

# Welcome to the Mangrove Restoration Tracker Tool User Guide!

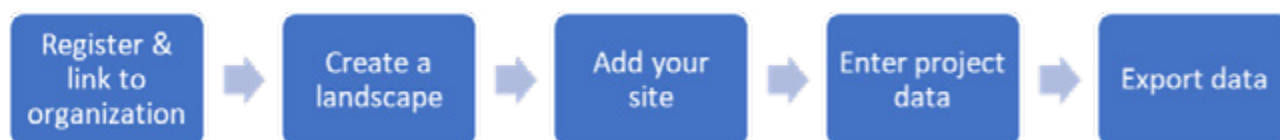
**The Mangrove Restoration Tracker Tool (MRTT) is an application to record and track outcomes from mangrove restoration projects.**

Developed by the University of Cambridge and WWF on behalf of the [Global Mangrove Alliance](#) in collaboration with conservation practitioners and scientists from around the world, the MRTT has a flexible structure designed to capture field and desk-based data on mangrove restoration projects in a standardised format. The MRTT data entry portal and global restoration project database is hosted on the [Global Mangrove Watch](#) platform.



**The tool will aid the mangrove conservation community in quantifying how specific conservation actions lead to outcomes for biodiversity, mangrove resilience, management effectiveness, communities, and governance. In turn, this will help improve mangrove conservation implementation and build a community to support more effective mangrove restoration projects.**

The MRTT has three overarching sections to record information through the lifetime of a mangrove restoration project: (i) site background and pre-restoration baseline, (ii) the restoration interventions and project costs, and (iii) post-restoration monitoring that incorporates both socio-economic and ecological factors. Each of the three sections has several subsections that make up the MRTT. The MRTT is designed to capture multiple monitoring events, allowing users to track their project throughout its lifetime.



The MRTT is able to record both historical and current restoration projects. If historical project data is being entered then all sections can be completed at once, with additional monitoring periods being added when required. For current or upcoming projects, the MRTT is designed for the user to enter data into section 1 (site background and pre-restoration baseline) before restoration interventions begin. Section 2 (restoration interventions) can then be populated as the intervention actions are completed. Section 3 (post-restoration monitoring) can then be completed multiple times at different time intervals to track project outcomes. The tool can also be viewed as a guide to the type of data that should be collected to plan and monitor mangrove restoration projects efficiently and effectively.

When the user has finished entering data, it can be exported to standard field reports (CSV/Excel) and can be used to create graphs or other reports. This can be used to help inform decision-makers and other stakeholders to plan, conduct and track key performance indicators for the success of mangrove restoration interventions. In addition, data entered into the MRTT will be visualised on the Global Mangrove Watch platform. This will allow future restoration projects to identify the restoration techniques used in areas with similar environmental and socio-economic settings. At a larger scale, the tracking of mangrove restoration projects across the globe gives crucial insight into factors underlying project success, which can be used to improve future global restoration outcomes.

# Getting Started

## Signing up/Registration

To enter data into the MRTT, you need to sign up as a user at:

<https://mrtt.globalmangrovetwatch.org>

You will need to enter your Name, Email and create a Password.

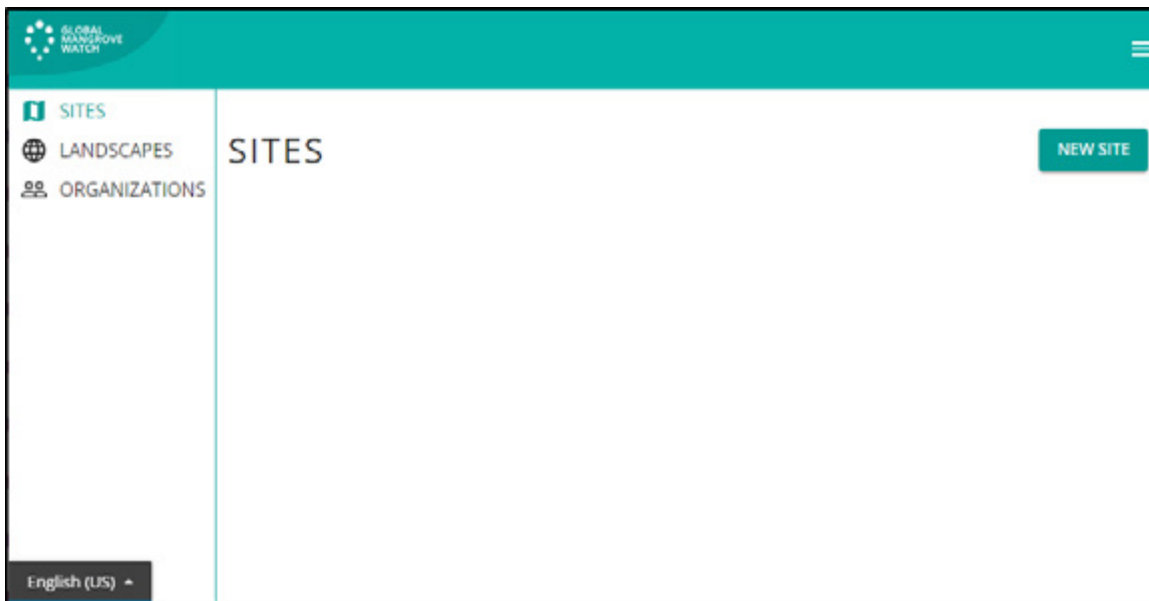


The image shows a registration form titled "SIGN UP". It contains four input fields: "Name", "Email", "Password", and "Re-type password". Each field is followed by a red asterisk indicating it is a required field. At the bottom right of the form, there are two buttons: "G/MS" and "Submit".

After signing up you will receive a confirmation email to verify your new account. You can access your profile information by clicking on the avatar in the upper right corner of any page. Here you can view and change your email and name.

If you forget your password for the MRTT, click '**FORGOT PASSWORD**' on the login page to receive an email with a link to reset your password.

Once you have registered and verified your account, you will arrive at the USER DASHBOARD.



USER DASHBOARD, the first step is to link your user account to an Organization.

## Organizations

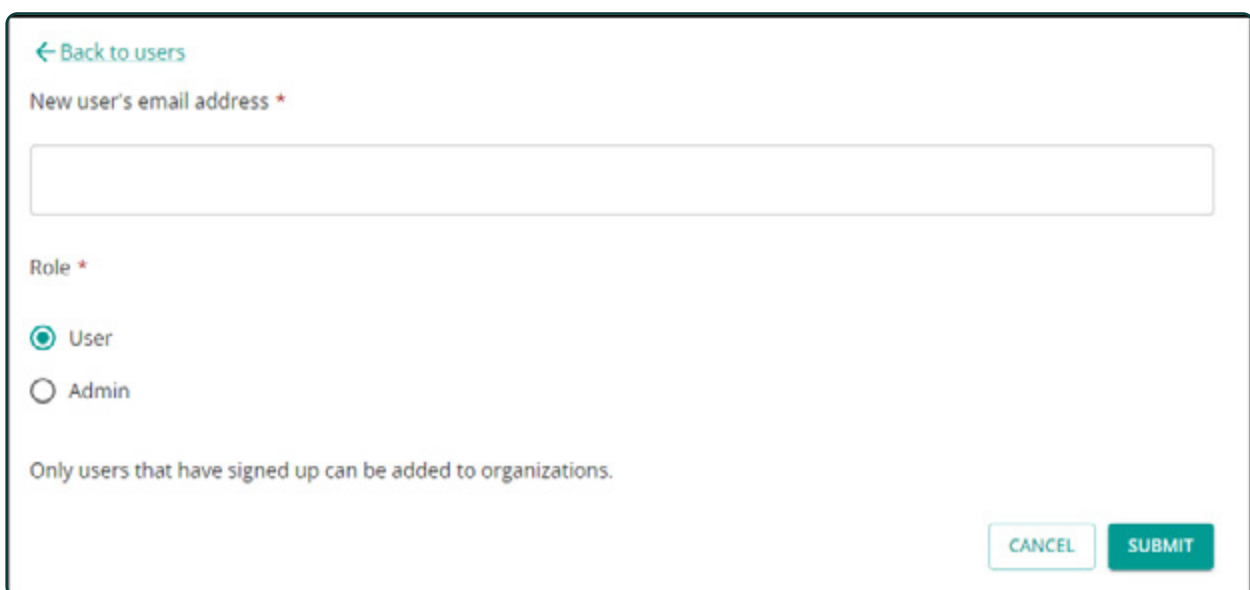
Click on the Organization tab on the left-hand side of the screen and you will be taken to the Organizations landing page. An 'Organization' is the group or entity who you work for and who you are submitting data to the MRTT on behalf of.

From the landing page you can either create a new Organization using the 'NEW ORG' button at the top right, where you will be asked to name the organization and then press '**SUBMIT**'.

A screenshot of a form titled 'NEW ORGANIZATION'. It features a single text input field labeled 'name \*'. At the bottom right of the form, there are two buttons: 'CANCEL' and 'SUBMIT'.

On the landing page under 'Other Organizations' is the list of organizations that have already been registered. If you belong to one of the listed Organizations, then please contact the admin to be added to that Organization.

The admin is the person who first created the Organization, admins can manage the users linked to an Organization, and add new users. If you are the admin for an Organization, under 'Your Organizations' click '**MANAGE USERS**'. A list of registered users linked to the Organization will appear. To add someone to the Organization click '**NEW USER**' in the top right, add their email address to the box and select whether they are a 'User' or 'Admin' within the Organization.



The screenshot shows a web form for adding a new user. At the top left, there is a link labeled '← Back to users'. Below it is a label 'New user's email address \*' followed by a text input field. Underneath the input field is a label 'Role \*' with two radio button options: 'User' (which is selected) and 'Admin'. At the bottom of the form, there is a note: 'Only users that have signed up can be added to organizations.' In the bottom right corner, there are two buttons: 'CANCEL' and 'SUBMIT'.

## Create a Landscape

The spatial structure of the MRTT is divided into 'Landscapes' and 'Sites'. Within the MRTT, a landscape is defined as the entire area for a project, which may be made up of one or more sites. Each site will need to be added to an existing landscape or a new landscape will need to be created.

After creating your user profile and adding your profile to an 'Organization' you will first need to create a landscape that your restoration project sites will be linked to, or add your site to an existing landscape. You will only be able to see the landscapes that belong to your Organization(s). To create a landscape, click on the 'Landscapes' tab on the left-hand side of the screen. Then click on the '**NEW LANDSCAPE**' button on the top right of the screen.



You can then enter the name of your Landscape and select the Organization it belongs to from those linked to your user profile. You can add any of the Organizations that you are a member of to the Landscape. If you need to add an Organization, that you are not currently a member of contact that Organization's admin.

Click **'SUBMIT'** to save the landscape.

## Create a Site

A site is defined as the area where the biophysical or community-based interventions took place. A site must always be linked to a Landscape, although there might only be a single site in a Landscape. To create a site, click on the 'Sites' tab on the left-hand side of the screen. Then click on the 'NEW SITE' button on the top right of the screen.

