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A BOOKLET FOR SUCCESSFUL IMPLEMENTATION

BLUE NATURE-BASED SOLUTIONS IN NATIONALLY DETERMINED CONTRIBUTIONS



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BLUE SOLUTIONS

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BLUE NATURE-BASED SOLUTIONS IN NATIONALLY DETERMINED CONTRIBUTIONS

A BOOKLET FOR SUCCESSFUL IMPLEMENTATION

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Abbreviations and acronyms

BMU	Federal Ministry of the Environment, Nature Conservation and Nuclear Safety
CBD	Convention on Biological Diversity
CMA	All States that are Parties to the Paris Agreement are represented at the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement
COP	Conference of the Parties
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (German Development Agency)
GHG	Greenhouse Gas
ICCROM	International Centre for the Study of the Preservation and Restoration of Cultural Property
ICOMOS	International Council on Monuments and Sites
IFOAM	International Federation of Organic Agriculture Movements
IKI	International Climate Initiative
IPCC	Intergovernmental Panel on Climate Change
IUCN	International Union for Conservation of Nature
LDC	Least Developed Countries
LULUCF	Land use, land-use change, and forestry
NAP	National Adaptation Plan
NbS	Nature-based Solutions
NDC	Nationally Determined Contributions
SDGs	Sustainable Development Goals
SIDS	Small Islands Developing States
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNEP	United Nations Environment Programme



1. INTRODUCTION: WHY WRITE A BOOKLET ON BLUE NBS FOR NDCS?

Can oceans and marine environments help combat the climate emergency?

Yes. Oceans, marine and coastal environments hold the key to indispensable Nature-based Solutions (NbS), which can keep global warming below 2 or even 1.5 degrees Celsius and help humanity adapt to the consequences of climate change.

How do NbS that focus on oceans, marine, and coastal habitats work in practice? How do they fit into Nationally Determined Contributions (NDC) architecture of the Paris Agreement? Are there concrete actions – specific coastal and marine NbS (hereafter Blue NbS) – that countries have undertaken to help enhance the climate mitigation and adaptation role of oceans and marine environments?

Yes, there is abundant experience and good practices, though few efforts have been made to compile these country experiences and lessons learned from the perspective of NDC implementation.

BOX 1 NATURE-BASED SOLUTIONS IN THE PARIS AGREEMENT

Whilst several definitions of NbS exist, the most commonly used specification stems from IUCN: ***'Nature-based Solutions are actions to protect, sustainably manage, and restore natural and modified ecosystems that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits.'*** (IUCN, 2020).

While the Paris Agreement does not reference or use the term, there are important linkages. The preamble of the treaty recognizes the relevance of the "integrity of ecosystems, including oceans, and the protection of biodiversity", linking these to the concept of climate justice; a proper treaty provision (Art. 5.2) is also dedicated to "policy approaches and positive incentives for activities relating to reducing emissions from deforestation and forest degradation".

As to specific societal challenges, the Paris Agreement principally refers to their climate mitigation capacity, i.e. to "conserve and enhance, as appropriate, sinks and reservoirs of greenhouse gases" (Art. 5.1). The Paris Agreement makes a reference, in this

context, to the typology of sinks identified in the Convention, namely "biomass, forests and oceans as well as other terrestrial, coastal and marine ecosystems" (Art. 4.1.d UNFCCC).

Tracking and reporting of land-based emissions and removals has long been – and continues to be – a challenge, though science, practical expertise and institutional capacity have made great strides in recent years (cf. Thomas et al. 2020). For Greenhouse Gas (GHG) reporting and accounting purposes, emissions and removals, i.e. forest land, cropland, grassland, wetlands, settlements, other lands. In 2013, the IPCC supplemented the 2006 Guidelines with new methodological guidance on wetlands. The role of coastal wetlands (mangroves, seagrass and tidal salt marsh ecosystems, in particular) in sequestering and storing "blue" carbon from the atmosphere and oceans is specifically recognized.

Beyond reporting and accounting, the emphasis on more holistic functions of NbS in NDCs is a development born from state practice rather than specific treaty guidance. Countries around the globe



increasingly focus on coastal wetlands, not just for their carbon sink qualities but for their capacity to provide a uniquely full spectrum of mitigation, (ecosystem-based) adaptation, and resilience benefits for communities globally.

In line with country practice (including concerning inventory preparation), when referring to 'Blue Nbs', this booklet focuses on oceans and marine environments in a coastal context; it does not refer to interventions on the high seas.

Specific guidelines addressing the role of Nbs in NDCs – across ecosystem types and on coastal ecosystems in particular – have recently been published⁽⁶⁾. This booklet, by contrast, provides a detailed look into how existing leading examples on coastal and marine Nbs can inform and inspire the *design* and the *implementation* of NDCs in the national, sub-national and project level contexts, including for NDC transparency and review cycles (see figure 1).

This document is meant to inspire governments and other stakeholders to embrace Blue Nbs in their NDCs – currently under revision by countries in advance of the 26th session of the Conference of the Parties (COP 26) to the United Nations Framework Convention on Climate Change (UNFCCC) – and to refine their global commitments by focusing on specific realization pathways. The examples herein are intended to provide hands-on implementation ideas and models to support countries in putting their climate mitigation and adaptation pledges into practice.

local fishermen

©Rob Barnes, GRID-Arendal





2. NDCS AND NBS

2.1. NATURE-BASED SOLUTIONS IN INTERNATIONAL CLIMATE CHANGE NEGOTIATIONS

While the COVID-19 pandemic is spreading across the globe at lightning speed, it is important to recognize the direct link between the destruction of nature, including of so many biodiversity-rich coastal habitats, and disease outbreaks. While the relationship between biodiversity and infectious disease is complex, it is clear that the loss and degradation of biodiversity undermines the web of life and increases the risk of disease spillover from wildlife to people^(b).

Nature-based Solutions (NbS) – see box 1 – offer the prospect of reverting the trend towards increased disease spillover.

BOX 2

KEY CONCEPT: NATIONALLY DETERMINED CONTRIBUTIONS (NDCS)

Nationally Determined Contributions (NDCs) contribute to the achievement of the Paris Agreement. NDCs demonstrate efforts made by countries to reduce their emissions and adapt to the adverse

effects of climate change. Member countries to the Paris Agreement are required to prepare, maintain and work towards the achievements of their NDCs.

NbS – and coastal and marine NbS, in particular – are increasingly recognized as a key strategy to combat and adapt to climate change. Ocean issues received close attention during COP 24 and the first session of the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement (CMA).^(c) They were also high on the COP 25 agenda, with some dubbing the 2019 conference the 'Blue COP'.^(d) The upcoming COP 26 in Glasgow will be an important move towards the continued integration of ocean-related issues into the context of climate change.

2.2. THE CHALLENGE

Governments, in turn, are keen to highlight the relevance of NbS – including Blue NbS – in their policy programs and, notably, their NDCs. However, the exact role of NbS in delivering country commitments often remains vague. Relevant targets and actions lack structure and detail. There are few, if any, clear plans and pathways to implementation, despite the strong international practice of coastal and marine NbS.

Countries could learn from the dozens, if not hundreds, of well-designed NbS examples that can help them to structure their NDC commitments. This booklet will shine a light on suitable NbS that showcase how countries can work towards successful implementation of their climate commitments.


BOX 3
KEY TERMINOLOGY: UNFCCC, COP AND PARIS AGREEMENT

The **United Nations Framework Convention on Climate Change** (UNFCCC) was adopted in New York on 9 May 1992 and entered into force on 21 March 1994. As outlined in Article 2, the ultimate objective of the Convention is the stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.

The **Conference of the Parties** (COP) is the supreme body of the Convention formed by the 197 countries that ratified it. Its main duty is to review the implementation of the Convention and take all necessary decisions to attain the main objective. Ordinary sessions are held every year and counted accordingly (COP 1, COP 2, COP 3, etc.).

The **Paris Agreement** was adopted in 2015 at COP 21 and entered into force the following year. The historic treaty provides the basis for international climate change cooperation from 2020 onwards. Its stated collective goal is to hold the increase in the global average temperature to 'well below' 2°C above pre-industrial levels; to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels; and to increase the capability of nations to adapt to the adverse impacts of climate change. All states that are parties to the Paris Agreement are represented at the COP; they serve as the meeting of the Parties to the Paris Agreement (CMA), the treaty's main decision-making body overseeing implementation.

2.3. BLUE SOLUTIONS INITIATIVE

The **Blue Solutions Initiative** promotes healthy oceans for sustainable development. Funded by the German Federal Ministry of the Environment, Nature Conservation and Nuclear Safety (BMU) through the International Climate Initiative (IKI), the Blue Solutions Initiative was launched to collect and foster global knowledge on coastal and marine NbS and to demonstrate to stakeholders – from governments to private sector to grassroots organizations – what successful real-case solutions look like and how they respond to widely experienced needs and gaps.

Under the Blue Solutions Initiative, four institutions from the fields of environment, conservation and development have combined efforts to develop and incubate marine and coastal management approaches and policy advice, focusing on holistic and yet practical hands-on solutions for the sustainable use of marine and coastal resources. By collating best practices, improving methods, enhancing capacity and fostering knowledge exchange, action is being supported at local, sub-national, national, regional and global levels, in a time of increasing adverse effects caused by climate change.

The PANORAMA knowledge sharing platform allows practitioners to share and reflect on their experiences, increase recognition for successful work, and learn with their peers how similar challenges have been addressed around the globe. The Blue Solutions Initiative, as the coordinator of the PANORAMA marine and coastal thematic community, has gathered over 240 solutions.



This report highlights 24 case studies from the PANORAMA platform. They were chosen for their relevance to coastal and marine Nbs for climate change adaptation and mitigation, as well as their refined NDC design and successful implementation, enabling climate action on the ground.



DO YOU WANT TO KNOW MORE

PANORAMA – Solutions for a Healthy Planet is a partnership initiative which documents and promotes examples of inspiring, replicable solutions across a range of conservation and sustainable development topics, enabling cross-sectoral learning and inspiration. The joint partnership initiative is implemented by GIZ, IUCN, UN Environment, GRID-Arendal, Rare, IFOAM – Organics International, UNDP, ICCROM, ICOMOS and the World Bank. PANORAMA currently connects over 200 solution providers who represent NGOs, government institutions, academia, international organisations, foundations and the private sector. It covers a wide range of conservation topics and coordinates a total of seven thematic communities. More info:

<https://panorama.solutions/en>

The Blue Solutions Initiative is a global partnership jointly implemented by GIZ, GRID-Arendal, IUCN and UNEP with the aim to strive for healthy oceans for sustainable development.

More info: <https://bluesolutions.info/>

PANORAMA
SOLUTIONS FOR A HEALTHY PLANET



BLUE SOLUTIONS



the art of fishing with
one leg paddling

© Mega Caesaria, Unsplash



3. DEPICTING BLUE NBS IN NDCS

3.1 NBS IN CURRENT NDCS

Whatever the coverage and ambition of an NDC, nature will feature as one of its key elements. Any transition to renewable energy is fundamentally a nature-derived solution, and many other low emissions pathways rely on nature-derived technologies and processes. However, NbS are different in that they *work with and enhance nature to help address societal challenges*.^(e) With a view to the challenge of climate change, Blue NbS are uniquely positioned to address mitigation targets and adaptation actions at the same time.

NDCs are primarily climate mitigation instruments in accordance with Article 4 of the Paris Agreement. However, countries have widely used their first NDCs to substantiate adaptation and resilience goals and actions, and the CMA has since clarified that NDCs may include an adaptation component (see figure 1).^(f) A two-third majority of first-generation NDCs include NbS in one form or another, addressing both mitigation and adaptation (including resilience) targets and actions.^(g) Concerning ocean and coastal habitats, Herr and Landis (2016) have traced 59 NDCs that see coastal ecosystems and/or the coastal zone as instrumental for their adaptation strategy.^(h) Furthermore, 28 NDCs include a reference to recognizing the role of coastal wetlands in mitigation efforts.

BOX 4 KEY TERMS OF ADAPTATION^(f)

Adaptation: Human-driven adjustments in ecological, social or economic systems or policy processes, in response to actual or expected climate stimuli and their effects or impacts (LEG, 2011). Various types of adaptation can be distinguished, including anticipatory and reactive adaptation, private and public adaptation, and autonomous and planned adaptation.

Adaptation benefits: The avoided damage costs or the accrued benefits following the adoption and implementation of adaptation measures.

Ecosystem-based Adaptation: The use of biodiversity and ecosystem services as part of an overall strategy to help people to adapt to the adverse effects of climate change. Ecosystem-based adaptation uses the range of opportunities for the sustain-

able management, conservation, and restoration of ecosystems to provide services that enable people to adapt to the impacts of climate change. It aims to maintain and increase the resilience and reduce the vulnerability of ecosystems and people in the face of the adverse effects of climate change.

National Adaptation Plan: Policy process introduced as part of the Cancun Adaptation Framework (COP 16) that allows Parties to formulate and implement national adaptation plans (NAPs) as a means of identifying medium- and long-term adaptation needs and developing and implementing strategies and programmes to address those needs. It is a continuous, progressive and iterative process which follows a country-driven, gender-sensitive, participatory and fully transparent approach.



