



mangalantaw:

Monitoring Mangrove Blue Carbon

A Mangrove Blue Carbon Infographic
made by the Integrated network-
based Management for Southeast
Asia coasts (*InMSEA*) Project

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PREFACE

Mangrove forests, a fortress against climate change impacts, are deteriorating. Mangroves capture and store more than twice the CO₂ (“blue carbon”) than other forests. They dampen waves during typhoons and shelter many fisheries species. But, they also suffer from climate change impacts, on top of unregulated deforestation, land-use change, reclamations, and pollution.

Mangrove forests are one of our nature-based solutions against climate change. Their decline has to stop. How? Research, monitor, raise awareness, pass policies, initiate collective action.

Mangalantaw is a play of two words that best describes this book: Mangal, referring to mangrove forests, and Lantaw, a Bisaya term meaning “to watch or look”. This series of infographics serves as a guide to anyone - citizens, scientists, businessmen, advocates - who want to contribute to mangrove conservation and restoration.

Tara, mangalantaw kita!

ACKNOWLEDGMENTS

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to our Project's funding and monitoring agencies: the Department of Science and Technology (DOST) and the Philippine Council for Industry, Energy and Emerging Technology Research and Development (DOST-PCIEERD);

to our Project Staffs: Dr. Ariel Blanco, Dr. Maria Lourdes San Diego - McGlone, and Dr. Miguel Fortes;

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and to the project that started the Blue Carbon Agenda in the country: the “Comprehensive Assessment and Conservation of Blue. Carbon Ecosystems and their Services in the Coral Triangle” (BlueCARES) Project.

God bless this work and the Philippines.

Pag-ibig sa tinubuang lupa!

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FEATURING:

Mang Groovy,

the enthusiastic researcher
with a big heart for the
mangrove and the community.





Do you feel that it's getting hotter? Or that typhoons are getting stronger? YES, it is from climate change!

"Climate change" is the shift in climate and weather patterns like in temperature and rainfall.

Climate change is due to excessive release of carbon dioxide (CO₂) from human activities like:

Burning fossil fuels

Deforestation

Pollution

Impacts of climate change include:

Intense typhoons

Sea level rise

Floods, storm surges

Property damage

Droughts during El Niño

CO₂ from disturbances traps heat from the sun. The more CO₂ is released, the more heat is trapped.

Plants reverse this by capturing and storing CO₂ in their bodies and soil.

Mangroves (salt-tolerant coastal plants) can store 2x more CO₂ than other plants!

Carbon (like CO₂) stored in mangroves are called **BLUE CARBON**.

Mangrove **BLUE CARBON** is released when they experience excessive cutting, land use change, and disturbances.

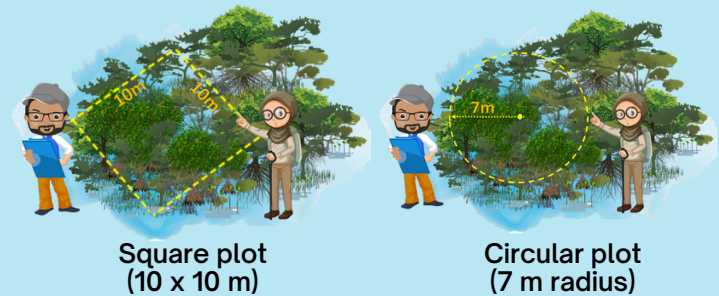




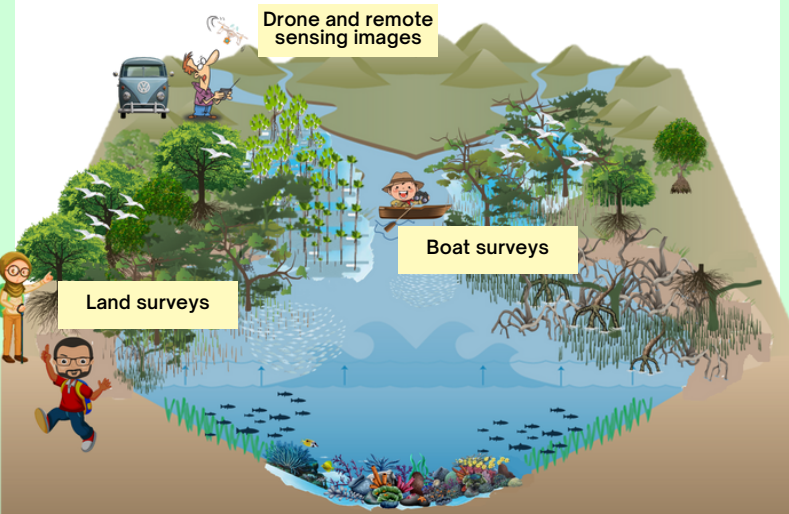
Monitoring refers to observing and assessing mangrove forests regularly over a period of time.

