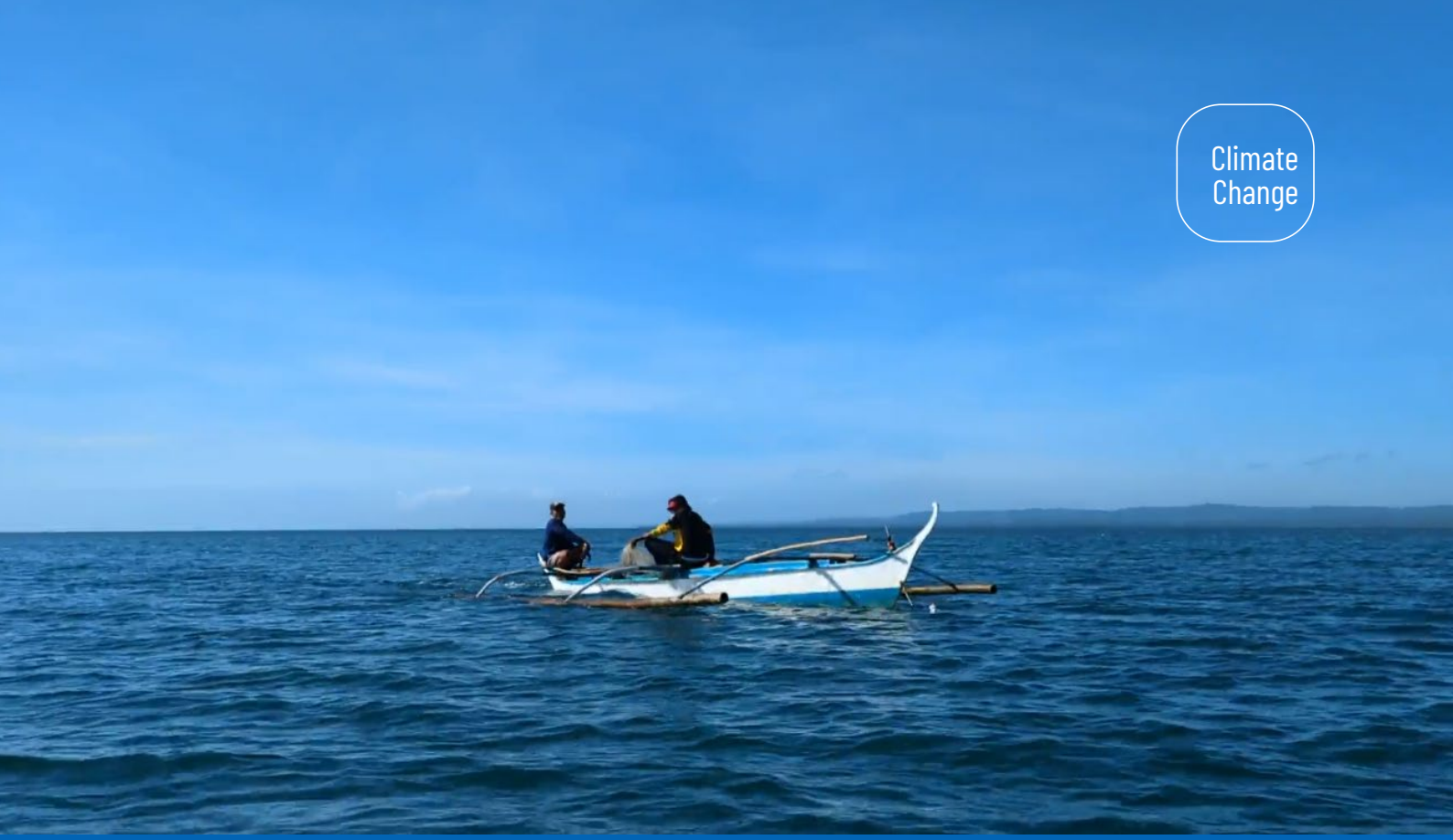


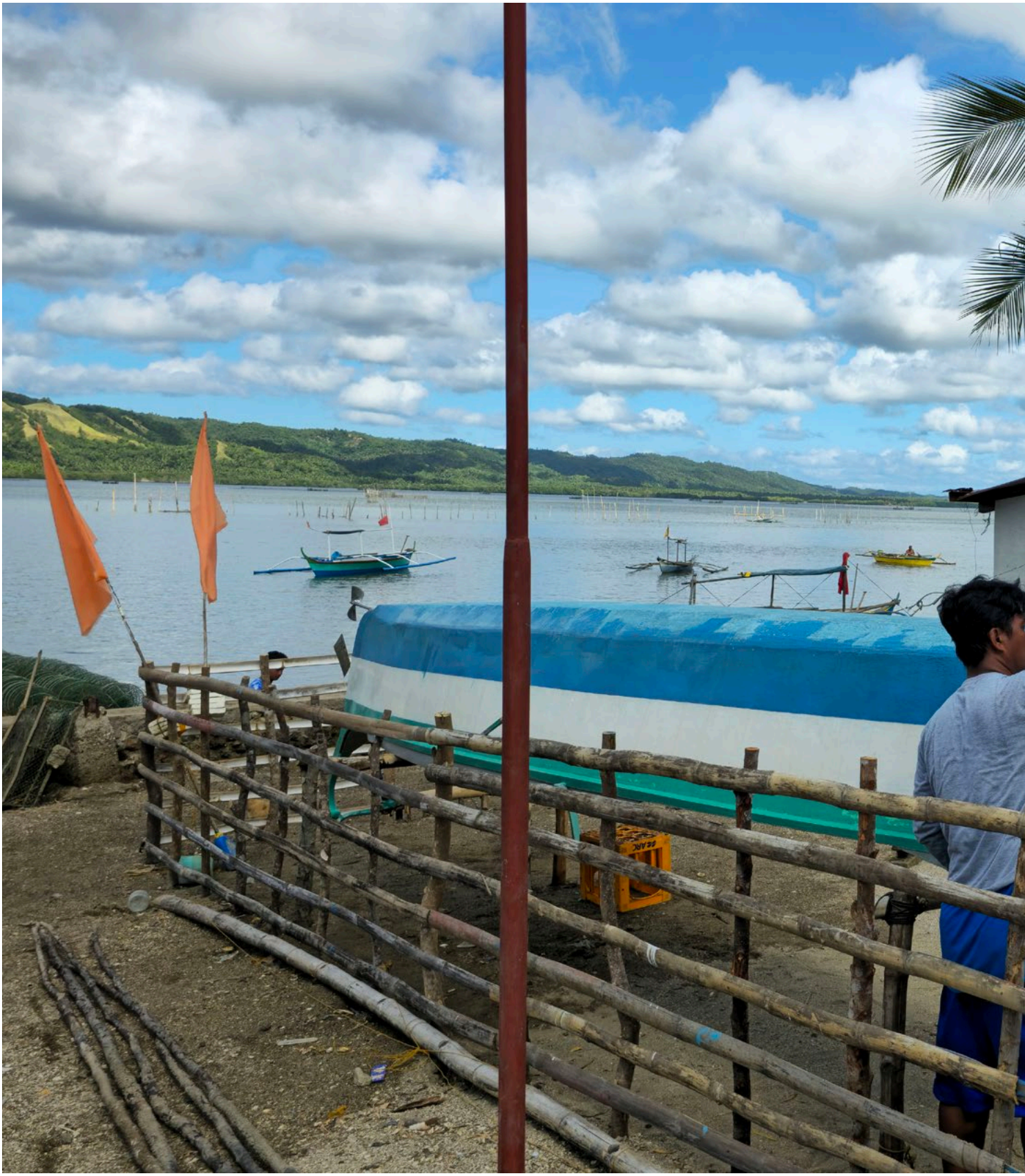
Climate Change

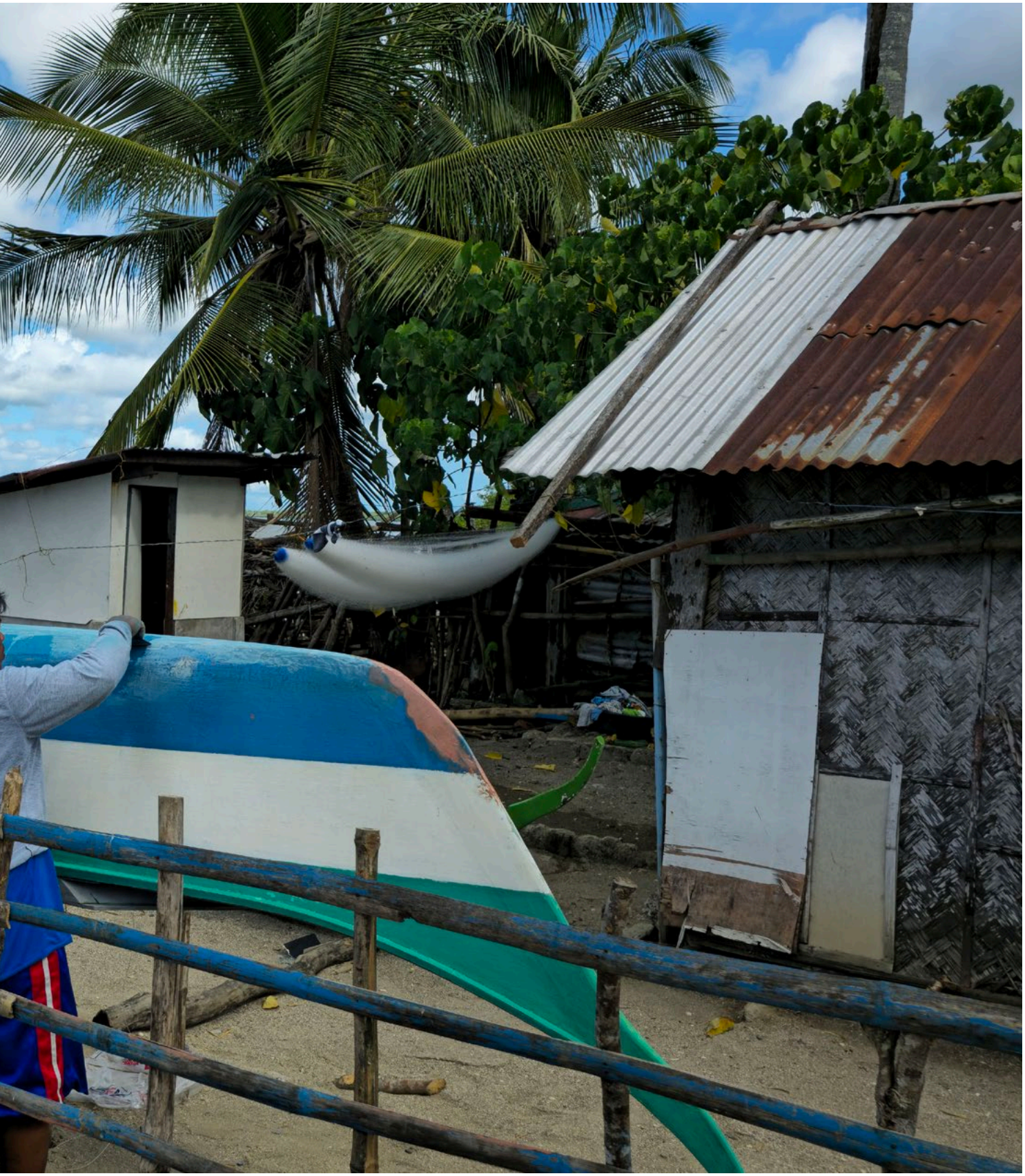
The Philippines
Climate Change Impacts & Small-scale Fisheries

A Case Study of Adaptation and Resilience

Written by
Maria Katrinna Nabor

International Collective in Support of Fishworkers
ICSF





A fisherman tending to his fiberglass craft, by Maria Katrinna Nabor

The Philippines: Climate Change Impacts & Small-scale Fisheries
A Case Study of Adaptation and Resilience

August 2025

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International Collective in Support of Fishworkers (ICSF) Trust
No:22, First Floor, Venkatrathinam Nagar, Adyar, Chennai 600 020, India
Tel: 91-44-24451216 / 24451217
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Front Cover:
The SSF utilize municipal fishing crafts that are less than one gross tonnage, which are not optimized for open sea fishing grounds or harsh weather conditions, by Maria Katrinna Nabor

ISBN 978-93-80802-18-3

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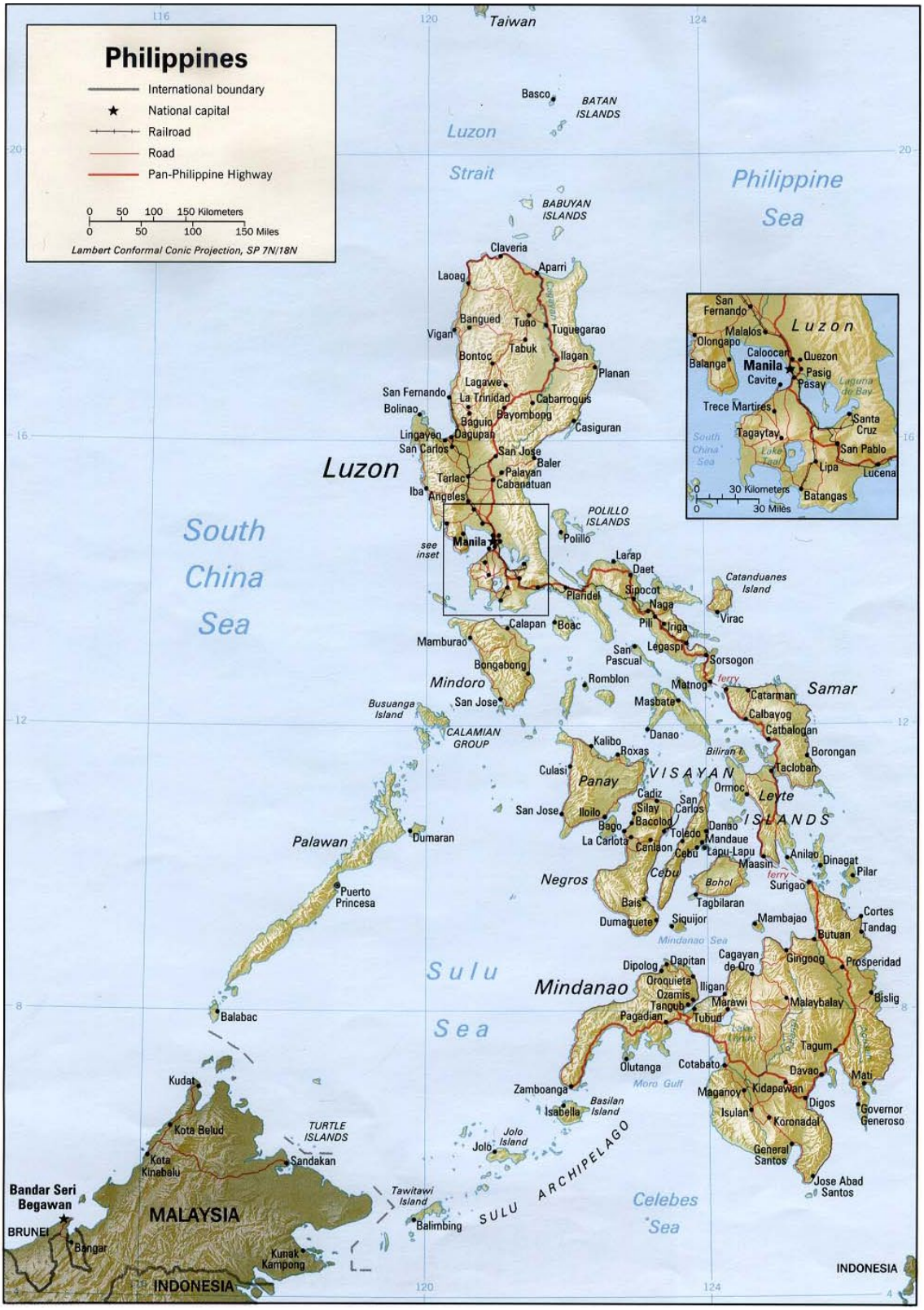

