Landesa

BLUE CARBON

Assessing the Mitigation Potential of Strengthening Coastal Community Fisheries' Tenure

CAMBODIA

CASE STUDY

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Landesa's coastal work in Cambodia is done through its local partners:

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Executive Summary

In Cambodia, Community Fishery (CFi) organizations were created to give the fishery sector and its related ecosystems (e.g., mangrove forests) community-oriented management. Today, community members have become agents of mangrove forest conservation and restoration. However, despite having the rights and the capability to manage resources, weak CFi tenure arrangements pose significant challenges. These arrangements are characterized by unclear boundary demarcation, lack of coordination, and limited control and protection for resource extraction and land use changes. As a result, they jeopardize the long-term management and sustainable development of CFis.

Through its Coastal Livelihoods and Mangroves Project, and a multi-stakeholder collaboration, Landesa is strengthening CFi tenure security in South and Southeast Asia as a mechanism to sustain coastal communities' livelihoods, protect mangrove forests, and mitigate climate change. In Cambodia, Landesa is working through its local partners in two pilot sites: Koh Kresna Lok Community Fishery (CFi) and Prek Kampong Smach Marine Fishery Management Area (MFMA).

Strengthening tenure security and resource co-management in coastal CFis in Cambodia is a strategic approach to conserve and sustainably use coastal and marine ecosystems, directly contributing to mitigate climate change. Landesa has estimated that mangrove reforestation and avoidance of mangrove forest and seagrass conversion under strong CFi tenure and resource co-management in 8 out of 41 coastal CFis can contribute ca. 46,506 $tCO2_e$ annually. This factor becomes relevant when considering Cambodia's Nationally Determined Contribution (NDC) target of reducing 50% of historical emissions from the Forestry and other Land Use sector by 2030 (average 21.54 $MtCO_2e$/year). Therefore, successful conservation and restoration under government-scaled secure tenure and resource co-management in coastal CFis represents an opportunity for mitigation in support of Cambodia's ambitious NDC targets.

This report describes the findings of carbon assessments conducted in two pilot sites which support the critical scaling of this land tenure-based approach to all coastal CFis as an additional component of Cambodia's carbon mitigation leadership through its NDC.

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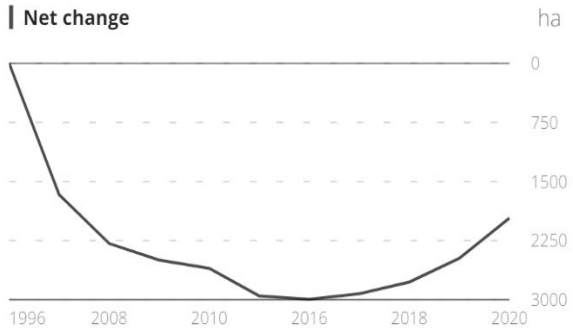
Introduction

Cambodia & Community Fisheries

Cambodia was considered to be one of the mangrove deforestation hotspots within Southeast Asia, with the highest rate of mangrove forest loss during the 1900s and 2000s (ArcGIS, 2021) (Bijeesh & Ngo, 2019) (See Figure 1). **CFi organizations were created to respond to an ambitious program implemented since 2000** by the Royal Government of Cambodia to give the fishery sector, and its related ecosystems (i.e., mangrove forests), a more community-oriented focus. Implemented by the Fisheries Administration (FiA) under the Ministry of Agriculture, Forestry and Fisheries (MAFF), the main objective of CFi establishment is to manage fisheries and related resources in a sustainable and equitable manner to improve standards of living and reduce poverty.

Figure 1. Mangrove net change in Cambodia (hectares).



***Note**: The extent of mangroves in Cambodia has decreased by 1,963.9 ha between 1996 and 2020* (GMW, 2024). *Reforestation, banning illegal charcoal production, and deactivation of non-profitable aquaculture ponds are some of the key factors that are believed to have caused a reduction in mangrove loss in recent years* (Bijeesh & Ngo, 2019).

Source: (GMW, 2024).

