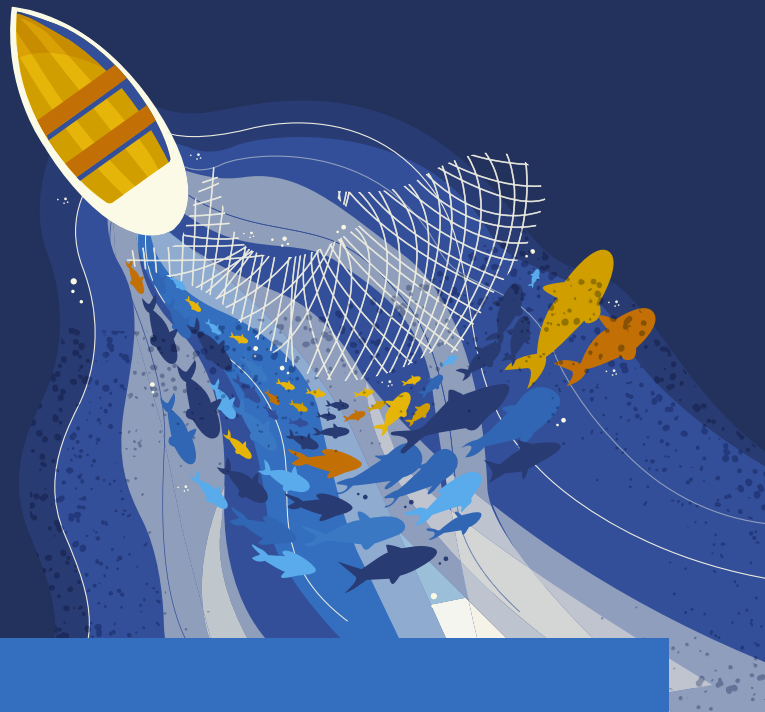


CASE STUDY

Thailand –

BAN PRED NAI



GEOGRAPHICAL CONTEXT

Ban Pred Nai (Village No. 2) is located along the eastern coastline of Thailand, in Huai Nam Khao Subdistrict, Mueang District, Trat Province. The village is within the mangrove forests of Trat Bay, which span approximately 1,920 hectares. Ban Pred Nai covers about 378.72 hectares and has 141 households, with a population of 225 men and 222 women.

Most villagers fish and harvest aquatic animals from the mangrove forest, including mudcrabs and mangrove crabs, for both food and income. Some community members also earn a living through seafood processing and trade. In addition, villagers farm fruit orchards (durian, rambutan, and mangosteen), while some also grow rubber trees.

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ECOLOGICAL AND TERRITORIAL DISRUPTION FROM CLIMATE CHANGE AND HUMAN ACTIVITY

- **PATTERN OF RAINFALL:** Rainfall patterns have shifted significantly in this region. Previously, rainfall was steady through March until October, with occasional showers in December and January. More recently, rainfall has become much heavier¹ and sporadic, causing slow drainage, flooded agricultural areas, and submergence of coastal infrastructure, hindering critical post-harvest activities. Contrastingly, rainfall seen in December and January has largely disappeared, resulting in an extended drought period.

¹ Thai Meteorological Department, *Climate Trends and Extreme Weather Reports* (2018), <https://shorturl.asia/EqMbX>, accessed August 14, 2025.

➤ **RISING TEMPERATURES AND UNPREDICTABLE WEATHER:** Temperatures have noticeably increased in recent years. Days above 35°C now occur about 15% more often each year. The added heat speeds evaporation and stresses intertidal mangrove habitats. As a result, groundwater now recharges more slowly, limiting access to clean water. At the same time, fishers report warmer seas, with surface waters in canals and along the coast noticeably warmer than before.² These shifts coincide with increasingly erratic weather: unseasonal rain and rapid swings between wet, cool, and hot conditions can occur within hours, while extreme heat, prolonged drought, and sudden downpours have become common.

