforestation from 2000 to 2012. *Nature Climate Change* 8: 240-244.

<sup>5</sup> Food and Agricultural Organization of the United Nations. (2007) *The world's mangroves: 1980-2005*. FAO, Rome.

<sup>6</sup> Ibid.

<sup>7</sup> Herr, D. and Landis, E. (2016). *Coastal blue carbon ecosystems. Opportunities for Nationally Determined Contributions. Policy Brief*. Gland, Switzerland: IUCN and Washington, DC, USA: TNC.

<sup>8</sup> Ibid.

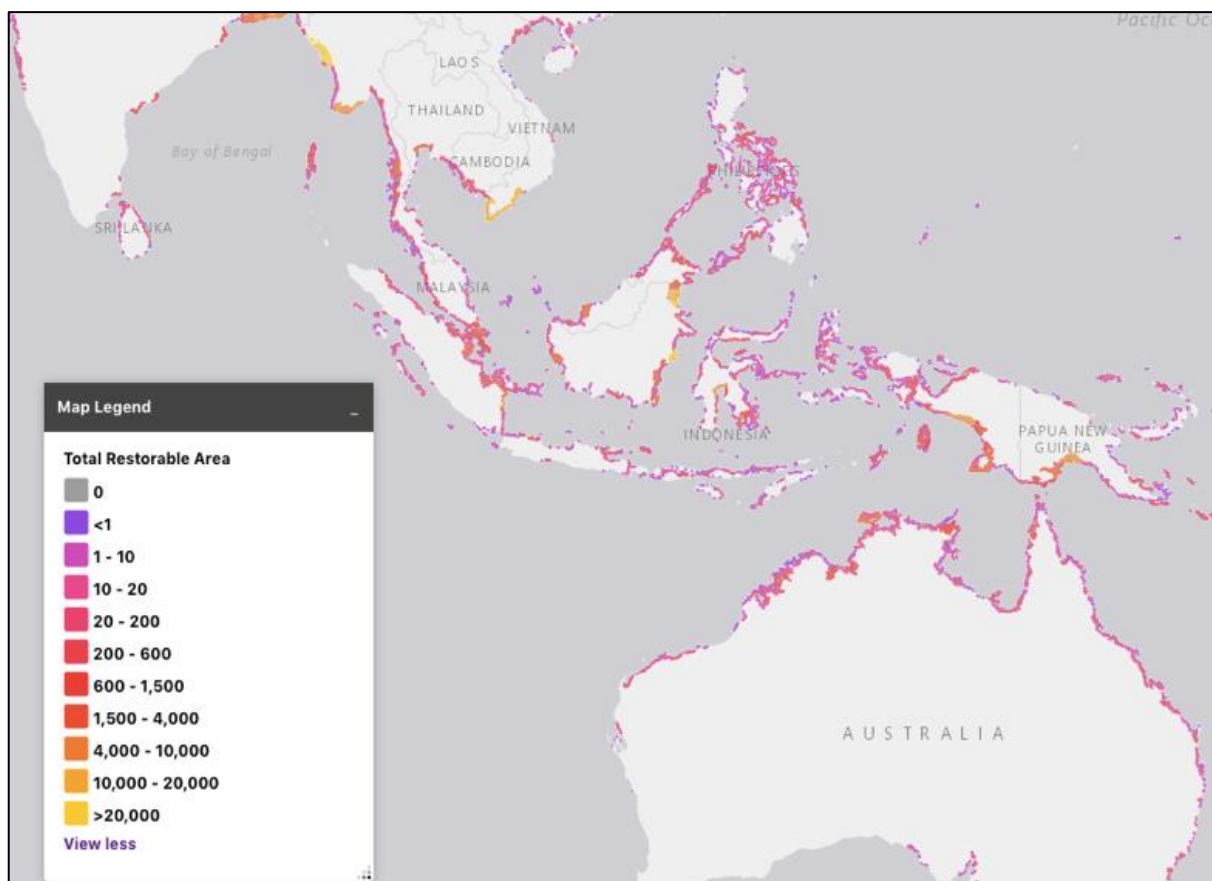
## 2. Where do we want to go?