You can then enter the name of your Site and select the Landscape it belongs to from those linked to your user profile. Here you can also set the '[Default Data Privacy](#)' for the site data, which determines if the data from each form will be sharable or not (see below). Click **'SUBMIT'** to save the Site.



**CREATE A SITE**

Site Name \*

Mida Creek

Landscape \*

Kenyan Coastal Restoration

Default Data Privacy \*

Public

Default Data Privacy determines if the data from each form will be sharable or not. Each form's privacy can be edited individually later. An exception is that Site Details and Location form is always set to public regardless of the default selected here.

CANCEL SUBMIT

The created site is then added to your user dashboard. Click on the site to access the **'SITE FORM OVERVIEW'** window.

## Data Sharing

We are committed to collaboration and working collectively to improve mangrove conservation outcomes. Through this we aim to build a community to support more effective mangrove restoration projects. Contributing data to the MRTT will help to support science-based restoration; however, we understand and value the need for data privacy. In the interests of collaboration, the approximate site location, name, and contact details (name and email) for all projects will be public on the GMW platform. In addition, the Global Mangrove Alliance Science Working Group will have access to the raw data, but this will only be presented as aggregated statistics to conduct large-scale mangrove restoration analyses without individual project sites being identifiable.

The MRTT allows you to select from a range of data sharing options which will determine how much of your data can be shared with other users via the GMW platform.

### The three data sharing options are:

- **Private** - All data submitted is private, except that entered in the Site Details and Location section, and is only available to other users if you choose to share it with them.
- **Hybrid** - Sections with sensitive results can be kept private, while other data is publicly viewable.
- **Public** - All data is fully available to the public.

### The privacy can be set in two locations:

1. The default privacy can be set on the 'Create a Site' screen (see above). This makes all sections of the MRTT either **Private** or **Public** (except the Site Details and Location section).
2. If you want to apply the **Hybrid** option, set the default to **Public** and for any sensitive sections the privacy can be set to **Private** individually. In the example the respondent has set all sections to **Public** (see above) except the Project Costs data, which has been made **Private** (see below).

## COSTS

Mida Creek

[← RETURN TO SITE FORM OVERVIEW](#) [← PREVIOUS SECTION](#) [NEXT SECTION >](#) PRIVATE [SAVE](#)

7.1 What type of support was provided for the project activities conducted at the site?

Monetary

Voluntary/Non-monetary

## Contact us

If you have any questions about the MRTT, how to complete the different sections or how we will use the data you provide please email: [contact@globalmangrovetwatch.org](mailto:contact@globalmangrovetwatch.org)



## Navigation

From the 'SITE FORM OVERVIEW' window you can access the different sections of the MRTT (see below). Clicking on an individual section goes to a window that allows you to enter the data for that section or edit the data already submitted.

**Mida Creek**  
KENYAN COASTAL RESTORATION

SETTINGS

REGISTRATION

- Site Details and Location
- Site Background
- Restoration Aims
- Causes of Decline
- Pre-Restoration Assessment

INTERVENTION

- Site Interventions
- Costs

MONITORING

ADD MONITORING SECTION ▾

Management Status and Effectiveness	2022-12-01
Ecological Status and Outcomes	2022-11-17
Socioeconomic and Governance Status and Outcomes	2022-09-13
Ecological Status and Outcomes	2015-08-05

DOWNLOAD SITE DATA

You can also navigate between sections or return to the 'SITE FORM OVERVIEW' at the top of each data entry window.

**SITE DETAILS AND LOCATION**

Mida Creek

← RETURN TO SITE FORM OVERVIEW   < PREVIOUS SECTION   NEXT SECTION >   PUBLIC ▾   SAVE

The 'SITE FORM OVERVIEW' allows you to enter data on the Registration and Intervention sections once. Monitoring data can be entered on Management Status and Effectiveness, Socioeconomic and Governance or Ecological Status and Outcomes and can be entered multiple times, every time a monitoring session is carried out.

## Saving Data

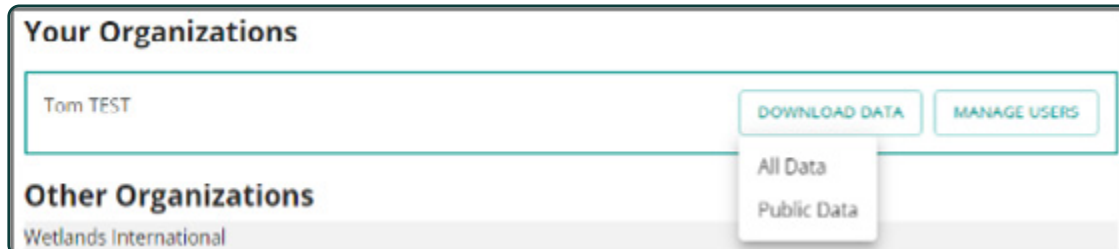
After completing the data entry for a section, it is very important to hit the 'SAVE' button in the top right corner, otherwise the data will be lost. Data that has been previously entered and saved can be edited by navigating to the required section in the 'SITE FORM OVERVIEW' window. Again, make sure to hit the 'SAVE' button to store any edits.

## Accessing Data

Users can download data on restoration projects from the MRTT at three locations within the tool.

### Organization Data

To download the data on all the sites you have created on the MRTT for a particular 'Organization' you are a member of, select 'DOWNLOAD DATA' from the 'ORGANIZATIONS' window of your USER DASHBOARD. You will be given the option to produce a spreadsheet containing all the data recorded for a site, or just that data that has been marked as 'Public' using the privacy settings. Whichever option you select a xlsx spreadsheet will be created that contains the responses to questions completed in the MRTT.



### Multiple Site Data

To download the data on all the sites you have created on the MRTT, select 'DOWNLOAD DATA' from the 'SITES' window of your USER DASHBOARD. You will be given the option to produce a spreadsheet containing all the data recorded for a site, or just that data that has been marked as 'Public' using the privacy settings. Whichever option you select a xlsx spreadsheet will be created that contains the responses to questions completed in the MRTT.

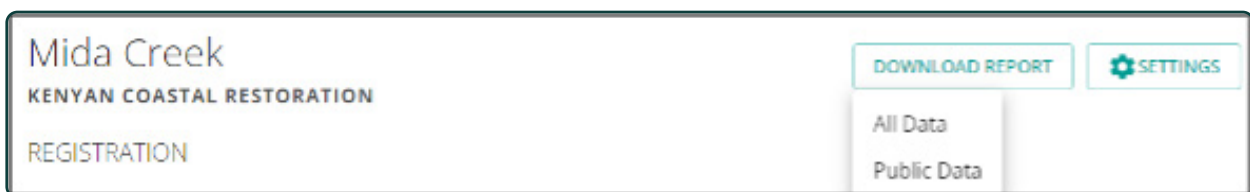


The screenshot shows a dashboard titled 'SITES'. In the top right corner, there are two buttons: 'DOWNLOAD DATA' and 'NEW SITE'. A dropdown menu is open under 'DOWNLOAD DATA', showing two options: 'All Data' and 'Public Data'. The main content area lists two sites:

- Mida Creek**  
KENYAN COASTAL RESTORATION
- Gazi Bay**  
KENYAN COASTAL RESTORATION  
Last updated: 15 May 2023

## Single Site Data

To download the data on an individual site, select 'DOWNLOAD REPORT' from the 'SITE FORM OVERVIEW' window. You will be given the option to produce a report containing all the data recorded for a site, or just that data that has been marked as 'Public' using the privacy settings. Whichever option you select a pdf will be created that contains the responses to questions completed in the MRTT.

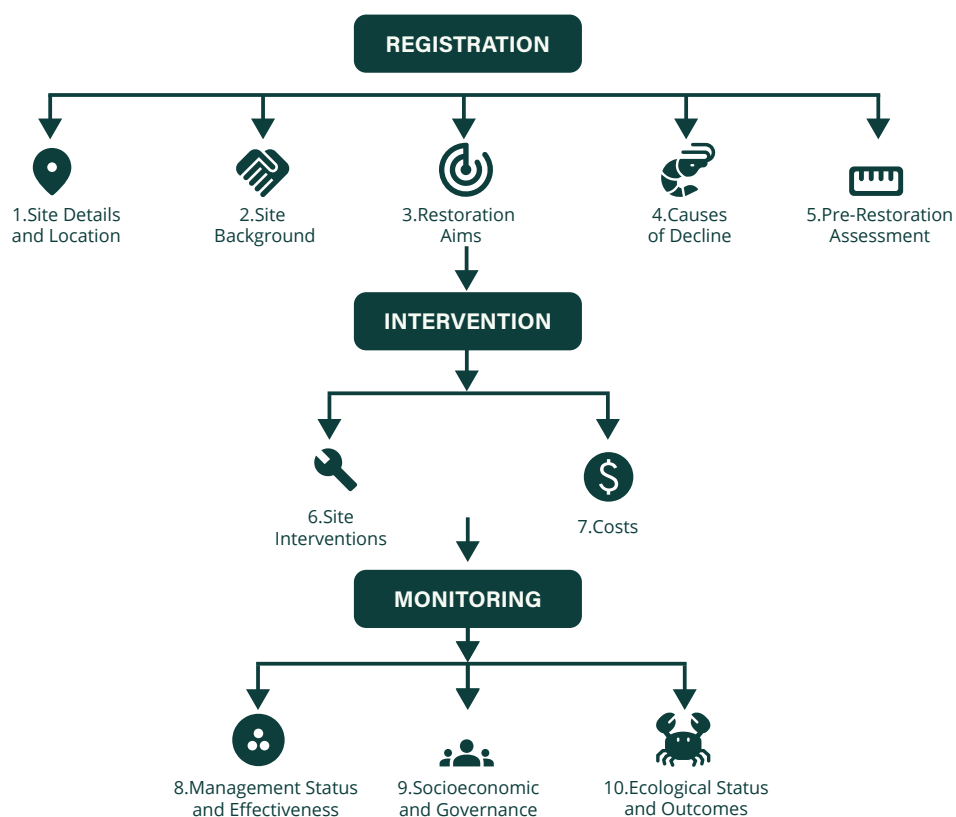


The screenshot shows the 'Mida Creek' site overview page. The title is 'Mida Creek' with the subtitle 'KENYAN COASTAL RESTORATION' and the section 'REGISTRATION'. In the top right corner, there are two buttons: 'DOWNLOAD REPORT' and 'SETTINGS'. A dropdown menu is open under 'DOWNLOAD REPORT', showing two options: 'All Data' and 'Public Data'.