The CFi model provides its members with the right to organize, cooperate, and defend fishing activities, while allowing them to use and manage all fishery resources in accordance with the CFi agreement and plan. As a restricted use right, the CFi community does not have the right to sell any land, grant use rights outside the community, or erect any structure without the prior permission of FiA. The CFi cannot partition or establish any type of private ownership of the area and cannot enter into any agreement with any person or entity (FAO, 2017).

Today, although **CFi members play an important role in planting mangrove trees and protecting coastal ecosystems, their efforts are threatened by non-CFi members and new development projects** (Landesa, 2023). According to the Asian Development Bank, **seagrass habitats are considered to be declining in extent by 7% annually, while mangroves are declining between 3% to 5% annually**, with major coastal developments threatening extensive areas of mangrove forests and seagrass in Cambodia (ADB, 2022).

The unclear demarcation and zoning of CFi boundaries, insufficient multi-stakeholder coordination, and limited resources for control and protection have resulted in illegal activities that adversely affect CFi member livelihoods and hinder the effective implementation of their CFi management plan. At the same time, limited coordination and resources have made it difficult to efficiently collaborate in collective initiatives to patrol and conserve natural resources. Illegal fishing and extraction of forest resources have triggered a cycle in which remaining resources for CFi members are not enough to cover costs of patrolling, resource protection, and initiative development. Furthermore, mangrove forest degradation and climate change has limited women CFi members' livelihood opportunities in particular. Overall, fewer livelihood opportunities in sustainable mangrove forest management are driving younger generations to seek employment opportunities in other sectors (Landesa, 2023).

Landesa's Coastal Livelihoods and Mangroves Project

Landesa, through its **Coastal Livelihoods and Mangroves Project**[1], is strengthening coastal land tenure rights in the Bay of Bengal (Bangladesh and India) and Southeast Asia (Myanmar, Thailand, Cambodia, and Indonesia). This ambitious project aims to sustain livelihoods, protect mangrove forests, and mitigate climate change through context-specific and gender equality and social inclusion (GESI) responsive activities in each country. These include policy advising, legislative support, community assessments, forest cover mapping, and locally led climate adaptation and mitigation.

In Cambodia, **Landesa is working through its local partners in two pilot sites**: Koh Kresna Lok Community Fishery (CFi) situated in Kampot Province and Prek Kampong Smach Marine Fishery Management Area (MFMA) in Preah Sihanouk Province.

Koh Kresna Lok CFi is the combination of Lok CFi (recognized since 2006) and Koh

[1] https://cdn.landesa.org/wp-content/uploads/Coastal-Livelihoods-and-Mangroves-Project-brochure.pdf

Kresna CFi (recognized since 2013). Since 2019, the Kampot Fishery Cantonment, together with non-governmental organizations, began assisting Koh Kresna Lok CFi to re-elect a new Community Fishery Committee, re-define the new boundary of the combined CFi, and identify the members of the CFi.

On the other hand, Prek Kampong Smach MFMA was established and formally recognized on December 26th, 2023 (Proclaim No. 504). Its main purpose is to manage marine fisheries, improve coastal ecology, promote eco-tourism, safeguard the livelihoods of local communities, and enhance their resilience to climate change. The seven CFis located in Prek Kampong Smach MFMA were all established by 2004 and were either recognized or in the process of obtaining recognition from MAFF by 2010.

As interest in mangrove conservation and sustainable resource management grows among CFis and the government, Landesa is engaged in a multi-stakeholder collaborative effort to strengthen tenure rights for CFis. Through enhanced CFi tenure security and co-management, local communities in collaboration with the government will help support and sustain the continued health of mangrove ecosystems while benefiting from natural resource-based livelihood security. This dual objective not only fosters community resilience but also contributes significantly to climate change mitigation efforts. For this, Landesa's work through local partners consists of:

Land and resource tenure security

- **Conducting CFi Land and Water Use Remapping** to **clearly classify zones** within the CFi boundaries and **strengthen the CFi plan** to respond to environmental and development interests. Remapping efforts are being accompanied by clear demarcation of CFi boundaries approved by MAFF.
- **Complementing the CFi plan with an integrated resource monitoring and patrol plan for law enforcement**. The strategic approach behind this plan lays on the need to synergize the efforts of CFi members, provincial FiA, and local police units to patrol and report against illegal activities.

