

THAILAND MANGROVE FORESTS, CLIMATE, AND LIVELIHOODS

Case studies from the communities of Nai Nang, Klong Prasong, and Bang Khang Khao Thailand Mangrove Forests, Climate and Livelihoods: Case studies from the communities of Nai Nang, Klong Prasong, and Bang Khang Khao Prepared by: EWMI-ODI Team Edited by: Pyrou Chung, Director at EWMI-ODI Licensed under Attribution-NonCommercial-ShareAlike 4.0 International CC BA-NA-SA 4.0

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INTRODUCTION

By 2030, Thailand intends to reduce its greenhouse gas emissions by 20% from the current projected businessas-usual level. This ambitious proposal also seeks to meet net-zero emissions targets by 2065. This has sparked the initiation of the Thailand Voluntary Emission Reduction Program (T-VER) under policy regulations that are designed to initiate carbon-financing projects in mangrove areas. Under this policy, environmental polluters can use carbon credits to offset their greenhouse gas emissions. In coastal areas, the Department of Marine and Coastal Resources (DMCR) has signed a memorandum of understanding (MOU) with large companies to invest in mangrove restoration and earn carbon credits.

Ninety-nine mangrove communities have signed agreements covering an area of 162,590 Rai.

However, most of the communities that Knowledge For Development Foundation (K4D) and its partners have assisted do not understand the terms of the agreements they have signed. It is unclear if communities had any real negotiation power to influence the terms of the MOU, as most of the rights and benefits seem to accrue solely towards the companies' benefits. Communities and local stakeholders have raised many questions regarding the equitability of the initiative.

K4D seeks to support local communities affected by the T-VER initiative and has undertaken legal research examining the potential outcomes of the carbon-financing initiative in mangrove communities. Community research is necessary to about community learn more experiences and concerns related to climate change and the carbon credits program.

Whilst working with those villagers and our partners we aim to explore the current implications of the initiative and to raise awareness of the program. This is also an opportunity to provide further information to those communities about the impacts of climate change.

This study employs a community-based participatory action research approach in three mangrove forest-dependent communities located in Krabi and Trang Provinces in Southern Thailand. It aims to explore how stakeholder power dynamics shape and influence decision-making across various target villages while addressing power imbalances and potential inequalities within the carbon financing scheme.

The overall objective of our is programming to support communities to register for Community Forestry (CF) while fostering a critical natural awareness of resource management practices. The research aims to engage communities through consultation, capacity-building training/workshops, and participatory

data collection, focusing on socioeconomic surveys, community mapping, and the CF application process. Special emphasis will be placed on the involvement of women's groups in leading surveys and the use of participatory methods to ensure inclusive and sustainable community forest management.

K4D in this specific context, also played a key role as mediators during dialogue discussions and raising awareness on the Carbon Credit Schemes (CCS) initiatives to address the gaps in community knowledge. K4D presents these findings in a case study structure for each of the three villages that we supported. Although the implications of the carbon-financing initiatives may take several years to be realized, documenting the initial phases of the initiative will allow us to understand the existing socioeconomic circumstances of engagement and to plan more effectively for future outcomes.

CASE STUDY COMMUNITY PROFILES

The communities involved in this project are the Nai Nang and Klong Prasong communities in Krabi Province, where Nai Nang has several established CF and Klong Prasong communities are attempting to apply for CF certification K4D support. Both these communities have signed MOUs as part of the carbon credit schemes (CCS). The third community Bang Khang Khao in Trang Province, is currently being supported by K4D to take formal steps to establish a CF and has not been involved in the carbon financing project to date. These research sites were selected because: 1) the villagers' livelihoods mainly depend on mangrove forests as their resources; and 2) the communities are either already involved in the CCS or have the potential to be included.

It is important to recognize that the of CF was previously registration undertaken by the Royal Forest Department (RFD) for terrestrial forests which included mangrove areas. Long before formal registration, many coastal communities likely had their own traditional systems for managing mangrove resources. Even without formal recognition, communities have undertaken their own conservation and restoration efforts. This has involved planting mangroves, patrolling the area to prevent illegal activities, and

educating others about the importance of mangroves. These informal agreements with local authorities and other stakeholders to manage specific mangrove areas, although not legally binding, provide a framework for cooperation.