Resilience: The ability of a social or ecological system to absorb disturbances while retaining the same basic structure and ways of functioning, the capacity for self-organization and the ability to adapt to stress and change.

Vulnerability: The degree to which a system is susceptible to, or unable to cope with, adverse effects

of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude and rate of climate variation to which a system is exposed, its sensitivity and its adaptive capacity. Therefore adaptation would also include any efforts to address these components (IPCC AR4, 2007).

It is noted that while most NDCs do not set a firm jurisdictional boundary, the focus is mostly on habitats and interventions within territorial waters, though some measures concerning reef protection and fishing may extend further. The high seas, on the other hand, lie outside national climate plans. There are some indications that this may change in the future, as policymakers are attentive to emissions cycles that transcend international borders (regarding international transport, emissions from indirect overseas land-use change or global supply chain interventions, for example). Knowledge on the potential for blue carbon sequestration beyond coastal waters and in areas beyond national jurisdiction is growing, as is the interest in influencing these processes.^(j)

Why are Blue NbS important?

The value of healthy ecosystems for climate adaptation and resilience has long been evaluated and communicated. The high significance of NbS for climate change mitigation represents more recent, but also widely accepted, knowledge. According to research, there are 20 ecosystem conservation, restoration and management activities which are cost effective types and can provide 37% of the CO₂ mitigation needed by 2030 for a > 66% chance of holding warming below 2°C. One-third of this cost-effective NbS potential can be delivered at or below 10 US\$ per tCO₂eq.^(k)

Blue NbS represent an important share of the mitigation potential. The area covered by blue carbon ecosystems is comparable to just 1.5 percent of terrestrial forest cover, yet their loss and degradation are equivalent to 8.4 percent of CO₂ emissions from terrestrial deforestation due to their high carbon stocks per hectare.^(l) In addition, new sequestration opportunities can uptake and store some 0.5% of global emissions (or about 180 million tCO₂eq) annually.^(m)

When it comes to adaptation, its benefits and resilience, Blue NbS certainly excel. Natural coastal habitats significantly reduce wave heights. Coral reefs and saltmarshes are most effective, triggering a reduction of 70%, followed by seagrass and kelp beds (36%) and mangroves (31%). Across 52 sites harnessing these habitats in coastal defence projects, NbS were two to five times more cost-effective at lower wave heights and at increased water depths compared to engineered structures.⁽ⁿ⁾



Belize coral reefs, sea-grasses and mangroves

©Jason Valdez, Marine Photo-bank

What is the problem with Blue NbS in NDCs?

The prominence of NbS in the NDCs is real but elusive. NbS references are sometimes cursory, vague or exaggerated. They almost always lack detail and, more importantly, rarely translate into robust evidence-based targets and actions whether on mitigation, adaptation or co-benefits such as healthy soils and biodiversity. Only around 17% of NDCs (with current or planned actions involving ecosystem-based adaptation) set quantifiable and robust targets. Similarly, although over 70% of NDCs are estimated to contain references to efforts in the forest sector, only 20% of these include some form of quantifiable targets and just 8% include targets expressed in tonnes of carbon dioxide equivalent. It certainly remains the exception, not the rule, to find an NbS related NDC contribution as clearly defined as the following one from Uruguay (notabene referring to terrestrial wetlands, not coastal ones): ‘... avoiding CO₂ emissions from SOC in 50% of the peatlands area of year 2016 (4.183 ha)...’⁽⁶⁾

To put this in context: A clear understanding of climate change action remains the backbone of the Paris Agreement, including clarity and tracking of progress towards achieving individual nationally determined contributions (on the basis of comparable metrics) and adaptation actions.^(p) The lack of metrics – whether uniform, comparable or not – has a debilitating effect for the transparency arrangements of the Paris Agreement and, ultimately, for the shared ambition of combatting climate change.

At the level of design and implementation, the ambiguity of pledges also points to a broader absence of conceptual clarity (often the result of a lack of capacity) concerning the significant and integrative potential that NbS hold to formulate joint objectives for mitigation, adaptation and resilience in their NDCs (see figure 2), as well as the loss of opportunity for countries to rigorously embed their climate commitments in an ambitious NbS framework that is built on, and caters to, bespoke national policies.

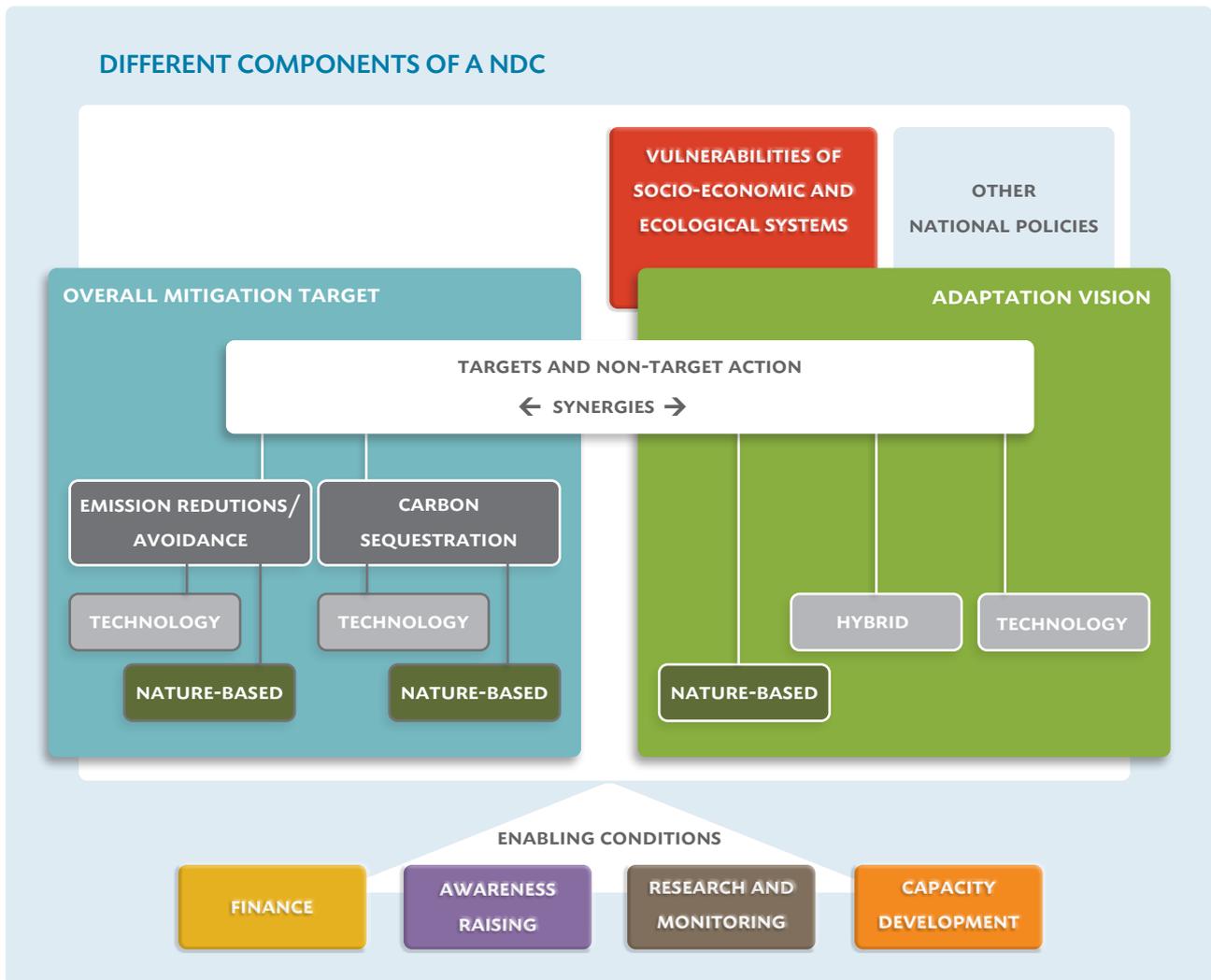


Figure 1 Role of NbS in NDCs (adapted from Seddon et al. 2019).

3.2 NDC CYCLE AND RAISING AMBITION

What is the NDC cycle?

Every five years, countries must update their country commitments in a way that demonstrates progression, taking into account data advances from regular transparency and stock-taking exercises (the ‘ambition mechanism’). Thus, the current NDC update and future NDC updates and revision procedures offer the chance for countries to restate, refine and enhance the role of NbS.

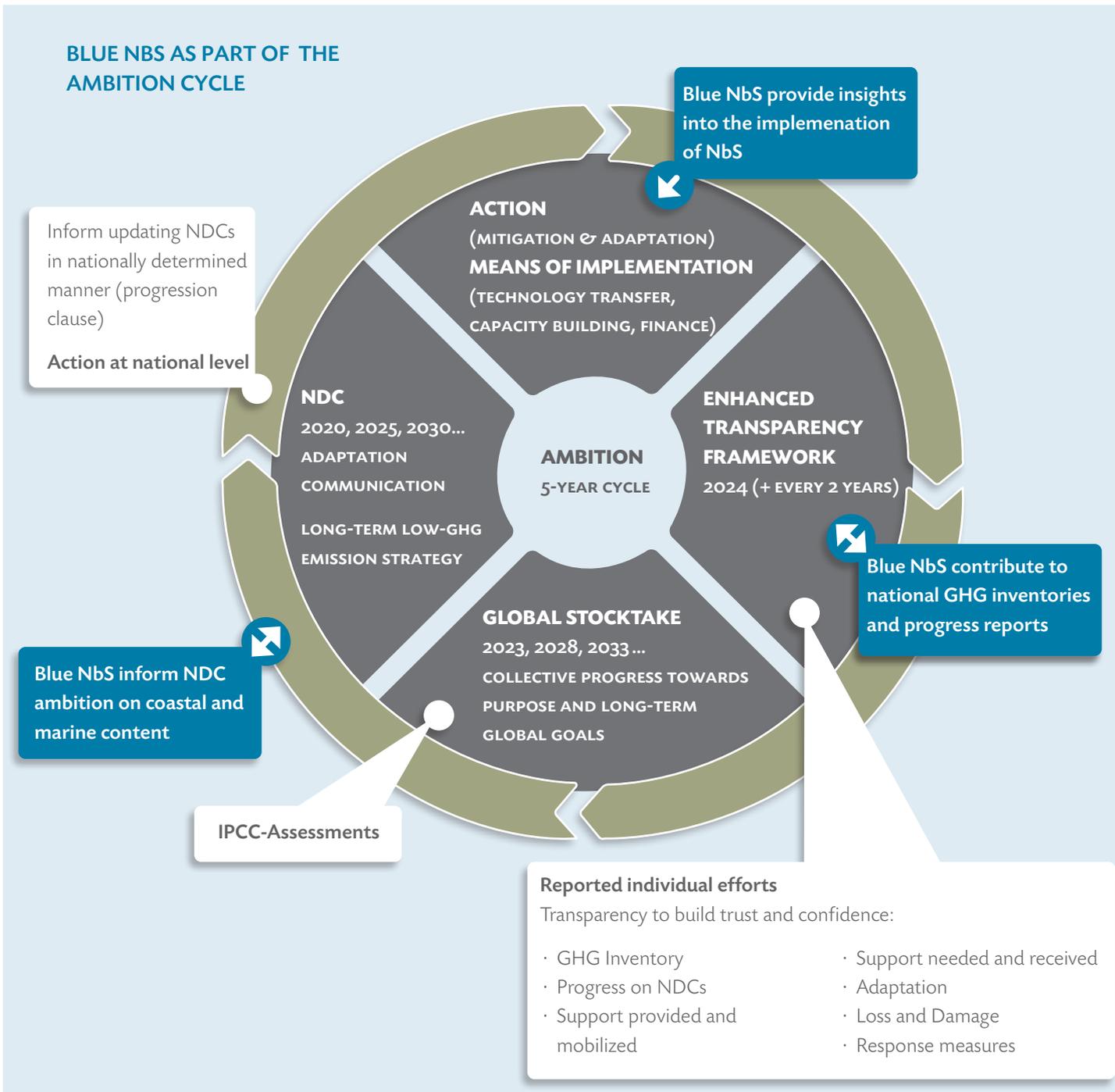


Figure 2 Blue NbS and the NDC ratchet mechanism (Source: UNFCCC Secretariat, modified).

How can NbS contribute to NDCs’ progression and raise ambitions?

Coastal and marine NbS often have a bearing on both the mitigation and the adaptation section in a country’s NDC, a ‘win-win’. Coastal wetlands are massive carbon stocks, so whenever a country plans to protect its seagrass beds to safeguard its fishing grounds, plant mangroves to fortify its defence against flooding, or rewet a coastal floodplain to stem against the trend of saltification and erosion, the result is both a mitigation and an adaptation benefit.