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List of Acronyms

BFAR	Bureau of Fisheries and Aquatic Resources
CCA	Climate Change Adaptation
CCC	Climate Change Commission
CRMP	Coastal Resource Management Project
DA	Department of Agriculture
DENR	Department of Environment and Natural Resources
DSWD	Department of Social Welfare and Development
FAO	Food and Agriculture Organization of the United Nations
FARMCs	Fisheries and Aquatic Resources Management Councils
IFARMCs	Integrated Fisheries and Aquatic Resources Management Councils
IUUF	Illegal, Unreported and Unregulated Fishing
LGU	Local Government Unit
MAO	Municipal Agriculture Office
MDRRMO	Municipal Disaster Risk Reduction and Management Office
MENRO	Municipal Environment and Natural Resources Office
MFARMCs	Municipal Fisheries and Aquatic Resources Management Councils
MPA	Marine Protected Area
MPDO	Municipal Planning and Development Office
MSWDO	Municipal Social Welfare and Development Office
NAP	National Adaptation Plan
NAPC	National Anti-Poverty Commission
NCCAP	National Climate Change Action Plan
NDC	Nationally Determined Contributions
NDRRMC	National Disaster Risk Reduction and Management Council
NFARMC	National Fisheries and Aquatic Resources Management Council
OCD	Office of Civil Defence
PSF	People Survival Fund
SSF	Small-scale Fisheries/Fishers
UNFCCC	United Nations Framework Convention on Climate Change

Introduction

The 2021 Global Climate Risk Index ranked the Philippines as the 17th most affected country by extreme weather events. Of the country's 14 basic sectors (as defined under Republic Act No. 8425), the artisanal fisherfolk are among the most vulnerable to events related to climate change. In its 2021 latest survey on poverty, the Philippine Statistics Authority (PSA) recorded a poverty incidence of 30.06 per cent within the sector compared to the national poverty incidence average of 18.1 per cent. Situated along the coastlines, artisanal fisherfolk are both physically and economically vulnerable to the impacts of climate change. As an archipelagic country, 70 per cent of its 1,493 municipalities are in coastal areas.

The Philippine Fisheries Code of 1998 (Republic Act 8550) does not include provisions for addressing the impact of climate change on the country's fisheries and its stakeholders. Even its 2015 amendment (through the Republic Act 10654) did not include mitigation and adaptation measures. The focus is limited to Illegal, Unreported and Unregulated Fishing (IUUF). In its place, the country has adopted the Climate Change Act of 2009, leading to the creation of the Climate Change Commission (CCC). It is tasked with the coordination, monitoring and evaluation of government programmes and action plans to address climate change impacts. The People Survival Fund (PSF) was established in 2012 to support climate change programmes and action plans through financing local initiatives. At present, the country's strategy on climate change is defined and detailed under its National Climate Change Action Plan (NCCAP) for 2011-2028. The country ratified the Paris Agreement on March 23, 2017, and submitted its Nationally Determined Contributions (NDC) to the United Nations Framework Convention on Climate Change (UNFCCC) in 2016.

In its Second National Communication (SNC) to the UNFCCC in 2014, the Philippines identified agriculture—including forestry and fishing—as highly vulnerable sectors to the effects of climate change. The communication recognized the municipal fisheries' contribution to the economy, but failed to emphasize on how it planned to build resilience among small-scale fisheries (SSF) communities. From the country's perspective, the sector is subsumed under the larger umbrella of agriculture. This is reflected in the government structure: the Bureau of Fisheries and Aquatic Resources (BFAR), charged with the fisheries sector, is subsumed under the country's Department of Agriculture (DA). Fisheries stakeholders have called this arrangement unfavourable. The sector contributes to the national coffers without any guarantee of resource allocation commensurate with its contribution. This also limits its representation in national decision-making and designing of programmes. This is expected to have a significant impact on SSF communities' access to support and resources required to build resilience.

The Climate Change Act of 2009 is now a decade and a half into its implementation. The contribution of the legislation and the adoption of international instruments to SSF communities' capacity adaptation to climate change impacts are still not clear. This makes it imperative to review adaptation measures at the community level. By putting an emphasis on the perspectives of the SSF communities about the impact of climate change, successive programmes can be better informed. This will also allow the SSF communities to showcase grassroots experiences that support adaptation and the building of resilience. Climate change adaptation programmes should build on what is being done at the community level and provide support and resources to ensure their continuity and expansion. As of the writing of this report, policies and programmes for climate change adaptation are still under development or review. Therefore, the data on implementation and assessments of the new initiatives shared by respondents from government offices is limited.

This case study contributes to a better understanding of climate change adaptation measures at several levels. It highlights the perspectives of SSF communities on how climate change impacted their access to fisheries resources and livelihoods, and their efforts towards building resilience. To this end, the case study did the following:

- Documented the observations of SSF actors about the impacts of climate change on the coastal community in Tagkawayan and the strategies adopted by national and sub-national agencies
- Developed a narrative on the impacts of climate change and the adaptation measures from the perspective of a SSF community
- Examined the availability and adequacy of support to increasing resilience of Tagkawayan's SSF community
- Identified the support, as defined by the SSF community members, needed to advance their adaptation and promote resilient fisheries
- Elicited key information from data collection and analysis on efforts to reduce the vulnerability of SSF communities

Research design and methodology

Three methods were employed to collect secondary and primary data on climate change and its impact on SSF adaptation and resilience: (i) review of related literature; (ii) key informant interview (KII); and (iii) focus group discussion (FGD). A review of literature on key laws, policies and programmes at multiple levels helped establish the broader institutional and organizational context of climate change and SSF community adaptation. This review also guided the selection of national and sub-national government and non-government respondents for KIIs. The data was drawn to develop the SSF narrative from the perspective of community members through FGDs.

To guide the development of interview questionnaires and data analysis, the case study utilized a comprehensive framework. Its elements were:

Institutional Context

- Existing policies, programmes, and measures addressing climate change impacts on SSF communities

- Support, such as financial, technological, or capacity building, provided by the government and other actors to help fishing communities adapt and recover
- Improvements needed in planning, implementation, monitoring, and evaluation of climate change adaptation measures

Mechanisms for Integration

- How international climate frameworks are translated and integrated from global to local levels in the fisheries sector
- Formal or informal mechanisms facilitating SSF community participation in designing, planning, implementing, monitoring, and evaluating adaptation measures

Stakeholder Engagement Processes

- Processes for gathering feedback from stakeholders, including the SSF community, on evolving adaptation needs
- Key actors involved in planning, implementing, monitoring, and evaluating climate change adaptation and mitigation in SSF
- SSF community perspectives
- Observations and experiences of SSF communities on the impacts of climate change and their livelihoods
- Identification of vulnerable sub-groups within SSF communities and factors contributing to their vulnerability
- Strategies for better integrating SSF community voices and traditional knowledge into the design and implementation of adaptation measures

Table 1 lists KII respondents for relevant government agencies and organizations mandated with climate change adaptation planning, monitoring and implementation.

Table 1. Key Informant Interviews

Name	Organization
Kyle Dela Cruz	Climate Change Commission, Policy Research and Development Division
Raquel de Leon	Office of Civil Defence; and National Disaster Risk Reduction and Management Council (OCD-NDRRM)
Jennelyn Vargas	Bureau of Fisheries and Aquatic Resources (BFAR), Fisheries Planning and Economics Division, Climate Change Adaptation and Mitigation DRRM Ad Hoc Team
Bayani Garcia	Municipality of Tagkawayan, Municipal Disaster Risk Reduction and Management Office (MDRRMO)
Rhea Rodriguez	Municipality of Tagkawayan, Municipal Social Welfare and Development Office (MSWDO)
Juanito Panganiban Cleudith Ann Gutierrez	Municipality of Tagkawayan, Municipal Agriculture Office (MAO)
Maribel Rosana	Municipality of Tagkawayan, Municipal Environment and Management Office (MENRO)
Francis Villanueva	Municipality of Tagkawayan, Municipal Planning and Development Office (MPDC)

Not every SSF has their own craft. Some fisherfolk have to rent a craft, which eats into their income, by Maria Katrinna Nabor

Table 2 shows the basic information of the coastal community respondents (eight female fishers and seven male fishers) from the municipality of Tagkawayan. The fishers are representatives of the barangay fisherfolk associations from the coastal barangay (local administrative unit) of Candalapdap, Laurel, Maguibuay, Rizal, Sabang, Mahinta and San Diego. Data on their fishing vessels revealed that the small-scale fishers utilize municipal fishing craft that are less than one gross tonnage (GT) and are not optimized in horsepower and size to go to open sea fishing grounds or operate in harsh weather conditions. Their dependence on fishing as a source of income also makes them extremely vulnerable to the impacts of climate change.

Their fishing methods are largely targeted like crab traps and handlines. The fishers have observed a noticeable impact on the productivity of their fishing operations in relation to increased unpredictability of extreme changes in weather conditions. Changes in water temperature forced those with crab traps and fish cages to move to deeper waters. This increased the costs, time and resources requirement. With prices not going in their favour, these changes often result in declines in household income. Their way of life leaves them with no choice but to remain in fishing and adapt to the effects of climate change—as seen in the average period for which respondents remain active in fishing (26 years) and time spent in the coastal area (37 years), both of which are inextricably linked to the fisheries resources.

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Table 2. Focus group discussion participants

Name	Age	Sex	Number of Household Members	Years Living in the Community	Primary Source of Income	Years Active in Fishing	Fishing Method	Size of Craft	Horse-power
Jessa	43	F	6	23	Fishing (craft)	20	*Kitang, pangke*	Less than 1 gross tonnage	-
Anita	56	F	7	34	Fishing	34	*Pana, Kawil, Biwas, Lambat*	Less than 1 gross tonnage 7 horsepower	7
Teodilyn	44	F	9	44	Fishing	30	*Kitang, Biwas*	Less than 1 gross tonnage	-
Wilma	63	F	6	44	Fishing, Copra	30	*Lambat*	None; rents craft	-
Luningning	57	F	5	36	Fishpond	25	*Pangke*	Less than 1 gross tonnage (7.5 horsepower)	7.5
Emily	49	F	7	27	Fishing	26	*Pangke, Biwas*	Less than 1 gross tonnage (7 horse-power)	7
Vilma	45	F	4	12	Fishing	12	*Kitang,* nylon, hook	Less than 1 gross tonnage (12 horsepower)	12
Rosario	43	F	8	43	Fishing, Oyster harvesting	25	*Kitang, Biwas*	Less than 1 gross tonnage (10 horsepower)	10
Domingo	57	M	7	30	Fishing (motor craft)	5	*Pangke*	6.5 meters (10 horsepower)	10
Alexander	60	M	11	42	Fishing, Farming	42	Trap net	6 meters (6.5 horsepower)	6.5
Ramil	49	M	9	49	Fishing	30	*Lambat*	None; rents craft	-
Romeo	52	M	8	52	Fishing	30	*Lambat* (for fish and crab)	7 meters	6
Renato	62	M	7	62	Fishing	40	*Lambat*	7 meters	6
Melahor	48	M	5	48	Fishing	28	*Baklad*	5 /7.5 horsepower	7.5
Darwin	44	M	9	21	Fishing, Farming	21	*Pana*	None	-
Mean	**51.47**		**7.20**	**37.80**		**26.53**			**7.95**
Mode	**43**		**7**	**44**		**30**			**7**
Median	**49**		**7**	**42**		**28**			**7.25**

Fishing method terms:
Kitang: Fishing line with multiple hook
Pana: Spear
Biwas: Hook and line
Lambat: Fishing net
Baklad: Fish corral

Review of Related Literature

This section presents an examination of the existing literature on climate change adaptation in the context of SSF. The literature reviewed outlines existing perspectives on addressing institutional policies and programmes, support mechanisms, community needs, and participatory processes in the context of climate change adaptation.

Institutions

Local autonomy is a key principle enshrined in the Philippine Constitution, granting sub-national governments, including provinces, cities and municipalities, a significant degree of autonomy and decision-making power. Consistent with Article X of the constitution on the structure, organization, and functions of local government units (LGUs), as well as their sources of revenue and budgeting processes, the legal framework empowers local authorities to deliver essential public services and facilities that are crucial for promoting the well-being and development of local communities across the country. Therefore, the decentralization and devolution of administrative power within the country guides both policy development and the planning, monitoring, implementation and evaluation of government interventions.

The Local Government Code of 1991 provides municipal governments with oversight authority over local policies and programmes. Within its mandates, LGUs serve as the primary implementers of programmes and projects within their jurisdiction. LGUs are empowered to address local needs effectively. This also affects how quasi-government bodies like the Fisheries and Aquatic Resources Management Councils (FARMCs) and civil society organizations work within the context of climate change adaptation. Considering that they are expected to raise other sources of revenue outside the annual allocations from the Internal Revenue Allotment, this limits the capacity of LGUs to unilaterally respond to the demands of climate change adaptation and mitigation.

Climate change policies and programmes have been adopted by countries party to the UNFCCC. There is a wealth of policies and programmes on climate change, but their priorities and implementation targets are limited in the context of the plight of SSF adaptation experience. Given the administrative structure of the country, national laws need to be adopted at the local level—and context-specific plans and programmes need to be developed and adjusted according to the financial and technical capacity of the LGUs.