➤ **WIND PATTERNS AND RISE IN SEA LEVELS:** Westerly winds are now more frequent, stronger, and less predictable, making them harder to forecast. These out-of-season winds strike with greater force and often snap or topple trees. At the same time, coastal fishers report rising sea levels, with the highest tides observed this year.³ High-tide marks around the pillars of houses built in areas regularly flooded by seawater are about two inches higher than thirty years ago. Although not attributed solely to sea-level rise, 23% of mangrove-fringed agricultural plots have been abandoned since 2010 as mangrove degradation has increased saltwater intrusion and sediment loss (further explained below).⁴ The same changes have caused aquaculture ponds to overtop their embankments, forcing farmers to invest in raising embankment heights.

Pred Nai has long been constrained by state policies that ignored community rights and damaged the mangrove ecosystem. In 1941, the area was put under a government logging concession, after which decades of logging and intensive shrimp farming followed and severely degraded the forest. By the early 1980s, the once-thriving 1,920-hectare forest was largely destroyed. The concessions benefited corporations and restricted villagers' access to crabs, shellfish, and other mangrove products. Community resistance eventually secured a government ban on logging and aquaculture, but by the time the concession expired in 1994 the ecosystem was already badly damaged.

Further pressure came from 1983 to 1987, when twelve traditional crab harvesting sites were reclassified as state conservation zones and closed to the community, which strained livelihoods and added stress to an already fragile ecosystem.

As degradation advanced, the mangroves lost key functions, including buffering waves, regulating salinity, and supporting marine life. This left the community more exposed to sea level rise, heavier rainfall, and salinity shifts. Recovery has stalled, nursery grounds have shrunk, and aquatic populations vital to livelihoods have declined.

Meanwhile, illegal and destructive fishing by neighboring communities, such as push nets and trawling, has increased. Although banned in coastal waters because of their impact on juvenile species, these practices persist under weak enforcement, depleting biodiversity, reducing fish stocks, and destabilizing local fisheries.

2 In the absence of formal studies in Baan Pred Nai, fishers report that nearby shallow, warmer waters yield fewer catches, requiring longer trips offshore to cooler, deeper grounds.

3 Rising saltwater can intrude into mangrove forests, alter salinity balance, reduce fish populations, damage forests, and weaken natural protection against storms and erosion.

4 Sustainable Development Foundation (SDF), *Impacts of Sea Level Change and Mangrove Degradation on the Coastal Community of Baan Pred Nai, Trat Province* (field survey report, Sustainable Development Foundation, 2022).



THE IMPACTS OF CLIMATE CHANGE ON FISHER PEOPLES' HUMAN RIGHTS, LIVELIHOODS AND WAYS OF LIVING

Climate change, biodiversity loss, and declining aquatic life now severely affect local fishers' livelihoods and undermine their human rights. These impacts reflect long-term resource exploitation, weak governance, and top-down policy.

RIGHT TO FOOD AND NUTRITION

The significant decline in mangrove biodiversity has caused an estimated 60–70% fall in crab populations since 2003.⁵ This decline has cut incomes and weakened the community's right to food and nutrition, as well as food sovereignty. In the past a fisher earned about 500–600 baht (approximately USD 16) per night from mud and mangrove crabs.⁶ Today about 45% of households report reduced fishing income. Women are hit hardest because they handle post-harvest processing, shellfish gleaning, and trading while facing less safe access to harvesting areas and fewer alternatives.⁷ Rising operational costs further strain households.⁸ Additionally, Several staple fish species (for example Java Tilapia and long-whiskered catfish) disappeared after 1987 as the mangrove ecosystem stopped providing suitable habitat.

Reduced mangrove resources and restricted access to wild foods weaken control over local food systems.⁹ As reliance on external, often lower-quality and more costly foods grows, traditional diets and practices erode, along with social cohesion, resilience, and the inter-generational transfer of ecological knowledge.¹⁰

Meanwhile, prolonged droughts reduce fruit yields and degrade coastal water quality by lowering freshwater inflows, shifting salinity, raising temperatures, reducing oxygen, and concentrating land-based pollutants (chemical inputs). Seasonal floods during peak monsoon months (September – October) submerge up to 40% of fish-drying and storage areas, cutting processing capacity – especially for women – and causing spoilage, food-safety risks, and lower household incomes. As crab numbers fall, women lose key income sources, including jobs at now-closed women-run crab-sorting shops. Many shift to wage labor, nearshore fishing, or selling mangrove waste, and they often manage household finances and seek loans when harvests fail during monsoon or drought.¹¹

5 Comparison of annual mud crab production, 1998–2020, drawing on: Community Forestry Center for People and Forests, *Report on Monitoring Changes in the Mangrove Ecosystem* (2004); P. Jaengsaeng, *Mud Crab Purchase Records* (unpublished internal data, 2012); D. Wareekhet, *Mud Crab Purchase Records* (unpublished internal data, 2020).