In March 2015, the Cabinet enacted the Promotion of Marine and Coastal Resource Management Act of B.E. 2558, which established the Department of Marine and Coastal Resources (DMCR) officially recognized the value of local mangrove stewardship. The primary goal of the Act is to promote sustainable management and conservation of marine and coastal resources. In 2022 a legal framework for CF was created and the DMCR established formal protocols allowing villagers to create Mangrove Community Forests, providing them with ten-year management authority. Communities and NGOs have played a role in advocating for the recognition of resource tenure rights and mangrove conservation. This policy shift is significant progress in these campaigning efforts for greater tenure rights. While the framework established pathway for registering a formal Mangrove Community Forests, it's crucial to acknowledge the existence of informal management practices and community-driven initiatives.

Nai Nang Community, Krabi Province

Village: Nai Nang Village No. 3

Sub-district: Khao Khram

District: Muang

Province: Krabi

Population: 921 (458 Male, 463 Female)

Households: 268

Religion: 99% Muslim and 1% Buddhist

Livelihoods: agriculture cash crops (rubber, fruit and palm oil), fishing, and rice farming (secondary).

Community Forests: 771 rai (123 ha) 50

rai (8 ha) is designated for CF

registration without Carbon Credit

Program participation)

Carbon Credit Scheme: Yes, 771 ha

Nai Nang, is located on the mainland on the Andaman Coast in southern Thailand. Nai Nang is approximately 35 kilometres north of the Mueang Krabi District Office.

The Nai Nang community has been proactive in protecting their mangrove forest covering approximately 3,700 rai (592 hectares) with approximately 14 mangrove species. The communities commitment to sustainable mangrove management is evident in their regular forest patrols, garbage collection, beach cleaning, and raising awareness about the importance of mangrove conservation. These efforts resulted in an overall reduction in deforestation. Furthermore demonstrate a strong foundation to enhance community-based monitoring for long term health of their mangrove ecosystem.

The Community Mangrove Forest was registered under the Royal Forest Department in 1995 for 500 rai (80 hectares), and 4 years later, this was extended to 771 rai (123 hectares). However. CF certification was not extended beyond 2011. In 2014, several members of the community formed an apiculture group to generate alternative income from honey products, this is informal an conservation group who was supported with technical training and assistance from the Mangrove Action Project (MAP). Today, the collective is officially recognised by the department of Agriculture and includes over 45 families The connections between the people, the bees, and the forest are at the centre of the apiculture group. The bees rely on the mangrove forest for food, water, and nutrients; in return, the bees support the mangroves through pollination.

Many neighbouring groups and villages have expressed an interest in learning about Nai Nang's Apiculture model. However, before assisting them, the Nai Nang Apiculture Group wants to see a commitment linking the practice of apiculture with mangrove conservation. They stress that raising bees requires a good pollen source for feeding the bees, which means a healthy environment, including mangroves for the coastal villages. Nai Nang has also encouraged the villages to stop using harmful pesticides, something they had learned over time. Since they stopped the use of pesticides, they have seen an increase in bee activity and honey yield.

A Nai Nang Women's Group that formed separately from the Apiculture Group provides support, training, and networking and is registered as a small and micro-community enterprise under the government.

Under the government scheme they have been provided with a new commercial gas oven to cook several of their products and snacks, such as dried bananas glazed with honey, honey glazes, and toffee corn flakes. These products are mainly sold through local shops, special events, and to village visitors. The women's group has a savings fund accumulated from the profits which is then divided as returns amongst members at the end of the year.

In March 2024, regardless of this successful enterprise and conservation efforts of the community, the 771 rai that the communities depend upon for their apiculture livelihood has now been allocated as a CF under MOU for a Carbon Credit Scheme.



Nai Nang's Women group participating in a community research exercise - Photo by EWMI-ODI Team

Klong Prasong Community, Krabi Province

Village: Klong Prasong Village No. 2

Sub-district: Klong Prasong

District: Muang

Province: Krabi

Population: 708 (316 male, 364 female)

Households: 170

Religion: 65% Muslim and 35% Buddhist

Livelihoods: primarily small-scale fishing and secondarily labourers, aquaculture, shrimp farming.

Community Forests: 706 rai (112 ha)

application pending.

Carbon Credit Scheme: Yes (442 ha).