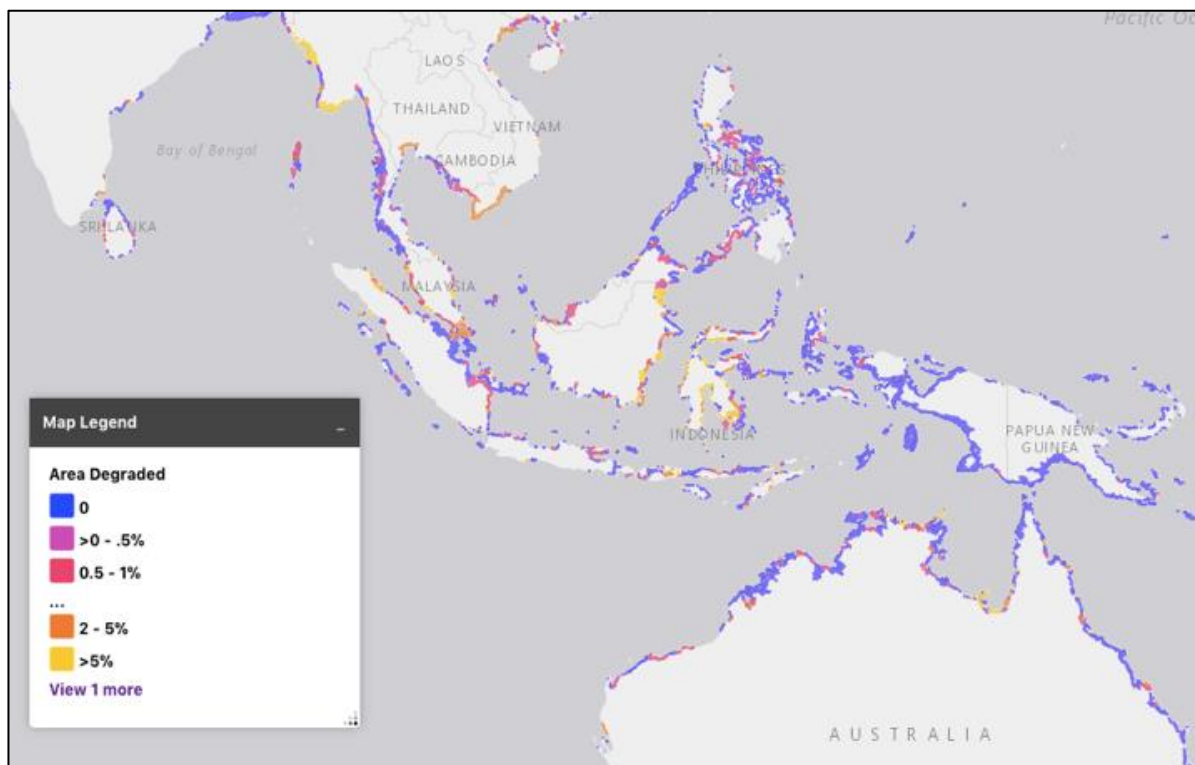
### Mangrove restoration potential and the Paris Agreement

In 2018, the Global Mangrove Watch team, coordinated by Wetlands International produced a time series of 'global mangrove extent maps' between 1996 and 2016, based on satellite images. These maps show changes in mangrove cover on a global scale. Utilizing this work, Wetlands International and its partners developed a maximum extent of mangroves over this time (some 14,559,400 ha), allowing users to calculate and locate mangrove losses and gains world-wide. Table 1 shows these statistics by major mangrove region. The resulting high-resolution maps provide critical information to prioritize restoration, boosting the cost effectiveness and success rate of mangrove restoration efforts.

Variable	1996	2007	2010	2016	1996 - 2016
Extent (km <sup>2</sup> )	142,795	138,901	137,629	136,714	
Losses (km <sup>2</sup> )	-	5,969	3,498	3,057	8,437
Gains (km <sup>2</sup> )	-	2,074	2,227	2,142	2,356
% Change	-	-2.73	-0.92	-0.66	-4.26
Annual % Change	-	-0.25	-0.31	-0.11	-0.21

Additionally, The Nature Conservancy and IUCN have mapped key areas for mangrove restoration around the world with information provided by Mangrove Watch. This [restoration potential map \(MRP\)](#) shows that from the more than 8000,000 ha of lost coastal mangroves globally, 500,000 ha are highly restorable. Another 200,000 ha have been identified as degraded mangroves, yet with proper management actions being in a position to be fully recovered.