We monitor to determine mangrove overall health, carbon stocks, and priority sites.

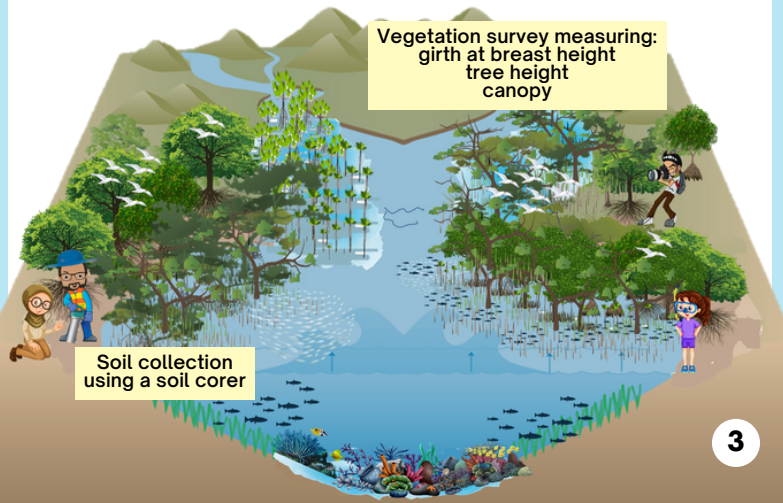
It's impossible to measure all mangroves in your site. Instead, you can plot using a shape of your choice:



To determine monitoring sites, initial surveys can be done by:



In these plots, you will collect data for both trees and soil.



Data Analytic Platform

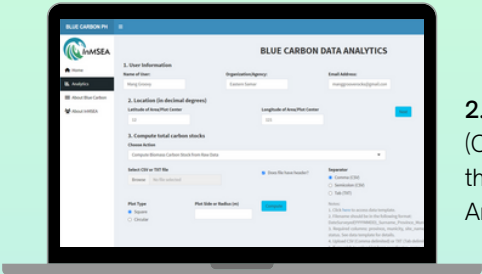
Computing mangrove tree carbon is as easy as 1-2-3 with the Blue Carbon Data Analytic Platform! Just encode, upload, and compute!



1	province	municipity	site_name
2	Eastern Samar	Balangiga	Bacjao
3	Eastern Samar	Balangiga	Bacjao
4	Eastern Samar	Balangiga	Bacjao
5	Eastern Samar	Balangiga	Bacjao
6	Eastern Samar	Balangiga	Bacjao
7	Eastern Samar	Balangiga	Bacjao

1. ENCODE your data in a spreadsheet with these columns:

- o province - Province of study site
- o municity - Municipality or City of study site
- o site_name - Specifics of study site
- o plot_id - Plot ID or code
- o species - Species name of tree
- o gbh_cm - Girth at breast height of tree, in centimeters
- o height_m - Tree height, in meters
- o cw_m - Canopy width, in meters
- o ch_m - Canopy height, in meters
- o status - Status of tree, either "live" or "dead"



2. UPLOAD the table (CSV or TXT file) in the Blue Carbon Data Analytic Platform.

- Fill in the required information, then click "Next".
- Select "Compute Biomass Carbon Stock from Raw Data"
 - o Upload CSV or TXT file.
 - o Separator: Select "Comma" if CSV, and "Tab" if TXT.
 - o Plot Type: Select whether plot shape is Circular or Square.
 - o Plot Side or Radius: Type plot side length or radius in meters.



