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IKI INTERNATIONAL CLIMATE INITIATIVE

Fishing for Climate Resilience

Project Results, Insights and Lessons Learned

Foreword

Let's admit it—climate resilience is somewhat of a buzzword. How is it achieved? What does it look like? What does it mean for people?

This report uses a series of metrics to evaluate Rare's progress in enhancing the adaptive capacities of vulnerable small-scale fishing communities to climate change through Ecosystem-based Adaptation approaches. But throughout this project, metrics have not been the only thing on our minds.

We think about Emerald Dolar, a fisher from Surigao del Norte, Philippines who watches the unpredictability of the seasons grow each year because of climate change, threatening his livelihood.

We think about La Ode Muhammad Ramadan, a community leader from Pasi Kolaga, Indonesia, who brings together religious leaders, village elders, youth, and other members of the community to work together to end destructive fishing practices and protect vital ecosystems.

We think about Mayor Mary Jean Te of Libertad, Philippines whose citizens depend on nature for sustenance and security from the ever-worsening impacts of climate change.

We think about Adolph Demei from the Melekeok community in Palau, a fisherman and protector of marine resources, who encourages everyday Palauans to become active conservationists.

While terms like "climate resilience" may be abstract, the consequences are all too real for these individuals and so many others across the Asia Pacific. And it is with them in mind that I am excited to share this new report, *Fishing for Climate Resilience*. The insights from this report offer lessons for our networks of implementing partners, local leaders, and practitioners to better support coastal communities, while sending a strong message to international policy makers about the importance of small-scale fisheries in shaping and implementing ambitious policy frameworks such as the National Determined Contributions to the Paris agreement.

Rare looks forward to sharing these insights and building small-scale fishing communities ability to adapt to climate change.

Rocky Sanchez Tirona
Managing Director, Fish Forever, Rare

Foreword

The world is facing a triple planetary crisis: biodiversity loss, climate change and pollution. And these three global challenges are closely interlinked. This gets obvious when looking at oceans: they are critical for nature and people, but also for global action on climate change and biodiversity. The pressure on our oceans is already huge because of unsustainable uses such as overfishing. Climate change puts additional pressure on the oceans through heating and acidification. And over the past decades pollution has reached scales where we are well underway to a world with more plastic than fish in our oceans.

The Kunming-Montreal Global Biodiversity Framework, the Glasgow Climate Pact, as well as the establishment of the UN Ocean & Climate Change Dialogue acknowledge that the coming years will be crucial for increased ambition towards the conservation and sustainable use of our oceans and for the fight against climate change. Promoting Nature-based Solutions (NbS) including Ecosystem-based Adaptation (EbA) are a key way to combine biodiversity protection, climate change mitigation and adaptation, and to address other societal challenges such as food security, safe water supply and pandemic prevention. Therefore, initiatives supporting a climate resilient and nature positive development are and will become more and more important.

The Fishing for Climate Resilience project is a lighthouse example of such an initiative. We have been honored to support Rare and partners in Indonesia, the Marshall Islands, Micronesia, Palau and the Philippines over the past years via Germany's International Climate Initiative (IKI). By mainstreaming coastal EbA approaches into the small-scale fisheries sector, the project has strengthened the adaptive capacity of local fisheries and the integrity of marine habitats and coastal ecosystems. It has contributed to ensuring food security and improving livelihoods for its targeted communities—in particular in such difficult times as during the COVID-19 pandemic. Hence, it succeeded in strengthening social, ecological as well as economic resilience and showed that EbA has the potential to be catalytic for climate resilient and nature positive development. The project further showcased the potential of local actors as agents of change and that collective commitment and peer-to-peer-learning on a local level are key for designing successful EbA measures.

I hope that the results of the Fishing for Climate Resilience project will persist and that its experiences and lessons learnt will inspire policy- and decision-makers, practitioners and all those wishing to contribute to the preservation of our oceans for generations to come. Enjoy reading!

Elke Steinmetz
Head of Division for International Cooperation on Biodiversity of the German Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BMUV)

Foreword

Ngā mihi nui kia koutou katoa,

Back in 2018, when Rare first approached us to work with them on the Fishing for Climate Resilience (FFCR) initiative, I was immediately impressed by the scope and ambition of the project. For me this was a match made in heaven: a chance for us to leverage the high level political leadership within our Network, and connect them to genuinely grassroots community-led work, facilitated correctly and with cultural sensitivity. It also built on a long relationship we have had with Rare as a member and partner.

Designed to help small-scale fishing communities adapt to climate change through Ecosystem-based Adaptation (EbA) approaches, "Fishing for Climate Resilience" implements and mainstreams EbA measures systematically in community-led fisheries management in 36 vulnerable fisheries-dependent local government units in the Philippines, Indonesia, Palau, Federate States of Micronesia, and the Marshall Islands.