# Structure of the MRTT

## Sections

The tool is divided into three overall sections, with 10 subsections that are as follows:



### Registration

1. Site Details and Location (Project start date/end date, country, site area)
2. Site Background (Stakeholders, management and protection status, governance, land tenure, customary rights)
3. Restoration Aims (Socio-economic, ecological and other aims)
4. Causes of Decline (Cause of mangrove loss, magnitude of the impact)
5. Pre-restoration assessment (Previous restoration efforts, mangrove species present, physical site measurements)

## Intervention

6. Site Interventions (Stakeholder involvement, biophysical interventions, species planted, training, community activities)
7. Costs (Finance mechanisms, funding, costs, expenditure, in kind contributions)

## Monitoring

8. Management Status and Effectiveness (Stakeholder management, management status, protection status, finance for management, capacity for enforcement, benefit sharing)
9. Socioeconomic and Governance (Governance of the site, land ownership, tenure arrangement, socioeconomic outcomes)
10. Ecological Status and Outcomes (Stakeholder involvement, mangrove area/condition, natural regeneration, survival rate for planting, ecological outcomes)

## Linkages

The tool has been designed to be intuitive and cohesive for the user. In line with this approach there are several linkages between different sections of the tool. Examples of these are listed below:

- **Q3.1** and **Q3.2** are auto populated with the stakeholder organisations and entities selected in **Q2.1**.
- **Q5.3e** and **Q6.2b** automatically sorts the list of mangrove species based on the country(s) selected in **Q1.2**.
- **Q9.4** asks the user to link the socioeconomic outcomes entered with the socioeconomic aims selected in **Q3.2**.
- **Q10.7** asks the user to link the ecological outcomes entered with the ecological aims selected in **Q3.2**.

In addition, the appearance of many questions is dependent on the responses to previous questions. For instance, questions **Q5.2a-c** detailing previous restoration efforts are only displayed if the answer to **Q5.2 Has mangrove restoration/rehabilitation been attempted at the site previously? is Yes.**

## Question Types

Icon

Question Type



This question requires a date input



This is a single choice question and users should select one answer from the options.



This is a single choice question where users can only select 'Yes' or 'No'



This is a multiple-choice question and users should select all options that apply.



This question requires a text input



This question requires a year input



This question requires data input into a table



This question requires a numerical input

## Data Entry

The data captured in the MRTT is split across 10 subsections. The tool is not intended to replace detailed field data collection, but instead represents an overview of the information needed to record a mangrove restoration project. This will allow comparison between projects that use different interventions or are undertaken in different regions. The aim is that the data required in the MRTT would already have been collected without the need to go out and collect further field data. Where the answer to a specific question is unknown, users are asked to either select that option or leave the question blank.

## Registration

### Section 1 - Site Details and Location

Included in this section is key background information on the project such as its duration, start and end dates, the country(s) the restoration is taking place in, and the location and extent of the site. Capturing the accurate location and extent of an intervention site provides an opportunity to monitor key indicators using high-resolution remote sensing, potentially reducing the need for labour and cost-intensive field-based monitoring. To accurately capture the site area in the tool, the user can draw a polygon on satellite imagery or upload a geospatial data file of the site area.

#### Q1.1a\* Project start date

Enter the date when project planning started. If the exact date is unknown, please put the 1<sup>st</sup> of January of the start year.



#### Q1.1b\* Does the project have an end date?

This refers to the date of the end of the intervention (not long-term monitoring or formal protection). Please select **Yes** if the interventions have been completed or if you know the expected date that the interventions will be finished.



Please select **No** for actions that are ongoing and have no definitive end date.

#### Q1.1c\* Project end date

If **Yes** has been selected in **Q1.1b** then please enter the date here. If further funds are being sought to extend the activities, please use the end date of the current funding.



### Q1.2 \* What country/countries is the site located in?

You can select one or more countries where mangroves are present from a dropdown list. You can also type in the name, which will search the country list.

A screenshot of a web form titled "1.2 What country/countries is the site located in? \*". Below the title is a search input field with the placeholder text "Country". The field contains the text "Ban" and a small downward arrow on the right. Below the input field, a dropdown menu is open, showing the option "Bangladesh".

*Example: The user searches for Bangladesh within the country list*

### Q1.3 \* What is the overall site area?

The site area refers to the area of the biophysical restoration activities (e.g., hydrological reconnection or mangrove planting) and not any activities in the surrounding communities.

The map will automatically zoom into the country selected in Q1.2. If more than one country is selected, the map will zoom into the extent of all of the countries.

To draw the site area, select the polygon tool on the top left corner on the map and then select the points of the site area on the map. Please try and accurately record the boundary of the restoration site. More than one polygon can be drawn. If an error is made, you can select the polygon and then click on the dustbin icon on the top left corner of the map. This will delete the entire selected polygon and then it can be drawn again.





Example: The user draws a polygon around the area to be restored

## Map Controls



Draw a polygon



Zoom out of the current view



Delete the current polygon outline



Reset the map to a north/south axis



Zoom in on the current view

You can also upload a file of the geometry of the site area. To add a file, click or drag and drop a file on the box indicated below.

Accepted file formats are geojson, KML and shapefile. Shapefiles must be provided as a .zip folder containing the minimum set of shapefile files (.shp, .shx and .dbf). Only polygon geometry from uploaded files will be included, lines and points will be ignored. If a file is uploaded the polygons can also be edited afterwards.

Draw the site area on the map or upload from file. Uploaded geometry can be edited. Only polygon geometry from uploaded files will be included. Lines and points will be ignored.

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Click or drag and drop a file here. Accepted formats are geojson, KML and shapefile. Shapefiles must be provided as a .zip file containing the minimum set of shapefile files (.shp, .shx and .dbf).

\*This is a required question, and you will not be able to submit the data without selecting at least one option.

**Click 'Save' to store the data for this section.**

## Section 2 - Site Background

This section collects data on the project stakeholders as well as the level of protection, land tenure rights, and legal and management status of the site prior to the start of restoration interventions.

### Q2.1\* Which stakeholders are involved in the project activities?

The stakeholders are the organisations or entities that developed the project idea and are responsible for the planning, management and implementation. These are not the organisations or entities that carried out the biophysical interventions, community-based activities or were responsible for socioeconomic/ecological monitoring (these are captured in later subsections).

1+

Definitions of these stakeholder categories are available in [Appendix A](#)

Multiple stakeholders can be selected by ticking the box next to the stakeholder categories e.g., local or municipal government or international NGO. If a stakeholder belongs to more than one category, please select all that apply.

When a stakeholder category is selected a box will appear below. Where possible, please enter the name of the stakeholder organisation/ entity (e.g., Overseas government agencies - USAID) in the box. If the stakeholder can't be named, for example the local community, please leave the box empty.

The screenshot shows a form titled "2.1 Which stakeholders are involved in the project activities? \*". It contains a list of stakeholder categories with checkboxes. The following categories are checked:

- Local community representatives (with an empty "Name" input box below it)
- National, central or federal government (with an empty "Name" input box below it)
- Overseas government agencies

The following categories are not checked:

- Local leaders
- Indigenous peoples
- Traditionally marginalised or underrepresented groups
- Landowners/customary area owners
- Sub-national, regional or state government
- Local or municipal government

*Example: The user selects the stakeholders involved in the projects, they are unable to name the 'Local community representatives' or 'National, central or federal government' involved, but are able to name USAID as the 'Overseas government agency'*

## Q.2.2 What was the management status of the site immediately before the project started?

The management status here relates to the recognition of protection of an area, not the governance of the area. For example, a locally managed area with governance by local communities would be **'formally recognized at the national level'** if there was formal recognition/ acknowledgement of the existence of the area, with community governance by national or sub-national government.

**1**

### Options are:

**Protected informally at a local level:** The site is not designated within a state-, nationally- or internationally-recognized formal area-based conservation framework but is recognized as protected by local communities or indigenous peoples. This includes privately protected lands.

**Protection is formally recognized at the state/province/regional level:** The site is recognized as protected based on state, provincial or regional mechanisms.

**Protection is formally recognized at a national level:** The site is recognized as protected based on national or subnational state-recognized mechanisms e.g., National Nature Reserves, District Protected Areas.

**Protection is formally recognized at an international level:** The site is recognized under international mechanisms such as Ramsar, UNESCO World Heritage Sites or Biosphere Reserves, or regional area protection conventions.

**None:** The site is not covered within an area-based conservation framework whether formally or informally.

**Unknown:** The management status for the site was not recorded or was not known.

### Q2.3 Are management activities at the site recognized in statutory or customary laws?

Definitions of the key terms:

**Statutory** laws are written laws made by the national government or other official governing bodies and are legally documented and enforced.

**Customary** law here refers to the 'locally recognised principles', practices and customs of indigenous peoples and local communities. These are well established informal rules of conduct that provide certain entitlements or obligations to those within its scope. Often orally held and transmitted.

**1**

2.3 Are management activities at the site recognized in statutory or customary laws?

Select

- Yes - statutory
- Yes - customary
- No
- Partially - statutory
- Partially - customary

*Example: The question allows users to select one option from a dropdown menu*

### Q2.4 Name of the formal management area the site is contained within (if relevant)?

If applicable, please write the name of the formal management area the site is contained within in the box.



## Q2.5 How would you describe the protection status of the site immediately before the project started?

If this has not been formally assessed, please estimate the protection status. If your mangrove restoration site is part of a larger managed area with multiple management types, please only record the management status of the restoration area itself.

**1**

### Options are:

**Full protection:** No extractive activities permitted.

**Partially protected:** Some extractive activities permitted.

**Sustainable use:** Most sustainable use activities are permitted e.g., fuel wood collection.

**No management:** The site has no known management status.

**Other:** A protection status not covered in the previous categories. Please provide details where possible.

## Q2.6 Are the stakeholders involved in project activities able to influence site management rules?

### Options are:

**Yes:** There are structures and mechanisms in place to account for stakeholders' perceptions and concerns.

**No:** There are no structures and mechanisms in place to account for stakeholders' perceptions and concerns.

**Partially:** There are some structures and mechanisms in place to account for stakeholders' perceptions and concerns.

**1**

## Q2.7 What best describes the governance arrangement of the site immediately before the project started?

Options are:

**Governance by government:** Federal or national ministry/agency in charge; sub-national ministry/agency in charge; government-delegated management (e.g., to an NGO).

**Shared governance:** Collaborative management (various degrees of influence); joint management (pluralist management board; transboundary management (various levels across international borders).

**Private governance:** By individual owner; by non-profit organisations (NGOs, universities, cooperatives); by for-profit organisations (individuals or corporate).

**Governance by indigenous peoples and local communities:** Indigenous peoples' conserved areas and territories; community conserved areas – declared and run by local communities.

**Mixed governance:** The site has different governance structures in different areas or at different times, or uses multiple governance structures simultaneously.

**None:** There was no governance arrangement for the site before the project activities started.

**Unknown:** The governance arrangement for the site was not recorded or was not known.

**Other:** A governance arrangement not covered in the previous categories. Please provide details where possible.



## Q2.8 What was the land tenure of the site immediately before the project started?

Land ownership (or tenure) refers to the set of rights that individuals or groups have over the land and the resources found within it.



### Options are:

**Private (individual or business):** Ownership refers to the formal or legal recognition of an individual or business over the rights to use and manage the land.

**Customary:** Ownership refers to the formal or informal set of use rights over the land of self-identified communities.

**Communal:** Ownership of land or other property by a community so that each member has a right to use the property or a portion of it.

**Government:** National/sub-national or local e.g., Protected Areas or public lands (or undocumented) that may not be protected.

