High-Quality Blue Carbon

# Practitioners Guide 2026

For conservation, restoration, and carbon crediting projects in blue carbon ecosystems

Second Edition

CONSERVATION INTERNATIONAL

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# Contents

# 0.0 Introduction to the High-Quality Blue Carbon Principles & Guidance

*Blue Water Mangroves on Mansuar Island, Indonesia. The lack of wave action combined with clear water allow corals to grow very near the surface in this unique environment © Conservation International*

## An Executive Summary of the High-Quality Blue Carbon Practitioner's Guide and Progress Wheel is also available.

As the effects of climate change begin to be experienced more frequently and more drastically than ever, the need to reduce human-caused greenhouse gas emissions and effectively decarbonize our society becomes increasingly urgent. While reducing emissions in line with limiting global warming to 1.5 degrees Celsius must be the priority, there is a recognition that delivering effective emission reductions has so far been slow, expensive and technologically challenging. There is therefore a need to offset human-caused emissions both through technological solutions, and by protecting and increasing the Earth's natural capacity to absorb carbon dioxide and other greenhouse gases.

Coastal vegetated ecosystems, such as mangroves, saltmarshes and seagrasses, are increasingly recognized as critical ecosystems. This is due to their ability to provide food, extreme weather protection and support livelihoods, all while harboring incredible biodiversity, enhancing coastal resilience and acting as immense carbon sinks. This function of efficiently capturing and storing carbon for long periods has led to coastal vegetated ecosystems being described as blue carbon ecosystems.

Interventions that directly increase carbon removals or reduce emissions due to the conservation, restoration or sustainable management of these ecosystems are collectively known as blue carbon projects.

Nature-based solutions, including blue carbon projects, are an essential part of our response to the climate crisis as they can deliver multiple mitigation and adaptation benefits. However, these projects are complex and require significant resources to implement at high-quality, as coastal blue carbon ecosystems can be both dynamic and sometimes extreme places to work. Additionally, they are rarely removed from human influences, such as pollution, urban development or resource extraction activities.

The private sector has shown interest in investing in blue carbon ecosystems and is expected to play an increased role in funding their restoration and sustainable use, including through carbon and nature crediting markets.

The release of the High-Quality Blue Carbon Principles & Guidance in 2022 was a landmark moment in the blue carbon space. The document highlights the need for safeguards for both people and nature, informs the due diligence processes for project financers and credit buyers, and introduces a pathway for all blue carbon projects to achieve a high-quality standard.

*Seagrass © Matt Curnock, Ocean Image Bank*

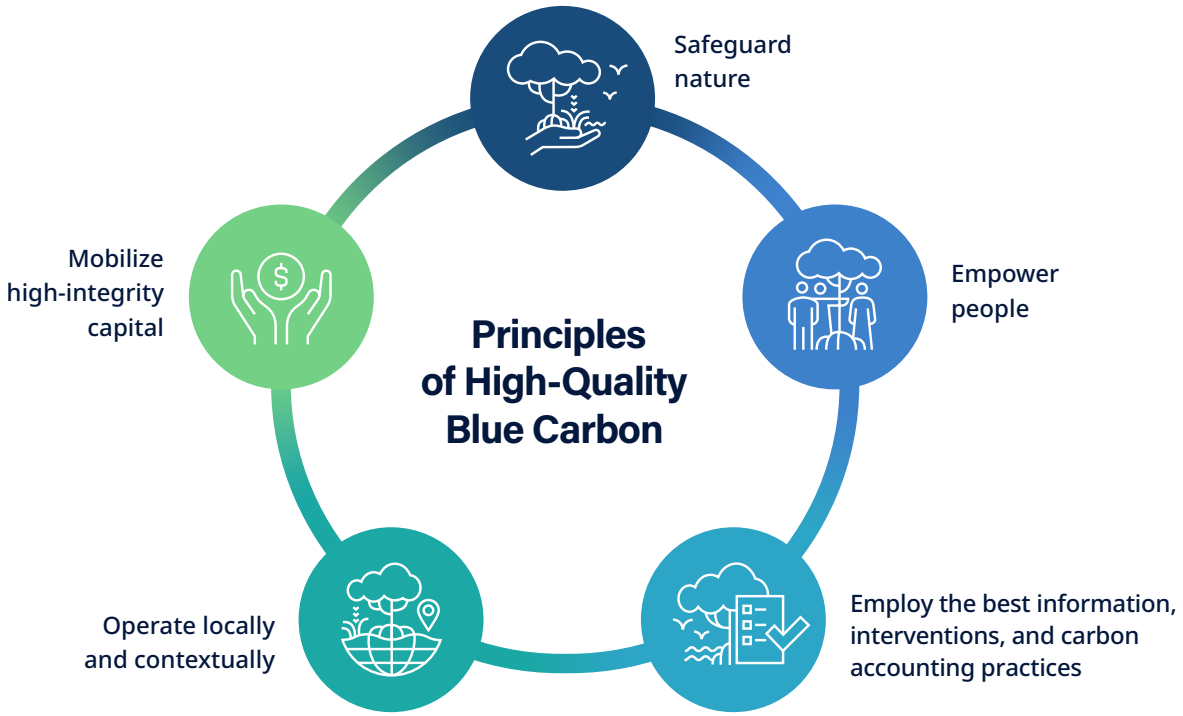



**Figure 1:** The five High-Quality Blue Carbon Principles.

The High-Quality Blue Carbon Principles, (Figure 1), provide valuable guidance to projects that seek to generate payment for ecosystem services or other value to the community and non-market projects alike. In all cases high-quality projects must still be able to articulate how project activities produce tangible benefits.

The adoption of the High-Quality Blue Carbon Principles is not limited to blue carbon crediting projects and thus their adoption has been seen across a wide array of stakeholders. For example, the High-Quality Blue Carbon Principles & Guidance has been referenced in both national and international ocean conservation guidance, including the Ocean Panel Blue Carbon Handbook, and the Roadmap for High Integrity Marine Natural Capital Markets in the UK. They are also considered a foundational resource for the Brazilian national Recommendations on Socio-Environmental Safeguards for Blue Carbon Projects (Recomendações de Salvaguardas Socioambientais para Projetos de Carbono Azul - Portuguese).

The Global Mangrove Alliance Best practice guidelines for mangrove restoration adopted the core principles and added one more: "Design for Sustainability". This recognizes that projects are typically financed and managed for limited timescales and need to plan for a sustainable transition once grant or credit income ends:

> **Principle 6: Design for Sustainability.**
> All projects have risks to sustainability that may occur beyond the project lifetime. Creating sustainable mangrove projects and programs needs to be inclusive of how these initiatives will last into the future, including financing, threat abatement, community stewardship and climate change.

## The Mangrove Breakthrough

The Mangrove Breakthrough is a global movement redefining how the world protects, values, and safeguards mangroves to build resilient communities and economies. This collective goal is ambitious and clear: mobilize USD 4 billion to protect and restore 15 million hectares of mangroves by 2030.

Launched at UNFCCC COP27, the Mangrove Breakthrough is part of the UNFCCC's 2030 Breakthrough Agenda and builds on the work by the Global Mangrove Alliance (GMA).

The Mangrove Breakthrough is building the financial architecture needed to drive mangrove-positive investments by catalyzing radical collaboration - bringing together a variety of stakeholders including governments, financial institutions, NGOs, scientists, and local communities behind four shared goals:

- Reduce avoidable mangrove loss from direct human activities to zero
- Restore at least 50% of recently lost mangrove areas
- Increase long-term protection from 40% to 80% of remaining mangroves
- Mobilize sustainable finance to support the protection, restoration, and stewardship of existing mangrove ecosystems

The Mangrove Breakthrough is creating a pipeline of investable projects with their partners at Restor. On this platform, mature mangrove-positive projects can connect with investors, contributing to the ultimate goal of mobilizing funding towards mangrove-positive investments and creating real, tangible outcomes, building the climate resilience of millions of people.

The combined High-Quality Blue Carbon and Global Mangrove Alliance Principles (hereafter just "Principles") were formally adopted by the Mangrove Breakthrough in 2025. As of April 2026, 49 national and sub-national governments and over 50 non-state actors have endorsed the Mangrove Breakthrough and thus the Principles.

> **"The Mangrove Breakthrough is enabling a global pipeline to transform investments in mangroves worldwide. A critical step is bringing mangrove projects to mature investment-ready levels. The High-Quality Blue Carbon Practitioners Guide is a key tool in providing investors with confidence in carbon projects. Indeed, these guidelines ensure that carbon projects are high-quality, science-driven, and aimed to benefit both people and biodiversity."**
>
> **Ignace Beguin Billecocq**
> **The Mangrove Breakthrough**

*Gazi mangroves, Kenya © Julia Jung/ACES*

## The Saltmarsh Breakthrough

Saltmarshes are among the most valuable yet overlooked coastal ecosystems, providing essential services for climate mitigation, biodiversity, and coastal resilience. However, these vital habitats face ongoing degradation, threatening their ability to support people and nature. The 2030 Saltmarsh Breakthrough is a bold initiative to change this trajectory, bringing together global partners to drive targeted action for the conservation, restoration, and sustainable management of saltmarshes.

The Saltmarsh Breakthrough is a Global Call to Action, creating a path forward to scale actions and investments to turn the tide on conserving and restoring these vital ecosystems. This initiative aims to catalyze global action to conserve, restore, and sustainably manage saltmarsh ecosystems. The Saltmarsh Breakthrough developed the first-ever State of the World's Saltmarshes report, launched ahead of the 3rd United Nations Ocean Conference (UNOC3). This foundational report sets the stage for developing funding mechanisms and financial strategies to support global saltmarsh conservation. Aligned with the Kunming-Montreal Global Biodiversity Framework, the Paris Agreement, and the UN Decade on Ecosystem Restoration and Ocean Science, the Saltmarsh Breakthrough brings together governments, the private sector, and communities to restore and protect these critical ecosystems.

Launched at UNFCCC COP30 in Belém, the vision for the Saltmarsh Breakthrough is for this ecosystem to be globally recognized and locally stewarded as essential ecosystems with a 2050 goal of all saltmarshes to be conserved and sustainably managed; and the restoration of lost and degraded areas achieved and on track to maturity.

**It is underpinned by three targets:**

1. 50 countries integrating saltmarshes into policy frameworks by 2030
2. Conserve and restore 500,000 hectares by 2030
3. Mobilize increased finance for saltmarsh conservation and restoration ($5 billion by 2030)

**As the Saltmarsh Breakthrough develops technical guidance and support for Parties and practitioners, it is drawing on the High-Quality Blue Carbon Principles and Guidance to ensure restoration and protection projects are based on best practice.**

Globally, saltmarshes occur in 120 countries, from Arctic coasts to tropical estuaries. They provide similar services and are subject to many of the same threats and pressures as mangroves and seagrass. Throughout the tropics saltmarshes occur in close proximity to mangrove ecosystems, generally as open habitats or as smaller patches on the landward margin. This guide is an important tool for practitioners and investors to enable delivery of high integrity projects across the worlds of key blue carbon ecosystems.

By aligning with breakthroughs for other blue carbon ecosystems, such as seagrass and mangroves, the initiative aims to create a cohesive framework for protecting and restoring coastal ecosystems globally.

This integrated approach will enhance resilience to climate change, safeguard biodiversity, and unlock the full potential of nature-based solutions to address pressing environmental challenges.

*Salt marshes in The Solent, UK, a nationally recognized site of special scientific interest and haven for bird life © Matt Jarvis*

# 0.1 Blue carbon project types

Blue carbon projects do not always mean blue carbon crediting projects. The production and sale of carbon credits is just one option for funding the conservation or restoration of blue carbon ecosystems. The combined High-Quality Blue Carbon and Global Mangrove Alliance Principles can additionally be applied to projects supported by non-carbon-market finance.

This may include traditional grant funding, impact investment, Corporate Social Responsibility (CSR) or Environmental, Social and Governance (ESG) spending and a variety of new market mechanisms, including nitrogen, biodiversity, and nature credits. Innovative financial products include blue bonds, debt-for-nature swaps and leveraging the insurance value of coastal protection provided by blue carbon ecosystems to subsidize their restoration or maintenance.

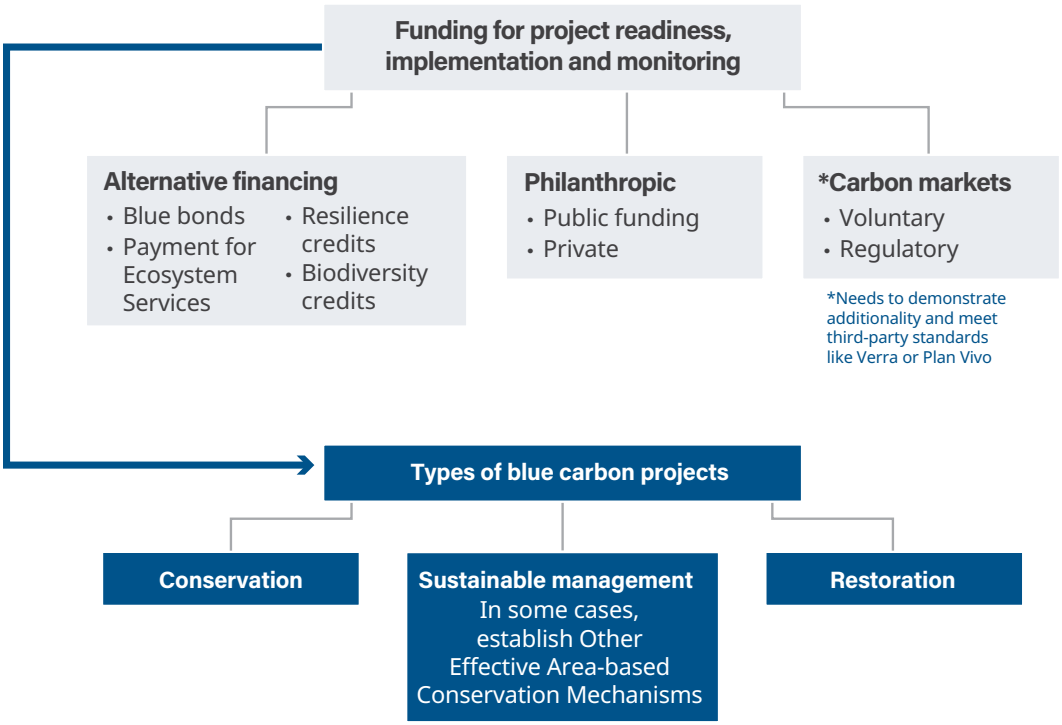



**Figure 2.** Different types of blue carbon projects, and corresponding non-exhaustive list of funding options available

**Source:** The Blue Carbon Handbook: Blue carbon as a nature-based solution for climate action and sustainable development. Schindler Murray, L., Milligan, B., et al. (2023).

Emerging project types include sustainable aquaculture based on the reintroduction of native coastal vegetation to stabilize dike walls, rehabilitation of areas which are no longer viable for production, and recreating small but vital refuges for biodiversity. Green-gray infrastructure projects blend nature and engineering to establish stretches of blue carbon ecosystems in strategic locations. These help counter erosion or reduce storm surge damage, offering a sustainable alternative to high-emission concrete shore defenses.

**Further reading:**

- Actionable Blue Carbon Ecosystems for Climate Mitigation and Adaptation
- Global Green-Gray Community of Practice

### 0.1.1 Who is this guide for?

This guide has been designed for restoration and conservation practitioners, and producers of blue carbon credits. It also serves as a reference for government and philanthropic funders, carbon credit buyers, and investors in blue carbon ecosystems, building a shared understanding of how high-quality principles are put into practice.

Projects do not have to be producing credits to use this guide or the self-assessment framework. However, as a companion piece to the High-Quality Blue Carbon Principles and Guidance, there is a focus on meeting the needs of project proponents who are seeking access to the carbon market.

This document has been written with mangroves, saltmarshes and seagrasses in mind, but can also be applied to emerging blue carbon ecosystems such as kelp. The Practitioners Guide connects users with existing guidance and best practice resources for application in the blue carbon context.

### 0.1.2 What does this guide do?

Buyers, investors and funders of blue carbon projects have been quick to adopt the Principles to guide strategies, requests for proposals (RFPs), and due diligence procedures. However, applying them in practice requires building an understanding of what high-quality looks like across a range of ecosystems, project settings and activity types.

For project managers, there is a need to be able to qualify and articulate how their work meets or exceeds expectations of high-quality, and to be able to embed these concepts into their ongoing work. During testing, proponents of early-stage projects noted that the framework also provided a template for project design which identified activities they had missed and were subsequently able to quickly resolve.

For project financers, this guide facilitates assessments of projects based on stages of development and alignment with high-quality, and can inform investment decisions. It can also support financers in building dialogue with project developers, recognizing that the integration of high-quality practices into projects is an ongoing process. As an example, the 2024 Practitioners Guide underpins much of the assessment criteria for mangrove projects in the 2026 Symbiosis Coalition Quality Standard.

Despite there being many types of blue carbon projects, they all have commonalities. Investors and credit buyers need to be confident in their claims, have clear terms and agreements and follow local legal requirements. Project managers need to address the needs of people, navigate complex land tenure and legal processes, work with governments, design and implement projects which are rooted in ecological best practice, and secure sustainable funding for long-term monitoring.

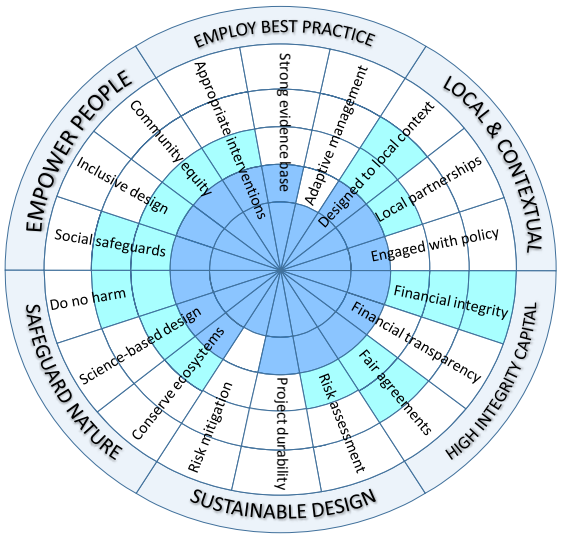
By understanding the common challenges across project types, this guide identifies where guidance exists and creates a central point to access a suite of blue carbon resources.

## 0.1.3 How to use this guide

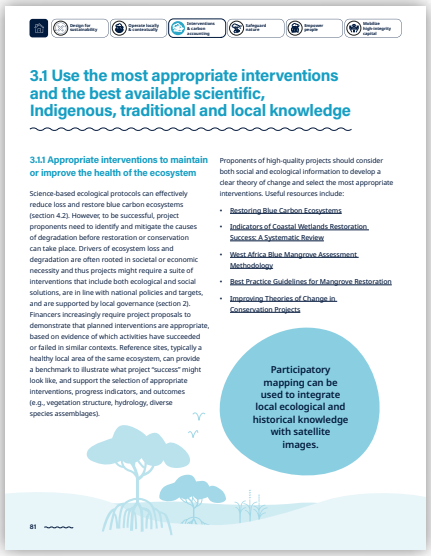
This Second Edition of the Practitioners Guide is a follow-up to the High-Quality Blue Carbon Principles and Guidance document released at the UNFCCC Climate COP27, and the 2024 Practitioners Guide released at the Convention on Biological Diversity COP16. It can be used as a standalone document and serve as a central reference point for blue carbon practitioners, or be used in conjunction with the HQBC Progress Wheel self-assessment tool (Section ii).

The main content of this guide has been organized using the Principles as a framework for project development. Chapter and section headings are consistent across both documents and are mapped to corresponding sections of the Progress Wheel.

Practitioners using the wheel to assess or track how their project aligns with the Principles are then able to easily locate supporting information within the guide. Each section contains links to free and accessible guidance and a case study specific to the principle being discussed.




| HIGH-QUALITY PRINCIPLE | PROGRESS LEVEL (1-5) |
|---|---|
| **PRINCIPLE 1. Design for Sustainability** | |
| Risk assessment | 3.0 |
| Project durability | 2.0 |
| Risk mitigation | 1.0 |
| **PRINCIPLE 2. Operate Locally and Contextually** | |
| Design according to local context | 4.0 |
| Working with local partners | 3.0 |
| Engage with policy | 2.0 |
| **PRINCIPLE 3. Employ Best Practice** | |
| Appropriate interventions | 3.0 |
| Evidence-based outcomes | 2.0 |
| Adaptive management | 1.0 |
| **PRINCIPLE 4. Safeguard Nature** | |
| Conserve ecosystems | 3.0 |
| Science-based project design | 3.0 |
| Do no harm | 4.0 |
| **PRINCIPLE 5. Empower People** | |
| Social safeguards | 4.0 |
| Inclusive design | 3.0 |
| Community equity | 3.0 |
| **PRINCIPLE 6. High Integrity Capital** | |
| High-integrity finance | 5.0 |
| Financial transparency | 2.0 |
| Fair agreements & contracts | 4.0 |



3.1 Use the most appropriate interventions and the best available scientific, Indigenous, traditional and local knowledge

3.1.1 Appropriate interventions to maintain or improve the health of the ecosystem

Science-based ecological protocols can effectively reduce loss and restore blue carbon ecosystems (section 4.2). However, to be successful, project proponents need to identify and mitigate the causes of degradation before restoration or conservation can take place. Drivers of ecosystem loss and degradation are often rooted in societal or economic necessity and thus projects might require a suite of interventions that include both ecological and social solutions, are in line with national policies and targets, and are supported by local governance (section 2). Financers increasingly require project proposals to demonstrate that planned interventions are appropriate, based on evidence of which activities have succeeded or failed in similar contexts. Reference sites, typically a healthy local area of the same ecosystem, can provide a benchmark to illustrate what project "success" might look like, and support the selection of appropriate interventions, progress indicators, and outcomes (e.g., vegetation structure, hydrology, diverse species assemblages).

Proponents of high-quality projects should consider both social and ecological information to develop a clear theory of change and select the most appropriate interventions. Useful resources include:

- Restoring Blue Carbon Ecosystems
- Indicators of Coastal Wetlands Restoration Success: A Systematic Review
- West Africa Blue Mangrove Assessment Methodology
- Best Practice Guidelines for Mangrove Restoration
- Improving Theories of Change in Conservation Projects

Participatory mapping can be used to integrate local ecological and historical knowledge with satellite images.

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**Figure 3:** The structure of the Progress Wheel self assessment tool matches the layout of the Practitioners Guide.

*Lone mangrove settled in the intertidal, Thailand © Ana Grillo, IUCN/MFF*

## 0.1.4 What has changed in the second edition?

Based on a year of testing and user feedback, the second edition has been restructured to resemble the project development process, and to reference project documentation produced at different stages of design – concept notes, feasibility studies, theories of change, etc. Links to tools and technical guidance have been relocated to be placed within the main text and more easily discoverable by users. The overall volume of external guidance accessible from the guide has more than doubled, creating a comprehensive library of project development tools.

Supplementary guidance on benefit sharing agreements has been produced in partnership with CrossBoundary and the World Economic Forum Blue Carbon Action Partnership, and may be accessed here: High-Quality Blue Carbon: Benefit Sharing Agreements.

The Progress Wheel tool has been reordered to remain directly linked to the restructured guide and simplified in some areas. Space to record the project start date and funding status have been added to contextualize the results. The tool was also tested against the newly released Article 6.4 Safeguards guidance to ensure alignment with the developing Paris Agreement Crediting Mechanism.

# 0.2 Introducing the Progress Wheel

Following the release of the High-Quality Blue Carbon (HQBC) Principles and Guidance, engagement with early adopters identified demand for a structured way to integrate the Principles into project design, and to communicate to stakeholders and prospective funders how projects aligned with expectations of high-quality.

The HQBC Progress Wheel self-assessment tool serves two main purposes:

- As an adaptive management and planning tool, which enables users to self-assess progress towards high-quality outcomes from project inception onwards and identify areas in need of attention.
- As a reporting and communications tool which provides a standardized visual aid in communicating project progress in a format which can be easily understood by financers and other project participants.

The "Progress Wheel" is an application of the Society for Ecological Restoration "Recovery Wheel". Designed as a tool to track ecosystem recovery in restoration projects, the Wheel can be customized to track and report on different metrics, depending on the project's needs. Iterations of this tool are becoming more common across the ecosystem restoration space and project managers are increasingly familiar with how to use it. For example, there are existing versions published for mangrove restoration tracking [1](Cadier et al., 2020) and social benefits monitoring [2](Gann et al., 2019).

This guide is explicitly linked to the structure of the Progress Wheel, which is adapted to demonstrate project alignment with both the High-Quality Blue Carbon Principles and the shared Global Mangrove Alliance and Mangrove Breakthrough Guiding Principles. It can be applied to any blue carbon ecosystem project at any point of the project's development and management.

> **Project implementation is a continuum and achieving the highest quality is not expected from day one. This guide is not about a static quality "score" but rather about tracking and communicating progress towards high-quality actions and outcomes.**

Recognizing that projects are constantly changing, we have renamed this version of the tool the "Progress Wheel".

[1] Cadier C, Bayraktarov E, Piccolo R and Adame MF (2020) Indicators of Coastal Wetlands Restoration Success: A Systematic Review. Front. Mar. Sci. 7:600220. doi: 10.3389/fmars.2020.600220

[2] Gann GD, McDonald T, Walder B, Aronson J, Nelson CR, Jonson J, Hallett JG, Eisenberg C, Guariguata MR, Liu J, Hua F, Echeverria C, Gonzales, EK, Shaw N, Decleer K, Dixon KW. 2019. International principles and standards for the practice of ecological restoration. Second edition. Restoration Ecology S1-S46. https://onlinelibrary.wiley.com/doi/10.1111/rec.13771

## 0.2.1 Instructions for use

The progress wheel tool works by asking project managers to self-assess performance in key metrics by selecting the scenario most aligned with their project, using pre-defined criteria. This produces both a numerical value and a visual output:

| HIGH-QUALITY PRINCIPLE | PROGRESS LEVEL (1-5) |
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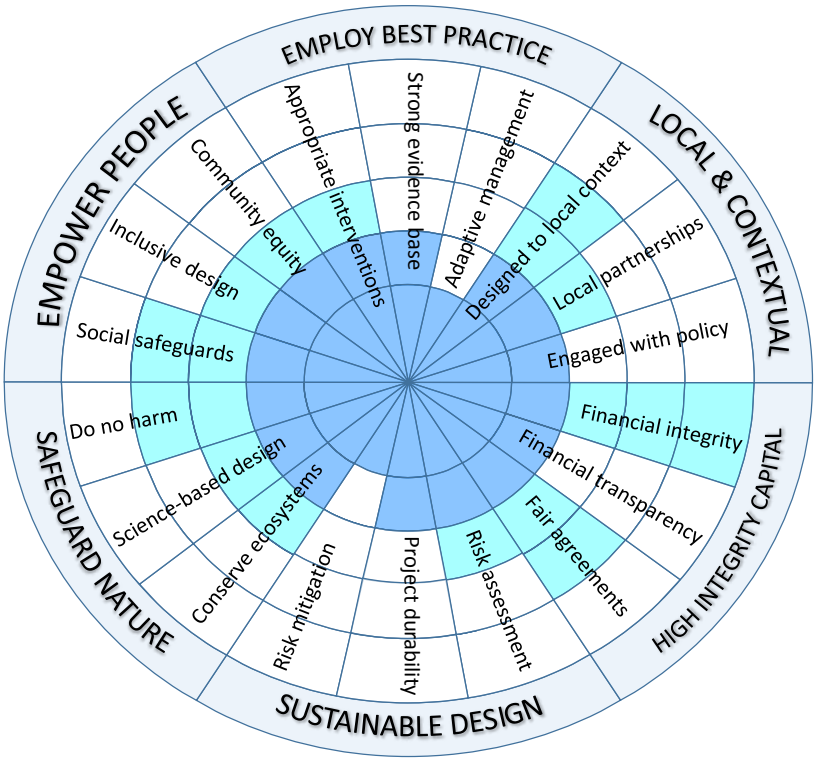



**Figure 4:** The Progress Wheel self-assessment tool.

The Progress Wheel introduces a standardized multiple-choice process where the project assessor selects statements describing a range of project activities and matches them to their own project.

The tool consists of six sections, one for each principle. Each section is completed based on alignment with key criteria. The user selects the most applicable scenario in each case, by typing a number 1 into the cell below the matching statement. When complete, the tool automatically generates a numeric output and an 'Evaluation Form'. Not all criteria will apply to all projects. For example, assessment of climate mitigation protocols or carbon standards used may not apply to a non-crediting project. Where appropriate, a "non-applicable" option can be selected.

The equation will automatically be adjusted so results are not skewed up or down.

To produce the visual output, simply click on "Update Recovery Wheel", and the visual will update within a few seconds. The quantity of the wedge that is colored in for each section and category indicates how closely the project meets the Principles for that area. The more area colored, the more closely the project aligns with the Principles. This visualization helps indicate overall project quality as well as any areas for improvement.

We recommend using the Progress Wheel as often as is helpful throughout a projects life cycle to understand what is going well and where improvement is needed. Each assessment is expected to take less than an hour to complete. The first time the tool is used, it is recommended that a project assesses its progress three times at different stages:

**If the project is a new or planned project:**

Assessment 1 – At the start of the project - Use the Progress Wheel to demonstrate the current or anticipated baseline starting point (Year 0).

Assessment 2 – Select a point in time when project activities should be well underway (Year 2 or 3) and select criteria based on current planned project goals for this time period.

Assessment 3 – Based on the output of Assessment 2, use the results to adaptively manage project plans as needed, and repeat the assessment based on revised plans, identifying any additional capacity or budget requirements.

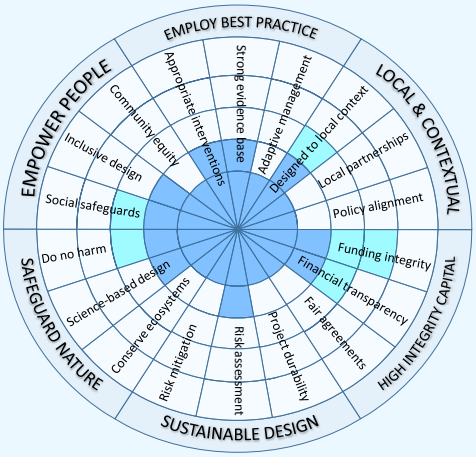
**If the project is already in progress the recommended times to use the Wheel include, but are not limited to:**

i. Use the Progress Wheel to retroactively demonstrate the baseline starting point for the project in all areas (Year 0).

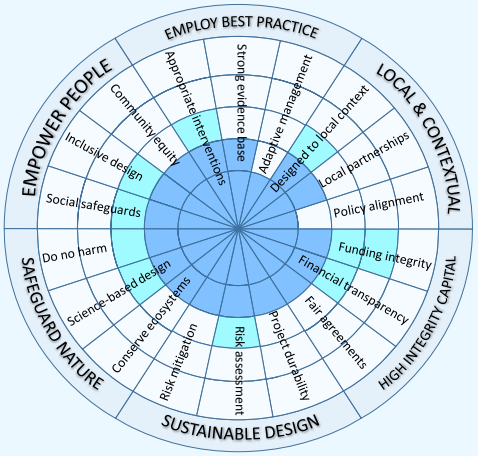
ii. Conduct an assessment of how the project aligns with the Principles in the present day.

iii. Conduct a final assessment based on how the project is predicted to have progressed 2-3 years from now.

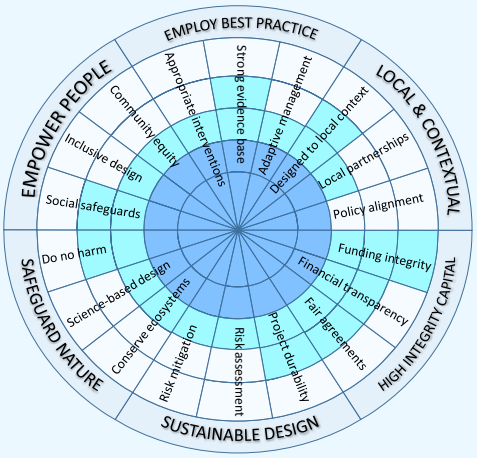
The Progress Wheel can be used to demonstrate how additional support for key activities can improve specific areas of impact. For example, when applying for funding it can be useful to produce two future predictions, one based on how the project can be expected to perform based on current resources, and a second showing how performance in key areas could be improved following increased funding.




**Wheel 1**




**Wheel 2**




**Wheel 3**

**Figure 5 (right):** Wheel 1 shows a fictional project in year 1, with funding secured but all other interventions in planning or incomplete stages. Wheel 2 shows the project in the "present", with clear progress in all areas. Wheel 3 shows the predicted project progress for year 3

There are spaces on the evaluation form marked “supporting evidence” where projects can add links to online documentation or media, for example a crediting project might link to the registry entry, project documents and monitoring reports.

### 0.2.2 Interpreting results

It is important to recognize that project development is a continual process, and the progress of projects is subject to constant change. Low scoring criteria identify areas where progress is at an early stage, not yet begun, or which have not performed as expected and require adaptive management interventions.

The numeric scores on the Progress Wheel can be interpreted as follows:

| Score | Current progress |
|---|---|
| 1 | Progress in this area is minimal, represents a starting baseline, or has not yet begun. In a mature project, this may indicate cause for concern or identify additional funding/capacity building needs. |
| 2 | Progress in this area is at a basic stage. This may either be representative of an early-stage project progressing as expected, or an older project requiring updating or support to meet modern best practice criteria. |
| 3 | Progress in this area is in line with accepted best practice and is satisfactory across all criteria. This is representative of a high-quality project. |
| 4 | Progress in this area meets or exceeds current definitions of best practice and is representative of a very high-quality project. |
| 5 | This level of achievement is aspirational and represents an unusually high-quality project. |

**Table 1:** Interpreting the progress wheel

**Remember, there is no such thing as a perfect project.** All projects will have areas in need of improvement. Projects will vary according to their unique context, time since initiation, technical capacity and resourcing. Progress along a timeline will also look very different for fully funded projects and those operating on a restricted budget, with some projects operating for years on minimal funds while seeking investment.

> **Readers are reminded when interpreting the wheel, not to expect an early stage or underfunded project to have already implemented all the necessary activities to score highly.**

Here progress scores provide context for targeted conversations between proponent and supporter around needs and expectations.

Using the progress wheel tool facilitates reporting by generating an easily understandable visualization based on a common framework This creates an accessible one-page summary which can be quickly understood by the reader and is broadly comparable across blue carbon ecosystems and project types.

During product testing, the progress wheel visual was included in a real-world project description sent to potential buyers of high-quality carbon credits. Results showed the visual was effective at encouraging recipients interest in the project, but highlighted the need to ensure links to supporting evidence were provided, and to provide a copy of the Executive Summary of the High-Quality Blue Carbon Practitioner's Guide and Progress Wheel for context.