Unsurprisingly this significant body of work has yielded substantial data, allowing us to gauge against defined parameters, the success of our collective community engagement, as well as the effectiveness of Rare's social marketing and behavioural adaptation strategies across varied island contexts. It has produced wonderful examples of island 'Bright Spots' just waiting to be showcased to the rest of the world. And so, this was where our Global Island Partnership came in.

Over the last couple of years we have featured the work of FFCR at specially curated events in the margins of major international meeting events in cities across the globe: from Lisbon to Vancouver; the Climate COP to the UN General Assembly; and featuring Prime Ministers and practitioners alike. What's more, no matter if virtual, hybrid or live in person, consistent across all these efforts was the connecting of policy makers to decision makers and creating the conditions for these achievements to be scaled upward and outward.

Many of the lessons learnt and presented in this report have originally been expressed at these events, the messaging continuously refined and distilled across many sessions. And while this project may have ended, the work has only just begun. Through initiatives like the Coastal 500 and Local 2030 Islands Networks, we will continue to find opportunities for local implementers to share their stories, learn from each other and inspire planetary progress.

At a time when the impacts of climate change are becoming increasingly severe and urgent, it is essential that we prioritize the development of climate resilience in islands, and that we do so in a way that is inclusive, equitable, and sustainable. Rare's report provides a valuable contribution to this effort, and I hope that it will inspire and inform island communities, policymakers, and practitioners alike.

I encourage you to read this report with an open mind and a spirit of curiosity and inquiry, and to join Rare in its mission to create a more resilient and sustainable future for our islands and our planet.

Ngā mihi mahana,

Kate Brown
Executive Director,
Global Island Partnership

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Glossary and abbreviations

BE.Center: Rare's Center for Behavior and the Environment

BFAR: Bureau of Fisheries and Aquatic Resources

BMUV: German Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection

CCVA: Climate Change Vulnerability Assessment

CEA: California Environmental Associates

CFRM: Coastal and Fisheries Management Board

CPUE: Catch per Unit Effort

CSO: Civil Society Organization

EbA: Ecosystem-based Adaptation

FMB: Fisheries Management Body

EO: Executive Order

FAO: Food and Agricultural Organization of the United Nations

FARMC: Fisheries and Aquatic Resources Management Council

FEBA: Friends of Ecosystem-based Adaptation

FSM: Federate States of Micronesia

GCF: Green Climate Fund

GLISPA: Global Island Partnership

IKI: International Climate Initiative

IPCC: Intergovernmental Panel on Climate Change

IUCN: International Union for Conservation of Nature

IUU: Illegal, Unreported, Unregulated

LGU: Local Government Unit

MA+R: Managed Access and Reserve

MCT: Micronesia Trust Fund

MSME: Micro, Small and Medium size Enterprise

MSP: Marine Spatial Planning

MTWG: Municipal Technical Working Group

NAP: National Adaptation Plan

NDC: National Determined Contributions

NGO: Non Governmental Organization

PAMO: Protected Area Management Office

SC: Saving Club

SDG: Sustainable Development Goal

SIPLAS: Siargao Island Protected Landscape

SPR: Spawning Potential Ratio

SSF: Small Scale Fisheries

TURF: Territorial Use Right Fisheries

UNFCCC: United Nations Framework Convention on Climate Change

UNFCCC COP: United Nations Framework Convention on Climate Change Conference of the Parties

USD: United States Dollar

Report Highlights

Through its Fishing for Climate Resilience project, Rare and partners applied a unique approach for a dual-purpose: 1) delivery: to enhance capabilities of coastal Small-Scale Fishing (SSF) communities and governments in the Philippines, Indonesia, Federate States of Micronesia (FSM), and Palau to adapt to climate change impacts—the delivery element—and 2) development: to grow insights on links between social and ecological dimensions of human vulnerability to climate change—the development element. These insights now provide opportunities for partner countries to deliver and enhance their National Determined Contributions (NDC) to the Paris Agreement and National Adaptation Plans (NAPs) under the United Nations Framework Convention on Climate Change (UNFCCC) in a way that is meaningful to coastal communities' livelihoods.

Rare and partners combined their knowledge, developed skills not previously existing, and introduced tools suitable for SSF communities and government to reduce (future) risks caused by changes in their living environment. Outreach regarding benefits of local EbA measures in countering future climate change impacts and at a larger-than-local scale proved difficult. Instead, a narrative which includes more immediate benefits from formally recognized territorial rights and inclusion in village, municipal or district level decision-making processes appears a stronger motivator for initial adoption of measures. Therefore, taking a holistic approach to enhance all three categories of resilience (environmental, social, and economic), focused on generating benefits for nature and people, has been an important driver for communities to consider EbA measures, particularly the creation of Managed Access areas complemented with marine Reserves (MA+R).