Klong Prasong is one of three communities on Klang Island in the Krabi River estuary. The Klong Prasong area is about one meter above sea level, making the entire area low lying and surrounded by mangrove forests with many small canals linking the Krabi River to the community.

The entire island (including Klong Prasong village) has a population of almost 6,000. Klong Prasong is approximately 5 kilometres east of the Mueang Krabi District Office. It can be accessed by a local ferry (long-tail boat) and by taking a sidecar or motorcycle taxi from the pier.

The economy is largely based on the sea, with the main occupation being small-scale fishing along the Andaman Sea and inshore and river estuaries where they catch fish, prawns, crabs, and shellfish.

Secondary jobs are general labour and aquaculture, especially sea bass, which are raised in floating pens with net bottoms; several shrimp farms are also run on the island. Most residents have no land title deeds but have access to user rights for building housing on the government land through a tax payment to the local authority or Subdistrict Administration Office.

Other occupations include hospitality, shopkeeping, and small-scale rice farming. Some people tap rubber, have small fruit or cashew orchards, and keep water buffalo or goats. Tourism is growing, with more people becoming involved seasonally on the island, working at a resort, running community homestays, and providing boat tours and transportation services to and from the mangroves serving day trippers visiting the area and touring fish cage aquaculture sites.

The community demonstrates a deep understanding of sustainable mangrove management. Beyond their diverse livelihoods, fisherfolk recognize mangroves as vital fish nurseries thus practising sustainable fishing. Women's groups utilize mangrove leaves and barks to make natural tie dye clothes products for tourists. Furthermore, the community actively participates in mangrove reforestation initiatives.

Storms occur yearly during the monsoon; the most severe in memory was during the 1960 Indian Ocean cyclone season. Many houses are built close to the coast facing the open Andaman Sea, so exposure is high. During monsoon seasons, storms cause frequent damage to houses due to high winds and waves, so people must repair their homes regularly.

Coastal erosion resultina continued intensive storms has become increasingly severe over the years due to the removal of vegetation and land mangroves, construction or reclamation. harbor port or development, and construction of major dams upstream that have prevented sediment from reaching the sea. The local district government built a concrete break along the village front to stop erosion and flooding. Storm waters were still topping the wall.

While the government raised the wall height, the storm surge during high tide still overflows, as occurred in June 2012. When this happens, the wall prevents the water from draining back into the sea, prolonging the flooding; as a result the saline water kills vegetation and salinates the soil.

The intensive wave energy that hits the wall removes sediments at the base of the wall, so mangroves are unable to grow near the wall. In response to these issues, the Raks Thai Foundation built a bamboo wall in front of the concrete wall to reduce wave energy and allow mud to accumulate behind the wall where mangroves can be planted.

The mangrove species are predominantly Avicennia sp. and appear relatively healthy. Avicennia alba naturally grew on the site and colonized the area about ten years ago. The area was planted using Rhizophora apiculata seedlings provided by the DMCR in August 2012, with an estimated survival rate of 10%. A local community leader stated that seedlings died for no reason, and others were dislodged and washed away by the waves. This highlights the need to coordinate with local knowledge holders to ensure appropriate restoration responses are utilized.



Klong Prasong's Women group Photo by EWMI-ODI Team

Bang Khang Khao Community, **Trang Province**

Village: Bang Khang Khao Village No. 4

Sub-district: Khao Mai Kaew

District: Si Khao

Province: Trang

Population: 1,081 (549 male, 532 female)

Households: 277

Religion: 98 Muslim and 2 Buddhist

Livelihoods: primarily general labours, rubber and palm oil farmers, fisheries and secondarily in education

Community Forests: None. 1001 rai (161

hectare) of mangrove forest proposed

for CF

Carbon Credit Scheme: No.

In the past, Bang Khang Khao Village had abundant upland mangrove forests, and there were many different types of birds and wildlife. Later, villagers came to build houses, starting with 2-4 households. Subsequently, more villagers migrated to the area, clearing the forest for farming and gardening. As a result, the wildlife that once inhabited the area gradually disappeared. However, there was a canal where bats would gather to rest in the evening. From then on, the villagers named the village "Bang Khang Khao," which means "Bat Village." However, there are no longer any bats living there.

Bang Khang Khao is a lowland area with mangrove forests and the Klong Kala Se Noi and Klong Kala Se Yai canals on either side. The total area is 6,150 rai (984 hectares).