**Unknown:** The land ownership of the site is not known or was not recorded.

**Other:** A land tenure not covered in the previous categories. Please provide details where possible.

## Q2.9 Are customary rights to land within the site recognised in national law?

Recognition to these customary rights can occur through formalisation (i.e., documenting, certifying, and registering) of certain aspects (e.g. boundaries of the area); transferring aspects of customary rights into the statutory system by writing them into law; or some combination of both.



### Definitions of the key terms:

**Partially:** Some rights are recognised but not the full 'bundle of rights' e.g., right to access resources, rights to use (for sale or subsistence), rights to manage the site, or right to exclude others from the site.

\* This is a required question, and you will not be able to submit the data without selecting at least one option.

Click 'Save' to store the data for this section.

## Section 3 - Restoration Aims

Given the multiple services and functions mangrove ecosystems support, the aims of mangrove restoration interventions are often multiple and varied. To this end, this section has divided the aims of the restoration project into three themed areas - ecological, socio-economic and other.

### Q3.1 \* What are the ecological aim(s) of the project activities at the site?

The ecological aims are organised into three themes: 1) those related specifically to mangroves, 2) those related to other biodiversity aims and 3) those related to ecological functions. Definitions of the ecological aims are provided in [Appendix B](#)

1+

If there were no ecological aims, select '**None**'

Once an aim is selected, the stakeholders selected in **Q2.1** will appear in a list below. The user is then asked to rank the importance (Primary aim, Co-benefits or Neither) of the ecological aims to each stakeholder using a drop-down selection.

**3.1 What are the ecological aim(s) of the project activities at the site? \***

Increase mangrove area

Please rank the importance of the aims to the stakeholders below.

Local community representatives  
Select  
Primary aims

National, central or federal government  
Select  
Neither

Overseas government agencies (USAID)  
Select  
Co-benefits

Improve mangrove condition/halt or reduce degradation

Increase mangrove species richness

Please rank the importance of the aims to the stakeholders below.

Local community representatives  
Select  
Co-benefits

National, central or federal government  
Select  
Primary aims

Overseas government agencies (USAID)  
Select  
Primary aims

*Example: The stakeholders identified in Q2.1 are added underneath the selected ecological aims and the user ranks the aims' importance to each stakeholder.*



Definitions of the key terms:

**Primary aims:** These are the focus of the project activities at the site and against which the outcomes of success will be measured. These aims are outlined in the site plan and project activities will be tailored to achieve them.

**Co-benefits:** These are potential co-benefits of the project activities at the site and they may be aspirational outcomes. The intervention will not be tailored to achieve these aims but there is some likelihood of their occurrence. There may or may not be monitoring of outcomes related to these aims.

**Neither:** These aims are not a focus for the stakeholder

### Q3.2 \* What are the socio-economic aim(s) of project activities at the site?

The socio-economic aims are organised into two themes: 1) those related to ecosystem services and 2) those related to social outcomes. This is a multiple-choice question and users should select all that apply. Definitions of the socio-economic aims are provided in [Appendix C](#)



If there were no socio-economic aims, select '**None**'

Once an aim is selected, the stakeholders selected in **Q2.1** will appear in a list below. The user is then asked to rank the importance (Primary aims, Co-benefits or Neither) of the socio-economic aims to each stakeholder using a drop-down selection.

Definition of the key terms: (see Q3.1 above)

### Q3.3 What are the other aim(s) of project activities at the site?

Definitions of the other aims are provided in [Appendix D](#)



Once an aim is selected, the stakeholders selected in **Q2.1** will appear in a list below. The user is then asked to rank the importance (Primary aim, Co-benefits or Neither) of the other aims to each stakeholder using a drop-down selection.

Definition of the key terms: (see Q3.1 above)

\* This is a required question, and you will not be able to submit the data without selecting at least one option.

Click 'Save' to store the data for this section.

## Section 4 - Causes of Decline

Understanding the causes of mangrove decline provides an indication as to where restoration actions could potentially be more effective. The assessment of the causes of loss/degradation has been framed around the IUCN's Threats Classification Scheme but tailored to the mangrove context. In addition, given the likelihood that the pressures at a site are multifaceted, users are provided with the opportunity to rank the magnitude of the identified pressures.

### Q4.1 Is the cause(s) of mangrove loss or degradation at the site known?

If **No** is selected, then you can click **Save** and proceed directly to **Section 5**. If **Yes** is selected proceed to **Q4.2**.

**Y/N**

### Q4.2 \* What were the major cause(s) of mangrove loss or degradation at the site?

Causes of loss/degradation are framed around the IUCN's Threats Classification Scheme<sup>1</sup> tailored to the mangrove context.

Once the causes have been selected in **Q4.2** then these will appear in **Q4.3** below.

**1+**

### Q4.3 Rate the magnitude of impact of the cause(s) of decline selected in the previous question, on mangrove loss and degradation

Users are asked to rate the magnitude of impact of the cause(s) of decline on mangrove loss and degradation identified in **Q4.2**. The term "magnitude" is used here in the sense of degree or size.

**1**

<sup>1</sup> <https://www.iucnredlist.org/resources/threat-classification-scheme>

4.3 Rate the magnitude of impact of the cause(s) of decline selected in the previous question, on mangrove loss and degradation - High, Moderate, Low

---

**BIOLOGICAL RESOURCE USE**  
LOGGING & WOOD HARVESTING  
Fuel wood collection  
Magnitude of impact \*  
Low

**POLLUTION**  
DOMESTIC & URBAN WASTE WATER  
Sewage  
Magnitude of impact \*  
Moderate

**AGRICULTURE & AQUACULTURE**  
MARINE & FRESHWATER AQUACULTURE  
Shrimp aquaculture  
Magnitude of impact \*  
High

**RESIDENTIAL & COMMERCIAL DEVELOPMENT**  
Housing & urban areas  
Magnitude of impact \*\*  
High

*Example: The user has selected four causes of mangrove loss or degradation and has ranked the magnitude of their impact.*

\*This is a required question, and you will not be able to submit the data without selecting at least one option.

Click 'Save' to store the data for this section.

## Section 5 - Pre-Restoration Assessment

Understanding the site's baseline conditions and dynamics of the mangrove ecosystem is critical in determining the most appropriate intervention. In addition, crucial lessons can be learned from previous unsuccessful interventions to ensure that future efforts are the most efficient and effective.

### Q5.1\* **Have mangroves naturally occurred at the site previously?**

This question asks if prior to the project activities whether the presence of mangroves was recorded at the site. This only refers to natural occurrences and does not include previous restoration/rehabilitation attempts.

**1**

### Q5.2\* **Has mangrove restoration/rehabilitation been attempted at the site previously?**

Have previous activities aimed at restoring/rehabilitating mangroves taken place at the site.

**1**

If **No** or **Unknown** is selected, then you can proceed directly to **Q5.3**. If **Yes** is selected then proceed to **Q5.2a**.

**5.2 Has mangrove restoration/rehabilitation been attempted at the site previously?**

Yes

**5.2a What year was restoration/rehabilitation last attempted at the site? \***

year

**5.2b What biophysical interventions were previously attempted at the site?**

- Restore hydrology - excavate channels
- Restore hydrology - remove or breach aquaculture pond walls
- Restore hydrology - clear channel blockages
- Restore hydrology - reconnection of upstream flows restricted by dams or road crossings.
- Trap sediments (e.g., fence barriers)
- Reduce wave energy (e.g., bamboo walls, offshore reefs, breakwaters)
- Reprofile and change the elevation of the soil, relative to sea level
- Activities to reduce salinity
- Exclusion fences
- Vegetation clearance and suppression
- Remove debris

*Example: The user identified that mangrove restoration has been attempted previously and therefore Q5.2a-c appear.*

**Q5.2a What year was restoration/rehabilitation last attempted at the site?**

If known, please enter the year that restoration/rehabilitation was last attempted at the site. If one or more restoration/rehabilitation activities have been attempted, enter the year the most recent activity finished.

1986

**Q5.2b\* What biophysical interventions were previously attempted at the site?**

Definitions of the biophysical interventions are provided in [Appendix E](#)

1+

### Q5.2c\* **If the last restoration/rehabilitation attempt was unsuccessful, please specify why this was the case?**

To the best of your knowledge, please identify the causes of the previous unsuccessful restoration/rehabilitation attempt.

1+

Definitions of the causes of unsuccessful restoration/rehabilitation are provided in [Appendix F](#)

### Q5.3\* **Was the site assessed before the current project activities were started?**

With regards to a site assessment, this refers to a formal assessment in terms of site physical measurements. This is only for the current project activities at the site rather than previous restoration efforts captured under **Q5.2a-c**.

1

If **No** or **Unknown** is selected, then you can proceed directly to **Q5.4**. If **Yes** is selected then you will proceed to **Q5.3a**.

### Q5.3a **How was the assessment undertaken?**

What form did this assessment take, both options can be selected.

1+

**Options are:**

**Field assessment:** Assessment based on direct field measurements.

**Remote assessment:** Assessment based on examining resources such as Google Earth, satellite imagery, or the Global Mangrove Watch platform.

### Q5.3b **Has the site been compared to a reference site?**

Users are asked to define whether a reference site was used to determine the structure, species and natural functioning (e.g., tidal elevations) of the site prior to disturbance. The reference site can take the form of site visits or photos of nearby/representative mangrove areas. The definition of a reference of an ecosystem is "a model characteristic of the particular ecosystem that informs the target of the restoration project."<sup>2</sup>

1

<sup>2</sup> Mcdonald, T., Gann, G. D., Jonson, J., and Dixon, K. W. (2016). International Standards for the Practice of Ecological Restoration – Including Principles and Key Concepts. Washington, DC: Society for Ecological Restoration. doi: 10.1111/rec.12359

### Q5.3c What year were mangroves lost from this site?

Users should estimate the year mangroves were last naturally occurring at site and enter the full year (e.g.,1992) into the box provided.

1986

### Q5.3d Is natural regeneration apparent at the site?

The user should consider before the project activities commenced were mangroves naturally returning to the site. This can be identified by newly established seedlings being present.

1

Options are:

**No:** Natural regeneration is not apparent.

**Mangroves have established:** The naturally regenerating mangroves have established on the site, but remain small and stunted.

**Mangroves have established and grown:** The naturally regenerating mangroves have established on the site and show signs of growth.

### Q5.3e What mangrove species were present at the site?

The mangrove species list will be sorted based on those species found in the country selected in **Q1.2** (with country specific species listed first).

1+

5.3e What mangrove species were present at the site?

- Acrostichum aureum*
- Acrostichum danaeifolium*
- Avicennia germinans*
- Avicennia schaueriana*
- Conocarpus erectus*
- Laguncularia racemosa*
- Rhizophora mangle*
- Acanthus ebracteatus*
- Acanthus ilicifolius*

*Example: The user selected Anguilla in Q1.2 therefore the mangrove species are sorted so the species found in Anguilla are at the top, with the other mangrove species below.*

### Q5.3f What was the species composition of mangroves at the site?

Of the species identified in **Q5.3e**, users should estimate the percentage composition of those species at the site. The percentages of all species should total 100%.