Select skills and tools were developed purposefully so that communities and government can witness and interpret change independently. This will not only aid future decision-making when and where it matters, it will also increase awareness by SSF actors about the sensitivity of the sector to change. As evidenced during the pandemic, communities and local governments know that investing in the capability to adapt to change is important, even in areas where direct exposure to climate change impacts may be low. Also, when provided with appropriate tools, local leaders are easily motivated to collaborate across political jurisdictions if this serves ecological resilience through networks of MA+R—illustrating the value of networked approaches for scaling.

Fisher at sunset in Del Carmen, Philippines.

A total of 393 communities were engaged and actively implement EbA measures. An estimated total of **20,072 direct beneficiaries** were reached of which **47% of whom are women**. A total of **37,965 people were reached by behavioral adoption campaigns**. Communities monitor their catches and related financial results and share weather information for safety at sea. As a result, a total of **2,502 km² of coastal waters are now co-managed fishing grounds** and a total of **30,85 km² of blue carbon ecosystems are protected** in newly established reserves.

Communities and government are now making provisions that reduce vulnerability to future impacts of climate change, and that provide immediate benefits for well-being of people engaged in SSF. The nature of provisions made by communities and their governments indicate clear interest in strengthening resilience to change and provides early evidence of behavior change for better outcomes that are more immediate as well. This is useful for sustaining behavior required to enjoy benefits of EbA measures as it takes time for EbA to deliver measurable benefits. Motivating compliant behavior with EbA has generally been difficult to achieve in these countries.

Municipal and provincial governments supported formalization of EbA measures and allocated public funding for created fisheries management bodies (FMBs). The MA+R interventions are included in **17 local government annual investment plans**, and about **USD $3M were allocated** by local governments in the Philippines for MA+R establishment, support for community enforcers, mangrove

replanting, and waste management, among other activities that have started in some municipalities. Also, the governor of Southeast Sulawesi, Indonesia and five municipalities in the Philippines approved climate resilient (MA+R) areas benefiting nearly **23,000 fishers across 117 coastal communities**. Combined, these policy milestones give small-scale fishers the legal basis to access and co-manage **2,447.54 km² of fishing grounds and 54.39 km² of reserves**. In Sulawesi, compliance is supported by a decree outlining the guidelines for community-based enforcement within the MA+R areas to ensure rightful use of authority and sustainable fishery management.

Villages reserved funds for future hardship, to pay for ecosystem restoration and social causes. For example, the Indonesian Buton District's Village Empowerment Agency and Legal Division issued a regulation requiring local leaders to prioritize marine and fishery-related activities in their village funds. This policy enabled **15 villages to allocate $69k for marine protection activities**. These provisions made by communities and government partners are of the kind that will support sustainable project impacts and lasting change. Also, some savings clubs in San Isidro and Del Carmen (Halian), the Philippines, initiated a nutrition project for children as part of their regular activities.

There are now 8 communities that have officially approved climate-smart fisheries management plans and another 26 will soon follow. These provide the foundation for future action as climate exposure increases. The value of this was already illustrated in the Philippines: the emergency relief response rate was notably reduced during a devastating hurricane due to the existence of FMBs and the ability of the mayor to provide food to survivors by temporarily opening a nearby marine reserve to fishing. While this was a difficult decision for the local councils and mayor to make, there was not enough relief assistance at the time. The local leaders still imposed rules, allowing only hook and line fishing for a limited amount of time, after which the reserve was closed again.

Through the tools that were provided and co-created, information relevant for (future) decision-making in support of the SSF actors is collated at low-cost for all levels where decisions are made for this sector (e.g., household, village, municipality, district, province, country). For example, in Palau, the Bureau of Fisheries with Rare developed and now implements the **national fisher registration system** to gather information on fishers, gear, and licensing. This information will help fishery managers protect the ocean from unsustainable fishing practices thus increasing its resilience to other threats including climate impacts. Catch applications, registration of SSF fishers and FMBs provide practical information pathways through which SSF needs are identified and support can be provided effectively.

Financial literacy may help reduce sensitivity to future impacts, and focusing on skill development of women has the added benefit of affecting family wellbeing. Involving women in fisheries management decisions is not new, yet through this project, Rare has succeeded to discover a pathway to enhanced gender equity that is easily accepted because communities throughout the region considered it a logical and respectable role for women in a way that is easily accepted.

Jumriati, a school teacher and fish buyer who attended Rare's Microenterprise Co-learning Workshop in Kendari to gain experience, learn new information and to meet fish buyers who come from different districts.

Access to financial services for micro-enterprises that adopt EbA measures and support MA+R management and rules, opens opportunities to grow sustainably and retain economic resilience. As microentrepreneur fish buyers have a significant influence in determining the size, quality and variety of fish that enter the market, these capacity building strategies are essential to green recovery by ensuring a resilient domestic value chain and sustaining best practices for climate resilient MA+R areas. Placing SSFs within the context of Micro, Small and Medium-scale Enterprises (MSME), and creating an 'access to finance' fund or facility to support the specific needs of MSMEs in coastal areas could support scaling.