Bang Khang Khao relies approximately 650 rai (104 hectare) of mangrove forest located in Klong Kala Se Noi and Klong Kala Se Yai along with various branches of canals running through the area. The community utilizes these forests for subsistent livelihood and wood for animal pens and home repairs. These forests are not officially registered as community mangrove forests. However, with K4D's support, the 104 hectares is now in the final stage of the CF registration process. Meanwhile, the Bang Khang Khao community has not indicated plans for CCS participation. The village environmental and faces including resource challenges, deforestation and degradation mangrove forests, improper waste disposal polluting mangrove forests, and chemical runoff from agriculture.

Historically, the abundant mangrove forests provided a significant source of income for local villagers. However, the establishment of a charcoal concession between 1968 and 1998 led to severe degradation of the forest and its associated aquatic resources. As a result, the community's livelihoods became unsustainable. To address this Bana Khana Khao issue. neighbouring villages-initiated efforts to restore the mangrove forests through community-based forest management. Despite these efforts, challenges arose due to lack of a strong management committee, ineffective communication of community needs, and insufficient coordination with government agencies.

In recognition of the community's longstanding reliance on mangrove forest, Mangrove Action Project (MAP) undertook a feasibility study in 2015 which concluded that a communitybased mangrove forest management approach would be suitable to support efforts conservation over mangroves. An area of 316-rai was identified and divided into three distinct land use zones for utilization. conservation, and restoration. Each zone is governed under specific rules to manage its use along with associated penalties for violations of this use. Unfortunately at the time the DMCR had yet to formulate registration for mangrove CF, thus this management plan was never initiated.

n June 2024, K4D organized a workshop with the Bang Khang Khao villagers to establish the Community Forest to resubmit this area to the DMCR through the CF registration procedure. The main issues discussed were:

- 1) The need to create jobs and supplement livelihoods, especially for older women, were identified as the most pressing. Communities also felt that waste management needed to be addressed to stem pollution mangroves, support the regeneration of mangrove forest, and increase biodiversity and aquatic life. Lastly, the need to resolve land rights issues, a main contributor to tenure and resource riahts insecurity. was highlighted.
- 2) After identifying these priorities, communities set out a clear agenda to organise the data and information they needed to support them to resolve these issues. These included a need for clear boundaries of their mangrove resource, a clear land use map and management plan, and a better understanding of the relevant law and policies to facilitate access to secure tenure rights.

3)The main objective for registering the CF with the government is to secure the community's right to access and protect the mangrove resources. The community's primary goal is to ensure they have the legal right to use and protect the mangrove forest within their community territory, and they recognize the need for stronger official protection beyond just local oversight. They want to ensure they have the legal authority to manage their forest and prevent exploitation, especially as mangrove forests gain more attention role in due to their carbon sequestration. This increased attention makes the forest vulnerable to being used for carbon credit programs by companies.

COMMUNITY-BASED PARTICIPATORY ACTION RESEARCH

K4D has undertaken several workshops utilising a communitybased Participatory Action Research approach. The preliminary research was conducted between July-September 2024, where 50 people (31 women, 19 men) from Nai Nang, Klong Prasong, and Bang Khang Khao participated in focus group discussions utilising participatory (FGD) approaches to gather information on their communities' perceptions of the CCS initiative, learn about their current understanding, and comprehend the existing historical context for natural resources management and stakeholders engaged.

On the second field trip, 33 people (18 women, 15 men) from the three targeted communities participated in FGDs, addressing the following topics: stakeholder involvement and power dynamics; community perspectives; and their engagement in the CCS. K4D conducted a structured survey during FGDs to gather individual experiences regarding their participation and access to information about the CCS. The communities' women leaders conducted the surveys with support from the research team to collect the communities' socioeconomic status and background information.



Community-driven brainstorming at Bang Khang Khao, June 2024, identifying data needs for mangrove management. Bang Khang Khao Community, Trang. Photo by EWMI-ODI team.

Stakeholder Power Analysis

While the power dynamics of each village differs, four main groups of stakeholders emerged: government authorities (local to national); (ii) corporations; (iii) NGOs; (iv) community members. Within each stakeholder group different power levels are at play, varying depending on the strength of community organizing. We asked communities to represent the stakeholders in Venn diagram activities designed to determine who the pivotal stakeholders were in decision making regarding the implementation of the CCS.