*Mangroves in Gazi Bay, Kenya © Anthony Ochieng Onyango/ACES*

*Assessing sediment conditions prior to restoration, Tanzania*
*© Dominic Wodehouse Mangrove Action Project*

## 0.2.3 Supporting evidence

Documentation required by prospective project financers may include:

*Mangroves in Liberia, by Trond Larsen © Conservation International*

**Concept stage documentation:**

- Project concept note, including a preliminary theory of change
- Desk-based stakeholder mapping (section 2.1)
- Pathway to securing land tenure and site management rights
- For climate mitigation projects, Tier 1 Greenhouse gas (GHG) estimations (section 3.2.2)
- A map of the project area

**Feasibility or pre-implementation stage documentation:**

- Stakeholder Engagement Plan (sections 2 & 5)
- Records of any partnerships secured or community engagement to date (section 2)
- Risk assessment, including ecological, policy, social and financial risks (section 1)
- For climate mitigation projects, Tier 2 GHG estimations (section 3.2.2)
- Draft gender assessment and community safeguards plan (section 5)
- Draft Monitoring, Evaluation, Accountability and Learning plan addressing project goals and risks (sections 1.3 & 3.3)
- Draft project design or implementation plan linked to theory of change
- Draft financial model
- A site map such as a KML file clearly showing project boundaries
- Latitude and longitude of project site to facilitate remote due diligence
- Feasibility assessment, if completed

**Implementation stage documentation**

- Evidence of land tenure and management rights (sections 2 & 5)
  - Evidence of carbon trading rights for crediting projects
- Feasibility assessment
- Formal additionality assessment for crediting projects (section 3.2.3)
- Project Design Document (PDD) or similar including:
  - Theory of change and rationale for selected interventions (section 3)
  - Ecological and biodiversity baselines (sections 3 and 4)
  - GHG emissions baselines for carbon crediting projects (section 3)
  - If for a carbon crediting project, the PDD should be produced using templates appropriate to the accrediting organization (section 3.2.2)
- Stakeholder Engagement Plan including:
  - Socioeconomic Baselines (sections 2, 3 & 5)
  - Stakeholder mapping (sections 2 & 5)
  - Evidence of Full, Prior, and Informed Consent (FPIC) (section 5.1.1)
  - Gender assessment and community safeguards plan (section 5.3.1)
  - Benefit Sharing Agreement (section 5.3.2)
  - Community conservation agreements or memorandums of understanding (sections 5 & 6)
- MEAL plan addressing project goals and risks (sections 1.3 & 3.3)
- Any site monitoring or results of trial interventions
- Project governance structure including community representation and other partnerships
- Details of the project implementation team, demonstrating relevant expertise
- Links to project or lead partner websites, or project profiles on Restor, Global Mangrove Watch, or similar platform.
  - For crediting projects, link to the project registry entry
- Project financial plan

**Additionally for ongoing projects:**

- Annual reports
- Outcomes of implementation and monitoring
  - For crediting projects, validation and verification reports
- Long-term site management planning

*Cispata Bay mangroves from the Vida Manglar project, Colombia © Daniel Uribe*

## 0.2.4 Progress wheel case study: Vida Manglar

The Vida Manglar blue carbon crediting project encompasses 7,500 hectares of mangrove in Colombia's Cispatá Bay, within the Sinú River basin. The project includes 14,000 residents, comprising 435 families and 14 community-based mangrove organizations. Vida Manglar is certified by the VERRA Verified Carbon Standard and Community, Climate and Biodiversity Standard, and is set to avoid approximately one million metric tonnes of $CO_2e$ emissions over 30 years. Notably, recovery of the mangroves is due to hydrological restoration and active maintenance and monitoring, not mass planting.

As such, this project supports a naturally biodiverse ecosystem and is re-introducing previously depleted keystone species. By reinvesting over 90% of carbon credit revenues into community-decided conservation and livelihood initiatives, including an endowment fund to support project longevity after the crediting period ends, the project exemplifies long-term sustainable climate action that delivers both environmental and social benefits.

| HIGH-QUALITY PRINCIPLE | PROGRESS LEVEL (1-5) |
|---|---|
| **PRINCIPLE 1. Design for Sustainability** | |
| Risk assessment | 5.0 |
| Project durability | 4.3 |
| Risk mitigation | 3.0 |
| **PRINCIPLE 2. Operate Locally and Contextually** | |
| Design according to local context | 3.5 |
| Working with local partners | 3.5 |
| Engage with policy | 4.3 |
| **PRINCIPLE 3. Employ Best Practice** | |
| Appropriate interventions | 5.0 |
| Evidence-based outcomes | 5.0 |
| Adaptive management | 5.0 |
| **PRINCIPLE 4. Safeguard Nature** | |
| Conserve ecosystems | 4.3 |
| Science-based project design | 4.5 |
| Do no harm | 4.5 |
| **PRINCIPLE 5. Empower People** | |
| Social safeguards | 4.0 |
| Inclusive design | 4.2 |
| Community equity | 3.7 |
| **PRINCIPLE 6. High Integrity Capital** | |
| High-integrity finance | 4.5 |
| Financial transparency | 5.0 |
| Fair agreements & contracts | 4.7 |

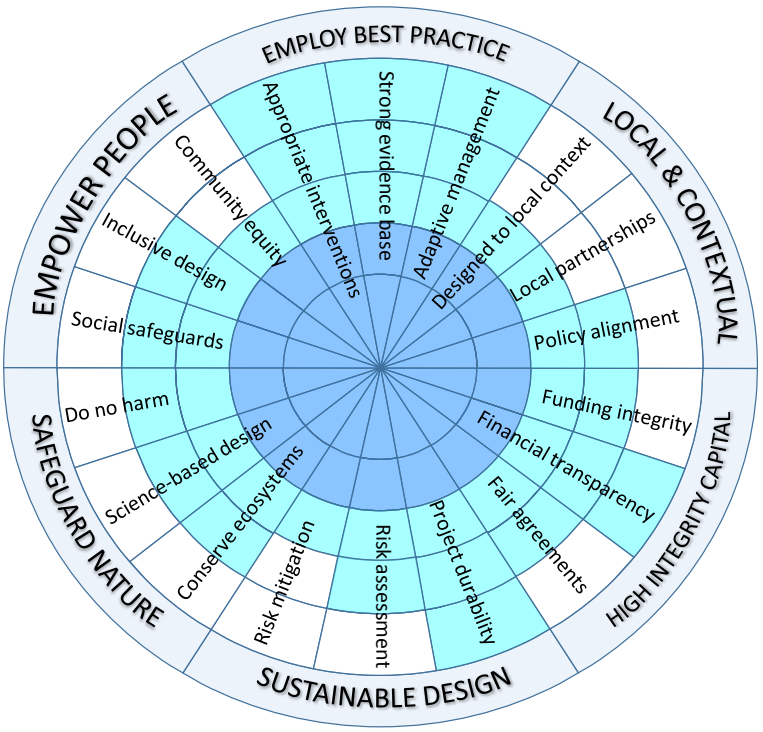



**Figure 6:** The Progress Wheel self assessment tool applied to the Vida Manglar carbon crediting project, Colombia.

## 0.2.5 Progress wheel case study: Mikoko Pamoja

Mikoko Pamoja ("Mangroves Together") is a community-led blue carbon project in Gazi Bay, Kenya. The world's first blue carbon project, certified by Plan Vivo's Carbon Standard (PV Climate Standard) in 2012. By today's standards Mikoko Pamoja would be considered a micro project, protecting and managing 117 hectares of mangrove forest. The Gazi bay communities include around 1,081 households or roughly 5,400 residents.

Mangrove deforestation was effectively halted through providing alternative wood sources and working in close partnership with the community to protect and rehabilitate degraded areas, including limited planting of new mangroves. The project sequesters 2,500 to 3,000 metric tonnes of $CO_2e$ annually, with carbon revenues transparently invested into infrastructure projects decided upon by community members, including educational materials, clean water access for over 3,500 people, and alternative livelihoods.

| HIGH-QUALITY PRINCIPLE | PROGRESS LEVEL (1-5) |
|---|---|
| **PRINCIPLE 1. Design for Sustainability** | |
| Risk assessment | 4.7 |
| Project durability | 3.5 |
| Risk mitigation | 3.5 |
| **PRINCIPLE 2. Operate Locally and Contextually** | |
| Design according to local context | 5.0 |
| Working with local partners | 5.0 |
| Engage with policy | 4.7 |
| **PRINCIPLE 3. Employ Best Practice** | |
| Appropriate interventions | 4.3 |
| Evidence-based outcomes | 5.0 |
| Adaptive management | 4.5 |
| **PRINCIPLE 4. Safeguard Nature** | |
| Conserve ecosystems | 4.3 |
| Science-based project design | 5.0 |
| Do no harm | 5.0 |
| **PRINCIPLE 5. Empower People** | |
| Social safeguards | 4.8 |
| Inclusive design | 5.0 |
| Community equity | 5.0 |
| **PRINCIPLE 6. High Integrity Capital** | |
| High-integrity finance | 4.5 |
| Financial transparency | 5.0 |
| Fair agreements & contracts | 4.7 |

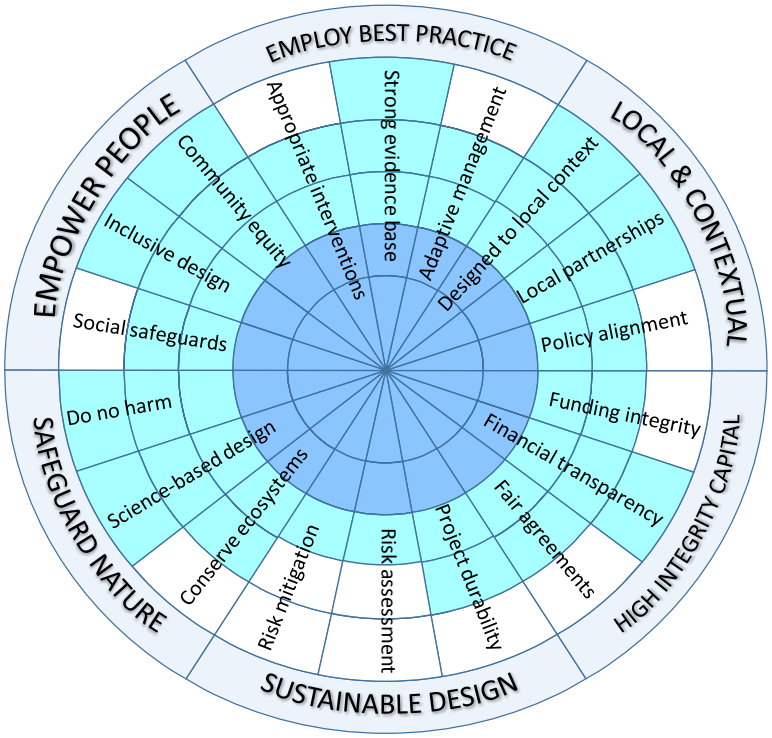



**Figure 7:** The Progress Wheel self-assessment tool applied to the Mikoko Pamoja carbon crediting project, Kenya.

*Newly sprouting mangroves at Mikoko Pamoja, Gazi Bay, Kenya*
*© Tony Wild/Anthony Ochieng Onyango/ACES*

Gazi Bay has been a focal point for mangrove research for decades, with long established partnerships between universities, especially Edinburgh Napier University, national reasearch institutes including the Kenya Marine and Fisheries Research Instities, and communities. Mikoko Pamoja grew out of this partnership, and this is reflected in the progress wheel in the unusually high performance in local partnerships, inclusivity and equity, and science-based design.

The project is not for profit, with the Association for Coastal Ecosystem Services charity established to provide technical support, carbon credit management and additional fundraising services. Financial reports are published annually and are freely available on the Plan Vivo website. Mikoko Pamoja demonstrates how small-scale, community-owned and managed carbon projects can deliver outsized climate and ESG returns.

# 1.0 Design for sustainability

*Mangrove channels are home to many edible fish © Matt Curnock, Ocean Image Bank*

**This principle addresses the need for sustainable blue carbon project designs which are inclusive of how these initiatives will last into the future. This includes financing, threat abatement, community stewardship and climate change. High-quality projects ensure that sustainability and durability considerations are established at concept stage and maintained as essential design requirements throughout feasibility analysis and project design.**

As a first stage of project design, project proponents should produce a concept note including project location, stakeholders identified so far, the issues the project aims to address, why it is needed, and intended goals.

Supported by desk-based research, the concept note outlines the project's theory of change and expected outcomes, plus basic plans for preliminary activities such as stakeholder mapping and engagement, in-situ data collection, and project design processes. The concept note functions as a concise proposal used to socialize the project, generate interest or feedback, and support funding applications for early stages of implementation or the production of a feasibility study.

Building on the concept note, a project feasibility study is the next stage of design. It provides a structured, evidence-based assessment of whether the assumptions set out in the project's theory of change are realistic and viable from ecological, social, financial, legal, and governance perspectives. Transparency around risks and how they might be addressed should be captured as part of the project feasibility study, including risk assessments that identify environmental, social, legal, and operational threats (section 1.1), and preliminary plans for their monitoring, mitigation, and adaptive management (section 3.3).

*Gazi Mangroves, Kenya © Anthony Ochieng Onyango/ACES*

Feasibility studies are recommended for all blue carbon projects and are essential for any intending to generate credits. Crediting projects should align their feasibility assessments with the Project Idea Note (PIN), Project Design Document (PDD), or equivalent project description templates required by the chosen crediting standard. The addition of indicative implementation and monitoring cost estimates provides the evidence base needed for financiers to engage with the project.

Financiers should note that stakeholder mapping and Free, Prior and Informed Consent (FPIC) of project affected people must be initiated before any field data collection or other on site feasibility activities can begin (section 5.1). FPIC continues through each stage of feasibility and design, ensuring that Indigenous Peoples' and Local Communities (IPs & LCs) rights are respected prior to any project decisions or activities. For crediting projects in particular, this takes both expertise and time – months, rather than weeks, and can be correspondingly expensive. Similarly, on site sampling and measurement of soil organic carbon represents a significant upfront cost. As such, funding is usually needed for full site feasibility reports to be completed.

**The following resources include content relevant to feasibility assessments:**

- Quantifying the Reporting, Coverage and Consistency of Key Indicators in Mangrove Restoration Projects
- Mangrove Rehabilitation and Restoration as Experimental Adaptive Management
- Coastal Blue Carbon in Practice
- Guiding principles for delivering coastal wetland carbon projects
- Consultation and Free, Prior, and Informed Consent: A referential practice for carbon projects following a rights-based approach

**Project design templates and examples to inform the feasibility assessment can be found here:**

- Verra Project Description & Monitoring Report templates
- Plan Vivo PIN template
- Gold Standard templates
- Article 6.4 activity standard for projects
- Feasibility Assessment: Aotearoa New Zealand Blue Carbon Resilience Credits
- Feasibility study for the preparation of Blue Carbon offsetting projects in Andalucia, Spain

> **In summary, the concept note communicates "what the project aims to do" the feasibility study answers "can this project work?", and the risk assessment addresses "what could stop this project from working, and how do we design the project to prevent that?"**

# 1.1 Risk assessments

High-quality blue carbon projects identify and assess risks as part of a feasibility assessment, including social, political, environmental and financial variables. Projects are ideally located at sites with minimal risks to durability, or address risks through monitoring, mitigation and adaptive management. Comprehensive measures should be in place to minimize the impacts of future events, including impacts of climate change, such as sea level rise and increased storm severity, that may pose a significant risk of reversal. Risk assessments do not necessarily have to be complex – a simple risk matrix may suffice – while for risks that may require a technical approach there are several existing frameworks which can be adapted to fit the project context:

- Using Ecosystem Risk Assessment Science for Ecosystem Restoration
- A Framework for Risk Analysis in Ecological Restoration Projects
- Global Carbon Council AFOLU Non-permanence Risk Assessment Tool
- WWF and University of Queensland's Climate-Smart Mangrove Decision Support Tool

*Measuring diameter at breast height of mangrove trees*
*© Conservation International*

**Standard-specific tools for carbon crediting projects include:**

- Verra's Digital Non-Permanence AFOLU Risk Tool
- Gold Standard Risks and Capacities Guidelines for Blue Carbon and Freshwater Wetlands

**High-quality projects integrate social, political, environmental and financial risk assessments into project plans.**

## Ecological risks

Ecological risks include a broad range of environmental and climate change impacts that harm, stress or threaten the ecosystem. Some of the large-scale risks include increasing severity of extreme weather events such as hurricanes, flooding, and storms that physically damage the project area. Similarly, sea level rise and coastal erosion may decrease the project area and threaten the durability of carbon storage. Biological threats, including invasive species and diseases, and hydrological impairments, including upstream or downstream barriers, can compound physical impacts, stress the ecosystem and make it less resilient to additional risks.

Projects should take steps to identify and evaluate potential climate change-related risks. Datasets for sea level rise, water temperatures and historic precipitation or extreme weather records are usually freely available online and are highly useful in assessing risks to durability. A proactive approach requires evaluating the likelihood and severity of each risk occurring and including corresponding strategies to respond to such events in project adaptive management plans (section 3.3).

- Verra Guidance on sea-level rise risk assessment
- Manual for Climate Change Vulnerability Assessment of Coastal and Marine Protected Areas
- Assessing the Effectiveness of Marine Nature-based Solutions with Climate Risk Assessments
- NOAA Marine Protected Area Climate Vulnerability Assessment Guide
- The Climate Change Resilience and Adaptation Planning Tool
- Climate Change Vulnerability Assessment and Adaptation Planning for Mangrove Systems
- WWF and University of Queensland's Climate-Smart Mangrove Decision Support Tool
- Pamoja voices climate-resilience planning toolkit

*Ambilobe © WWF*

## WWF's Climate-Smart Mangrove Decision Support Tool

The Climate-Smart Mangrove Tool, available in English and Spanish, helps practitioners integrate climate change considerations into mangrove projects focused on new protection, updating management plans for existing protection, or restoration. The tool has an interactive workbook that guides users through a structured six-step process that includes a vulnerability assessment, followed by considering and prioritizing potential climate-smart interventions for the site:

**Step 1:** Identify site-specific characteristics indicative of climate change sensitivity.

**Step 2:** Identify climate threats to which the site is exposed.

**Step 3:** Assess vulnerabilities based on the combination of climate threats and site-specific characteristics from steps 1 and 2.

**Step 4:** Assess the socioeconomic adaptive capacity conditions that could enable or inhibit potential management actions.

**Step 5:** Identify appropriate climate-smart management actions that address the vulnerabilities from step 3 and adaptive capacity outcomes from step 4.

**Step 6:** Prioritize climate-smart management actions from step 5 to enhance the resilience of mangrove sites to short- and long-term climate stressors.

By combining scientific data with local knowledge, the Climate-Smart Mangrove Decision Support Tool helps conservation practitioners select climate-smart actions to address current and future impacts of climate change on mangrove ecosystems and make their projects more durable while enabling adaptive management.

*Measuring the growth of a newly planted mangrove*
*© Conservation International*

*Green turtle (Chelonia mydas) grazing in seagrass, Bahia, Brazil*
*© Luciano Candisani/iLCP*

## Human risks

Human risks to blue carbon projects largely stem from activities that can compromise the overall integrity and health of the ecosystem. Changes in land use by clearing, overharvesting, or intensive use of blue carbon ecosystems, whether for commercial or subsistence reasons, reduce the ecosystem's resilience. Existing protections or restrictions on use may lack enforcement, or the project site may be vulnerable to illegal activities carried out by external groups at the expense of project stakeholders. Projects should consider the risk of conversion of blue carbon habitat for commercial purposes such as aquaculture, agriculture, or coastal development in areas upstream from, adjacent to, or overlapping project sites. Coastal tourism can also cause physical damage to sensitive habitats through over exposure to human use, infrastructure development, pollution, or additional stressors.

When assessing human risks, it is essential to consider not only risks to the project resulting from human activity, but also to assess the risk to humans, particularly IP & LC stakeholders, as a result of project activity.

Conflicts between investors and local communities can be a risk in blue carbon projects, particularly if the project's goals and values are not aligned with project participants. For example, if land tenure or management rights are formalized directly with government bodies without community recognition, if access to resources is reduced or lost, or for crediting projects, if revenue is captured by intermediaries or elites. Projects implemented without transparent participation may face protests, legal challenges, or reputational damage. Proponents should mitigate risk – both financial and socio-ecological – by establishing clear governance structures and decision-making processes, ensuring community members have a meaningful voice in project decisions and can hold project developers and investors accountable for their commitments (section 5.1).

**Useful resources include:**

- Gold Standard Safeguarding Principles and Requirements
- Plan Vivo Participatory Toolkit
- Community Based Safeguarding Visual Toolkit
- Social and Biodiversity Impact Assessment (SBIA) Manual for REDD+ Projects
- Indicators of Resilience in Socio-ecological Production Landscapes and Seascapes
- Consultation and Free, Prior, and Informed Consent: A referential practice for carbon projects following a rights-based approach

## Policy risks

Policy risks can profoundly affect project feasibility (section 2.3). Policy and administration changes at the local or national level can impact how a project operates, such as changes to land tenure or ownership rules, authorizations for crediting projects on government-owned land, or whether permission is granted for upstream private development or public infrastructure projects that cause harm to the environment. In some instances, policy changes may place a permanent or temporary moratorium on carbon credit sales, or introduce additional taxation on credit revenue that makes smaller crediting projects financially unsustainable.

At the onset of the project, developers should conduct a thorough policy analysis to identify any conflicting policies or potential developments that may negatively impact the project.

This includes incorporating lessons learned from other projects that experienced policy shocks to inform adaptive management planning. Project proponents should engage with relevant government agencies early and often, and periodically update their policy analysis to account for any policy changes.

**Useful resources include:**

- Tangled roots and changing tides - Mangrove governance for conservation and sustainable use
- Legal frameworks for mangrove governance, conservation and use - Assessment summary
- Mobilizing the Mangrove Breakthrough country summaries
- Quantifying the presence and potential of national legal frameworks for global mangrove protection
- Where land meets the sea - A global review of the governance and tenure dimensions of coastal mangrove forests (2016)

*Reopening channels to restore mangroves © Dominic Wodehouse*

*Mangroves line the cenotes of Tulum, Mexico*
*© Mark Beeston, Conservation International*

For carbon crediting projects, policy risk assessments should include determining if the host country has stated an intention to participate in Article 6.2 or 6.4 and its state of readiness. Although voluntary carbon crediting projects do not automatically require Article 6 letters of authorization, most countries are still developing the accounting, tracking, and authorization infrastructure for Article 6 implementation. Evolving policy decisions may affect whether host governments later require corresponding adjustments for exported mitigation outcomes or place conditions on credit issuance or claims. Given growing buyer preference for credits with clear alignment to national accounting, proponents should proactively assess whether the host country intends to authorize voluntary carbon credits as Internationally Transferred Mitigation Outcomes (ITMOs).

At the time of writing, there is no approved methodology for blue carbon projects to be developed under Article 6.4, although this may change through 2026-2027. Useful resources include:

- UNFCCC what is Article 6?
- IETA NDC 3.0 and Article 6 tracker
- Getting ready for Article 6.4: Practical steps for carbon projects
- Host Country Article 6 Readiness: Key Aspects to Drive Demand
- UNFCCC list of Designated National Authorities for A6.4
- Article 6 Implementation Partnership resource library
- Article 6.4 Sustainable development tool

## Financial risks

Demonstrating a robust financial risk assessment builds financier confidence that the project has a viable long-term financial strategy and will not fold due to short-term interruptions in funding. Monitoring changes in currency values can be critical for projects which receive international funding, while dramatic increases in inflation or interest rates can undermine implementation budgets. Projects which require co-funding or multiple grants to maintain activities for the intended timeframe need to be transparent about the risk of funding shortfalls and how that impacts ongoing implementation, monitoring, or benefit sharing.

Financial risk assessments should include risks experienced by participating IPs & LCs, including non-delivery of benefits, the opportunity cost of implementing the project compared to the value of benefits received, changes in household income, and potential changes in market value of any goods or ecosystem services produced by alternative livelihood activities. For example, a local apiculture initiative could experience price decrease due to market volatility or oversupply. Proponents should identify these risks early and integrate contingency plans into their adaptive management strategies.

Fluctuations in market prices and demand also pose risks to crediting or other revenue generating projects. Strategies for the project to mitigate and adapt include diversifying revenue, creating flexible budgets and setting aside a portion of finances in a reserve or endowment fund. Crediting projects should also carry out an assessment of the risk of reversal associated with changes or reductions in stakeholder benefits at the end of the crediting period, carried out at least five years in advance.

**Useful resources include:**

- The Blue Carbon Cost Tool
- Understanding market potential and investment requirements for high-quality coastal wetland projects
- CrossBoundary: Masterclass in Project Finance for Carbon Activities
- CrossBoundary / USAID Carbon Finance Playbook
- UNESCO Blue Carbon Finance Toolbox
- Business planning for Protected Areas

> **High-quality blue carbon projects produce comprehensive assessments for ecological, human, financial and policy-related risks using an open and transparent process inclusive of stakeholders and community members. Results are transparently shared with all project participants and used to inform monitoring and adaptive management plans.**

**Further reading and case studies:**

- Mangrove related policy and institutional frameworks in Pakistan, Thailand and Viet Nam (2016)
- Mangrove Species' Response to Sea Level Rise Across Pohnpei, Federated States of Micronesia
- Sea-level rise escape planning for Florida's coastal ecosystems
- Multiple impact pathways of the 2015–2016 El Niño in coastal Kenya
- Coastal risk screening tool
- Surface elevation changes in an estuarine mangrove forest in Vanga, Kenya: Implications for management and mitigation of sea level rise
- How mangrove forests adjust to rising sea level

**Additional resources modeling sea level rise:**

- UNFCCC Technical Guide on Sea level Rise
- NOAA Sea-level rise viewer
- NASA Sea-level Change observations from space
- Global Intertidal Change
- Sea-level Rise Exploration and Assessment Tool (SEA Tool)

**Financial risk assessments should include risks experienced by IPs & LCs, including the opportunity cost of participating in the project compared to benefits received.**

### 1.1 Risk assessments

To align with the High-Quality Blue Carbon Principles, projects need to be able to show:

- **The project conducted an ecological risk assessment.**
  - Effects of climate change on the project site are monitored for example, sea level rise, heat stress, changing rainfall and severe weather.
- **The project conducted a human risk assessment.**
  - Human impacts on the project site and nearby ecosystem are monitored and inform response actions.
  - Local social changes and community satisfaction with the project are monitored and inform response actions.
- **The project conducted a financial risk assessment.**
  - Risk assessment outcomes were incorporated into design of project finances and funding/income streams.
- **The project conducted a policy risk assessment.**
  - Risk assessment outcomes were incorporated into project governance, management and financing plans.

# 1.2 Project durability

Durability is a project's ability to sustain ecological and social outcomes beyond initial funding and through changing conditions. In the context of carbon crediting projects, durability is the project's capacity to sustain and protect its credited carbon stocks securely over the intended storage period. Crediting projects aiming to be compliant with the ICVCM Core Carbon Principles should plan for project durability of 40+ years, even if credits are only issued for part of that time. High-quality crediting projects also need to consider permanence – the length of time carbon stored from project activities will stay out of the atmosphere. Most standards consider nature-based projects to achieve permanence if carbon is stored for 100 years. Specific requirements for durability and permanence are addressed within the individual standards.

**More information on project durability and permanence for crediting projects can be found at:**

- Permanence in carbon credits: why it matters, and how to evaluate it
- ICVCM Continuous Improvement Work Program report: Permanence
- Integrity Council follow-up work program to refine permanence requirements
- The Blue Carbon Handbook

For non-market projects which may be reliant on short term grant funding, durability can be challenging. Implementation of restoration does not automatically result in successful ecological recovery. It is recommended that it takes at least five years to assess the success of restoration, with projects ideally maintaining and monitoring sites for ten years or more, far longer than the 3-5 year timespan of most grant periods. Proponents need to plan for the risk that site monitoring and maintenance will cease at the end of the funding period unless a follow-on grant or other revenue can be secured.

*Fish farm in mangroves © Conservation International*

*Beekeeping provides sustainable income in Corregimiento Caño Grande, Colombia © Daniel Uribe*

The durability of a blue carbon project is grounded in project design that looks beyond short funding cycles and anticipates the environmental, social, and economic conditions that will affect long-term feasibility. This includes improving management of how the system is used, or livelihood improvements to reduce pressures on ecosystem resources, formalizing local tenure rights of blue carbon ecosystems (section 5.2), alignment with local and national policies (section 2.3) and designing solutions that address both biophysical and socioeconomic causes of loss and degradation.

Many projects support livelihoods directly tied to restoration activities (e.g., payment for establishing nurseries, planting, channel maintenance, monitoring). While this provides short-term economic benefits to local communities, it does not link community members' livelihoods and well-being to the long-term health of the ecosystem. Instead, it can create a dependency on the funding flow for the restoration activities.

The most durable projects are those which support user groups in transitioning away from damaging activities and invest in diverse sustainable livelihoods linked to a healthy ecosystem. Examples include agroforestry, sustainable non-destructive fishing, ecotourism, or development of non-extractive resource uses such as honey and soap production. Practical steps for durability include co-developing alternatives with project participants to ensure long-term adoption, capacity building designed to support livelihoods beyond the expected funding period, including targeted train-the trainer programs, and local recruitment which embeds skills within the community (section 5). The Blue Carbon Plus (BC+) initiative, jointly led by The Nature Conservancy and Conservation International, studies, develops, and funds scalable local businesses that protect and restore mangroves, seagrasses and saltmarshes as part of how they operate and earn revenue.

The project site, whether seabed, intertidal, or supratidal wetland, will need to have clearly established and legally recognized tenure and governance which empowers the community to continue sustainable management practices. This can be further supported by planning for multi-year maintenance and monitoring routines to be in place and active before the project ends, and ensuring local capacity to lead and maintain the site, insulating the project against the shock of funding or crediting income ending.

Large scale trends in socio-political dynamics and human activities (such as increased migration of people to the coast) can also increase pressures on project sites. Additional biodiversity loss or species movement might deliver cumulative or accelerated negative impacts. While these forces are outside the immediate control of the project, they should be accounted for and addressed in adaptive management plans (section 3.3).

For blue carbon projects, durability is best achieved through risk identification, adaptive management and community support. The monitoring and management requirements of carbon crediting programs are designed to ensure project durability for the identified crediting period and beyond.

**Additional resources modeling sea level rise:**

- Keys to successful blue carbon projects: Lessons learned from global case studies
- The Livelihood Assessment Tool-kit
- Non-Timber Forest Product Livelihood-Focused Interventions in Support of Mangrove Restoration
- Securing Sustainable Financing for Conservation Areas: A Guide to Project Finance for Permanence
- WWF Sustainable Finance for Conservation Playbook
- Functionality of restored mangroves: A review
- Tackling the mangrove restoration challenge

## 1.2 Project Durability

To align with the High-Quality Blue Carbon Principles, projects need to be able to show:

- **The project has produced a 5 year monitoring plan and has begun implementing it.**
  - The project has adaptive management plans in place and can be responsive to monitoring results.
  - The project trains and employs local staff.
- **The project has begun implementing plans for sustainable alternatives to activities which degrade the ecosystem, co-developed with local stakeholders.**
  - Project provides full technical or financial support for stakeholder transition away from damaging activities.
- **Project aims for the benefits provided to stakeholders during project period to continue after project ends and is developing a long-term maintenance and management plan.**
  - The project is building sufficient local capacity to maintain the project site.
  - Site governance achieved during project implementation facilitates longer term management rights.

# 1.3 Establish measures to mitigate risk of reversal

Risk of reversal is the likelihood that gains in ecosystem extent, condition, or carbon storage within blue carbon habitats are undone by natural disturbances, human activities, or inadequate long-term management, negating earlier restoration or protection benefits.

Changes in political priorities, the availability of long-term finance, evolving societal needs and climate change all pose risks of reversal. To address these risks and ensure durability over the longest possible timeframe, projects should establish mitigation measures from the outset.

Unmitigated risks can swiftly compromise a project's financial viability and undermine or reverse ecological or social outcomes. To mitigate this danger, high-quality projects take a proactive and transparent approach to risk allocation and management. Participating stakeholders should agree on how risks are identified, monitored, and distributed, considering each party's influence over specific risks, the potential costs involved, and their capacity to respond. This prevents risk from becoming concentrated on any single stakeholder group and supports faster, coordinated responses when conditions change.

All projects should integrate mitigation strategies into their project design and be prepared to share them with financiers and other stakeholders. Appropriate documentation includes:

- **Risk Plan** – Based on the outcomes of risk assessments, any points where there could be issues that reduce or reverse project outcomes are identified, and steps are outlined to overcome those risks (including adaptive management, section 3.3). Doing this before risks manifest allows the project team to respond to issues as quickly and efficiently as possible.
- **Monitoring, Evaluation, Accountability and Learning (MEAL) Plan** – Decide on the indicators of success that need to be tracked, who will do that, the methods that will be used and the frequency that the indicators are assessed.
- **Responsible, Accountable, Consulted, Informed (RACI) Chart** – This chart provides clear guidance on roles and responsibilities amongst the team, describing who makes decisions and how to keep everyone informed.

For carbon crediting projects, carbon standards typically require projects to set aside a percentage of credits into a buffer pool, where they cannot be sold, to offset the risk of any future carbon reversals. The number of credits allocated to the buffer pool varies between standards and may be a set percentage, or may depend on whether the project implements sufficient mitigation plans to address the risk of reversal. This is assessed using standard-approved or provided risk tools:

- Verra's Digital Non-Permanence AFOLU Risk Tool
- Gold Standard Risks and Capacities Guidelines for Blue Carbon and Freshwater Wetlands
- Plan Vivo's PV Climate Procedures Manual

There are likely to be additional risks associated with the ending of carbon crediting income and associated community benefits and incentives. However, crediting projects have the potential to establish long-term alternative livelihoods or diversified revenue streams which can effectively remove the need for stakeholders to re-engage in activities which degrade the project site once credit income ceases. Financial planning should include the transition at the end of the crediting period, for example, endowments capitalized during the crediting period can extend the time project benefits are maintained (section 6.3.2).

For projects supported by grant funding of typically 3-5 years, mitigating the risk of reversal at the end of the funding period is more challenging compared to carbon crediting projects which span 20 years or more. High-quality projects will plan beyond the initial funding period and invest in dedicated staff or consultant time to sequence successive grants or actively explore long-term sustainable finance options to continue project monitoring, maintenance and community benefits for as long as is required to ensure durability.

Active participation in national or international networks can increase exposure and access to funding opportunities or further support. Prominent networks relevant to blue carbon projects include:

- Global Mangrove Alliance
- The Mangrove Breakthrough
- The Saltmarsh Breakthrough
- Mediterranean Posidonia Network
- Seagrass-Watch

Projects should plan for financial durability from the outset, blending near-term funds with investment in diversified revenue or longer-term mechanisms to sustain core operations after grants or credits decline, reducing exposure to funding gaps that can stall or reverse project progress. Early action to secure tenure, governance, local capacity, and operational protocols, backed by a clear financial exit and transition plan, decreases the risk of reversal beyond the funding period. As part of project feasibility and ongoing delivery, projects should be able to provide donors or investors with up-to-date annual resource and budget plans:

- **Resource and Budget Plan** – This plan describes what expertise, materials, equipment, etc. are needed at what point in the project lifetime, how resources will be managed, and the budget required. In some cases, funding may be coming from multiple sources, so it can be useful to decide early what expenses are charged to which funding source and if there are any restrictions on how funds can be spent.