For NDC planning, this connection is an important one. Whatever coastal and marine NbS a country picks, the implementation will usually inform both the country's mitigation and adaptation pathways and, consequently, the design of the next NDC. The dual or cross-cutting nature of NbS interventions and commitments led Chile, for instance, in its second NDC, draft what it calls an 'integration component' that presents adaptation and mitigation actions within a 'complementary strategy'.⁽⁹⁾

The cross-cutting structure of coastal and marine NbS is not confined to their climate benefit. It concerns their dual habitat context (landwards and seawards), their economic and livelihoods role (from food security to energy supply, construction material, trade in fish and seafood, and similar income generating activities) and their shared governance framework. This cross-cutting structure makes NbS the ideal bridge between NDCs and National Adaptation Plans, on the side of the UNFCCC, the Global Biodiversity Framework, on the side of the Convention on Biological Diversity (CBD), as well as the Sustainable Development Goals (SDGs) of the 2030 Agenda. Blue NbS may, ultimately, provide the matrix for transcending today's strict jurisdictional-geographic focus of mitigation responsibility. Transboundary interventions, as well as involvements on the high seas, are likely to emerge in the future.

Supporting the Sustainable Development Goals

Climate action across the agriculture, forestry and other land-use sectors is ill-understood when treated in isolation. The climate crisis is as much an issue of resources and livelihoods diminishing or threatening access to clean water and food as it is a social and gender crisis. Furthermore, the adverse effects of climate change have disastrous impacts on biodiversity aggravating the global biodiversity emergency and limiting the adaptive capacity of ecosystems and communities. This is particularly visible in ocean, marine and coastal environments where many of the most vulnerable communities live and work.



Using best practices from practitioners in the marine and coastal realm to implement NDCs helps advance wider goals as set by the 2030 Agenda for Sustainable Development and the compilation of SDGs. The SDGs also provide a robust basis to define globally recognized impact frameworks and metrics for understanding the cross-sectoral and network challenges and for realising comprehensive actions.



local people's fishing boat, Anakao, South-West Madagascar

©Peter Prokosch, GRID-Arendal



So, how do we use NbS in NDCs?

An open, well-orchestrated NDC design process, therefore, while complex and challenging, is rewarding. It can capture heteronomies, redundancies, ambiguities and actual conflicts in policymaking and governance and bring them to a solution or, where not available, gauge the space for compromise, trade-offs and strategic prioritization. Reading NbS from an NDC perspective, the aim would be, in each case, to clearly outline:⁽⁶⁾

- relevant habitats and ecosystems addressed in the NDC;
- relevant mitigation value (carbon sink credentials and quantities; GHG mitigation benefits);
- information on assumptions and methodological approaches towards how impact – including GHG mitigation benefits – will be measured, as part of the information to facilitate clarity, transparency and understanding of NDCs (referred to as ‘ICTU’);
- adaptation and resilience value for vulnerable communities;
- mitigation targets;
- adaptation actions and milestones;
- synergies, synchronicities, and complementarities between mitigation and adaptation measures;
- links to the Global Biodiversity Framework and the SDGs; as well as
- programmes, plans, and implementation details.



mangrove trees Kenya

©Peter Prokosch, GRID-Arendal



4. EXAMPLES OF BLUE NBS FOR NDCS

The portfolio of Blue NbS presented below is based on real-case scenarios. They are meant to demonstrate the climate impact of marine and coastal NbS solutions and their specific role or functionality in delivering NDC commitments. Some of the solutions collected are project-level interventions, others are aggregated in programs operated at the national or sub-national level.

NDCs often address a wide range of topics, from the definition of targets and actions on mitigation and adaptation to financing strategies, awareness-raising efforts and capacity building. Blue NbS have the potential to inform different NDC sections according to each country's needs and challenges. This report groups best practices into nine different categories of interest to an NDC:



Note: tap the link in each box to navigate through categories and find relevant solutions.



OVERVIEW OF BLUE NBS IN NINE CATEGORIES OF CLIMATE CHANGE ADAPTATION AND MITIGATION



	CLIMATE CHANGE IMPACTS AND VULNERABILITY	1 Integrated Mangrove Fishery Farming (IMFF)	India
		2 Engaging Multi-sectoral Partners for Climate Resilience	Philippines
		3 Sustainable Management of Morocco's Marine Resources	Morocco
	ADAPTATION	4 Strengthening community leadership for mangrove restoration and food security of The Paz River	El Salvador
		5 Ecosystem-based coastal protection through floodplain restoration	Vietnam
		6 Coral gardening for Climate Change adaptation in Vanuatu	Vanuatu
		7 At the water's edge: enhancing coastal resilience in Grenada	Caribbean
		8 Multi-sectoral coastal and marine management vision	Costa Rica
		9 Luru Ridges to Reefs Protected Area Network (Luru PAN)	Solomon Islands
	MITIGATION	10 An incentivized, participatory approach to mangrove conservation	Madagascar
		11 Blue carbon credits financing community based mangrove management	Kenya
	MITIGATION/ADAPTATION CO-BENEFITS	12 Building with Nature for safe, prosperous and adaptive coastlines	Indonesia
		13 Community Mangrove Restoration within the Muni-Pomadze Ramsar Site	Ghana
	CAPACITY DEVELOPMENT	14 Blue Carbon A-Z: from small projects to policy development	Costa Rica, Colombia, Ecuador
		15 'Pesca Responsable': responding to climate change through sustainable responsible fishing and mangrove rehabilitation	Mexico
		16 Marine protected area learning site for the Coral Triangle	Indonesia
	RESEARCH AND MONITORING	17 Empowering island communities: the use of cost-benefit analysis to support informed climate change decisions	Palau
		18 Community-Based Ecological Mangrove Restoration CBEMR)	Thailand
	LOCAL KNOWLEDGE	19 Addressing resource degradation to enhance climate change resiliences	Senegal
		20 The Palau National Marine Sanctuary: Protecting a nation's entire marine territory to ensure sustainable development, enhance food security, boost tourism and enrich	Palau
	AWARENESS RAISING	21 Valuating climate adaptation options on Placencia Peninsula	Belize
		22 Mangrove restoration for sustainable fishery in Palk Bay	India
	FINANCE	23 Private sector investment in conservation of dry forests and mangrove restoration	Costa Rica
		24 A Multi-actor alliance to reduce the risks of cascading hazards in Sian Ka'an	Mexico

Note: tap the numbers to delve into projects.



4.1 CLIMATE CHANGE IMPACTS AND VULNERABILITY

Reducing the vulnerability to climate change is a priority of the Paris Agreement and will guide the design of any NDC adaptation section. Many, if not most coastal and marine NbS are particularly apt to address climate change vulnerabilities resulting from increasingly frequent and increasingly extreme weather events, sea-level rise, water shortages, pollution, and more. However, countries are struggling to match identified negative climate impacts and increased vulnerabilities with concrete actions and targets. Many NDCs do not go beyond acknowledging vulnerabilities and stating, in very general terms, the relevance of preserved and restored ecosystems.

A first step on the pathway to closely link vulnerabilities and climate action is to lead an investigation into specific and localized climate change impacts, risks, and needs, and to actively involve local communities and conservation leaders in that research. While the information gathered is localized, over time, the data set grows and feeds a nation-wide inventory on climate impacts and vulnerabilities. The following examples show how to do so successfully:

1 | INTEGRATED MANGROVE FISHERY FARMING (IMFF)

COUNTRY	India	
LOCATION	Cuddalore district, Tamil Nadu	
LEAD ORGANIZATION	M.S Swaminathan Research Foundation (MSSRF)	
CONTEXT	In the state of Tamil Nadu, half of the population is highly dependent on fishing in the ocean and backwaters as well as on paddy cultivation. Climate change has increased storms, floods and rising of sea level resulting in land erosion and salinisation of land and ground water, thus affecting agricultural activities.	
OBJECTIVE(S)	To respond to specific vulnerabilities of coastal communities to climate change by introducing saline tolerant plants, growing brackish water fish in ponds to generate sustainable and additional income, and planting mangroves and halophytes to protect the coastline.	
RELEVANT BUILDING BLOCK	<ul style="list-style-type: none"> • Situation Analysis and Vulnerability Assessment (BB1) • Village level institutions (BB 2) • Construction of integrated mangrove fish ponds (BB 3) • Participatory Monitoring (BB 4) 	
ACTIVITIES	<ul style="list-style-type: none"> • Participatory vulnerability and risk assessments; • Establishment of communal management committees; • Construction of integrated mangrove fish ponds; • Introduction of brackish water fish in ponds to generate additional income; • Mangroves and halophytes farming; • Participatory monitoring activities. 	



4.1 CLIMATE CHANGE IMPACTS AND VULNERABILITY / Integrated Mangrove Fishery Farming

RESULTS AND IMPACT	<ul style="list-style-type: none"> • 262 families (786 individuals) benefited from the project (up to 1000 EUR per year per beneficiary family raised from sustainable fish farming); • The community gained skills to reproduce the solution and increase the number of benefitting families; • Coastal protection was enhanced; • A saline affected area became a productive sustainable aquaculture without environmental pollution effects; • Gender and socially balanced village management committees were created.
NDC RELEVANCE	<p>This blue NbS offers:</p> <ul style="list-style-type: none"> • Deep and inclusive vulnerability and impact assessments as a preparatory stage for NDC design and implementation; • Precise NDC focus that links vulnerabilities to specific actions and targets; • Substantial adaptation and resilience benefits; • High community impact; • High scalability of action.
ADDITIONAL BENEFITS	<ul style="list-style-type: none"> • Mitigation co- benefits; • Contribution to the NDC transparency framework by gathering quantitative and qualitative data and enhance monitoring capacities.
SDGS	
LINK	

2 | ENGAGING MULTI-SECTORAL PARTNERS FOR CLIMATE RESILIENCE

COUNTRY	Philippines	
LOCATION	Siargao Island	
LEAD ORGANIZATION	Local government	
CONTEXT	<p>Communities in Siargao Island are engaged in farming, fishing, and tourism. Many live below the poverty line. Illegal fishing and unregulated mangrove cutting was widely practiced putting at risk marine and natural resources on which the communities depend for their livelihoods and to weather negative impacts from climate change.</p>	
OBJECTIVE(S)	<p>Identifying specific vulnerabilities to develop adaptation strategies through partnerships with communities, private sector, academia and NGOs.</p>	



4.1 CLIMATE CHANGE IMPACTS AND VULNERABILITY/Engaging Multi-sectoral Partners for Climate Resilience

RELEVANT BUILDING BLOCK	<ul style="list-style-type: none"> • Situation Analysis and Vulnerability Assessment (BB1) • Village level institutions (BB 2) • Construction of integrated mangrove fish ponds (BB 3) • Participatory Monitoring (BB 4)
ACTIVITIES	<ul style="list-style-type: none"> • Participatory vulnerability and risk assessments; • Establishment of communal management committees; • Construction of integrated mangrove fish ponds; • Introduction of brackish water fish in ponds to generate additional income; • Mangroves and halophytes farming; • Participatory monitoring activities.
RESULTS AND IMPACT	<ul style="list-style-type: none"> • A coordinated adaptation strategy resulting in a significant decrease in illegal fishing, mangrove cutting and other illegal activities; • Increased involvement of the community in conservation and protection activities; • Trained by local government and NGOs, fish wardens and peoples organizations now are involved in the enforcement of fisheries law, protection of protected marine areas and information campaigns against illegal fishing; • Alternative livelihood opportunities made communities less dependent on fishing activities; • The local government secured funding from the national government to set up the Siargao Climate Field School for Farmers and Fishermen; • Identification and involvement of partners with the technical knowledge and capacity to implement the adaptation strategies.
NDC RELEVANCE	<p>This Blue NbS offers:</p> <ul style="list-style-type: none"> • Inclusive vulnerability assessments as a basis for understanding the differentiated climate change impacts within different sectors of the population, such as women, men, and age groups; • Guidance to draft a holistic adaptation strategy; • Training and capacity-building of communities needed to achieve NDC targets and proposed actions; • High scalability of action.
ADDITIONAL BENEFITS	<ul style="list-style-type: none"> • Permits the design of NDC implementation and governance tools.
SDGS	
LINK	



4.1 CLIMATE CHANGE IMPACTS AND VULNERABILITY

3 | SUSTAINABLE MANAGEMENT OF MOROCCO'S MARINE RESOURCES

COUNTRY	Morocco	
LOCATION	Alboran MPA, Mar Chica Lagoon, Al Hoceima National Park (PNAH)	
LEAD ORGANIZATION	Association for Integrated Resource Management (AGIR)	
CONTEXT	Coastal cities highly dependent on marine resources where illegal fishing and trawler encroachment was a common practice.	
OBJECTIVE(S)	To help vulnerable communities adapt to climate change by creating a network of fisheries cooperatives that sustainably manage marine protected areas on the basis of scientific and local knowledge.	
RELEVANT BUILDING BLOCK	<ul style="list-style-type: none"> • Stakeholder involvement in the management of marine areas (BB 1) • Community management of no-take areas within the MPAs (BB 2) • Sustainable commercial management of marine resources in MPAs (BB 3) • Participatory research and planning through a systemic and prospective sustainability analysis (BB 4) • Network of Mediterranean Fisheries Cooperatives (BB 5) 	
ACTIVITIES	<ul style="list-style-type: none"> • Improvement of knowledge on vulnerabilities and risks by conducting targeted research and monitoring; • Use of a participatory approach to study sociocultural, economic, ecological indicators and identifying current, potential and alternative scenarios; • Creation of an integrated action program for the sustainable management of the artisanal fisheries; • Establishment of a fisheries cooperatives network; • Management of marine resources in a sustainable and commercial manner. 	
RESULTS AND IMPACT	<ul style="list-style-type: none"> • 3000 artisanal fishermen operating within three sectors of the Moroccan Mediterranean benefit from the program; • The implementation of marine protected areas managed by fishermen and fishermen wives cooperatives; • Refinement of MPAs and creation of new ones; • The eradication of dynamite and copper sulfate fishing; • Notable reduction of osprey nest disturbances and the doubling of the number of young ospreys; • Eradication of illegal trawling inside the Marine protected areas; • Poverty reduction of 30% for approximately 1200 artisanal fishermen; • Estimated 20% to 30% increase in marine species and ecosystems. 	
NDC RELEVANCE	<p>This blue NbS offers:</p> <ul style="list-style-type: none"> • High community impacts; • Adaptation actions that improve natural resources conservation and living conditions; • Resilience before climate change by reducing poverty and restoring livelihoods; • Systematic approach to research and monitoring; • High importance for ensuring the integrity of ecosystems; • Importance for communities and livelihoods resilience; • High inclusiveness level. 	