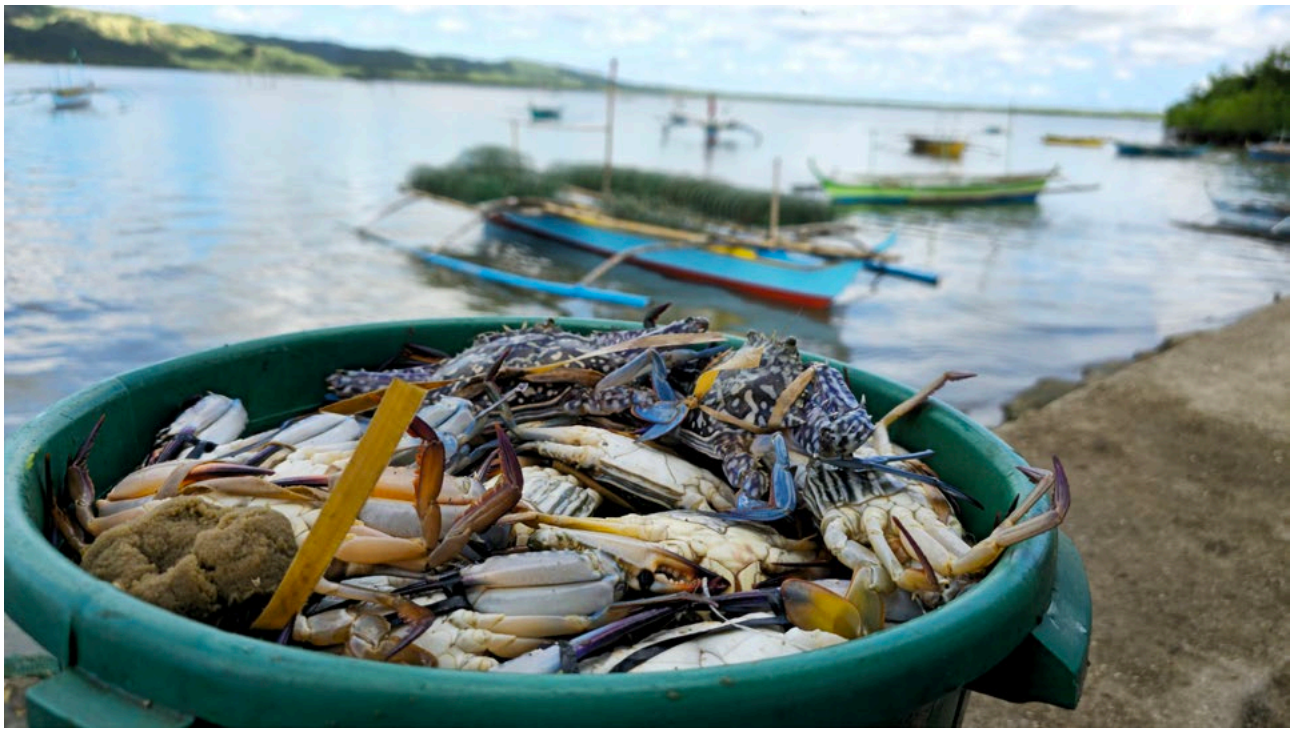
Policies and programmes

The Philippines has broad climate change policies, but lacks specific programmes tailored to SSF. The country has developed overarching climate change policies like the NCCAP, which provides a framework for adaptation and mitigation efforts and a Fisheries Code that recognizes the impacts of climate change on the sector. However, a dedicat-

ed policy specifically addressing climate change adaptation for SSF is lacking. The BFAR integrates climate change into national fisheries plans, but further efforts are needed to develop targeted strategies for SSF. The literature highlights the need for a more holistic approach that considers the interconnectedness of climate change, poverty, and food security in SSF communities. It is also important to distinguish between marine and inland fisheries, as their vulnerabilities and adaptation needs may differ.

Support to fishing communities

Various forms of support are provided to fishing communities, including access to financing, technology, and training through government programmes and NGOs. Social safety nets, such as cash transfers and livelihood diversification programmes, are also implemented. The scope and effectiveness of these supports vary, ranging from financial assistance and subsidies to capacity-building programmes focused on sustainable fishing practices and alternative livelihood options. Nonetheless, based on the 2023 findings of the FAO and studies by other researchers in 2021, access remains a challenge for many SSF communities, particularly vulnerable groups. Studies emphasize the importance of strengthening social protection measures and providing alternative livelihood options to enhance resilience.



Blue swimming crabs, once abundant in Tagkawayan municipality, are now fewer in number and smaller than before, by Maria Katrinna Nabor

Assessments of the sector have revealed that social safety nets and alternative livelihood programmes are crucial for resilience. Sound research supports this analysis, suggesting the exploration of resilient fisheries development and incorporating ecosystem-based adaptation measures in accordance with the recommendations of the Global Environment Facility. A broader, yet more defined, approach for SSF should be considered for further development of plans to address adaptation. The role of the government and several stakeholders has enhanced support for fisheries in adapting to climate change.

Improvements in planning and evaluation
The literature emphasized the need for improved coordination among stakeholders, greater community participation in planning and implementation processes, and enhanced monitoring and evaluation mechanisms. Integrating climate change considerations into local development plans and strengthening the capacity of LGUs to implement adaptation measures are crucial steps. Participatory approaches that involve SSF communities in identifying vulnerabilities, designing adaptation strategies, and monitoring progress were found to be essential for ensuring effectiveness and ownership. This requires a shift in perspective and approaches that allow communities to have a stronger voice and influence in designing programmes. Adaptive management frameworks, which emphasize learning-by-doing and flexibility in response to changing conditions, are particularly relevant in the context of climate change.

Mechanisms

The effectiveness of the implementation of policies and programmes is influenced by the mechanisms adopted by each country and how these are applied from the local to the national level.

Formal mechanisms for community participation
While some formal mechanisms exist for community participation in coastal resource management, such as the establishment of people's organizations and community-based fisheries management programmes, their integration into climate change adaptation planning and implementation remains limited. The literature highlights the need for stronger institutional frameworks that facilitate meaningful participation of SSF communities in decision-making related to climate change adaptation, as was highlighted in a 2012 study titled 'Towards Sustainable Development of Small-Scale Fisheries in the Philippines: Experiences and Lessons Learned from Eight Regional Sites'.

The Municipal FARMC, or MFARMC, is the primary institution and mechanism for participation of municipal fishers in decision-making at the local government level. The FARMCs were established under the Fisheries Code of 1998 to promote fisherfolk empowerment, and to address the issues faced by coastal and inland fishing communities. The council, as a multi-stakeholder advisory body, provides representation to various stakeholders. The municipal-level council, according to the Fisheries Administrative Order 196 outlining the guidelines for its establishment, should include the Municipal Planning and Development Officer; the chairperson of the Agriculture/Fishery Committee of Municipal Council; a representative of the Municipal Development Council; a representative from an accredited NGO; a representative from the private sector; a representative from the DA; and at least eleven fisherfolk representatives, including those from the youth and women demographics.

The MFARMCs are tasked with assisting their respective LGUs in the preparation and submission of their locality's Municipal Fisheries Development Plan. They are also responsible for evaluating the implementation of the plan and providing recommendations to ensure its effective execution. The MFARMCs are empowered to recommend the enactment of municipal fishery ordinances. They have a role in enforcing fishery laws, rules and regulations within the municipal waters. There are no particular provisions limiting their function to issues on climate change. However, there is also no specific provision requiring them to tackle this issue. Considering that the council is driven by its mem-

ber-stakeholder representation, their priorities are also guided by their interests within the fisheries sector.

Processes

Within existing mechanisms, processes that promote participation in the planning, implementation, monitoring, and review affect how effective or limiting current and proposed efforts on climate change adaptation can be.

Stakeholders involved

Various stakeholders are involved in climate change adaptation efforts, including government agencies like BFAR and LGUs, NGOs, research institutions, and SSF communities themselves. However, power imbalances and limited capacity within local communities can hinder effective participation. Strengthening community organizations and promoting collaborative governance models are essential for ensuring equitable and effective adaptation planning and implementation.

Public consultations

While public consultations are conducted as part of environmental impact assessments and other planning processes, their effectiveness in capturing the specific needs and perspectives of SSF communities regarding climate change adaptation is often limited. The literature emphasizes the importance of regular and meaningful consultations that provide opportunities for SSF communities to share their experiences, voice their concerns, and contribute to decision-making. Public consultations are conducted as part of environmental impact assessments and other planning processes. This forms part of the participatory decision-making process that is made possible through the MFARMC, where the municipal fishers are represented and take the lead with the support of the LGU.

SSF community

Although the implementation of the UNFCCC includes creating local climate change action plans, SSF community concerns and interests are not often specified in these plans of action. The fisheries sector is included in actions related to dealing with climate change, but specific adaptation needs and support of the SSF sub-sector are expected to be determined by the LGUs.

Need for adaptation and increased resilience

SSF communities face numerous challenges related to climate change, including the increased frequency and intensity of extreme weather events like typhoons and floods, sea level rise, ocean acidification, and changes in fish stocks. Adapting to these impacts requires a multi-faceted approach that includes strengthening social safety nets and enhancing disaster preparedness. These include, among others, promoting sustainable fishing practices; diversifying livelihoods; empowering local communities; and providing access to related information and technologies. Access to climate information, early warning systems, and appropriate technologies are also crucial for building resilience.

The specific needs of SSF communities may vary depending on their location, the types of fisheries they engage in, and their socio-economic context. Addressing the specific needs based on the local context is crucial. Mobility and access to fishing grounds are

also affected by climate change and other factors. Small-scale fishers employ several adaptation strategies, including livelihood diversification. Considering the sensitivity and adaptive capacity of SSFs to decline is also important.

Role of SSF communities in adaptation

The precarious situation of SSF in the Philippines underscores the need for a roadmap for recovery and adaptation. This calls for an approach that considers and includes the interests of SSF communities, which possess valuable traditional knowledge and practices; these can contribute to climate change adaptation. Their intimate understanding of local ecosystems, fishing grounds and weather patterns can inform the development of effective adaptation strategies. Empowering SSF communities to actively participate in planning, implementation, and monitoring of adaptation measures is essential to ensuring their effectiveness and sustainability.

Studies on fisherfolk resilience, preparedness, coping capacity and adaptation strategies in specific regions provide valuable insights. Factors influencing adaptation, such as access to information, resources, and social networks, are also important considerations. Research on climate change vulnerability and its impacts on SSF in specific areas offers further insights.

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Case Study Site

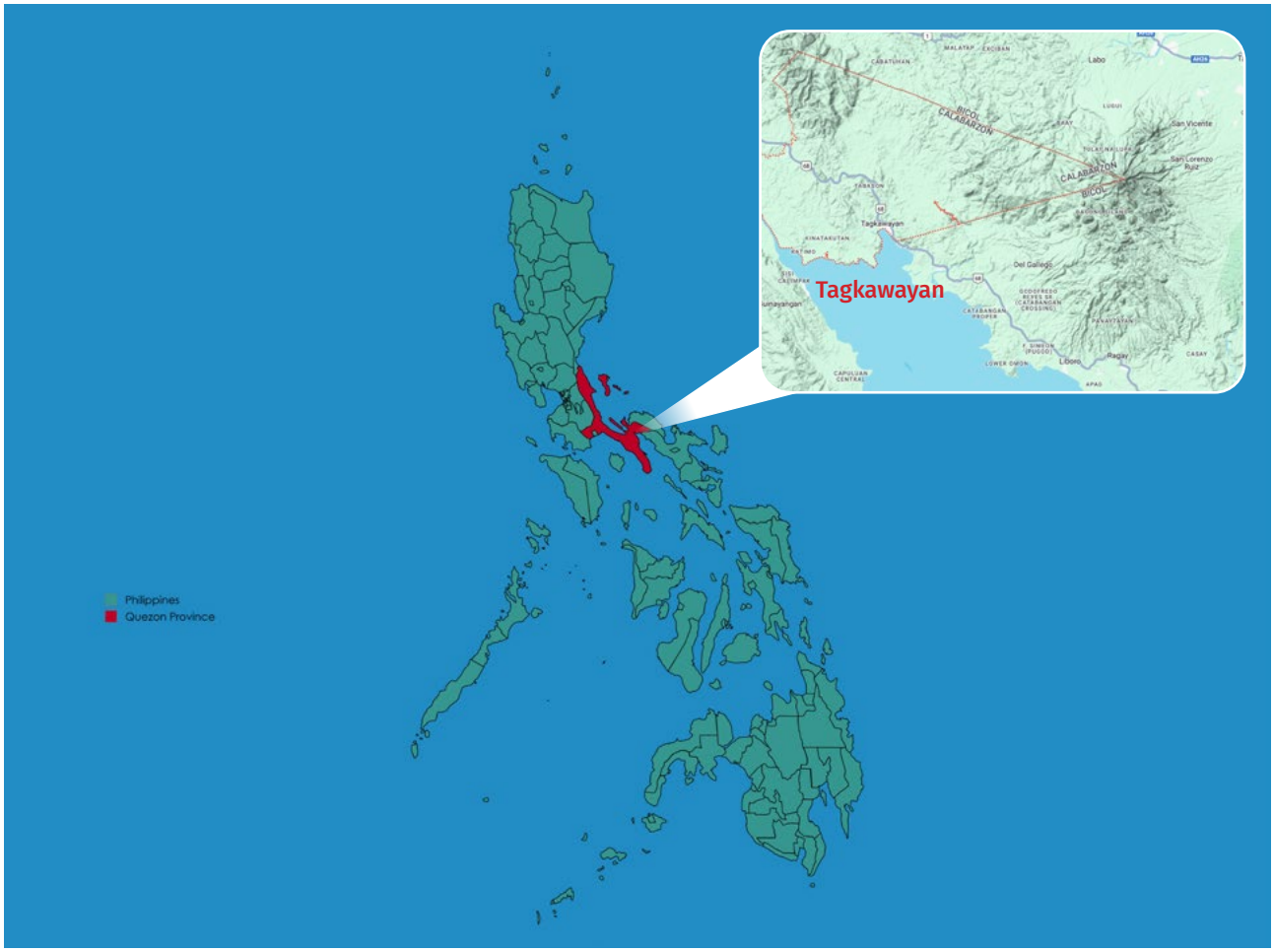


Figure 1. Map showing the case study site at Tagkawayan municipality, Quezon province, the Philippines

The case study focused on the coastal municipality of Tagkawayan in Quezon province. Of the municipality's 45 barangays, 13 are situated on the Ragay Gulf coast. Its 46.21 sq km of municipal waters form part of the 3,225 sq km Ragay Gulf, which it shares with the provinces of Camarines Sur and Masbate. As the country's third largest gulf, it serves as a major source of seafood products. Fishing is one of the main sources of livelihood, particularly for its coastal barangays. Of its 54,003 total population, 1,887 are registered as fisherfolk.

Tagkawayan used to host a fleet of large commercial fishing trawlers until the 1970s. Its active marine fishery led to the establishment of one of the first state-sponsored municipal schools of fishery in 1965. Its fishery school, now integrated into the larger Southern Luzon State University (SLSU) system, caters to the province and continues to offer a degree in fisheries. The collapse of its fish stocks led to a ban on trawl fishing in favour of SSF operations.

Tagkawayan has one of the most active fishery law enforcement set-ups. It is one of the few municipalities that regularly allocates policing resources to support the monitoring

of illegal, unreported, and unregulated fishing (IUFF) in its municipal waters. It has also initiated the consolidation of fisheries management within the Ragay Gulf.