Governance enhancements and initiatives

- **Developing inclusive communication platforms** where provincial, subnational, and CFi members and representatives can participate in the planning and implementation of the CFi plan.
- **Strengthening CFi members capacity and skills** for sustainable mangrove forest management, resource monitoring, development of sustainable economic activities, and communication.
- **Bolstering capacity development programs** that will support CFi's needs, aiming to close the loop of limited resources to support covering conservation expenses.

All of the above activities seek to meaningfully engage women, men, and youth, while carefully considering the impacts of local gender norms in the communities.

Objective

The main objective of this report is to describe the influence of mangrove and seagrass conservation and mangrove plantation initiatives on greenhouse gas mitigation. These efforts are bolstered by strengthening tenure security and fostering natural resource co-management, achieved through collaborative endeavors between coastal Community Fisheries and the government. By assessing the mitigation potential, this report aims to underscore the significance and pertinence of coastal Community Fisheries in advancing Cambodia's aspirations for climate change mitigation as articulated in its updated Nationally Determined Contribution (NDC).

Methodology

For estimating the carbon mitigation potential of mangrove and seagrass conservation and mangrove plantation activities, this report has employed the **Ex-Ante Carbon Balance Tool** v9.4 (EX-ACT) developed by the Food and Agriculture Organization of the United Nations (FAO). The application of this tool responds to its use for developing the NDC scenarios for the Forestry and other Land Use (FOLU) sector for Cambodia's updated NDC (2020).

Primary data required for proceeding with a **Tier 1**[2] assessment approach was collected through multiple interactions with Community Fisheries and government offices at local and regional levels. To achieve a more tailored assessment, **Tier 2**[3] coefficients were adjusted to reflect Cambodia's total ecosystem carbon stocks for mangrove forests according to Sharma S., et al. (2020) (See Annex 1). In June 2024, Landesa conducted field visits and held two consultative meetings for data verification with provincial authorities and CFi Committee members. In October 2024, Landesa and the Fisheries Action Coalition Team (FACT) held a workshop to validate the report findings with key government representatives.

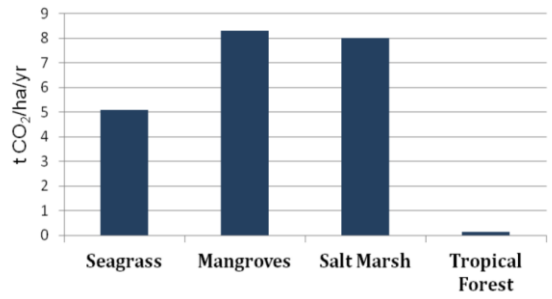
[2] International Panel for Climate Change (IPCC) default values and other peer-reviewed literature data.
[3] Region-specific carbon stock values and emission coefficients.

Blue Carbon and Cambodia's NDC

Blue Carbon in Cambodia

Coastal and marine ecosystems such as mangrove forests, salt marshes, and seagrass beds are efficient at sequestering and storing atmospheric carbon dioxide (CO_2). **Blue carbon refers to carbon stored in coastal and marine ecosystems**, which can store up to 5 times as much carbon as upland forests (See Figure 2) (TNC, 2024).

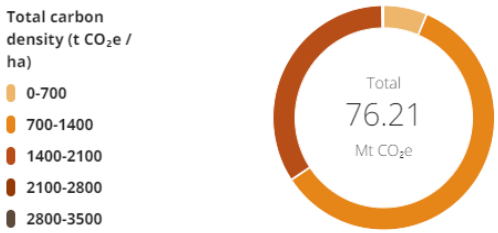
Figure 2. Annual carbon sequestration comparison.



Note: *tCO_2 by hectare and by year between blue carbon ecosystems (seagrass, mangroves, and salt marsh) and tropical forest.*
Source: (Mcleod & et al., 2011).