The biggest motivator for adoption of these EbA measures and collaborative management was the facilitation of legalized access rights. This legalization of co-management arrangements for indigenous and local coastal communities combined with new skills obtained by fishers to monitor the state of their own fisheries and the creation of FMBs, makes it so that fishers and their families now have the capacity to make collaborative decisions based on feedback loops that are

meaningful to them. Participants in the MA+R understand clearly that any benefits from management will accrue to them, and this formed a key incentive for collaborative behavior. This provides precedent and examples that can be referenced by others, which contributes to the field of practice.

Mayor Mary Jean Te of Libertad, Philippines discusses pathways to scale Ecosystem-based Adaptation Approaches in Small-Scale Fisheries at the UNFCCC COP27.

The holistic approach taken by Rare and its partners, has been fine-tuned, and insights gained through the project will help to accelerate and scale up resilience building in this important SSF sector through the global Fish Forever program. Importantly, application of the lessons also provides an opportunity to enhance success by Rare's government partners and other organizations who struggle to motivate communities for compliance with marine conservation and fisheries management. Without rationalization of fishing capacity, the sector has been operating in a near-open access condition, which has resulted in a race-to-the-bottom of different segments of the sector competing to catch the last fish. Hence project insights are useful not only for areas where measurable impacts of climate change on fisheries exist, but also as more generic fisheries management measure in areas where communities have yet low levels of exposure to impacts of climate change.

The project advanced development of models for holistic integration of environmental, social, and economic interventions in climate change adaptation projects and demonstrated how local level EbA actions and policies are relevant to national policies such as NDCs and NAPs. As the pandemic helped government and donors see the critical role of SSF actors for food security, insights generated offer opportunities for enhanced project design by the international development sector and for effective government public spending aimed at the SSF sector. For island and coastal states aimed at supporting vulnerable ocean-dependent communities, this project could serve as an example for how to support a government in formulating national policies inclusive of EbA measures and local implementation. Going forward, national policies should support the legal context for holistic adaptation approaches which mainstream EbA, as well as create an investment climate to achieve change at the scale required. It will be important to note, however, that management reforms intended to promote climate adaptation or EbA benefits may need to consider the negative impacts from a changing climate and its increasing greenhouse gas emission scenarios. For sustainable fisheries management approaches to realize their climate adaptation potential, it is critical to also reduce global greenhouse gas emissions through other mitigation strategies.

Acknowledgments

Fishing for Climate Resilience was implemented with 36 communities and local government units across the Philippines, Indonesia, Palau, the Federated States of Micronesia (FSM), and the Marshall Islands. Rare's partners were: the Global Island Partnership (GLISPA), the Micronesia Conservation Trust (MCT), the Food and Agriculture Organization of the United Nations represented through its Philippines Office. This project was part of the International Climate Initiative (IKI). The German Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BMUV) supports this initiative based on a decision adopted by the German Bundestag through the International Climate Initiative (IKI). In 2020, Rare received additional funds for green recovery activities to help the sector respond to pandemic threats.

Project participation by community members and government for the following areas is very much appreciated. We thank people from Indonesia in Kapuntori, Kulisusu, Maginti, Mataoleo, Mawasangka, Pasi Kolaga, Sagori, Siompu, Siotapina-Lasel, Talaga Raya, Teluk Kolono, Teluk Moramo, Tiworo Utara, Wabula, and Wawonii. We thank people from the Philippines in Burgos, Culasi, Dapa, Del Carmen, General Luna, Libertad, Pandan, Pilar Camotes, Pilar Siargao, Poro, San Benito, San Francisco, San Isidro, Santa Monica, Sebaste, Socorro, and Tudela. We thank people from FSM in Kitti, Kolonia & Nett, Madolenihmw, Sokehs, and U. We thank people in Palau from Ngiwal and Melekeok.

This report is the result of a project assessment using project documents, publicly available information on the broader context to the project as well as of information gathered through more than 40 interviews with Rare staff, their partners and experts in the field of fisheries management, marine conservation, and development finance. Community and local authorities participated in recordings of their most significant stories about their experience in the project and important lessons were shared by many of the project partners during a workshop as well. All respondents and workshop participants were very gracious with their time and shared highly useful information and perspectives.

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Introduction

Climate change—does it matter much for fisheries?

Fisheries management systems are ill-equipped to deal with rapidly changing environmental conditions that lead to changes in stock productivity and distribution. Governments and regional fisheries management organizations need to incorporate climate change in their approaches to risk reduction. Dahlke et al. (2020) predict the magnitude of the impact on a wide range of fish species, based on their thermal bottleneck theory which assigns highest vulnerability to embryos and spawners. They expect 60% of species to be seriously affected within the next century, in a doomsday scenario of 5 degrees celcius warming compared to pre-industrial temperatures. They also predict 10% of species to be seriously affected if climate goals are achieved and warming remains below 1.5 degrees C. These predictions do not include extinctions, but adaptation is expected to be very slow and difficult, as shifts to cooler spawning seasons or cooler habitats may be very problematic and possibly unsuccessful due to various reasons. Dahlke et al. (2020) assess their estimates to be conservative because their predictions do not include other effects of climate change such as direct deoxygenation, acidification, and temperature extremes.