The municipality's inland fishery is also integral to aquaculture production in the province. The municipality hosts aquaculture hatcheries (primarily shrimp) and has recently increased its efforts to support the local industry. The municipality is one of BFAR's 56 targeted sites for sustainable mariculture park projects. The project was initiated to promote the country's food security and economic growth.

The Municipal Environment and Natural Resources Office (MENRO) is actively protecting the locality's mangrove area of 1,266.43 hectares, which accounts for 21.47 per cent of the municipality's total water use area. The municipality plans to increase this area by 100 hectares to protect the coastal environment and improve the resilience of the local ecosystem and coastal barangays. Its municipal water use includes allocations for the fishery reserve area, fish sanctuary, mangrove forest coral reefs, seagrass beds and fish port. In addition to its marine water, it also has 21 identified rivers and a lake that forms part of its inland waters.

As proof of its active coastal resource management and partnership with its SSF communities, the municipality was recognized under the Malinis at Masaganang Karagatan (MMK or the Clean and Abundant Sea), BFAR's flagship programme recognizing and providing incentives to bolster the efforts of LGUs towards sustainable fisheries management.

The MMK programme evaluates LGUs for best practices, particularly on the following criteria:

1. Absence of illegal fishing
2. Observance of off-fishing season
3. Declared marine protected areas
4. Clean, coastal waters without garbage or industrial effluents flowing to the sea
5. Effective mangrove protection and rehabilitation programme

The municipality has been recognized under the programme for two consecutive years when it first joined the Search for Outstanding Coastal Municipality in 2021 and 2022. In 2024, the municipality was awarded Philippine Pesos (PHP) 2 million for winning the year's MMK (1 PHP = 0.018 USD).

The municipality is also promoting tourism development through ecotourism to provide alternative livelihoods to its coastal and SSF communities. It has targeted the coastal barangays of Candalapdap, Laurel, Maguibuay, Rizal, Sabang, Mahinta and San Diego as primary locations for developing eco-tourism.

The Municipal Disaster Risk Reduction and Management Office (MDRRMO) is mandated to handle climate change mitigation and adaptation. It maintains information on the locality's natural hazards, vulnerabilities, and climate change risks. It recognizes the particular vulnerability of women and children. Its coastal barangays, especially areas with low mangrove coverage, have been subject to past storm surges.

The municipality's chief executive is very active in promoting sustainable development and protecting the environment through participatory governance. The selected site is expected to highlight ways on how an SSF community can co-develop mechanisms for adaptation along with a supportive LGU.

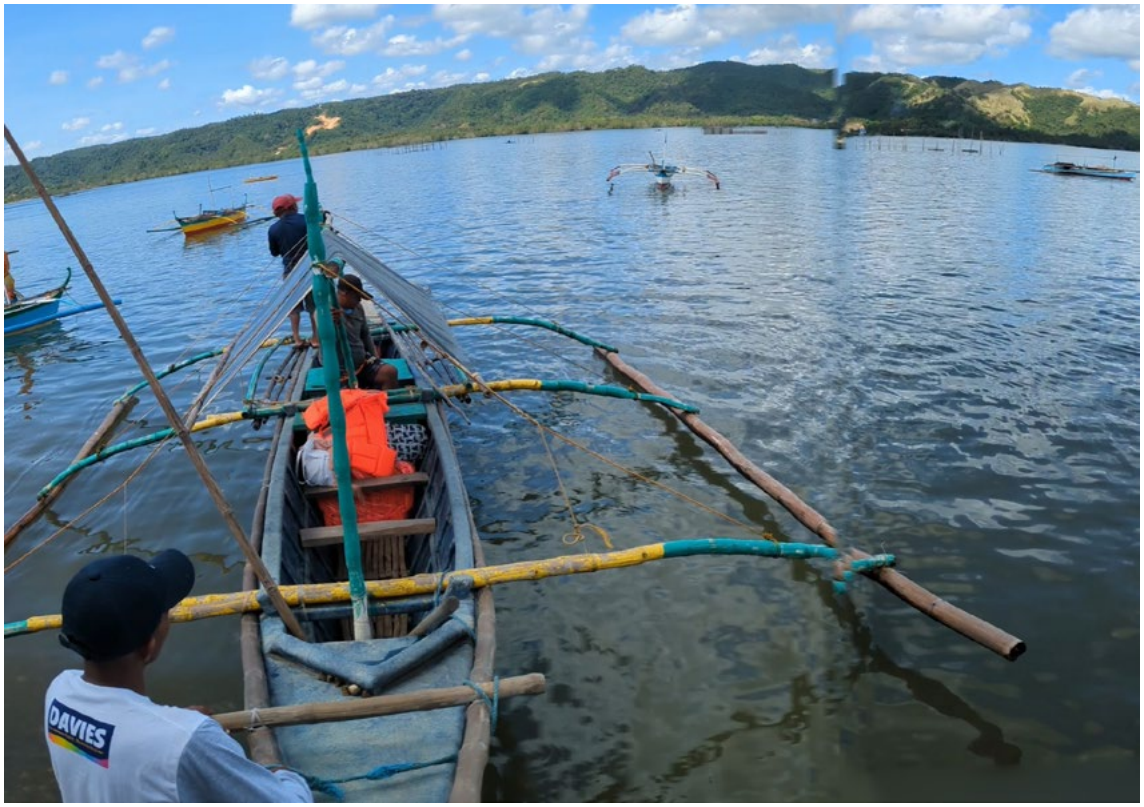
Results

SSFs in the Philippines face the brunt of climate change impacts, necessitating robust adaptation measures. A complex interplay of institutions, mechanisms, and stakeholder engagement shapes the country's approach to building resilience. Key institutions like the BFAR play a central role, integrating climate change into national fisheries plans and developing adaptation manuals.

While institutional frameworks exist, challenges remain; they include limited budgets and the need for dedicated offices focused on climate change and disaster risk reduction at national and regional levels. The Office of Civil Defence, through its National Disaster Risk Reduction and Management Council (NDRRMC), emphasizes the importance of SSF and other marginalized sectors in its comprehensive framework. However, funding limitations and the need for improved focus on remote and disadvantaged LGUs persist.

Formal and informal mechanisms support stakeholder participation. The Fisheries Code mandates fisherfolk involvement in policy formulation through consultations. The National Fisheries and Aquatic Resources Management Council (NFARMC) provides an advisory platform with fisherfolk representation. At the local level, Integrated FARMCs further facilitate community engagement. However, ensuring effective and meaningful participation, particularly for vulnerable sub-groups and women, requires ongoing attention.

Based on its 2021-2026 Comprehensive Development Plan, the municipality's allocations in relation to climate change are shown in Table 3.



SSF fishing boats sailing the Tagkawayan municipal waters in the Philippines, by Maria Katrinna Nabor

Table 3. Climate Change Adaptation Allocation 2021-2026

Investment in Climate Change Adaptation	Budget Allocation	%
Establishment of 45 Barangay Material Recovery Facilities	₱6,000,000.00	5.12%
Disaster Risk Reduction, Climate Change Adaptation and Leadership Training for Youth	₱400,000.00	0.34%
Construction of River Protection	₱6,000,000.00	5.12%
Provision of IEC materials	₱300,000.00	0.26%
Procurement of Customized Emergency Response Vehicle	₱300,000.00	0.26%
Installation of All Hazards Early Warning System	₱300,000.00	0.26%
Drainage System/Flood Control Improvement	₱50,600,000.00	43.19%
Installation of Solar Powered Street Lights	₱28,950,000.00	24.71%
Construction of Evacuation Centers	₱4,000,000.00	3.41%
Construction of Mangrove Walk with Floating Cottages	₱10,000,000.00	8.54%
Establishment of Wastewater and Treatment Facilities	₱10,000,000.00	8.54%
Research on Preservation of Watershed Protection	₱300,000.00	0.26%
Total	**₱117,150,000.00**	

Given its broader approach and budget constraint, items that directly address climate change adaptation in coastal communities are:

1. Construction of river protection
2. Provision of IEC materials
3. Installation of an early warning system
4. Construction of evacuation centres
5. Construction of mangrove walk with floating cottages

This amounts to PHP 20,600,000 or 18 per cent of its total allocation. Although these will provide support to coastal communities, only the construction of mangrove walks—expected to provide alternative sources of income as part of the municipality's eco-tourism development—will be directly beneficial to small-scale fishers and not just to the coastal community at large.

Stakeholder engagement is crucial for successful adaptation. Key informants from the Climate Change Commission (CCC) and the BFAR reveal the need for improved coordination among stakeholders and greater community participation in planning and implementation. Fisherfolk have been consistent in expressing their concerns about the increasing frequency and intensity of extreme weather events, highlighting the need for stronger social safety nets, alternative livelihood options, and improved disaster preparedness.

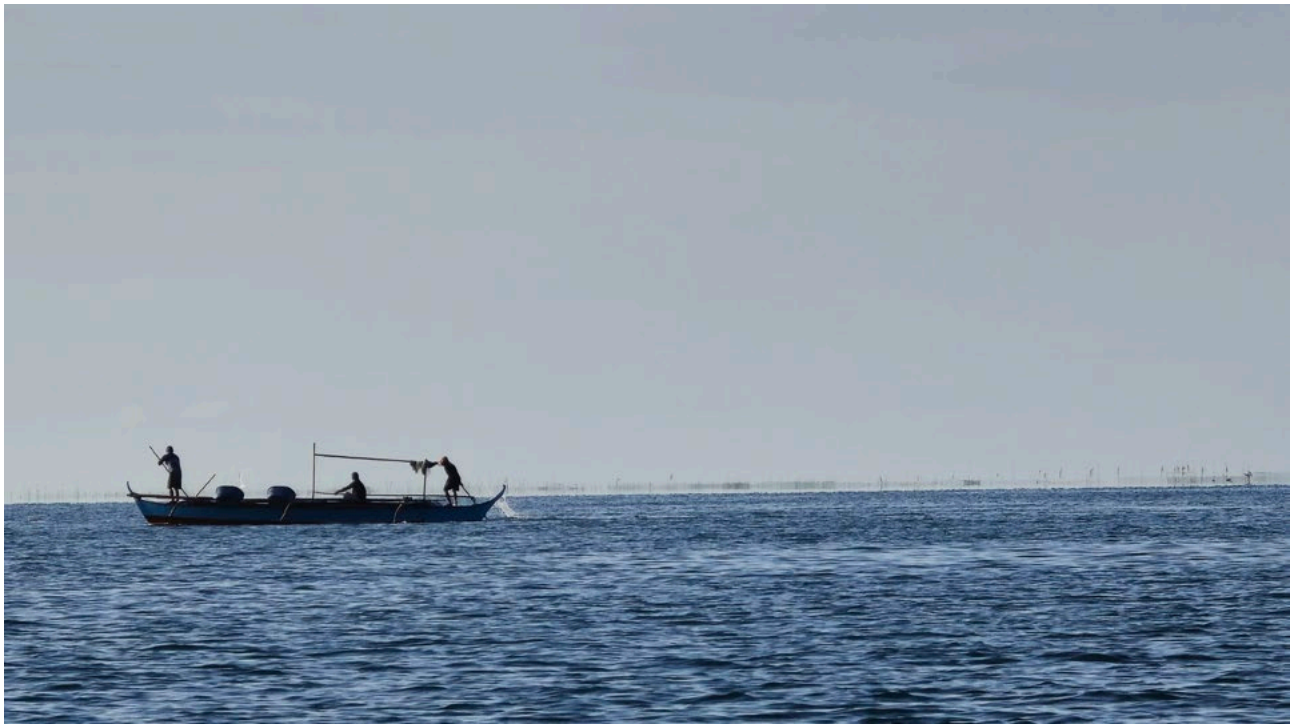
The interviews with the MENRO, MDRRMO and MSWDO offer insights into both the plight of the locality's SSF community, and the lack of adequate resources for the authorities to provide the support the community needs.

Institutions

Through the CCC, the government recognizes in its priority areas the impacts of climate change on the critical fisheries sector. The NCCAP 2011-2028 reflects this, as does the more recent Philippine Development Plan 2023-2028. The National Adaptation Plan (NAP) 2023-2050 has identified 'agriculture, fisheries and food security' as one of eight key sectors for adaptation action. The 'water resources' and 'ecosystems and biodiversity' sectors support the sustainability fabric of fishing communities. The policy needs to be adopted at the local level, however. This localization is key to allowing LGUs to develop plans and allocate the necessary funding.

The CCC also collaborates closely with the DA, specifically the BFAR. Considering that the CCC does not directly implement programmes, the execution of its proposals and recommendations at the sub-national level is through agencies like the BFAR, which is responsible for the development, improvement, management, and conservation of the country's fishery and aquatic resources. The bureau is authorized to reinforce and implement policies and programmes specifically targeted towards SSF communities.

The DA's Farm and Fisheries Clustering and Consolidation Programme aims to advance the interests and conditions of small farmers and fishers. It encourages them to adopt the strategy of clustering and consolidating their production, processing and marketing activities as community business enterprises, including the pooling of assets, labour, and other resources. The Agriculture and Fisheries Modernization Act mandates the advancement of new technology, the promotion of equitable access to resources, the pursuit of a market-driven approach, increasing profitability, ensuring food security, the promotion of sustainability, and the empowerment of small farmers and fisherfolk. The law also requires the regular monitoring and consideration of the effects of climate change, weather disturbances, and the annual productivity cycle in developing agriculture and fisheries production programmes. This requires the support of LGUs for implementation.



Net fishing is one of the more common ways SSFs in Tagkawayan catch fish, by Maria Katrinna Nabor

In terms of financing, the CCC and the Department of Finance have established the People's Survival Fund (PSF) in the National Treasury. The fund aims to provide long-term financial support to enable the government to effectively address the problems of climate change through adaptation programmes and projects. One of the eleven approved projects under the PSF is specifically focused on fisherfolk: the 'Siargao Climate Field School for Farmers and Fisherfolks' in Del Carmen, Surigao del Norte.

This project, with a budget of PHP 80,705,896, is a partnership with the Surigao State College of Technology. It aims to empower fisherfolk, farm owners, workers, and helpers to become climate-smart, and to establish a sustainable end-to-end institutional system for generating and applying locally tailored climate information tools, building capacity to utilize these tools, and reducing potential economic losses due to climate change. Although progress has been made, there remains greater demand for similar projects—considering the country has almost 1,500 localities.

The DA-BFAR and Department of Social Welfare and Development (DSWD) entered into a Memorandum of Agreement in November 2021 to develop a social protection programme for fisherfolk and their families during periods of inclement weather and reduce the risks and impact to livelihood and income when small fishing craft are not able to go out to sea.

As part of this agreement, the fishing industry sector, particularly the SSF, will be provided with social protection packages from the DSWD, including livelihood, financial, and medical assistance. The DSWD has also committed to promoting the goods and services of fisherfolk by forging linkages and partnerships with LGUs, and private entities and organizations. The department has urged its field offices and other programme implementers to engage local farmers in the procurement of raw materials for its feeding programmes this year.