According to the Global Mangrove Watch (GMW), the **total organic carbon stored in mangroves in Cambodia** is estimated at 76.21 $MtCO_2e$[4], with 10.53 $MtCO_2e$ stored in above-ground biomass and 65.68 $MtCO_2e$ stored in the upper 1 m of soil (See Figure 3). In 2020, Sharma S., et al., estimated that the mean total ecosystem carbon stocks in mangrove forests in Cambodia was 784.7 ± 30.1 Mg C/ha[5], which is within the range (355-1,385 Mg C/ha) reported in the mangrove literature.

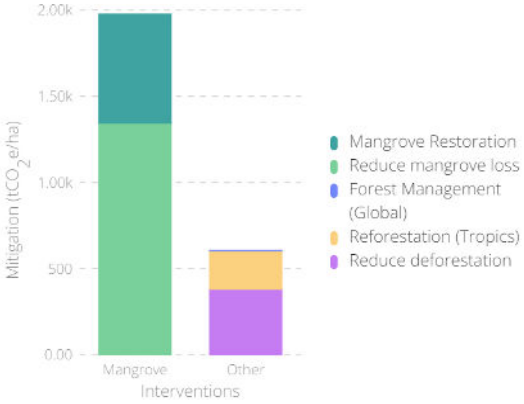
Figure 3. Mangrove blue carbon in Cambodia (2016) (amount and density of carbon stored in mangrove biomass and soil).



Source: (GMW, 2024).

When it comes to mitigation, the **greatest emission mitigation potential per hectare in forested areas in the country is estimated to come from reducing mangrove loss** (1,344.33 tCO_2e/ha) **and mangrove restoration** (632.22 tCO_2e/ha), especially when compared to other interventions in other forested areas[6] (See Figure 4) (GMW, 2024).

Figure 4. Mangrove emissions mitigation in Cambodia (2016) (estimates of emission mitigation potential).



Source: (GMW, 2024).

[4] Million metric tons of carbon dioxide equivalent.
[5] Megagrams of carbon per hectare.
[6] Forests and other ecosystems (e.g., grasslands, peatlands). It excludes values related to agriculture, bioenergy, or demand-side measures (e.g., food waste).

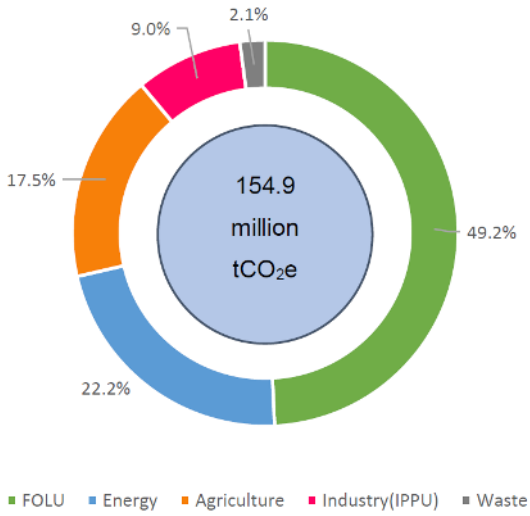
Cambodia's Forestry and other Land Use NDC Scenario

Cambodia's updated NDC (2020) has set an ambitious target for the Forestry[7] and Land Use (FOLU) sector to halve the deforestation rate by 2030, in line with Cambodia's REDD+[8] strategy. The updated NDC also pays particular attention to gender and vulnerable groups, ensuring that adaptation and mitigation actions contribute to a more inclusive society (KoC, 2020).

According to the Business-as-Usual (BAU) emission scenario for the country, overall emissions in 2030 without the FOLU sector are expected to rise by up to 79 MtCO2e/year, while overall GHG emissions with the FOLU sector are expected to increase to 155 MtCO2e/year. **The FOLU sector will generate the highest overall BAU emissions** (49.2%) in 2030, followed by the energy sector (22.2%), the agricultural sector (17.5%), Industry (9.0%), and waste sector (2.1%) (See Figure 5) (KoC, 2020).

Responding to this, **Cambodia's updated NDC has set a target of reducing 50% of historical emissions from the forest sector by 2030**. This represents an **average annual reduction of 21.54 $MtCO_2e$/year**. Under this scenario[9], the FOLU sector is expected to provide the major share, when compared to other sectors, of 59.1% emission reduction by 2030.

Figure 5. BAU GHG emissions in 2030 - including the FOLU sector.