 4.1 CLIMATE CHANGE IMPACTS AND VULNERABILITY/Sustainable Management of Morocco's Marine Resources

ADDITIONAL BENEFITS	<ul style="list-style-type: none"> • Guidance for strategic planning; • Guidance for capacity building and awareness raising actions; • High importance for adaptation co-benefits.
SDGS	
LINK	



4.2 ADAPTATION

Many countries (including most developing countries) use NDCs to highlight adaptation needs and design goals and actions on adaptation alongside their mitigation commitments. The practice links Article 4 Paris Agreement (on NDCs) with Article 7 Paris Agreement, which establishes the goal of enhancing the adaptation capacity, strengthening resilience and reducing vulnerability to climate change.

While coastal communities are among those most vulnerable to the climate emergency, blue Nature-based Solutions (NbS) offer the opportunity of protecting these communities against ever more extreme weather events, rising sea levels and strained water and land resources and of improving their livelihoods.

4.2.1 Mangrove restoration

Mangroves offer coastal communities protection from flooding storms and rising sea levels, while at the same time providing a rich environment for sustainable fisheries and sustainable forms of aquaculture, benefitting families, women in particular, and communities at large.

4 | STRENGTHENING COMMUNITY LEADERSHIP FOR MANGROVE RESTORATION AND FOOD SECURITY OF THE PAZ RIVER

COUNTRY	El Salvador	
LOCATION	Communities of Garita Palmera, el Tamarinod and Bola de Monte, San Francisco Menendez, Ahuachapán	
LEAD ORGANIZATION	Unidad Ecologica Salvadoreña (UNES) and Local Committees	
CONTEXT	The Paz River course and hydrodynamics have been altered affecting water supply in the river mouth and coastal mangroves. Deforestation and agricultural practices also contribute to the mangroves degradation.	
OBJECTIVE(S)	Strengthening adaptive capacity by restoring coastal and mangrove forests and improving communities self governance and political agency.	
RELEVANT BUILDING BLOCK	<ul style="list-style-type: none"> • Action learning and monitoring to increase capacities and knowledge (BB 1) • Implementation of Mangrove restoration EbA measures (BB 2) • Strengthening water governance and leadership for adaptation (BB 3) 	



4.2 ADAPTATION /Strengthening community leadership for mangrove restoration and food security ...

ACTIVITIES	<ul style="list-style-type: none"> • Provision of training to strengthen natural resource management, local advocacy and adaptive capacities; • Implementation of joint monitoring activities; • Elimination of sediments in mangrove channels to enhance salinity levels and water quality; • Reforestation of degraded mangrove areas; • Surveillance actions by community members; • Implementation of a local plan for sustainable use of resources; • Creation of local governance structures.
RESULTS AND IMPACT	<ul style="list-style-type: none"> • Improvement on local knowledge on sustainable mangrove and water sheds management, climate change and food security; • Community ownership of EbA measures, water defense and natural resources; • Restoration of more than 3ha of mangrove and improvement of hydrological system; • Partnerships established with the Ministry of Environment and Park Rangers; • Communities involvement
NDC RELEVANCE	<p>This blue NbS offers:</p> <ul style="list-style-type: none"> • A tangible and measurable adap • Station solution for coastland countries; • Concrete, evidence based targets for adaptation actions, which often are absent in NDCs; • High mitigation impacts, by restoring and protecting carbon sinks; • An adaptation option that is gender responsive, participatory and follows a transparent approach in line with art 7.5 of the Paris Agreement.
ADDITIONAL BENEFITS	<ul style="list-style-type: none"> • Substantial mitigation benefits; • REDD+ benefits; • Use of 2013 IPCC Guidance on Wetlands can be piloted.
SDGS	
LINK	

5 | ECOSYSTEM-BASED COASTAL PROTECTION THROUGH FLOODPLAIN RESTORATION

COUNTRY	Vietnam	 <p>U-shaped fences in the provinces of Bac Lieu and Soc Trang. The long-shore elements close the eroded gap in the mangrove forest by connecting the remaining headlands. © Cong Ly, GE Wind</p>
LOCATION	Soc Trang, Bac Lieu and Ca Mau Provinces	
LEAD ORGANIZATION	GIZ	
CONTEXT	<p>Farmers and fishers communities have been affected by erosion, flooding and storms along the Mekong Delta. Due to erosion and unsustainable use of the mangroves, a 100m long stretch of mangrove forests surrounding the dyke that protected the community was destroyed. Continuous storms and floodings repeatedly damaged the dyke making reparations necessary almost every year. A long term solution was required.</p>	



4.2 ADAPTATION / Ecosystem-based coastal protection through floodplain restoration

OBJECTIVE(S)	To provide protection to people living directly behind dikes by restoring flood plains and rehabilitating mangrove forests.
RELEVANT BUILDING BLOCK	<ul style="list-style-type: none"> • Numeric modelling of hydro- and sediment dynamics (BB 1) • Planning and construction of breakwaters (BB 2) • Breakwater monitoring and maintenance (BB 3) • Mangrove protection and planting (BB 4)
ACTIVITIES	<ul style="list-style-type: none"> • Numeric modelling of hydro- and sediment dynamics; • Construction process of bamboo breakwaters used to accumulated sediment and enable conditions for mangroves restoration; • Implementation of monitoring and maintenance activities; • Mangrove protection and restoration by involving local communities in management.
RESULTS AND IMPACT	<ul style="list-style-type: none"> • Effective flood, storm surge and erosion protection; • Increased biodiversity and availability of ecosystem services; • Floodplain restoration for mangrove rehabilitation sites; • Improved security for people living behind the dyke; • Secured livelihoods by improving small-scale fishery and aquaculture; • After 9 months of the fences installation, seedlings occurred and grew well thus accomplishing their objective; • Waves no longer reach the dyke and nearby villages are less affected by wind and floods.
NDC RELEVANCE	<p>This blue NbS offers:</p> <ul style="list-style-type: none"> • A technical, scientific and local knowledge based, adaptation solution; • High importance for Ecosystems Based Adaptation; • High importance for ecosystems integrity conservation; • Effectiveness, low costs and longlasting effects of EbAs in comparison to artificial adaptation actions (e.g dykes); • Means to preserve ecosystem services and livelihoods for the communities.
ADDITIONAL BENEFITS	<ul style="list-style-type: none"> • High importance for mitigation actions by restoring mangrove forests and their capacity to act as carbon sinks; • REDD+ benefits; • Use of 2013 IPCC Guidance on Wetlands can be piloted.
SDGS	
LINK	



4.2.2 Coral reef management

Island and coastal countries are among the most affected by climate change impacts. Often exposed to hazards such as cyclones, sea levels rise and violent weather, countries require protection and means to slow or stop coast erosion and secure livelihoods, as well as alternative income activities. Coral reefs provide for a range of important climate adaptation solutions, while at the same time providing food security, and foster other income generating activities. However, these are also very fragile ecosystems and the rise in water temperature has provoked its destruction.

6 | CORAL GARDENING FOR CLIMATE CHANGE ADAPTATION IN VANUATU

COUNTRY	Vanuatu	 <p>Coral gardening @ CCCPIR-SPC/GIZ</p>
LOCATION	Pele, Shefa Province	
LEAD ORGANIZATION	SPC/GIZ in partnership with Vanuatu's Nguna-Pele Marine and Land Protected Area Network	
CONTEXT	Vanuatu, as an island country, has already started suffering the impacts of sea levels rise and extreme weather. Ocean acidification and the increase in water temperature are a direct threat to Coral Reefs and the coastal and ecosystem protection they offer to the island.	
OBJECTIVE(S)	To obtain sustainable climate change adaptation by rehabilitating coral reefs as they are essential for livelihoods, income generation and climate change adaptation.	
RELEVANT BUILDING BLOCK	<ul style="list-style-type: none"> • Climate Resilient Coral Gardening (BB 1) • Eco-tourism Partnerships (BB 2) • Participation of women and girls (BB 3) 	
ACTIVITIES	<ul style="list-style-type: none"> • Use of coral gardening to restore the reef where it has been destroyed by cyclones or other climate change linked hazards; • Adoption of eco-tourism partnerships with tour operators and bungalow owners to upscale and promote coral gardening activity; • Involvement of tourists on the program by allowing them to plant coral fragments; • Implementation of a gender approach that allowed women to appropriate the project by becoming central subjects in harvesting resources and acting as guides for tourists. 	
RESULTS AND IMPACT	<ul style="list-style-type: none"> • Since 2014 over 3000 individuals have participated of the gardening activities; • Over 3000 coral fragments have been planted on a variety of submerged structures; • Eroding coastlines are stabilizing with increased coral health; • More tolerant of heat stress coral varieties are spreading; • 7 island villages are receiving sustainable income; • Village women and girls proactively participate in the program; • Education programs have reached over 500 youth. 	



4.2 ADAPTATION /Coral gardening for Climate Change adaptation in Vanuatu

NDC RELEVANCE	<p>This blue NbS offers:</p> <ul style="list-style-type: none"> • Adaptation actions that improve natural resources conservation and living conditions; • Cost-effective NDC implementation solutions; • Increased resilience through reducing poverty and restoring livelihoods; • Systematic approach to research and monitoring.
ADDITIONAL BENEFITS	<ul style="list-style-type: none"> • Gender responsiveness; • Alternative income sources, thus diminishing the pressure over the coral reef's and marine resources.
SDGS	
LINK	

7 | AT THE WATER'S EDGE: ENHANCING COASTAL RESILIENCE IN GRENADA

COUNTRY	Grenada	 <p>Coastal erosion at Telescope Bay in Grenada © Marjo Aho</p>
LOCATION	Telescope Bay	
LEAD ORGANIZATION	The Nature Conservancy Caribbean Programme	
CONTEXT	Coastal Communities in Grenada were threatened by coastal erosion and flooding due to increasing sea level rise and storm surge. Coral reefs were also losing capacity to protect coastal communities.	
OBJECTIVE(S)	To build social and ecological resilience through the implementation of nature based solutions including the installation of artificial reef structures.	
RELEVANT BUILDING BLOCK	<ul style="list-style-type: none"> • Climate change impact visualisation (BB 1) • Integrated vulnerability assessment (BB 2) • Informed Decision Making (BB 3) • Reef enhancement for coastal protection (BB 4) 	
ACTIVITIES	<ul style="list-style-type: none"> • Climate change impact and vulnerability assessments; • Development of visualization tools included web-based maps; community surveys and participatory 3D mapping; • Creation of online platform that reflects relevant information for decision making and adaptation planning processes; • Installation of reef structures designed to provide fish and coral habitat, break wave energy and reduce coastal erosion and flooding. 	



4.2 ADAPTATION / At the water's edge: enhancing coastal resilience in Grenada

RESULTS AND IMPACT	<ul style="list-style-type: none"> • Integration of 400 community members knowledge to the vulnerability assessment and visualization tools. • Increased social cohesion amongst community members • Increased awareness of environmental issues affecting communities • Creation of training and employment opportunities for community members. • Attenuation of water energy and coastal erosion.
NDC RELEVANCE	<p>This blue NbS offers:</p> <ul style="list-style-type: none"> • A technical, scientific and local knowledge based, adaptation solution; • High importance for EbA; • High importance for vulnerability reduction by restoring coral reefs and their capacity to stop coastal erosion; • High importance for ecosystems integrity conservation; • Effectiveness, low costs and longlasting effects of EbA; • Means to preserve ecosystem services and livelihoods for the communities; • High social inclusiveness;
ADDITIONAL BENEFITS	<ul style="list-style-type: none"> • Adaptation co-benefits such as job creation and alternative income sources; • Restoration of landscapes and highly degraded areas.
SDGS	
LINK	



4.2.3 Bottom-up governance

Local and traditional knowledge, expertise and good practices can steer Blue NbS and thereby inform national policy plans by providing knowledge about the effectiveness of NbS and by fostering societal participation in their implementation. Robust community governance is also a key feature of NDC implementation across sectors, but in particular in the context of land and coastal planning and use.