This is in line with DSWD Administrative Order No. 4, Series of 2016, which prioritizes the involvement of local farmers' organizations, composed of poor and small-holder farmers, in the procurement of rice, viands, and non-rice-based snacks, through Community Participation as a Negotiated Procurement Modality. To support these ongoing initiatives, the DSWD's national programme management office of the Enhanced Partnership Against Hunger and Poverty is closely coordinating with the Government Procurement Policy Board to set and facilitate their implementation. Like other efforts, this has not yet been fully realized at the local level.

Enhancing the resilience of fishery sectors, including the SSF communities, is a key priority in several climate change policy instruments in the country, including the NAP, which is undergoing high-level review. The programme, along with other existing climate change policies, must be integrated into the priority projects, activities, and schemes, particularly at the local government level.

Given the additional responsibilities placed on LGUs to comply with, and carry out, these plans and programmes, capacity-building initiatives should be developed to empower them to create and innovate, thereby strengthening their ability to implement and monitor these activities. Although limited in its capacity for implementation, the CCC recognizes the importance of continuous research that transforms policies and programmes to enhance food production security in the fisheries sector.

Key challenges and actions need attention. Climate change and disaster risk management are not yet fully institutionalized within BFAR. Although climate change is mainstreamed in its plans and programmes, there is no dedicated budget or office for climate change and disaster risk management at the national and regional levels. An ad hoc office within the Fisheries Planning and Economics Division works on these issues; it operates on the limited budget of the Planning Division Office.

Two national training programmes were conducted in 2023 with the FAO's support. They focused on capacity building for climate change and the possible contribution to the NAP and the NDCs. This aimed to ensure the inclusion of the fisheries sector, previously not involved. Consultations with LGUs were carried out to create programmes and interventions specific to SSF and cooperatives. One such upcoming project is the Parametric Weather Insurance for SSFs during times of calamities.

The Climate Change Adaptation and Mitigation - Disaster Risk Reduction and Management (CCAM-DRRM) Strategic Framework has been used to develop an operations manual with FAO assistance. The manual, which is under review, is intended for use by regional and provincial offices, down to the LGUs. For now, the strategic framework is designed only for the bureau.

Based on the BFAR's assessment, SSF communities are primarily affected by typhoons and cyclones. BFAR assists with the repair and rehabilitation of fishing equipment. SSFs are also vulnerable to rising water temperatures. To mitigate its impact, the bureau distributes fish aggregating devices (payao) and provides climate-resilient seafood strains that can withstand heat. These are available at national technology centres and can be requested directly by SSF actors or through their respective LGU. Training is also provided on the care of these species. However, the only commercially viable species currently being addressed is tilapia.

To improve its communication in relation to disaster preparedness, early warning systems for harmful algal blooms and calamities like typhoons are issued in the local language by the regional office. This includes advisories for early harvest for those practising aquaculture, in case water parameters become unfavourable. The BFAR also provides logistical support for transporting the harvested fish to market and has promoted replacement of wooden craft with more durable fibreglass-reinforced plastic craft, reducing the need to cut trees for building craft.

The national government and certain non-state actors provide support to help small-scale fishers reduce and recover from the negative impacts of climate change. At the provincial and regional level, meetings, training sessions, and development of information, education, and communication materials on the impacts of climate change are conducted. The BFAR facilitates access for SSF to social protection programmes, risk transfer mechanisms, and insurance from the Philippine Crop Insurance Corporation, including the proposed weather index-based/parametric insurance. The bureau also prepares and endorses rehabilitation plans for early recovery, with funding subject to the availability of the DA's quick response fund. It shares these funds with the organizations working with SSFs.

An annual budget of PHP 1 billion per agency for early recovery from disasters is lodged under the DA. The bureau prepares rehabilitation plans and submits them to the DA for funding from the quick response fund. For projects with longer timelines, the BFAR also

submits proposals to the NDRRMC. The agency allocates a small portion of its regular budget to assist SSF by providing repair materials, fishing craft, fishing gears, and fingerlings to help them get back to their livelihood.

Climate change and disaster risk management are major themes of the National Plan of Action for Small-scale Fisherfolk (NPOA-SSF), which now involves the active participation of artisanal fishers across the country. The BFAR has conducted consultative workshops for Fisheries Management Areas 1 and 6. This is expected to better guide the development of programmes.

Although there are many policies and programmes at the national level, the establishment of a dedicated office and budget for Climate Change and Disaster Risk Reduction and Management at the BFAR central, regional, and provincial offices will enable effective planning and implementation of resilience programmes, and monitoring and evaluation of interventions. Currently, there is no dedicated office for CCAM-DRRM within BFAR, so climate change concerns are only mainstreamed in their projects, without having specific targeted initiatives.

The Office of Civil Defence (OCD) focuses on localizing efforts, working with LGUs to utilize their disaster risk management funds and assess them for accreditation under the Gawad Kalasag Seal (Seal of Good Governance). The OCD serves as the secretariat for the Prevention and Mitigation Pillar of the NDRRMC, as well as the focal point for vulnerable sectors and other stakeholders. The office also provides legislative services, such as creating position papers and attending hearings.

The respondent is a member of the Technical Working Group of the National Anti-Poverty Commission (NAPC). The OCD is mandated to administer the comprehensive National Civil Defence and Disaster Risk Reduction Management Framework, which consists of four thematic pillars:

i. Disaster Preparedness
ii. Disaster Prevention
iii. Quick Response
iv. Rehabilitation and Building Forward Better

This mandate stipulates that SSF and other marginalized sectors will be the focus of the NDRRM Plan's outcomes and activities. Its outcomes and goals include: the prevention and mitigation phase, providing access to vulnerable sectors to risk financing; and responsive operations in addressing their needs.

Like the CCC, the OCD's policies and programmes are implemented through its partner agencies and LGUss. At present, the office's current focus is on anticipatory action through House Bill 9935 or the Declaration of a State of Imminent Disaster. The office is working on other bills related to the Magna Carta for DRRM workers.

The OCD has adopted a 'no regret approach', which prioritizes safeguarding vulnerable sectors and developing shock-absorptive social protection. This means that the government can prepare the necessary resources for LGUs and the most vulnerable communities before a disaster strikes.

The Anticipatory Action Technical Working Group that developed House Bill 9935 includes representatives from the FAO, the Start Network, the World Food Programme, the Philippine Red Cross, the German Red Cross, the UN Office for the Coordination of Humanitarian Affairs, the UN Children's Fund, the DSWD, the Department of Science and Technology, the OCD, the Department of the Interior and Local Government, the Department of Budget and Management, and other government and humanitarian agencies. The OCD serves as the secretariat for this technical working group.

The bill, yet to pass into law, includes programmes that support the mitigation of climate change effects on SSF. This will include identifying weather-related disasters that affect SSF and the most vulnerable sectors and determining how to address them. It will also provide guidelines on activating measures in place before a disaster strikes. But adaptation plans need to be developed locally; national policy and programmes provide a legal basis for the LGUs to do so.

The NDRRMC has made significant progress since its creation under the Philippine Disaster Risk Reduction and Management Act of 2010. The country is now focused on anticipatory actions and addressing imminent disasters. This marks a shift from the previous 'response-oriented' approach. There are now measures and systems in place at the national level, and LGUs are engaged in DRRM and climate change adaptation efforts. A variety of tools are available for assessing risks and hazards. To further improve the current DRR plan, the OCD believes that there is a need to intensify awareness campaigns, especially in remote areas.

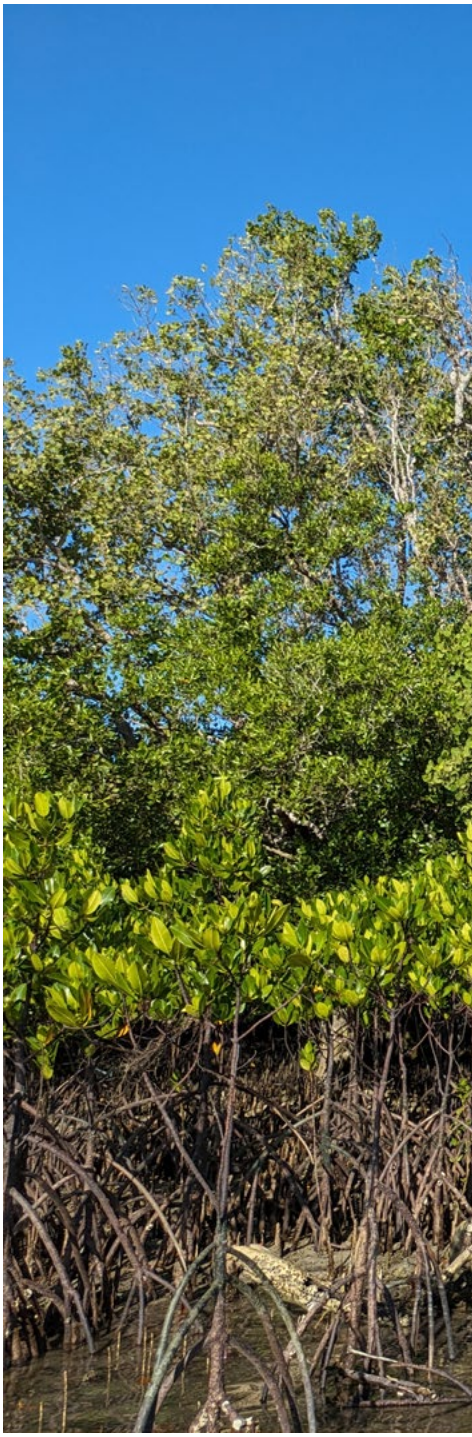
Connectivity remains a challenge and requires new ways to ensure that critical information reaches all communities. While the national-level framework looks promising and well-developed, the dynamics at the local level are beyond the control of the OCD or the NDRRMC, particularly regarding the autonomy of local governments. The political will of local chief executives is a common problem in many areas. The lack of DRRM priority at the local level limits the national government's ability to intervene. This can be observed in the present situation where the wealth of DRR or climate change policies and programmes is not reflected in local policies and programmes.

Funding is a significant limitation for both the sub-national and local government units. This demands focus on improving support for remote, geographically isolated, and economically disadvantaged LGUs. Similarly, continuity is critical to increasing local resilience. The OCD and NDRRMC recognize the need to consider the possibility of DRRM not being a priority for the next set of elected local leaders. The culture of safety, resilience, and disaster risk reduction and management is not yet deeply embedded in Filipino society. Transitioning to this mindset will be a gradual process, but it is a crucial goal to pursue.

The interviews reveal that the municipal government's approach to addressing climate change impacts on SSF is focused on integrated programmes that address the broader sectors rather than separate policies for sub-sectors in marine or inland fisheries. The MDRRMO emphasizes a comprehensive strategy encompassing preparedness, prevention, mitigation, response, recovery, and rehabilitation. Similarly, the MENRO highlights initiatives such as mangrove planting and protection, which benefit both marine and inland fisheries by addressing shared vulnerabilities like extreme weather events and habitat degradation. These programmes benefit both marine and inland fisheries by addressing shared vulnerabilities like extreme weather events and habitat degradation.

Although these institutions exist at the national and sub-national level, the decentralized political and administrative configuration of the Philippines requires the local governments to actively adopt them and harmonize them with local policies and programmes. The interviews conducted in Tagkawayan indicated that several forms of support are being provided to fishing communities to help them reduce and recover from the negative impacts of climate change. These include:

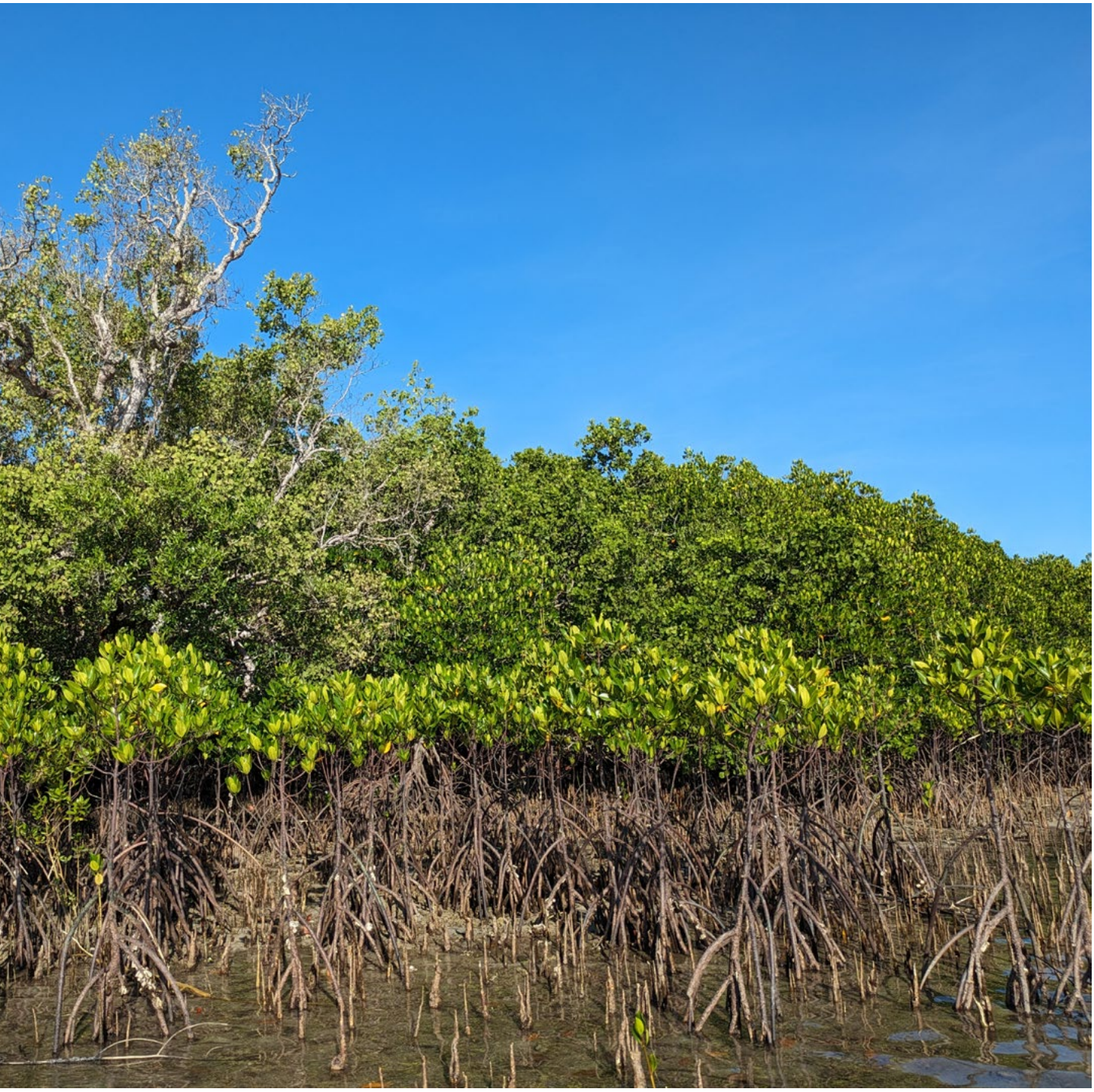
1. **Financing:** The MDRRMO has funds available for recovery and rehabilitation efforts, such as in the case of displacement due to severe storms
2. **Livelihood support:** The MENRO involves fisherfolk in mangrove-planting projects, providing them with alternative income opportunities
3. **Community engagement:** Fishing communities are engaged in initiatives like mangrove restoration, suggesting a focus on localized, community-based solutions



However, the specific details on the scope and scale of these support mechanisms need to be explored further to assess their impacts. Given its current broader focus, in-depth evaluations are not yet available. Further investigation would be needed to fully understand the comprehensive support system in place. Nonetheless, local respondents have limited awareness on the details of the national policies and programmes. With availability and accessibility of funding being the critical components of local action, the identified limitations of the national government agencies are highlighted by this result. This was supported by MDRRMO's emphasis on the limited availability of funds for recovery and rehabilitation in worst-case scenarios, such as displacement due to severe typhoons. This means that SSF communities need to find creative ways to deal with the more indirect impacts of climate change on their livelihoods. Similarly, the MENRO involves fisherfolk in mangrove planting projects to provide them with alternative livelihood opportunities and augment the reduction of their income from unpredictable weather events.