Longer-term threats such as climate change also present a risk of reversal. Project proponents need to openly discuss this threat with participants and financers and develop agreements that consider the potential risks of reversal or reduction in project outcomes or benefits. Where available, insurance products may be used to further protect project outcomes, buffering the financial shock of extreme events or underperformance. Useful resources for financial planning include:

- Verra: Innovative approaches to addressing durability
- Practice standards for Conservation Trust Funds
- Conservation Finance Alliance resource library
- Repository of Protected Area Business Plan resources
- IUCN Practice guidance for protected and conserved area finance
- UNEP Blue Finance case studies
- UNESCO Blue Carbon Finance Toolbox
- CrossBoundary Project finance for carbon activities masterclass

**Further reading:**

- Indicators of Coastal Wetlands Restoration Success: A Systematic Review
- Region Manual for Mangrove Monitoring in the Pacific Islands Region SPREP Library/IRC

*Seagrass beds of Atauro Island, Timor Leste*
*© Paul Hilton for Conservation International*

### 1.3 Establish measures to mitigate risk of reversal

To align with the High-Quality Blue Carbon Principles, projects need to be able to show:

- **Project has integrated risk management and mitigation strategies, informed by risk assessments and supported by clear processes such as Responsible, Accountable, Consulted, Informed chart, Monitoring, Evaluation, Accountability and Learning plans and adaptive management responses.**
- **Project has clear financial plans as well as the human resources to secure further income past initial grant or crediting period.**

# 1.4 Case study: West Africa Blue

**West Africa Blue ("Blue") is a developer of high-quality, large-scale blue carbon projects across West Africa, distinguished by its commitment to transparent engagement and equitable benefit sharing with local communities.**

Based in Freetown, Sierra Leone, the organization develops financially sustainable projects through the sale of high-quality nature-based carbon credits. Blue's portfolio includes pioneering projects in Sierra Leone and Guinea, with plans for expansion across West and Central Africa:

- **Sierra Leone Sherbro River Estuary Project:** This flagship initiative spans approximately 94,000 hectares of mangrove conservation and restoration. Listed on the Verra Registry in August 2023, the project is preparing for carbon credit issuance and sale on the Voluntary Carbon Market by late 2026. The project aims for Climate, Community, and Biodiversity Gold certification, signifying exceptional benefits beyond carbon sequestration, including enhanced community well-being and biodiversity protection.
- **Guinea Project:** Modelled on the Sierra Leone project, Blue's second major initiative is a grouped project in the Forécariah and Boffa Prefectures, covering approximately 30,500 hectares with a mix of mangrove conservation and restoration. The full Project Description Document was listed on the Verra Registry in April 2026, with the validation process starting soon and first credit issuance expected in mid 2027. Building on over two years of community and government engagement, the Guinea project includes pilot project activities designed to reduce the reliance on mangrove wood, such as improved cookstoves, improved fish smoking ovens (IFSOs), and mangrove-free solar salts.

*Community consultation meeting, Sierra Leone*
*© T.J. Blade @ Envizage Concepts*

*Measuring circumference of large mangrove trees, Sierra Leone*
*© T.J. Blade @ Envizage Concepts*

## Risk Assessment

Blue addresses risk first by conducting comprehensive environmental assessments of project areas. These assessments pair remote sensing methods such as publicly available satellite imagery with high-resolution field methods and prevailing technologies such as machine-learning. Gaps in detection – such as below-canopy degradation – are addressed though community-based monitoring, radar–biomass modelling, and regular ground truthing. Including analysis of coastal dynamics such as seasonal flooding, tide patterns, and hydrological shifting in mangrove ecosystem assessments enables projects to respond proactively to changing environmental conditions to mitigate risk.

Beyond ecological risks, the organization's sustainability design incorporates mechanisms that reduce long-term risk for stakeholders. The Grievance and Accountability Mechanism provides community members with a channel through which they can share concerns and feedback with project managers, allowing on-the-ground problems to be addressed before they escalate and risk project outcomes. The Simple, Equitable Revenue Sharing (SERS) benefit-sharing model minimizes communities' exposure to the financial risk of market volatility and operational cost overruns by tying benefits to gross carbon revenues rather than net profits, ensuring impacted communities can depend on predictable payments.

*Community member with fuel efficient cookstove, Sierra Leone*
*© T.J. Blade @ Envizage Concepts*

*Planting mangrove propagules, Sierra Leone © T.J. Blade @ Envizage Concepts*

## Project Durability

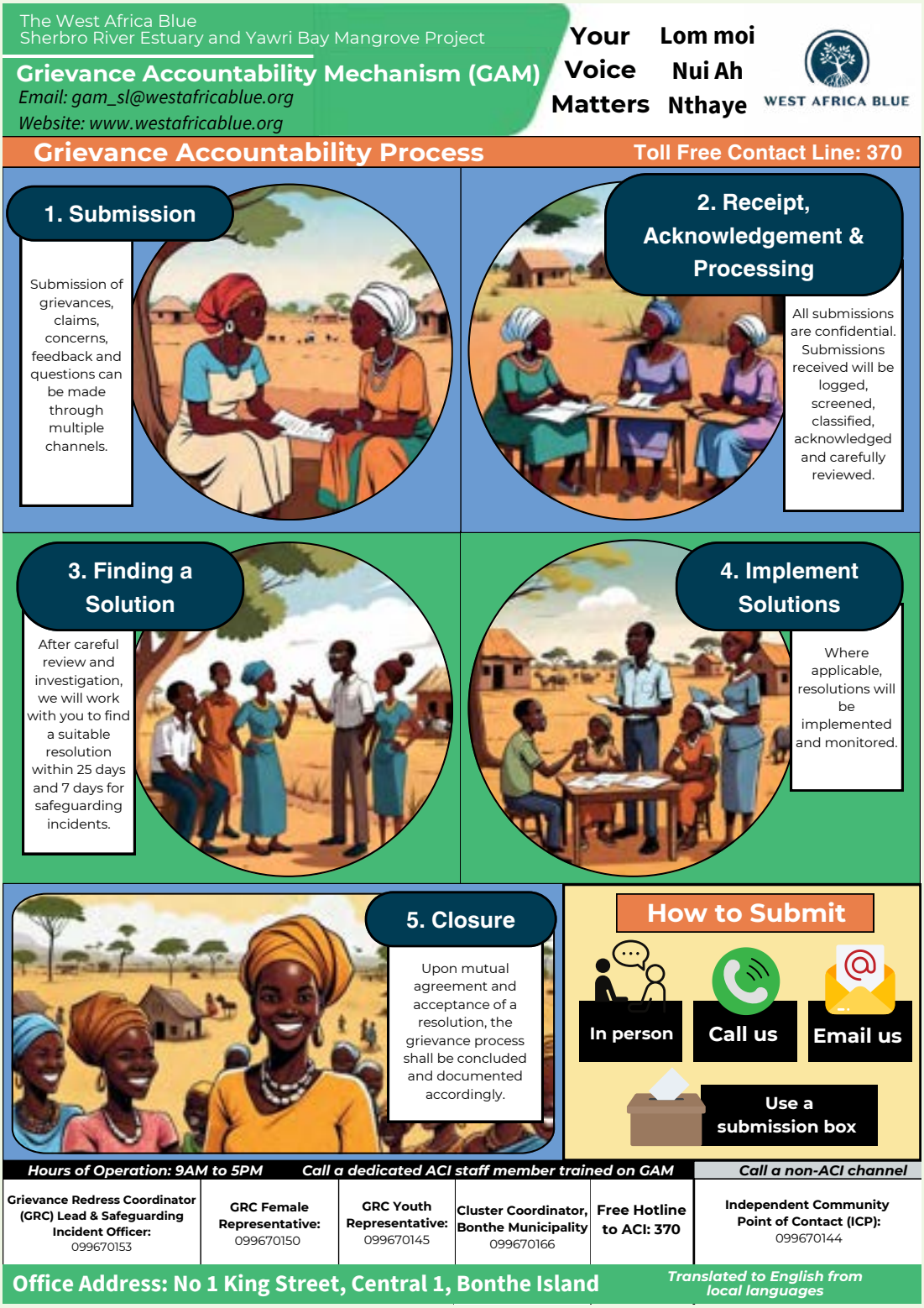
Blue's projects are designed to be resilient and have 50–100-year project lifecycles grounded in the socioeconomic stability of local communities. Beyond the SERS benefit-sharing model which ensures local communities and governments receive a transparent, reliable cash flow, other community benefits include:

- Employment: Direct employment of community members in project operations (e.g., cookstove captains, woodlot attendants, restoration workers), at the outset of the project. Employment is initially prepaid by Blue, years in advance of revenue, and then reimbursed from the community's share, interest-free and capped at 50% of any revenue share payment.
- Direct Financial Benefits from Programs: Reduced household spending on fuelwood due to more efficient cookstoves and IFSOs, and new sources of household income from alternative livelihoods. These are *additional* benefits not deducted from the community's revenue share.

*Efficient cookstove newly installed in community member's home © T.J. Blade @ Envizage Concepts*

- No-Cost Funding for Community-Based Activities: Support for community trust setup and community-nominated projects (e.g., water wells, latrines, schools, shared fishing infrastructure).

These near-term benefits ensure that stakeholders are not forced to resume mangrove deforestation activities due to a lack of initial or predictable funding.




Poster for West Africa Blue's Grievance and Accountability Mechanism. For the purpose of this guide, this poster has been translated into English from local languages.

To ensure project outcomes are sustained, Blue invests heavily in adaptive management and local capacity building. Their "train the trainer" model and the establishment of Community Benefit Organizations – independent legal entities led by community directors – empower local leadership to manage monitoring and management long after the initial setup. Blue mitigates the drivers of deforestation by establishing diverse, sustainable, and gender-inclusive livelihoods that do not depend on continuous project funding. Initiatives include:

- Efficient Cookstoves: Locally made clay brick cookstoves have been constructed, reducing wood consumption by up to 65%, with over 2,370 currently in use in Sierra Leone, predominantly by women.
- Woodlots: Blue has planted over 12,400 woodlot trees (gmelina and cashew) in Sierra Leone to provide alternative construction materials and fuelwood, reducing pressure on mangroves.
- Sustainable Oyster Farming: Introduction of sustainable oyster racks allows women to harvest oysters without damaging mangrove roots, diversifying income and promoting conservation.
- Solar Salt Production: A novel approach utilizing solar evaporation to produce salt, eliminating the need for burning mangrove wood, which is a significant deforestation driver.

By promoting the socioeconomic health of the local community and formalizing community-led governance, Blue creates a durable framework where conservation becomes a permanent economic preference rather than a temporary project requirement.

## Measures to Mitigate Reversal

To ensure the long-term durability of its restoration and conservation efforts, Blue adopts a proactive management framework designed to mitigate the potential for reversal. By integrating robust safeguarding instruments – such as the Grievance and Accountability Mechanism – and clear Benefit Sharing Agreements, the organization ensures that roles are transparent and community concerns are addressed before they compromise project outcomes. Through its "Living Labs" initiative, Blue offers its projects as testing grounds for open-source solutions to real-world challenges. This includes sharing key lessons learned, methodologies, and documentation templates. This commitment to knowledge sharing stimulates the market, catalyzes private finance, and raises the bar for quality and transparency across the sector.

*Shellfish smokers, Sierra Leone © T.J. Blade @ Envizage Concepts*

# 2.0 Operate locally and contextually

*Community groups constructing permeable structures to trap sediment in Demak, Indonesia © Nanang Sujana*

**This principle recognizes that coastal ecosystems are shaped by highly specific social, governance and biophysical conditions that cannot be standardized across sites.**

Mangroves, saltmarshes and seagrasses respond differently to hydrology, geomorphology and sediment regimes, and these local ecological conditions determine whether an intervention will deliver durable carbon and biodiversity outcomes (sections 1.2 and 4.1). However, all blue carbon projects operate within the context of formal layers of national and local policy, legislation, and governance, and informal local and social hierarchies, which need to be effectively navigated before any activities can begin.

Proponents of high-quality projects, whether local or international, need to both secure local support and understand how the project fits within the wider policy context. This includes assessing how the project is nested within, or contributes to, national climate and biodiversity commitments, local development priorities, and coastal zone management, conservation, or restoration targets. Establishing this alignment creates opportunities to build institutional support, reduce implementation risks, potentially ease access to public funding, and highlight the value the project delivers.

Sustainable projects are strengthened by collaboration with local partners and take a structured approach to understand, engage, and build trust with the people and organizations around them, identifying potential points of conflict or risk during project feasibility and addressing them early on through informed and iterative design. By grounding project theory of change, design, and implementation decisions in place-based social, institutional, and environmental conditions, high-quality projects are more likely to deliver durable outcomes, in line with national and local priorities.

This section of the Practitioners Guide discusses the social and policy dimensions of project planning. Understanding the ecological context is discussed in sections 3 & 4, and stakeholder inclusivity and safeguards are discussed in section 5.

*Local fishermen in a mangrove estuary.*
*© Srikanth Mannepuri, Ocean Image Bank*

*Protected mangroves from above, Colombia © Mariana Rivera-Uribe, Mangrove Photography Awards 2021*

# 2.1 Design projects according to the local social and ecological context

Social and ecological contexts are often closely linked – sometimes so closely that blue carbon ecosystems have been described as "socio-ecological" ecosystems, deeply connected to local economies, food and resource provision, and cultural identities.

Recognition that drivers of ecosystem change are often rooted in societal or economic necessity has resulted in wider adoption of social solutions to ecological problems. While science-based ecological protocols can be effective at restoring ecosystem health (section 4.2), high-quality project designs incorporate socioeconomic information to identify and mitigate drivers of change, and to reduce risk of project reversal (section 1.3 and 3.1). As such, there is no single "one size fits all" solution for designing and implementing activities in blue carbon ecosystems. While project management structures and processes such as ecological design or stakeholder mapping and engagement may be transferable and replicated in different locations, every new project will be designed or adapted to fit their unique local ecological and social context.

The following tools may be applied to support project design within the local context:

- A guide to the Restoration Opportunities Assessment Methodology (ROAM)
- The 4 Returns Framework for Landscape Restoration
- The SWAMP Toolbox: A suite of resources for coastal wetland project development for mitigation or other outcomes

Financiers also need to ensure their desired outcomes align with the local social and ecological context. There have been instances where misconceptions about ecosystem restoration techniques have caused external funders to impose project targets such as planting 100,000 mangrove trees, causing project proponents to prioritize meeting the funder's specified target rather than designing in line with social and ecological conditions. Ignoring site-specific data may result in project failure, as drivers of degradation or loss remain unaddressed.

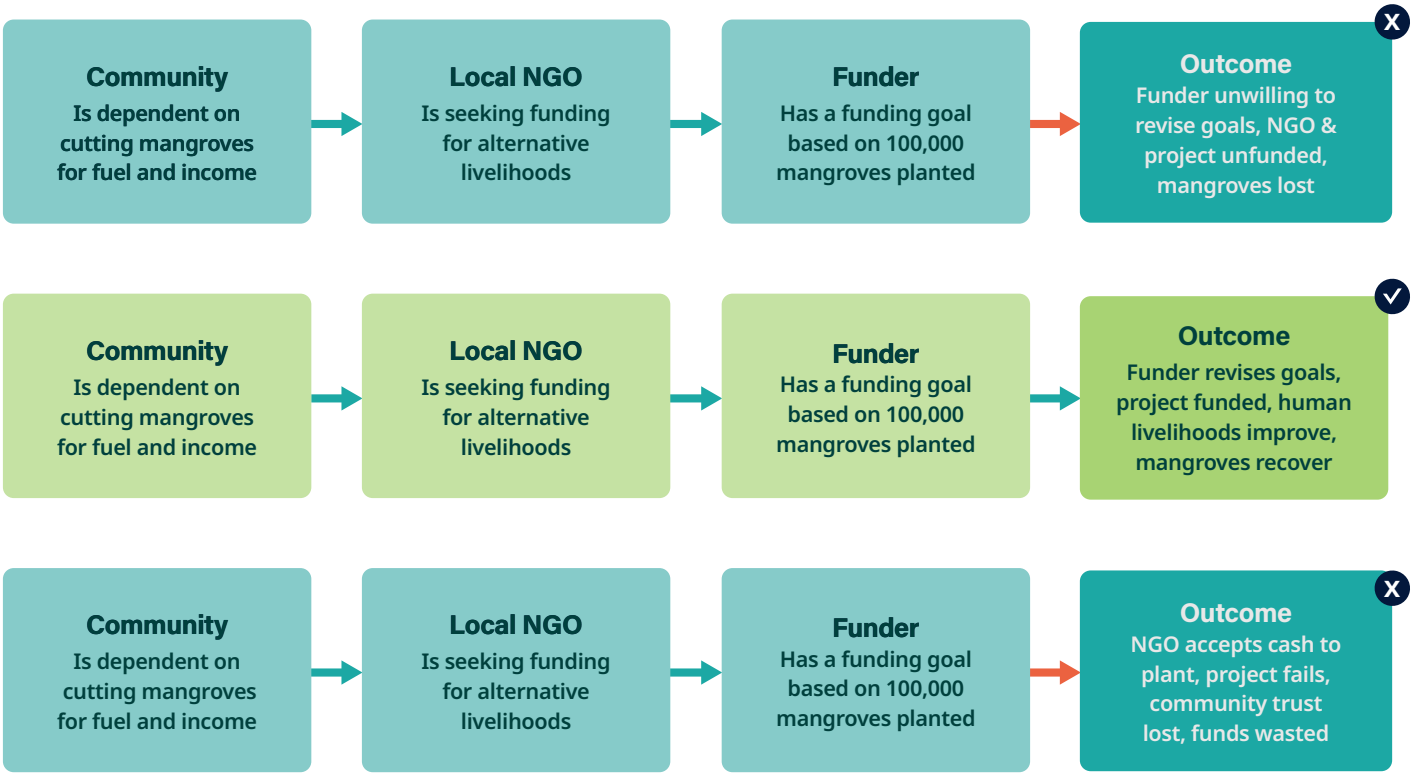



**Figure 8:** Observed positive and negative outcomes from mismatches between funder goals and project funding needs. Funding goals based on number of trees planted are rarely applicable to ecosystem restoration goals.

**Source:** Beeston, M., Cameron, C., Hagger, V., Howard, J., Lovelock, C., Sippo, J., Tonneijk, F., van Bijsterveldt, C. and van Eijk, P. (Editors) 2023. Best practice guidelines for mangrove restoration.

*Mangroves in Mindanao, Philippines © Alexpunker*

Imposing external goals onto projects can undermine effective implementation and project success. The local socioeconomic and ecological context must inform the outcomes agreed with financiers for the overall design and governance of the project to be durable and successful.

High-quality blue carbon projects take the time to map local stakeholders and understand where there is potential support or opposition prior to engagement. Investing in local staff or partners with a history of working in the area is key. As part of this process, projects should categorize or organize stakeholders into clear groups so that engagement strategies can be planned in a structured and appropriate manner. Stakeholder mapping should include community leaders, influential individuals, commercial, recreational and/or subsistence resource users, vulnerable groups, local institutions such as universities, and community organizations and NGOs active around the project area. Suggested categories include:

- **Community Stakeholders:** All individuals and groups residing in or near the project area who have a relationship to, or interest in, the coastal ecosystem, its resources, or the project.
- **Project-Affected People (PAPs):** Individuals and groups who may experience positive or negative impacts directly resulting from project activities.
- **Traditional, Cultural, and Customary Governance:** Non-state governance systems that influence decision-making or resource management.
- **Institutional Stakeholders:** Organizations with public mandates or formal authority over land, resources, compliance, or development.
- **Private-Sector Stakeholders:** Commercial actors with operational, economic, or supply chain interests in or near the project area.
- **Civil Society and Non-Institutional NGOs:** Non-profit organizations without formal regulatory mandates but with social, environmental, or advocacy roles.
- **Sectoral Stakeholders:** Groups with indirect interests due to sectoral interactions with coastal ecosystems (e.g., shipping, tourism).

*Mapping site elevation in mangroves*
*© Dominic Wodehouse/Mangrove Action Project*

A simple influence/interest matrix is sufficient to understand who may be impacted by the project and who could have an impact on it, and to establish a baseline on which to base social engagement, partnership and communications strategies. This exercise also feeds back into social risk assessments. Examples are provided in the following resources:

- Stakeholder mapping for the Ocean Country Partnership Programme: India
- Stakeholder Mapping: Methods, Benefits & Examples
- The Nature Conservancy: Stakeholder Mapping
- NOAA Stakeholder Mapping group planning sheet
- Stakeholder Analysis in Environmental and Conservation Planning
- WWF Stakeholder Analysis Tool
- Plan Vivo Participatory Toolkit: Tool 1, Stakeholder Analysis

High-quality blue carbon projects should identify the full diversity of institutional and private sector stakeholders and determine which actors are necessary to engage for regulatory or operational reasons, which offer value as partners, and which primarily require clear and consistent information about the project. Projects should establish operating procedures to provide transparent updates, enable these stakeholders to offer feedback easily, and monitor changes in the social context through participation in local forums and targeted engagement.

Coastal communities in developing countries may be reliant on blue carbon ecosystems for resources and interact with them as part of their daily lives. It is essential that all blue carbon projects engage with community stakeholders and project-affected people early, confirm Free, Prior and Informed Consent (FPIC), and co-develop activities that ensure equitable participation and benefits (section 5).

When discussing community support, engagement, and benefits, there is a tendency to think of coastal villages in less economically developed landscapes. However, projects may include improved management or restoration of areas adjacent to or impacted by urban or industrial development, or busy ports and harbors, while blue carbon ecosystems are widespread and present in developed countries with very different social contexts. In developed and urban locations institutional, private sector or sectoral stakeholders using the ecosystem or nearby areas can have a dominant presence, while community stakeholders may consist primarily of fishers, recreational users, or local NGOs. Blue carbon projects may find themselves in the position of needing to negotiate with parties with conflicting interests, and simultaneously with local governance to secure planning permissions.

Projects that generate revenue in developed or urban contexts, where large populations live near the project area, but where residents may have little or no connection to coastal ecosystems or are largely unaffected by project activities, will need to determine whether benefit-sharing models are warranted.

In addition to stakeholder mapping, project proponents will need baseline social and economic data to inform project plans. This includes understanding household income levels, typical daily wages, reliance on fishing or other resource-based livelihoods, and access to water, fuel, education, healthcare, and local food production, as well as the presence of distinct cultural or social groups. Baseline development should begin with a desk-based review and, where possible, consultation with local organizations. If the project needs to carry out data collection such as household interviews or questionnaires, they must ensure these are carried out using an established method in line with best practice and including relevant social safeguards (section 5.1). This information should inform the project concept, early-stage budget, risk assessments, and feasibility, before progressing to direct community engagement and co-development. The effects of any social or economic interventions require regular monitoring and reporting, supported by clear adaptive management to ensure no negative outcomes are realized (section 3.3).

The following case studies may be useful for project proponents:

- Incentives and disincentives of mangrove conservation on local livelihoods in the Rufiji Delta, Tanzania
- Local perceptions of changes in mangrove ecosystem services and their implications for livelihoods and management in the Rufiji Delta, Tanzania
- CASE STUDY: Community Based Ecological Mangrove Rehabilitation (CBEMR) in Indonesia
- Enablers and Challenges When Engaging Local Communities for Urban Biodiversity Conservation in Australian Cities
- Sustainable coastal management in supporting blue economy: an Indonesian experience
- Blue Carbon Ecosystem Services Through a Vulnerability Lens: Opportunities to Reduce Social Vulnerability in Fishing Communities
- Participatory community mapping to include sociocultural dimensions in ocean governance

*By the mangroves, Gazi Bay, Kenya © Anthony Ochieng Onyango/ACES*

## 2.1 Design projects according to the local social context.

To align with the High-Quality Blue Carbon Principles, projects need to be able to show:

- **The project carried out rigorous stakeholder mapping.**
  - Project ensured all potentially impacted stakeholder and user groups were contacted, made aware of project plans and able to provide feedback.
- **Any in person socioeconomic data collection is carried out in line with published best practice, is clearly documented, and includes relevant social safeguards.**
- **The project concept, feasibility assessment, and design are grounded in local social and economic realities based on reliable data.**
  - Socioeconomic data is included in project reporting, measured against a documented baseline.

# 2.2 Establish a diverse network of local partners to ensure project success and longevity

Blue carbon projects depend on sustained and coordinated site-appropriate stewardship, and local partners provide the social license, governance linkages, and knowledge that determines whether a project succeeds and persists. Establishing a network of local partners can strengthen project legitimacy, improve community acceptance, and reduce operational and social risk by ensuring activities are technically sound and culturally appropriate.

Many projects are implemented by multiple partners with different areas of expertise and experience. Actors such as civil society organizations, NGOs, and private sector stakeholders identified through stakeholder mapping should be assessed as potential long-term partners based on their roles, influence, and relevance to project objectives. In certain geographies, there may be several active carbon credit project developers. Understanding if there are other nearby carbon projects being developed can help when engaging with relevant agencies and making sure there are no overlapping initiatives.

Blue carbon ecosystems are frequently governed by multiple agencies with overlapping mandates – including forestry, natural resource management, climate change, fisheries, and marine or coastal authorities. As a result, most projects encounter governance questions that must be addressed early. Institutional partners can play a role in clarifying jurisdiction, securing required permissions, and resolving or avoiding governance conflicts that may delay or undermine implementation. These partners also help navigate tenure arrangements, regulatory processes, and other administrative hurdles that determine the pace and feasibility of project development.

Where possible, projects should incorporate existing local capacity. Universities and research institutes may already maintain long-term coastal monitoring programs or have capacity to deliver ecological baselines, monitoring, or training. Local NGOs with experience delivering nature-based projects or community development initiatives can be invaluable partners, particularly where they possess established social relationships or operational presence in remote areas.

The Vida Manglar project (section 6.4) provides a clear example of how both community partnership and local institutions support project viability. The project is implemented with the regional environmental authority (Corporación Autónoma Regional del Valle del Sinú – CVS ), the national marine research institute (INVEMAR), the Omacha Foundation, and Conservation International Colombia, anchoring activities within protected area plans, research frameworks, and official coastal management processes. Fondo Acción serves as the administrator of the Vida Manglar fund, ensuring appropriate allocation and oversight of carbon revenues in line with legal and institutional requirements. Inclusion of local communities is formalized through conservation agreements with Community Based Mangrove Associations and representation. This consortium of partners illustrates how project proponents can work with multiple institutions to navigate tenure, regulatory permissions, co-development of project goals and activities, and inclusive management agreements.

**Additional Reading:**

- Enhancing the integration of governance in forest landscape restoration opportunities assessments
- Solent Seascape partners
- Solent Seascape data explorer

**High-quality projects will aim to embed themselves within the local socio-institutional landscape, cultivating robust partnerships with community stakeholders and engaging local and regional government agencies to enable effective, scalable, and enduring implementation.**

## 2.2 Establish a diverse network of local partners to ensure project success and longevity

To align with the High-Quality Blue Carbon Principles, projects need to be able to show:

- **The project has effectively engaged or partnered with local government entities relevant to the management and/or restoration of blue carbon ecosystems.**
- **Project forms local partnerships and incorporates local capacity where needed - e.g., partnering with universities to assist with scientific expertise.**
- **Projects funded by market mechanisms have effectively identified relevant government entities to ensure rights to transact ecosystem services such as carbon or biodiversity.**

*Mangrove boardwalk, Grand Bahama. - Mark Beeston © Conservation International*

# 2.3 Account for the local implications of international policies

## 2.3.1 Account for the local implications of international policies

Conserving and restoring blue carbon ecosystems supports meeting the commitments of many Multilateral Environmental Agreements (MEAs), such as the United Nations Framework Convention on Climate Change (UNFCCC), the Convention on Biological Diversity (CBD), the Ramsar Convention on Wetlands of International Importance (Ramsar) and the Sustainable Development Goals (SDGs).

While MEAs differ in their scope and complexity, signatory nations often define national targets which overlap and contain synergistic goals. Countries may also design national policies to achieve MEA goals that influence coastal zones and impact or enable the operation of blue carbon projects, especially those aiming to produce carbon credits.

High-quality projects may generate support by voluntarily reporting on their contributions to national commitments. Reporting will depend on the project's scope, activities and local context. For example, proponents can utilize reporting frameworks such as the System of Environmental Economic Accounts (SEEA) or the Framework for Ecosystem Restoration Monitoring (FERM) to report under the CBD, or voluntarily register projects under the UN Decade for Ecosystem Restoration. Projects that decide to use these frameworks should first align project monitoring indicators (section 3.3) with the framework reporting metrics to ensure ease of use. Blue carbon projects may also frame project goals in language which demonstrates alignment with blue carbon climate mitigation or adaptation targets in the country's Nationally Determined Contribution (NDC) submission to the Paris Agreement.

The following resources can support project proponents in understanding how blue carbon ecosystems fit into national policy:

- Nationally Determined Contributions Registry
- Blue Carbon and Nationally Determined Contributions: Second Edition
- The International Policy Framework for Blue Carbon Ecosystems
- Mobilizing the Mangrove Breakthrough country summaries
- IETA NDC 3.0 and Article 6 tracker

Reporting against the SDGs is encouraged by project financers and high-quality carbon standards. Blue carbon projects should clearly articulate how project activities align with the host country's SDG priorities and demonstrate contributions to sustainable development. Guidance on how to report project outcomes within the framework of the SDGs include:

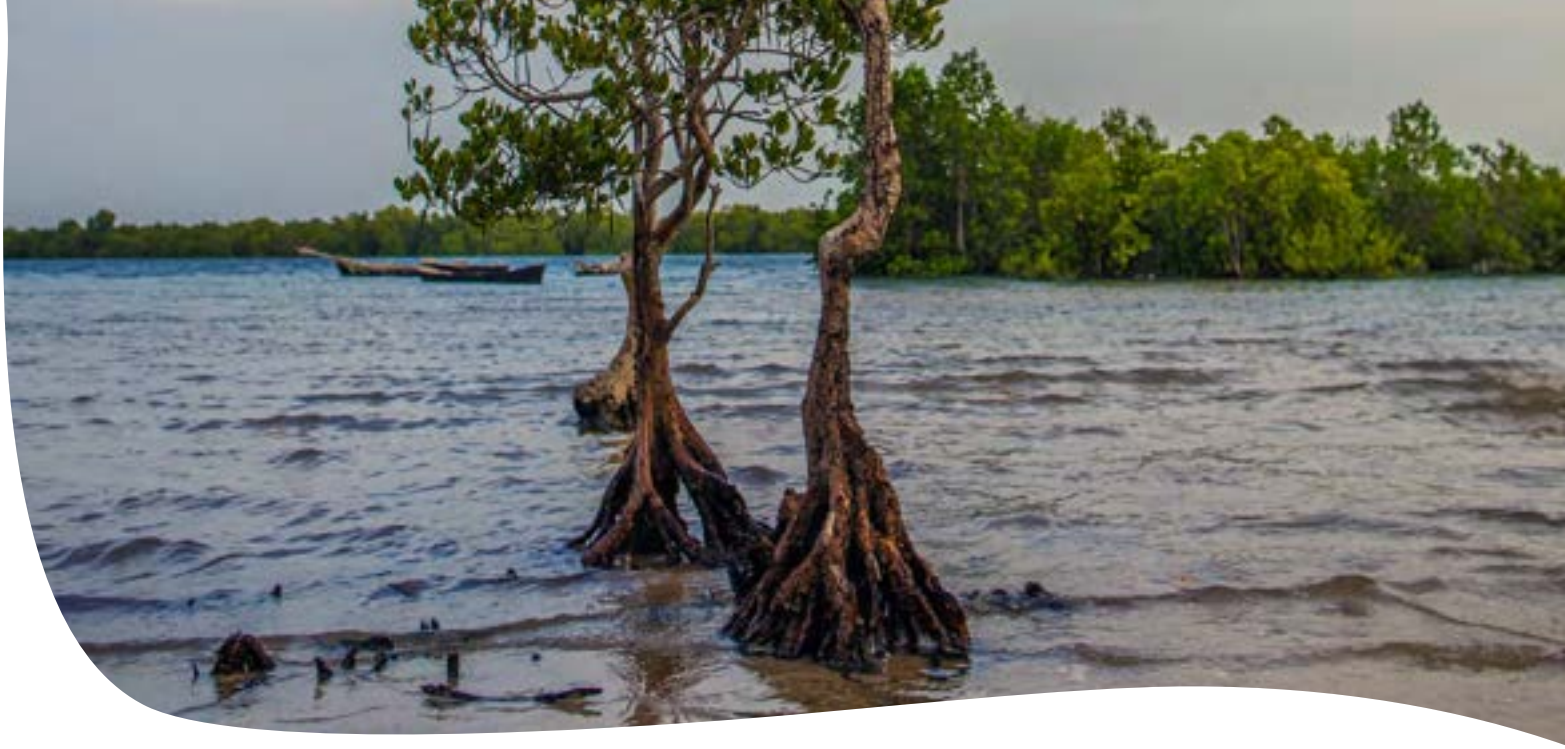
- United Nations Action Platform: Reporting on the SDGs
- UN Guidelines to Support Country Reporting on SDGs
- Core SDG Indicators for Entity Reporting: Training manual
- Tackling the Sustainability Reporting Challenge
- Assessing standardized SDG contributions at the project level

SDG reporting is mandatory for VCS version 5.0 and Gold Standard. For example, VCS certified projects are required to show how the project supports relevant national SDG objectives and to report quantified contributions to at least three SDG targets or indicators.

- Gold Standard SDG Impact Tool
- Gold Standard Digital SDG Impact tool
- Verified Carbon Standard 5.0 Stakeholder Resources
- Verra Sustainable Development Verified Impact Standard (SDVISta)

Developers of climate mitigation or carbon crediting projects should also understand local implications of national governments which opt to participate in UNFCCC Article 6 carbon trading, both Article 6.2 (bilateral trades authorized by national government) and Article 6.4 (the Paris Agreement Carbon Market (PACM)). Article 6.8 includes non-market approaches to support NDC achievements and is linked below for reference. Countries publish their intent to participate in Article 6 carbon trading within their NDCs. Proponents can find out more about Article 6 at:

- UNFCCC what is Article 6?
- UNFCCC: Article 6.2
- UNFCCC: Article 6.4
- UNFCCC: Article 6.8
- TNC Article 6 Explainer
- The Paris Agreement Crediting Mechanism state of play (Jan 2026)



*Vanga Blue Forest Project, Kenya © ACES/TonyWild/Anthony Ochieng Onyango*

National participation in Article 6 markets may affect access to the international Voluntary Carbon Market (VCM). Countries will decide if they will allow VCM credits to be exported and whether those credits must apply a Corresponding Adjustment (CA) to account for which country will count the credit towards their emission reductions. Proponents will also need to consider whether the mandatory safeguards for participation in Article 6.4 activities may be included in national decisions affecting VCM project implementation. Where Article 6 policies are still in development in many countries, financiers and project proponents alike will need to understand the risk of national policy changes and ensure contractual arrangements allow for fair adjustment if policy shifts restrict credit availability, without placing undue liability on communities or project partners.

- Article 6 Readiness Tracker
- Carbon Market Regulations Tracker
- UNEP Article 6 Pipeline
- Article 6.4 sustainable development tool

For blue carbon projects in countries participating in Article 6.4, the PACM may offer an emerging opportunity to produce credits under a UN supervised crediting system with its own approved methodologies, a centralized registry, and designed to align with national accounting and compliance markets. However, the PACM remains in development: at the time of writing no UN approved Article 6.4 methodologies for blue carbon ecosystems have been issued, and whether blue carbon projects will be eligible is at the host country's discretion.

> **High-quality projects can clearly demonstrate how project goals and activities align with national and international policy targets and MEA commitments.**

**Additional Reading:**

- TNC Carbon Market Resource Centre
- Scaling up wetland conservation, wise use and restoration to achieve the Sustainable Development Goals
- Coastal and Marine Ecosystems as Nature-Based Solutions in New or Updated Nationally Determined Contributions (2023)
- LRI: The Paris Agreement Crediting Mechanism (2025)
- Blue Carbon Ecosystems Climate Investment Planning and Mobilization Framework
- The United Nations and global blue carbon governance: a policy and practice review of frameworks, challenges, and possible pathways
- Getting ready for Article 6.4: Practical steps for carbon projects
- Host Country Article 6 Readiness: Key Aspects to Drive Demand
- UNFCCC list of Designated National Authorities for A6.4
- Article 6 Implementation Partnership resource library

### 2.3.1 Account for the local implications of international policies

To align with the High-Quality Blue Carbon Principles, projects need to be able to show:

- **Project articulates how it aligns with national commitments to international policy targets, for example, climate mitigation or biodiversity plans outlined in NDCs, NBSAPs, and related national policies or action plans.**
- **Carbon crediting projects can articulate how they align with national policy related to Article 6.**
- **Project articulates how it contributes to specific targets of the Sustainable Development Goals.**

*Mangrove forest, Caravelas, Brazil © Conservation International*

### 2.3.2 Advance policies to promote high-quality blue carbon project development

Blue carbon projects frequently face an absence of policies and legal frameworks for implementing nature-based solutions, particularly around land tenure or management rights for blue carbon ecosystems. It may be the first time that a particular project type has been proposed in that country or jurisdiction. This necessitates time spent mapping national and local policies or legislation which can support or inhibit implementation and financing, identifying policy gaps which create uncertainty (and therefore risk, section 1.1), and building any necessary local or national government relationships to resolve barriers to implementation.