The restoration potential map seeks to directly address the request and need by countries to have guidance for prioritizing coastal (blue carbon) ecosystems for conservation and restoration that includes inter alia: climate change mitigation and adaptation benefits, the range of other potential ecosystem benefits and services and assessment of costs relative to benefits. The interactive map not only shows where restoration is possible, but what humans have to gain from this as well.

Mangrove restoration opportunities exist in every region and restoration potential was found in 105 countries and territories. Losses were recorded in 97% of the countries and territories with mangroves while degradation was recorded in 76%. The MRP map uses drivers of restoration to assess the most viable areas for restoration. Southeast Asia stands out in particular as the region with the largest area of restorable mangroves. Indonesia in particular has a high restoration potential, with the largest extent of mangroves globally and an estimated 1,866 km<sup>2</sup> that can be restored.

<b>Regional summary of restorable areas.</b> Note that these only cover areas of loss; degraded mangrove areas will provide additional benefits					
Region	Area restorable (km <sup>2</sup> )	Proportion of original mangrove areas restorable	Average restorability score	Extent of highly restorable mangrove areas (km <sup>2</sup> )	Area of degraded mangrove areas (km <sup>2</sup> )
Australia & New Zealand	350.9	3.3%	0.73	328.6	54.6
East & Southern Africa	412.0	5.3%	0.72	407.0	133.0
East Asia	7.0	4.0%	0.69	6.5	2.6
North & Central America & the Caribbean	2,277.2	9.6%	0.65	1,636.3	140.2
Pacific Islands	166.6	2.6%	0.62	147.1	5.0
South America	1,068.2	5.2%	0.70	794.9	92.6
South Asia	352.7	3.9%	0.63	279.7	32.4
South East Asia	3,037.1	6.4%	0.64	2,591.2	847.0
Middle East	11.4	3.3%	0.63	7.9	2.7
West & Central Africa	437.1	2.1%	0.73	430.5	78.5
<b>TOTAL</b>	<b>8,120.0</b>	<b>5.5%</b>	<b>0.67</b>	<b>6,629.9</b>	<b>1,388.6</b>

## Trends in conservation finance

Investments in mangroves are projected to increase as signatory countries to the Paris Agreement should take action to conserve and enhance, as appropriate, sinks and reservoirs of greenhouse gases, including forests, and to invest in adaptation to protect people and ecosystems. As mangroves restoration is included within the NDCs of some tropical countries, these countries are likely to develop and implement related policies, legal frameworks, and/or economic measures for its restoration and conservation (e.g. public budget lines, subsidies, tax reductions, carbon taxes, national emission reduction markets, or market-based measures under the Paris Agreement.)<sup>9</sup>

Though mangrove-specific data does not yet exist, the value of conservation finance assets managed by impact investors is increasing, from US\$21.5 billion in 2009 to a projected US\$200 billion in 2020.<sup>10</sup> New funding mechanisms such as the Blue Action Fund bring new sources of public money to coastal and marine conservation projects. Mangrove projects are in a strong position to benefit from the availability of capital in this sphere, due to their ecosystem service provision and direct link to climate change mitigation and adaptation, biodiversity conservation and livelihoods.<sup>11</sup>

To meet the global need for conservation funding in general, investments into conservation projects need to be at least 20-30 times greater than they are today, reaching US\$200-300 billion per year.<sup>12</sup> The need to mobilize additional grants, as well as finance and to use these funds more effectively, is now more relevant than ever in order to reach global targets to increase mangrove cover in addition to stopping the current loss. Since many public funds are at their capacity due to competing needs, there is scope for the private sector to fill this gap.<sup>13</sup> While NGOs, foundations and public funds are traditionally the source of grants in conservation projects, the wide-ranging environmental and social impacts of recent projects are increasingly drawing interest from the private sector.<sup>14</sup>