Mechanisms

There are formal mechanisms in place to support the participation of SSF communities in the designing, planning, implementing, monitoring, and evaluating of climate change adaptation measures. The enactment of the Climate Change Act of 2009 led to the creation of the CCC as the lead policymaking body tasked with coordinating, monitoring, and evaluating the government's plans. This ensures the mainstreaming of climate change into national, sectoral, and local development plans and programmes.



Apart from environmental resiliency, Tagkawayan is also exploring developing mangrove walks for ecotourism and to create alternative income streams for fisherfolks. By Maria Katrinna Nabor

The Climate Change Office was established to focus on the proper implementation of the CCC's mandate. It has translated and communicated the contents of the UNFCCC from the international level down to the regional, national, and local levels in the context of the fisheries sector. The NAP now includes the fisheries sector, which was previously excluded from national planning. As a result, the BFAR has integrated fisheries and aquaculture components into the latest iteration of the NAP for 2023-2050, which has been outlined below in Table-4.

Table 4. National Adaptation Plan and Fisheries

Climate Impact Drivers	Impacts on Agriculture and Fisheries and Food Security
Increased temperature	**Heat stress** Increased temperature reduces the yield of rice and other crops, driven by heat stress, shortened growing periods, and other factors. Livestock also experiences heat stress, degrading health and productivity. Farmed fish, fisheries, and seaweed yield are projected to decrease, with longer fish culture periods and increased fish mortality contributing to this. **Pests and diseases** Increased temperature has been observed to increase the incidence of pests and diseases. **Water stress** Drought leads to water stress across crops and livestock, leading to reduced yield, productivity, and quality. Drought has also led to farmers not planting, leading to disrupted cropping schedules. **Soil degradation** Lack of soil moisture leads to reduced nutrient content, hindering nutrient absorption and thus reducing crop yield and health. **Decreased productivity** Increased temperature may lead to heat-related illnesses, reduced productivity, and mental health impacts for farmers and fisherfolk. **Reduced fish stocks** Rising sea water temperature can lead to coral bleaching, decreased biodiversity, and disruption in the food chain. This translates to reduced catches of reef fish, which can impact available fish supply and associated economic activities.
Sea level rise	**Saltwater intrusion in farmland** Sea level rise may lead to salinity intrusion into farmland and fishponds, resulting in substantial water shortages for irrigation in countries with extensive coastline and river deltas. As an archipelago with similar geographical features, the Philippines is at risk of finding itself in a similar situation.

Similarly, the Comprehensive National Fisheries Industry Development Plan (CNFIDP) serves as both a guidance and platform for sectoral participation in the development of the sector. This plan addresses climate change-related matters through its guidance to projects and programme development.

To promote participation in decision-making, SSF actors are represented in the country's 12 Fisheries Management Areas (FMA), the primary regional resource management body. Climate change is integrated into the local coastal resource management plans. But no separate council or office is specifically dedicated to handling climate change-related concerns. The current assumption on climate change being already integrated into the CRM also limits the specificity of the plan concerning SSF adaptation strategies. Nonetheless, the BFAR believes that the current grouping of the FMAs can take into account resources and climate considerations.

Therefore, formal and informal mechanisms exist to support the participation of SSF communities in designing, planning, implementing, monitoring, and evaluating climate change adaptation measures to enhance resilience. This is supported under Rule 65.2 of the amended Fisheries Code that mandates the participation of fisherfolk in policy formulation through stakeholder consultation workshops. Within the BFAR, the NFARMC provides a formal mechanism for participation in decision-making. This is further reflected at the sub-national and local levels with the Integrated FARMCs for clusters of prov-

inces and Municipal FARMCs for local governments. Depending on the municipality, the Fisheries Code also allows for the establishment of Barangay FARMCs where applicable.

Although significant progress has been made, challenges remain due to limitations in dedicated personnel and budget for CC-DRM. Based on the KIIs and FGDs with representatives from the community, the key areas for improvement include:

1. **Coordination and collaboration:** Enhance coordination among government agencies and stakeholders to ensure a more cohesive and effective approach to managing shared resources and implementing adaptation strategies
2. **Community participation:** Incorporate the knowledge and feedback of SSF communities in the design, planning, and monitoring of adaptation measures to ensure that they are relevant and responsive to local needs
3. **Monitoring and evaluation:** Establish robust monitoring and evaluation frameworks to track the progress and effectiveness of adaptation efforts and use the findings to regularly update and refine the strategies as needed

The OCD's Gawad Kalasag Seal and special awards programme assesses the status and capacity of local DRRM councils and LGUs to ensure responsiveness of plans to current needs. A tool and checklist are also utilized to determine if councils are partially, fully, or beyond compliant with the criteria. A critical criterion is to ensure that vulnerable sectors, including women, are represented at the local level. If these sectors are not represented, the local DRRM council will not be marked as fully compliant.

The interviews highlight the need for improved coordination and collaboration among stakeholders within the municipality and other national agencies. The MENRO highlighted the challenges in delineating municipal waters and the need for a more cohesive approach to managing shared resources. This suggests a need for clearer guidelines and stronger partnerships to effectively implement and monitor adaptation measures. The interviews also suggest that while SSF communities are engaged in some adaptation initiatives such as mangrove planting, the presence of formal mechanisms to support their meaningful participation is not fully clear.

Processes

The CCC takes a comprehensive, participatory approach when formulating policies and regulatory frameworks. This includes securing representation from national and local government agencies, academia, civil society, non-profits, and private/business entities across diverse sectors. This ensures that the perspectives and experiences of scientific experts, stakeholders, and vulnerable groups like children, youth, women, persons with disabilities, and indigenous peoples are incorporated. The commission collaborates closely with implementing agencies. It provides consultations and capacity-building activities to support the LGUs.

The CCC is mandated to formulate a National Strategic Framework on Climate Change in alignment with the NCCAP. In 2014, the CCC established a results-based monitoring system to track the NCCAP's implementation, which led to the first iteration of the NCCAP for the 2011-2016 period. The process involves conducting multiple stakeholder consulta-

tions, FGDs, and KIIs with relevant agencies, in addition to data gathering and processing. Another mechanism to monitor and evaluate policy compliance is Climate Change Expenditure Tagging, a tool used to track, monitor, and report on the climate-related expenditures of government institutions as aligned with the NCCAP.

Existing processes were put in place to periodically gather feedback on the need for adaptation in the context of fisheries at several levels. The NFARMC's regular consultations with fishers revealed the need to strengthen climate change and disaster risk reduction efforts. This has been raised in several consultations and workshops.

To enhance the resilience of small-scale fishers, the BFAR has identified several key needs and roles, including: (i) improving SSF actors' knowledge and capacity on climate change; (ii) diversifying livelihoods to provide alternative income sources; and (iii) ensuring the representation of SSF's specific concerns and needs at the national level, as the government's plans and programmes are often broad in scope.

At the local level, the key stakeholders include:

1. **Government agencies:** The MDRRMO and the MENRO play crucial roles in coordinating and implementing adaptation strategies. The BFAR also integrates climate change considerations into national fisheries plans
2. **Local fishing communities:** The interviews indicate that SSF communities are engaged in some adaptation initiatives, such as mangrove planting projects led by the MENRO.
3. **Civil society organizations and academic institutions:** The respondents recognize that these stakeholders can contribute valuable expertise, data, and community engagement
4. **Private sector:** The locality is actively engaging the businesses and industries reliant on marine resources that could collaborate with local communities and government agencies to develop and finance adaptation solutions. The sector is considered as an alternative source of resources and support that the local government cannot generate on its own

The SSF Community

Small-scale fishing communities require support for technology development and transfer, capacity-building, and access to climate finance. The agriculture, livestock, and fisheries sectors in the Philippines face significant challenges due to climate change. The NAP proposes to ground national policies and existing programmes related to this sector with three priority outcomes:

1. **Productive and resilient agriculture and fisheries. This can be achieved by:**
    a. Diversifying and substituting crops, livestock, aquaculture
    b. Expanding cold storage chains and facilities
    c. Improving and ensuring gender-responsive aquaculture infrastructure
    d. Improving feed varieties
    e. Driving adoption of urban farming
    f. Developing and holding technical training programmes for farmers and fisherfolk
    g. Continuing to research and establish crossbred and genetically-improved species

2. **Conservation of natural resources critical for agriculture, aquaculture, and fisheries by:**
    a. Improving soil health management programmes
    b. Improving and expanding integrated pest management programmes
    c. Promoting adoption of efficient irrigation techniques
    d. Improving the dissemination of precision agriculture and aquaculture
    e. Encouraging sustainable farming and fisheries management
    f. Strictly enforcing agro-aqua ecological zoning measures
    g. Conducting sustainable and gender-responsive research and development of agriculture, aquaculture, and fisheries

3. **Food and income security for farmers and fishers in the face of climate change by:**
    a. Expanding and supporting farmer and fisherfolk cooperatives and networks with encouragement to women's representation and participation
    b. Developing localized and inclusive early warning systems and information dissemination
    c. Improving climate insurance and ensuring its inclusiveness
    d. Training farmers and fisherfolk and promoting best practices
    e. Conducting climate risk vulnerability assessments (CRVA)
    f. Establishing and facilitating market linkages for small-scale farmers and fishers
    g. Improving the provision of credit and financing programmes

According to the NDRRMC, to better support SSF in adapting to the worsening impacts of climate change, a shock-absorptive adaptive social protection plan is crucial. This would help identify measures to assist the SSF. It also emphasizes that during disaster warnings when going to sea is prohibited, the national and local governments should provide financial subsidies to support the SSF players when they cannot earn their living. Measures should also be in place to help the SSF cope with the effects of the El Niño Southern Oscillation (ENSO) climate phenomenon, which contributes to rising ocean temperatures. Improving their access to loans and subsidies should be a priority.

The role of small-scale fishers in climate change mitigation is limited, as they are among the first casualties of its negative impacts. However, in terms of adaptation, they are forced to take action. It is crucial for the government and relevant agencies to educate SSF actors on climate change and its effects. The OCD holds that although the SSF are at the bottom of the hierarchy, the Philippines as a country is affected by the actions of industrialized countries. This partly informs the broader scope of plans for climate change mitigation and adaptation. Given their limited financial and technical capacity, SSF communities are not expected to contribute to mitigation efforts, yet they must be empowered to adapt.

The fisherfolk interviews reveal concerns about extreme weather events, flooding, and the impact on livelihoods. A multi-faceted approach is required, including:

1. Strengthening social safety nets: Providing financial assistance, alternative livelihood options, and access to essential resources during crises
2. Enhancing disaster preparedness: Implementing early warning systems, improving infrastructure, and developing evacuation plans
3. Promoting sustainable fishing practices: Encouraging resource management techniques that protect fish stocks and marine ecosystems
4. Empowering local communities: Ensuring their active participation in decision making and providing access to training and resources

The KIIs and FGDs highlighted the critical role of SSF communities in the development and design of programmes for adapting to climate change.

Fish pens built by fisherfolk to cultivate high-value grouper fish like lapu-lapu, by Maria Katrinna Nabor

Climate Change and Tagkawayan's SSF Community

The fisherfolk of Tagkawayan vividly recalled the devastation caused in 2014 by Typhoon Glenda, which they consider the most disastrous impact of climate change they have experienced. It destroyed many houses and fishing craft, flooded the coastal barangays, and left the area without power for over two months. It took the fishery resources almost half a year to recover and return to their pre-typhoon productivity. The typhoon also damaged the small-scale fish cages operated by municipal fishers.

Many fish cages and fishing nets have been destroyed and swept out into the sea during typhoons. During Typhoon Glenda, fishing households were forced to migrate to the nearby city and to the capital Manila. In areas with mangrove cover, some shellfish gleaners were able to continue their operations. Those who engage in fish-vending were able to continue, but at very limited capacity due to reduction in supply of fish. The flooding also destroyed many fishponds. The damages to aquaculture infrastructures were estimated to be in the hundreds of thousands of pesos.

The respondents also observed that changes in sea temperatures affected the availability of fishes that can be caught in their fishing grounds and the growth of the fish they are cultivating. This significantly reduced the income of many fish cultivators. Cultivators were forced to make changes to their operations to address the impact of sea temperature changes. Some operators started moving their fish cages to deeper waters, which increased costs and reduced income potential.

Given the limited financial resources of their municipality, households dependent on

fishing and fishery resources had to rely on their own ingenuity to cope. Some found solutions by watching YouTube videos. While access to information technology has helped some households through early warning systems or updated information on fish cultivation, they represent a small fraction of the coastal population. Nonetheless, leveraging technology needs to be explored as more households gain access.

With women fishers primarily engaged in the gleaning and aquaculture, the burden on them is increased during these trying times. During the more recent typhoon that hit the municipality, one of the respondents engaged in managing a small-scale fish cage lost 300 pieces of fish. With her fish cage destroyed, it took her two years to recover. She also noticed that the productivity of her fish cages had reduced due to the increasing frequency of typhoons and temperature changes. During colder months, fish cultivators observed slowed growth rate and increased mortality in crab and lapu-lapu (a high-value grouper) populations due to low temperatures and reduced oxygen levels. To address these, the fish cultivators had to shift their operations and implement early harvesting to reduce overall losses.

Their situation was further exacerbated by the COVID-19 pandemic, during which the selling price of the grouper was cut down to less than one-fourth of the pre-pandemic rate (from PHP 1,050.00/kg to PHP 250.00/kg). These reduced whatever savings they had and their capacity to invest further in the growth of their livelihood. Those with no capacity to engage in aquaculture were forced to migrate temporarily to seek jobs in the city.