- Tools for Institutional, Political and Social Analysis of Policy Reform: A Sourcebook for Development Practitioners
- Power tools: for policy influence in natural resource management
- OXFAM Influencing for Impact Guide
- ODI Resource hub for policy engagement

High-quality blue carbon projects can act as a catalyst to drive the necessary political, social and economic support for subsequent projects. Pilot projects act as proof of concept and can hold a particularly important role in defining national standards for best practice. Projects can also serve a role in demonstrating and promoting successful restoration or management interventions and inclusive development processes which can be replicated at scale.

Proponents of high-quality crediting projects can lead the way in clarifying the legal frameworks necessary for carbon trading, including governance, land tenure, and carbon rights, and support the safeguarding of the rights of IPs & LCs. For example, FPIC or benefit sharing agreements are not a mandatory legal requirement in many countries – although they are required by most financers and carbon standards. Alternatively, poorly designed or exploitative projects can disincentivize policy decisions to support blue carbon trading: in some cases, policymakers have paused all project development or placed a moratorium on blue carbon credit trading until protective legislation is in place.

An increasing number of countries are designing or implementing national plans to monitor, manage, or restore blue carbon ecosystems, however local capacity to effectively realize national targets may be lacking. High-quality projects take a leading role in science to policy dialogues, ensuring that decision-makers understand the local context and scientific processes of coastal ecosystems. This can include participating in local and international forums, or working groups, or collaborating with other blue carbon or nature-based projects, academic institutions, local non-governmental organizations and civil society to share lessons learned.

Projects may find support on policy matters from local and international forums, and working groups under the Global Mangrove Alliance, the Blue Carbon Initiative, or the International Partnership for Blue Carbon.

**Additional reading:**

- Blue Carbon Initiative Policy Working Group
- Better Restoration Policies are Needed to Conserve Mangrove Ecosystems
- Land tenure considerations are key to successful mangrove restoration
- IUCN Legal Frameworks for Mangrove Governance
- Ecosystem Restoration through Managing Socio-Ecological Production Landscapes and Seascapes (SEPLS)
- Guide to Valuing Coastal Wetlands

### 2.3.2 Advance policies to promote high-quality blue carbon project development

To align with the High-Quality Blue Carbon Principles, projects need to be able to show:

- **The project has ensured all legal requirements for operation are met and is appropriately registered with local and/ or national authorities.**
- **Project is engaged with local or national policy, for example, through participation in local policy forums, national consultations, or working groups.**

*Jitambue bee keeping group member at Mchinga, Tanzania*
*© Elizabeth Wamba, Wetlands International East Africa*

# 2.4 Case study: The Solent Seascape Project

**The Solent Seascape Project (SSP) is a collaborative initiative working to restore the Solent strait. It is the UK's first seascape-scale restoration project, aiming to re-create a dynamic network of coastal habitats that provide benefits for communities, nature and climate.**

**The objectives of the project are:**

- Collaborate with local stakeholders and communities to develop and co-create a long-term seascape recovery plan that supports better management of existing Solent marine and coastal habitats.
- Actively restore saltmarsh, seagrass meadows, native oyster reefs, and breeding seabird nesting sites to increase habitat extent and catalyze recovery across the wider seascape, improving ecological connectivity.
- Assess ecosystem service benefits (carbon, biodiversity, nitrates), creating an evidence base of the wider benefits of seascape restoration.
- Develop key interventions and financial mechanisms to upscale the potential for seascape restoration in the longer term by working with government and regulators.
- Empower local communities and build capacity to ignite and improve understanding of seascape processes, catalyze behavioral change, and increase involvement in seascape recovery.

The project is actively restoring four key habitats: seagrass, saltmarsh, seabird nesting sites and oyster reefs. These habitats provide multiple benefits, including carbon sequestration, water filtration, coastal protection, fish nursery habitat and improved social wellbeing. Taking a multi-habitat approach can enhance ecological connectivity, which enables the flow of organisms, nutrients, and energy between marine and coastal habitats and supports vital services like carbon storage.

*Aerial view of tidal marshes in The Solent, U.K. © Matt Jarvis*

## Design according to local contexts

The Solent is a diverse estuarine system of harbors, ports and sandbanks between the Isle of Wight and mainland England. These vital marine habitats are suffering from severe threats such as coastal development, poor water quality and sea level rise.

Saltmarsh is a critical coastal habitat in the UK, providing many benefits to the surrounding seascape. It plays an important role in coastal protection, providing significant wave attenuation, and when in a healthy, non-eroding state, sequesters and stores carbon and nitrogen. It is also vital for the Solent's internationally renowned bird populations, especially as resting and breeding areas. For example, in 2023, over 85% of all breeding seabirds in the Solent used saltmarsh islands to breed.

Seagrass meadows are vitally important diverse habitats and provide crucial coastal and marine ecosystem benefits, such as supporting and provisioning services for biodiversity. They provide key fish nursery habitat particularly for commercially important fish species and support grazing herbivore, piscivorous and wading birds.

The UK's saltmarsh and seagrass habitats are critical blue carbon stores. However, 85% of saltmarsh habitat has been lost in the last century and seagrass meadows have declined by up to 92%. In the Solent, over 2,100 hectares of declining seagrass and saltmarsh remain, and the majority are in 'unfavorable' condition. To help reverse these declines, SSP partners have been actively restoring using the range of methods outlined opposite.

*Seagrass seed collection (Zostera marina) in The Solent. Seaview, Isle of Wight © Luke Helmer*

**Table 2:** Restoration methods for saltmarsh and seagrass applied in The Solent

| Saltmarsh | Seagrass |
|---|---|
| **Beneficial Use of Dredged Sediment (BuDS)**<br><br>Depositing sediment dredged (often from within a harbor system) on an intertidal area to raise the elevation of a site. With sufficient elevation, halophytic plants will colonize the area, and saltmarsh will develop (Brook *et al.* 2025). See here for further information about the SSP BuDS trial in Chichester Harbour. | **Dispenser Injection Seeding (DIS)**<br><br>An effective science-based intertidal seed restoration method for Common Eelgrass (*Zostera marina*). A methodology conceptualized and first trailed in the Dutch Wadden Sea demonstrating improved seedling emergence rates compared to other seed-based restoration techniques. An adapted caulking gun design integrates seeds and sediment to allow optimal seeding depth and density in intertidal environments. |
| **Managed Realignment**<br><br>Creating new saltmarsh by strategically breaching, removing or relocating coastal defenses further inland. | **Transplant Planting**<br><br>Bare root *Zostera marina* plants are sourced from local seagrass meadows (license dependent) and transplanted within restoration sites. Transplants are planted with anchoring methods *i.e.* biodegradable supports, a sustainable consideration to anchoring, in areas of moderate water movement such as currents and tides. Sources of transplant material include Project Seagrass grown nursery plants and local donor meadow plants. These are being trialed, to reduce the impact on the donor seagrass bed.<br><br>Utilizing storm and wave-derived seagrass fragments *i.e.* plants or rhizomes dislodged naturally from seagrass beds, to actively replant in restoration sites encourages use of the natural resource, is a dynamic response to restoration and actively engages local volunteers and stakeholders in seascape restoration through 'Fragment Walks'. |

Since 2022, the SSP has worked to reverse ecosystem declines by actively restoring seagrass meadows, saltmarshes, native oyster reefs and seabird nesting sites. Further, the Solent is one of the busiest waterways in Europe and Portsmouth is the second most densely populated city in the UK (after central London). In one of the city's electoral wards, 40% of children are living in poverty. Those living near and using the Solent face several issues including poor water quality and coastal erosion. This project and the activities associated with it are helping to connect communities with the seascape and maintain the many benefits it provides.

In addition to restoring habitats, the project team monitors the wider benefits of seascape scale restoration to the local area, including carbon sequestration, nutrient remediation, biodiversity uplift and habitat connectivity. This comprehensive scientific monitoring programme is led by the University of Portsmouth. By assessing progress, the project will ultimately provide a series of lessons learned from taking a community engaged, seascape-scale restoration approach.

### Establish a diverse network of local partners & advance policies that promote high-quality blue carbon project development

The project partnership is led by Blue Marine Foundation and includes local environmental NGOs, academic institutions, government bodies and the private sector. The ten official partners are: Blue Marine, Royal Society for Protection of Birds (RSPB), Hampshire & Isle of Wight Wildlife Trust (HIWWT), University of Portsmouth, Isle of Wight Estuaries Project, Coastal Partners, Chichester Harbour Protection and Recovery of Nature (CHaPRoN), Natural England, Environment Agency and Project Seagrass.

To improve long-term protection and management of existing habitats, the project is co-developing a Seascape Recovery Plan with the local communities and stakeholders. A Recovery Plan is a suite of mechanisms (e.g., codes of conduct, zonations, by-laws) to remove or reduce anthropogenic pressures on existing habitats, allowing them to naturally expand and improve in health.

The SSP appointed external engagement specialists to support this co-production process, which involves a series of workshops, 1:1 interviews, questionnaires and other methods with a diverse network of local stakeholders. The engagement planning framework known as the Bridge model (set out below) is being utilized. Developed by The Environment Council, it focuses on building strong, trust-based relationships and creating shared goals and understanding.

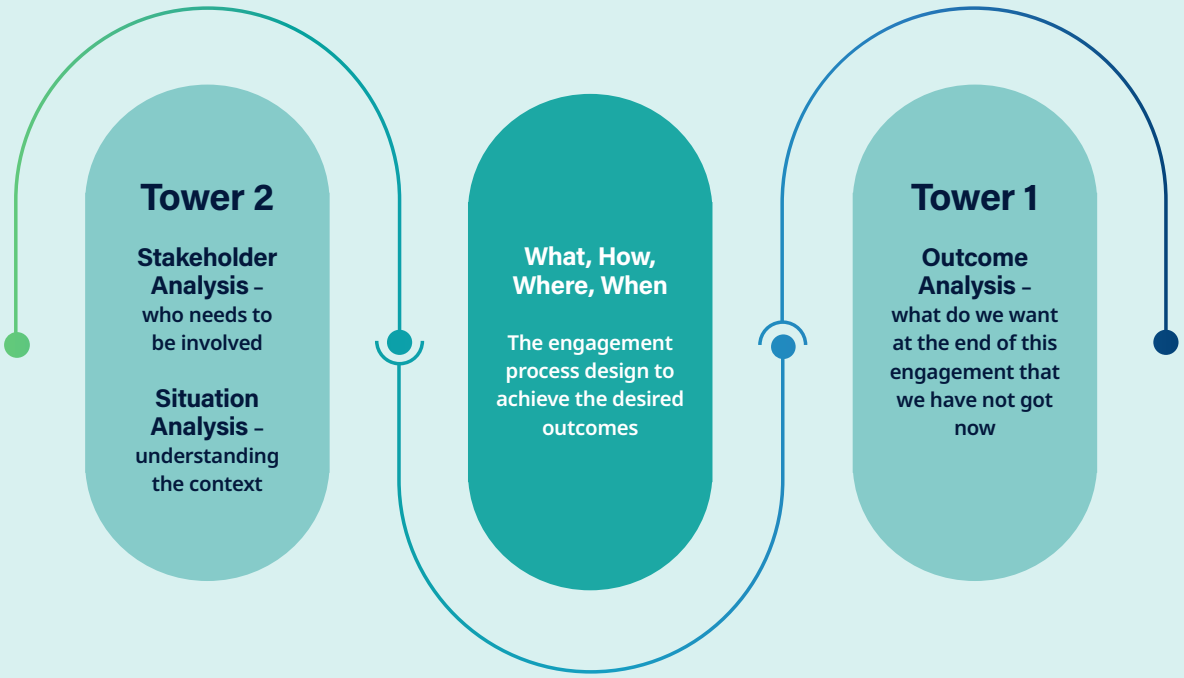



**Figure 9:** The Bridge model engagement planning framework.

Prior to the Recovery Plan co-production process, a mapping exercise took place to identify key stakeholders. Key groups that have been involved with or supported by this project include:

- **Schools:** SSP partners host events and education programs for school groups and are developing free resources for schools and centers across the region. In addition, they have produced films and other media initiatives to raise awareness and encourage wider engagement in seascape restoration.
- **Volunteer groups:** The SSP co-developed a range of volunteer opportunities with community members to provide opportunities for skills and knowledge development, such as the Marine Champions network (local volunteers trained support coastal restoration initiatives), and has had over 600 volunteers so far. These activities equip local communities with the knowledge, ocean literacy and skills to participate in activities ranging from scientific research to public engagement.
- **Tourism and water sports:** More than 36,000 people are employed in the tourism sector in the Solent and it is globally renowned for sailing and other water sports. Increased wildlife and nature experiences will increase the attraction of the Solent as a tourist destination.
- **Commercial isheries:** Over 300 licensed commercial fishing vessels operate in the Solent. The project will provide opportunities to be a part of the project through workshops and research. Collaboratively, a sustainable fishery can benefit from improved and increased biodiversity and fish stocks in local waters resulting from habitat restoration and protection.
- **Industries:** Another emerging area is the Beneficial use of Dredged Sediment (BuDS) method being trialed in the project. This approach finds an effective use for material dredged from navigation channels to support restoration efforts and is a way to involve dredgers in restoration work, such as recharging eroded areas of saltmarsh.

Finally, the project is one of seven projects trialing the Plan Vivo Biodiversity Standard (PV Nature) high integrity, non-offsetting biodiversity credit methodology. 60% of the funds generated are required to go directly back to the local community. These funds can be used for anything the community decides upon, from building new infrastructure to further habitat restoration.

**Further reading:**

- The Solent Seascape Project
- Solent Seascape Data Explorer

*Seagrass Zostera marina at Seaview, Isle of Wight © Luke Helmer*

# 3.0 Employ the best information, interventions and carbon accounting practices

*Fringing mangroves © Matt Curnock, Ocean Image Bank*

**This principle highlights the need for reliable evidence to inform blue carbon project design and management decisions. Projects have the greatest potential for success when activities are backed by scientific data in combination with Local Ecological Knowledge (LEK). Projects and financers including climate mitigation outcomes in their reporting, or producing carbon credits, need to understand which carbon accounting practices or carbon standards are best suited to their needs.**

*Gazi Bay, Kenya © Anthony Ochieng Onyango/ACES*

*Monkey in mangrove tree © Lammert Hilarides, Wetlands International*

**This section of the guide outlines four interlinked themes for project design:**

1. Using Local Ecological Knowledge, on the ground measurements, site-specific satellite imaging and remote sensing data to provide the rationale for selecting appropriate interventions.
2. Evidence requirements for additionality, baselines, and theory of change.
3. Carbon accounting at different stages of project development, selecting high-quality carbon standards.
4. Monitoring and adaptive management.

A selection of science-based best practices for ecological restoration and management are provided in section 4.2. Selecting appropriate interventions first involves investigating both the project site and any upstream influences that could impact project success.

For project proponents considering carbon credit finance, the following resources provide overviews of how carbon markets function and the general process of producing verified carbon credits:

- UNDP: What are Carbon Markets and How Do They Work?
- The Voluntary Carbon Market Explained
- The Nature-Based Credit Science Decoder Series
- Scientific Best Practice Guides for Land-based Carbon Projects: Blue Carbon
- The Best Practice Guidelines for Mangrove Restoration (Blue carbon project module)
- Ocean Panel Blue Carbon Handbook
- The development of Blue Carbon projects: a guide for communities
- Demystifying Non-Carbon Market Approaches for Blue Carbon Ecosystems

# 3.1 Use the most appropriate interventions and the best available scientific, Indigenous, traditional and local knowledge

## 3.1.1 Appropriate interventions to maintain or improve the health of the ecosystem

Science-based ecological protocols can effectively reduce loss and restore blue carbon ecosystems (section 4.2). However, to be successful, project proponents need to identify and mitigate the causes of degradation before restoration or conservation can take place. Drivers of ecosystem loss and degradation are often rooted in societal or economic necessity and thus projects might require a suite of interventions that include both ecological and social solutions, are in line with national policies and targets, and are supported by local governance (section 2). Financers increasingly require project proposals to demonstrate that planned interventions are appropriate, based on evidence of which activities have succeeded or failed in similar contexts. Reference sites, typically a healthy local area of the same ecosystem, can provide a benchmark to illustrate what project "success" might look like, and support the selection of appropriate interventions, progress indicators, and outcomes (e.g., vegetation structure, hydrology, diverse species assemblages).

Proponents of high-quality projects should consider both social and ecological information to develop a clear theory of change and select the most appropriate interventions. Useful resources include:

- Restoring Blue Carbon Ecosystems
- Indicators of Coastal Wetlands Restoration Success: A Systematic Review
- West Africa Blue Mangrove Assessment Methodology
- Best Practice Guidelines for Mangrove Restoration
- Improving Theories of Change in Conservation Projects

**Participatory mapping can be used to integrate local ecological and historical knowledge with satellite images.**

*Collecting seagrass, Atauro Island, Timor-Leste © Paul Hilton for Conservation International*

**Drivers of ecosystem loss and degradation are often rooted in societal or economic necessity.**

High-quality blue carbon projects employ a combination of direct site assessment, stakeholder knowledge and historical experience, and remote observation data to understand current ecosystem condition, identify changes over time, and create the evidence base for selecting appropriate interventions. Traditional hands-on ecological surveys and site-based monitoring also provide opportunities to train and upskill local staff, building long-term capacity within the community and ensuring that community members can meaningfully participate in project activities (section 5.2).

Participatory mapping can and should be used to integrate local ecological and historical knowledge with satellite images and maps to further understand how and why the project site has changed over time, and to mark areas which are prioritized by community stakeholders for restoration, conservation, or other uses. Because participatory mapping is fundamentally about understanding people's perceptions of their landscape and the resources they value, it also helps reveal how communities relate to these places, how they use them, and what they consider important to protect or restore.

This includes a wide range of techniques from smartphone-based data collection to 3D paper maché models or sketch maps drawn with natural materials, which together support a richer, community grounded understanding of both natural and cultural resources. Collaborative activities like this can be a step towards actively co-designing solutions and identifying where alternative livelihoods may be required, and underpin both feasibility assessment and ongoing monitoring, learning and engagement (section 5).

Satellite data is increasingly used in combination with field observations to understand how project sites and the surrounding areas have changed over time, including both gains and losses in blue carbon ecosystem extent. Trends in land use change such as areas converted for aquaculture or rice production, or cleared for wood or grazing can be identified, indicating drivers of loss and providing the basis for the business as usual (BAU) scenarios which are the foundation for a project theory of change, and which are a mandatory requirement for carbon crediting projects (section 3.2). Similarly, satellite imagery can track erosion or loss due to sea level rise, informing risk assessments (section 1.1) and identifying priority areas where restoration may support coastal protection or be most urgently needed.

Remote observations can also identify the point in time where ecosystem degradation occurs, which can be cross-referenced with major weather events such as storms or heatwaves, upstream land-use change, or the construction of infrastructure such as road causeways or dams that may alter site hydrology.

While satellite imagery and global remote sensing provide high-level site data, drone surveys employing video, LiDAR, or hyperspectral sensors can create finer resolution site level datasets, including canopy cover, distribution of tree species, and above ground biomass. It should be noted however that not all projects will have access to the equipment or expertise to deploy drone mounted equipment for site mapping or monitoring, and this does not prevent a project from being regarded as high-quality. Project managers need to consider the balance between the cost-benefit and availability of technical approaches and more community-inclusive hands-on surveying and monitoring methods.

*Seagrass monitoring at Vanga Blue Forest, Gazi Bay, Kenya*
*© Anthony Ochieng Onyango / ACES*

*Aerial view of mangrove forest in Gambia © Mariusz Prusaczyk*

Monitoring and adaptive management (section 3.3) should also be explicitly designed to match site conditions, drivers of change, and the type of intervention selected.

Project developers may need to consider data sovereignty in the handling, storage, management and sharing of data collected, particularly where third parties (including the project developer themselves) are involved and not domiciled in the country of implementation. Data handlers should review regulations regarding the use and management of data, particularly when it has been collected on Government-owned land, in community-managed land, collected by IPs & LCs, or includes traditional knowledge shared by IPs or LCs for use by the project. Regulations – formal or informal – may exist that govern the use, ownership, or commercialization of such data.

**Useful resources:**

- Indigenous Data Sovereignty Toolkit
- Indigenous Data Sovereignty: How Researchers can Empower Data Governance (video)
- About the Nagoya protocol

**Further reading:**

- A socio-ecological survey in Inhambane Bay mangrove ecosystems: Biodiversity, livelihoods, and conservation
- Building with Nature: Indonesia
- WWF Rapid Assessment and Prioritization of Protected Area Management (RAPPAM) Methodology
- Plan Vivo's Participatory Toolkit Tool 11b: Assessment and Utilization of Blue Carbon Ecosystem Products and Areas
- Coastal Blue Carbon– Science Review – Satellite-Based Earth-Observation
- Trends Earth: Tracking Land-Use Change (requires basic GiS skills)
- Développement D'un Projet Bleu Carbone Un Guide Pour Les Communautés (French)

## 3.1.2 Incorporating local ecological knowledge

High-quality projects uphold and champion the inherent rights of Indigenous People, their land and their culture. LEK represents knowledge of native vegetation, fauna, and ecosystem function passed down over generations. It provides critical information on how to best sustainably manage and conserve blue carbon ecosystems. Striking a balance between traditional use of blue carbon ecosystems and conservation or improved management outcomes can be challenging, but high-quality projects incorporate LEK as a fundamental source of data and use it to connect project goals with local traditional and cultural values. For example, local knowledge of ecosystem health, biodiversity and productivity can be integrated with data from reference sites to define the criteria for successful restoration or conservation goals.

In Gathaagudu (Shark Bay) Australia, partnership between Malgana Traditional Owners, the Indigenous owned enterprise Tidal Moon, and Conservation International integrates generational knowledge of seagrass meadows, local fauna, and seasonal working conditions with ecological seagrass restoration and sea cucumber production. This collaboration demonstrates an Indigenous led pathway for the sustainable management, monitoring and recovery of blue carbon ecosystems.

In other regions, blue carbon habitats may be under threat from changes in fishing practices and increased demand. Establishing legally recognized community fishing groups and locally managed marine areas may offer a route to regulate access and reduce pressure on blue carbon ecosystems.

In communities with strong cultural or spiritual ties to blue carbon ecosystems, external partners need to work closely with community members and knowledge holders to understand and preserve the social, historical and traditional importance of blue carbon ecosystems. LEK should be recognized as the intellectual property of the knowledge holders, who specify how/if/when the proponent can share or publish LEK and how any benefits derived will be dispersed.

- Including Local Ecological Knowledge (LEK) in Mangrove Conservation & Restoration. A Best-Practice Guide for Practitioners and Researchers
- The CARE Principles for Indigenous Data Governance
- A socio-ecological survey in Inhambane Bay mangrove ecosystems: Biodiversity, livelihoods, and conservation
- Traditional Indigenous Understanding of Marine Environments
- How Indigenous Australians are restoring Earth's largest organism
- Plan Vivo Participatory Toolkit

### 3.1 Use the most appropriate interventions and the best available scientific, Indigenous, traditional and local knowledge

To align with the High-Quality Blue Carbon Principles, projects need to be able to show:

- **Locally relevant peer reviewed scientific evidence, land use change data, and local historic knowledge are combined to understand ecological and socioeconomic drivers of change.**
- **Project interventions are designed to address ecological and socioeconomic drivers of change and degradation.**
- **Project design includes local knowledge (including Local or Traditional Ecological Knowledge) and inclusive participatory design.**

*Collecting firewood, Vanga Blue Forest Project © Anthony Ochieng Onyango / ACES*

# 3.2 Project outcomes are grounded in evidence-based assessments

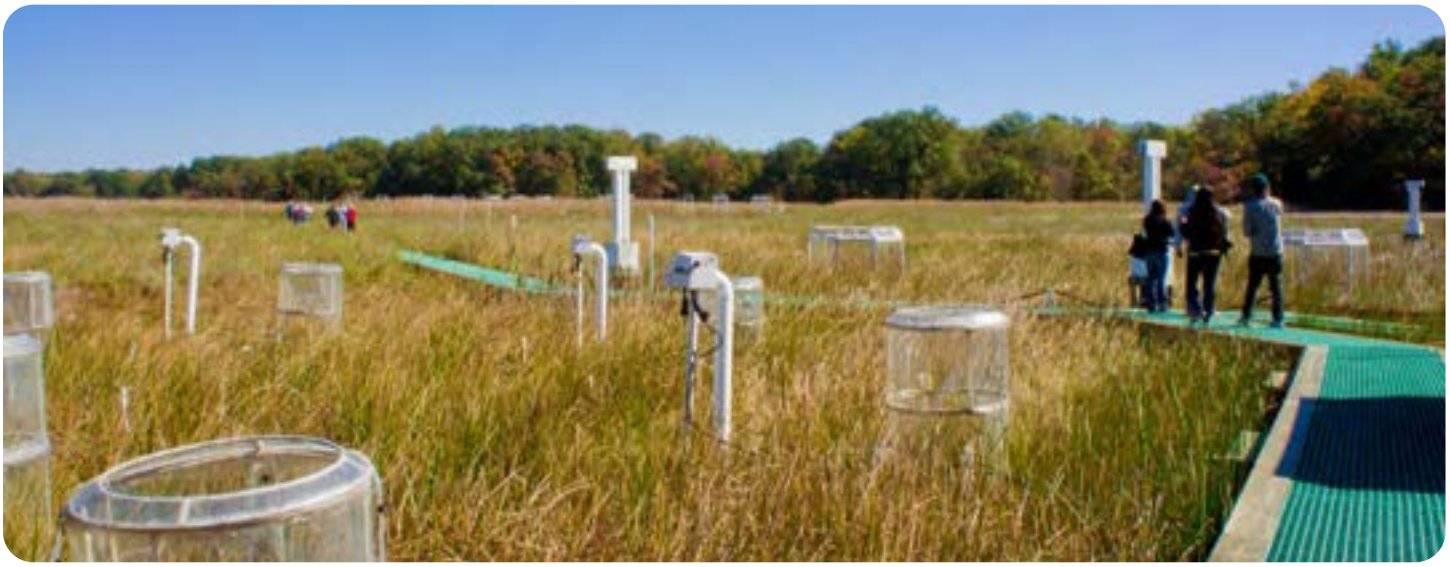
## 3.2.1 Establish accurate baselines and BAU scenario

The Business as Usual (BAU) scenario describes what would likely happen to the site if the project did not occur. Proponents need to provide a defensible, evidence-based narrative predicting future ecosystem or land use changes, based on historical trends in land use and ecosystem cover change, national policy and local regulations, ongoing management, and ecological and socioeconomic drivers of loss or degradation. The project theory of change should lay out how proposed activities are expected to influence ecological and/or social outcomes relative to BAU.

For example, a conservation project could produce a BAU scenario based on annual rates of ecosystem loss, and set a project goal to reduce annual loss. The theory of change would propose interventions which address the drivers of loss, such as capacity building in sustainable management paired with the provision of alternative livelihoods.

For all projects, BAU scenarios can be compared to with-project scenarios to validate the assumptions in the project theory of change. Blue carbon projects aiming to produce credits will need to produce both BAU scenarios and accurate carbon baselines.

*Seagrass seed collection, Seaview, Isle of Wight, UK*
*© Luke Helmer*



*"Long term monitoring of greenhouse gas fluxes in saltmarsh, at Smithsonian Environmental Research Centre, USA*
*© Conservation International/photo by Sarah Hoyt*

To produce a carbon baseline, proponents apply a technical methodology to model the expected ecosystem change and associated greenhouse gas (GHG) emissions or removals in line with the BAU scenario, supported by rigorous on-site sampling and measurement of current carbon stocks.

This is compared to a with-project scenario, which models how GHG emissions or removals are expected to change once project activities are implemented.

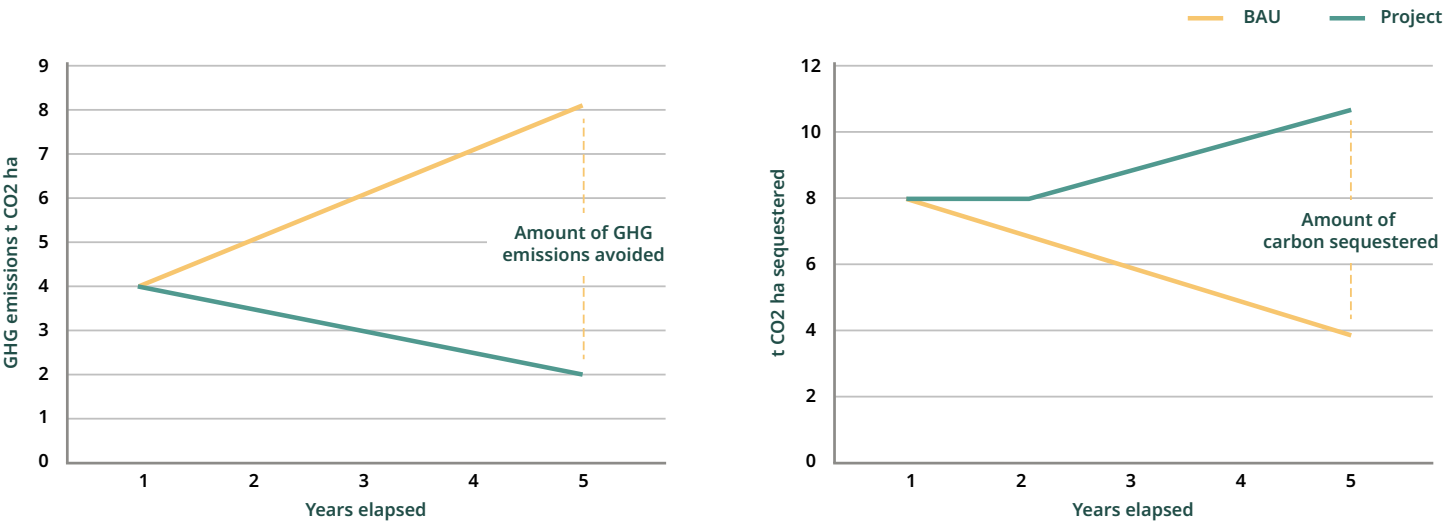



**Figure 10.** The difference between the GHG emissions in the business as usual (BAU) scenario, and the avoided GHG emissions in the with project scenario represents the additional carbon eligible to be counted as credits from protecting a mangrove from destruction (left). The difference between the reduction in carbon sequestration with the BAU scenario and the increase in carbon sequestration in the with project scenario represents the additional carbon eligible to be counted as credits by reducing degredation and reforesting a mangrove site (right).

**Source:** Beeston, M., Cameron, C., Hagger, V., Howard, J., Lovelock, C., Sippo, J., Tonneijk, F., van Bijsterveldt, C. and van Eijk, P. (Editors) 2023. Best practice guidelines for mangrove restoration.

For carbon crediting projects, models are reviewed and validated by third party auditors, commonly called validation and verification bodies (VVBs), before the project can progress. Results from continual on-site sampling and monitoring are usually compared to the baseline model every 3–5 years, with observed changes verified by the VVB before credits are issued. Without a credible baseline, it is not possible to calculate real and verifiable changes in GHG emissions.

Above-ground carbon stocks in mangrove forests can be calculated as a percentage of above-ground biomass, which can be modeled by scaling up field measurements of sample plots, or by using satellite or drone observations. Measuring above-ground biomass and carbon stocks in tidal marshes and seagrass is usually reliant on field sampling only, as vegetation may be too small for reliable remote assessment. Once above-ground biomass is known, allometric equations use species-specific ratios of aboveground biomass (AGB) to belowground biomass (BGB) to create estimates of below-ground carbon stocks. However, it is not yet possible to accurately predict site level soil organic carbon (SOC) stock via remote sensing as no reliable fine scale relationships between SOC and biomass, ecological, and environmental factors have yet been identified. To produce initial models, local default values can be applied, and later revised based on on-site measurements over time. Without ground truthing to validate the model, this approach is suitable for Tier 2 (section 3.2.2) or early feasibility reporting.

Calculating GHG baselines in blue carbon ecosystems is widely assumed to be prohibitively complicated and it is not uncommon for technical carbon stock assessments or carbon crediting methodologies to refer to the necessary data points required, but without providing standard operating protocols for data collection.

The Coastal Blue Carbon Field Manual contains instructions for a lot of those procedures and is an invaluable resource. The physical collection of most data can be carried out using reasonably simple and portable equipment, or in some cases, smartphone apps. However, if collecting soil samples to measure SOC, lab costs can be expensive.

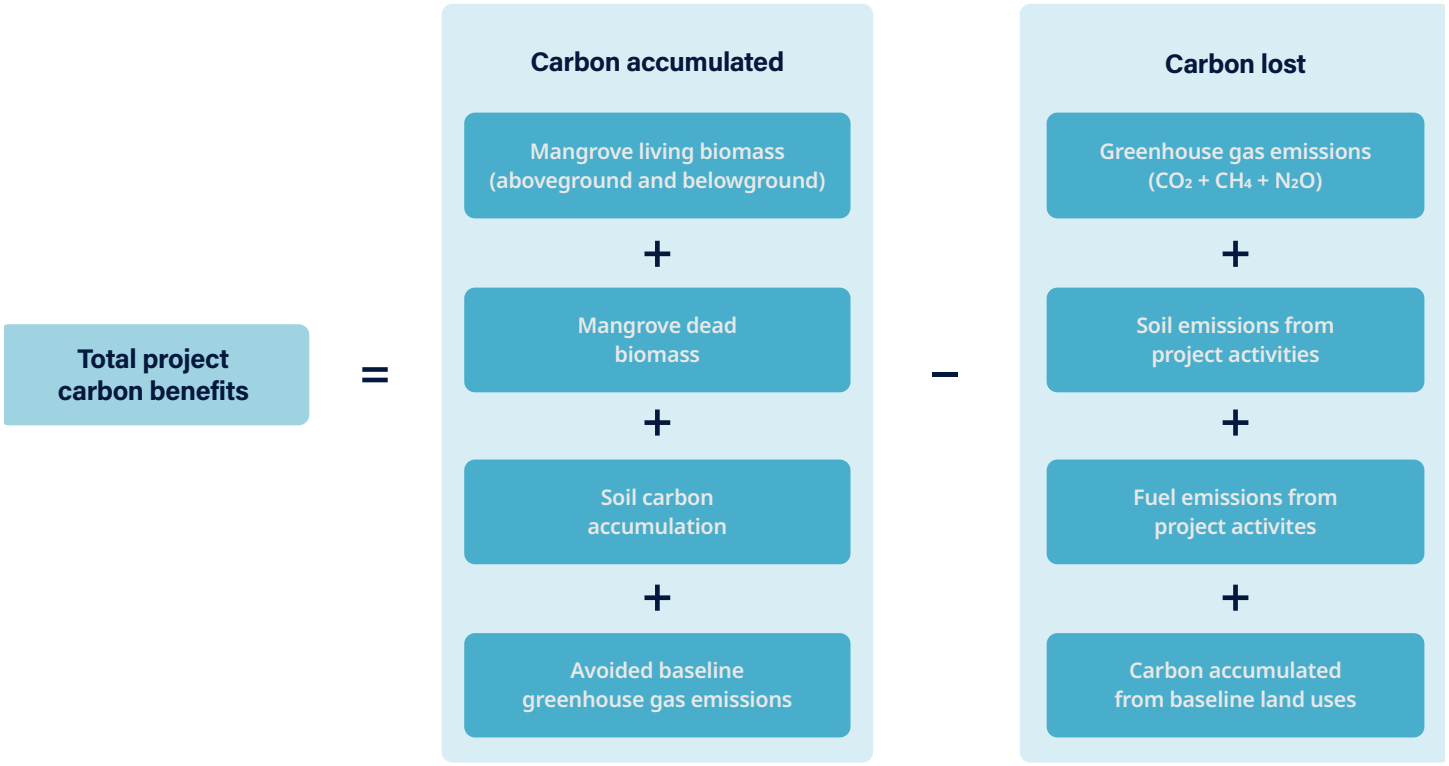



**Figure 11:** Project mitigation outcome calculations are specific to each carbon credit methodology, including the sum of parameters in carbon accumulated minus the parameters of carbon added to the atmosphere.
**Source:** Beeston, M., Cameron, C., Hagger, V., Howard, J., Lovelock, C., Sippo, J., Tonneijk, F., van Bijsterveldt, C. and van Eijk, P. (Editors) 2023. Best practice guidelines for mangrove restoration.