### *Investments in mangrove restoration and conservation*

National and international donors and the private sector have increased their financial support for mangrove projects over the last two decades, owing to the contributions of mangrove conservation to ecosystem services, such as coastal protection, climate change mitigation, and adaptation. As better science is collected mangrove management methodologies are improved, decreasing investment risk and maximizing mangrove ecosystem benefits. To reduce risks and avoid malpractices, proper guidance by restoration ecologists and ecosystem scientists needs to be a prerequisite during project implementation. Especially, if projects are framed to serve risk reduction purposes, experts in flood risk management should be brought in as well. While local communities should be involved from the onset of the restoration plans, mangrove restoration cannot be a community effort alone<sup>15</sup>. Furthermore, it is essential to ensure that both bio-physical as well as socio-economic conditions are appropriate for mangrove recovery<sup>16</sup>.

Including mangrove restoration as part of the suite of climate change adaptation measures brings two major benefits and revenue streams. First, mangroves can contribute greatly to cost avoidance and minimization of damage from for instance coastal erosion or storm surges; which is of great interest to NGOs, governments and the insurance industry. Second, mangroves can generate cash flow opportunities and revenue streams, which is

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<sup>9</sup> Herr, D. and Landis, E. (2016). *Coastal blue carbon ecosystems. Opportunities for Nationally Determined Contributions. Policy Brief*. Gland, Switzerland: IUCN and Washington, DC, USA: TNC.

<sup>10</sup> Credit Suisse (2014) Corporate Responsibility report. Credit Suisse, Zurich, Switzerland

<sup>11</sup> Flint et al. (2018) Increasing success and effectiveness of mangrove conservation investments: A guide for project developers, donors and investors. IUCN, Geneva, Switzerland, and WWF Germany, Berlin, Germany. Forthcoming.

<sup>12</sup> Ibid.

<sup>13</sup> Credit Suisse (2014) Corporate Responsibility report. Credit Suisse, Zurich, Switzerland

<sup>14</sup> Ibid.

<sup>15</sup> Wesenbeeck, B. 2016. To plant or not to plant? Stopping malpractices in using mangroves to increase coastal resilience. Guest blog, Wetlands International

<sup>16</sup> Wetlands International (2016) Mangrove restoration: to plant or not to plant? Wetlands International.

of greater interest to impact investors. In Belize, for example, tourism associated with coastal ecosystems is said to contribute an estimated US\$150-196 million (2007), which is about 12-15% of Belize's economy.<sup>17</sup>

The biggest call for coastal wetland-related emission reductions, including mangroves, might come from host countries themselves, as they recognize these projects as cost-effective solutions to implement the Paris Agreement and invest in them through national budgets, national carbon markets and international funding support.

### 3. How do we get there?

#### **The need for a coordinated global mangrove conservation agenda and the Global Mangrove Alliance (GMA)**

While mangroves rank among the most valuable ecosystems on Earth, they are highly threatened and largely overlooked by the global community. To reverse this downward spiral, there is an urgent need for a coordinated global mangrove conservation agenda that ensures that good science, sound environmental policies and practices, and adequate funding are in place. By bringing together the leaders in the field of mangrove conservation—from the grassroots to the global level—we can change the way that society manages and values its mangroves.

In 2017, five of the world's leading global conservation organizations—Conservation International, the International Union for Conservation of Nature, The Nature Conservancy, Wetlands International, and World Wildlife Fund—established the Global Mangrove Alliance (GMA). Based on a global analysis of the threats to mangroves and opportunities for conservation, the GMA is building a global movement of hundreds of civil society organisations, technical experts, government agencies, corporations, funding agencies, foundations and community groups to jointly work towards the **ambitious goal of increasing global mangrove cover by 20% by 2030**, as well as targets linked to biodiversity conservation, climate regulation, food security and human wellbeing. The GMA will use its collective strengths and partnerships to address the barriers to large-scale mangrove conservation and restoration through several streams of work, including through:

- *Finance*: develop novel and diverse valuation and financing mechanisms that help take mangrove ecosystem conservation and restoration to scale.
- *Improving policy*: work with governments to develop integrated management plans that consider the multijurisdictional nature of mangrove conservation and restoration.
- *Building capacity*: build awareness among policymakers, financing institutions, NGOs and others of the multiple benefits and cost effectiveness of conserving and restoring mangroves for climate change adaptation, mitigation and human well-being.
- *Proof of Concept*: develop real-world examples of integrating mangroves into national-level management plans, and local scale demonstrations of improved human well-being due to mangrove conservation and restoration.
- *Knowledge Sharing*: develop the knowledge and tools required to integrate mangroves and their ecosystem services into national level mitigation, adaptation, disaster risk reduction and land-use strategies.