6 Except during rainy periods or cold weather, when the catch may be reduced.

7 In Trat, women typically handle post-capture processing and marketing. For mud and fiddler crabs in mangroves, women often participate in the full chain, from harvesting to sale.

8 Typical expenses include fuel for boats, fishing gear replacement during monsoon losses, purchased drinking water, and irrigation water for orchards in the dry season.

9 Access to as many as 17 wild mangrove food sources, including various shellfish, is reported to be restricted.

10 Reduced household income in Baan Pred Nai exacerbates social vulnerability, weakening kinship ties, mutual support, and cohesion.

11 Women's wage labor commonly includes orchard work in Baan Pred Nai, such as tending durian, applying fertilizer, and pruning.

In addition, Honey once supplemented incomes by up to 100,000 baht (approximately USD 3,000) per family each year. Today it is about 10,000 baht (USD 300), and some years there is none. The main reason is reduced plant diversity: forests once rich in year-round blooms are now dominated by seasonal *Rhizophora* spp (planted under government schemes). Declining freshwater flow and pesticide use in nearby orchards further reduce bee habitat. Destructive honey-collection practices also contribute to the drop.

Climate change also has profound and multidimensional impacts on supply chains, with severe implications for local fishing communities, especially women. Extreme weather events such as storms, floods, and droughts destroy infrastructure, boats, equipment, and habitats. Changes in fish migration due to warming and acidification of water, reduce catch availability and predictability, making fishing activities riskier and undermining the ability of local fishers and fish women to plan and sustain their livelihoods.

Climate change also exacerbates gender inequalities. As men migrate for work, women assume more responsibility for household survival, care, and subsistence gathering, yet their contributions remain undervalued in policy and management. Economic stress increases unpaid care work and narrows livelihood options. Income loss pushes younger people to migrate, shrinking the labor base for local resource management and weakening the use of traditional knowledge in increasingly unstable ecosystems.¹²

RIGHT TO HEALTH AND RIGHT TO WATER

These pressures, together with declining household income in Ban Pred Nai, are directly affecting community health. As families rely on mangrove resources and native plants, reduced income from fishing and foraging limits dietary options and leads to nutritional deficiencies, especially among children, women, and older adults. Climate variability also affects women's health, increasing fatigue, illness, and stress. With fewer natural resources available, women and men work longer hours, up to 12 to 14 hours a day, across multiple livelihoods, leaving less time for rest and family. Rising living costs, debt, and limited access to healthcare and medicines add further strain.

Water security is also under pressure. Recurring droughts and rising temperatures have made on-site pond water insufficient for households and orchards, pushing farmers into a paid water-sharing system with an annual fee of 1,000 baht (about USD 30) and higher irrigation costs.¹³ Villagers worry that income losses limit their ability to maintain and upgrade drinking-water infrastructure, including filter replacements and equipment repairs.

¹² Women also shoulder increased caregiving for family members who fall ill more frequently, especially children and older adults, amid erratic weather.

¹³ A community fund supports water-pumping equipment; members pay an operational fee of 50 baht (approximately 1.50 USD) per hour for fuel and the operator.

Thailand's environmental policies emphasize protecting coastal ecosystems, including mangrove forests, and have established conservation zones. For example, the 1992 Mangrove Reforestation Project signaled national intent to restore degraded areas.¹⁴ In practice, however, mangrove concessions, aquaculture promotion, and some reforestation programs often exclude meaningful community participation, especially from women, and can conflict with existing environmental laws. Many projects prioritize fast-growing monocultures over diverse, locally adapted species, which weakens ecosystem resilience. Despite women's central role in marine and coastal resource management, their contributions and needs remain largely overlooked.