8 | MULTI-SECTORAL COASTAL AND MARINE MANAGEMENT VISION

COUNTRY	Costa Rica	<p>Regulated resource use in the managed area © BIOMARCC-GIZ</p>
LOCATION	Nicoya	
LEAD ORGANIZATION	GIZ Costa Rica	
CONTEXT	Coastal communities, mainly dependent of artisanal fishing, were suffering the negative consequences of unsustainable exploitation of marine resources by different stakeholders.	
OBJECTIVE(S)	To provide a solution to the general problem of ingovernability of seascapes and unsustainable management.	
RELEVANT BUILDING BLOCK	<ul style="list-style-type: none"> • National protected areas coverage analysis (BB 1) • Vulnerability and climate risk assessment (BB 2) • Legally established participatory process (BB 3) • Multi-sectorial dialogue platform (BB 4) • Governance model (BB 5) 	
ACTIVITIES	<ul style="list-style-type: none"> • Implementation of gap analysis to prioritize sites of importance for conservation; • Prioritization of adaptation actions for protected areas and districts, such as recovering mangrove forests, beach terraces and the relocation of touristic trails; • Adoption of an administrative resolution at a national level to support the process and determine its feasibility; • Identification of stakeholders to promote voluntary participation and ensure the inclusion of local authorities, fishermen, and local residents. 	
RESULTS AND IMPACT	<ul style="list-style-type: none"> • Establishment of the multisectoral dialogue platform to address the issues of geographical delimitation and the governance model with roles and responsibilities by sector and areas of use; • Implementation agreements have been adopted; • Improved relations between actors and empowerment of local stakeholders; • Increased clarity about the needs of local communities regarding coastal resources management. 	
NDC RELEVANCE	<p>This blue NbS offers:</p> <ul style="list-style-type: none"> • Good governance practices with a high level of social inclusion. • Adaptation planning and solutions based on scientific and local knowledge. • Participatory process that informs national policy building. 	
ADDITIONAL BENEFITS	<ul style="list-style-type: none"> • High community impact; • High scalability of action; 	



4.2 ADAPTATION / Multi-sectoral coastal and marine management vision

SDGS	    
LINK	

9 | LAURU RIDGES TO REEFS PROTECTED AREA NETWORK (LAURU PAN)

COUNTRY	Solomon Islands	<p>Rich in natural resources: Lauru in the Solomon Islands © James Hardcastle</p> 
LOCATION	Choiseul Province, Lauru	
LEAD ORGANIZATION	Provincial government, LLCTC and TNC	
CONTEXT	Coastal communities of Lauru noticed the risk of unsustainable use of marine resources and were interested in improving their conservation and sustainable management.	
OBJECTIVE(S)	To constitute a network of Marine protected areas to strengthen marine resources protection and make a sustainable use of them.	
RELEVANT BUILDING BLOCK	<ul style="list-style-type: none"> • Conservation plan built on local and scientific knowledge (BB 1) • Consultative establishment of protected area sites (BB 2) • Continued collaboration between all stakeholders (BB 3) • Coordinated monitoring of protected areas (BB 4) • Overseeing implementation of the network (BB 5) • Support in developing alternative livelihoods (BB 6) 	
ACTIVITIES	<ul style="list-style-type: none"> • Implementation of participatory process based on scientific and local knowledge to build a conservation plan; • Establishment of protected area sites through a consultative process. A committee formed by the community oversees and manages the new protected areas, and the management plans included in the network master plan; • Establishment of a communal monitoring and dispute settlement process; • Coordinated and continuous monitoring activities; • Constitution of an environmental and conservation committee, integrated by representatives of all sectors, to oversee the implementation of the network of protected areas; • Development of alternative livelihoods to mitigate the opportunity cost of conservation actions. 	



4.2 ADAPTATION / Lauru Ridges to Reefs Protected Area Network (Lauru PAN)

RESULTS AND IMPACT	<ul style="list-style-type: none"> Local communities have full ownership in the establishment of the Lauru Ridges to Reefs Protected Area Network; Stocks of commercial species have recovered; Alternative livelihood options have generated revenues; LLCTC has requests to set up another 15 sites; The Choiseul Provincial government is working to bring the protected area network into law.
NDC RELEVANCE	<p>This blue NbS offers:</p> <ul style="list-style-type: none"> High scalability of action from a local to national wide level; Adaptation actions that improve natural resources conservation and living conditions; Resilience before climate change by reducing poverty and restoring livelihoods; Good governance practices with a high level of social inclusion.
ADDITIONAL BENEFITS	<ul style="list-style-type: none"> Systemic approach to research and monitoring; Guidance for strategic planning; Guidance for capacity building and awareness raising actions; Community ownership;
SDGS	
LINK	



4.3 MITIGATION

Coastal wetlands are massive carbon sinks. Their degradation – from agricultural encroachment, pollution, timber extraction, aquaculture, infrastructure and development – leads to substantial emissions. Conservation and restoration, by contrast, help reduce a country's GHG emissions and enhance existing carbon stocks (carbon removals).

While the incentive instruments foreseen under the Paris Agreement (cf. Article 6 enhanced ambition instruments) are not yet fully operational, global mechanisms to incentivize mitigation action through conservation and restoration of coastal wetlands do exist and are accessible for public and private entities alike. Voluntary carbon markets, in particular, present an ad-hoc opportunity in the sense that the methodologies and market platforms for carbon asset generation and marketing are readily available.

10 | AN INCENTIVIZED, PARTICIPATORY APPROACH TO MANGROVE CONSERVATION

COUNTRY	Madagascar	 <p>Theory of change © Cicelin R., Blue Ventures</p>
LOCATION	Andavadoaka	
LEAD ORGANIZATION	Blue Ventures	
CONTEXT	Coastal communities in Madagascar highly dependent on mangroves for livelihoods and basic resources. The overexploitation of mangroves for wood and commercial use caused widespread degradation and deforestation.	
OBJECTIVE(S)	Restoring mangroves through carbon finance (larger-scale).	
RELEVANT BUILDING BLOCK	<ul style="list-style-type: none"> • Participatory mapping for management (BB 1) • Participatory theory of change (BB 2) • Participatory forest management plan (BB 3) • Participatory monitoring (BB 4) • Mangrove reforestation by communities (BB 5) 	
ACTIVITIES	<ul style="list-style-type: none"> • Implementation of participatory mapping with the communities to understand the state and use of mangroves; • Development of a participatory research approach to understand degradation drivers and possible solutions; • Creation of a Forest Management Plan with the community; • Implementation of monitoring activities with the communities' participation, including carbon monitoring; • Education of community members on carbon benefits and mangroves management; • Reforestation of mangroves in degraded areas; • Use of carbon credits to finance the project activities and community initiatives. 	
RESULTS AND IMPACT	<ul style="list-style-type: none"> • Strict protection of 830 mangrove hectares against logging to enhance carbon stocks; • 1877 hectares of mangrove harvested by the community under a controlled regime; • 1095 hectares designated for replantation. 12 ha have been planted. 	



4.3 ADAPTATION / An incentivized, participatory approach to mangrove conservation

NDC RELEVANCE	<p>This blue NbS offers:</p> <ul style="list-style-type: none"> • High mitigation impacts, by restoring and protecting carbon sinks; • Adaptation actions that improve natural resources conservation and living conditions; • Resilience before climate change by reducing poverty and offering alternative livelihoods;
ADDITIONAL BENEFITS	<ul style="list-style-type: none"> • Gender responsive solution; • Community appropriation; • Guidance for conducting participatory analysis and research; • Good governance practices with a high level of social inclusion; • High importance for ecosystems integrity conservation; • Pilot function for Art. 6 enhance ambition instruments foreseen under the Paris Agreement; • Innovative financial mechanism.
SDGS	
LINK	

11 | BLUE CARBON CREDITS FINANCING COMMUNITY BASED MANGROVE MANAGEMENT

COUNTRY	Kenya	 <p>KMFRI research work © Mikoko Pamoja</p>
LOCATION	Gazi Beach	
LEAD ORGANIZATION	Mikoko Pamoja Community Organization	
CONTEXT	Coastal communities close to natural protected areas and highly dependent on mangroves and marine resources.	
OBJECTIVE(S)	Protecting and restoring mangroves using carbon finance (small-scale).	
RELEVANT BUILDING BLOCK	<ul style="list-style-type: none"> • Participatory Forest (BB 1) • Forest Management Agreement (BB 2) • Carbon know-how through strong partnership (BB 3) • Community environmental education and awareness (BB 4) 	



4.3 ADAPTATION / Blue carbon credits financing community based mangrove management

ACTIVITIES	<ul style="list-style-type: none"> • Formation of Community Forest Associations; • Development of Participatory Forest Management Plans; • Signing of the Forest Management Agreement with the Kenya Forest Service to implement the management plan and ensure community's ownership of resulting carbon credits; • Collaboration with the Kenya Marine and Fisheries Research Institute to determine carbon stocks and baselines, and to conduct monitoring activities; • Implementation of awareness and education on the local and global significance of mangrove ecosystems, and carbon financing; • Restoration and protection of mangrove forests.
RESULTS AND IMPACT	<ul style="list-style-type: none"> • Plantation of 10 hectares of mangrove forest in 3 years; • 7000 seedlings planted in the past 2 years. Planting is a continuous activity, the goal is to plant 4000 seedling per year; • 6000 to 7000 persons employed to work in the project, therefore direct beneficiaries; • A total emission reduction of 50000t Co2 is expected in 20 years; • Successful financing of community projects in health, education and mangrove management; • Improved education standards and awareness for the importance of healthy mangroves.
NDC RELEVANCE	<p>This blue NbS offers:</p> <ul style="list-style-type: none"> • High mitigation impacts, by restoring and protecting carbon sinks; • Adaptation actions that improve natural resources conservation and living conditions; • Resilience before climate change by reducing poverty and promoting jobs creation; • Good governance practices with a high level of social inclusion.
ADDITIONAL BENEFITS	<ul style="list-style-type: none"> • Guidance for community involvement in the protection of national protected areas; • Guidance for strategic planning; • Guidance for capacity building and awareness raising actions; • Community ownership; • High scalability of action from a local to national wide level; • Pilot function for Art. 6 enhance ambition instruments foreseen under the Paris Agreement; • Innovative financial mechanism.
SDGS	
LINK	



4.4 MITIGATION/ADAPTATION CO-BENEFITS:

4.4.1 Alternative incomes

Nature-based climate solutions are unique in that their benefits are usually not confined to climate change mitigation and/or adaptation but move beyond climate impacts proper yielding a range of social, economic and cultural benefits.

Conservation and restoration of coastal habitats are never a purpose in themselves. They ensure the continuation (or restatement) of important ecosystem services such as clean water supply, food supply and protection from natural hazards. They also provide a wide range of sustainable economic and income-generating opportunities for local communities.

12 | BUILDING WITH NATURE FOR SAFE, PROSPEROUS AND ADAPTIVE COASTLINES

COUNTRY	Indonesia	<p>Securing eroding delta coastlines © INFIS</p>
LOCATION	Demak, Central Java Province	
LEAD ORGANIZATION	Wetlands International	
CONTEXT	Coastal territories impacted by floods resulting in destroyed infrastructure and productive land, drinking water pollution, reduction of aquaculture and other natural resources necessary for income generation.	
OBJECTIVE(S)	To increase resilience of 20 km of coastline before climate change combining civil engineering with mangrove rehabilitation.	
RELEVANT BUILDING BLOCK	<ul style="list-style-type: none"> • Construction of permeable dam structures as sediment traps and basis for mangrove rehabilitation (BB 1) • Socio-economic measures to promote sustainable land-use (BB 2) • Capacity building on "Building with Nature solutions" targeted at government officials, private sector, students and local communities (BB 3) • Policy dialogue to develop governance arrangements for improved coastal zone management (BB 4) 	
ACTIVITIES	<ul style="list-style-type: none"> • Restoration of sediment balance by using permeable dams and mud nourishment; • Rehabilitation of mangroves on sediment restored areas; • Development of sustainable aquaculture; • Introduction of livelihoods diversification (seaweed cultivation, crab, shirmp); • Implementation of three different training curricula targeting government, private sector and communities; • Development of 10 year village management plans to inform the national master planning processes on coastal management. 	