Deeper waters are cooler and temperature rise is more rapid and profound in shallow and surface waters than it is at greater depths. Considering the thermal bottleneck hypothesis for spawners and embryos, species which spend their entire life in shallow water might be assumed most vulnerable to climate change. Juveniles of some snapper species, however, prefer habitats shallower than those occupied by adults. Deep-water snappers and groupers may also be particularly vulnerable to climate change and overfishing due to their large size and slow maturation. Some demersal species in the Pacific have specialized adaptations that allow them to survive only within a very narrow range of environmental conditions. All this implies that even small environmental perturbations are predicted to result in species distribution shifts that alter ecosystem trophodynamics and affect different types of fisheries.

What about Small Scale Fishing communities in the Asia Pacific?

The Asia Pacific region hosts the most diverse and endemic-rich marine life on the planet and contributes some 65 percent of the world fisheries production. Years of unsustainable fishing practices, poverty, and poor law enforcement have already inflicted significant damage to critical habitats such as coral reefs, mangroves, and seagrass beds. With climate change happening, scientists predict that these habitats will worsen in the coming years, leaving hundreds of thousands of vulnerable small-scale fishing communities and dependent economies exposed to sea level rise and disaster risks caused by increased frequency of hazards such as storms.

How does Rare's global Fish Forever program fit in?

Since 1973, Rare has applied social marketing and behavioral adaptation strategies to strengthen environmental stewardship. The global Fish Forever program combines this with climate and fisheries science, aiming to reverse further decline and collapse of fish stocks around the globe. Fish Forever's focus on community-based fisheries management increases both ecological and social adaptive capacity and ensures equitable distribution of benefits so that both people and nature can adapt and thrive under changing conditions. Fish Forever's goals of improving biodiversity and helping fish populations recover through application of Ecosystem-based Adaptation (EbA) measures targets sustaining of livelihoods. Supporting small-scale fishing communities through the creation of managed access areas complemented by fishing reserves is Rare's way to operationalize Territorial Use Right Fisheries (TURF)—a globally recognized approach to motivate collaborative stewardship over fish stocks. As exposure to impacts of climate change increases, resilience of coastal fisheries and their communities must be strengthened through Fish Forever.

Launched in 2018 with support from Germany's International Climate Initiative (*Internationale Klimaschutzinitiative*—IKI), Rare and partners implemented the project "Fishing for Climate Resilience: Empowering vulnerable, fisheries dependent communities to adopt Ecosystem-based-Adaptation (EbA) measures for securing food and livelihoods" (hereafter referred to as 'the project').