Building on this policy context, the Department of Marine and Coastal Resources (DMCR) has promoted mangrove reforestation as a climate mitigation strategy, with growing private-sector involvement through public-private partnerships and carbon-credit schemes.¹⁵ The stated aim is to restore mangroves and expand carbon sinks. Implementation, particularly where forest-land concessions are granted to private entities, has raised concerns about customary rights, environmental justice, and fair benefit-sharing.¹⁶

In July 2022, DMCR issued formal ministerial regulations on carbon credit sharing for community-based mangrove planting and maintenance, titled "Regulation on Carbon Credit Trading and Benefit Sharing Obtained from Planting and Maintaining Mangrove Forest for the Community B.E. 2565". These regulations establish mechanisms for private sectors and communities to participate in carbon credit generation within a "community stewardship model". The policy sets a 10-year restoration period (2022–2031), aiming to restore up to 300,000 rai (≈ 48,000 ha) across 23 coastal provinces using carbon credit-based projects. Early targets (2023) included 7,088 ha across 16 provinces, involving both newly planted areas and community-managed existing mangrove forests.¹⁷

DMCR facilitates private companies to connect with coastal communities to apply for partnership. Private companies can invest in restoration and receive carbon credits via the T-VER (Thailand Voluntary Emission Reduction) platform managed by the Thailand Greenhouse Gas Management Organization (TGO). According to the regulation: Communities

14 Department of Marine and Coastal Resources (DMCR), *Thailand's National Policy and Strategic Plan on Marine and Coastal Resources Management (2019–2037)* (Bangkok: DMCR, 2021).

15 RECOFTC. (2022). *The risks and rights in forest carbon markets: A Southeast Asia perspective*. Bangkok: RECOFTC – The Center for People and Forests.

16 Asia Pacific Forum on Women, Law and Development (APWLD), *Climate Justice and Gender Equality: Voices from the Frontlines in Asia and the Pacific* (Chiang Mai: APWLD, 2023).

17 Department of Marine and Coastal Resources (DMCR), *Regulation on Carbon Credit Trading and Benefit Sharing Obtained from Planting and Maintaining Mangrove Forest for the Community B.E. 2565 (2022)* (Bangkok: Ministry of Natural Resources and Environment, 2022)

directly involved in planting and maintenance receive their share of carbon credits. Benefit-sharing typically allocates 20% to the community, 10% to DMCR, and 70% to private sector investors or project sponsors.¹⁸ Beginning in 2025, Thailand exempts land tax on mangrove areas that meet restoration and vegetation criteria to encourage participation in blue-carbon initiatives.¹⁹

Although the scheme is not yet operating in Ban Pred Nai, DMCR plans to allocate 2,080 rai (333 ha) in Trat, including mangrove land near the village, for a carbon-credit project under Thailand's 30x30 policy. The initiative, developed with companies such as PTT Global Chemical (PTTGC) and SCG Chemicals, aims to expand mangrove cover for carbon sequestration.²⁰ The initiative is registered under T-VER, expected to sequester around 23,700 tons CO₂ annually, and includes local community engagement and crab release programs.²¹ The restoration plan, however, emphasizes single fast-growing species, which reduces mangrove biodiversity.²²

On the ground, community experience reflects these risks. In 2023, planting for carbon credits proceeded along 16 hectares of Ban Pred Nai's shoreline, mainly with *Rhizophora mucronata*, without any community meeting, consultation, or referendum. Most of the planted trees have since died. The episode has heightened concerns about rights, accountability, and ecological suitability.

More broadly, carbon-credit schemes marketed as climate solutions are expanding in coastal and mangrove areas, with growing risks of displacing traditional fishers and harvesters through afforestation and restoration that overlook social and ecological diversity. These policies often overlap and can violate customary tenure rights, reclassify community-managed forests, and restrict access to fishing grounds and mangrove products, while excluding communities, especially women and Indigenous groups, from decision-making and benefit-sharing. Weak rights-based safeguards and fragmented marine governance allow these problems to persist, leaving fishing communities vulnerable to displacement and ecological harm under the banner of mitigation.²³

18 Ibid. DMCR facilitates private–community partnerships by engaging interested companies and enabling direct dialogue with community representatives where community mangrove projects are proposed.