4.4 MITIGATION/ADAPTATION CO-BENEFITS/ Building with Nature for safe, prosperous and adaptive coastlines

RESULTS AND IMPACT	<ul style="list-style-type: none"> • 45 cm of mud trapped and growing of Avicennia mangrove juveniles of 50 cm tall within 1.5 year; • 10 community groups are supported through farmer field schools and provided with resources to initiate new aquaculture management practices and livelihood diversification, benefiting 300 households; • Coastal security, safety, economic growth and self reliance of 70,000 vulnerable farmers and fishermen and women; • Improvement of food and income security; • Revitalization of 6000ha of aquaculture ponds.
NDC RELEVANCE	<p>This blue NbS offers:</p> <ul style="list-style-type: none"> • Reduces risks before climate change hazards onto development sectors; • High importance for Ecosystema Based Adaptation; • High importance for ecosystems integrity conservation; • Effectiveness, low costs and longlasting effects of EbAs in comparison to artificial adaptation actions.
ADDITIONAL BENEFITS	<ul style="list-style-type: none"> • High importance for mitigation actions by restoring mangrove forests and their capacity to act as carbon sinks; • REDD+ benefits; • Use of 2013 IPCC Guidance on Wetlands can be piloted; • Guidance for community involvement in the protection of national protected areas; • Guidance for strategic planning; • Guidance for capacity building; • High scalability of action from a local to national wide level.
SDGS	
LINK	

13 | COMMUNITY MANGROVE RESTORATION WITHIN THE MUNI-POMADZE RAMSAR SITE

COUNTRY	Ghana	 <p style="text-align: right;">Planting mangroves along the shore © A Rocha Ghana</p>
LOCATION	Muni Pomadze Ramsar Site, Ghana, Central Region	
LEAD ORGANIZATION	A Rocha Ghana	
CONTEXT	Communities dependent on the Ramsar site for income generation were suffering the negative impacts of mangrove degradation caused by antropogenic activities. For instance, fish resources declining and poor water quality.	



4.4 MITIGATION/ADAPTATION CO-BENEFITS/ Community Mangrove Restoration within the Muni-Pomadze

OBJECTIVE(S)	To restore the mangrove degraded area along the Muni Lagoon and its ecological integrity, while providing alternative income sources to reduce the pressure over the ecosystem.
RELEVANT BUILDING BLOCK	<ul style="list-style-type: none"> • Communication of challenges and solutions (BB 1) • Development of new sustainable decision-making skills (BB 2) • Participatory development of alternative livelihoods (BB 3) • Participatory landscape managements (BB 4)
ACTIVITIES	<ul style="list-style-type: none"> • Implementation of a communication strategy to raise awareness on the impacts of their actions and possible solutions; • Identification of capacity gaps; • Implementation of a training strategy on conservation, alternative livelihood options, and restoration of degraded habitats; • Identification of alternative livelihood options through a participatory dialogue; • Beneficiaries were provided with startup capital in the form of equipment; • Restoration of mangroves.
RESULTS AND IMPACT	<ul style="list-style-type: none"> • Replantation of 7.5 ha of mangroves out of the 30 ha goal; • Improvement of fish spawning areas; • Increase in migratory birds population; • Household incomes increased by 10%; • Women empowerment and economic independence increased.
NDC RELEVANCE	<p>This blue NbS offers:</p> <ul style="list-style-type: none"> • Comprehensive adaptation solution that improves natural resources conservation and living conditions; • Increased resilience through reducing poverty and restoring livelihoods by generating alternative income sources; • Pressure reduction over mangroves and other natural resources; • Gender responsive solution; • Community appropriation; • High importance for ecosystems integrity conservation.
ADDITIONAL BENEFITS	<ul style="list-style-type: none"> • Guidance for awareness raising strategies; • Guidance for conducting participatory analysis; • High level of social inclusion.
SDGS	
LINK	



4.5 CAPACITY DEVELOPMENT

The integration of ocean and marine matters into climate change policymaking and implementation requires a wide-reaching, complex set of capacities (technical, legal, governance-related, and more). At the same time, engaging in marine and coastal activities provides and creates capacity to move from projects to policies, from small to big, and from grassroots action to mainstreaming exercises.

14 | BLUE CARBON A – Z: FROM SMALL PROJECTS TO POLICY DEVELOPMENT

COUNTRY	Costa Rica	 <p>Mangrove research helps improve 'blue carbon' project planning and design © Miguel Cifuentes</p>
LOCATION	Nicoya, Guanacaste	
LEAD ORGANIZATION	CATIE	
CONTEXT	Communities and governments interested in Blue Carbon solutions with limited knowledge and implementation capacities.	
OBJECTIVE(S)	To facilitate the development of sound scientific and political frameworks, including carbon stock inventories, livelihoods and vulnerability studies, and assessments of land/use dynamics.	
BUILDING BLOCKS	<ul style="list-style-type: none"> • Carbon inventories in mangrove ecosystems (BB1) • Social and ecological vulnerability assessments (BB 2) • Geospatial and emissions modelling (BB 3) • Ecosystem services valuation (BB 4) • Development of national policy frameworks (BB 5) 	
ACTIVITIES	<ul style="list-style-type: none"> • Elaboration of carbon inventories. • Social and ecological vulnerability assessments. • Implementation of a geospatial analysis on the basis of satellite images. • Valuation of ecosystem services through a participatory process. • Provision of technical knowledge on policy making processes that will inform national plans. • Transfer of knowledge and promotion of Blue Carbon solutions to other countries within the region. 	
RESULTS AND IMPACT	<ul style="list-style-type: none"> • Local organizations' capacities enhanced and empowered to conduct conservation actions. • Completion of an estimate study on natural capital loss due to mangrove area losses. • Increased government's interest on mangrove protection and blue carbon projects. • Support provided in the creation of a blue carbon strategy that will be part of the National Wetlands Policy. • Fueled dialogues across Central America and Mexico. 	
NDC RELEVANCE	<p>This blue NbS offers:</p> <ul style="list-style-type: none"> • Deep and inclusive vulnerability and impact assessments as a preparatory stage for NDC design and implementation; • Contribution to the NDC transparency framework by gathering quantitative and qualitative data and enhance monitoring capacities. • High community impact; • High scalability of action. 	



4.5 CAPACITY DEVELOPMENT / Blue Carbon A-Z: from small projects to policy development

ADDITIONAL BENEFITS	<ul style="list-style-type: none"> • Guidance for strategic planning; • Guidance for capacity building and awareness raising actions;
SDGS	    
LINK	

15 | 'PESCA RESPONSABLE': RESPONDING TO CLIMATE CHANGE THROUGH SUSTAINABLE RESPONSIBLE FISHING AND MANGROVE REHABILITATION

COUNTRY	Mexico	 <p>La Encrucijada © Ana Elisa Peña Del Valle Isla</p>
LOCATION	Reserva de la Biosfera La Encrucijada, Villa Comaltitlán, Chiapas,	
LEAD ORGANIZATION	Comisión Nacional de Áreas Naturales Protegidas (CONANP, México)	
CONTEXT	Fishing, ranching and farming communities settled between the mountains and two large coastal lagoon systems; whose economic activities have degraded the ecosystem thus aggravating climate change risks and vulnerabilities.	
OBJECTIVE(S)	To foster communities' ownership and involvement in a participatory management strategy to preserve the biosphere reserve and promote a sustainable management of resources.	
BUILDING BLOCKS	<ul style="list-style-type: none"> • Creating a sense of belonging to local ecosystems (BB 1) • Increasing community self-organization (BB 2) • Creating adaptive capacity as a buffer against risk (BB 3) • Rehabilitating channels and hydrological flows in mangroves (BB 4) 	
ACTIVITIES	<ul style="list-style-type: none"> • Rehabilitation and maintenance of mangrove ecosystems, and hydrological flows; • Promotion and improvement of community self-organization; • Involvement of women and children in sustainable alternative income sources; • Capacity building on fishing catch limits and productivity possibilities, zoning plans and collective decision making processes; • Increase of communities' capacity to negotiate and regulate sustainable fishing and access markets directly, avoiding intermediaries; • Capacity development to touristic business development and administration; • Diversification of economic activities towards mangrove related ecotourism and mangrove flower honey production; • Awareness raising withing local communities of the connection between mangrove ecosystems and local livelihoods; • Involvement of women and children in awareness raising activities, thus strengthening the learning process within families. 	



4.5. CAPACITY DEVELOPMENT / "Pesca Responsable": responding to climate change...

RESULTS AND IMPACT	<ul style="list-style-type: none"> • 591 direct beneficiaries of 8 local communities comprising 3029 habitants; • Improved, sustainable fishin practices and increased catches. • Rehabilitation of 84 km of canals, estuaries and lagoons; • Improvement of water quality, ecosystem productivity, greater mangrove seed dispersal, and species dicersity; • Increased incomes for eight fishing communities; • Improved governance systems within fishing communities. • Strengthened social cohesion.
NDC RELEVANCE	<p>This blue NbS offers:</p> <ul style="list-style-type: none"> • Guidance for capacity building and awareness raising actions; • High community impact; • High scalability of action; • Reduces risks before climate change hazards onto development sectors; • High importance for ecosystems integrity conservation; • High importance for mitigation actions by restoring mangrove forests and their capacity to act as carbon sinks;
ADDITIONAL BENEFITS	<ul style="list-style-type: none"> • Guidance for strategic planning; • Gender responsiveness; • REDD+ benefits; • Use of 2013 IPCC Guidance on Wetlands can be piloted; • Guidance for community involvement in the protection of national protected areas.
SDGS	
LINK	

16 | MARINE PROTECTED AREA LEARNING SITE FOR THE CORAL TRIANGLE

COUNTRY	Indonesia	 <p>Seaweed farming in Nusa Penida © Marie Fischborn</p>
LOCATION	Nusa Penida, Bali	
LEAD ORGANIZATION	Coral Triangle Center	
CONTEXT	<p>Nusa Penida has 45,000 inhabitants highly dependent on marine resources, however mangrove deforestation, unlicensed fishing, sewage, pollution coral mining and climate change effects threaten biodiversity, ecosystems and livelihoods.</p>	
OBJECTIVE(S)	<p>Address unsustainable practices that degradate the ecosystems and threaten biodiversity and livelihoods.</p>	



4.5. CAPACITY DEVELOPMENT / Marine protected area learning site for the Coral Triangle

BUILDING BLOCKS	<ul style="list-style-type: none"> • Baseline data collection (BB 1) • Consultative development: zoning and management plan (BB 2) • Sustainable financing mechanism (BB 3) • Collaborative management of all stakeholders (BB 4) • Ecological restoration (BB 5) • Sharing experiences to support other sites (BB 6)
ACTIVITIES	<ul style="list-style-type: none"> • Provision of marine education training on the island, including mangrove replanting; • Development of a mangrove seed bank; • Development of a MPA with local communities and authorities, • Adoption of partnerships with tour operators and targeted tourism promotion; • Collection of scientific data through a participatory process to determine criteria for establishment of protection zones and discussions with local stakeholders; • Introduction of an entrance fee mechanism for tourists willing to visit Nusa Penida; • Establishment of a management body between local government and communities; • Rehabilitation of degraded mangroves and corals to improve resilience and reduce climate change effects; • Implementation of a continuous training and outreach strategy so that Nusa Penida becomes a learning site.
RESULTS AND IMPACT	<ul style="list-style-type: none"> • Stabilization of coral reef conditions and fish populations; • Sustainable dive tourism implementation; • Full protection of Mola mola and Manta Ray species; • Successful implementation of eco-tourism at the Marine Protected Area (MPA), in 2016 256000 persons visited the MPA.
NDC RELEVANCE	<p>This blue NbS offers:</p> <ul style="list-style-type: none"> • Guidance for capacity building and awareness raising actions; • High community impact and ownership; • High scalability of action; • Reduces risks before climate change hazards; • High importance for ecosystems integrity conservation; • High importance for mitigation actions by restoring mangrove forests and their capacity to act as carbon sinks; • High importance for adaptation.
ADDITIONAL BENEFITS	<ul style="list-style-type: none"> • Guidance for strategic planning; • REDD+ benefits; • Use of 2013 IPCC Guidance on Wetlands can be piloted; • Guidance for community involvement in the protection of national protected areas; • Alternative income strategies. • Innovative financial mechanism.
SDGS	
LINK	



4.6 RESEARCH AND MONITORING

To firmly place Blue NbS in policy plans and practical action robust research is needed and a robust monitoring framework needs to be built. Tracing impact – in terms of climate mitigation, adaptation, biodiversity benefits, livelihoods, etc. – is often complex and needs bespoke solutions integrating the knowledge base and the workforce of local communities.