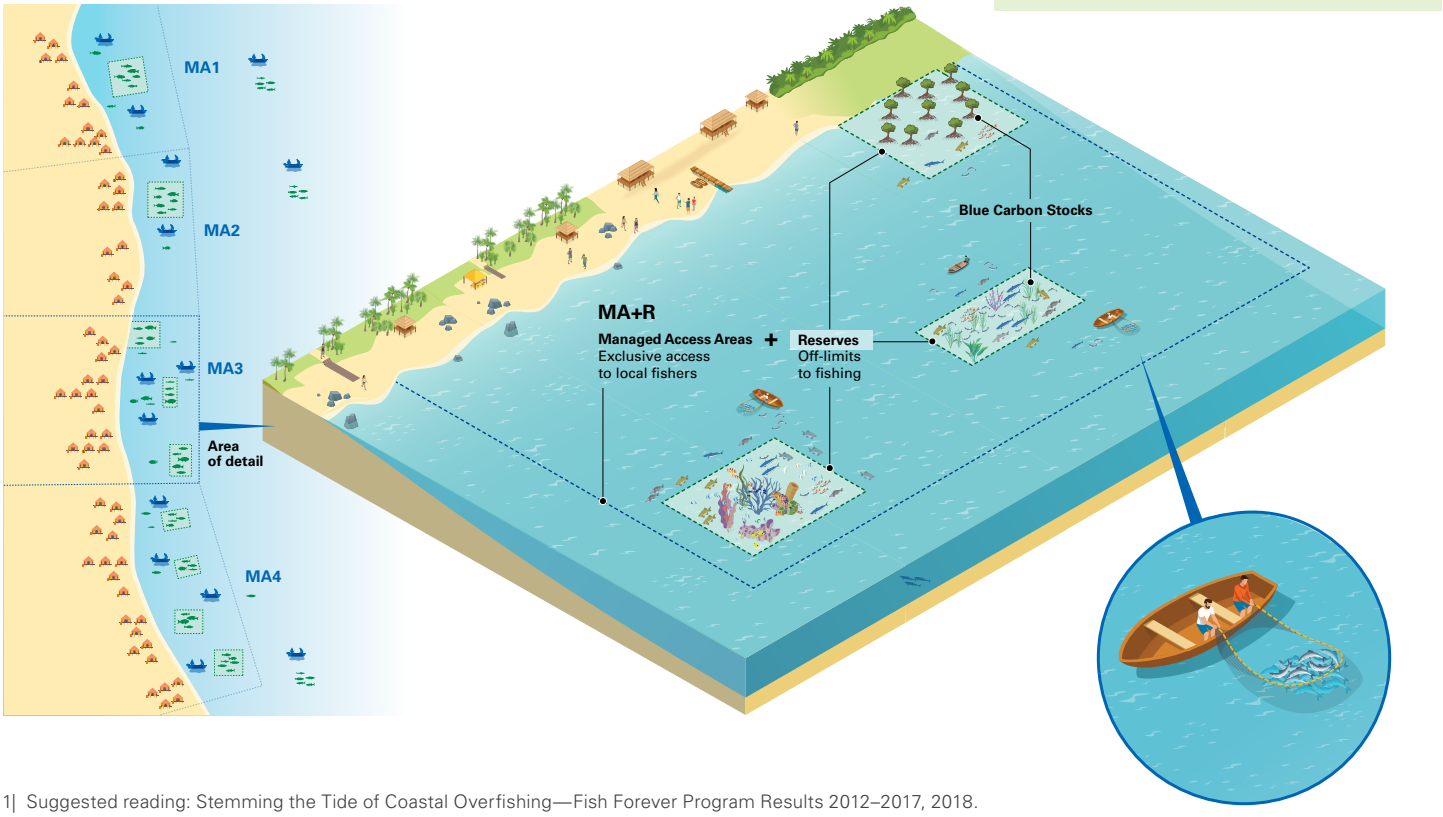
Part I: Project Description

In September 2018, Rare launched a four-year regional project across the Philippines, Indonesia, Federated States of Micronesia (FSM), Palau, and the Marshall Islands in partnership with national and local governments, the Food and Agriculture Organization (FAO), Global Island Partnership (GLISPA) and Micronesia Conservation Trust. The project received additional funds in 2020 for green recovery activities to help the sector respond to challenges caused by the COVID-19 pandemic. Together, the partners are working to enhance the adaptive capacities of vulnerable small-scale fishing (SSF) communities to climate change by adopting EbA approaches. By mainstreaming EbA into the productive fisheries sector, the project supports partner countries in implementing their Nationally Determined Contributions (NDCs) and National Adaptation Plans (NAPs) under the United Nations Framework Convention on Climate Change (UNFCCC).

This is Rare's first initiative combining climate adaptation with SSF. This project is extremely timely, as losses up to $10 billion a year in global fisheries revenues are expected from reduced productivity and altered stock distributions caused by ocean warming and deoxygenation (Lam et al., 2016). This provides urgency to accelerate efforts and serve needs identified through the global Fish Forever program between 2012–2017[1].

Rare and partners considered the value of EbA measures to build climate resilience through integrating two EbA measures with community-based fisheries management: creation of managed access areas complemented with marine reserves (hereafter referred to as MA+R) (figure cross reference).

Impacts of ocean warming and deoxygenation on marine organisms can affect entire fish populations and ecosystems, and thus the fisheries that depend on those. Most hypotheses for direct impact on fish stocks are linked to aerobic capacity that determines tolerance to temperature extremes. The composition of fish communities at specific fishing grounds will be altered if-and-when species shift their distributions poleward in response to ocean warming. Climate-change impacts on global fisheries can be clustered into two broad categories: changes in stock productivity and changes in species distributions. Responding to changes in fisheries productivity requires harvest policies that are appropriately adaptive to changing demographics. Changing species distributions can move stocks into and out of management jurisdictions, altering incentives for management of those stocks.



1| Suggested reading: Stemming the Tide of Coastal Overfishing—Fish Forever Program Results 2012–2017, 2018.

Rare designed this project to empower women who are direct and indirect actors in fisheries and—as such—constitute a critical part of the social system of SSF communities. Empowering women enhances fishing households' financial inclusion and provides financial identity while supporting participatory collection and use of fisheries data for SSF management. Through this holistic approach, the project served a dual-purpose: 1) enhance climate resilience of coastal SSF communities by applying EbA measures and 2) generate lessons for enhancement of the global Fish Forever program. Figure 1 provides project outcomes envisioned during project design.