In Nai Nang, community representatives described themselves as the drivers of decision-making within their community, with local authority respecting their participation contributions. However, in the case of the CCS, the company and the DMCR made an agreement to undertake the initiative without consulting with the communities. The Apiculture Group was approached first by the DMCR and presented with a contract (MOU) which informed them of the initiative. It was presented to them in a positive light and it was assumed that they would agree to the initiative and enter into the agreement with the company. Upon reflection, this group felt that they were coerced into signing the agreement.

Other groups—including communitybased tourism groups, fishing groups, and the food processing group—were informed in later rounds communications separately. In this community, there were differences in the way power is observed by men and women. While men identified the sub-district officer and village headman as having the least power in the carbon credits scheme, women pointed to villagers and religious leaders as having the least power. This distinction could be rooted in traditional values, being of a minority Muslim culture, or gender discrepancy norms whereby women engage less with administrative matters of the community.

Representatives of the Klong Prasong community identified the village headman and community leaders as key decision-makers in their village. The DMCR, the company, the Klong Prasong headman and villagers selected by the headman were the key stakeholders who jointly made the decisions and signed the MOU under the CCS. This decision was then later shared with the sub-district administrative officer, and village headman's relatives. Established village committees, such as fisherfolks religious and committees, were later informed; despite the villagers however, representing 80% of the population, they were not consulted but simply informed of the decisions.

In contrast, the Bang Khang Khao community has yet to sign onto the CCS initiative. Representatives acknowledged that the sub-district officers have the greatest decisionmaking power. The villagers foresee that if the company and the DMCR agree to initiate the CCS they would firstly inform the sub-district officer. Once it is finalised, they will likely inform other groups, including the village committee, villagers, sub-district administrative officers, and the school principal. They foresee very little consultative processes occuring.

Although there are some variances in the power analysis for each village, the government, ultimately the DMCR, and the company hold the highest decisionpower. They are jointly determining the terms of the CCS initiative, who they communicate with, what information they share, and how the benefits of the CCS project are distributed. Local communities have historically served as the guardians of the mangroves and maintained strong cultural ties through traditional practices in these ecosystems. However, in all instances, there was no attempt to engage them in free, prior, and informed consent before agreements were made and formalised. As such, while the local communities represent a significant population, they sufficient representation in high-level decision-making processes. findings also showed that NGOs, particularly K4D in this context, play a key role as mediators during dialogue discussions and raising awareness on the CCS initiatives to address the gaps in community knowledge.



Awareness and Knowledge of the Carbon Credits Scheme

The power dynamics at play are crucial in shaping and influencing how and what information is provided to local communities; as a result, they directly shape how communities understand the CSS. To assess the level of community awareness understanding of the CCS, this study primarily on community members' access to information, sources of information, and the frequency with which they received updates related to the scheme.

The study found that knowledge and understanding of the mechanics of the CCS were diverse depending on the community's internal relationships, their collective voice, and the effectiveness of their leadership. The information about CCS was delivered to different stakeholders in inconsistent modalities and stages during the development process.



of survey respondents overall (n=33) across the three communities indicated that they were aware of the CCS initiative.



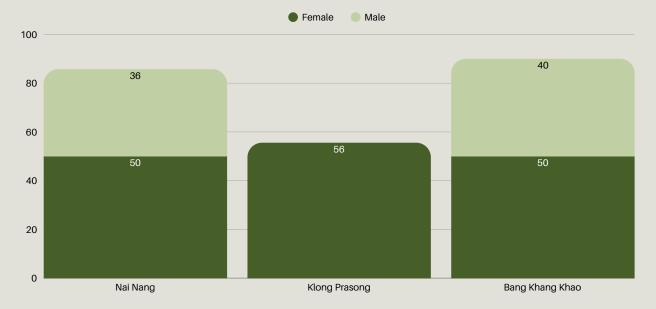
indicated that they had learned about the CCS initiative within the last few years.



had heard about CCS initiative within the last few months.

48% of respondents across the three communities reported accessing information annually rather than regularly. In this context "annually" means that they did not obtain information as frequently as they would like to have. This familiarity could be biased due to our engagement with the communities, additionally the higher number of female respondents could also be attributed to the women's networks who conducted the surveys.