19 Ibid.

20 PTT Global Chemical Public Company Limited (PTTGC), "PTTGC Collaborates with DMCR to Expand Mangrove Carbon Sinks under the 30x30 Policy," *Corporate Sustainability News* (2023), <https://www.pttggroup.com/th/newsroom/news/1301/>

21 Focus group interview with the committee of the Ban Pred Nai Mangrove Forest Conservation and Development Group, May 2025.

22 PTT Global Chemical Public Company Limited (GC) has a clear plan to reduce greenhouse gas emissions by 20% by 2030 and is committed to achieving Net Zero by 2050. Planting, restoring, and conserving forests in collaboration with government agencies, the private sector, and local communities is one of its social and environmental activities. This approach has been a continuous effort by the company since 2013 to procure high-quality carbon credits, with over 6,000 rai already implemented. For this specific project, GC's operations cover an area of approximately 3,500 rai across four provinces: Rayong, Trat, Chanthaburi, and Phetchaburi. It's estimated to reduce carbon emissions by about 23,700 tons of CO₂e per year. Additionally, there's a crab release program to breed crabs in nursery areas.

23 Sustainable Development Foundation (SDF), *Carbon Credit Projects and Customary Rights: A Case Study of Baan Pred Nai, Trat Province* (Bangkok: SDF, 2024); Asia Pacific Forum on Women, Law and Development (APWLD), *Displaced by Carbon: Feminist Perspectives on Climate Solutions and Mangrove Carbon Markets in Southeast Asia* (Chiang Mai: APWLD, 2023); International Work Group for Indigenous Affairs (IWGIA), *Indigenous Peoples and the Green Economy: A Critical Perspective* (Copenhagen: IWGIA, 2023).

In this context, villagers strongly oppose the carbon credit project, fearing it will limit their access and rights to manage the forest. Instead, they seek to register the forest under the 2023 DMCR community-based mangrove management regulation to retain local control.

In response to climate change and environmental degradation, Ban Pred Nai revived its mangrove initiative. The community registered under the Community Mangrove Forest Project in 2024 and rejected the carbon credit model. Approved in 2025, the project enables community-led management under traditional rules, restores biodiversity beyond monoculture, and reopens a learning center for ecotourism and education. The effort is led by the Ban Pred Nai Mangrove Forest Conservation and Development Group with support from NGOs, academics, and local residents.²⁴

Ban Pred Nai also has a long record of mobilization. In the 1990s residents self-organized in response to environmental damage and livelihood loss. They adopted community rules for sustainable use and banned illegal logging and overharvesting. In 1992 the community formally launched the Community Mangrove Forest Project. Collaboration with NGOs, academics, and progressive forest officials brought national and international attention. From the 1990s through the 2000s the community restored more than 2,000 rai (320 ha).

Overall, the case of Pred Nai shows how climate change and poorly designed carbon credit schemes intersect to harm coastal communities. It underscores the need for rights-based, community-led approaches that recognize traditional knowledge, secure tenure, and meaningfully include women and other marginalized groups in decision-making.²⁵

24 Department of Marine and Coastal Resources (DMCR), *Regulation on Community-Based Mangrove Forest Management B.E. 2566 (2023)* (Bangkok: Ministry of Natural Resources and Environment, 2023).

25 Suthawan Sathirathai and Edward B. Barbier, "Valuing Mangrove Conservation in Southern Thailand," *Contemporary Economic Policy* 19, no. 2 (2001): 109–122, <https://doi.org/10.1093/cep/19.2.109>; UNDP. (2004). Equator Prize 2004: Celebrating local success for global goals. United Nations Development Programme. Retrieved from <https://www.undp.org/publications/equator-prize-2004>; RECOFTC. (2010). Community-based forest management in Pred Nai Village, Trat Province, Thailand. The Center for People and Forests (RECOFTC). Retrieved from <https://www.recoftc.org/publications/0000260>.

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