High-quality projects opt for conservative carbon mitigation models combining long-term satellite time-series data with field measurements of biomass and SOC stocks, based on a stratified sampling design, or, where direct sampling is not feasible, conservative default factors for SOC. BAU and with-project scenarios account for sea level rise, changing rainfall and temperature trends, and include considerations of sedimentation, erosion, and substrate types on the project site.

Ongoing revisions to blue carbon methodologies are expected to replace long-term modelled baseline scenarios with "dynamic" baselines. In this approach, the BAU scenario is revised with each verification, based on the observed conditions in comparable reference areas. Dynamic baselines have been introduced in some terrestrial forest methodologies but may be challenging to apply in blue carbon ecosystems. For example, in some locations comparable reference areas might not be available, while local ecosystem conditions and drivers of change can be highly variable over relatively small distances.

It should be noted that while the accurate measurement of any carbon pools included in crediting calculations is required, the inclusion of SOC is not mandatory for some methodologies.

However, given that in blue carbon ecosystems 60-90% of the carbon value is in the soil, not including this may drastically reduce the volume of credits issued. The Vida Manglar mangrove carbon crediting project in Colombia (section 6.4) was the first blue carbon conservation project to fully account for the soil organic carbon pool.

- Protocols for the Measurement, Monitoring and Reporting of Structure, Biomass and Carbon Stocks in Mangrove Forests
- Mangrove Science Earth Engine Apps
- CariCAS Carbon Accounting in Seagrass
- Landscape GHG Accounting Guidance
- The Nature Conservancy: The Bar of Excellence
- Impact of seagrass loss and subsequent revegetation on carbon sequestration and stocks
- Mangrove Restoration Under Shifted Baselines and Future Uncertainty
- European Space Agency: Coastal Blue Carbon Project
- The Coastal Carbon Library and Atlas: Open-source soil data and tools supporting blue carbon research and policy

*Capacity building in site selection*
*© Dominic Wodehouse, Mangrove Action Project*

*The Vida Manglar project restored site hydrology with limited supplementary planting. Cispata Bay, Colombia*
*© Daniel Uribe*

### 3.2.1 Establish accurate baselines and BAU scenario

To align with the High-Quality Blue Carbon Principles, projects need to be able to show:

- **Project produces Business as Usual (BAU) scenario using site specific evidence to link to ecological and socioeconomic drivers of change.**
- **Project theory of change articulates how ecological and/or social outcomes compare to BAU scenario.**
- **Project design specifically addresses drivers of loss or degradation, or barriers to regeneration identified in the BAU scenario.**
- **Project outcomes are measured against ecological and/or socioeconomic baselines.**
- **Project is able to clearly demonstrate additionality to existing management strategies (environmental, social, economic, governance etc.).**

### 3.2.2 Ensure transparent and accurate greenhouse gas accounting and monitoring by using a scientifically sound methodology or protocol

Donors often require reporting on the climate mitigation outcomes of blue carbon projects, while projects intending to produce carbon credits need to be able to model mitigation outcomes with increasing detail and accuracy as the project progresses.

Project proponents and financers need to be aligned on the level of detail expected at different stages of project development and the associated time and costs. The International Panel on Climate Change (IPCC) uses a three-tiered reporting structure which can be applied to both define the expected level of scientific rigor and facilitate reporting against NDCs or other national targets (section 2.3).

**Levels of methodological complexity for estimating greenhouse gas emissions and removals:**

- **Tier 1:** "Tier 1 is the most basic method. It applies a simple default methodology as well as default emission factors and other parameters defined in the IPCC Guidelines."
- **Tier 2:** "Tier 2 methods replace those default values by country-specific data and can use more detailed calculations and activity data."
- **Tier 3:** "Tier 3 methods include country-specific equations for calculating emissions, with models and measurements tailored to national circumstances, repeated over time, and driven by high-resolution activity data, integrating several types of monitoring. Models should undergo quality checks, audits, and validations."

ESSD (2021)

*Shawlet and Kuto conducting a mapping exercise, Tanzania*
*© Elizabeth Wamba/Wetlands International*

In the context of blue carbon projects, Tier 1 uses global default values for GHG emissions and can be combined with mapping ecosystem area within the project boundaries to establish a clear but preliminary understanding of potential mitigation benefits. This is appropriate for the concept stage or for donors requiring only basic reporting of mitigation outcomes. Default emission values for blue carbon ecosystems can be found in The Wetlands Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Chapter 4.

Tier 2 incorporates peer-reviewed country-specific or location-specific values for carbon stocks and GHG emissions. Models are based on clearly defined and stratified site maps, integrating increasingly detailed spatial data, such as changes in canopy cover and land use, hydrological conditions, species composition and zonation, sediment type, and, where available, the use of locally derived allometric equations. This level of reporting is appropriate for grant-funded projects with the budget and expertise for more accurate accounting and forms the basis for early feasibility assessments. The Smithsonian Coastal Carbon Atlas provides a repository of in-situ blue carbon measurements.

As early field measurements, participatory mapping, and in-situ data become available, advanced assessments begin to overlap into Tier 3, offering the level of granularity required to evaluate project mitigation potential based on site-specific data. This level of modeling requires time, expertise, and financial investment to produce and is appropriate for advanced feasibility studies or longer-term grant-funded projects, providing the budget amount is sufficient. The Coastal Blue Carbon Handbook (2014) contains instructions for site level sampling and carbon stock assessment appropriate for use by all projects. The forthcoming 2026 edition will include tiered approaches and standard operating procedures for data collection.

Full Tier 3 accounting will need consistent multi-year, site-specific data and repeated monitoring, using an approved methodology capable of producing verifiable, repeatable carbon estimates. This is mandatory for high-quality crediting projects, but due to the cost and extended time frame will only be appropriate for a minority of long-term philanthropic or public programs. Crediting projects will need to select and adhere to a reputable standard and methodology, committing to managing and monitoring the project site for 20-40 years or more and undergoing repeat verification assessments every 3-5 years, a responsibility which should not be entered into lightly.

In the last few years, the number of new crediting programs and standards entering the VCM has grown significantly. The quality and rigor of these programs vary, and projects should be pragmatic in their selection. For the international voluntary carbon market, organizations such as the International Carbon Reduction and Offset Alliance (ICROA) and the Integrity Council for Voluntary Carbon Markets (ICVCM) assess and endorse quality GHG crediting programs. Some countries (for example the United Kingdom and Indonesia) have proposed the establishment of national approved lists of voluntary standards or methodologies. Similarly, national and compliance markets will have clear criteria for accepted credit types and issuing entities. For projects in countries participating in Article 6.4 of the Paris Agreement, the Paris Agreement Crediting Mechanism (PACM) will provide an additional pathway for blue carbon crediting, however this is still in development.

High-quality blue carbon projects should select a GHG crediting program and/or methodology endorsed by ICROA or the ICVCM, or where applicable, the national government body responsible for carbon trading regulation.

The following links include ICROA-approved standards applicable to mangroves or other blue carbon ecosystems. At the time of writing, the ICVCM and PACM have not yet progressed to approving methodologies for blue carbon crediting:

- ICROA Endorsed Standards List
- ART-TREES (may include mangroves in project areas where they are included in national definitions of forests)
- CerCarbono (Blue carbon methodology in review at time of writing)
- Climate Action Reserve Mexican Forest Protocol (may be applied to mangroves)
- Gold Standard: Nature Activities Hub, Blue Carbon and Freshwater Wetlands
- Isometric – Mangrove Restoration Protocol
- Plan Vivo – PV Climate Standard V5
- Verra – Verified Carbon Standard (VCS)

Highly technical methodologies will yield the maximum volume of carbon credits but have a correspondingly high burden of proof. Other methodologies are focused on enabling access to carbon financing and have deliberately increased the accessibility of the technical demands, issuing a lower volume of credits to compensate for the less granular data used.

This approach is particularly well suited to smaller, community-oriented projects which prioritize sustainable income over profit. Both approaches can be of high-quality, and projects should feel free to select which aligns best with their goals, capacity and budget.

**Useful resources for understanding and applying blue carbon crediting methodologies include:**

- U.S. Climate Resilience Toolkit – Coastal Blue Carbon in Practice
- The Science and Policy of the Verified Carbon Standard Methodology for Tidal Wetland and Seagrass Restoration
- Salinity Influence on Methane Emissions from Tidal Marshes
- Landscape GHG Accounting Guidance: Developing Landscape-scale Carbon Projects
- The Ocean Panel Blue Carbon Handbook

While financers of blue carbon projects that do not produce credits can and should communicate the climate mitigation outcomes resulting from their support, they should be careful to frame their role as contributing to climate and resilience outcomes without implying ownership of quantified emission reductions or making offsetting claims (section 6.1.2).

*© Conservation International/photo by Samuel Lee*

The informal sale of carbon benefits, whether marketed as credits, carbon packages, emissions units, or by any other name, via private websites and without any accessible documentation, accreditation, third party verification, or lifecycle tracking in a reputable registry, is never compatible with high-quality.

In all cases, the data and methodology used to calculate mitigation outcomes should be laid out in project documentation in a clear and replicable way and freely accessible online. For example, from a credit registry or project website. This can safeguard the project against allegations of bad practice, facilitate financer or buyer due diligence, insulate against greenwashing accusations, and provide a useful reference for future projects.

**Additional resources:**

- Integrity Council for Voluntary Carbon Markets – Core Carbon Principles
- Recommendations for strengthening blue carbon science
- Quantifying Coastal Blue Carbon: A Literature Review of Blue Carbon Methods in Canadian Ecosystems
- The Coastal Carbon Library and Atlas: Open-source soil data and tools supporting blue carbon research and policy
- Precision of Mangrove Sediment Blue Carbon Estimates and the Role of Coring and Data Analysis Methods
- Blue carbon in sediment from Sanggou Bay: composition, burial flux and its response to human activities

## 3.2.3 Demonstrate additionality using clear evidence and reasoning

Additionality describes whether a project delivers climate or ecosystem benefits that would not have occurred without the project activity. Projects are additional if their conservation or restoration actions produce outcomes beyond those of existing policies, protection, or management plans. Carbon crediting projects are required to demonstrate in project design documents (PDD) that emission reductions or removals are in addition to those that would have occurred under a realistic baseline or business-as-usual scenario, that carbon finance is essential to making the project viable, and that the associated emission reductions or removals would not have taken place in the absence of credit revenues. Financiers usually require proponents to demonstrate additionality as part of the feasibility assessment.

**How to demonstrate additionality:**

- VCS Demonstration of additionality: tidal wetland restoration and conservation
- Plan Vivo Approved Methodologies
- Gold Standard: Requirements for Additionality Demonstration
- CerCarbono Tool to Demonstrate Additionality
- UNFCCC Demonstration of Additionality In 6.4 Mechanism Methodologies
- UNFCCC CDM tools

Projects that include mitigation outcomes in their reporting should clearly qualify the quality and source of data used in their reporting and justify how the outcomes are directly attributable to project interventions. However, if not producing credits, applying the additionality procedures required by carbon markets is unnecessary.

**Further reading:**

- The Nature Conservancy: The Bar of Excellence
- Demystifying Non-Carbon Market Approaches for Blue Carbon Ecosystems
- UNFCCC CDM tools
- Best-practice Guidelines for Mangrove Restoration: Blue Carbon Module

*© Conservation International/photo by Sarah Hoyt*

*Community member's home, on the landward edge of the mangroves*
*© Daniel Uribe*

### 3.2.2 Ensure transparent and accurate greenhouse gas accounting and monitoring by using a scientifically sound methodology or protocol & 3.2.3 Demonstrate additionality using clear evidence and reasoning

To align with the High-Quality Blue Carbon Principles, projects need to be able to show:

**For projects reporting on climate mitigation outcomes but not producing carbon credits:**

- **Project applies Tier 1, 2, or 3 reporting based on IPCC default values, locally relevant peer reviewed data, or an accepted scientific methodology.**
- **Project able to clearly demonstrate additionality to existing management strategies (environmental, social, economic, governance etc.).**
- **Project documents the sampling design and methods used to produce data (e.g., the Blue Carbon Manual, a carbon crediting methodology or other peer reviewed approach).**
- **Sufficient information is included in publicly available project documents so others can understand how the baseline was created.**

**For projects producing carbon credits:**

- **The selected GHG program & standard has been reviewed and approved by either: A national government body responsible for carbon trading regulation, or ICROA, or the ICVCM.**
- **Uses in-situ data to produce models for all claimed carbon pools OR peer reviewed data with an appropriate buffer to accommodate environmental variation, in line with selected methodology.**
- **Project able to clearly demonstrate additionality to existing management strategies (environmental, social, economic, governance etc.) using a published additionality methodology.**
- **Project technical documents are accessible online.**

# 3.3 Employ adaptive management protocols

Adaptive management is a flexible approach to project planning that anticipates potential changes and risks, adjusts strategies based on ongoing performance monitoring, and uses pre-planned protocols to respond to and mitigate challenges as they emerge.

It is supported by iterative project design which demonstrates how proponents have considered the risks, environmental stressors, and drivers of change identified during site assessment and feasibility, and how they will respond and adapt.

Iterative design arranges the project into a sequence of stages, each ending with a decision gate. At these gates, project teams review monitoring results, evaluate performance, and learn from experience to select the most effective pathway forward. This process does not alter the project's goals; instead, it provides a structured approach to integrating Monitoring, Evaluation, Accountability, and Learning (MEAL) into decision-making.

**Key components of adaptive management in high-quality blue carbon projects:**

- **Iterative design:** The project employs an iterative design approach, integrating risk response and continual improvement through a robust monitoring, evaluation, accountability, and learning framework.
- **Ecological Monitoring and Feedback:** Adaptive management is supported by a formal monitoring process which monitors environmental stressors, identifies activity displacement and assesses the effectiveness of ecological elements of the project.
- **Social Adaptive Management:** The project has formal processes to solicit feedback and engage communities, accessible to all stakeholders, and addresses concerns through regular community engagement programs.
- **Clear Adaptive Management Strategies:** The project has clear strategies to respond to underperformance of social and ecological interventions, acute or chronic environmental stressors, and previously identified risks.
- **Documentation and Accessibility:** The project maintains written records stored in accessible online format and shares learnings and experiences in appropriate written or video formats.

Guidance and case studies for applying iterative design and adaptive management include:

- An Introduction to Adaptive Management for Threatened and Endangered Species
- USAID library of adaptive management resources
- Adaptive Management Framework: A Results-Based Approach to managing Puget Sound recovery
- CIFOR field guide to Adaptive Collaborative Management
- Mangrove Rehabilitation and Restoration as Experimental Adaptive Management
- International Principles & Standards for the Practice of Ecological Restoration
- Conservation Standards Principles and Practices for Effective Conservation
- WWF and University of Queensland's Climate-Smart Mangrove Decision Support Tool

Iterative design and adaptive management need to be supported by effective monitoring. Monitoring activities need, at a minimum, to include risks, progress towards project goals, reporting requirements for funders or carbon standards, and environmental stressors. Project participants and local stakeholders also provide valuable feedback on changes to the project site or adjacent areas which may require adaptive management actions, e.g., farmland and freshwater sources becoming saline.

Project sites may face acute or chronic environmental stressors that vary in timescale and intensity. Acute stressors include sudden intense impacts such as extreme weather events, while chronic stressors involve prolonged effects such as warmer temperatures or changes in rainfall.

Annual or semiannual remote sensing assessments can be used to monitor changes in ecosystem extent, canopy cover, and above-ground biomass. Global Mangrove Watch can also detect mangrove loss and alert users in near-real time. However, the environmental stressors underpinning changes on the project site are rarely remotely detectable, only becoming apparent through repeated field-based monitoring. On-site data loggers can provide continuous high-resolution measurements of parameters such as water level, salinity, temperature, or dissolved oxygen, and may detect stressors missed by periodic field visits, however these can be expensive, and proponents will need to assess the cost benefit against the quality and frequency of data required.

Ecological monitoring plans will need to consider zonation within the project area, stratifying the site according to elevation or depth, distance from freshwater or tidal influence, geological or constructed features, and human use. Both random and fixed plots or transects distributed across all strata and employing consistent data collection methods provide the basis for a robust dataset.

The frequency of monitoring should account for tidal, seasonal and annual changes in the ecosystem. It is normal for data collection to be conducted more frequently in the first 1-3 years of site assessment to establish seasonal baseline conditions, then at reduced frequency to identify deviations from the baseline. Similarly, project interventions such as the restoration of vegetation will initially be monitored with a high frequency (weekly to monthly), ensuring that the project team are able to identify and manage threats in a timely manner, and record growth and survival rates.

Other variables are monitored much less frequently. For example, SOC, AGB and BGB carbon stocks change relatively slowly, and measurements should be carried out at intervals of 3-5 years, in line with the selected carbon standard and methodology. Except for carbon stocks, monitoring every 5 years to align with crediting verification cycles is not sufficient and would subject the project site to risks from unnoticed environmental stressors.

Depending on ecosystem type and site conditions, vegetation extent and condition may be monitored annually, vegetation biodiversity may be monitored every one to three years, faunal diversity may be measured annually, or seasonally, depending on migration or reproductive behaviors of the indicator species selected. Sedimentation and erosion rates may be monitored once or twice per year, or following disturbance such as storms or alterations to site hydrology.

As an example, water quality monitoring in mangroves should include, at a minimum, nutrient concentration, turbidity or suspended solids, temperature, pH, salinity, and porewater salinity, and be carried out initially monthly, then quarterly or in response to disturbance. The EPA Factsheets on Water Quality Parameters and NOAA Monitoring Estuaries Tutorials are useful starting points.

High-quality projects will design, implement, and report on monitoring plans based on published methodologies and established best practices. Examples include:

- Indicators of Coastal Wetlands Restoration Success: A Systematic Review
- Mangrove Restoration Tracker Tool
- The Global Biodiversity Standard
- Seagrass-Watch: Manual for Mapping & Monitoring Seagrass Resources
- Salt Marsh Restoration Monitoring Guidelines

For many projects, monitoring plans will be constrained by on site conditions including accessibility and safety, risk of theft of unattended equipment such as camera traps or water quality monitors, and the available budget and technical capacity of the team. What is important is that the data collected is consistent and of sufficient quality to support both adaptive management decisions and project reporting requirements.

### 3.3 Employ adaptive management protocols

To align with the High-Quality Blue Carbon Principles, projects need to be able to show:

- **The project monitors metrics related to identified risks and implementation progress and employs clear adaptive management strategies to respond to underperformance.**
- **Adaptive management plans are reviewed and updated periodically.**
- **The project has clear social adaptive management strategies and works with project participants to address concerns as part of a regular community engagement program.**
- **Human driven damage to project sites is monitored (e.g., stump counts in mangroves, anchor scars in seagrass).**
- **The project produces annual monitoring reports.**

*Soil core sampling for monitoring of SOC. Smithsonian Environmental Research Centre, USA © Conservation International/photo by Sarah Hoyt*

## 3.4 Case study: Jiquilisco, El Salvador

# Mangrove Restoration in the Bay of Jiquilisco, El Salvador:

## A Collaborative Conservation Success Story

**Authors:** Laura Michie & Dominic Wodehouse, Mangrove Action Project

**Use the most appropriate interventions and the best available scientific knowledge, including Indigenous, traditional and local knowledge:**

The Community-based Ecological Mangrove Restoration (CBEMR) initiative in the Bay of Jiquilisco, El Salvador, demonstrates the transformative impact of training in restoration best practices. It also showcases a remarkable collaboration between local communities, government agencies and NGOs on a national scale.

In July 2011, after previous failed attempts to restore mangroves in the Bay of Jiquilisco, a national forum on mangrove restoration was organized by Asociación Mangle (AM), Fondo de Inversión Ambiental de El Salvador, EcoViva (FIAES) and Mangrove Action Project (MAP). This drew attention to the environmental challenges faced by the mangrove forests of the Bay of Jiquilisco and the surrounding areas.

*Mangrove restoration planning, Bay of Jiquilisco, El Salvador*
*© Leo Thom, Mangrove Action Project*

*On site data collection is a critical part of restoration planning. Bay of Jiquilisco, El Salvador © Asociación Mangle*

**Appropriate interventions to maintain or improve the health of the ecosystem:**

Following the forum, a four-day CBEMR workshop was conducted which targeted local communities, Wetland Rangers, environmental organizations and government officials. The training introduced participants to the science-based "best practices" approach promoted by MAP, equipping them with skills and knowledge in mangrove restoration.

The success of the 2011 workshop led to significant developments in mangrove restoration in El Salvador. El Salvador's Ministry of Environment and Natural Resources (MARN) recognized the importance of a science-based ecological approach and engaged with AM to lead mangrove restoration efforts in the country. Consequently, AM, EcoViva and their local partners initiated the restoration of the mangrove ecosystem in El Llorón. This contributed to tangible conservation outcomes by prioritizing the restoration of ideal hydrological conditions to support mangrove regeneration, instead of exclusively depending on tree planting.

These efforts have propelled ecological restoration to the forefront of El Salvador's national mangrove conservation strategy. Plus, FIAES, the largest environmental fund in El Salvador, identified CBEMR as the primary method for its mangrove restoration work.

### Employ adaptive management protocols:

To evaluate the progress of the mangrove restoration work, MAP conducted a follow-up visit to El Salvador in February 2023. The findings reveal that over 1,000 individuals in the country have received training in the scientific and ecological aspects of CBEMR and are actively applying these methods to restore mangroves. Over 70 km of channels have been excavated, and without the need to plant any trees, hundreds of hectares of mangrove forest have been restored. Authorities at MARN have now incorporated the principles of CBEMR into the national policy for best practices in mangrove restoration.

### Incorporating Local Ecological Knowledge:

Many elements inform MAP's training. Our training approach is comprehensive and collaborative. Before each session, we conduct thorough groundwork research of the communities' mangrove condition, collaborating with local NGOs to understand the Local Ecological Knowledge of the mangrove ecosystem and incorporate local experience and previous restoration efforts. We encourage inclusivity by gathering diverse perspectives from various stakeholders, predominantly local communities, alongside representatives from the Forest/Environment Department and NGOs.

This allows us to address the underlying causes of mangrove loss and lack of natural regeneration by engaging with communities to understand local challenges. Rather than immediately focusing on planting trees, we prioritize collaborative research to develop site-specific solutions, encompassing both biophysical and social aspects.

*Assessing mangrove site condition, Bay of Jiquilisco, El Salvador*
*© Asociación Mangle*

*Clearing deadwood from channels to restore site hydrology, Bay of Jiquilisco, El Salvador*
*© Asociación Mangle*

Through explaining the biology and ecology of these systems, the communities learn the 'why', which builds on their own Local Ecological Knowledge. Importantly, by building and leaving capacity within the community, rather than imposing external solutions, we ensure sustainability beyond the duration of our projects. This enables communities to not only restore their own sites but also maintain the health of existing mangroves and extend their restoration efforts to other areas. The sense of ownership cultivated through this process ensures that communities continue to protect and nurture their forests long after MAP's direct involvement has ended, ensuring the longevity and effectiveness of conservation efforts.

Arguably the Jiquilisco Bay Project was successful because MAP's workshop built on participants' local knowledge and in this case crystallized the need for greatly improved hydrology. The CBEMR method empowered local communities to take the lead in the restoration efforts. It was the local people who identified practical solutions to their unique environmental challenges and implemented them successfully.

# 4.0 Safeguard nature

*Mangroves and needlefish off Mansuar Island, Indonesia © Conservation International*

**This principle focuses on ecological best practices for high-quality blue carbon project implementation, including the need to record and conserve biodiversity, implement well-designed activities using established methods, and avoid interventions which could potentially lead to direct or indirect harmful consequences.**

Social safeguards and impacts on people are addressed in the next section, under the principle "Empower People".

It is often assumed that every instance of conserving and restoring blue carbon ecosystems will exclusively generate positive outcomes for people and biodiversity. However, this is not always the case. Blue carbon ecosystems do not exist in isolation from each other; they are interconnected across a wider seascape. Fauna migrate between systems daily, seasonally, at different stages of life, or may seek shelter from heat or severe weather events. Nutrients, including carbon, are transported or exchanged across watersheds and seascapes, while intact ecosystems can have a protective influence on nearby areas.

Unforeseen or avoidable negative impacts on people and the environment have led to real and perceived risks associated with nature-based solutions and nature-derived carbon market finance in general, and potentially even more so with blue carbon.

# 4.1 Conserve our planet's remaining intact ecosystems

High-quality blue carbon projects recognize the importance of both restoration and conservation, considering not only restoration sites within project boundaries but also the potential to extend their conservation influence across the broader landscape. Restoration sites also benefit from the conservation of neighboring ecosystems, while restoring areas can provide buffers around areas of high conservation value.

While ecosystem restoration plays a crucial role in environmental recovery, it often falls short of fully replicating the complexity and biodiversity of undisturbed habitats. It is also the case that blue carbon ecosystems store high densities of carbon per unit area, usually accumulated over many years, that once released via ecosystem degradation or draining cannot be recovered in a climate relevant timescale.

> **Thus, conserving an intact area to prevent the emission of stored carbon can have a much higher climate mitigation benefit than restoration alone, while simultaneously preserving existing biodiversity.**

With this in mind, project financers should consider balancing support of both restoration and conservation projects.

Projects producing carbon credits from restoration activities should consider the potential to incorporate areas of conservation or improved management under project governance, or, while securing project land tenure, expanding the process to support recognition of community land or fishery management rights outside of project boundaries. Project proponents will need to carefully weigh the cost versus the benefits of mitigating potential leakage, the ability to promote improved community management, or reducing the risk that project outcomes are compromised by encroachment, degradation or land-use change in surrounding areas, and alignment with local or national conservation goals (section 2).

Conservation benefits beyond carbon, such as biodiversity uplift, coastal resilience, or local fishery productivity, may be attractive to philanthropic or public funding streams. This can facilitate access to blended finance, or additional revenue options such as stacking or bundling of carbon and biodiversity certificates.

Platforms such as Global Mangrove Watch provide datasets on the value of ecosystem services, such as coastal protection and recruitment to commercial fisheries.

However, while the economic value of conserving blue carbon ecosystems is usually significant, it will depend on country-specific or local evidence which is often sparse.

The IUCN Red List of Ecosystems and the IUCN Red List of Threatened Species can be used to inform priority areas for conservation for biodiversity outcomes. LEK (section 3.1.2) can also identify local biodiversity gain or loss trends and help identify species and areas of local cultural or subsistence value.

Effective conservation and restoration are grounded in local support. Advocating for the ecosystems we aim to preserve is a core part of any conservation activity, with the central message that healthy blue carbon ecosystems provide both more tangible benefits and economic value to local stakeholders than degraded or cleared sites. Hands-on activities such as school outreach programs offer an important opportunity to build on community understanding of blue carbon ecosystems, while welcoming visitors to the project site, if feasible, can be a powerful tool to build support for both conservation and the project itself.

*Gazi Mangroves , Kenya © Anthony Ochieng Onyango/ACES*

**Additional Resources:**

- Beyond Carbon Credits: Non-carbon market approaches for conserving and restoring blue carbon habitats
- WWF Rapid Assessment and Prioritization of Protected Area Management (RAPPAM) Methodology
- Measuring and accounting for the benefits of restoring coastal blue carbon ecosystems
- The Development of Blue Carbon Projects: A Guide for Communities
- Supporting Blue Carbon Projects: An Introductory Guide for Buyers, Investors & Funders
- FAO Sustainable Forest Management Toolbox

## 4.1.1 Integrate biodiversity into project planning

Healthy blue carbon ecosystems tend to be highly biodiverse. Detailed studies of mangrove flora and fauna in India, for example, have recorded more than a thousand species present. For conservation or restoration planning, it is critical to consider the potential impacts of project activities, including repeated disturbance or significant changes in site conditions on rare, threatened, or sensitive species. In many places, comprehensive biodiversity data are not available for all blue carbon ecosystems and information may be limited to peer-reviewed papers focused on specific phyla.

It is good practice for project proponents to carry out baseline biodiversity assessments and to confirm the presence or absence of species of conservation interest on their project sites. Internationally recognized guidelines such as The Global Biodiversity Standard and Good practices for the collection of biodiversity baseline data can be used to inform baseline assessments and monitor changes in site conditions – including identifying positive outcomes which can be integrated into project goals and donor reporting. Publishing the results of biodiversity surveys is also both scientifically valuable and useful for countries to meet data and reporting requirements under the Global Biodiversity Framework.

*Measuring tree diameter to calculate above ground biomass*
*© IUCN/MFF*

**Practical methods for carrying out field biodiversity assessments include:**

- Kingdom of Cambodia Mangrove Biodiversity Survey Report (contains methods in appendices)
- Core Standardized Methods for Rapid Biological Field Assessment

High-quality blue carbon projects adopt a data-driven approach to assess and manage the risk of harm and benefits to local biodiversity. Where relevant, projects integrate biodiversity outcomes into monitoring and reporting, measuring progress against the baseline assessment.

**Further reading:**

- Rapid assessment protocol for terrestrial vertebrates
- More than marine: revealing the critical importance of mangrove ecosystems for terrestrial vertebrates
- The Role of Vegetated Coastal Wetlands for Marine Megafauna Conservation
- Marine Biodiversity Credits
- A socio-ecological survey in Inhambane Bay mangrove ecosystems: Biodiversity, livelihoods, and conservation
- Conceptualizing ecosystem degradation using mangrove forests as a model system (requires journal access)

### 4.1 Conserve our planet's remaining intact ecosystems

To align with the High-Quality Blue Carbon Principles, projects need to be able to show:

- **Project design includes activities that build understanding of ecosystem service benefits relevant to project participants.**
- **External outreach activities promote conservation and/or sustainable management of the wider land or seascape.**
- **Project conducts baseline assessments of flora and fauna biodiversity.**
- **Indicators of ecosystem health are documented and used as a basis for monitoring project outcomes, including:**
  - **Species richness and relative abundance**
  - **Presence or absence of indicator species (e.g., detritivores, bioturbators, grazers)**
  - **Presence or absence of threatened or endemic species**
  - **Presence of non-native or invasive species**
  - **Relative abundance of commercial or subsistence food species**

# 4.2 Design projects in accordance with science-based ecological protocols

Early blue carbon ecosystem management and restoration projects attempted to apply terrestrial production forestry methods to the more complex and dynamic intertidal area, often with limited or no long-term project success. For example, common mangrove restoration activities that utilize monoculture plantations, if they survive, may result in increased carbon capture and storage but fail to support biodiversity. Instead, local areas of the same ecosystem in a healthy or pristine state can be used as reference sites to determine suitable project goals and the science-based methods to achieve them.

While generalized standards for restoration such as the International Principles and Standards for the Practice of Ecological Restoration should inform the fundamental principles of project design, LEK and guidelines for particular ecosystems should be used to tailor design to match the unique socioecological context of each project. It is highly recommended for project teams to review all previous local restoration work as there is always much to learn from previous outcomes, including revealing pitfalls that can be avoided.

In combination with research papers examining conservation or restoration approaches in specific geographies or contexts, the following guides can be used to inform design across a project's lifecycle:

**Seagrasses**

- Seagrass Restoration Handbook
- Seagrass Watch field resources library
- Seagrass Restoration in Tanzania

**Saltmarshes**

- Saltmarsh Restoration Handbook
- DEFRA Saltmarsh Management Manual
- Restoration, creation and management of salt marshes and tidal flats – A collation of evidence-based guidance

**Mangroves**

- Best Practice Guidelines for Mangrove Restoration (includes resources for blue carbon credit projects)
- Ecological engineering for successful management and restoration of mangrove forests
- Mangrove restoration tracker tool

Project design needs to identify and effectively address drivers of loss or degradation, and why ecosystems are not naturally regenerating, before any restoration work can take place (section 3.1 and 3.2), ensuring that safeguarding nature and building the right conditions for natural systems to thrive remain central to the project.

*David Gross © Ocean Image Bank*

Designing projects in accordance with accepted science-based approaches is reliant on projects being able to assign sufficient time, resources and expertise to collecting both ecological and social data. That data is critical for making informed, evidence-based decisions that consider all the variables required to protect or restore nature long-term (section 3.1). Third-party technical providers are available, from NGOs providing restoration training such as Mangrove Action Project, drone operators offering site mapping or biomass measurement services, or specialist consultants in site analysis and project design. Where budgets are limited, approaching academic or NGO networks or sharing implementation plans for comment may attract useful feedback at low cost. Skipping the evaluation of physical and social site conditions carries a high risk of low-quality project delivery, or complete failure, and the cost of accessing external expertise should be factored against the benefit of de-risking the project to enable access to finance.

**Additional Resources:**

- Global Mangrove Watch – Data visualization platform including global mangrove, saltmarsh and coral ecosystem maps
- Video series: How to effectively restore mangroves
- Climate-Smart Mangrove Support Tool | World Wildlife Fund
- Effectiveness of community-based mangrove management for coastal protection: A case study from Central Java, Indonesia
- Mangrove Action Project resource library
- Blue Forests Yayasan Hutan Biru knowledge hub
- The Google Earth Engine Mangrove Mapping Methodology
- Mangrove Restoration: It's more than just planting

### 4.2 Design projects in accordance with science-based ecological protocols

To align with the High-Quality Blue Carbon Principles, projects need to be able to show:

- **Project design is based on one or more restoration and/or conservation protocols widely accepted as best practice and aligned with project context.**
- **Selected interventions directly target drivers of ecosystem loss or degradation.**
- **Implementation plans have been shared with project participants and stakeholders to incorporate their feedback.**
- **Project team has reviewed previous site management activities**

# 4.3 Do no harm

Under the principle of "Safeguard Nature" the goal is to ensure that blue carbon projects, at the very least, do not cause additional harm to the environment. This includes the loss, degradation or disturbance of existing biodiversity within the project or in neighboring ecosystems as a result of project activities.

Blue carbon ecosystems are intrinsically interconnected to both each other and to other terrestrial and marine ecosystems. Common activities such as altering water flow around the project site through increasing vegetation coverage, digging channels, or installing moorings, roads, or hard structures, risk inflicting unforeseen consequences on nearby areas.

Following a simple risk assessment framework (section 1.1) and including both neighboring and downstream areas in risk assessment and monitoring, can be effective in identifying and mitigating potential harm before any physical work begins.

Similar to risk assessments, conducting Environmental Impact Assessments (EIAs) prior to restoration or conservation activities is another way to identify possible harm. While EIAs are often legally required for many coastal or marine development projects, they may not be mandatory for nature-based projects. If locally relevant EIA procedures are available, applying them to blue carbon projects can provide insight on potential project impacts and could support any applications or negotiations around land tenure, operating permissions, or access to finance. If there are no local requirements or guidance on EIAs, the Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine include a clear overview of the process which can be adapted to suit the project context.