### Q5.3g What physical site measurements were taken?


This question refers to the physical site measurements that were recorded at the site prior to the restoration activities commencing.

Eight pre-defined parameters are given, users should enter a numerical value into the value box and the measurement unit is stated above.





5.3g What physical site measurements were taken?

Tidal range (cm) 

value

74

*Example: The user enters the site tidal range in centimeters.*

Users can also add rows to the table to provide alternative measurements. To enter additional measurements then users should click on **+Add Measurement Row**. Users should then enter the measurement type, numerical value and unit of measurement. Once completed then they should click on the **'Save'** button below to save the additional measurements

Measurement type

Value

Unit

type

Water temperature

value

23.2

unit

Celsius

SAVE CANCEL

*Example: The user enters the water temperature of the site in Celsius.*

#### Q5.4 Was a pilot/test intervention conducted?

Prior to commencing the full project activities was a pilot/test intervention undertaken to assess the best method for restoring/rehabilitating mangroves at the site.

1

#### Q5.5 Was external expertise or guidance consulted on how to best restore the site?

Prior to the project activities commencing at the site was external input sought to assess how best to restore the site.

1

Definition of the key terms

**External expertise:** This could take the form of formal restoration training courses or informal discussions with non-governmental organisation staff, government employees or research scientists.

**Written guidance:** This could take the form of consulting best practice documents or internet sources.

\* This is a required question, and you will not be able to submit the data without selecting at least one option.

Click 'Save' to store the data for this section.

# INTERVENTION

## Section 6 - Site Interventions

In order to understand which actions lead to successful outcomes in mangrove restoration, it is crucial to record the interventions undertaken. Users are asked to detail the actors that carried out the intervention, any training given, and what specific actions were taken, with further detail required for any planting activities.

### Q6.1 Which stakeholders undertook the project activities at the site?

These are the organisations or entities that carried out the biophysical interventions or other activities implemented to address the causes of decline at the site.



Definitions of the stakeholder categories are available in [Appendix A](#)

Respondents are asked to identify whether the participants were paid or voluntary.

#### Definitions of the key terms:

**Paid:** Participants are given monetary reimbursement for their time. This can be payment in-kind such as participants or their communities receiving benefits e.g., building a clinic as payment for their time

**Voluntary:** Participants take part without financial or in-kind benefits. Provision of food or drinks for participants would count as voluntary.

**6.1 Which stakeholders undertook the project activities at the site?**

---

Local community representatives

Local leaders

Indigenous peoples

select  
Paid ▼

*Example: The user identifies who carried out the project activities and that they were paid to take part.*

## Q6.2 \* What biophysical interventions were used to restore/rehabilitate the site?

Definitions of the biophysical interventions are provided in [Appendix E](#). If **None** is selected, then you can proceed directly to **Q6.3**.



### Q6.2a What was the duration of the biophysical interventions?

This question refers to the dates from the start to the end of all the biophysical interventions, but not socioeconomic activities. This is not inclusive of long-term monitoring. The end date may have already passed if the interventions have been completed or can be the expected date they will be finished.



### Q6.2b What mangrove species were used?

This question will appear if all or any of the following options were selected in **Q6.2**, 'Planting', 'Broadcast collected propagules onto an incoming tide' or 'Large scale broadcasting of propagules from the air or boats.'



There will be a list of mangrove species ordered with those species found in the country selected in **Q1.2** listed first.

When a species is selected further questions will appear below. The user is asked to provide the source of the seeds/propagules and/or seedlings as well as the number from that source.

#### Definitions of the key terms:

**Propagules:** The reproductive seed or fruit of the mangrove tree.

**Seedlings:** The sprouted propagule with developed root system.

**Collected from mangrove areas and/or riverbanks:** Mangrove fruits or seeds that have fallen to ground or into the water are collected and directly planted at the site.

**From a nursery:** Propagules, either bought or collected, are reared in a nursery and the resulting seedlings are planted.

**Transplanted - no roots and soil:** Seedlings are dug up, without roots or soil and planted at the site.

**Transplanted - with roots and soil:** Seedlings are dug up, with roots or soil and planted at the site.

6.2b What mangrove species were used?

*Acrostichum aureum*

*Acrostichum danae-folium*

*Avicennia germinans*

What was the source of seeds/propagules or seedlings?

Seedling

from a nursery ▾

Count

500

Propagule

collected from mangrove areas and/or riverbank ▾

Count

300

*Example: The user identifies that 500 seedlings sourced from a nursery were planted, as were 300 propagules collected from another mangrove area.*

### Q6.2c Were mangrove-associated species planted?

This question will appear if all or any of the following options were selected in **Q6.2**: 'Planting', 'Broadcast collected propagules onto an incoming tide' or 'Large scale broadcasting of propagules from the air or boats.'



Users should click on the *+Add Measurement Row* button. You are then asked to provide the species scientific name and enter the number of individuals planted, and whether they were sourced from the wild, from a nursery or both. Users are asked to identify the main purpose (if applicable) that the mangrove-associated species were planted for. Then click the *Save* button to save the data in **Q6.2c**.

### Q6.3 Did local participants receive restoration training?

This question asks whether individuals undertaking the physical interventions have received any mangrove restoration training. This can take the form of formal restoration training courses or informal discussions with non-governmental organisation staff, government employees or research scientists.

**1**

If **No** or **Unknown** is selected, then you can proceed directly to **Q6.4**.

If **Yes** is selected then **Q6.3a** will appear.

#### Q6.3a What type of organisations provided the restoration training?

Participants are asked to select the type of organisation(s) that provided the training

**1+**

Definitions of the stakeholder categories are available in [Appendix A](#)

#### Q6.4 \* **Were there other activities implemented to address the causes of decline at the site?**

Options are:



**Livelihood activities:** Activities centred on providing livelihood opportunities for the communities surrounding the site e.g. more efficient fish smoking devices, honey production.

**Securing tenure arrangement:** Helping to establish/communicate clear boundaries on who can access the site to exploit resources e.g., fishing, collecting timber or crabs.

**Management activities:** Activities centred on improving management of the site e.g., agreements to reduce livestock pressure at the site, monitoring and enforcement of the site

**Strengthening mangrove governance:** Activities centred on improving governance of the site e.g., capacity building of community natural resource management group or conflict resolution training; trust/relationship building, leadership training

**Environmental education:** Activities aimed at raising awareness of the value of mangroves and nature.

**Formal mangrove protection:** Developing policies to provide formal protection of the site.

**Training and capacity building:** Activities centred on providing training and capacity to local communities to manage and protect the site.

**None:** No other activities were carried out.

**Other:** An activity not covered in the previous categories. Please provide details where possible

\*This is a required question, and you will not be able to submit the data without selecting at least one option.

**Click 'Save' to store the data for this section.**

## Section 7 - Costs

Understanding the financial mechanisms used to support restoration projects is key to creating more effective projects in the future. Costs that are reported in the tool do not need to provide fine-scale detail and can be aggregated to ensure data privacy.

### Q7.1 What type of support was provided for the project activities conducted at the site?

Options are:

**Monetary:** Inputs of financial support from donors.

**Voluntary/Non-monetary:** Non-monetised or in-kind contributions such as volunteer labour, knowledge or expertise, donation or lending of equipment, gifts of land.

If the answer 'Monetary' is selected in **Q7.1**, then **Q7.2 - Q7.5a** will appear.

If the answer 'Voluntary/Non-monetary' is selected in **Q7.1**, then **Q7.6** will appear





## Q7.2 What is the main finance mechanism used to fund the project interventions at the site?

**Options are:**

1

**Grant based:** Grant based funding include official development assistant, private and corporate philanthropy, remittances, conservation trust funds.

**Debt/Equity:** Funding including microfinance or Village Savings and Loan Association groups, eco credit schemes, crowdfunding, conservation finance incubators, private equity, green bonds, nature bonds, debt for nature swaps.

**Market:** Market-based finance including conservation enterprises such as tourism business, corporate social responsibility contributions; voluntary carbon offsets e.g. payments for Blue Carbon.

**Fiscal:** Fiscal measures including direct government expenditure, fiscal transfers such as redistribution of tax revenues and government grants or subsidies.

**Risk management:** Risk management mechanisms including reef insurance, impact/pay for performance bonds and blended finance.

**Regulatory:** Regulatory measures including green taxes, access fees such as entrance fees to protected areas, permits, concessions e.g. fishing licences or tourist concessions, tradable resource use permits, fines and penalties, payments for ecosystem services or biodiversity offsets.

**Unknown:** Financial mechanisms are not known or were not recorded.

**Other:** A financial mechanisms not covered in the previous categories was used. Please provide details where possible.

## Q7.3 What funders provided monetary support?

Users are asked to identify the providers of monetary support to the project across its whole duration. Click 'Add Measurement Row' to enter data. Users are then asked to provide the name of the funder where possible, if the funder wishes to be anonymous, please use 'Funder1', 'Funder2' etc. Also select the type of funder from the dropdown list, definitions are available in [Appendix A](#).



If more than one organisation provided funding, please provide the approximate percentage split between funders. Click 'Save' to save the data for this question.

7.3 What funders provided monetary support?

Funder Name	<input type="text" value="WWF"/>
Funder Type	<input type="text" value="International or nat..."/>
Percentage	<input type="text" value="70"/>

*Example: The user identifies that 70% of the project funding came from WWF.*

#### Q7.4 What was the total cost of the project activities at the site?

Users are asked to provide the total cost of the project activities at the site. This incorporates all activities from planning through to long-term monitoring. If a start and end date for the project activities has been provided, please provide the total cost over the entire span of the project activities. Where an end date is not known or specified, please provide the total cost to date. Costs should be correct for the years they were incurred.



Users should enter a number value and then select the appropriate currency from the drop-down list. Costs should be entered as numerical values only, please do not include currency symbols.

## Q7.5 What was the breakdown of the costs of the project activities?

Where more information is available or shareable, users are asked to breakdown the total project cost into six broad categories. Costs should be entered as numerical values only, please do not include currency symbols.



### Options are:

**Project planning & management:** Including land purchases; feasibility and pilot studies; EIAs; project design; management staff costs; community engagement; project reporting.

**Biophysical intervention:** Including equipment purchased or rented; labour costs; consumables e.g., building material, fuel, food; nursery construction, propagules or seedlings.

**Community activities:** livelihood activities, capacity building, community activities, education and awareness raising.

**Site maintenance:** Including maintaining operation structures; re-planting vegetation; removal of invasive vegetation, wages of individuals maintaining the site.

**Monitoring:** Any monitoring of project outcomes, including ecological and socio-economic indicators; wages of individuals monitoring the site or training people in monitoring.

**Other costs:** Anything not covered in the previous categories.

## Q7.5a What was the approximate percentage split in expenditure between the different biophysical interventions and/or community activities?

If more than one type of intervention was identified in **Q6.2** and **Q6.4** then **Q7.5a** will appear. The interventions selected in those previous two questions will automatically appear in this question. Users are then asked to estimate the percentage of total expenditure for each type of intervention.