#### **The Global Mangrove Alliance and the Paris Agreement**

The Global Mangrove Alliance is guided by the idea that a coordinated effort across sectors and geographies will accomplish more, faster. If we can accelerate existing work to protect and restore mangroves, while also funneling significant new global investment into projects that help us restore mangrove, we can improve the well-being of millions while revitalizing critical coastal ecosystems. The GMA serves as a platform to drive action,

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<sup>17</sup> Hoegh-Guldberg, O. (2015) Reviving the Ocean Economy: The case for action – 2015. WWF, Switzerland.

linking separate projects into a cohesive path to increasing mangrove cover by 20% by 2030 and in doing so, reduce greenhouse gas emissions while making communities more resilient.

Almost all NDCs recognize the impacts of Land Use Land Use Change and Forestry (LULUCF) on climate change.<sup>18</sup> More specifically, 28 nations have identified mangrove restoration as a means for climate mitigation and are currently at various stages of implementation – from changing policies to replanting entire mangrove forests<sup>19</sup>. For each country who has included mangrove forests, or other LULUCF elements, the opportunity is still ripe to strengthen the NDC by providing more information and detailed mitigation targets in 2020.

The importance of the carbon sequestration benefits from mangrove forests and other terrestrial and marine systems are engrained in the Paris Agreement, specifically in Article 5.1 stating, “Parties should take action to conserve and enhance, as appropriate, sinks and reservoirs of greenhouse gases as referred to in Article 4, paragraph 1(d), of the Convention, including forests.” Thus, one option for enhancing ambition on climate action is through the inclusion mangroves as a natural climate solution under the UNFCCC is through countries’ NDCs.

Starting in 2020, when the Paris Agreement starts the implementation phase and every five years onward, nations will be requested to resubmit their NDCs – with revised and more ambitious actions and targets. Fortunately, the untapped mitigation potential from mangrove restoration leaves scope for the improvement of climate mitigation pledges (acknowledging that some countries do take action for mangrove restoration under different programmes). Nonetheless, seeds of change have been planted, many branches of opportunity are growing, and now is the time for mangroves to thrive as called for and supported by global agreements.

To date, mangroves have not been uniformly integrated, but can be referenced in both mitigation and adaptation components. This gap holds promise and opportunity to enhance ambition in the revised NDCs in 2020 as well as in future communicated NDCs. Incorporating mangroves and other coastal and terrestrial systems sinks, sources, and reservoirs in the NDC is important for increasing ambition as well as to ensure that these systems will be accounted for in the Global Stocktake. In addition, the new trading mechanisms anchored in Art. 6 of the Paris Agreement (Sustainable Development Mechanism and Cooperative Actions with trading of Internationally Transferred Mitigation Outcomes (ITMOs)) may eventually provide an important source of financing.

Noting this, there is a significant opportunity to include and expand mangroves in a more prominent role in the mitigation section of future, revised NDCs of all coastal countries. Overall the climate mitigation opportunity of blue carbon ecosystems shows as:

- Mangrove conversion accounts for average emissions of 7.2 Mg CO<sub>2</sub> ha<sup>-1</sup> yr<sup>-1</sup><sup>20</sup>
- Mangrove soils hold over 6.4 billion tons of carbon, 4.5 times more carbon than the US economy emits every year.<sup>21</sup>

### **The Global Mangrove Alliance and Agenda 2030**

Mangrove restoration can also be counted towards achieving other international efforts, such as the Bonn Challenge, which aims to bring 150 million hectares of degraded and deforested land into restoration by 2020, and 350 million hectares by 2030. Mangrove restoration is a win-win investment: it supports local livelihoods, while meeting the implementation of international pledges and international agreements, such as:

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<sup>18</sup> Food and Agricultural Organization of the United Nations. (2016) *The Agriculture Sectors in the Intended Nationally Determined Contributions: Analysis*. FAO, Rome.