*Quadrat sampling in the intertidal seagrass*
*© Anthony Ochieng Onyango ACES*

**Further reading:**

- Best Practice Guidance for Biodiversity-Inclusive Impact Assessment
- Convention on Biological Diversity EIA Training Guide
- Malaysia Environmental Protection Dept. Handbook on EIA

Some commonly applied project activities may deliver less than ideal results or increase the risk of unintended harm. Activities to carefully assess before implementation include:

- Restricting access or banning current use of the ecosystem (leakage risk from the displacement of activities that cause emissions or ecosystem degradation to another location, section 4.3.1)
- Use of non-native species for livelihoods or other purposes (section 4.3.2)
- Alteration of site hydrology affecting neighboring areas
- Creating roads or increasing accessibility to protected areas
- Livelihoods that turn out to be destructive (For example, high-intensity tourism or recreational use).

Experimental restoration interventions, for example bamboo walls or plant encasement methods, should be approached with considerable caution. These are often expensive or labor-intensive to install and maintain, and their effectiveness is highly dependent on site conditions. Proponents will need to additionally assess the risk of harm resulting from intervention failure: collapsed bamboo or failed encasements can damage young plants, alter site dynamics, and plastic encasements may result in pollution.

There are several activities with a very high risk of harming nature which should be avoided altogether. Inclusion of the activities listed below will prevent a project from being considered high-quality and may also prevent projects from accreditation by some standards:

- Afforestation or conversion of an existing healthy and functional ecosystem (e.g., converting mudflats or seagrass to mangrove)
- Use of fertilizers, pesticides or chemical treatments
- Use of non-native species in restoration.

*Community-Based Ecological Mangrove Restoration training, Lamu, Kenya © Dom Wodehouse, Mangrove Action Project*

### 4.3.1 Activity displacement and leakage

There is a risk that human activities which cause ecosystem loss or degradation, such as unsustainable cutting for timber or charcoal, or use of bottom-towed fishing gears, may be displaced from the project site rather than reduced or halted. This can result in intensified use and degradation at other locations. In addition to the ecological impact, this presents reputational risk to the project and partner organizations. For crediting projects this also presents financial risk as leakage must be deducted from carbon accounting. High-quality projects will need to consider this during risk assessments and design project interventions which effectively address drivers of degradation rather than displace them, ensuring that project outcomes are real and lasting. This can also include mechanisms that reduce resource use, such as improved cookstoves, or protect restoration areas, such as resource-wide fencing and livestock grazing agreements.

To ensure community uptake of alternative resources or livelihood provisions, community members should be integrated into the design and decision-making process. Co-designing alternative solutions helps make sure they meet community needs and are widely adopted, therefore mitigating the risk of activity displacement and strengthening long-term ecosystem protection (section 5).

Should monitoring of at-risk areas identify activity displacement occurring, projects may need to revise implementation, resource provisioning, or alternative livelihood plans accordingly. Note that this kind of adaptive management should include engagement and negotiation with affected parties ahead of any solution and projects may need to allow for longer set-up times, and raise additional funds, to do so effectively.

*Mangrove nursery maintained by Bonefish & Tarpon Trust, Grand Bahama © Conservation International*

*Cispata Bay mangroves in the Vida Manglar project area, Colombia © Daniel Uribe*

Projects which produce credits or which need to report on climate mitigation outcomes need to consider the leakage of GHG emissions through activity displacement, and also any emissions associated with project implementation activities. High-quality crediting standards require that projects apply an approved methodology to assess the risk of leakage, and may use different methodologies for different leakage types, for example, emissions from the displacement of agricultural activities, unplanned deforestation, or from the use of heavy machinery. Examples of these tools are provided below.

- PV Climate PU004 Leakage module
- Gold Standard leakage tool (draft)
- Verra has several specific leakage modules which can be found here.
- An example is the module for the Estimation of emissions from activity shifting for avoiding unplanned deforestation and avoiding unplanned wetland degradation

The PACM has not yet published a leakage procedure for blue carbon projects but the 6.4 Standard Addressing leakage in mechanism methodologies indicates the requirements will be broadly similar.

Projects applying standards which do not include assessment or monitoring of leakage can increase project quality by choosing to independently apply a leakage assessment using a methodology from a different standard. From the perspective of project finance, having carried out this exercise reduces funder or investor risk.

**Addressing activity displacement or leakage is essential to safeguarding nature at scale and requires engagement and negotiation with affected parties, and projects may need to raise additional funds to do so effectively.**

### 4.3.2 Using alien or invasive species

The risks associated with introducing non-native species in restoration or afforestation, such as invasive behavior, displacement of native species, and introduction of pathogens contradict the principles of high-quality blue carbon projects and high-value carbon credits.

The use of non-native flora for livelihoods or alternative resource provision can be justified in cases where native species are functionally or economically unfeasible. This may include the use of naturalized species in subsistence or small-scale production, supported by evidence that the naturalized species is non-invasive and presents no risk to local biodiversity. A clear example is planting non-native casuarina trees on degraded land in Kenya to serve as an alternative community wood source, reducing damage to mangroves. The species is already well established in Kenya for timber production and can be considered a justifiable use of non-native species, providing clear benefits with negligible environmental risk.

> **However, such projects should be classified as rehabilitation or complementary livelihood planting rather than restoration or conservation, and should be clearly communicated as such.**

The use of non-native fauna for pest control, alternative livelihood opportunities, or as a food source should be approached with extreme caution. For instance, African tilapia aquaculture as an alternative income stream. Whilst these are commonly farmed in blue carbon ecosystems in Asia, tilapia species are aggressive, invasive, and in some locations are driving native species to extinction. Therefore, such introductions must be carefully justified and monitored.

*Octopus in seagrass © Conservation International/photo by Jafet Potenzo Lopes*

### 4.3: Do no harm

To align with the High-Quality Blue Carbon Principles, projects need to be able to show:

- **The project design efficiently avoids loss of biodiversity.**
  - **Any activities which include conversion of existing systems are based on clear reasoning and impact assessment.**
  - **Conservation or restoration uses appropriate native species only.**
  - **Project design avoids reduced water quality, increased erosion, harmful sedimentation or other side effects of project implementation.**
- **Project implementation is structured to mitigate negative impacts on adjacent areas.**
  - **Adjacent areas or ecosystems are monitored in case of negative impacts of project implementation.**
  - **Crediting projects monitor neighboring areas for leakage / activity displacement.**

## 4.4 Case study: Seagrass restoration in Virginia

# Under the Sea:
## Virginia's Blue Carbon Seagrass Project

**Authors:** Chelsea Bowers and Stefanie Simpson

**The Volgenau Virginia Coast Reserve (VVCR) Seagrass Restoration Project is possible due to over 50-years of land protection, public and private partnerships and concerted eelgrass restoration research efforts in Virginia's coastal bays.**

Historically, Virginia's seaside bays were covered in vast meadows of eelgrass beds. However, from 1930-1932 a slime mold disease swept across the eelgrass meadows, resulting in 99% loss. While the water quality remained pristine, the isolation of the location was not conducive to eelgrass meadow re-establishment. In the decades since, and particularly in the past 50 years, conservation efforts have protected the water quality, while long-term research and strong partnerships have provided the enabling conditions for the largest, most successful seagrass restoration effort in the world and now, the first registered seagrass blue carbon project.

Community and stakeholder engagement is an ongoing process that started well before the blue carbon project in 2011 with the creation of a special area management plan process to share information and gather feedback on project activities. Since then, engagement has included multiple approaches with the intention of keeping the local community informed and engaged.

The VVCR community engagement program, managed by The Nature Conservancy (TNC), includes a combination of educational outreach and consultation efforts and materials. Consultation efforts include a quarterly meeting of the VVCR Community Advisory Group, which is designed to represent the interests of local stakeholders. This is made up of representatives of local Eastern Shore community institutions (aquaculture, education, real estate, religious, agriculture etc.) who represent a diversity of age, race and geographic location groups. These meetings are used to communicate updates about the project including the results of project implementation and monitoring, relevant changes to risks, costs and benefits for the local community, and the validation/verification process, including the Validation and Verification Body (VVB) site visit.

*Seagrass in Com National Park, Timor Leste*
*© Paul Hilton for Conservation International*

Stakeholder feedback has been integral to the design of the project. For example, stakeholders in the aquaculture community expressed concern for eelgrass restoration that could compete with the available leasing of bottomlands. As a result of this process, the project includes buffer areas around shellfish or aquaculture lease areas where no new restoration will take place.

In the event that local stakeholders' grievances arise during project implementation or during the project lifetime, stakeholders can access TNC's VVCR staff in-person at the TNC office or via phone or email contact. When a grievance is received, the Project Lead will acknowledge receipt of the grievance and assess the appropriate internal or external resources to amicably address the grievance directly.

**Many enabling conditions provided the opportunity for this project, including:**

- TNC's legacy of land conservation sustained and improved water quality conditions for eelgrass restoration success on the Eastern Shore of Virginia.
- Longstanding partnerships between TNC, the Virginia Institute of Marine Science, University of Virginia and the Commonwealth of Virginia have supported eelgrass restoration efforts, a proven restoration approach, long-term data on carbon sequestration and identified project scalability.
- Well-established community engagement on the Eastern Shore of Virginia.

**The Virginia Coast Reserve seagrass project is the first registered seagrass blue carbon crediting project.**

**The VVCR Seagrass Restoration Project is a collaboration among:**

- TNC, which oversees stakeholder engagement, volunteer coordination and carbon project management.
- Virginia Institute of Marine Science (VIMS), which pioneered the restoration methodology and provides project monitoring support.
- University of Virginia (UVA), which co-authored the VM0033 methodology, and conducts long-term research on carbon sequestration and stocks that is the foundation for the carbon accounting data and scaling opportunities.
- Virginia Department of Environmental Quality (VA DEQ), which manages state ownership and rules around carbon credits.
- Commonwealth of Virginia, which owns the seafloor bottom where restoration occurs.
- TerraCarbon LLC, which provides technical support for project development and approval.

A cooperative agreement between the Virginia Marine Resources Division, VA DEQ and TNC provides the governance structure for the project over the next 30 years, with potential for renewal. The project uses a grouped approach, as project activity occurs across 66,452 hectares of Virginia's Eastern Shore.

Regular meetings of the VVCR Blue Carbon Advisory Group, an inter-agency team, which is composed of members from VA DEQ, VIMS, UVA and TNC provides a process for ongoing consultation and mechanism for communicating project results and potential negative impacts to these stakeholders.

Milestones for this project included updates to state legislation for carbon projects. The project was listed on Verra's registry with a project start date of October 2015 for a 20-year crediting period. It is currently in validation and verification for the first round of credits to be certified, anticipated late 2024 or early 2025.

*Pipefish are adapted to live in seagrass beds, Raja Ampat, Indonesia.*
*© Burt Jones and Maurine Shimlock*

*Quadrat sampling in subtidal seagrass © Johannes R. Krause*

**Key milestones for this project include:**

- February 2019: Completion of Feasibility Study.
- July 2020: Passing of Virginia legislation that authorized VA DEQ to participate in the voluntary carbon market.
- September 2021: Cooperative agreement signed to formalize partnership to support carbon project.
- March 2022: Project listed on Verra's registry.
- May 2022: Public comment period for project.
- July 2022: Beginning of project validation and verification.
- 2026: Anticipated approval and credit issuance.

Registering this seagrass restoration project on the voluntary carbon market provides a transparent process for measuring the climate mitigation value and access to carbon offset buyers. Once finalized, carbon revenues will support monitoring and research for the project, which can include additional scientific study to inform future restoration efforts. The project will pave the way for future seagrass restoration and blue carbon projects across the globe, aiming to increase the pace and scale of this critical work.

# 5.0 Empower people

*Lilian in the forest Gazi Bay, Kenya © Anthony Ochieng Onyango/ACES*

**Most blue carbon projects take place where people live and work. Blue carbon practitioners must implement social safeguards to protect and enhance community member rights, knowledge, leadership, livelihoods, and where relevant, foster equitable access to markets for ecosystem services.**

The responsibility lies with proponents of high-quality projects to assess what legal obligations they have to local users and rightsholders, carry out their own stakeholder mapping (section 2), and put in place their own processes to safeguard the rights and livelihoods of communities and other project affected people. To do this effectively, interdisciplinary teams with a balance of social and ecological expertise are required. Plus, financiers need to be conscious of the time and resource investment needed for adequate consultation and/or consent for the project.

In urban locations, blue carbon practitioners must negotiate layers of overlapping permissions and effectively socialize the project with diverse commercial, industrial, community and government stakeholders. In developing areas, clearly defined processes may not exist to establish or recognize ownership or management rights for blue carbon ecosystems.

In either case, there may be no formal safeguards or grievance pathways for residents, users, rightsholders or other stakeholders to object to conservation or restoration activities that may directly affect them, and it is the responsibility of the project to ensure those safeguards are provided.

Differing roles, responsibilities, and socioeconomic status will often determine how people interact with blue carbon ecosystems and how they perceive their usefulness or value. Some user groups may value clearing mangroves for timber or charcoal, others may wish to remove seagrass to create sandy bottomed swimming areas for tourists, still others may be reliant on both systems to support recruitment and productivity of local fisheries. In many places this can also vary according to local gender roles, resulting in men and women having different perspectives of ecosystem dynamics and trends in resource abundance.

> **Integral to the definition of high-quality projects is that conservation should never be carried out at the expense of people's safety, needs or rights.**

While using crediting mechanisms in blue carbon systems is relatively new, there is a long history of coastal marine protected area (MPA) management and terrestrial REDD+ projects from which to draw lessons and best practices. Highly regarded social safeguarding frameworks include:

- The World Bank's Environmental and Social Safeguards
- United Nation Environment Programme (UNEP) Environmental, social and sustainability framework
- Food and Agriculture Organization (FAO) Framework for Environmental and Social Management

**While those specific to different crediting standards can be found here:**

- Plan Vivo Participatory Toolkit
- Gold Standard Safeguarding principles and requirements
- VCS Version 5.0 and supporting resources
- CerCarbono Safeguarding principles and procedures
- Article 6.4 Sustainable development tool

Details on safeguards in the ICVCM Core Carbon Principles are still evolving, however this Practitioner's Guide and Progress Wheel are designed to strongly align with CCP requirements at the time of writing. The Plan Vivo standards may be applied to non-crediting projects to demonstrate compliance with a recognized governance framework without issuing credits. There are also third-party verified social standards which can be applied to both crediting and non-crediting projects. VCS crediting projects which are certified by these social standards gain a label attached to the credit indicating the additional certification (and therefore project quality). VCS compatible social standards include:

- Climate, Community and Biodiversity (CCB) Standards and Sustainable Development Verified Impact Standard (SD VISta), administered by Verra.
- SocialCarbon
- And W+, which specifically verifies women's empowerment outcomes in climate and development projects.

*Maintirano fisherman in front of mangroves © WWF*

For projects which do not have funder- or standard-issued monitoring and reporting requirements for social impacts, the use of a third-party verified social standard can be a critical tool for demonstrating project quality and associated risk reduction for finance.

The IPLC Resource Center's Making carbon markets work for Indigenous Peoples and local communities and The Nature Conservancy's Human Rights Guide for Working with Indigenous Peoples and Local Communities provide practical guidance on how to navigate the processes within these frameworks. Essential themes around safeguarding, consent, inclusivity, grievance mechanisms and benefit sharing are explored further in this chapter.

# 5.1 Social safeguards

## 5.1.1 Ensure Free, Prior and Informed Consent (FPIC)

Free, Prior and Informed Consent (FPIC) is an essential activity and the first step in implementing any high-quality blue carbon project. FPIC is an Indigenous People's right enshrined in the United Nations Declaration of the Rights of Indigenous People and should also be extended to local communities in line with the right to self-determination of all people. High-quality blue carbon projects uphold FPIC by engaging with IPs & LCs holding statutory or customary rights, including those historically displaced from the project area, respecting local cultural and political contexts, and ensuring that consent is not assumed but sought through a continuous, multi-stage dialogue.

This process also supports the creation of de-risked long-lasting projects that integrate local needs, practices and values. All high-quality projects in areas owned, inhabited, or which provide essential goods or services to communities will have to follow the FPIC process. It is a mandatory requirement for all good carbon standards, is increasingly being insisted upon by project financers as both an ethical and risk mitigation requirement, and is a legal requirement in some countries (e.g., Sierra Leone).

Before initiating the project, IPs & LCs must consent to engage with the project. Consent must be **free** from intimidation, threats, force or bribes. Proper FPIC procedures also require that the project consults communities through culturally appropriate means and respects the rights of community members to make informed decisions about the project **prior** to implementing activities. This necessitates that community members have access to all information about the project activities, benefits and risks in the appropriate formats and languages (written, in-person, video, etc.) to make an **informed** decision. Project proponents may have to engage in capacity building to ensure that project participants clearly understand the commitments and responsibilities they are agreeing to. Participants must be included in identifying social and environmental risks, with the power to modify project design or withhold **consent** entirely.

**Guidance for applying FPIC in practice is freely available, including:**

- FAO guidance for Free Prior and Informed Consent
- Guidelines for applying Free, Prior and Informed Consent
- Consultation and Free, Prior, and Informed Consent: a referential practice for carbon projects following a rights-based approach
- The Practice of FPIC: Insights from the FPIC Solutions Dialogue

*Local people are a critical source of ecological information © Ana Grillo*

For projects which originate within or are led by local communities or Indigenous Peoples, the FPIC process may be more organic. However, project activities and governance structures still need to be clearly documented and agreed to, with the role of each partner clearly defined. Locally led projects also need to conduct FPIC processes to confirm and document consent and support of affected minority groups or other stakeholders within their own communities.

FPIC can only really be realized if or when communities have access to the information and skills needed to effectively negotiate. High-quality projects recognize that parties have unequal power and this influences their capacity to negotiate, and so make sure third-party mediation or legal advice is available where needed, and proceed at a rate that IPs & LCs are comfortable with.

All agreements must be documented in accessible languages and formats, upholding the rights enshrined in UNDRIP and ILO Convention 169.

**The United Nations Food and Agriculture Organization (FAO) offers the following steps and best practices that should be documented and recorded:**

1. **Identify the needs, concerns and perspectives of Indigenous communities, including appropriate representatives and leaders.**
2. **Utilize participatory stakeholder mapping to record demographic and geographic information.**
3. **Collaborate with representatives and leaders to develop plans to communicate information about the project transparently and effectively to stakeholders.**
4. **Communicate how the project will support the needs of IPs & LCs and document consent for the project's plans and activities.**
5. **Create feedback and grievance mechanisms that are accessible to all community members in a culturally appropriate format.**
6. **Continuously monitor and evaluate the project through participatory processes.**
7. **Document lessons learned, share and disseminate information about the project.**

Source: FAO (2014)

High-quality blue carbon projects uphold FPIC by applying a decision-making process appropriate to the local cultural and political context. This is determined by IPs & LCs, including making changes to the project design and activities as necessary to meet community needs. Clear records of the process are also kept, including any objections raised and solutions reached, and consent is given in writing with all parties having access to the resulting agreements in accessible formats.

**Additional Reading:**

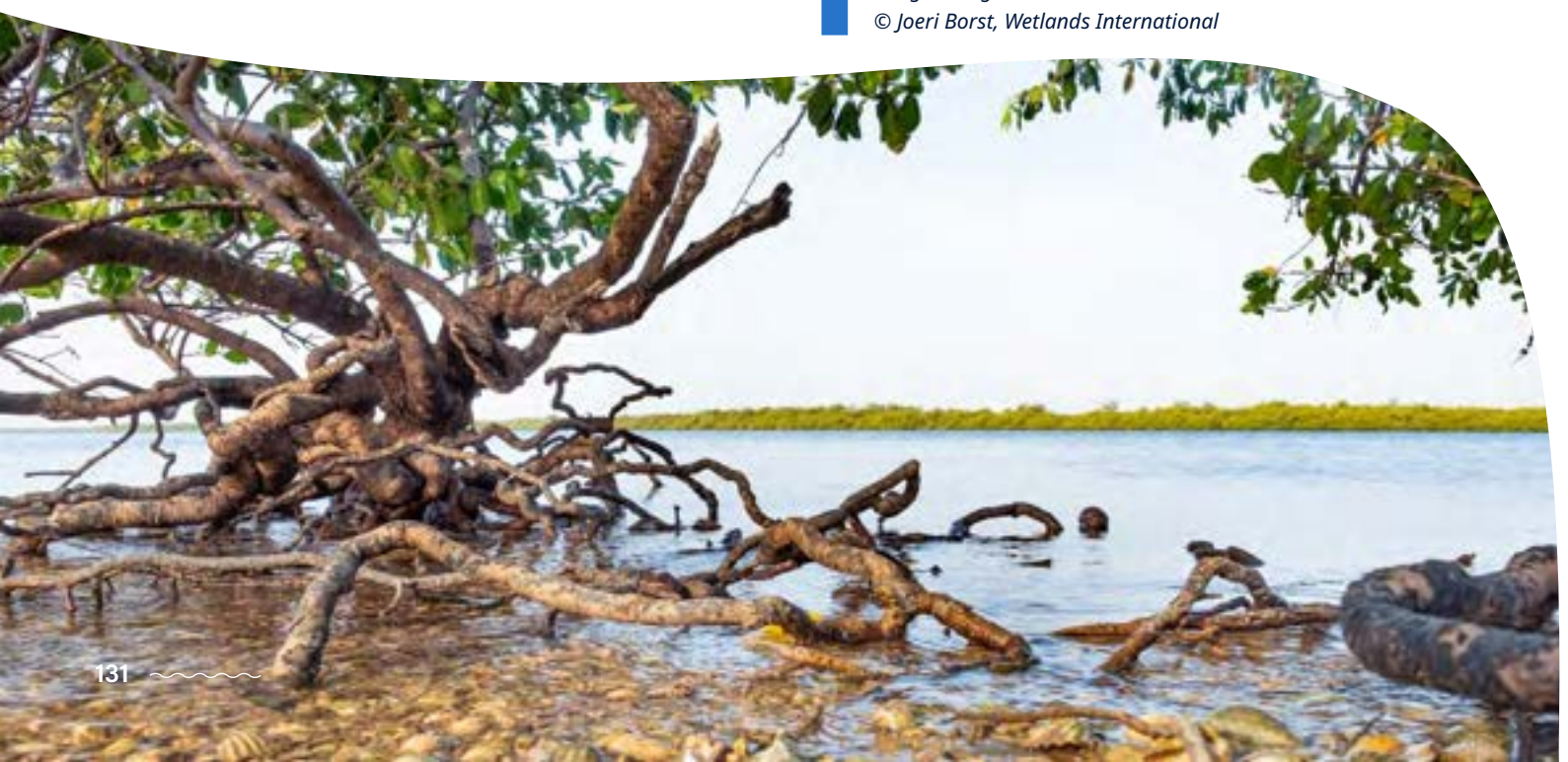
- Nature-base human rights screening tool
- United Nations Declaration on the Rights of Indigenous Peoples
- Indigenous and Tribal Peoples Convention, 1989 (No. 169)
- Core Values, Ethics, Spectrum – The Three Pillars of Public Participation
- UNEP Framework Principles on Human Rights and the Environment
- UN Guiding Principles on Business and Human Rights

### 5.1.1: Ensure Free, Prior and Informed Consent (FPIC)

To align with the High-Quality Blue Carbon Principles, projects need to be able to show:

- **The project conducted a formal inclusive consultation and FPIC process.**
- **FPIC processes are updated at any necessary intervals throughout the project lifetime.**
- **All legal requirements are met.**
- **A written record of the FPIC process is kept.**
- **Consent was given in writing to a mutually agreed project proposal.**
- **Agreements clearly documented, witnessed, and negotiated in good faith.**
- **All participants had access to all required information to make an informed decision.**

*Fringe mangrove on hard substrate*
*© Joeri Borst, Wetlands International*



### 5.1.2 Ensure inclusive participation in stakeholder engagement

High-quality projects recognize that all people should have the right to engage in, determine, and influence decisions affecting their lives and livelihoods. Every group of people is unique, and there is a variety of published guidance to suit most social contexts, including:

- Participatory Approaches to Conservation with Local Communities and Indigenous Peoples: An Open Access Toolkit
- Audubon: Tools of Engagement: Toolkit for engaging people
- Plan Vivo Participatory Toolkit
- Getting it right: a Guide to Improve Inclusion in Multi-stakeholder Forums (English / Spanish / French / Bahasa Indonesia)
- Biodiversa Stakeholder Engagement Handbook
- Pamoja voices climate-resilience planning toolkit

Inclusive participation takes considerable time, capacity, and effort to achieve, and requires projects to employ dedicated community liaison staff. Experience demonstrates that, where possible, employing team members from within project-affected communities can be highly effective. Carbon crediting projects, due to their multi-decadal implementation and monitoring periods, require working closely with communities across several generations and investing in people is critical for long-term project durability. This may also present novel opportunities to address systemic inequalities and deliver social benefits over longer than usual timescales. There is a large body of evidence showing that achieving broad and highly participatory stakeholder engagement, including people of different genders, ages, religions, or other social statuses, delivers more sustainable and long-lasting results.

This includes ensuring decision-making and benefits are not captured by the high-ranking officials, prominent families, or other elites in the community.

In terms of project financing, effective social inclusion is not an optional extra separate from physical implementation costs, but is an essential part of project delivery. Depending on how many stakeholders are involved and the complexity of the social context, it may represent a higher total expenditure than the cost of restoration activities alone. Financial planning also needs to consider that stakeholder engagement can take months to carry out before physical work can start and requires effort to maintain throughout the project lifespan.

When reporting on the social engagement process to investors or funders, or for carbon crediting projects drafting a Project Design Document (PDD), vague terms such as “we consulted with the community” are insufficient. Project proponents should keep minutes of meetings and record, at a minimum, the number of attendees, the percentage of total stakeholders represented, the representation of different stakeholder groups, and the authority and role of any leading figures present. How group communications, small-group meetings or one on one consultations are carried out needs to be planned in line with local cultural dynamics, including identifying any challenges which may impose limitations on inclusivity and reporting on any actions taken to mitigate them. Crediting projects will need to align these consultations with their chosen standard’s specific evidence requirements and guidance from the outset. Failing to capture the correct type of evidence (e.g., gender-disaggregated attendance, meeting minutes) can create hurdles during validation and verification.

Key considerations to enable and encourage participation in community meetings or project activities are accessibility, opportunity cost, and ensuring community members are aware meetings are taking place and what is being discussed. Participating in project design, implementation, or training courses may represent time spent away from employment, subsistence activities, or familial responsibilities. High-quality projects facilitate participation by providing appropriate compensation for the time cost, or may provide supplementary services such as child minding, transport, or meals. Project proponents will also need to consider how to ensure accessibility for older people, disabled people, young people, and linguistic minorities. Project communications and group activities also need to be designed to accommodate different levels of education and literacy.

Care must also be taken where some communities may discriminate against certain individuals or groups (for example, women, youth, and members of ethnic minorities) thus discouraging them from participating in the project. Project teams should identify effective and socially feasible ways to ensure that the voices of all stakeholders are heard and included wherever practical and safe to do so. Potential solutions include providing anonymous feedback options or ensuring opportunities for individuals to speak with project staff away from large groups, such as during daily livelihood activities, so they can openly discuss their concerns without fear of retaliation.

Investing time with communities and stakeholder groups, and building relationships and connections with diverse individuals, groups, and leaders, can result in a deeper understanding of stakeholder needs.

This helps project teams operate safely within the local social and cultural context, including sensitivity to cultural and religious beliefs and avoiding causing or exacerbating conflict.

*CBEMR Training in the Rufiji Delta, Tanzania © Dominic Wodehouse, Mangrove Action Project*

**High-quality blue carbon projects will have designed an inclusive approach to stakeholder engagement that recognizes and engages key stakeholder groups, keeps clear records of community interactions and ensures transparent conduct.**

**Additional Reading:**

- Participatory Appraisal for Potential Community-based Mangrove Management in East Africa
- Community Project Development Guide
- Community Seagrass Guide
- Plan Vivo Participatory Toolkit

*Filming mangrove nursery technique, Tanzania*
*© Dominic Wodehouse Mangrove Action Project*

### 5.1.2 Ensure inclusive participation in stakeholder engagement

To align with the High-Quality Blue Carbon Principles, projects need to be able to show:

- **Project social engagement and safeguarding processes are effectively informed and facilitated by locally recruited team members or partners.**
- **Local teams and partners understand local social and cultural norms and are included in project management decisions.**
- **Project has identified different groups within the community, including minority groups, and invites participation in community meetings and project activities.**
- **Project design acknowledges and incorporates the perspectives of project affected people.**
  - **Social engagement processes are designed and delivered in line with a published best practice framework.**
  - **Social engagement processes are clearly documented, including records of attendance at meetings and activities.**
  - **Formal records of the process are kept.**

### 5.1.3 Ensure feedback, accountability and grievance mechanisms are available to all rightsholders and stakeholders

> **High-quality projects develop feedback and grievance mechanisms for communities and resource users to submit concerns and receive timely, transparent and equitable responses. These mechanisms ensure that projects adapt and evolve to the changing needs and circumstances of the community and are accountable for their impact on people.**

A feedback and grievance mechanism should enable project participants and other stakeholders to easily communicate with project governance, and to safely submit any complaints or concerns. Projects need to provide multiple accessible contact options suitable for the local context, including anonymous or confidential contact routes.

There should be a clear written procedure for processing a grievance, underpinned by a code of conduct or set of principles and clearly defined roles and responsibilities. An example is provided in the case study accompanying this chapter (section 5.4).

Grievances must receive a response followed by concrete actions to mitigate or compensate for the damage, regardless of the type or magnitude of harm. If no response or solution is apparent as a result of engagement, then the system may cease to be used and be rendered ineffective. Responses may include apologies, restitution, financial or non-financial compensation, adapting or halting activities, or other mutually agreed-upon solutions. Projects also need to ensure that the existence of feedback and grievance mechanisms, and how to access them, is effectively communicated to all project participants and any other potentially affected people.

*Community capacity building in mangrove monitoring, Tanzania © Dominic Wodehouse, Mangrove Action Project*

In 2011 the United Nations Human Rights Council updated The Guiding Principles on Business and Human Rights (UNGP) and the framework for addressing human rights issues within organizations – including blue carbon conservation and restoration projects.

Project-level mechanisms should be based on engagement and dialogue: consulting the stakeholder groups for whose use they are intended on their design and performance, and focusing on dialogue as the means to address and resolve grievances.

The UNGP outlines that grievance mechanisms should be legitimate, accessible, predictable, equitable, transparent, rights-compatible and adaptive:

- **Legitimate:** enabling trust from the stakeholder groups for whose use they are intended and being accountable for the fair conduct of grievance processes.
- **Accessible:** being known to all stakeholder groups for whose use they are intended and providing adequate assistance for those who may face particular barriers to access.
- **Predictable:** providing a clear and known procedure with an indicative time frame for each stage, and clarity on the types of process and outcome available and means of monitoring implementation.
- **Equitable:** seeking to ensure that aggrieved parties have reasonable access to sources of information, advice and expertise necessary to engage in a grievance process on fair, informed and respectful terms.
- **Transparent:** keeping parties to a grievance informed about its progress and providing sufficient information about the mechanism's performance to build confidence in its effectiveness and meet any public interest at stake.
- **Rights-compatible:** ensuring that outcomes and remedies accord with internationally recognized human rights.
- **A source of continuous learning:** drawing on relevant measures to identify lessons for improving the mechanism and preventing future grievances and harms.

The structured framework of the grievance mechanism prevents serious concerns from escalating into disputes and human rights abuses. Communities are not static, so the project must evolve and adapt with them while remaining accountable to the communities for their actions.

For carbon crediting projects, should the project fail to address project-level grievances effectively, it may also be possible for severe grievances to be escalated and raised directly with the certifying carbon standard.

**High-quality projects are those which provide a mix of different routes to safely provide feedback. This includes ensuring all participants have easily accessible ways to be heard, and making sure participants are aware these feedback routes are available.**

**Further reading:**

- WWF Principles & Safeguards Hub
- Forest Carbon Partnership: Grievance Redress
- Appeal and grievance processes under the Article 6.4 mechanism

*Harvesting from the mangroves in Demak, Central Java, Building with Nature Indonesia initiative*
*© Wetlands International, Nanang Sujana*

### 5.1.3 Ensure feedback, accountability and grievance mechanisms are available to all rightsholders and stakeholders

To align with the High-Quality Blue Carbon Principles, projects need to be able to show:

- **The existence of a feedback and grievance mechanism, how it works, and how to use it are clearly communicated to all parties participating in project activities.**
  - **Informal feedback structures and stakeholder meetings are in place and functional.**
  - **Feedback and grievance mechanisms are aligned with international human rights standards.**
- **The grievance mechanism includes one or more communication pathways which are considered accessible or equitable for all project participants.**
  - **The mechanism has clear steps and processes in place, is impartial, and results in a tangible outcome.**
  - **There is a clear third-party appeals process for any contested decisions.**
  - **Full records are kept.**

*Gazi mangroves, Kenya © Anthony Ochieng Onyango/ACES*

# 5.2 Inclusive project design

## 5.2.1 Respect traditional land use practices and legal rights to land, resources and carbon

While inclusive stakeholder engagement is critical to securing social license and consent to operate, moving from consultation and consent to project implementation requires the formalization of legal rights to own or manage land or seabed, as well as clear recognition of how traditional land use practices and resource use will be maintained and managed. Crediting projects also need to confirm the right to earn revenue from the sale of carbon credits, and whether such sales are subject to taxation, or require corresponding adjustments or letters of authorization from national governments.

While obtaining permission to operate from government authorities is a legal requirement, project managers must also consult with local communities and stakeholders regarding ownership or management rights, taking care to avoid misunderstandings or potential conflict between different user groups.

Legal rights to land, or land tenure, vary widely across blue carbon ecosystems and are often unclear or complex. Intertidal areas may be classified as seabed, land, both, or remain undetermined. Subtidal areas are usually classified as seabed and typically government owned. While fisheries may be governed by registered community entities or by overlapping local, regional, or national authorities, fisheries management agreements might not include rights to manage the underlying seabed or non fish or shellfish resources.

Addressing these issues may include formalizing and strengthening community rights and tenure, for example by obtaining written clarification of traditional de facto ownership or usage rights. This may also include supporting the establishment of legally recognized community associations or cooperatives, such as forestry or fisherfolk groups, with associated resource management rights. In some countries, logging concessions may provide a clear pathway to secure management rights in mangrove areas, although they may still be subject to further negotiations to change the proposed use of gazetted land.

Where effective mechanisms to recognize Indigenous or customary tenure are absent, projects may secure land tenure or management rights over state-owned land by engaging directly with government authorities. If this approach is taken, particular care is required to ensure that IPs & LCs who hold customary rights or depend on the area for livelihoods are not disenfranchised. Projects should proactively include affected communities in governance and decision-making, and ensure that existing traditional use and resource management practices are respected and maintained alongside any formal tenure or management agreements.

Crediting projects also need to establish clarity over the ownership or management of carbon stored within the ecosystem, and over who holds the right to transact climate mitigation outcomes or other ecosystem services. Operating in a legally grey area should be avoided. Where clear legal frameworks are not present, options may include securing ecosystem management or carbon trading permissions through memoranda of understanding with the relevant government departments.

For information on land tenure and governance in different countries LandPortal provides an archived version of the USAID LandLinks Tools and Guides. The WRI LandMark platform provides global data on Indigenous and community land rights and tenure, while national governance of mangroves in selected countries is explored in the 2024-25 Mobilizing the Mangrove Breakthrough series of reports. Case studies can provide valuable insight, and high-quality projects can support scaling up of blue carbon initiatives by sharing their experiences and lessons learned.