The respondents said the local government was able to provide some support. Through the MFARMC, the LGU distributed fishing net replacements, eight fish cages, funds for crab fattening, fingerlings of crab, prawn/shrimp and milkfish. Small no-interest loans were also provided in addition to the financial subsidies. These allowed some to start livelihood recovery. Although the communities recognized that these are not enough to fully recover and return to their pre-typhoon operations, they appreciated the support that their local government was able to provide, given its limited funds. The DA and BFAR also aid the communities, albeit with limited coverage.

Located in a gulf, the municipality has experienced fewer destructive typhoons than other coastal towns facing the open sea. However, the community has observed worsening typhoons affecting the lives and livelihoods of fishers in the area. In the coastal barangay of Katimo, fishers residing there since 1974 have witnessed a significant increase in water levels. What used to be a house along the coastline is now replaced with an elevated docking platform for fishing craft.

Due to the ongoing sea level rise, the coastal barangay had to construct a sea wall to protect the houses from regular high tide flooding. From 1974 to 1990, residents were forced to move their homes at least 10 metres from their original locations. Although a sea wall is in place, heavy rains still cause flooding that reaches houses. Residents also point to the thriving mangroves inside the sea wall as evidence that high tides continue to overflow the wall and inundate the streets.

These experiences are now becoming the norm for the coastal barangays of the municipality. The MDRRMC recognizes the plight of their municipal fishers, but can currently only provide early warning support and evacuation assistance during calamities. Their post-recovery capacity remains limited. The MENRO can offer limited support through developing alternative nature-based sources of income. Meanwhile, the Municipal Social

Welfare and Development Office (MSWDO) provides post-disaster subsidies and social services for affected communities. However, the coastal communities' resilience remains low, as evidenced by their slow recovery.

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The Tagkawayan community has planted 1,266.43 hectares of mangrove trees as part of their coastal rehabilitation process, by Maria Katrinna Nabor

Conclusion and Recommendations

The impacts of climate change pose significant challenges for SSF in the Philippines. Extreme weather events, sea level rise, and habitat degradation threaten the livelihoods and food security of coastal communities. Adaptation strategies are critical to building their resilience. The case study, by examining the impact of climate change on SSF communities of Tagkawayan, identified several ways in which climate change impacts SSF communities.

National and sub-national agencies have adopted various strategies to address these challenges. The National DRRMO and MDRRMO focus on disaster preparedness, response, and recovery, while the MENRO identifies nature-based solutions to address both environmental degradation and alternative income demand from the community. The interviews reveal a need for improved coordination among stakeholders and greater community participation in planning and implementation processes. But for these to be effective, funding and resources need to flow from the national to the sub-national, local government and to the local communities.

The fisherfolk of Tagkawayan express concerns about the increasing frequency and intensity of extreme weather events and their impact on fishing grounds. They highlight the need for stronger social safety nets, including financial assistance and alternative livelihood options, to cope with income losses during weather-related crises. Improved disaster preparedness measures like early warning systems and resilient infrastructure are urgently needed. The community's involvement in mangrove planting demonstrates a proactive approach to adaptation, but further empowerment and access to resources are needed. Empowering SSF communities, particularly vulnerable groups and women, to actively engage in planning, implementation, and monitoring processes is crucial for building resilience.

Further research is needed to assess the effectiveness of programmes not specific to the sector, but which also include small-scale fisherfolk. Given that national policies and programmes are still in the early stages of development and implementation, additional studies can be conducted once more monitoring and evaluation data becomes available.

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References

Aguinaldo, R. T., & Gomez, A. V. (2021). Potential Participation of Fisherfolks in Tourism Activities in Samal Island, Mindanao, Philippines. Philippine Journal of Science, 433-441.

Azanza, R., Alino, P., Cabral, R., Junio-Menez, M., Mendoza, R. U., & Siriban, C. (2015). Valuing the Blue Economy Using a Philippine Lens.

Babaran, R., Quinitio, G. F., Monteclaro, H. M., Ishikawa, S., & Watanabe, K. (2014). Impact survey of Super Typhoon "Yolanda" on Basic Livelihoods and Ecosystem Health in Panay of Philippines. Japan Science and Technology Agency - DOST PCIEERD.

Bailey, C. (1982). Small-scale fisheries of San Miguel Bay, Philippines: occupational and geographic mobility. Tokyo, Japan: Institute of Fisheries Development and Research, College of Fisheries, University of the Philippines in the Visayas, Quezon City, Philippines; International Center for Living Aquatic Resources Management, Manila, Philippines; and the UN University.

Barut, N. C., Santos, M. D., Mijares, L. L., Subade, R., Armada, N. B., & Garces, L. R. (2003). Philippine Coastal Fisheries Situation. WorldFish Center Conference Proceeding (pp. 885-914). WorldFish Center.

BFAR. (2000, January 21). Guidelines on the Creation and Implementation of Fisheries and Aquatic Resources Management Councils (FARMCs). Fisheries Administrative Order 196. Quezon City, Philippines: Bureau of Fisheries and Aquatic Resources.

BFAR. (2024). For The Malinis At Masaganang Karagatan (MMK) Program. Retrieved from Bureau of Fisheries and Aquatic Resources: https://www.bfar.da.gov.ph/malinisatmasaganangkaragatan-national-evaluators-for-the-malinis-at-masaganang-karagatan-mmk-program/

Climate Change Commission. (2011). National Climate Change Action Plan 2011-2018. Climate Change Commission.

Congressional Policy and Budget Research Department. (2021). Facts in Figures: Global Climate Risk Index 2021. Congressional Policy and Budget Research Department, House of Representatives.

CRMP. (2024). Understanding the Philippine Coastal Environment. Retrieved from One Ocean: https://www.oneocean.org/about_crmp/where_we_are.html

DILG. (2024). Regional Summary - Number of Provinces, Cities, Municipalities and Barangays by Region. Department of Interior and Local Government. Retrieved from https://www.dilg.gov.ph/PDF_File/factsfigures/dilg-facts-figures-202489_c0319070a1.pdf

EAS. (2009). Workshop Proceeding on 'Addressing Food Security Through Sustainable Agriculture. The East Asian Seas Congress 2009. Congress/Wp/2010/16. EAS. Retrieved from https://www.pemsea.org/sites/default/files/2023-11/Proceedings%20of%20the%20Workshop%20on%20Addressing%20Food%20Security%20through%20Sustainable%20Aquaculture.pdf

Eluriaga, L. T., Garcia, Y. T., & Catelo, M. O. (2020). The Effects of Risk Preference on the

Choice of Adaptation Strategies of Small-scale Fishers in Response to Depleting Fisheries. Journal of Economics, Management & Agricultural Development, 6(2), 54-67.

Eluriaga, L. T., Garcia, Y. T., Sajise, A. U., & Catelo, M. O. (2019). Assessment of Sensitivity and Adaptive Capacity to Fisheries Decline: A Case of Small-scale Fisheries in Guimaras. Philippine Journal of Social Sciences and Humanities, 24, 20-34.

Fabinyi, M., Belton, B., Dressler, W. H., Knudsen, M., Adhuri, D. S., Aziz, A., . . . Vandergeest, P. (2022). Coastal transitions: Small-scale fisheries, livelihoods, and maritime zone development in Southeast Asia. Journal of Rural Studies, 184-194.

Food and Agriculture Organization. (2023). The contribution of women in small-scale fisheries to healthy food systems and sustainable livelihoods in the Philippines. Rome: Food and Agriculture Organization of the United Nations.

Global Environment Facility. (2017). The Meloy Fund: A Fund for Sustainable Community Fisheries in Southeast Asia. Global Environment Facility.

Heck, N., Pfliegner, K., Mucke, P., Kirch, L., & Agostini, V. (2020). Fisheries at Risk: Vulnerability of Fisheries to Climate Change. Technical Report. Berlin: The Nature Conservancy.

Kumar, M. K., Hakkim, L., Jeyaraaj, S., T.R., & Kumar, B. (2022). Impact of climate change and the vulnerability of small-scale fisheries communities: An overview. International Journal of Health Sciences, 6(S4),, 8502–8509. Retrieved from https://doi.org/10.53730/ijhs.v6nS4.10610

Lacsamana-Umenga, D., & Maderazo, M. (2021, May). A Roadmap for Recovery. Samudra, 85, pp. 73-78.

Lacsamana-Umengan, D. (2018, January). Clear and Present Danger. Samudra, pp. 50-55.

Liu, J.-M., Borazon, E. Q., & Munoz, K. (2021). Critical problems associated with climate change: a systematic review and meta-analysis of Philippine fisheries research. Environmental Science and Pollution Research, 28:49425–49433.

Macusi, E. D., Camaso, K. L., Barboza, A., & Macusi, E. S. (2021). Perceived Vulnerability and Climate Change Impacts on Small-Scale Fisheries in Davao Gulf, Philippines. Frontiers in Marine Science, Sci. 8:597385. doi: 10.3389/fmars.2021.597385.

Macusi, E. D., Laya-og, M. E., Maynawang, I. S., & Macusi, E. S. (2024). Fisher's resilience: preparedness, coping capacity, and adaptation capacity in Surigao del Sur, Philippines. Human Ecology, 1-24.

Macusi, E. D., Macusi, E. S., Jimenez, L. A., & Catam-isan, J. P. (2020). Climate change vulnerability and perceived impacts on small-scale fisheries in eastern Mindanao. Ocean and Coastal Management.

Malayang, B. S., Oracion, E. G., Bomediano, M. R., Calumpong, H. P., Abesamis, R. A., & Montebon, R. D. (2020). Policy Paper: Opportunities and Challenges to Fisheries Policy in the Philippines Today. Journal of Environmental Science and Management, 23(1), 111-126.

Marriott, S. (2023). Connecting Social and Ecological Systems in Small-Scale Fisheries in the Philippines. Dissertations. 2099. The University of Southern Mississippi, The Aquila Digital Community.

Monnier, L., Gascuel, D., Alava, J., Cheung, W., Barragan, M., Ramirez, J., . . . Niedermueller, S. (2020). Small-scale fisheries in a warming ocean: exploring adaptation to climate

change. Berlin: Scientific report. WWF Germany.

Municipality of Tagkawayan. (2024, May). Socio-Economic Profile. Retrieved from Municipality of Tagkawayan: https://tagkawayan.gov.ph/pamanat-yaman-the-tagkawayan-local-cultural-profile/socio-economic-profile/

National Economic and Development Authority. (2011). Philippine Development Plan 2011-2016: Competitive & Sustainable Agriculture and Fisheries Sector. NEDA.

O'Neil, E. D., Crona, B., Ferrer, A. G., & Pomeroy, R. (2019). From typhoons to traders: the role of patron-client relations in mediating fishery responses to natural disasters. Environmental Research Letters, 1-10.

Perez, M., Pido, M., Garces, L., & Salayo, N. (2012). Towards Sustainable Development of Small-Scale Fisheries in the Philippines: Experiences and Lessons Learned from Eight Regional Sites. WorldFish.

Philippine Statistics Authority. (2020). Population Census of 2020. Philippine Statistics Authority.

Philippine Statistics Authority. (2021). Fisherfolks and Farmers Remain to Have the Highest Poverty Incidence Among the Basic Sectors in 2021. Philippine Statistics Authority.

Philippines. (1986). The 1987 Constitution of the Republic of the Philippines. Article X - Local Government. Retrieved from https://openlibrary.org/books/OL5095529M/The_Constitution_of_the_Republic_of_the_Philippines

Philippines. (1991). Local Government Code of 1991. Republic Act 7160. Retrieved from https://www.officialgazette.gov.ph/1991/10/10/republic-act-no-7160/

Samah, A., Shaffril, H., Hamzah, A., & Samah, B. (2019). Factors Affecting Small-Scale Fishermen's Adaptation Toward the Impacts of Climate Change: Reflections From Malaysian Fishers. Original Research, 1-11.

Santos, M. S., Dickson, J. O., & Velasco, P. L. (2011). Mitigating the Impacts of Climate Change: Philippine Fisheries in Focus. Fish for the People, 9(2), pp. 101-110.

Songcuan, A., & Santos, M. (2013). Adaptive Strategies in Coping with Climate Variability: Experience of Philippine Traditional Indigenous Fishers. Fish for the People, 11(3), pp. 1-9.

Tagkawayan LGU. (2024). 2M Premyo Sa MMK, Ipinagkaloob Ng BFAR IV-A Sa Tk! Retrieved from Municipality of Tagkawayan: https://tagkawayan.gov.ph/2m-premyo-sa-mmk-ipinagkaloob-ng-bfar-iv-a-sa-tk/

Talbot, E., Jontila, J.-B. S., Gonzales, B. J., Dolorosa, R. G., Jose, E. D., Sajorne, R., . . . Queiros, A. M. (2024). Incorporating climate-readiness into fisheries management strategies. Science of Total Environment, 918, 1-12.

USAID. (2018). Marine Tenure and Small-Scale Fisheries: A Priority for Development Programming. USAID.GOV.

Villar, M. S., Penacilla, N. P., Penacilla, D. C., & Lanciso, M. M. (2022). Climate Change Adaptation Impact of Indigenous Fishing Techniques in Selected Coastal Barangays of Partido Area. The American Journal of Humanities and Social Sciences Research, 5(4), 20-29.