<sup>19</sup> Herr, D. and Landis, E. (2016) *Coastal blue carbon ecosystems. Opportunities for Nationally Determined Contributions. Policy Brief*. Gland, Switzerland: IUCN and Washington, DC, USA: TNC.

<sup>20</sup> Lovelock, C., Fourqurean J., and Morris, J. (2017) Modeled CO<sub>2</sub> Emissions from Coastal Wetland Transitions to Other Land Uses: Tidal Marshes, Mangrove Forests, and Seagrass Beds. *Frontiers in Marine Science* 4:143.

<sup>21</sup> Sanderman, J. et al. (2018) A global map of mangrove forest soil carbon at 30m spatial resolution. *Environmental Research Letters* 13:5.

- Paris Agreement to the United Nations Framework Convention on Climate Change (UNFCCC)
- Aichi Targets 14 and 15 to the Convention on Biological Diversity (CBD)
- Implementation of the Convention on Wetlands (Ramsar Convention)
- Sustainable Development Goal (SDG) 13 (Climate Action), 14 (Life Below Water), and 15 (Life on Land), among others
- Implementation of the Sendai Framework for Disaster Risk Reduction (SFDRR)

### Examples of Implementation from the GMA

The members of the GMA contribute a suite of mangrove conservation and management projects on the ground as well as engaging in mangrove-related policy. Below are examples of member projects:

- The Mangrove Restoration Potential Map. The MRP Map can be used as an implementation tool to:
  - Identify areas with potential for sequestering high amounts of carbon, and for avoiding further carbon losses from the soil of former mangrove areas
  - Predict the potential gains to fisheries from mangrove restoration in different locations
  - Highlight places where the flooding of coastal populations may be reduced through restoration
  - Refine, as appropriate, the inclusion of mangrove restoration activities as part of national and sub-national REDD+ efforts.
- IUCN, via the Blue Natural Capital Financing Facility is helping coastal projects, including those in mangroves areas, to become bankable providing technical assistance and funding. The BNCFF is supporting projects with clear, positive social and environmental impacts, including in terms of climate change mitigation and adaptation as well as other ecosystem services. Visit [www.bluenaturalcapital.org](http://www.bluenaturalcapital.org)
- The GMA has submitted a [voluntary commitment](#) through the Community of Mangrove Ocean Action.
- Wetlands International is generating awareness and demand for the innovative [Building with Nature \(BwN\) approach](#) to support a paradigm shift from conventional hard-infrastructure approaches to coastal security to integral coastal zone management approach that provides resilience.
- Mangrove Capital Africa, a ten-year programme funded by DOB Ecology, focuses on mangrove restoration in the Saloum and Rufiji deltas. In subsequent years, the plan is to extend this work to other sites in West and East Africa with on the ground programmes that adopt a holistic approach to the management of marine ecosystems. Visit <https://www.wetlands.org/casestudy/mangrove-capital-africa/>. In its work, WI aims for mangrove rehabilitation programmes that comply with the principles of ecological mangrove rehabilitation, resulting in costs savings and more valuable and diverse mangrove forests. See <https://www.wetlands.org/publications/mangrove-restoration-to-plant-or-not-to-plant/>.

In addition to support on the ground efforts at the project level, the GMA also serves to elevate mangrove work, connect practitioners to policy-makers, and promote collaboration in the field in order to bring individual projects to scale. The GMA builds upon the diverse skills and networks each organization brings to amplify existing efforts and drive increased attention to the critical role of mangroves in coastal systems. With an eye to catalysing new investments, the Alliance aims to improve land use management and on-the ground conservation, restoration and sustainable use of mangroves. The GMA provides one way to take action on mangrove conservation and restoration towards climate mitigation and adaptation. If you are interested in learning more or becoming a GMA member, please visit us as <http://www.mangrovealliance.org/>.