To support the recovery of degraded sites, rotational or temporary access restrictions may be necessary; however, these should only be implemented following documented stakeholder consultation and consent to avoid negative stakeholder impacts. For example, community forest management rules should be set by the community and supported with credible and enforceable sanctions. The complete and permanent exclusion of local stakeholders from project areas is incompatible with the Principles and should be avoided.

Traditional uses of blue carbon ecosystems should be assessed to determine whether they actively degrade the site or hinder recovery, and whether potentially damaging activities can be effectively managed or modified to mitigate impacts.

*Building the capacity of aquaculture farmers with innovative sustainable practices through Coastal Field Schools in Indonesia © Boskalis*

Where ecosystem degradation is driven by activities such as overextraction of resources, including timber or fuelwood, the provision of alternative resources is a widely accepted mitigation approach. For income generating activities such as charcoal production that are incompatible with conservation or restoration goals, management solutions such as the provision of long-term alternative livelihoods should be considered. These should be developed and trialed early, in partnership with affected user groups and community leaders, to ensure that interventions are practical, socially acceptable, and do not undermine practices of cultural significance. High-quality projects work with affected users to offer a range of desirable alternative activities that are appropriately risk assessed and economically viable.

**Guidance on alternative livelihoods is available from:**

- The Livelihoods Centre
- Options for mangrove friendly livelihoods

Enabling users to switch to activities that no longer damage the project area, while still providing resources or livelihood benefits, in turn allows the ecosystem to recover successfully. Critically, alternative livelihood activities will need to compete with the opportunity cost of the unsustainable activities and be closely monitored to ensure there is no displacement of household income or access to basic resources.

> **High-quality projects are those which listen to the needs and ambitions of different community user groups when establishing the most appropriate interventions. They also keep clear records of solutions offered, rejected, or accepted, and co-design appropriate alternatives aligned with stakeholders' chosen livelihoods and traditional practices.**

**Additional Reading:**

- Mangrove forest food products as alternative livelihood measures
- Alternative Sustainable Livelihoods for Coastal Communities A Review of experience and guide to best practice (Dated, but useful)
- 8 Facts about Community Land and Biodiversity Conservation
- The Scramble for Land Rights: Reducing Inequity between Communities and Companies
- Plan Vivo Participatory Toolkit, specially Tool 11b Assessment and Utilization of Blue Carbon Ecosystem Products and Areas
- Working With Indigenous Knowledge Holders to Advance Equitable and Inclusive Nature and Climate Initiatives

### 5.2.1 Respect traditional land use practices and legal rights to land, resources and carbon

To align with the High-Quality Blue Carbon Principles, projects need to be able to show:

- **Project recognizes community ownership or management rights.**
  - **Traditional owners and/or users have a meaningful role in project decision making.**
  - **The project supports the registration of legally recognized community governance or resource management entities.**
  - **If the project produces credits, who has the right to own and sell ecosystem services is clearly established.**
- **Non-damaging or low impact uses of the site are able to continue, preserving traditional practice where possible.**
  - **Community and user groups were included when determining which activities can continue and which require a change in practice.**
  - **Any restrictions to site access are necessary and agreed upon with stakeholders.**
  - **Access to the restoration/ conservation site is limited to local communities/ stakeholders and closed to others.**
- **Alternative livelihoods or other compensatory measures are proven to be economically viable.**
  - **Alternative livelihoods activities or compensatory measures are selected with the affected user groups through an inclusive process.**
  - **Records are kept of all alternative livelihoods consultations for internal use.**

*Common Greenshanks in flight in the Rufiji Delta © Menno de Boer, Wetlands International*

## 5.2.2 Empowering local communities with the means to participate and lead

A formally, documented project governance structure is necessary to ensure the meaningful participation of communities and stakeholders in decision-making, as well as appropriate representation in project leadership. This requires the formalization of relationships between project proponents, technical and other partners, rightsholders, community representatives or leadership, and other stakeholder groups.

Signed agreements, such as Community Conservation Agreements, document shared objectives, roles and responsibilities, decision making processes, and safeguards, in a form that is understood by all parties and can be implemented over the full project lifecycle.

Project governance and agreements should be co-developed via a structured, long-term process that includes all relevant stakeholders and adheres to the principles of Free, Prior, and Informed Consent (FPIC, section 5.1.1). Ensuring adequate safeguards is not only an ethical obligation, fair and transparent governance integrating meaningful community participation in decision-making builds trust and reduces the likelihood of disputes, reducing project risk.

Community leadership may not always adhere to formal structures, titles, or legally recognized entities. Project proponents working with communities will need to recognize and respect traditional informal leadership practices and integrate them within project governance, rather than relying solely on formal titles or existing structures.

Legally established community governance entities that represent the rights, interests, and decision making authority of project affected communities should be formally recognized as project partners.

**Examples of community governance entities may include:**

- Indigenous Peoples' councils or authorities with statutory or customary recognition.
- Community-based natural resource management organizations or conservancies responsible for coastal or mangrove stewardship, such as community forest associations.
- Registered fishing cooperatives or associations representing customary marine resource users.
- Village level or local government bodies with statutory responsibility for local development or coastal management, such as village councils.
- Registered Women's or Youth Community Associations.
- Religious leadership and organized religious groups

Projects such as Mikoko Pamoja in Kenya have supported the registration of legally recognized Beach Management Units and Community Forest Associations to strengthen community management rights and formally integrate communities as partners in project governance. In some countries, community trusts or foundations may also be established to manage ecosystem resources or carbon-related revenues on behalf of community members.

Negotiations between external partners and IPs & LCs have a real risk of power imbalance, with external partners often having access to expertise and legal support which may not be accessible to local stakeholders. High-quality projects address this risk through procedural safeguards that ensure all parties are able to participate on an equal footing in negotiations. These include access to legal advice or third-party oversight when needed, materials in appropriate languages and formats, time for review and reflection of draft agreements, and the freedom to decline proposals without coercion.

**Guidance on social equity and project governance includes:**

- IUCN: Assessing and Improving Social Equity in Marine Conservation
- The Social and Economic Impacts of Carbon Markets on Communities

**Negotiation advice for both project proponents and community stakeholders can be found in:**

- Indigenous Negotiations guide
- Colombia Law School: Expert Insights on Best Practices for Community Benefits Agreements – although not written for blue carbon projects the tips given are valid
- Human Rights Guide for Working with Indigenous Peoples and Local Communities

Community-led blue carbon projects are increasing as more financers prioritize projects with strong local leadership. Access to technical assistance can be a challenge for community-led projects which may be vulnerable to bad actors ("cowboy" developers) who capture an outsized share of funding or carbon credit income, in return for overseeing project design and delivery. However, responsible partnerships between IPs & LCs and conservation or project development organizations can facilitate access to funding, expertise, and training, enabling communities to have more choice over how they manage or develop their natural resources.

Good partners recognize that working with IPs & LCs to define project goals and inclusive decision-making processes represents an opportunity to increase local leadership capacity. This can include introducing project stakeholders to the concepts of nature finance and market mechanisms, and strengthening connections to potential partners such as local government, universities, or other research institutions.

Capacity building should be treated as a core project activity, not an optional co-benefit: without targeted support, inclusive governance can remain nominal, and power imbalances may persist through implementation. Project goals can include multi-year programs for training with the goal of recruiting community members into the project team, including management roles. Care should be taken to ensure traditional community leadership roles remain relevant and integrated into project management structures, and are not made redundant.

Lessons learned from early blue carbon crediting projects highlight the importance of strengthening local capacity to support ecological restoration planning and carbon estimation, including participation in field measurements, sample collection, storage, laboratory submission, and interpretation of results. Project participants may also seek targeted training in areas such as financial literacy, sustainable resource management, and protocols for monitoring and reporting.

By investing in local capacity, high-quality projects embed and retain knowledge within communities and build in-country capability to maintain or expand project activities. International organizations partnered with IPs & LCs should also ensure local colleagues and community members are included in opportunities to speak or participate in regional or national meetings and international forums, and are provided with appropriate financial support to do so.

> **Communities are not static, and governance arrangements should be capable of adapting over time; high-quality projects include periodic review of representation, participation, and leadership outcomes, and adjust governance mechanisms and capacity building activities to continue to align with stakeholder's requirements.**

**Additional Reading:**

- Governance Principles for Community-centered Conservation in the Post-2020 Global Biodiversity Framework
- For Nature-Based Solutions to Be Effective, We Need to Work with Indigenous Peoples and Local Communities

### 5.2.2 Empowering local communities with the means to participate and lead

To align with the High-Quality Blue Carbon Principles, projects need to be able to show:

- **Traditional community leadership roles are integrated into project management structure.**
    - **Local leaders and team members have opportunities to participate in regional or national meetings.**
- **The project offers training and/or capacity building for community members to participate in project activities such as data collection and monitoring.**
    - **The project facilitates participation in training activities by providing appropriate compensation, transport, or other supporting measures.**

# 5.3 Community equity

## 5.3.1 Ensure locally relevant gender integration

Project proponents should conduct a gender assessment or analysis during the project design/feasibility phase to understand the specific social and cultural context and gender norms in local communities. This includes an in-depth understanding of their needs, vulnerabilities, knowledge, capacity and agency within society. There are many formats for gender assessment or analysis, and many standards or project financers will have their own requirements, but the basic tenets are similar.

**Reliable resources include:**

- Conservation International Gender Equality tools
- The Nature Conservancy Guidance for Integrating Gender Equity in Conservation
- IUCN Gender Analysis Guide
- Gender Analysis Toolkit for Coastal Management Practitioners
- Field Guide to Adaptive Collaborative Management and Improving Women's Participation
- Reach-Benefit-Empower-Transform (RBET) Framework

Standard-specific gender requirements for Plan Vivo and the Verra VCS are integrated into mandatory social equity and safeguarding requirements. These are set out within the main standard and program guides shared at the beginning of this section. Plan Vivo offers additional guidance within their Participatory Toolkit. Gold Standard has published separate mandatory Gender Equality Requirements & Guidelines. Article 6.4 gender requirements are still evolving but expected to be closely aligned with the above standards and the Core Carbon Principles. The W+ Standard provides a standalone certification framework for gender outcomes in restoration and conservation projects and may be applied as a quality label to VCS carbon credits.

A structured participatory process coupled with a thorough gender assessment/analysis allows projects to design gender plans that are culturally respectful and realistic within local social constraints. For example, in some cultures, women or individuals from other marginalized groups may hold leadership positions and actively participate in public discourse. In contrast, the same behavior may be considered inappropriate in other places, and activities such as focus groups of women run by a male team member would need to be avoided.

Project proponents need to be mindful that decision-making power around management blue carbon ecosystems and resources may be unequally shared according to gender, economic, or social status, and ensure that the needs of primary user groups are properly represented.

*Mikoko Pamoja community monitoring, Gazi Bay, Kenya © Anthony Ochieng Onyango/ACES*

For example, in one area women may be the primary users of intertidal mangroves or seagrass, but legally recognized management rights might be granted to a fishing cooperative or forestry association made up predominantly of men.

This greater understanding of gendered power dynamics allows blue carbon projects to set gender goals and/or design gender action plans to reach, benefit, empower or transform targeted stakeholder groups and monitor risks to community cohesion or other potential impacts.

At a minimum, high-quality blue carbon projects take active steps (through gender assessment/analysis, plans, associated gender-sensitive indicators and risk management systems) to ensure they do not risk harm to participants or exacerbate pre-existing social conditions.

Building a locally appropriate mixed-gender project team is an excellent first step to making all community members feel more comfortable when participating in the project and sharing their knowledge and ideas. Actions such as joining in with the daily activities and routines that are typically assigned to women in the community, for example assisting with cooking or collecting food, can create a safe and informal space for engagement. These gender-inclusive approaches can effectively support the project by reaching a wider group of stakeholders. However, they should be considered and adopted in direct consultation and collaboration with local leaders and representatives, and project staff working in women-only spaces should be provided with appropriate safeguards training to ensure safety of both staff and participants.

**High-quality projects are a welcoming, inclusive and non-coercive environment for people to participate. By working carefully within local social and cultural norms, they ensure participant safety, bolster community engagement and create a sustainable project and environment.**

**Additional Reading:**

- UN-SWAP System-Wide Action Plan on Gender Equality and Women's Empowerment
- Gender integration and intersectionality in food systems research for development: A guidance note
- Pacific handbook for gender equity and social inclusion
- Ramsar Guidance on Mainstreaming Gender
- Integrating gender into the design, implementation and monitoring of carbon credit projects
- Advancing Gender Responsive and Socially Inclusive Practices in Nature Based Solutions for Adaptation

### 5.3.1 Ensure locally relevant gender integration

To align with the High-Quality Blue Carbon Principles, projects need to be able to show:

- **They have conducted a gender assessment/ analysis to understand the complex social and cultural gender norms of the local community, prior to conducting any social engagement.**
- **Meetings, trainings and other group activities are designed to be accessible to women, female presenting, and non-conforming people.**
- **The project team prioritizes the safety of women, are sensitive to local gender norms, and do not force participation.**
- **Meeting attendance records include the number of participants of different genders.**
- **The project team is gender-balanced, or if not, it has a process in place to improve gender balance.**

*Maintaining a community mangrove nursery, Thailand*
*© Ana Grillo*

### 5.3.2 Empower local communities to define equitable benefit sharing

Benefit sharing is a system that distributes project benefits such as project income, ecosystem services, livelihoods and biodiversity among participating communities and stakeholders. Benefit Sharing Agreements (BSAs) typically outline expected project outcomes, the associated benefits to each party involved, and define the mechanisms and predicted timelines for delivery. How to construct an equitable BSA is a complex topic and addressed in more detail in the supplementary guide: High-Quality Blue Carbon: Guidance for benefit sharing agreements.

When structuring BSAs or describing the full package of project benefits the following categorization can be useful:

- **Non-monetary benefits:** Relevant to all project types, non-monetary benefits may include capacity building, investment in alternative livelihoods, or other positive impacts integrated into the project's socioeconomic goals.
- **Non-carbon benefits:** Relevant to all project types, includes benefits created as an effect of project implementation, compared to benefits delivered as a deliberate activity or project goal. Whether it is appropriate to include these benefits as part of a BSA may be dependent on project context and design.
- **Monetary benefits:** For projects generating revenue from credit sales or other sources, this includes how monetary benefits are managed, allocated, and delivered to beneficiaries.

The Forest Carbon Partnership Facility (FCPF) provides the following definitions of non-monetary and non-carbon benefits for carbon crediting (emission reductions) projects:

**Non-monetary benefits:** Goods, services, or other benefits funded with emission reductions payments, or directly related to the implementation and operation of the emission reduction (ER) Program, that provide a direct incentive to Beneficiaries to help implement the ER Program and can be monitored in an objective manner (e.g., technical assistance, capacity building, and in-kind inputs or investments such as seedlings, equipment, buildings). These benefits, if any, must be included in the Benefit Sharing Plan.

**Non-carbon benefits:** Any benefits produced by or in relation to the implementation and operation of an ER Program, other than Monetary and Non-Monetary Benefits (e.g., improvement of local livelihoods, improved forest governance structure, clarified land tenure arrangement, enhanced biodiversity and other ecosystem services). Such benefits are specified in a distinct section of ER Program Documents and do not form part of the Benefit Sharing Arrangements or the Benefit Sharing Plan for the ER Program.

> **Not all blue carbon projects will generate income that can be dispersed among stakeholders or invested in community needs. However, they should still be able to articulate how project activities produce tangible benefits in other forms, such as coastal resilience, storm protection, increased revenues from tourism or fishing and the preservation of natural or cultural heritage.**

Climate mitigation and biodiversity benefits may be of primary interest to external partners or funders, but intangible to local communities. Project proponents need to be able to explicitly link stakeholder benefits to project activities, for example increases in fish catches due to implementing seasonal fishery closures over seagrass beds. High-quality projects recognize that paid labor or jobs created by implementing the project are not a substitute for community benefit sharing, but rather part of a package that includes outcomes that benefit the whole community.

**Community and Indigenous participants should have a prominent role in defining whether project benefits and associated sharing mechanisms are fair, equitable, and meet their needs.**

The impacts of loss or recovery, and of changes in the management of blue carbon ecosystems, may be disproportionately distributed across different user groups. Attention will need to be paid to ensure benefit-sharing schemes and alternative livelihoods effectively compensate those most affected. In all cases, they must consider the varying responsibilities, roles and vulnerabilities of individuals and groups participating in the project. The project has a responsibility to define social and economic baselines against which to measure the positive or negative effects of project implementation and demonstrate that the promised benefits are delivered. This data would be needed to demonstrate that there is no displacement of household income or access to basic resources as a result of the project interventions.

Community and Indigenous participants should have a prominent role in defining whether project benefits and associated sharing mechanisms are fair, equitable, and meet their needs. BSAs should be co-developed with all relevant stakeholders and adhere to the principles of FPIC. Ensuring adequate safeguards is not only an ethical obligation; fair and transparent agreements build trust and reduce the likelihood of disputes, reducing project risk. Negotiations should be clearly documented with records available to all parties, and may in some instances be observed by third parties acting as safeguards to ensure the process is carried out in line with best practice. By building in specific safeguards for non-discrimination on the grounds of religion, social status, residency, etc., programs can minimize the risk of elite capture by ensuring that project benefits are distributed based on participation and rights, rather than local political influence.

Many local communities will have limited to no familiarity with how carbon markets operate and may not understand when payments are expected or why payment amounts vary over time. Although these details are usually set out in agreements between the project proponent and credit buyers, the contractual language is often technical and difficult to interpret. Where projects invest in clear, consistent, and trusted communication with communities, participants tend to be more engaged, and the risk of misunderstandings or conflicts are reduced. Transparency can be as simple as a handwritten poster in a prominent location.

> **High-quality projects should present clear evidence which documents the consultation process, including how community representatives had an active and meaningful role in defining equitable benefit sharing on their own terms.**

In addition to the High-Quality Blue Carbon: Guidance for benefit sharing agreements, further information can be found in:

- Assessing the transparency and integrity of benefit sharing arrangements related to voluntary carbon market projects
- Forest Carbon Partnership Facility: Guidance Note on Benefit Sharing
- BioCarbon Fund Knowledge Center
- Flora and Fauna Lessons learned on Benefit Sharing in REDD+
- Benefit Sharing at Scale: Good Practices for Results-Based Land Use Programs

### 5.3.2 Empower local communities to define equitable benefit sharing

To align with the High-Quality Blue Carbon Principles, projects need to be able to show:

- **Indigenous people and local communities have a clear understanding of project benefits and impacts and are able to define the benefits they receive.**
- **The process of defining benefit sharing is transparent and open to third party oversight, and/or qualified neutral or legal advice.**
- **Participants have the right to withhold consent.**
- **Negotiations are clearly documented with records available to all parties in appropriate languages.**

## 5.4 Case study: Vanga Blue Forest, Kenya

# Vanga Blue Forest

**Authors:** Hamad Juma Tsunusi, Amber Baker & Mark Huxham

**Location:** Kenya, Kwale County, Lungalunga Sub–county, Vanga, Jimbo and Kiwegu villages, Vanga Bay. The project is in the transboundary conservation area between Southern Kenya and Northern Tanzania.

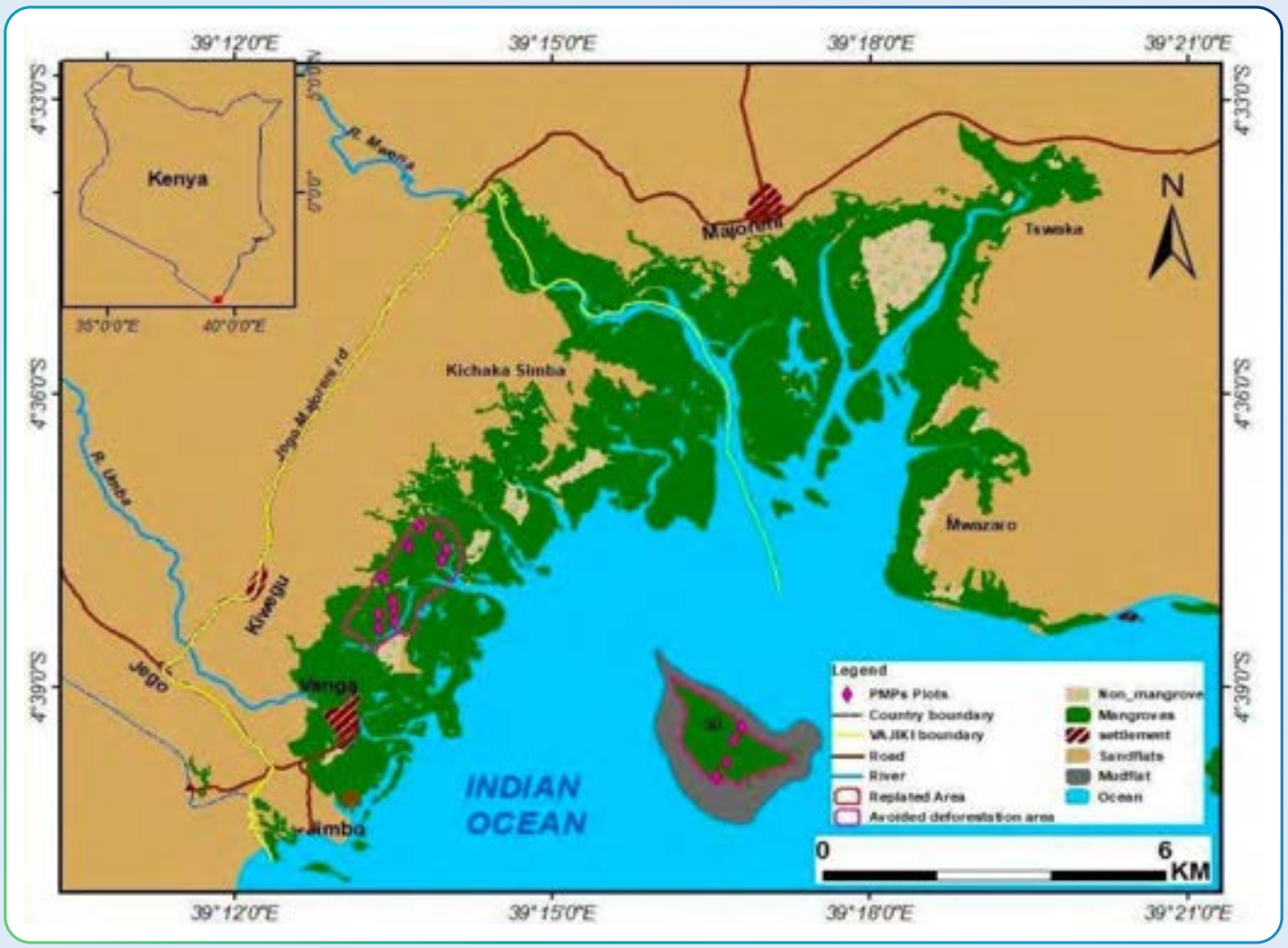



**Figure 12:** Map of Vanga mangrove ecosystem showing the project areas in red.

The Vanga Blue Forest (VBF) Project generates climate, community and biodiversity benefits under the Plan Vivo carbon standard (PV Climate). The key aim of the project is to sustain the flow of mangrove goods and services by halting further deforestation and degradation.

**Specific objectives of the project are:**

1. To restore degraded mangroves in the Vanga project area through education, awareness creation, and community participation.
2. To prevent continued emissions from the deforestation and degradation of mangroves in Vanga in a way that can be measured, reported, and verified.
3. To conserve a healthy mangrove forest from encroachment and degradation, for conservation, carbon enhancement, and scientific purposes.
4. To promote long-term socioeconomic development of the local communities through income generation from mangrove forest resources, including sales of carbon credits.
5. To enhance community capacity in joint mangrove management.

This loss is mainly caused by overexploitation of mangroves by the local communities to meet their household requirements for wood and energy. VBF also seeks to contribute to improving community livelihood.

**Traditional land use practices and legal rights**

Under Kenyan law, mangrove forests belong to the government, but local communities can assume tenureship rights to forest products, including carbon. To do this they need to work through a Community Forest Association (CFA). VBF and partners, including the Association for Coastal Ecosystem Services (ACES), established a local CFA, with VBF initiated as a legally recognized Community Based Organization (CBO) operating under this CFA. VBF and partners, including the Kenya Marine and Fisheries Research Institute (KMFRI) and ACES, had been looking for ways to secure sustainable funding for seagrass conservation efforts in Vanga since the inception of VBF. The release of Plan Vivo's PV Nature Standard in 2023 provided the opportunity to develop a community-based seagrass biodiversity crediting project – Vanga Seagrass Project – a potential world first.

**VBF is the sister project of Mikoko Pamoja. Both projects enable long-term community development funded from the sale of carbon credits.**

## Providing equitable access to global finance and markets

VBF was founded in 2019 following the requests of local people. Vanga lies 30 km from Mikoko Pamoja, the world's first community-led blue carbon project. Having visited Mikoko Pamoja, community leaders from Vanga saw the potential for their own area, and asked for help from ACES and KMFRI. They had a long history of voluntary mangrove conservation, including planting and protecting the natural forest.

The project partners KMFRI and ACES worked to secure money to help establish the project and were able to align VBF credit sales and management with the processes already established under Mikoko Pamoja.

The project belongs to the VBF community-based organization, who collaborate with Scottish charity ACES as advisory partner. The project is community-led, with a project coordinator managing the day-to-day activities on the ground, supported by ACES. The project is governed by a committee of local people/stakeholders.

Project documentation (including the Project Design Document and the Annual report) can be found on the Vanga Blue Forest project page, available here:

https://www.planvivo.org/vanga

https://www.aces-org.co.uk/our-projects/vanga-blue-forest/

Key stakeholders are described below (Vanga Blue Forest PDD, 2021):

**Table 3:** Vanga Blue Forest key stakeholders.

| Key functions | Organization |
|---|---|
| Project coordination | Association for Coastal Ecosystem Services (ACES) Scottish Charity (nonprofit organization) |
| Project technical operations | Kenya Marine and Fisheries Research Institute (KMFRI) |
| Project implementation | Vanga Blue Forest (VBF) community organization through VAJIKI CFA User groups: Jimbo Environmental Group, Magugu mariculture group, Mwambiweje Women Group, Vumilia Nguvu Kazi Group |

## Accountability and grievance mechanisms

VBF has multiple ways of giving feedback. This includes the use of the suggestion box outside the VBF office, or expressing views, feedback or complaints through the VBF coordinator, the CFA and the VBF chairperson.

Any grievances are always addressed by the VBF Committee members in the first instance. If no resolution is reached, the village heads are involved according to established practice, this follows the procedures outlined in the VBF constitution through the village barazas. To the right is the summary of the VBF grievance mechanism.

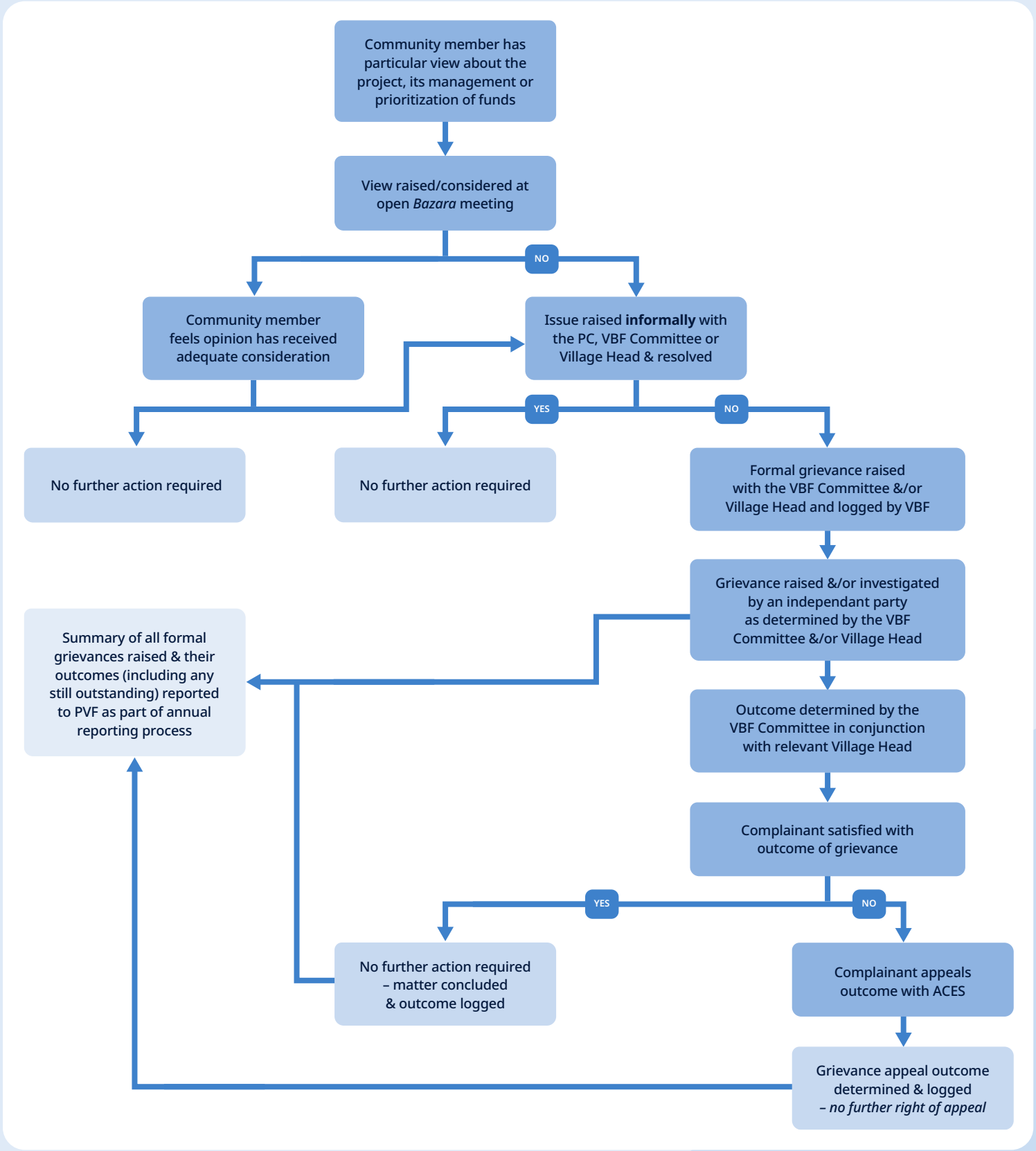



**Figure 13:** Vanga Blue Forest grievance process.

## Locally relevant gender integration

VBF prioritizes gender equality and representation throughout its activities, including:

- Women in leadership positions, including the Assistant Secretary and the Project Treasurer. The Project Treasurer holds decision-making authority over the allocation of funds, including the amounts, timing, and use of project finances.
- In each of the sub-committee groups, specifically the conflict resolution, project governance and finance sub-committees, there must be women involved.
- Gender equality features in all VBF plans and projects. Where a team of four VBF members are needed, then there must be two women and two men.

Women are represented within the VBF committee and are involved in decision-making. Compared to men, women would generally have low representation in decision-making processes in Vanga. This attribute is common across Kenya, with men tending to predominate in leadership positions. There are, however, positive changes in the project area where women are assuming leadership roles. A participatory approach has been used whereby the community (including women and youth) were involved in every step of the project design and planning. The project works to promote the role of women in leadership to meet the two-thirds gender rule enshrined in the national constitution (2010). There is constant consideration for gender equality in project activities – by ensuring equal participation and making sure everyone is involved. There has been a noticeable increase in participation from women, and they are always encouraged to be involved and contribute to the project activities.


*Handwritten poster detailing project finances, Vanga Bay, Kenya © Mwanarusi Mwafrica*

*Seagrass monitoring in Vanga Bay, Kenya © Anthony Ochieng Onyango/ACES*

*Seagrass monitoring in Vanga Bay, Kenya © Anthony Ochieng Onyango/ACES*

## Community defined benefit sharing

Vanga Blue Forest supports multiple communities by distributing income derived from carbon credits. 36% of the monetary benefits go to local work teams and enforcement personnel to protect the project, while another 26% flows to community projects. The participating communities collectively decide on how to disperse carbon credit income through a multi-step process.

First, each individual community meets to discuss potential projects, and the community needs they wish to fund.

Second, a Project Committee meets to discuss the suggested community development projects. The communities then meet again to go over the Committee's responses and vote on which project they would like to fund.

Once the community makes a collective decision on where to distribute the funds, they identify which groups or individuals will receive payments to complete the project. However, individuals must deliver the promised result, or they may receive some or none of the promised monetary amount. As such, the benefit-sharing system of the VBF allows communities to collectively identify their needs and employ the appropriate checks and balances to ensure that individuals deliver the project to benefit the entire community.

**Additional Reading:**

- Participatory Appraisal for Potential Community-based Mangrove Management in East Africa
- Rawls in the Mangrove: Perceptions of Justice in Nature-based Solutions Projects

# 6.0 Mobilize high-integrity capital

© Matt Curnock, Ocean Image Bank

Achieving durable benefits for people, nature, and the climate requires that all parties involved in financing natural climate solutions apply high-integrity, ethical principles appropriate to their roles. High-quality outcomes are not delivered by projects alone, nor secured by capital in isolation; they emerge from coordinated expectations and actions across the full value chain.

High-integrity projects are shaped jointly by project proponents, participants, intermediaries, standard setters, financiers (including philanthropic funders and return-seeking investors), credit issuers, and credit buyers. While project proponents are rightly held accountable for rigorous design and implementation, other actors exert substantial influence over project quality through the terms, timing, pricing, and structure of capital they provide, or enable.

Mobilizing high-integrity capital therefore requires each party to understand and take responsibility for the quality dimensions within their control. For example, funders and investors may need to adjust grant durations or investment horizons to allow adequate time and resources for project design, stakeholder engagement, benefit-sharing arrangements, and post-intervention monitoring. Intermediaries and standard setters play a critical role in aligning incentives, setting realistic requirements, and avoiding rules that unintentionally undermine quality or severely limit credit quantity. Credit buyers and sellers, in turn, influence outcomes through purchasing commitments and price signals that reflect the full, long-term costs of producing a high-quality credit.

Taken together, these coordinated actions help ensure that project proponents are not merely compliant, but genuinely enabled and empowered to deliver lasting climate, nature, and community outcomes.

*Multi-stakeholder collaboration in Demak, Central Java*
*© Yus Rusila Noor, Wetlands International*

*Seagrass monitoring in Vanga Bay, Kenya © Anthony Ochieng Onyango/ ACES*

**The concept of high-integrity capital applies to:**

1. The integrity of potential finance sources, whether they operate in a manner aligned with the Paris Agreement goals or publish science-based emissions reduction targets, and how this could affect the project's reputation
2. The accuracy of claims made by financiers regarding project social, ecological, and mitigation outcomes, and what project proponents can do to support accurate communications
3. Building trust and reducing risk through financial transparency, particularly of benefits and income shared with the community
4. Including the cost of capital, pre- and post-implementation costs, baselines, and monitoring in financial models to set an appropriate credit price
5. Designing fair and transparent agreements to define project outcomes and how different stakeholders benefit from them
6. For crediting projects, ensuring sales agreements balance risk and returns while also adhering to social and environmental integrity

**This chapter will explore these six criteria.**

**General resources on project financing include:**

- The High-Level Panel on a Sustainable Ocean Economy's (Ocean Panel) Special Reports:
  - The Ocean Finance Handbook
  - Blue Carbon Handbook
- Carbon Finance Playbook
- Common Success Factors for Bankable Nature-based Solutions
- Capitalizing on the global financial interest in blue carbon
- Financing Nature-based solutions for coastal protection
- IUCN Blue Natural Capital Knowledge Centre
- Earth Security: Strategic Foresight resource library
- Beyond Carbon Credits: Demystifying Non-Market Approaches for Blue Carbon Projects
- IOC UNESCO Blue Carbon Finance Toolbox
- Guiding Principles on Business and Human Rights
- Integrity Council for Voluntary Carbon Markets: Core Carbon Principles
- Supporting blue carbon projects: an introductory guide for buyers, investors and funders
- Early-stage Financing for Community-led Forest Carbon Projects: The Barriers and Solutions
- Turning the Tide: A Financier's Guide to Investing in Blue Carbon Ecosystems
- Principles for Investment in Natural Climate Solutions
- Business Planning for Protected Areas

*Mangroves © Conservation International*

**Specific guidance for investors in mangrove projects can be found here:**

- World Economic Forum: Investing in Mangroves, the Corporate Playbook
- Deep Blue: Opportunities for Blue Carbon Finance in Coastal Ecosystems
- Earth Security: The Business Case for Mangroves in Indonesia
- The Blue Carbon Cost Tool
- The Nature-Based Credit Science Decoder Series

*Mangrove roots provide a complex habitat for juvenile fish and crabs © Wetlands International*

# 6.1 High-integrity finance

## 6.1.1 Establishing financier integrity

High-quality blue carbon projects should carry out due diligence to establish the integrity of potential finance sources. The due diligence process does not have to be long or complicated but should ensure that investors or donors have an established reputation for financial reliability, and align with the project's environmental and social values, or ideally follow recognized Environmental, Social & Governance (ESG) standards.