Source: (KoC, 2020).

For achieving this target, the government is committed to improve the management and monitoring of forest resources and forest land use; strengthen the implementation of sustainable forest management; and reduce deforestation, build capacity, and engage stakeholders[10] (KoC, 2020).

[7] Cambodia's mangroves are considered forest.
[8] Reducing Emissions from Deforestation and forest Degradation, conservation of forest carbon stocks, sustainable management of forests, and enhancement of forest carbon stocks.
[9] There is only one NDC scenario for all sectors except FOLU. The FOLU sector has three NDC scenarios - Scenario 1: 60% forest cover by 2030; Scenario 2: Reducing 50% of historical emission by 2030; and Scenario 3: INDC emission reduction. Scenario 2 is presented in the NDC as part of the mitigation targets considering that this approach will have a better resilience to failure in mitigation activities.
[10] Based on Ministerial submissions and REDD+ Technical Secretariat. The lead ministry is the REDD+ Technical Secretariat.

Blue Carbon in Koh Kresna Lok CFi

Koh Kresna Lok CFi is situated in Kampot Province, in the south coast of Cambodia along the Gulf of Thailand. The CFi covers a total area of 593 ha, including approximately **89 ha of mangrove forest and ca. 92 ha of seagrass** in shallow and deep water (See Figure 6). The area is characterized by an **average elevation** of **2.26 m above sea level** with mangrove forests along the coast (FAO, 2024). The area is also characterized by a **gleysol soil type** (**wetland soils**) (FAO, 2024), with a tropical climate with a **mean annual temperature** of **27.6°C** and **mean annual precipitation** of **1,840.34 mm** (FAO, 2024).

Figure 6. Koh Kresna Lok CFi map.

Source: *FiA.*

According to GMW[11], in 2020, the **mean aboveground biomass density of mangroves** within the CFi was approximately **74 tons per hectare**, which accounts for about 70% of Cambodia's average mangrove aboveground biomass density of 105.59 tons per hectare. The **mean maximum canopy height of mangroves** within the CFi in 2020 was around **4.6 meters**, representing approximately 55% of Cambodia's average mangrove maximum canopy height in the same year, which was 8.48 meters.

Blue Carbon Balance Assessment

Following the EX-ACT data considerations, the following settings have been used for the blue carbon balance assessment:

1. **Climate:** Tropical
2. **Moisture:** Moist
3. **Soil Type:** Wetland soils
4. **Total Duration of Accounting:** 20 years[12]
5. **Implementation Phase:** 4 years (2023-2026 – Project Implementation Period)
6. **Capitalization Phase:** 16 years (16 years have been set for a total duration of accounting of 20 years, which is the period for achieving a new equilibrium after any land intervention)
7. **Forest Type:** Mangrove Forest
8. **Forest Extent & Status:** ca. 89 ha of **Low** to **Moderate**[13] degraded mangrove forest[14].
9. **Land Use Threat:** The following areas of **mangrove forest within the CFi** are threatened by:
    a. Land use change – ca. 21 ha of mangrove forest – Potential use of fire **NO**
    b. Land degradation – ca. 68 ha of mangrove forest due to pollution and illegal activities, especially at the borders of the CFi.
10. **Assumptions:** To assess the potential impact of the project, the following assumptions have been considered, building on the activities and approaches proposed by Landesa and its local partners for collaborative work in the CFi:
    a. The project, through mapping, demarcation, community empowerment, and capacity development support, leads to successfully protect and avoid mangrove forest land conversion and degradation within the CFi.
    b. Strengthening CFi tenure and FiA's implementation of the Plan for the Sustainable Management of Seagrass Area (2024-2028) leads to avoid seagrass destruction.
    c. The project, through secured CFi tenure, leads to incentivize