Share of respondents (%) who are aware of CCS scheme; by village and gender



Awareness of the CCS initiative remains limited for the three communities, and 48% receive information less frequently than desired. In Klong Prasong 33% of men were unsure if they had heard about the CCS initiative, this is not represented in this graph.

Interestingly, respondents from the three communities received more information from community meetings than from government sources, with 25% citing community meetings and 17% mentioning the DMCR. Other sources included word of mouth (11%), NGOs (8%), and local leaders (8%).

In Nai Nang village, 57% of female respondents received information about CCS while the initiative participating in Apiculture conservation activities, while 29% learnt about it from the DMCR. In contrast, 57% of male participants received information from the DMCR. These male leaders subsequently shared the CCS information with the conservation Apiculture groups. Fourteen percent of respondents reported that they received the information from NGOs. Nai Nang's leadership and representatives demonstrated a higher

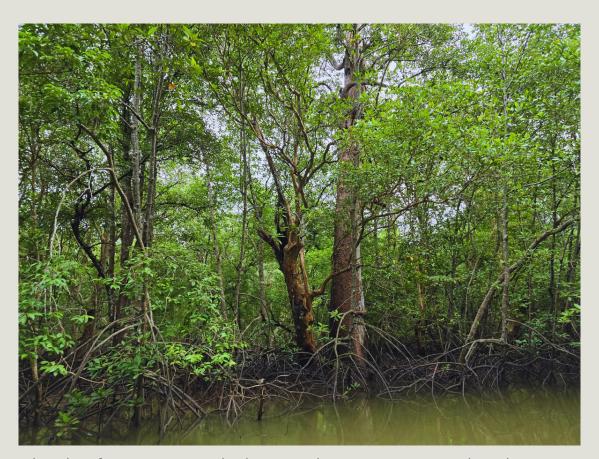
level of awareness (92%) and understanding of the CCS initiative than respondents from Klong Prasong (63%) and Bang Khang Khao (86%). This reflects the power analysis outcomes where the Nai Nang community leaders are proactively engaged in decision making for themselves and over their resources.

Klong Prasong village respondents stated that they did not directly receive information from the DMCR. Only 25% of male respondents received information from community meetings, while others obtained it from various sources. Seventy-five percent of male respondents were either unfamiliar or unsure of the CCS initiative. Most men in the community appear to engage in more traditional livelihood activities or responsibilities outside the household that may limit their availability to be involved in community-focused meetings.

On the other hand, 100% of female respondents reported that they were familiar with the CCS initiative, receiving information from multiple sources, including NGOs, social media, local leaders, and others. Therefore, women had a higher awareness understanding of the CCS initiative and greater exposure to had information-sharing processes discussions around the CCS. As a result. women have deeper involvement, awareness, and understanding of the CCS initiative than male community respondents. The study observed, however, while women in Klona Prasong demonstrated strong

leadership skills within their communities, they lacked formal recognition and opportunities to be invited to meetings organized by the DMCR and the company.

In Bang Khang Khao, the respondents reported obtaining information from various sources, including NGOs, social media, local leaders, and word of mouth. Most men received information through word of mouth rather than official channels. Women received information through local leaders at community meetings. Additionally, none of them received information about the CCS from the DMCR.



Diversity of mangrove species in Natural Mangrove Forest. Photo by EWMI-ODI team.

RECOMMENDATIONS

A strategic plan is necessary to challenge and restructure the existing power dynamics within communities to improve awareness of and communication around CCS issues. This requires empowering communities by closing knowledge gaps and fostering stronger unity and collective voices. There is also a critical need for the local DMCR staff to enhance their internal knowledge and awareness of the Carbon Scheme. This would enable them to effectively communicate with local communities, making the communities feel capable and influential in the decision-making process.

Livelihood groups within communities have demonstrated the potential to bridge and shift these power imbalances through capacitybuilding initiatives and activities. The Nai Nang community is a clear example of how such groups can unite to take collective action for equitable resource management. Through initiatives like beekeeping and conservation groups, they have successfully strengthened internal community power showcased a sustainable model of community-led resource governance.

Therefore, the DMCR engaged directly with conservation groups rather than focusing solely on individuals or community representatives.