7.5a What was the approximate percentage split in expenditure between the different biophysical interventions and/or community activities?

Planting  
percentage  
20

Restore hydrology - clear channel blockages  
percentage  
80

Securing tenure arrangement  
percentage  
50

Strengthening mangrove governance  
percentage  
50

*Example: The user identifies that 80% of the funding for 'Biophysical intervention' was spent on restoring the hydrology, with 20% spent on planting. The funding for 'Community activities' was split equally between securing tenure agreements and strengthening governance.*

## Q7.6 What non-monetised contributions were made to the project activities at the site?

**Options are:**

**Volunteer labour:** Time volunteered to the project activities, can be at any point in the timeline such as labour for physical interventions or unpaid monitoring.

**Knowledge or expertise:** Providing knowledge or expertise to support the project e.g., where to restore or the most appropriate physical interventions.

**Equipment:** The gifting or lending of equipment or materials used to carry out or monitor the project activities.

**Land:** Gifting of the land on which all or part of the project is carried out.

**Unknown:** The non-monetised contributions for the project were not recorded or are not known.

**Other:** A non-monetised contributions not covered in the previous categories. Please provide details where possible.

1+

Click 'Save' to store the data for this section.

# MONITORING

## Section 8 - Management Status and Effectiveness

To improve management effectiveness and maximise the potential of restoration projects, we need to understand the strengths and weaknesses of their management structure and the threats that they face. The tool offers guidance to practitioners in the data that should be collected, and can provide an overview of management processes and their relationship to successful projects.

### Q8.1 What date was this management status and effectiveness assessment conducted?

Date for management status and effectiveness assessment being reported on.

Note, if the assessment was completed in a workshop setting or using the paper version of the tool this may be different from when the question responses are input into the online platform.



### Q8.2 Which stakeholders currently manage the site?

Users are asked to identify which stakeholders are recognized/ integrated into the formal management.

This refers to after the end of the biophysical interventions or the community activities implemented to address the causes of decline at the site.

Definitions of the stakeholder categories are available in [Appendix A](#)



### Q8.3 Are these stakeholders involved in the project activities able to influence management rules at the site?

Options are:

**Yes:** There are structures and mechanisms in place to account for stakeholder's perceptions and concerns.

**No:** There are no structures and mechanisms in place to account for stakeholder's perceptions and concerns.

**Partially:** There are some structures and mechanisms in place to account for stakeholder's perceptions and concerns.



#### Q8.4 Has any aspect of the management status of the site changed since the start of the project activities?

Users are asked to identify whether the responses to **Q2.2**, **Q2.3** and **Q2.4** from the Site Background have changed due to the project activities

If **No** is selected, then you can proceed directly to **Q8.5**. If **Yes** is selected then you will proceed to **Q8.4a**.



#### Q8.4a What is the current management status of the site?

The management status here relates to the recognition of protection of an area, not the governance of the area. For example, a locally managed area with governance by local communities would be '**formally recognized at the national level**' if there was formal recognition/ acknowledgement of the existence of the area, with community governance by national or sub-national government.



##### Options are:

**Protected informally at a local level:** The site is not designated within a state-, nationally- or internationally-recognized formal area-based conservation framework but is recognized as protected by local communities or indigenous peoples. This includes privately protected lands.

**Protection is formally recognized at the state/province/regional level:** The site is recognized as protected based on state, provincial or regional mechanisms.

**Protection is formally recognized at a national level:** The site is recognized as protected based on national or subnational state-recognized mechanisms e.g., National Nature Reserves, District Protected Areas.

**Protection is formally recognized at an international level:** The site is recognized under international mechanisms such as Ramsar, UNESCO World Heritage Sites or Biosphere Reserves, or regional area protection conventions.

**None:** The site is not covered within an area-based conservation framework whether formally or informally.

**Unknown:** The management status for the site was not recorded or was not known.

#### Q8.4b Are management activities at the site recognized in statutory or customary laws?

##### Definitions of the key terms:

**Statutory** laws are written laws made by the national government or other official governing bodies and are legally documented and enforced.

**Customary** law here refers to the 'locally recognised principles', practices and customs of indigenous peoples and local communities. These are well established informal rules of conduct that provide certain entitlements or obligations to those within its scope. Often orally held and transmitted.

1

#### Q8.4c Name of the formal management area the site is contained within (if relevant)?

If applicable, please write the name of the formal management area the site is contained within in the box.



#### Q8.5 Has the protected status of the site changed since the start of the project activities?

Users are asked to identify whether the response to **Q2.5** from the Site Background have changed due to the project activities

If **No** is selected, then you can proceed directly to **Q8.6**. If **Yes** is selected then you will proceed to **Q8.5a**.

Y/N

#### Q8.5a How would you currently describe the protection status of the site?

If this has not been formally assessed, please estimate the protection status. If your mangrove restoration site is part of a larger managed area with multiple management types, please only record the management status of the restoration area itself. If the restoration area includes multiple areas with differing management status, please select all that apply.

1

##### Definitions of the key terms:

**Full protection:** No extractive activities permitted.

**Partially protected:** Some extractive activities permitted.

**Sustainable use:** Most sustainable use activities are permitted e.g., fuel wood collection.

**No management:** The site has no known management status.

## Q8.6 What is the main finance mechanism used to fund ongoing site management?

### Options are:

**Grant based:** Grant based funding include official development assistant, private and corporate philanthropy, remittances, conservation trust funds.

**Debt/Equity:** Funding including microfinance or Village Savings and Loan Association groups, eco credit schemes, crowdfunding, conservation finance incubators, private equity, green bonds, nature bonds, debt for nature swaps.

**Market:** Market-based finance including conservation enterprises such as tourism business, corporate social responsibility contributions; voluntary carbon offsets e.g. payments for Blue Carbon.

**Fiscal:** Fiscal measures including direct government expenditure, fiscal transfers such as redistribution of tax revenues and government grants or subsidies.

**Risk management:** Risk management mechanisms including reef insurance, impact/pay for performance bonds and blended finance.

**Regulatory:** Regulatory measures including green taxes, access fees such as entrance fees to protected areas, permits, concessions e.g. fishing licences or tourist concessions, tradable resource use permits, fines and penalties, payments for ecosystem services or biodiversity offsets.

**Unknown:** Financial mechanisms are not known or were not recorded.

1

## Q8.7 Is the current budget or funds used to support on-going management activities at the site sufficient?

Users are asked whether the current budget is adequate to cover the full costs of the site (direct and indirect) and to ensure that the site is managed effectively and efficiently. This is not about the restoration intervention costs - but about long-term budget to support on-going work/protection of the restoration site e.g. for ongoing monitoring, community groups, continued support of alternative livelihoods etc.

1



**Q8.8 Do those responsible for on-going management at the site (e.g., staff, community associations, management groups) have sufficient capacity and resources to enforce the rules and regulations?**

Rules and regulations may not always be legal laws, and may include local rules and norms.

1

**Definitions of the key terms:**

**Capacity:** This is related to a person's ability: it could mean the necessary skill set(s) required for enforcement; it could also refer to level of authority e.g., legal capacity.

**Resources:** This could mean technical equipment, time, money, skills.

**No capacity for enforcement:** The skills, authority and resources needed to manage the site are minimal or absent.

**Partial enforcement:** There are major weaknesses that need to be addressed to ensure the proper functioning of the site.

**Adequate enforcement:** A minimum level of enforcement exists which allows the functioning of the site but there are some gaps/weaknesses that need to be addressed to ensure its sustainability into the future.

**Fully enforce:** An adequate level of enforcement exists which allows the functioning of the site and there are no significant (negligible) gaps/weaknesses that cannot affect its sustainability into the future.

**Q8.9 Is there an effective strategy or approach for ensuring benefits from the site are shared equitably among local stakeholders?**

Benefits apply to any goods or advantages that occur as a result of mangrove restoration that offset any associated costs.

1

**Q8.10 Is the site consciously managed to adapt to climate change?**

Consciously managed to adapt to climate change means that decision-making for the site specifically considers information sources on climate change to address or adaptively manage the site for benefits for biodiversity or people under climate-change.

1

Click 'Save' to store the data for this section.

## Section 9 - Socioeconomic and Governance Status and Outcomes

The good governance of restoration sites has the potential to make a positive difference to the outcome of the project and the local communities. Ensuring that decision-making processes are inclusive, and benefits are shared equitably is key to the support and long-term sustainability of restoration projects. The tool allows for these factors to be monitored and assessed over time, enabling the importance of these outcomes in restoration projects to be appraised at both a local and global level.

### Q9.1\* **What date was this socioeconomic and governance status and outcomes assessment conducted?**

Date for socioeconomic and governance status and outcomes assessment being reported on.



Note, if the assessment was completed in a workshop setting or using the paper version of the tool this may be different from when the question responses are input into the online platform.

### Q9.2 **Has the governance arrangement of the site changed since the start of the project activities?**

Users are asked to identify whether the response to **Q2.7** from the Site Background have changed due to the project activities



If **No** is selected, then you can proceed directly to **Q9.3**. If **Yes** is selected then you will proceed to **Q9.2a**.

### Q9.2a What best describes the current governance arrangement of the site?

Options are:

**Governance by government:** Federal or national ministry/agency in charge; sub-national ministry/agency in charge; government-delegated management (e.g., to NGO).

**Shared governance:** Collaborative management (various degrees of influence); joint management (pluralist management board; transboundary management (various levels across international borders).

**Private governance:** By individual owner; by non-profit organisations (NGOs, universities, cooperatives); by for-profit organisations (individuals or corporate).

**Governance by indigenous peoples and local communities:** Indigenous peoples' conserved areas and territories; community conserved areas – declared and run by local communities.

**Mixed governance:** The site has different governance structures in different areas or at different times, or uses multiple governance structures simultaneously.

**None:** There was no governance arrangement for the site before the project activities started.

**Unknown:** The governance arrangement for the site was not recorded or was not known.

1+

### Q9.3 Has the tenure arrangement of the site changed since the start of the project activities?

Users are asked to identify whether the responses to Q2.8 and Q2.9 from the Site Background have changed due to the project activities

If **No** is selected, then you can proceed directly to Q9.4. If **Yes** is selected then you will proceed to Q9.3a.

Y/N

### Q9.3a What is the current land ownership of the site?

Land ownership (or tenure) refers to the set of rights that individuals or groups have over the land and the resources found within it. There are different types of land ownership, descriptions of the most common are provided below.

1+

**Options are:**

**Private (individual or business):** Ownership refers to the formal or legal recognition of an individual or business over the rights to use and manage the land.

**Customary:** Ownership refers to the formal or informal set of use rights over the land of self-identified communities.

**Communal:** Ownership of land or other property by a community so that each member has a right to use the property or a portion of it.

**Government:** National/sub-national or local e.g., Protected Areas or public lands (or undocumented) that may not be protected.