3. Click COMPUTE to show the processed data and computed tree carbon stocks!

Sediment Carbon Stock

Your soil samples have a long way to go. Don't worry! Here is a step-by-step guide on how to compute sediment carbon stock from your samples:



START HERE!

1 Air-dry sample (takes 3-5 days)



2 Transfer the sample to weighed microwavable cup



3 Weigh air-dried sample using top loading balance



4 Oven-dry sample at 60°C for 12 hours or overnight to get Dry Bulk Density



★ Dry Bulk Density is the weight of the soil sample over its volume.

5 Allow samples to cool to room temperature in a desiccator with desiccants



6 Weigh oven-dried sample using top loading balance



7 Repeat steps 4-5 until constant weight is achieved.

★ Constant weight: Current weight is 94% of the previous weight.

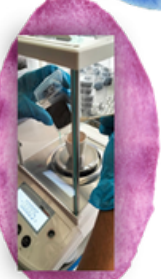
8 Grind oven-dried sample to homogenize



9 Get crucible and oven-dry at 105°C for 12 hours or overnight



10 Weigh 6 grams of homogenized sample (subsample) and place it in the oven-dried crucible



11 Oven-dry crucible with subsample at 105°C for 12 hours or overnight



12 Take ~1 gram of oven-dried subsample in a clean vial for acidification

★ Acidification is done to compute a correction factor for inorganic carbon

13 Weigh the crucible with the remaining subsample using an analytical balance



14 Place the crucible with the subsample inside the muffle furnace. Raise and stabilize the furnace temperature to 450°C and heat samples at this temperature for 4-8 hours.



15 Allow the subsample to cool down inside a desiccator



16 Weigh subsample using an analytical balance



17 Compute for sediment carbon stocks

18 Release the results



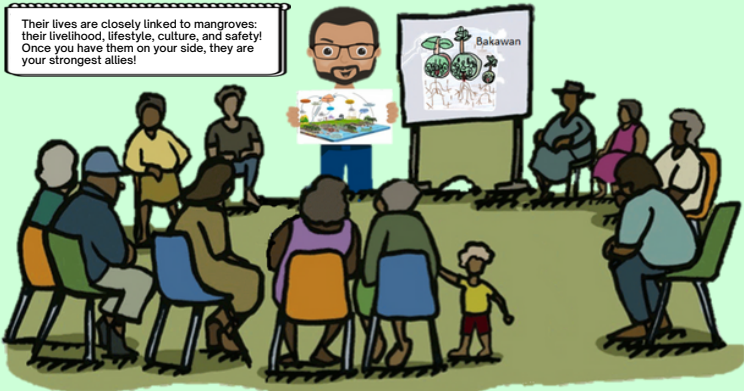
RESULTS



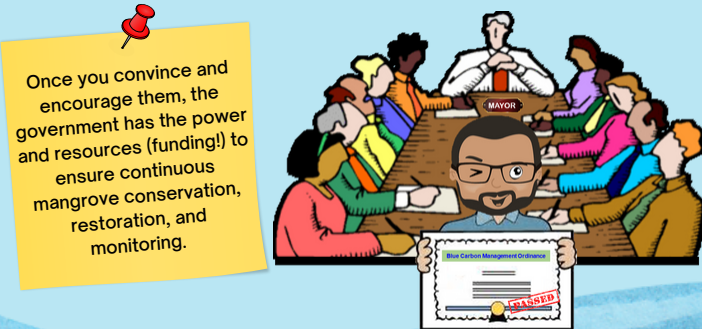
FINISH

Your data from regular mangrove monitoring is a powerful convincing tool!
Here is how you can use your data to spread awareness and promote mangrove conservation:

A. Show your results to the coastal community



B. Present your results to the government units



C. Implement policies on continuous monitoring and conservation

With enough support, resources, and funding, you can do a lot of activities to conserve, restore, and monitor mangrove forests and their blue carbon!





ATTRIBUTIONS

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Modifications include re-coloring, cropping, and combining.

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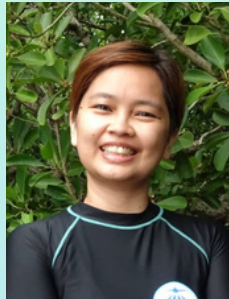
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