17 | EMPOWERING ISLAND COMMUNITIES: THE USE OF COST-BENEFIT ANALYSIS TO SUPPORT INFORMED CLIMATE CHANGE DECISIONS

COUNTRY	Federal States of Micronesia	<p>Malem survey team © Luke Brander</p>
LOCATION	Palau	
LEAD ORGANIZATION	Brander Environmental Economics	
CONTEXT	Communities at low-lying atoll island and high islands affected by the increasing risk of climate change impacts on community livelihoods and welfare.	
OBJECTIVE(S)	To identify and select ecosystem based adaptation solutions through a participatory process.	
BUILDING BLOCKS	<ul style="list-style-type: none"> Identifying EbA solutions through participatory assessments (BB 1) Steps towards effectively communicating EbA solutions and trade-offs to stakeholders (BB 2) 	
ACTIVITIES	<ul style="list-style-type: none"> Local participatory assessments to identify threats and potential solutions; Collection of information through household surveys on income sources and dependence on natural resources; Implementation of a social cost benefit analysis, including impacts on ecosystem services; Outcomes shared with communities through key messages and non technical languages emphasising impacts on welfare, traditions and customary rules. 	
RESULTS AND IMPACT	<ul style="list-style-type: none"> Local communities took informed decisions on which adaptation project better suits their needs; Adoption of revegetation to control erosion, management of waste and land planning were adopted as adaptation solutions. 	
NDC RELEVANCE	<p>This blue NbS offers:</p> <ul style="list-style-type: none"> Deep and inclusive vulnerability and impact assessments as a preparatory stage for NDC design and implementation; Contribution to the NDC transparency framework by gathering quantitative and qualitative data and enhance monitoring capacities. High community impact; High importance for Ecosystema Based Adaptation; Systemic approach to research High scalability of action. 	
ADDITIONAL BENEFITS	<ul style="list-style-type: none"> Guidance for strategic planning; Guidance for capacity building and awareness raising actions; 	



4.6 RESEARCH AND MONITORING / Empowering island communities: the use of cost-benefit analysis...

SDGS	   
LINK	

18 | COMMUNITY-BASED ECOLOGICAL MANGROVE RESTORATION (CBEMR)

COUNTRY	Thailand	
LOCATION	Trang Provinve, Adaman Coast	
LEAD ORGANIZATION	Mangrove Action Project (MAP)	
CONTEXT	Coastal communities affected by high levels of mangrove degradation.	
OBJECTIVE(S)	To restore barren, unproductive areas into healthy mangrove ecosystems to protect communities from natural disasters and sustain their livelihoods.	
BUILDING BLOCKS	<ul style="list-style-type: none"> • Community awareness, participation and stewardship (BB 1) • Historical and ecological background information collection (BB 2) • Site suitability assessment (BB 3) • Customized mangrove restoration (BB 4) • Long-term monitoring (BB 5) 	
ACTIVITIES	<ul style="list-style-type: none"> • Engagement of local communities in early planning by discussing restoration objectives, protection plans and co-management plans; • Implementations of trainings and development of small scale nurseries; • Communities involvement in monitoring process by observing tidal exchange, measuring seedling recruitment, and photo monitoring; • Data collection on land tenure, historical changes, local utilization, mangrove distribution and tide chars; • Identification of suitable restoration sites; • Mangrove restoration • Implementation of regular and long term monitoring. 	
RESULTS AND IMPACT	<ul style="list-style-type: none"> • 9 mangrove species and associates growing in the pond after 3 years of implementation; • Long term success rate in recovering natural mangrove biodiversity; • Consolidation of community stewardship and site protection from encroachment or degradation. 	



4.6 RESEARCH AND MONITORING / Community-Based Ecological Mangrove Restoration (CBEMR)

NDC RELEVANCE	<p>This blue NbS offers:</p> <ul style="list-style-type: none"> • High mitigation impacts, by restoring and protecting carbon sinks; • Adaptation actions that improve natural resources conservation and living conditions; • Community appropriation; • Guidance for conducting participatory analysis and research; • Good governance practices with a high level of social inclusion; • High importance for ecosystems integrity conservation;
ADDITIONAL BENEFITS	<ul style="list-style-type: none"> • REDD+ benefits; • Use of 2013 IPCC Guidance on Wetlands can be piloted; • Guidance for community involvement in the protection of national protected areas;
SDGS	
LINK	



4.7 LOCAL KNOWLEDGE

A great number of Blue NbS imitate or reflect traditional practices and local knowledge pushed aside over decades, if not centuries, by vertical political, economic and technological innovation and advances. Restating these practices and knowledge bases requires close engagement with local communities and the move to a more horizontal governance framework.

19 | ADDRESSING RESOURCE DEGRADATION TO ENHANCE CLIMATE CHANGE RESILIENCES

COUNTRY	Senegal	 <p style="text-align: right; font-size: small;">Senegal © IUCN Radhika Murti</p>
LOCATION	Saloum Delta Biosphere Reserve	
LEAD ORGANIZATION	International Union for Conservation of Nature (IUCN)	
CONTEXT	Climate change is exacerbating food insecurity and vulnerabilities in communities dependent on farming, rearing, fishery, tourism and salt extraction.	
OBJECTIVE(S)	To use local knowledge to reforest areas, restore degraded lands and regulate natural resources use.	
BUILDING BLOCKS	<ul style="list-style-type: none"> • Design of participatory steps for village engagement (BB 1) • Capacity building of local stakeholders (BB 2) • Documenting strategies and success evaluation (BB 3) • Creation of awareness raising and policy influencing tools (BB 4) • Facilitation of livelihood and economic diversification (BB 5) 	
ACTIVITIES	<ul style="list-style-type: none"> • Implementation of a Climate vulnerability and capacity assessment; • Identification of local knowledge based techniques for anti-salt bund and assisted natural regeneration; • Use of assisted natural regeneration and local traditional techniques such as “Facine” to enhance climate change resilience and reduce water erosion and salinization; • Development of communities capacities to foster the use of local techniques; • Creation of village committees to coordinate the implementation and act as advisory boards; • Regular monitor and evaluation of results and impact of such techniques; • Creation of tools to share information and knowledge; • Diversification of livelihoods; • Creation of multi-stakeholder dialogue platforms. 	
RESULTS AND IMPACT	<ul style="list-style-type: none"> • 6 villages are project beneficiaries, including farmers, market gardeners, pastoralist, men and women and local authorities. Its estimated that 20,000 persons will benefit from the project; • Restoration of 130 ha of forest; • 180 ha are currently being restored by 59 anti-salt bunds constructed with local materials; • 100 stakeholders trained on Assisted Natural Regeneration and anti-salt bunds techniques for the establishment and maintenance of three nurseries. 	



4.7 LOCAL KNOWLEDGE / Addressing resource degradation to enhance climate change resiliences

NDC RELEVANCE	<p>This blue NbS offers:</p> <ul style="list-style-type: none"> • A technical, scientific and local knowledge based, adaptation solution; • High importance for Ecosystema Based Adaptation; • High importance for ecosystems integrity conservation; • Deep and inclusive vulnerability and impact assessments as a preparatory stage for NDC design and implementation; • Precise NDC focus that links vulnerabilities to specific actions and targets; • Substantial adaptation and resilience benefits; • High community impact; • High scalability of action; • Training and capacity-building of communities needed to achieve NDC targets and proposed actions; • Means to preserve ecosystem services and livelihoods for the communities.
ADDITIONAL BENEFITS	<ul style="list-style-type: none"> • Mitigation co- benefits; • Contribution to the NDC transparency framework by gathering quantitative and qualitative data and enhance monitoring capacities; • Training and capacity-building of communities needed to achieve NDC targets and proposed actions; • Substantial mitigation benefits; • REDD+ benefits; • Use of 2013 IPCC Guidance on Wetlands can be piloted.
SDGS	
LINK	

20 | THE PALAU NATIONAL MARINE SANCTUARY: PROTECTING A NATION'S ENTIRE MARINE TERRITORY TO ENSURE SUSTAINABLE DEVELOPMENT, ENHANCE FOOD SECURITY, BOOS TOURISM AND ENRICH BIODIVERSITY CONSERVATION

COUNTRY	Palau	 <p>Rock Island Southern Lagoon, Palau © Keobel Sakuma</p>
LOCATION	Entire marine territory	
LEAD ORGANIZATION	Palau National Marine Sactuary	
CONTEXT	<p>Marine area of over 630,00 square kilometers were illegal and unregulated fishing, human and drug trafficking was a constant. The country was dependent on a export-based commercial fishing industry.</p>	
OBJECTIVE(S)	<p>To dedicate the entire marine territory to conservation by protecting the Exlusive Economic Zone, using tradicional practices of whole domain management and promote a holistic sustainable development.</p>	



4.7 LOCAL KNOWLEDGE / The Palau National Marine Sanctuary: Protecting a nation's entire marine territory...

BUILDING BLOCKS	<ul style="list-style-type: none"> • Developing a management model based on traditional knowledge (BB 1) • Establishing a sustainable financing mechanism (BB 2) • Importance of partnerships in developing surveillance and enforcement capacity (BB 3)
ACTIVITIES	<ul style="list-style-type: none"> • Use of the vulnerable reef areas protection traditional technique known as “bul”, which sets off limits fishing to protect biodiversity and livelihoods; • Development of a whole domain management approach on the basis of the “bul” technique; • Establishment of a tourism visitors fee which will finance surveillance, enforcement and the administration of the PNMS; • Implementation of funds raising strategies and establishment of a Sanctuary Endowment fund to place contributions; • Establishment a comprehensive monitoring, control and surveillance strategy with the support and partnership with fellow nations.
RESULTS AND IMPACT	<ul style="list-style-type: none"> • Managing 80% of the marine protected area as a no take zone; • Immediate protection of marine mammals, sharks and rays; • More effective means of prosecution; • Projected transition to a truly domestic, sustainable fishing industry; • Projected increase of ecotourism.
NDC RELEVANCE	<p>This blue NbS offers:</p> <ul style="list-style-type: none"> • A technical, scientific and local knowledge based, adaptation solution; • High importance for ecosystems integrity conservation; • Means to preserve ecosystem services and livelihoods for the communities; • High community impacts; • Adaptation actions that improve natural resources conservation and living conditions; • Importance for communities and livelihoods resilience; • High inclusiveness level.
ADDITIONAL BENEFITS	<ul style="list-style-type: none"> • Guidance for strategic planning; • Guidance for capacity building and awareness raising actions; • High importance for adaptation co-benefits; • Innovative financial mechanism.
SDGS	
LINK	



4.8 AWARENESS RAISING

Blue NbS are first and foremost information tools, and they start with awareness raising. It is striking to see how little regard is often paid by policymakers, planners, investors and so on for basic ecosystem services. This is just as often caused by a lack of knowledge, not disregard. Awareness raising campaigns to demonstrate the value of ecosystem services, provide cost-benefit assessments, and mainstream information into planning and policy processes are indispensable elements when designing and implementing Blue NbS.

21 | VALUATING CLIMATE ADAPTATION OPTIONS ON PLACENCIA PENINSULA

COUNTRY	Belize	 <p>Mangrove Boardwalk on Cocoplum Resort and Residential Development © Nadia Bood</p>
LOCATION	Placencia Peninsula	
LEAD ORGANIZATION	WWF	
CONTEXT	Coastal communities highly dependent on tourism activities and natural resources face significant climate related vulnerabilities mainly related to clearing land down to the shoreline practices. Communities have limited understanding on the cost and benefits of adaptation solutions.	
OBJECTIVE(S)	To conduct a cost benefit analysis on adaptation solutions to facilitate decision making, raise awareness and engage all stakeholders to foster collaboration with policy makers and ultimately, reduce the Peninsula's vulnerability and erosion risks.	
BUILDING BLOCKS	<ul style="list-style-type: none"> • Characterisation of ecosystem services (BB 1) • Climate impact hypotheses (BB 2) • Climate adaptation scenarios (BB 3) • Cost-benefit analysis (BB 4) • Transparent sharing of information (BB 5) 	
ACTIVITIES	<ul style="list-style-type: none"> • Engagement of stakeholders in the early design of an Integrated Coastal Zone Management Plan; • Data collection and inclusion on the natural/marine capital investment analysis tool; • Consultation of stakeholders on vulnerabilities; • Climate impact hypotheses translation into quantitative relationships; • Selection of adaptation strategies on the basis of outcomes for ecosystem service provisioning; • Analysis of alternative adaptation options on the basis of costs and benefits; • Development of a technical report; • Information shared with local communities, land developers, the private sector and government authorities to build capacity and raise awareness. 	
RESULTS AND IMPACT	<ul style="list-style-type: none"> • Private sector groups, community village councils, local NGOs and citizen groups are pushing an initiative to designate protected areas of the Placencia Lagoon so to protect mangrove forests and local ecosystems. • Increased attention to the use of green infrastructure to stabilize shorelines of private properties; • Proactive efforts to replant mangroves in areas previously cleared and experiencing notable erosion; • Based on the results of this analysis, a variety of stake holders have started awareness raising campaigns and capacity building programs. 	