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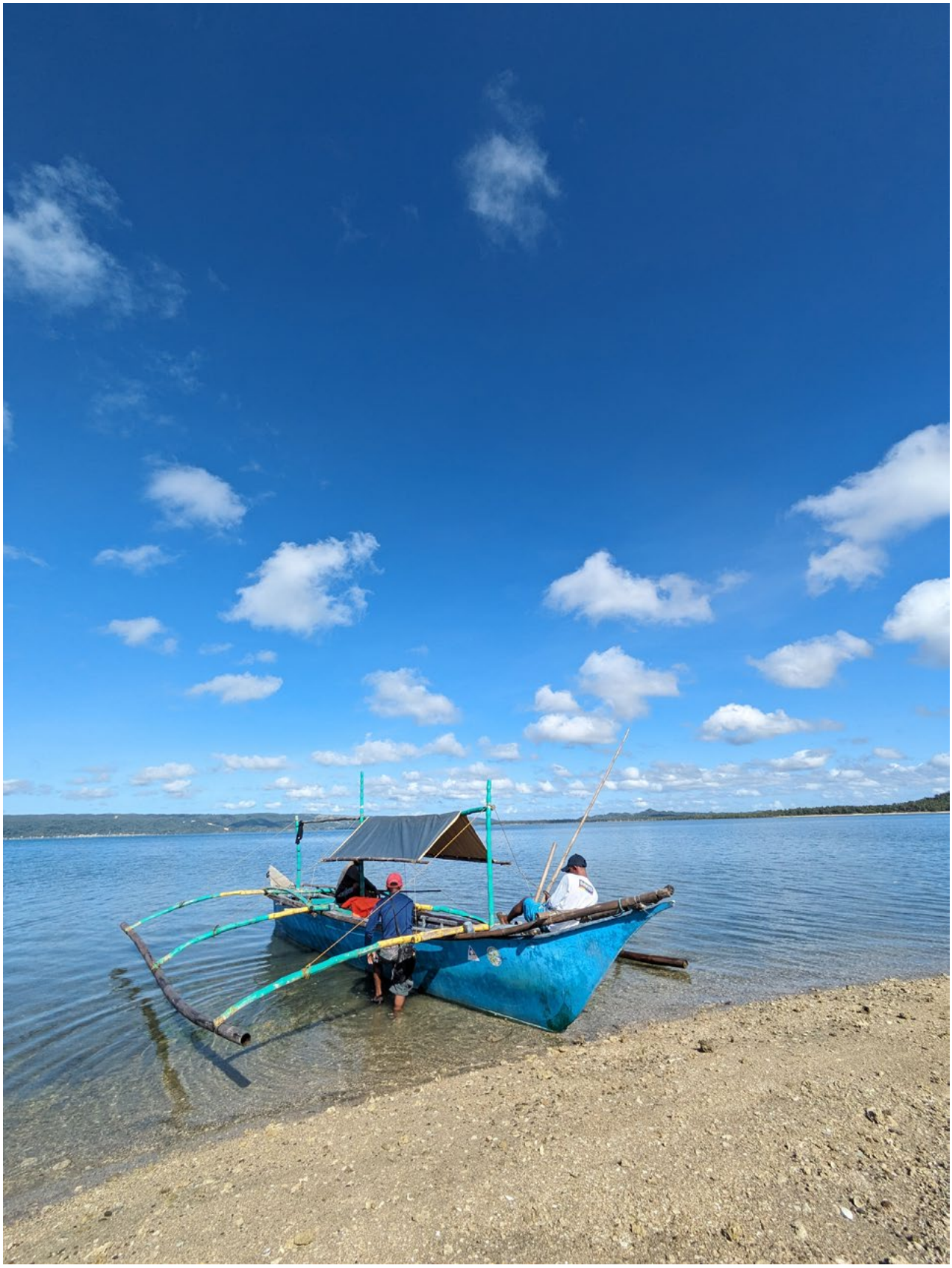
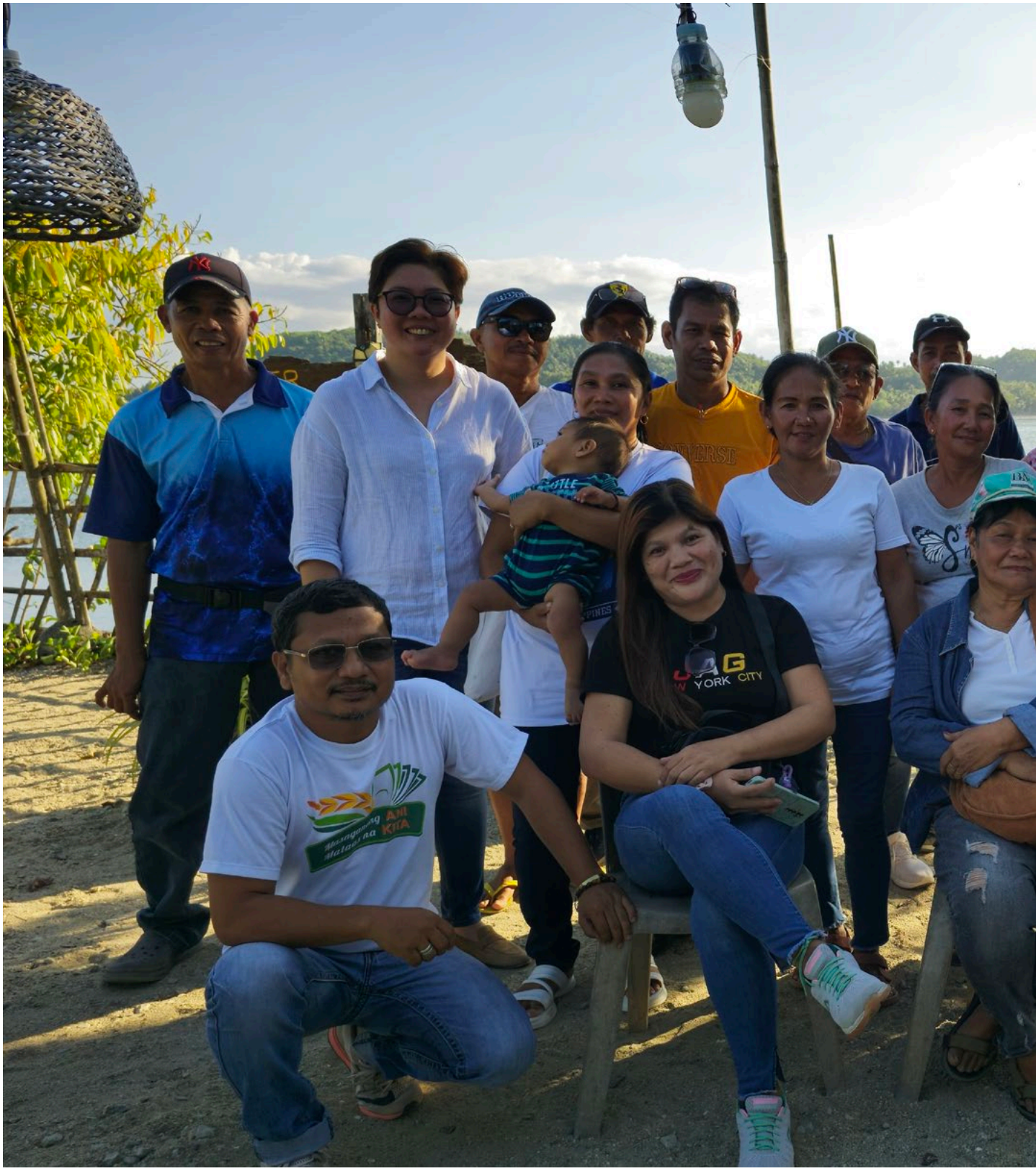


The Bantay Dagat municipal boat, which patrols the coastal areas of Tagkawayan and combats illegal fishing activities, by Maria Katrinna Nabor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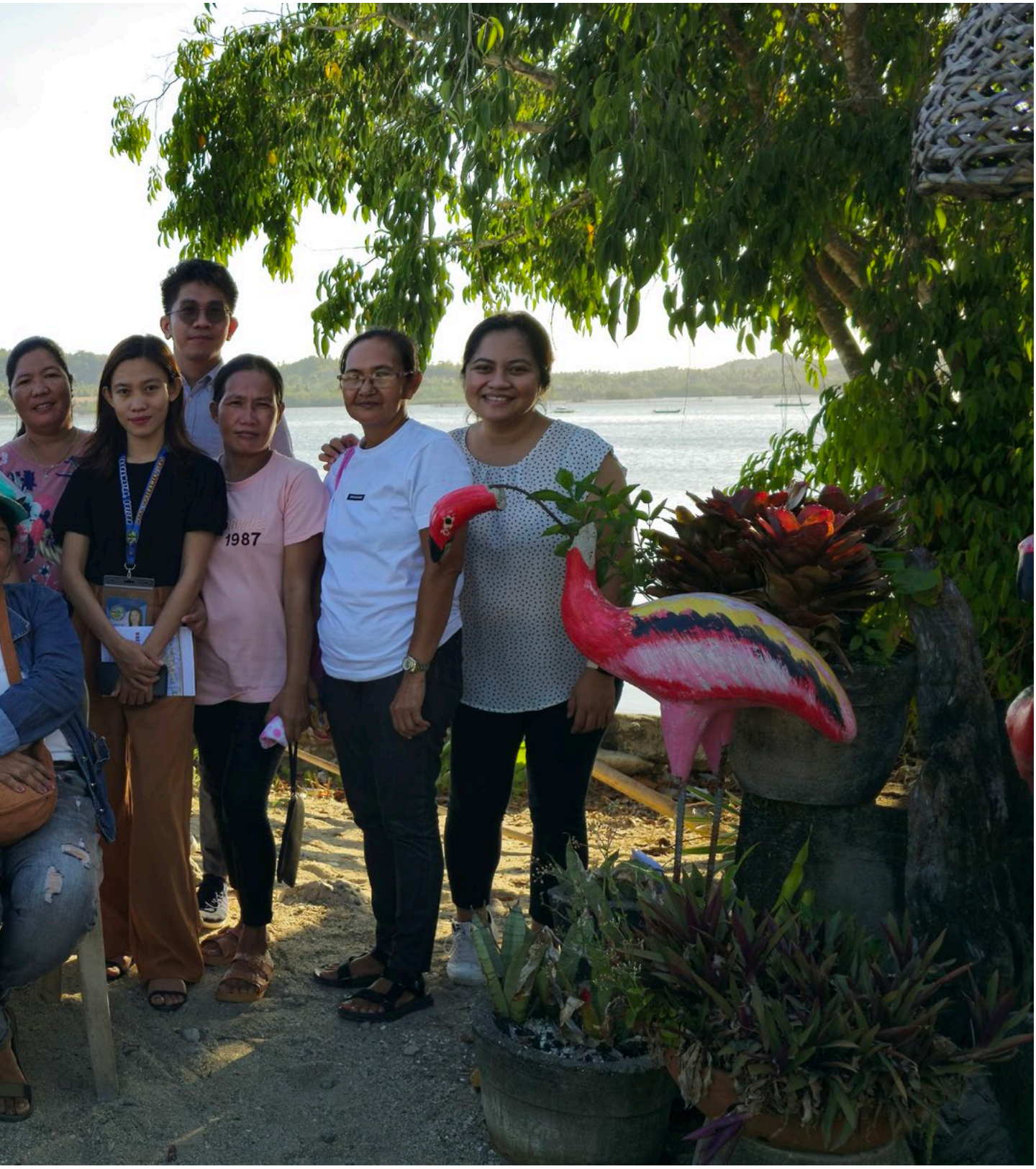
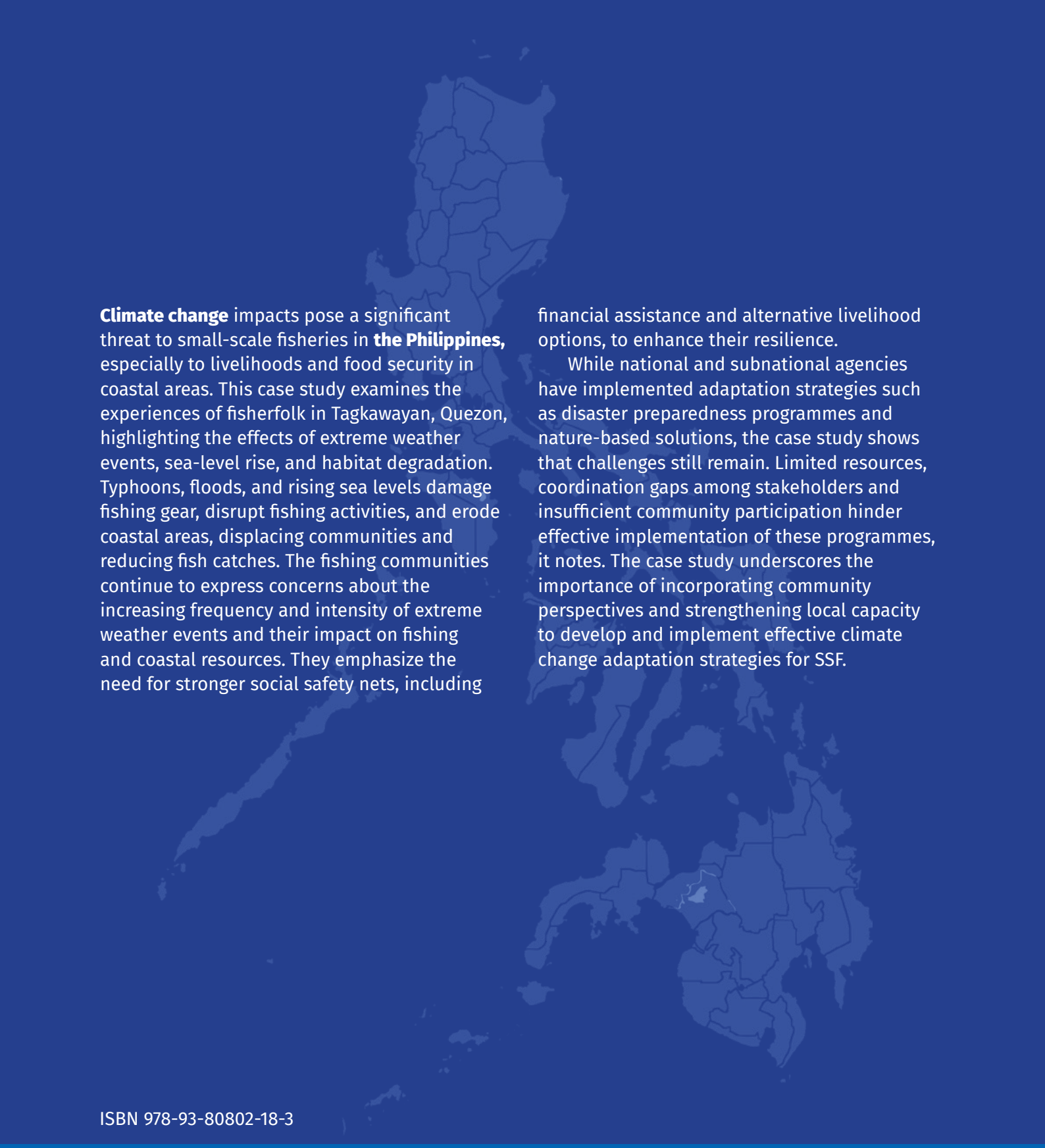


Tagkawayan fisherfolk participating in the focus group discussion, by Maria Katrinna Nabor



Climate change impacts pose a significant threat to small-scale fisheries in **the Philippines,** especially to livelihoods and food security in coastal areas. This case study examines the experiences of fisherfolk in Tagkawayan, Quezon, highlighting the effects of extreme weather events, sea-level rise, and habitat degradation. Typhoons, floods, and rising sea levels damage fishing gear, disrupt fishing activities, and erode coastal areas, displacing communities and reducing fish catches. The fishing communities continue to express concerns about the increasing frequency and intensity of extreme weather events and their impact on fishing and coastal resources. They emphasize the need for stronger social safety nets, including financial assistance and alternative livelihood options, to enhance their resilience.

While national and subnational agencies have implemented adaptation strategies such as disaster preparedness programmes and nature-based solutions, the case study shows that challenges still remain. Limited resources, coordination gaps among stakeholders and insufficient community participation hinder effective implementation of these programmes, it notes. The case study underscores the importance of incorporating community perspectives and strengthening local capacity to develop and implement effective climate change adaptation strategies for SSF.

ISBN 978-93-80802-18-3

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