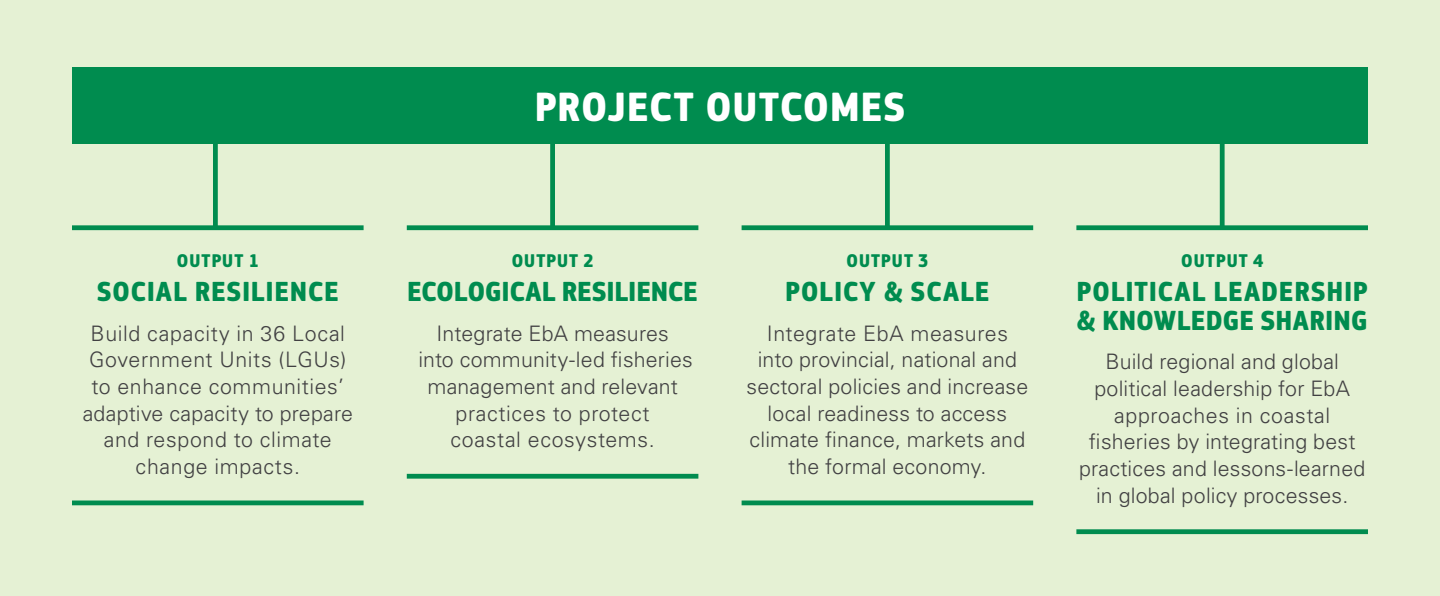


Figure 1. Schematic presentation project outcomes

Design for Impact

The climate change vulnerability framework promoted by the Intergovernmental Panel on Climate Change (IPCC), suggests that the extent to which people's livelihoods are vulnerable to the impacts of climate change has three dimensions: 1) their exposure to climate impacts (i.e., if impacts are felt in their location); 2) their sensitivity (i.e., the extent to which their livelihood is affected by an impact); and 3) their capacity to adapt to the likely impacts.

In the fisheries context, changes in sea surface temperature, acidification, sea level rise, storm surge and intensity all threaten fisheries through coral bleaching and subsequent mortality, direct and indirect fish mortality, and physical damage. Sensitivity evaluates how those physical changes will affect the local ecological and social systems and people dependent upon those systems. This is best measured by the dependency of the local population on the fishery as captured by the proportion of income that comes from the local fishing economy and therefore the proportion of local livelihoods that would be affected by physical changes. Adaptive Capacity is the ability of the local system to prepare for, respond to, and recover from those changes. This is often measured by resources available to assist recovery, through developed plans, cached resources, resilient infrastructure, and government effectiveness.

In 2013, Cinner et al., already discussed ways to improve on previously developed applications of vulnerability in fisheries by explicitly considering both social and ecological dimensions of vulnerability and found that "*Different communities have relative strengths and weaknesses in terms of social-ecological vulnerability to climate change.*" Socio-Ecological Climate Change Vulnerability Assessments (CCVA) disaggregate the ecological and social components of vulnerability by capturing the exposure to physical changes, the ecological sensitivity to those changes, the ecological adaptive capacity, the social sensitivity, and the social capacity separately (Cinner et al., 2013) (Figure 2).

The project aimed to develop a model for delivering reduced social and ecological vulnerability of SSF communities who depend on climate-vulnerable ecosystems and to uncover factors explaining change towards favorable behavior of key actors (communities, government, and investors) for mainstreaming EbA measures in their countries. Using fisheries and climate change information as well as local knowledge, Rare's community engagement and behavior adoption strategies help build cohesion and cooperation within the community, strengthening their ability to work closely and efficiently in finding solutions to the risks they are exposed to because of climate change.

This social adaptive capacity was a fundamental element during development of the project interventions.