4.8 AWARENESS RAISING / Valuating climate adaptation options on Placencia Peninsula

NDC RELEVANCE	<p>This blue NbS offers:</p> <ul style="list-style-type: none"> • Guidance for capacity building and awareness raising actions; • High community impacts and ownership; • Concrete, evidence based targets for adaptation actions, which often are absent in NDCs; • Adaptation actions that improve natural resources conservation and living conditions; • Systematic approach to research and monitoring; • High importance for ensuring the integrity of ecosystems; • Importance for communities and livelihoods resilience; • High inclusiveness level.
ADDITIONAL BENEFITS	<ul style="list-style-type: none"> • Guidance for strategic planning; • High importance for adaptation co-benefits. • High importance for mitigation impacts, by restoring and protecting carbon sinks.
SDGS	   
LINK	

22 | MANGROVE RESTORATION FOR SUSTAINABLE FISHERY IN PALK BAY

COUNTRY	India	
LOCATION		
LEAD ORGANIZATION	OMCAR Foundation	
CONTEXT	Coastal communities where mangroves are highly degraded due to being used as fuel wood, and eradicated for shrimp farming and cattle grazing	
OBJECTIVE(S)	To address mangrove degradation by raising awareness among local communities on mangrove benefits by involving the community in participatory conservation practices.	
BUILDING BLOCKS	<ul style="list-style-type: none"> • Participatory Mangrove Nursery and Plantations (BB 1) • Participatory GIS mapping of Mangroves and Landuse Pattern (BB 2) • Backyard mangrove nursery (BB 3) • Mangrove awareness field trips and education for schools (BB 4) • Attracting Public towards Conservation by Expeditions (BB 5) 	



4.8 AWARENESS RAISING / Mangrove restoration for sustainable fishery in Palk Bay

<p>ACTIVITIES</p>	<ul style="list-style-type: none"> • Development of seed collection, nursery raising techniques and plantation using locally adaptable strategies and low costs techniques trainings; • Identification of suitable places for mangrove restoration with community participation; • Involvement of local communities volunteers in seeds collection, segregation and nurseries building; • Implementation of low cost GIS mapping techniques with the participation of local communities; • Involvement of women in raising and growing mangroves in backyards of every households of village in exchange of incentives; • Education of school age youths on local ecosystems with special reference to mangroves and seagrass beds of Palk Bay; • Involvement of 70 students per school to the Field environmental education centre and field trip to mangroves; • Involvement of youths as volunteers for conservation activities;
<p>RESULTS AND IMPACT</p>	<ul style="list-style-type: none"> • More than 75,000 mangroves planted; • Awareness raised among 60000 students; • Mangrove plantation sites grown into small mangrove forest thickets; • Creation of boundary line GIS map of protected mangrove forest named Muthupet in Palk which comprises 13000 square hectares; • Establishment of the Palk Bay Environment Education Centre in a coastal village.
<p>NDC RELEVANCE</p>	<p>This blue NbS offers:</p> <ul style="list-style-type: none"> • Guidance for capacity building and awareness raising actions; • High community impacts and ownership; • Adaptation actions that improve natural resources conservation and living conditions; • High importance for ensuring the integrity of ecosystems; • Importance for communities and livelihoods resilience; • High inclusiveness level.
<p>ADDITIONAL BENEFITS</p>	<ul style="list-style-type: none"> • Gender responsiveness; • High importance for adaptation co-benefits; • High importance for mitigation impacts, by restoring and protecting carbon sinks; • Substantial mitigation benefits; • REDD+ benefits; • Use of 2013 IPCC Guidance on Wetlands can be piloted.
<p>SDGS</p>	
<p>LINK</p>	



4.9 FINANCE

However well-designed a measure, it can only be realized when funding is available, and a financial plan must be contemplated from the earliest design phase. Public expenditure in developing countries requires that a measure can be traced to a section in the country's development plan, often conditio sine qua non for any budgetary commitments. Private investments and foreign climate finance come without that requirement, though careful due diligence may flag any interventions that are not backed by a country's development plan(s).

Within any measure implemented with / within communities, the establishment of a transparent financial (benefit sharing) mechanism is crucial.

23 | PRIVATE SECTOR INVESTMENT IN CONSERVATION OF DRY FORESTS AND MANGROVE RESTORATION

COUNTRY	Costa Rica	
LOCATION	Peninsula de Nicoya	
LEAD ORGANIZATION	GIZ Costa Rica	
CONTEXT	Coastal fishing communities dependent on mangroves for livelihoods facing climate change impacts and heightened vulnerabilities due to the over exploitation of this ecosystem.	
OBJECTIVE(S)	To create an innovative financial mechanism for the conservation and rehabilitation of mangroves and the development of sustainable activities.	
BUILDING BLOCKS	<ul style="list-style-type: none"> • The global conservation standard (BB 1) • Feasibility study and benefit validation (BB 2) • Conservation credit unit (CCU) marketing (BB 3) • Implementation and monitoring (BB 4) 	
ACTIVITIES	<ul style="list-style-type: none"> • Certification of ecosystem services in public and private owned forests/protected areas for carbon offsetting and marketing; • Funds investment in the conservation and promotion of sustainable production in the project area; • Assessment of forest areas suitable for the sale of conservation credit units; • Elaboration of a masterplan outline of the project area and its potential to sell conservation credits; • International registration of the project area at Markit; • Fund administratio promote CCUS; • Revenues distributed among the fund administrator, the owners of the credit-generating land, and the conservation activities; • Implementation of monitoring activities. 	
RESULTS AND IMPACT	<ul style="list-style-type: none"> • Contractual agreements achieved with RISTIC GmbH and ALNATURA; • Implementation by FUNDECODES, ASEPALECO and government authorities. 10 years objectives have been agreed contractually; • Funds generated by the sale of conservation credits amount to USD 100,000; • Funds invested in the restoration of 20ha of mangroves, the consdervation of the private Karen Mongensen Forest Reserve and small scale production projects. 	



4.9 FINANCE/ Private sector investment in conservation of dry forests and mangrove restoration

NDC RELEVANCE	<p>This blue NbS offers:</p> <ul style="list-style-type: none"> • Innovative financial mechanism; • High importance for mitigation actions by restoring mangrove forests and their capacity to act as carbon sinks; • High importance for ecosystems integrity conservation; • Adaptation actions that improve natural resources conservation and living conditions; • Cost-effective NDC implementation solutions; • Increased resilience through reducing poverty and restoring livelihoods and alternative incomes.
ADDITIONAL BENEFITS	<ul style="list-style-type: none"> • REDD+ benefits; • Use of 2013 IPCC Guidance on Wetlands can be piloted.
SDGS	
LINK	

24 | A MULTI-ACTOR ALLIANCE TO REDUCE THE RISKS OF CASCADING HAZARDS IN SIAN KA'AN

COUNTRY	Mexico	<p style="text-align: right;">Sian Ka'an Mangroves © CONANP</p>
LOCATION	Sian Ka'an, Mérida	
LEAD ORGANIZATION	CONANP México	
CONTEXT	Biosphere Reserve of Sian Ka'an inhabited by fishing and agricultural communities. The reserve is under pressure from touristic and real state development activities.	
OBJECTIVE(S)	To increase local adaptive capacity through and EbA strategy based on mangrove rehabilitation and income diversification using public financial mechanisms.	
BUILDING BLOCKS	<ul style="list-style-type: none"> • Increasing the resilience of alternative local ecosystems that can provide habitats to lobster species (BB 1) • Thinking "out of the sector": Intelligently targeted payments of key actors (BB 2) • Increasing the adaptive capacity of local community fishing businesses (BB 3) • Increasing market for local sustainable products from the mangroves (BB 4) • Realizing the entrepreneurial capacities in local housewives for adaptation to climate change (BB 5) • Evidence-based problem solving (BB 6) 	



4.9 FINANCE / A Multi-actor alliance to reduce the risks of cascading hazards in Sian Ka'an

ACTIVITIES	<ul style="list-style-type: none"> • Use of targeted payments to create a local workforce to maintain and rejuvenate the mangroves; • Channels built to reconnect freshwater-saltwater fluxes; • Construction of little islands of sediment entrapped in netting know as “tarquinas” to promote mangrove natural regrowth; • Excavation of corridors to aument the natural flow of nutrients and water; • Collection of rubbish; • Rehabilitation of mangroves using EbAs; • Diversification of activities; • Provision of training, mentoring and certification activities; • Promotion of sport-fishing for tourists as alternative income generating activity for lobster fishermen; • Support of local fishing cooperatives into becoming sustainable local tourism service operators; • Organization and training of local women to manage eco-turism businesses.
RESULTS AND IMPACT	<ul style="list-style-type: none"> • Local mangroves have started to be rehabilitated providing protection from storm hazards; • Local lobsters have a larger area of habitat; • Lobster fishermen diversified their livelihoods; • Awareness raised among local farmers on the importance of mangroves to local ecosystem health and resilience; • Farmers economic capacity to adapt to climate change was boosted through the incentives scheme.
NDC RELEVANCE	<p>This blue NbS offers:</p> <ul style="list-style-type: none"> • Innovative financial mechanism; • A technical, scientific and local knowledge based, adaptation solution; • High importance for EbA; • High importance for ecosystems integrity conservation; • Effectiveness, low costs and longlasting effects of EbA; • Means to preserve ecosystem services and livelihoods for the communities; • High social inclusiveness; • High community impact; • High scalability of action;
ADDITIONAL BENEFITS	<ul style="list-style-type: none"> • Gender responsiveness; • Community appropriation; • Adaptation co-benefits such as job creation and alternative income sources; • Restoration of landscapes and highly degraded areas. • High importance for mitigation actions by restoring mangrove forests and their capacity to act as carbon sinks; • REDD+ benefits; • Use of 2013 IPCC Guidance on Wetlands can be piloted;
SDGS	
LINK	



5. CONCLUSION

One of the many lessons to be learned from accelerating climate change and the current COVID-19 pandemic is that Nature-based Solutions must move from the periphery into the centre of decision-making, from the highest to the lowest levels. The consequence of continued destruction and degradation of natural ecosystems will be a crisis in perpetuity – of health, living and wellbeing. Turning from the exploitation of natural resources towards their sustainable management and embracing nature as a source of wealth and ingenuity, we can build economies; through the enhancement of natural habitats we can offer the prospect of a resilient future.

NDCs have become key vehicles of both national and international climate change planning and implementation. Challenges abound, including the difficulty of identifying the role of ecosystems for mitigation and adaptation purposes; a lack of capacity to clearly monitor, report and measure nature-based interventions; and the absence of good practices of how to integrate NbS in NDCs. However, there is plenty of compelling, on-the-ground evidence demonstrating how NbS have positive impacts on stressed microclimates and how they can inform NDCs and the NDC process, and help countries realize their most ambitious contributions and action targets.



This booklet brings into focus Nature-based Solutions which involve coastal and marine habitats. These ecosystems – colossally rich in biodiversity, and immensely important as carbon stocks and providers of multiple environmental services – are heavily impacted by the climate emergency. At the same time, they offer myriad possibilities to combat this crisis.

When the solution providers featured in this booklet were first contacted, the authors were struck by the enthusiasm with which they were greeted. The original initiatives and measures have often exceeded expectations, improving both habitats and livelihoods. Stakeholders have witnessed their projects morph into larger programs with wider local, regional and national impact than expected, such as mangrove fisheries in India, which inspired an intervention blueprint promoted at the UN; a resilience project in the Philippines that has informed the design of the National Adaptation Plan; coral gardening in Vanuatu, now a key pillar in national environmental education; and blue carbon efforts in Madagascar, which have shaped national REDD policies.

These experiences deserve attention, study and replication across the planet.



SOURCES

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- (b) Secretariat of the Convention on Biological Diversity (2020). Global Biodiversity Outlook 5. Montreal, available at <https://www.cbd.int/gbo/gbo5/publication/gbo-5-en.pdf>
- (c) See, in particular, Decision 18/CMA.1: “Each Party is encouraged to use the 2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands.”, which paved the way towards comprehensive and structured accounting for GHG emissions and removals from coastal wetlands.
- (d) Cf. Decision 1/CP.25 (‘Chile Madrid Time for Action’): ‘Commends the efforts of the President of the Conference of the Parties at its twenty- fifth session to highlight the importance of the ocean, including as an integral part of the Earth’s climate system, and of ensuring the integrity of **ocean and coastal ecosystems in the context of climate change**; Requests the Chair of the Subsidiary Body for Scientific and Technological Advice to convene at its fifty-second session (June 2020) a dialogue on the ocean and climate change to consider how to strengthen mitigation and adaptation action in this context; ...Invites **Parties and non-Party stakeholders to submit inputs** via the submission portal⁷ by 31 March 2020 to inform the dialogues referred to...’
- (e) Decision 4/CMA.1, para. 8; Decision 9/CMA.1.
- (f) Cf. Seddon N, Chausson A, Berry P, Girardin CAJ, Smith A, Turner B. 2020 Understanding the value and limits of nature-based solutions to climate change and other global challenges. *Phil. Trans. R. Soc. B* 375: 20190120.
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- (o) Cf. Article 13 of the Paris Agreement for details.
- (p) UNFCCC 2017: First Nationally Determined Contribution of Uruguay, available at https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Uruguay%20First/Uruguay_First%20Nationally%20Determined%20Contribution.pdf.
- (q) UNFCCC 2020: Second Nationally Determined Contribution of Chile, available at <https://www4.unfccc.int/sites/NDCStaging/Pages/Party.aspx?party=CHL&prototype=1>.
- (r) See, in this context, also the WWF's 'eight simple recommendations for integrating nature into NDCs' (WWF 2020). https://c402277.ssl.cf1.rackcdn.com/publications/1318/files/original/enhancing_ndcs_through_nature_based_solutions.pdf?1585149353.
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