**Unknown:** The land ownership of the site is not known or was not recorded.

**Other:** A land tenure not covered in the previous categories. Please provide details where possible.

### Q9.3b Are customary rights to land within the site recognised in national law?

Recognition to these customary rights can occur through formalisation (i.e., documenting, certifying, and registering) of certain aspects (e.g., boundaries of the area); transferring aspects of customary rights into the statutory system by writing them into law; or some combination of both.

1

**Definitions of the key terms:**

**Partially:** Some rights are recognised but not the full 'bundle of rights' e.g., right to access resources, rights to use (for sale or subsistence), rights to manage the site, or right to exclude others from the site.

### Q9.4 What were the socioeconomic outcomes of the project activities at the site?

Users are asked to select the socioeconomic outcomes that have been assessed for the project from a range of options.

1+

Once the outcomes have been selected in Q9.4 then these will appear in Q9.4a below.

### Q9.4a Please fill in the measurement data for the selected socioeconomic outcomes

For the selected socioeconomic outcomes users are asked to identify whether the change in the outcome was 'Observed' or based on 'Quantitative' data.



For 'Observed' outcomes, the user can select the trend in that outcome as either 'Positive', 'Stable' or 'Negative'.

Users are then asked whether the observed outcome is related to one of the socio-economic aims of project activities from Q3.2.

**9.4a Please fill in the measurement data for the selected socioeconomic outcomes.**

---

Employment rates

Type Type  
Observed ▼

Trend Trend  
Positive ▼

Link outcome to aims

- Improve water quality
- Coastal storm or flood protection
- Provide sustainable timber resources
- Increase food security
- Not applicable

*Example: The user selects 'Employment rates' as the socioeconomic outcome. Changes in the outcome were 'Observed' and there was an increase in the indicator. The outcome provides information to the project aim of providing sustainable timber resources.*

*For outcomes based on 'Quantitative' data, users are asked to provide a measurement for the current value of that outcome and the unit of that measurement. Users can identify whether data was collected to quantify changes in the indicator relative to a baseline.*

*Users are then asked whether the observed outcome is related to one of the socio-economic aims of project activities from **Q3.2**.*

9.4a Please fill the measurement data for the selected socioeconomic outcomes.

Life expectancy

Type

Measurement

Unit

Comparison

Value

Link outcome to aims

Improve water quality

Coastal storm or flood protection

Provide sustainable timber resources

Increase food security

Not applicable

*Example: For a second socioeconomic outcome, the user selects 'Life expectancy'. Changes in the life expectancy were 'based on 'Quantitative' data. The post project life expectancy in years was 75 relative to 72 before the project started. The outcome provides information to the project aim of increasing food security.*

Definitions of the key terms:

#### Type

**Observed:** Changes in the socioeconomic indicators were apparent at the site but not measured.

**Quantitative:** Changes in the socioeconomic indicators were measured or modelled. Users are asked to input the site average values rather than raw data.

#### Trend

**Positive:** There has been an improvement in the indicator e.g., increasing fish catches, reducing death rates.

**Stable:** No observed change in indicator

**Negative:** There has been a worsening of the indicator e.g., increasing pollution, reducing employment.

**None:** No baseline data collected,

#### Comparison

**Before Measurement:** Data were collected at the site prior to the project activities.

**Comparison Site:** An unimpacted area was used as a comparison.

**Literature Value:** Comparison value extracted from published or grey literature.

**International Standard:** Comparison value from international standard.

**Q9.5 To what extent do you feel the socio-economic aims have been achieved?**

Response is a personal judgement, which may be supported by data where this is available. Socio-economic aims include social impacts on human well-being and livelihoods of local stakeholders.

1

**Definitions of the key terms:**

**Partially:** Outcomes are not sufficient to meet the socio-economic aims.

**Mostly:** Outcomes are sufficient enough to meet some key socio-economic aims.

**Fully:** Outcomes are sufficient to meet all key socio-economic aims.

\* This is a required question, and you will not be able to submit the data without selecting at least one option.

Click 'Save' to store the data for this section.

## Section 10 - Ecological Status and Outcomes

Mangrove restoration projects have the potential to support many different species of plants and animals. Monitoring ecological responses to restoration over relevant time periods is critical to understanding what interventions are successful. The tool allows users to capture changes in the extent and condition of mangroves within the project site, as well as capturing trends in a range of ecological metrics.

### Q10.1\* **What were the dates of the ecological monitoring being reported on?**

Ecological monitoring data can be recorded for multiple monitoring events (e.g., after 6 months, after 1 year, after 2 years post-project activities). Please record the dates of the most recent ecological monitoring.



Note, if the assessment was completed in a workshop setting or if using the paper version of the tool this may be different from a later date when the question responses are input into the online platform.

### Q10.2 **Which stakeholders carried out the ecological monitoring?**

These are the organisations or entities that carried out the ecological monitoring.



Definitions of the stakeholder categories are available in Appendix A

Respondents are asked to identify whether the participants were paid or voluntary.

#### **Definitions of the key terms:**

**Paid:** Participants are given monetary reimbursement for their time. This can be payment in-kind such as participants or their communities receiving benefits e.g., building a clinic as payment for their time

**Voluntary:** Participants take part without financial or in-kind benefits. Provision of food or drinks for participants would count as voluntary.



### Q10.3 Was there an increase in mangrove area?

**Options are:**

**Yes:** Monitoring data show that the mangrove area has increased.

**No:** Monitoring data show that the mangrove area has not increased.

**Unknown:** Increasing mangrove area was not the focus of the project, or mangrove area was not recorded.

If **Unknown** is selected, then you can proceed directly to **Q10.4**. If **Yes** or **No** is selected, then you will proceed to **Q10.3a**.



### Q10.3a What was the mangrove area pre- and post-restoration activities at the site?

Users are asked to provide the area of mangrove at the site pre-project activities and the unit of measurement (m<sup>2</sup>, km<sup>2</sup>, hectares or other specified unit) and the area of mangrove and unit post-project activities.



### Q10.4 Was there an improvement in mangrove condition?

**Options are:**

**Yes:** Monitoring data show or expert opinion suggests that the physical condition of the mangrove area has improved.

**No:** Monitoring data show or expert opinion suggests that the physical condition of the mangrove area has not improved.

**Unknown:** Improving mangrove condition was not the focus of the project, or mangrove condition was not recorded.



### Q10.5 **Is natural regeneration apparent, with mangroves establishing at the site?**

Following the project activities, are mangroves naturally returning to the site. This can be identified by newly established seedlings being present. This does not include planted mangrove propagules or seedlings.

1

#### **Options are:**

**No:** Natural regeneration is not apparent.

**Mangroves have established:** The naturally regenerating mangroves have established on the site, but remain small and stunted.

**Mangroves have established and grown:** The naturally regenerating mangroves have established on the site and show signs of growth.

### Q10.6 **What was the percentage survival of the planted mangrove seedlings or propagules?**

This question will appear if 'Planting' was selected in **Q6.2**

Users are asked to provide the percentage survival of the planted mangrove propagules and/or seedlings. If multiple planting efforts have been undertaken, for example if dead seedlings are replaced with new seedlings, please provide the percentage of all the material planted.

2  
13

#### Q10.6a **If survival was low, is the cause known?**

This question will appear if 'Planting' was selected in **Q6.2**

To the best of your knowledge, please identify the causes of the unsuccessful planting attempt.

Definitions of the causes of unsuccessful restoration/rehabilitation are provided in Appendix F

1+

## Q10.7 What mangrove ecological outcomes were monitored?

Users are asked to select the ecological outcomes that have been assessed for the project from a range of options.

Once the outcomes have been selected in **Q10.7** then these will appear in **Q10.7a** below.



## Q10.7a Please fill in the measurement data for the selected ecological outcomes.

Outcomes are based on quantitative data, and users are asked to provide a measurement for the current value of that outcome and the unit of that measurement. Users can identify whether data was collected to quantify changes in the indicator relative to a baseline.

Users are then asked whether the observed outcome is related to one of the ecological aims of project activities from **Q3.1**.



### Definitions of the key terms:

**None:** No baseline data collected,

**Before Measurement:** Data were collected at the site prior to the project activities.

**Comparison Site:** An unimpacted area was used as a comparison.

**Literature Value:** Comparison value extracted from published or grey literature.

**International Standard:** Comparison value from international standard.

10.7a Please fill the measurement data for the selected ecological outcomes.

**SPECIES COMPOSITION: FAUNA**

FISH: SPECIES RICHNESS

Measurement: 56

Unit: Number of species

Comparison: Comparison Site

Measurement - Comparison: 52

Link outcome to aims

Increase mangrove area

Increase mangrove species richness

*Example: The user selects 'Fish: Species Richness' as the ecological outcome. 56 fish species were recorded within the project site, compared to 52 fish species at a comparison site. The outcome is not linked to either of the ecological aims.*

### Q10.8 To what extent do you feel the ecological aims have been achieved?

Response is a personal judgement, which may be supported by data where this is available.

1

#### Definitions of the key terms:

**Were not:** There are no notable ecological outcomes.

**Partially:** Outcomes are not sufficient to meet the ecological aims.

**Mostly:** Outcomes are sufficient enough to meet some key ecological aims.

**Fully:** Outcomes are sufficient to meet all key ecological aims.

\*This is a required question, and you will not be able to submit the data without selecting at least one option.

Click 'Save' to store the data for this section.

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# Appendices

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## Appendix A - Definitions for stakeholder organisations and entities

**Local community representatives:** Representatives of any formally constituted locally based group.

**Local leaders:** Leaders within a community who have the ability to influence the people living there (e.g., mayors, religious leaders, business leaders and other well-known community figures).

**Indigenous peoples:** Distinct social and cultural groups that share collective ancestral ties to the lands and natural resources where they live, occupy or from which they have been displaced.<sup>3</sup>

**Traditionally marginalised groups:** Groups who have been denied access and/or suffered past institutional discrimination (including those of race, ethnicity, sexual orientation, socioeconomic status etc.).

**Landowners/customary area owners:** Individuals or groups that have ownership of the site, these sites are often owned by communities and administered in accordance with their customs.

**National, central or federal government:** The government of the nation in which the project is taking place.

**Sub-national, regional or state government:** Government operating at a sub-national (below national), regional or state level.

**Local or municipal government:** Lowest tiers of public administration within a particular country, specifically a level of administration that is both geographically-localised and has limited powers.

**Overseas government agencies:** Any foreign government or agency of a foreign government e.g., USAID, DANIDA, IKI.

**Intergovernmental agencies:** An entity created by treaty, involving two or more nations, to work on issues of common interest (e.g., development banks, European Union, United Nations, World Bank, World Health Organisation).

**Community based organisations, associations or cooperatives:** Formal or informal groups including women's groups, men's groups, youth/school groups, religious groups, conservation groups, fisheries cooperatives.

**Industry/Private sector:** Groups of organisations that are run for profit and are not controlled by the state.

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<sup>3</sup> <https://www.worldbank.org/en/topic/indigenouspeoples>

**Academic institute or research facility:** Accredited institutions (colleges, universities or other educational institutions) of higher learning or an establishment founded for the purpose of research.

**Ecotourists:** Tourists who travel to natural areas that conserve the environment, sustains the well-being of the local people, and involves interpretation and education.