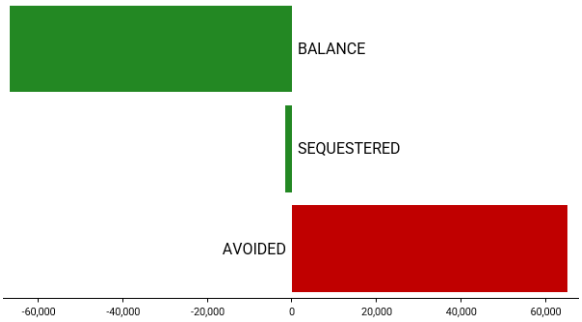
[11] Data based on the global extent of mangroves for select years from 1996 to 2016 (Bunting et al. 2018) combined with the canopy height and allometric relationships of Simard et al.
[12] The total duration of a project is typically assumed to be equal to 20 years following the International Panel for Climate Change recommendations (IPCC, 2006). These 20 years are the sum of two phases, the **implementation phase** of the project (i.e., the active phase of the project) and a **capitalization phase** (i.e., a period for reaching a new equilibrium after an intervention).
[13] Forest degradation levels: None to very low (0% to 10% biomass lost); **Low** (around 20% of biomass lost); **Moderate** (around 40% of biomass lost); and Large to extreme (more than 60% of biomass lost).
[14] Degradation level based on comparative status of biomass density and canopy height against Cambodia's average.

mangrove forest plantation of 22 ha assigned for restoration within the CFi[15].

Blue Carbon Balance Results

If CFi tenure is strengthened and its members, together with the government, are collaboratively successful in avoiding mangrove forest land and seagrass conversion and degradation, as well as conducting mangrove reforestation, the **total net mitigation potential estimated** is **66,785 tCO_2e**[16] (considering a total duration of accounting of 20 years). This represents an **average annual mitigation potential of 3,339 tCO_2e or 18.7 tCO2e per hectare**. The total **mitigation potential** (balance) is the result of **avoided emissions** from land and seagrass conversion and degradation (65,148 tCO_2e), as well as **sequestered emissions** from mangrove reforestation (1,636 tCO_2e) (See Figure 7).

Figure 7. Net fluxes, in tCO_2e.



Considering Cambodia's NDC target for the FOLU sector by 2030, the mitigation potential from strengthening Koh Kresna Lok CFi's tenure and resource co-management can **contribute 0.016%** of the aimed average annual reduction (**21.54 Mt CO_2e/year**) from the FOLU sector.

[15] Survival rate reported with current restoration efforts ~40%.

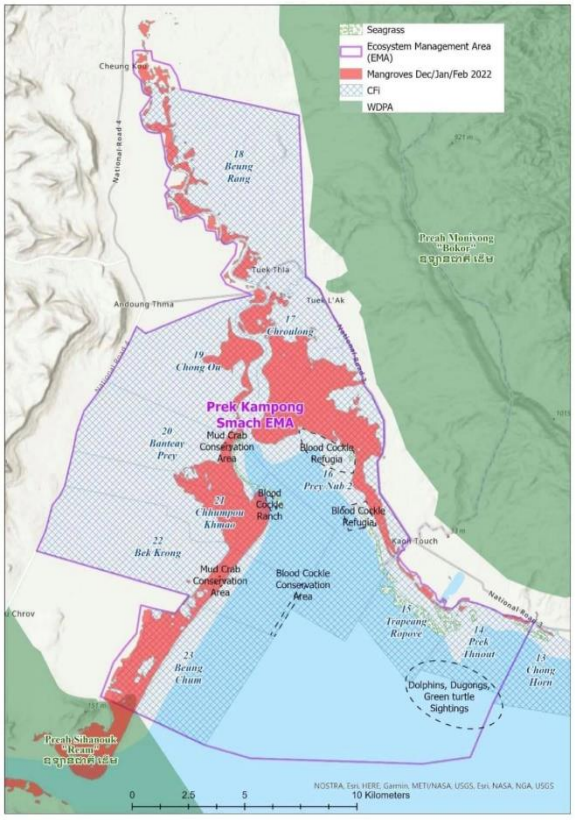
[16] Metric tons of carbon dioxide equivalent.

Blue Carbon in Prek Kampong Smach MFMA

Prek Kampong Smach MFMA is situated in Prey Nop district in Preah Sihanouk Province, coast of Cambodia. The MFMA covers a total area of 10,923 ha, including **ca. 2,876 ha of mangrove forests and 2 ha of seagrass** along the Veal Rinh Bay (See Figure 8). The area is characterized by an **average elevation** of **1.55 m above sea level** (FAO, 2024). The area is also characterized by a **gleysol soil type** (**wetland soils**) (FAO, 2024) and a tropical climate with a **mean annual temperature** of **25.5°C** and **mean annual precipitation** of **2,611.3 mm** (FAO, 2024).