Communities face ongoing insecurity regarding their rights to access and manage mangrove forests. Despite their traditional roles as guardians of mangroves and ecosystems, their authority and decision-making power remain marginalised, as highlighted by the power dynamics and stakeholder analysis conducted during the FGDs. Furthermore, the lack of secure land tenure rights and formal recognition undermines their efforts to sustain livelihoods and enhance their stewardship roles. This recognition has further marginalised communities, limiting their ability to access and participate equitably in the CCS.

Below, we provide eight recommendations to achieve these goals.

1. Secure and Strengthen Land Tenure for Community-led Conservation

Unclear land tenure rights limit communities' ability to manage and benefit from mangrove conservation.

Recommendations:

- Advocate for legal recognition of community-managed mangrove forests through the community forest mechanism.
- Support community mapping and documentation of traditional land use as evidence for tenure claims.
- Work with policymakers to integrate community governance structures into formal conservation policies.

2. Guarantee Free, Prior, and Informed Consent (FPIC) principles

The lack of FPIC compliance in project implementation has caused conflict and community dissatisfaction.

- Ensure that all agreements are made only after communities have been adequately informed and have had time to deliberate and provide feedback.
- Establish independent oversight mechanisms to monitor adherence to FPIC.
- Provide legal and advocacy support for communities to better understand and exercise their rights in CCS agreements.

3. Institutionalize Meaningful Consultation and Community Participation

A participatory approach is essential for the long-term success of conservation initiatives. The absence of proper consultations has led to a lack of transparency and community trust.

Recommendations:

- Implement structured and inclusive consultation processes before finalizing MOUs to ensure communities fully understand the implications and benefits.
- Establish mechanisms for ongoing information dissemination and dialogue between stakeholders.
- Develop culturally appropriate communication strategies to ensure all community members, including women and marginalized groups, have access to relevant information.

4. Promote Gender Equity in Leadership and Decision-Making

Women play a critical role in resource management but are often excluded from formal decision-making structures.

- Integrate gender-responsive mechanisms into conservation programs, ensuring women's representation in leadership roles.
- Provide targeted training and capacity-building programs for women to enhance their participation in conservation governance.
- Ensure that benefit-sharing mechanisms prioritize equitable access for women and marginalised groups.

5. Enhance local governance and power structures

Power imbalances between local leaders and broader communities have resulted in the mismanagement of resources and decision-making processes dominated by a few individuals.

Recommendations:

- Establish transparent governance structures that distribute decisionmaking power across community representatives rather than concentrating it in a few individuals.
- Provide financial management training for community leaders to ensure accountability and equitable resource allocation.
- Encourage local conservation groups and cooperatives to foster collective decision-making and resource management.

6. Build Awareness and Capacity on Carbon Credit Initiatives for Communities and Local Governance

Many communities have limited knowledge about carbon credit schemes, which hinders their ability to negotiate fair agreements and maximize benefits.

- Implement community-led training sessions on carbon credit mechanisms, rights, and potential risks.
- Ensure local government staff are adequately trained to provide communities with accurate and clear information on carbon financing.
- Develop simplified educational materials and conduct interactive workshops tailored to community needs.

7. Expand Livelihood Support for Sustainable Conservation Success

Sustainable income-generating activities enhance community engagement in conservation efforts and reduce dependency on unsustainable practices.

Recommendations:

- Provide financial and technical support for community-driven livelihood programs, such as sustainable aquaculture and apiculture.
- Develop cooperative models that allow communities to share benefits equitably.
- Facilitate market access and business development training to strengthen economic resilience.

8. Invest in Community-Led Climate Adaptation and Ecosystem Resilience

Climate change and environmental degradation continue to threaten mangrove forests and local livelihoods.

- Implement nature-based solutions such as mangrove restoration programs to address coastal erosion and storm surges.
- Provide technical support for sustainable land and water management practices.
- Advocate for climate adaptation funding that prioritizes community-led conservation efforts.



CONCLUSION

This research highlights the critical role that community participation, governance structures, and secure land tenure play in sustainable conservation initiatives. The findings underscore the necessity of securing land tenure rights over natural resources that encompass FPIC, improving consultation mechanisms, ensuring equity in decision-making, and enhancing local capacity to navigate carbon credit initiatives. Addressing these factors reduces conflict, improves trust, and fosters long-term environmental stewardship. While the approaches outlined in this study have proven effective in the communities engaged, they can also scale to other areas facing similar socio-environmental challenges. Continued research and investment are necessary to refine these models and ensure they are adaptable and responsive to diverse community contexts.