**Unknown:** The stakeholders for the project were not recorded or are not known.

## Appendix B - Definition of ecological aims

**Increase mangrove area:** Increase the area of mangrove within the site relative to the pre-intervention level.

**Improve mangrove condition/halt or reduce degradation:** Reduce the number of degraded, stunted or damaged mangrove trees at the site.

**Increase mangrove species richness:** Increase the number of mangrove species found at the site.

**Offset mangrove loss from another area:** Establish mangroves or increase mangrove cover in one location to offset losses due to development in another location.

**Habitat protection:** Protection of the site from loss or degradation through application of an area-based management status or other mechanisms.

**Increase native fauna/wildlife:** Increase the richness, diversity or density of native fauna/wildlife at the site.

**Increase native flora/vegetation (non-mangrove):** Increase the richness, diversity or density of vegetation other than mangrove tree species at the site.

**Reduce invasive species:** Remove or reduce the density of invasive organisms.

**Increase ecological resilience:** Increase the capacity for the site to respond to disturbance or perturbations.

**Increase habitat connectivity:** Link mangrove areas or provide habitat corridors for movement of species.

**Restore hydrological connectivity:** Increase the duration, frequency or magnitude of salt or freshwater inundation at the site.

**Improve sediment dynamics:** Increase the capture of sediment on eroding coastlines or reconnect sediment flows from upstream sources.

**Improve nutrient cycling:** Increase the movement of inorganic and organic matter.

**Increase carbon storage and sequestration:** Increase carbon storage and sequestration through re-establishing aboveground biomass or restoring soil carbon stocks.

**None:** There were no ecological aims for the project activities at the site.

**Unknown:** The ecological aims for the project were not recorded or are not known.

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## Appendix C - Definition of socio-economic aims

**Enhance fisheries/restore fishing grounds:** Mangrove habitat restoration aimed at providing nursery/feeding habitats to increase fish numbers/diversity, particularly linked to small-scale fishers. This includes fisheries for finfish, shells, molluscs and crabs.

**Provide sustainable timber resources:** Mangrove forests restored/rehabilitated to provide timber for building, fuelwood or charcoal.

**Provide sustainable non-timber products:** Mangrove forest habitat restored/rehabilitated as a source of non-timber products e.g., honey, mangrove fruits, tannins. Includes mangrove agroforestry.

**Improve water quality:** Mangroves restored/rehabilitated to act as a filtration system to reduce pollution and improve water quality.

**Prevent or ameliorate pollution:** Reduce pollution inputs to the site or remove waste products (more focussed on solid waste removal than previous option).

**Coastal storm or flood protection:** Mangrove restoration/rehabilitation as a barrier to reduce the impact of coastal storms, including hurricanes or cyclones, or flooding.

**Erosion control or coastal stability:** Mangroves used to stabilise eroding shorelines.

**Carbon offsets/trading:** Site restored/rehabilitated to be included in a carbon offsetting/trading scheme.

**Tourism and recreation:** To develop new areas for tourism and recreation e.g., walking, kayaking, wildlife watching.

**Land reclamation:** Mangrove restoration/rehabilitation to create new areas of land.

**Generate employment and income:** Mangrove restoration/rehabilitation focused on employment or income generation for local communities, particularly the identification of enterprises that can expand income generation (less specific than following options).

**Promote women's equal representation and participation in employment:** Activities aimed specifically at promoting gender equality or increasing women's employment.

**Safeguard cultural or spiritual importance:** Safeguard areas of cultural or spiritual value to indigenous peoples or local communities.

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**Safeguard traditional practises:** Safeguard the traditional practises of indigenous peoples or local communities e.g., extraction of resources.

**Increase food security:** Restore/rehabilitate mangrove areas as a means of increasing food security for indigenous peoples or local communities (less specific than above examples).

**Secure management rights and land tenure:** Support local natural resource management institutions to have secure management authority and tenure rights that are recognised by the local community and higher level government authorities.

**Improve local community health:** Provide access to healthcare facilities or medicine for local communities.

**Coastal beautification or aesthetic value:** To restore or rehabilitate the natural appearance of the coastline for its aesthetic appeal.

**Support local community natural resource management institutions:** Help to strengthen or build capacity of natural resource management institutions to engage in mangrove governance.

**Encourage community involvement:** Encourage community participation in environmental stewardship and protection, particularly for more vulnerable and marginalised groups that are directly affected by restoration activities.

**Education/raise environmental awareness:** Mangrove restoration as a tool to support environmental education or raise awareness of environmental issues.

**Sustainable financing:** Help to secure sustainable financing to support mangrove management activities once the project is complete.

**None:** There were no socio-economic aims of the project activities at the site.

**Unknown:** The socio-economic aims for the project were not recorded or are not known.



## Appendix D - Definition of other aims

**Have site designated as a protected area:** Include restored areas within a formally recognised protected area.

**Meet international commitments/national targets:** Restore areas as part of international commitments/national targets to increase mangrove/forest area e.g., Bonn Challenge, Nationally Determined Contributions (NDCs).

**Influence government policy:** Safeguard mangrove status more widely through policy mechanisms.

**Improve restoration techniques:** Assess different restoration techniques to improve restoration success.

**Answer scientific research questions:** Assess research questions such as mangrove ecosystem functioning, carbon storage, or human uses of mangroves.

**None:** There were no other aims of the project activities at the site.

## Appendix E - Definition of biophysical interventions

**Restore hydrology - excavate channels:** The topography of the site may not allow hydrological connectivity therefore tidal creeks/channels are dug to allow water to access and move across the site.

**Restore hydrology - remove or breach aquaculture pond walls:** Aquaculture pond walls stop the natural flow of tidal water; strategic breaching or removal of the walls can restore tidal connectivity.

**Restore hydrology - clear channel blockages:** Channels may have become blocked due to debris or sediment, the removal of which can aid hydrological connectivity.

**Restore hydrology - reconnection of upstream flows restricted by dams or road crossings:** Flows into and across the site may have been disconnected by dams or roads crossings; hydrological connectivity can be re-established by removing them or installing/widening culverts.

**Trap sediments (e.g., fence barriers):** Permeable structures made of bamboo or brushwood installed to reduce wave energy and allow sediment to be trapped behind the structure.

**Reduce wave energy (e.g., bamboo walls, offshore reefs, breakwaters):** Structures made of bamboo, rock or other material are placed in front of the site to reduce wave energy and allow regenerating or planted seedlings to become established.

**Reprofile and change the elevation of the soil, relative to sea level:** Previous land uses or sedimentation from catchment processes (e.g., farming) may have changed the topography of the site relative to the tidal range, therefore soil is reprofiled (either lowered or raised) to match tidal inundation.

**Activities to reduce salinity:** Salinity reduced at the site through activities such as reconnecting groundwater inputs.

**Exclusion fences:** Fencing used to reduce impact of grazing animals that may eat or damage regenerating or planted seedlings or demark the site as being protected for restoration.

**Vegetation clearance and suppression:** The project site may have become overgrown with unwanted species (e.g., Golden Leather Fern, *Acrostichum aureum*, *Melaleuca quinquenervia*, *Casuarina equisetifolia*, *Typha spp*) which must be removed before other interventions can take place.

**Remove debris:** Debris at the site (e.g., fallen trees or branches, plastic) that can be moved during periods of tidal inundation, removed to reduce damage to seedlings.

**Remove seaweed or algae from seedlings:** Growth of seaweed or algae can break or suffocate mangrove seedlings.

**Remove excess sand/sediment:** Sites may be inundated by sand/sediment transported during storms; removing this layer of excess sediment can prevent suffocation of mangroves and help to restore hydrology.

**Planting:** Directly planting propagules or seedlings into the substrate. This includes propagules and seedlings grown in a nursery or transplanted from the wild.

**Broadcast collected propagules onto an incoming tide:** Propagules are distributed onto the site during an incoming tide and are allowed to naturally establish.

**Large scale broadcasting of propagules from the air or boats:** Large numbers of propagules are distributed onto the site from boats or the air (including drones) and are allowed to naturally establish.

**Assisted natural regeneration:** Interventions aimed at enhancing or accelerating natural regeneration through reducing disturbances (e.g., fire, competition with other vegetation)<sup>4</sup>.

**None:** No biophysical interventions were carried out.

**Unknown:** Biophysical intervention(s) were used previously, but the specific intervention(s) is unknown.

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<sup>4</sup>FAO. 2019. Restoring forest landscapes through assisted natural regeneration (ANR) – A practical manual. Bangkok.

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## Appendix F - Definition of causes of previous unsuccessful restoration/rehabilitation

**Location not suitable for any mangroves:** Mangroves restored/rehabilitated, often through planting, in areas below mean sea level and therefore inundated too frequently, or above high water spring and therefore subject to too little inundation.

**Location not suitable for species used:** Species not matched to site conditions, for example *Rhizophora* species that cannot withstand wave action planted in seafront locations.

**Competition from invasive species:** Invasive species damaged or out-competed restored/rehabilitated mangroves.

**Damage from pests or wild animals:** Infestations of insects or crustaceans resulted in damage to seedlings.

**Barnacle/oyster infestations:** Infestations of barnacles or oysters impacted plant growth and survival.

**Plant diseases:** Mangrove trees were impacted by disease outbreaks such as viruses or fungi.

**Livestock grazing:** Grazing animals ate or damaged regenerating or planted seedlings.

**Storm damage to mangrove trees and their seedlings:** Restored/rehabilitated mangroves damaged by high winds or wave action.

**Extreme climatic events:** Site was impacted by extreme weather events such as drought, that inhibited plant growth and survival.

**Erosion due to waves or flooding:** Sediment at the site was eroded resulting in loss of mangrove trees.

**Refuse dumped on restoration site:** Solid waste was dumped at the site damaging mangrove trees, or affecting growth and survival.

**Surrounding land use impacting the site:** Activities surrounding the site, such as pollution inputs, resulted in mangrove loss or damage.

**Exploitation for resources:** The restored/rehabilitated mangroves lacked protection and were extracted for timber or other products.

**Original cause of loss/degradation not addressed:** The causes of original mangrove loss/degradation were not addressed prior to the restoration being attempted.

**Change in governmental/legislative support:** The government or legislative support for the restoration/rehabilitation project has changed or been removed resulting in degradation of the site.

**Weak/unsupportive tenure arrangement:** The tenure arrangement did not provide secure rights to local communities.

**Weak/unsupportive management rights:** The management activities were not supported by local institutions and/or national laws.

**Weak local natural resource governance institutions:** Natural resource governance institutions were not able to create the necessary conditions for sustainable and effective governance and management.

**Lack of sustainable financing mechanism in place:** No long-term financing to support site management and monitoring available.

**Poor stakeholder participation and engagement:** Local community stakeholders felt their perceptions and concerns were not adequately addressed and therefore the project activities lacked community support.

**Poor benefit distribution:** Inequitable distribution of benefits from mangrove restoration/rehabilitation disincentivized local community support.

**Unknown:** The cause of the project failure is unknown or was not recorded



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ALLIANCE**