According to GMW, in 2020, the **mean aboveground biomass density of mangroves** within MFMA was approximately **99 tons per hectare**, which accounts for about 94% of Cambodia's average mangrove aboveground biomass density of 105.59 tons per hectare. The **mean maximum canopy height of mangroves** within MFMA in 2020 was around **7.8 meters**, representing approximately 92% of Cambodia's average mangrove maximum canopy height in the same year, which was 8.48 meters.

Figure 8. Prek Kampong Smach MFMA map.



Source: *MAFF.*

Blue Carbon Balance Assessment

Following the EX-ACT data considerations, the following settings have been used for the blue carbon balance assessment:

1. **Climate:** Tropical
2. **Moisture:** Moist
3. **Soil Type:** Wetland soils
   Total Duration of Accounting: 20 years[17]
4. **Implementation Phase:** 4 years (2023-2026 – Project Implementation Period)
5. **Capitalization Phase:** 16 years (16 years have been set for a total duration of accounting of 20 years, which is the period for achieving a new equilibrium after any land intervention).
6. **Forest Type:** Mangrove Forest
7. **Forest Extent & Status:** ca. 2,876 ha of **Very Low**[18] degraded mangrove forest[19].
8. **Land Use Threat:** The following estimated percentages of **mangrove forest** were identified as threatened without the establishment of the MFMA:
   a. Land degradation – ca. **38%** of mangrove forest now assigned as core and buffer zones in the MFMA .
   b. Land use change and degradation – ca. **29%** of mangrove forest threatened by aquaculture activities (mostly crab farming).
9. **Assumptions:** To assess the potential impact of the project, the following assumptions have been considered, building on the activities and approaches proposed by Landesa and its local partners for collaborative work in MFMA:
   a. The project, through mapping, demarcation, community empowerment, and capacity development support, leads to successfully protect and avoid mangrove forest land conversion and degradation within MFMA.

[17] The total duration of a project is typically assumed to be equal to 20 years following the International Panel for Climate Change recommendations (IPCC, 2006). These 20 years are the sum of two phases, the **implementation phase** of the project (i.e., the active phase of the project) and a **capitalization phase** (i.e., a period for reaching a new equilibrium after an intervention).

[18] Forest degradation levels: **None to very low** (0% to 10% biomass lost); Low (around 20% of biomass lost); Moderate (around 40% of biomass lost); and Large to extreme (more than 60% of biomass lost).

[19] Degradation level based on comparative status of biomass density and canopy height against Cambodia's average.

b. Strengthening CFi tenure and MFMA resource co-management lead to avoid seagrass destruction.
c. The project, through secured CFi tenure, leads to **incentivize mangrove forest plantation** over ca. **7.5 ha per year**, suitable for mangrove restoration[20] during the duration of the project[21].

Blue Carbon Balance Results

If CFi tenure in MFMA is strengthened and its members, together with the government, are collaboratively successful in avoiding mangrove forest land and seagrass conversion and degradation, as well as conducting mangrove reforestation, the **total net mitigation potential estimated is 863,344 tCO_2e**[22], considering a total duration of accounting of 20 years. This represents an average annual mitigation potential of **43,167 tCO_2e or 10.8 tCO2e per hectare**. The total **mitigation potential** (balance) is the result of **avoided emissions** from land conversion and degradation (859,160 tCO2e), as well as **sequestered emissions** from mangrove reforestation in suitable areas (4,183 tCO2e) (See Figure 9).

Figure 9. Net fluxes, in tCO_2e.

Considering Cambodia's NDC target for the FOLU sector by 2030, the mitigation potential from strengthening CFi tenure and resource co-management in MFMA can **contribute 0.20%** of the aimed average annual reduction (**21.54 Mt CO_2e/year**) from the FOLU sector.