Failure to vet funding sources can expose projects to reputational risk, particularly if capital originates from entities with controversial practices, poor sustainability records, or with goals that undermine Paris Agreement-aligned policies. This could include extractive industries with ongoing poor environmental practices, organizations that make sustainability claims without verifiable action, or businesses linked to labor exploitation and human rights abuses, land conflicts, displacement of local communities, or allegations of corruption.

Conducting due diligence should include reviewing ESG ratings, litigation history, public disclosures, stakeholder feedback, and reputation. When in doubt, seek independent verification or legal counsel before entering agreements. Online services such as RepRisk can streamline this process.

**More on conducting due diligence can be found at:**

- How to conduct due diligence on investors
- UK Fundraising Regulator: Due Diligence and Fundraising (although UK focused, the concepts and linked resources are broadly applicable)
- OECD Due Diligence Guidance

High-quality financiers should also be committed to making demonstrable progress towards science-based emissions reduction targets and to following a mitigation hierarchy. Ideally, they should publicly disclose carbon emissions and progress towards GHG reduction and climate targets. Credit purchasers should have a clearly articulated approach to the role carbon credits play in their overall GHG reduction strategy. Some maintain openly accessible third-party-validated greenhouse gas inventories (for example, applying the GHG Protocol or equivalent), covering Scope 1, 2, and 3 emissions. Near-term climate strategies may incorporate insetting, or address ongoing emissions through credit purchases, retired in annual batches.

Guidance from initiatives such as The Science Based Targets Initiative (SBTI), ISO Net Zero guidelines, and the Voluntary Carbon Markets Integrity Initiative (VCMI) helps ensure that potential financiers align with global climate goals. Conservation International has also consulted with multiple stakeholders to produce Principles for Investment in Natural Climate Solutions and Principles for High-Integrity Insetting.

**Further information on the use of carbon credits is available in:**

- Guidelines on the responsible use of carbon credits: Guidance for mobilizing and vetting buyers
- Bending the Curve – Corporate use of carbon credits for net zero
- Guide to good practices for voluntary carbon markets: Supporting voluntary mitigation action with carbon credits
- Guidance on Voluntary Use of Nature-based Solution Carbon Credits Through 2040

Carbon credits are meant to complement direct emission reductions, not replace them. A common criticism of carbon markets is that companies may use credits to claim carbon neutrality without reducing ongoing emissions. For example, selling to a fossil fuel company that lacks a credible decarbonization plan and continues to expand oil and gas operations may expose the project supplying credits to accusations of being complicit in greenwashing. This type of reputational damage can limit access to other funding sources, especially philanthropic capital which avoids associations with activities that undermine environmental objectives. Some credit retailers employ selection criteria to exclude incompatible buyers and protect the project from reputational risk.

Projects and intermediaries selling credits should prioritize buyers who clearly communicate their intent to retire credits within a reasonable timeframe and avoid stockpiling them as speculative assets or regulatory hedges. This also protects the project from surplus credits accumulating in the secondary market and bringing down prices.

When intermediaries such as brokers are involved, project proponents should ensure that these partners apply the same rigorous standards when vetting buyers to maintain project integrity, and should select brokers who are committed to delivering maximum value to project partners and beneficiaries.

### 6.1.1: Establishing financier integrity

To align with the High-Quality Blue Carbon Principles, projects need to be able to show:

- **Conducts due diligence on finance sources**
- **Credits are being purchased for the purpose of retirement within a reasonable timeframe**
- **Financiers have science-based emission reductions targets which are monitored and publicly disclosed, following an established emission reductions framework**
- **Brokers apply similar guardrails to customer selection**

*El Salvador Mangrove Action Project*
*© Leo Thom, Mangrove Action Project*

## 6.1.2 High-integrity claims

Blue carbon ecosystems play a useful role in supporting climate mitigation and adaptation goals. However, both project proponents and financiers must communicate the project's benefits to nature, climate, and people with care and precision. Common risks include double counting, where multiple entities claim the same climate impact, and misinterpreting or misrepresenting how IPs & LCs benefit. This can erode trust in the market and with key stakeholders while compromising the integrity of reported outcomes. Inaccurate or non-additional claims also create reputational risk for both the project proponent and the financiers, should those claims be challenged. Financiers also need to be clear on whether they are providing philanthropic support, concessional capital, or a return seeking investment, and the nature of returns or impacts they are looking for.

Financiers need to ensure that all climate and social impact claims are verifiable and appropriately framed. For example, claiming carbon offsets from a project that does not issue third-party certified credits is misleading. A more accurate approach is to state that funding supported a project that delivered measurable emissions reductions or removals, contributing to the host country's climate targets.

Project proponents should be prepared to provide financiers with clear, transparent information and appropriate claims language to describe and communicate the project's outcomes. Proponents should also clearly outline how different sources of support contribute to overall project implementation and impact, including financing, grants, academic partnerships, and in-kind contributions. This reduces the risk of double claiming, where more than one financier claims responsibility for the same project outcome.

The depth and granularity of this information should be proportionate to the scale and role of the financier. More detailed disclosures are generally appropriate in the context of long-term partnerships, or, in the case of crediting projects, where a single buyer is providing substantial support and expects to offtake the majority of generated credits.

High-quality projects also maintain publicly accessible records, such as annual reports, detailing project outcomes and the evidence or methodologies used. This documentation supports the integrity of financiers' claims and can be anchored in frameworks such as the SDGs, which help communicate broader value creation in a recognized format.

Finally, for projects issuing credits, it is essential that credit issuance, ownership, and retirement are tracked and verified through reputable registries (section 3.2). This ensures transparency in transactions, provides confidence in claimed climate action, and protects against accusations of greenwashing.

By integrating these practices, financiers, project proponents, and credit buyers can strengthen the integrity of their claims, enhance market trust, and ensure that blue carbon investments deliver real, measurable, and defensible impact.

**Additional Resources:**

- Taskforce for Scaling Voluntary Carbon Markets
- International Emissions Trading Association (IETA)
- Taskforce on Nature-related Financial Disclosures
- GHG Protocol Corporate Standard
- VCMI Claims Code of Practice
- Key Trends in Climate Target Guidance, Regulation, and Practice

*Mangroves of Sungei Buloh, Singapore. © Mark Beeston, Conservation International*

**Investors and buyers can play a catalytic role in advancing blue carbon interventions, mobilizing capital, de-risking project development, and accelerating the delivery of scalable climate and ecosystem benefits.**

*Planting mangroves in restored waterways, Vida Manglar project, Colombia © Daniel Uribe*

### 6.1.2: High-integrity claims

To align with the High-Quality Blue Carbon Principles, projects need to be able to show:

- **Project proponents track how funds and in-kind support are distributed across project supporters, activities, and outcomes.**
- **The project proponent collaborates with funders or investors on how to represent project outcomes accurately.**
- **Project provides clear, accurate claims language and evidence.**
- **Project maintains publicly accessible documentation of outcomes aligned with a recognized framework such as the SDGs.**

# 6.2 Transparency

## 6.2.1 Financial transparency

Financial transparency promotes fair decision-making, builds stakeholder trust, and strengthens accountability. By contrast, limited or opaque financial disclosure can create information asymmetries that erode confidence, deter investment or buyer participation, and enable misleading narratives about the returns generated by blue carbon projects.

Proponents of high-quality projects share clear, verifiable details with financiers on how funds are allocated, monitored, and reported, as part of a strong governance structure. This transparency builds confidence that capital is used effectively, aligns with impact goals, and meets accountability standards set by investors and philanthropic partners. By doing so, projects become more competitive in attracting both private investment and grant-based support.

Non-Disclosure Agreements (NDAs) are commonly used to protect sensitive financial information, but project proponents need to take care to ensure the use of NDAs does not compromise project transparency or accountability. Proponents of high-quality projects are required to share information on project finances with project participants from an early stage, ideally during participatory design (section 5). This includes providing clear, accessible annual budgets and financial reports, supplemented by community-friendly formats such as oral briefings, public posters, and translations into appropriate languages. This also reduces social risks by managing expectations from the start. To strike the right balance, any NDAs should be narrowly scoped to protect genuinely confidential or sensitive financial or operational data, or the identities of vulnerable people, while enabling disclosure of information critical to carrying out informed participation and delivering on benefit-sharing arrangements. Agreements need to recognize IPs & LCs right to access, and authority to share, their own data, and should include explicit clauses that prevent the release of protected information into the public domain while permitting disclosure of necessary information to certifiers, auditors, and essential stakeholders.

Guidance on the structure and appropriate use of NDAs for projects with IP & LC participants is limited, however the below resources are broadly applicable. Resources on data sovereignty are provided in section 3.

**Resources:**

- Climate Policy Initiative
- Consultation and Free, Prior, and Informed Consent: A Referential Practice for Carbon Projects Following a Rights-Based Approach
- Carbon Finance Playbook
- State of Climate and Conservation Finance for Indigenous Peoples & Local Communities Report

### 6.2.1: Financial Transparency

To align with the High-Quality Blue Carbon Principles, projects need to be able to show:

- **Projects share clear, verifiable details with financiers on how funds are allocated, monitored, and reported.**
- **Share financial information with project participants early, ideally during FPIC & participatory design.**
- **The project produces annual written financial reports that are shared with all stakeholders for review in the relevant local languages.**
- **Non-disclosure agreements are limited to genuinely confidential information, enabling disclosure necessary for informed participation, benefit sharing, auditing, etc.**
- **The project publishes public-facing financial reports intended for external audiences that are open access, easily discoverable, and written for non-specialist readers.**

## 6.2.2 Accounting and disclosure of project costs

High-quality blue carbon projects incur costs that extend well beyond physical implementation. They require comprehensive financing across the entire project lifecycle, including establishing alternative resourcing or livelihoods, long-term monitoring, ongoing community engagement, site maintenance, and adaptive management. Underestimating these costs, or modeling financial needs solely around ecological outcomes, can compromise project integrity and increase the risk of failure. The Blue Carbon Cost Tool provides early-stage cost projections for mangrove projects across a range of geographies and implementation contexts, including producing custom financial models and break-even costs when provided with project-specific information.

Technical expertise is often contracted externally, particularly during project initiation and for ongoing monitoring and verification. To maintain integrity and ensure community benefits, contracts should be structured as fixed-fee arrangements rather than a percentage of carbon revenue, which can create conflicts of interest and reduce the share of benefits flowing to local stakeholders. However, where external support relates to credit distribution and price optimization, a revenue-based arrangement is an established market norm, as it aligns incentives to achieve the highest possible market prices.

While ecological expertise is essential for project design, successful implementation also requires investment in social scientists and team members with local cultural knowledge to ensure projects deliver measurable social development outcomes.

Project budgets need to account for baseline socioeconomic assessments, essential for monitoring and demonstrating that project activities do not displace livelihoods or restrict access to basic resources (sections 3 and 5). As such, project costs tend to be heavily front-loaded.

Financiers must recognize that project budgets need to include the time, resources, and expertise to effectively engage with IPs & LCs, design, implement, and monitor project ecological and social impacts, and ensure delivery of livelihood benefits. Monitoring of project outcomes needs to continue for several years post-implementation to be meaningful; shorter monitoring and reporting periods can miss subsequent project failures and provide misleading results to financiers.

For projects producing credits, credit pricing is a key determinant of financial viability. In most cases, mangroves and saltmarshes occur in narrow intertidal strips along coastlines and so the area available for project implementation, and the subsequent credit volume, is naturally limited. While long-term credit revenue can effectively subsidize operational expenditure, provide community benefits, and reduce the risk of impact reversals.

> **At the time of writing the market price of blue carbon credits is insufficient for most small to medium sized projects to become profitable in the short or medium term based on carbon revenue alone.**

Early blue carbon credit prices were in some cases benchmarked against terrestrial forest carbon credits and sold below cost to attract buyers, as projects were seeking to create an income stream for community stakeholders rather than a return on investment. Reliable market intelligence around blue carbon pricing remains scarce and is skewed by one unusually large project which can break even at a lower price than the majority. This has distorted market expectations around blue carbon credit prices and hindered the scalability of blue carbon initiatives.

Critically, the lack of reported credit sale prices across projects can make it difficult to produce viable investment models, or to justify an appropriate budget to include blue carbon in credit purchasing portfolios. There are often mismatches between the predicted market price used to assess financial feasibility, actual sales prices, and the price point required to unlock a pipeline of financially feasible projects.

Projects producing blue carbon credits are not required to publicly communicate if their operational costs are met by credit revenue alone, or if multiple revenue streams or blended finance are required to cover project running costs. **This lack of transparency perpetuates unrealistic expectations around financial feasibility, return on investment, and the value of benefits received by community stakeholders.** To address this issue, high-quality blue carbon crediting projects should commit to transparently sharing the cost of generating credits, or at a minimum if credit revenue is sufficient to meet their operating budget, and the portion of operational expenditure covered by grants or other revenue sources.

*Fishermen in the Vida Manglar project area, Colombia*
*© Daniel Uribe*

High-quality projects generate core benefits, including coastal protection, biodiversity conservation, and support for fisheries and local livelihoods. **These benefits strengthen long-term climate and economic resilience, yet they remain largely unpriced in carbon markets, leaving their value invisible in standard per tonne metrics.** Improving access to emerging revenue streams such as biodiversity credits, resilience credits, other nature credit types, and outcome-based bonds, together with valuation methods that quantify avoided coastal damage, fisheries support, and other non-carbon outcomes, can help address this gap. These approaches also create space for blended finance from philanthropic and public sources to support the resilience and biodiversity benefits that carbon markets do not yet compensate.

**Additional Resources:**

- Blue Carbon Cost Tool
- The Blue Carbon Cost Tool – understanding market potential and investment requirements for high-quality coastal wetland projects

### 6.2.2: Accounting and disclosure of project costs

To align with the High-Quality Blue Carbon Principles, projects need to be able to show:

- **Budget for full lifecycle costs, including alternative livelihoods, long-term monitoring, community engagement, site maintenance, and for crediting projects, validation and verification.**
- **Structure contracts to protect community benefits, using fixed fee arrangements for technical services and reserving revenue based fees only where they align with incentives.**

**Crediting projects:**

- **Commit to transparently sharing the cost of generating credits, if credit revenue is sufficient to meet their operating budget, and the portion of operational expenditure covered by grants or other revenue sources.**
- **Credit prices and other income streams aim for full cost recovery and a break-even price for credits.**

# 6.3 Design fair and transparent agreements and contracts

## 6.3.1 Fair and transparent agreements

Blue carbon projects rely on a series of negotiated agreements to ensure legal clarity, financial security, and community trust. High-quality projects design agreements and contracts to promote fair and transparent representation of project partners and any impacted parties.

At the community level, Community Conservation Agreements and Benefit Sharing Agreements (BSAs) (section 5.3) define how local stakeholders, including IPs & LCs, participate in or co-develop and benefit from the project. These agreements typically outline roles, responsibilities, expected project outcomes, and safeguards to protect livelihoods and human rights.

On the financing side, agreements between the project proponent and financiers establish the terms for capital provision, whether through philanthropic grants, loans, concessional capital, equity investment, or other. These contracts often include conditions for disbursement, reporting requirements, and performance milestones, especially when working with multilateral development banks or global funds, which have extensive monitoring and reporting requirements attached to project funding.

Specific resources on memorandums of understanding (MOUs) and legal agreements for projects in blue carbon ecosystems are limited, particularly for projects receiving return-seeking investment or producing carbon or biodiversity credits. The resources shared in this section can inform understanding of document development, but they should not be considered a substitute for qualified legal advice. Global Mangrove Trust provides templates for a selection of document types.

High-quality blue carbon projects ensure that communities and stakeholders receive long-term, tangible benefits through inclusive, transparent, and legally recognized BSAs (section 5.3.2). For projects funded by philanthropic or international development grants, benefit-sharing may alternatively be described as social, socioeconomic, or development goals or impacts, but these outcomes still require defining and reporting in a broadly similar manner. They are an essential requirement for high-integrity project finance.

BSAs typically outline expected project outcomes, the associated benefits to each party involved, and define the mechanisms and predicted timelines for delivery – ideally from year one. Benefits may include capacity building, improved livelihoods, or other positive impacts integrated into the project's socioeconomic goals. For projects which generate revenue, this will include how revenue from credit sales is allocated, including operational costs, community benefits, investor returns, and project proponent margins.

**In all cases, the value of benefits received by IP&LC stakeholders or the percentage revenue split agreed upon should exceed the opportunity cost of participating in the project and appropriately compensate for any behavior changes necessary for project implementation.** Plan Vivo's PV Climate mandates that 60% of gross project revenue be directed to communities.

BSAs for blue carbon projects are explored in more detail in chapter 5.3.2 and in the dedicated High-quality blue carbon: Guidance for benefit sharing agreements.

**Additional Reading:**

- Forest Carbon Partnership Facility: Guidance Note on Benefit Sharing
- Benefit Sharing at Scale: Good Practices for Results-Based Land Use Programs
- Beyond Beneficiaries: Fairer Carbon Market Frameworks

*Mangrove homestead, Corregemiento Caño Grande community, Vida Manglar project, Colombia*
*© Daniel Uribe*

### 6.3.1: Fair and Transparent agreements

To align with the High-Quality Blue Carbon Principles, projects need to be able to show:

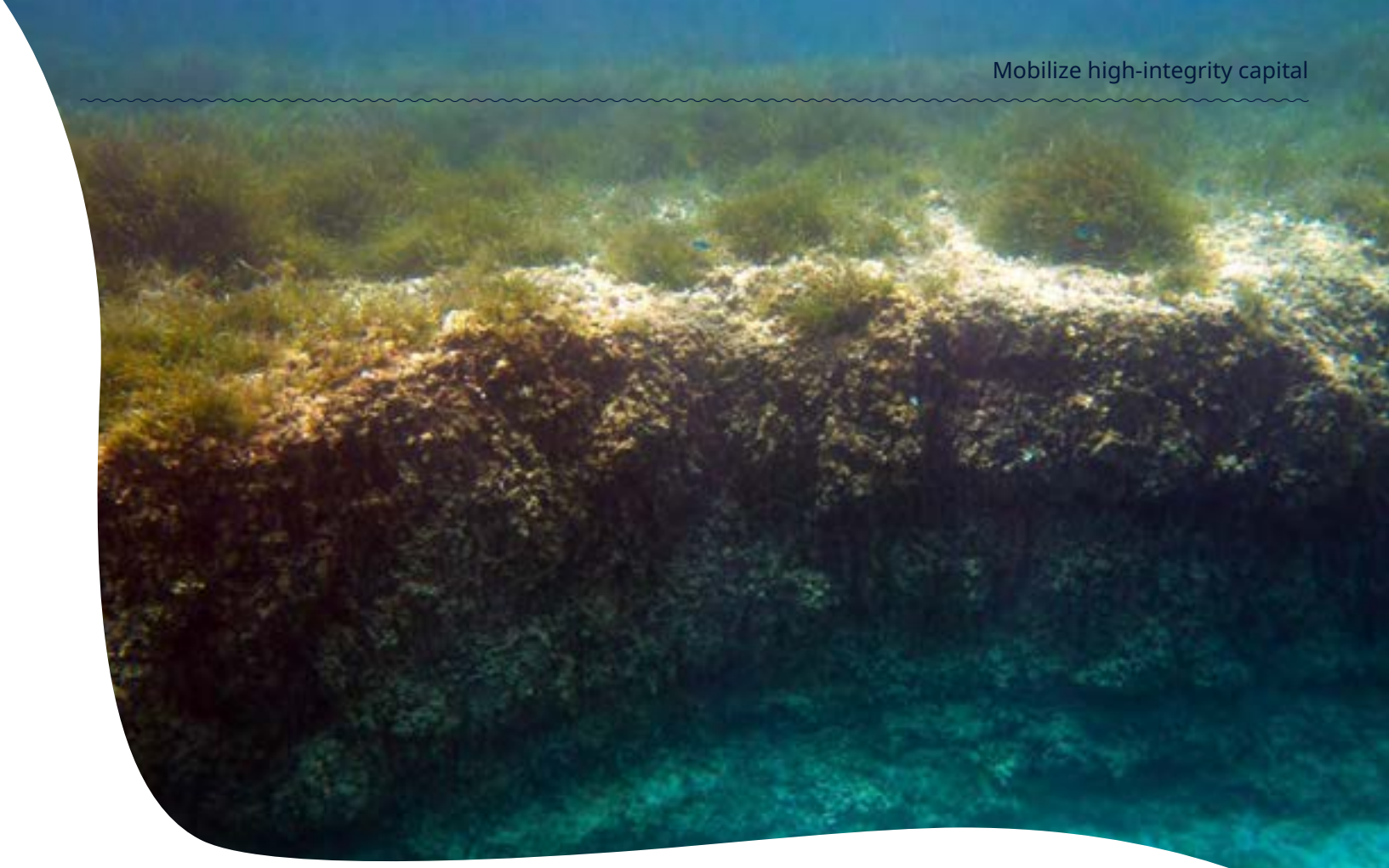
- **Establish clear, legally sound agreements covering community participation, financing arrangements, and (where applicable) carbon or biodiversity credit trading.**
- **Develop inclusive Community Conservation agreements that define roles, responsibilities, safeguards, and expected outcomes for project participants.**
- **Formalize financing agreements with clear terms for capital provision, disbursement conditions, reporting obligations, and performance milestones, consistent with funder requirements.**
- **Define benefit sharing mechanisms transparently and from early project stages, including timelines, capacity building, livelihood benefits, and, where relevant, allocation of revenues from credit sales.**
- **Ensure community benefits exceed opportunity costs.**

## 6.3.2 Financing considerations for blue carbon crediting projects

Financing blue carbon crediting projects may require accessing different funding sources at different stages of development, balancing early-stage risk with long-term financial sustainability. These projects often face unique challenges: high upfront costs, uncertain revenue streams, and the need for strong community engagement. Structuring financing agreements that attract diverse sources of capital while maintaining project quality is critical.

Blue carbon projects can strengthen long-term financial resilience by using endowment-style reserves or other ringfenced funds to provide stable support for core operations. Allocating a portion of early-year revenues to a dedicated rainy-day or contingency fund helps manage exposure to rising or unexpected costs and provides a buffer during funding gaps or periods of market volatility.

Philanthropic capital can play a role in the initial phases of mangrove restoration projects, covering feasibility studies, baseline assessments, and community engagement. These early activities are essential for defining the project's risk profile and determining whether the potential for return on investment will be financial, e.g., through the sale of carbon credits, or measured in terms of environmental impact or social development outcomes. The combination of large early-stage capital requirements, high and difficult-to-quantify risk, and limited sectoral or developer track record deters commercial investors from deploying at-risk capital at this point. Reliance on philanthropy is not without drawbacks: funding is limited, competitive, and often short-term, constraining scalability and obscuring the true cost of project development. While appropriate for a nascent market, prolonged dependence on philanthropic subsidies risks distorting market signals and discouraging early investment in commercially viable models.



*A dense carbon-rich mat of dead plant matter under Posidonia seagrass, built up over 1,200 years.*
*© Miguel Angel Mateo*

Equity investment provides upfront capital in exchange for a direct stake in the project and a share of credits or financial returns. This approach aligns investor interests with project success and is most suitable for projects with strong governance and clear revenue potential. However, proponents must weigh the trade-offs: equity financing dilutes ownership, can reduce control over decision-making, and may reduce the income available to project participants.

Project proponents need to account for all project costs to inform the break-even price per credit and guide pricing strategies for both forward contracts and spot-market sales. **Aligning credit prices with actual delivery costs is critical to ensuring long-term project sustainability and equitable benefit sharing.** To address the risk of budget shortfalls, project proponents need to set floor prices for credits sufficient to transition the project towards financial sustainability, either from increased credit revenue, stacking revenue streams, or blended financial models.

## When it comes to selling carbon credits, there are several approaches:

### Spot Purchases

Spot sales occur after credits are issued, typically in small batches. While this approach offers flexibility and avoids the steep discounts associated with large-volume offtake agreements, it exposes projects to market volatility. Project proponents need to consider their risk tolerance should prices fall, and balance spot sales with advance funding through forward sales. Spot purchases are best suited for projects with low credit volumes or those seeking short-term liquidity, as small spot purchases tend to attain a higher price per credit. Sales can be channeled through brokers or can be direct to the end-user.

### Forward Contracts

A forward contract provides upfront capital in exchange for securing future delivery of credits at a fixed price and volume over a defined period, usually three to five years. This arrangement provides prepaid revenue for developers to fund project costs and helps buyers hedge against short-term price fluctuations. However, predicting future credit prices remains challenging, particularly for high-quality projects that command a premium, and there is a risk that the fixed price will be woefully low compared to market values by the end of the agreed-upon term (the opposite could also be true).

### Carbon Offtake Agreements

An offtake agreement is primarily a procurement mechanism, guaranteeing a buyer for future credits, usually without upfront payment, providing revenue certainty but not financing. The key feature is its “bankability”. Offtake agreements are long-term commitments,
often spanning five to ten years or longer, offering revenue certainty for developers and making them attractive to institutional investors, lowering the cost of capital. For buyers, they guarantee access to a consistent supply of high-quality credits and allow influence over project design and co-benefits.

Frontier, founded by Alphabet, McKinsey, Meta, Shopify and Stripe, has published an example offtake agreement template, which includes the rationale behind it. This example contains some drawbacks for suppliers to be aware of, including no floor price or upwards price adjustment for inflation. Care also needs to be taken to ensure that credit volume and delivery schedules are realistic and recognize the time taken to complete monitoring, verification, and review by the standard required before issuance can take place, avoiding penalties for non-delivery based on impractical timelines. The Open Standard Carbon Removal Offtake Agreement (OSCAR) Guidebook provides detailed guidance supported by a suite of online resources.

Structuring these agreements requires careful attention to risk management, including delivery guarantees and market fluctuations. Termination and dispute resolution clauses should be clear and fair, outlining conditions for termination, remedies for non-delivery, and mechanisms such as arbitration or mediation. High-quality projects adopt a balanced approach, splitting commitments between short-term and long-term contracts to manage

exposure while meeting capital needs at key milestones.

While pre-sale agreements can provide necessary liquidity, they should be approached with caution. For example, locking in a price of $30/tonne in the first year may result in significant lost revenue if the market rises to $65/tonne by the fifth year. However, securing a price which ensures delivery of benefits to project participants can be a good trade-off as it means they're no longer bearing carbon market risk.

While fixed prices are a good risk management strategy to reduce adverse impacts of lower prices and ensure operating costs and community costs are met, project proponents need to take care that fixed prices account for increases in project running costs, unexpected expenditure, or inflation. Including an escalation clause within a fixed price contract can help maintain financial viability by adjusting the price over time in line with inflation or specific cost drivers. Discounts offered to early investors should be time-bound or volume-limited, reflecting the risk premium while preserving a portion of credits for sale at full price. Fixed-price or upfront payments for the full volume of projected emission reductions should be avoided, as this can expose projects to increased risk of non-delivery.

As demand for high-quality blue carbon credits increases, projects should evolve beyond donor dependency. Ultimately, revenue from blue carbon credits should be sufficient to cover core operational costs and any agreed benefit-sharing arrangements for a project to be financially feasible.

**Additional Resources:**

- Blue Forest Finance
- Carbon Finance Playbook
- World Economic Forum: Investing in Mangroves, the Corporate Playbook
- Earth Security: Unlocking the Blue Carbon Premium
- 4 Returns Framework: Courses on Business Approaches to Landscape Restoration

Market information resources (may require a subscription or membership to access*):

- MSCI Carbon market Forecasts
- Sylvera market Intelligence
- S&P Global: Carbon & Scenarios – Market Data

* This guide does not endorse any particular service provider and includes these options only where no comparable free services are available.

### 6.3.2 Finance considerations for blue carbon crediting projects

To align with the High-Quality Blue Carbon Principles, projects need to be able to:

- **Take a balanced approach to spot sales, forward contracts, and offtake agreements, avoiding over discounting, over commitment of future credits, and unrealistic delivery schedules.**
- **Verify sale agreements include fair termination, dispute resolution, delivery safeguards, and escalation clauses to account for inflation or rising operating costs.**

# 6.4 Case study: Vida Manglar

**Authors:** Maria-Claudia Diazgranados & Dane Bell

**Vida Manglar is a collaborative effort convened by Omacha Foundation, INVEMAR, Corporacion Autónoma Regional de los valles del Sinú y del San Jorge (CVS), Conservation International and partners that is designed to unlock long-term conservation funding for Cispatá's mangroves through voluntary carbon markets.**

The program is designed to manage resources that ensure the sustainability of the mangroves in the Gulf of Morrosquillo, Colombia, specifically those within the protected area of the DRMI (Regional Integrated Management District) Cispatá, which includes Bahía de Cispatá, La Balsa, Tinajones, and surrounding sectors of the Sinú River Delta, and is under the jurisdiction of the CVS. The project began on 15th May 2015 and is expected to issue credits for 30 years. It is the first blue carbon program in the world which takes into account the carbon stored not only in plants, but also the carbon stored in the soil. A total reduction of 939,296 $tCO_2e$ is expected to result from implementation of project activities.

## High-Integrity Finance

The project is registered under Verra's Verified Carbon Standard and the Climate, Community & Biodiversity (CCB) Standards and applies Verra's tidal wetland–inclusive VM0007 carbon accounting methodology. Greenhouse gas emissions are reduced through activities that identify, prioritize, and implement actions for the appropriate management of mangroves in the Gulf. These include promoting sustainable development, strengthening local governance, and supporting sustainable and viable economic alternatives for local communities. Pressure on the natural ecosystem is reduced through activities such as ecotourism, native beekeeping, and improvement of agriculture and local orchards. For the period 2019-2022, three local associations signed voluntary agreements to develop and implement their business models.

*Fishermen in the Cispata Bay area, Vida Manglar project, Colombia © Daniel Uribe*

The first phase, certified in April 2021, focuses on managing existing mangroves within DRMI Cispatá and reducing anthropogenic threats, with active participation from local communities. During the design phase, financial requirements were assessed to support the implementation of activities aligned with the management plan for the DRMI Cispatá. A participatory analysis including the following steps was used to construct the cash flow:

1. **Establishment of the project timeframe.** The project has a time horizon of 30 years. The cash flow projections were made for the first 10 years (2015–2025) and extended until the end of the project (2045). Income and expenditure projections were calculated year by year, based on the long-term inflation target set by the Central Bank of Colombia (Banco de la República), which stands at 5.9%. The exchange rate projection was adjusted according to the expected devaluation corresponding to the inflation rate differential between Colombia (6.5%) and the United States (3%), resulting in a total devaluation of 3.5–7.1%.
2. **Estimation of income.** Income corresponds to the projected revenues from the sale of carbon credits as well as the revenue from investment exercises of the sinking account and endowment fund.
3. **Estimation of initial investment (capital assets required), costs (necessary expenses), and expenditures (necessary disbursements for planned activities).** This includes the calculation of expenses such as research and monitoring programs and all expenses related to validation and verification procedures, such as the Monitoring Report.
4. **Calculation and projection of the cash flow.** Cash flow was constructed by subtracting project expenditures from income. Income tax was then deducted to produce the net cash flow after, which indicates the project's financial needs and resource requirements.

The blue carbon credits from the first verification period (2015–2018) were sold at up to USD $35 per credit. The project began using these funds in late 2022, approximately 1.5 years after approval, covering 11% of its financial needs in 2022, 36% in 2023, and 24% in 2024. For the second verification, the Steering Committee approved partner Conservation International to manage the sale of the available credits. A minimum sale price of USD $40 per credit is expected for this second period. Assuming full payment at once and a 7% annual return from the FIC sinking account, the Vida Manglar Fund could begin capitalizing an endowment with 50% of the blue carbon credits from the second verification, generating an estimated 5% average annual return.

If the third verification is completed by 2029 and subsequent verifications occur every three years, the project will be financially sustainable through the end of the crediting period originally approved by Verra. In that scenario, all essential activities identified could be financed through credit revenues. Ideally, the endowment would continue to grow until the project's conclusion, ensuring that funds remain available to support mangrove conservation in the DRMI Cispatá beyond the project's lifespan.

## Transparent Accounting and Finance

The Fondo Vida Manglar (Vida Manglar Fund) is composed of a sinking account and an endowment fund. Financial administration is carried out by Colombia's Fondo para la Acción Ambiental y la Niñez ("Fondo Acción"). Vida Manglar's governance structure enables the inclusion of all stakeholders, ensuring technical and financial coherence of activities, monitoring of conservation results and impacts, and effective decision-making.

In designing the Procurement Plan, the Vida Manglar Technical Committee prioritizes annual activities based on funds availability and strategic alignment with the Operational Manual (MOP) and the standard's requirements. These include payment of local staff, procurement of necessary equipment (excluding non-financeable items), REDD+ activities, wetland conservation and restoration activities, economic alternatives, local capacity building and implementation of sustainable use and management agreements, among others. Once approved, the Steering Committee authorizes Fondo Acción to proceed with the necessary contracts, acquisitions, and agreements.

When new project areas are selected, the same financial analysis is carried out, and the percentage of income from the sale of the certificates issued will depend on the respective mangrove coverage area in each case. The review of activity costs and the prioritization of activities outlined in the Procurement Plan is updated at least every two years.

*Members of the community of Corregimiento Caño Grande participate in the Vida Manglar project, Colombia © Daniel Uribe*

### Transparent Agreements and Contracts

In accordance with the roles and responsibilities of Vida Manglar partners, as outlined in the MOP, some implementation activities are led by institutional partners. Such cases require proper justification and prior approval by the Steering Committee. Regional mangrove associations are responsible for carrying out several project activities for which specific agreements are signed to ensure proper delivery. These agreements must meet the minimum criteria established by the Fondo Vida Manglar administrator and those outlined in the Benefit Sharing Agreement. Currently, the project maintains individual agreements with 14 legally recognized community mangrove worker (manglero) organizations.

Vida Manglar uses a blended project-finance model, pairing early philanthropic support with carbon revenue. The resources generated from the sale of blue carbon credits under the Vida Manglar program cannot finance 100% of the budget required for implementing management plan actions, and any shortfall is met by project partners and fundraising. Currently, 92% of gross credit revenues are reinvested into the conservation management plan and local livelihoods, with the remainder covering transaction/administrative costs. This sequencing – philanthropy helping de-risk design and certification, followed by high-integrity credit revenue that sustains implementation – illustrates a replicable pathway for blue carbon projects seeking both market access and durable community benefit-sharing.


www.oceanriskalliance.org