[20] Survival rate reported with current restoration efforts ~80%.
[21] Mangrove restoration efforts only reflect CFis' plans for mangrove plantation. This does not include other project-based restoration efforts conducted by the government and/or other organizations.
[22] Metric tons of carbon dioxide equivalent.

Conclusions

Along the coastlines of Southeast Asia, where coastal communities have been empowered and given legal rights and authority to manage mangrove forests, this approach has proven to be effective in improving the use of mangrove goods and services (Friess, Thompson, & et al., 2016) (Arifanti, Sidik, & et al., 2022). Furthermore, collaborative mangrove management has increased the efficiency of mangrove governance by reducing the costs of managing public goods and by increasing the benefits shared between local resource users. However, evidence shows that granting rural coastal communities' control over resources does not necessarily ensure effective management, especially when there are external threats imposed by powerful stakeholders or that require legal enforcement (Friess, Thompson, & et al., 2016).

In Koh Kresna Lok and MFMA CFis, community members have shifted from cutting down mangrove trees to planting and protecting them according to their management plans. Unfortunately, non-CFi members and new development projects threaten mangrove forests and seagrass. External threats take advantage of unclear demarcation of boundaries and zones, lack of coordination, and limited control and protection for resource extraction and land use change. While CFis possess the rights and capabilities to manage resources in alignment with CFi agreements and plans, there remains a critical necessity to bolster CFi tenure security and resource co-management. This can be achieved through collaboration between CFis and the government. Such collaboration is essential for CFis to not only sustain their livelihoods but also to effectively conserve mangrove forests and seagrass habitats.

Besides increasing the efficiency of mangrove and seagrass governance, strengthening tenure and resource co-management in CFis represents an opportunity for emissions mitigation potential, especially taking into account blue carbon and Cambodia's NDC. Considering the average annual reduction target of 21.54 MtCO2e/year for the FOLU sector, mangrove reforestation and avoiding mangrove forest and seagrass conversion under strong CFi tenure can contribute to this target. For instance, it is estimated that strengthening tenure in Koh Kresna Lok and MFMA CFis (8 out of 41 coastal CFis in total in Cambodia by 2024) can contribute ca. 0.22% of the FOLU sector target annually. Effective conservation and restoration efforts, facilitated by robust CFi tenure systems and co-management arrangements across the 41 coastal Community Fisheries can serve as a model for complementing mitigation strategies listed in the NDC. Overall, it is recommended to consider the contribution of the fishery sector in Cambodia (mangrove, seagrass, flooded forests, and fishery conservation areas), particularly in the context of the next round of Nationally Determined Contributions in 2025[23]. This approach will support Cambodia's ambitious mitigation targets for the FOLU sector.

[23] Refer to 'Blue Carbon and Nationally Determined Contributions – Guidelines on Enhanced Action (2023)' for a suggested guide on how to include blue carbon in the NDC considering the 2025 NDC update cycle and beyond.

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Annex 1

Table 1. Carbon stocks in measured mangrove ecosystem components in Cambodia (2020).

Region	Land use land cover type	Carbon stocks in various ecosystem compartments (Mg C ha^{-1})				
		Trees	Downed wood	Root	Soil	Total ecosystem
Northern Cambodia	Mean + SE	51.3 ± 6.9	13.0 ± 2.3	35.4 ± 3.7	840.1 ± 31.9	957.2 ± 32.8
Central Cambodia	Mean + SE	44.3 ± 10.5	7.0 ± 1.7	22.3 ± 5.5	481.6 ± 30.9	628.9 ± 33.1
Southern Cambodia	Mean + SE	20.5 ± 5.8	12.1 ± 6.0	16.0 ± 4.3	302.9 ± 17.1	386.2 ± 19.1
Cambodia	Pristine + SE	65.6 ± 9.3	14.4 ± 2.4	40.6 ± 17.7	688.5 ± 49.9	809.2 ± 52.8
	Degraded + SE	61.9 ± 9.3	20.2 ± 5.3	42.1 ± 19.0	497.4 ± 81.1	621.7 ± 89.3
	Deforested + SE	0	0	0	326.7 ± 45.3	326.7 ± 45.3

Source: Extracted from Sharma & et al. (2020)

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