Through this project, Rare and partners complemented knowledge, developed skills not previously existing, and introduced tools suitable for SSF communities and government to reduce (future) risks caused by changes in their living environment. Impacts on attitudes and behavior of SSF communities and local authorities were assessed as well as on fishing outputs.

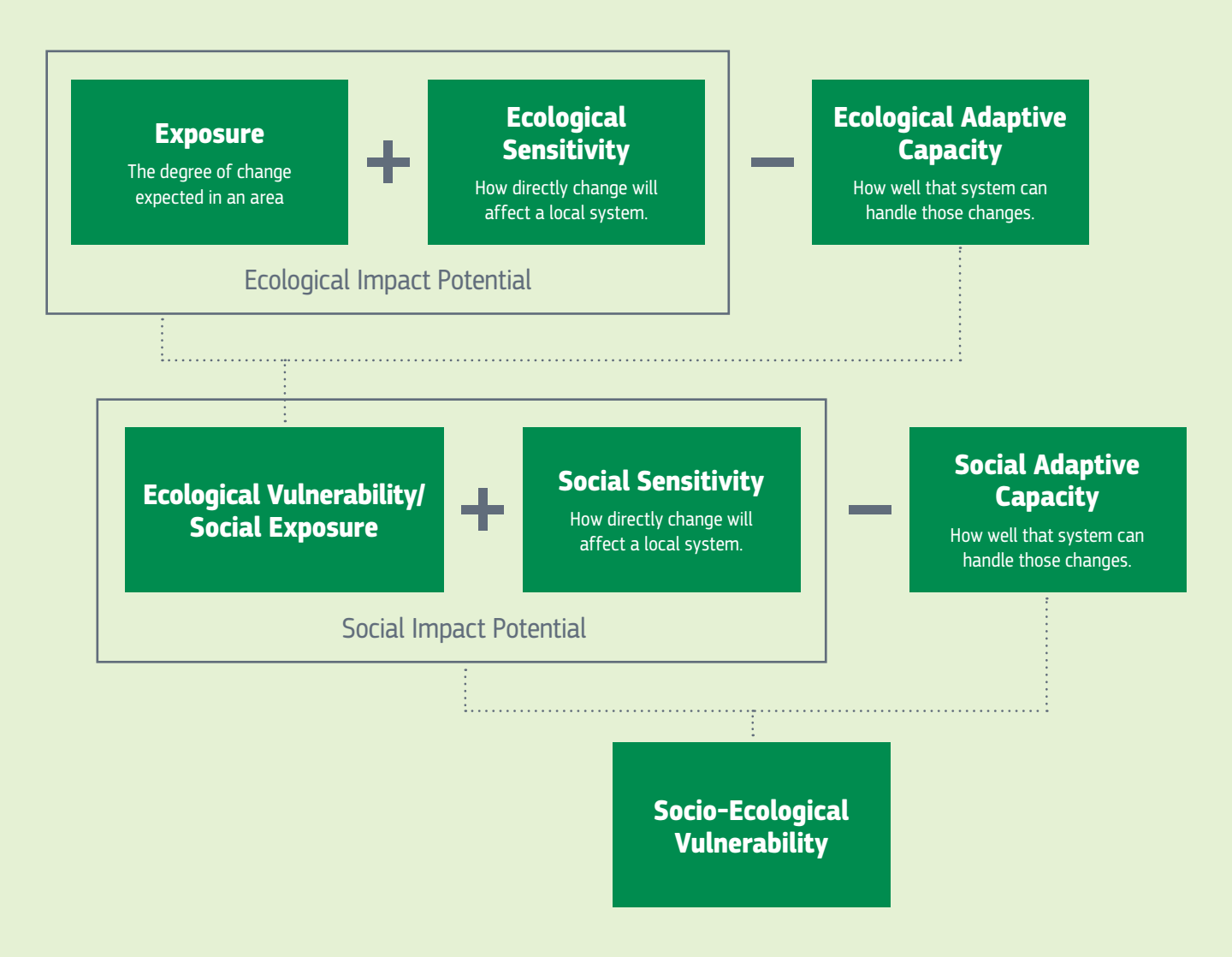


Figure 2. Conceptual model of the socio-ecological CCVA (adapted from Cinner et al., 2013).

Preparing for Success

Understanding conditions most conducive for successful adoption of EbA measures is important when designing investment strategies to effectively scale resilience building of SSF. Combining previous experience with SSF generated by Rare through Fish Forever with science-based criteria relevant to behavior change, 36 fisheries-dependent local government units in the Philippines, Indonesia, Palau, FSM, and the Marshall Islands[2] were selected (Figure 3).

The behavioral context for these sites was considered to gain understanding of the overall socio-ecological system and to define target behaviors of actors and their likely motivations and barriers. For each of the sites that made the final selection, Rare and its partners developed, piloted, and conducted CCVAs[3] as a tool for SSF and collected information needed as part of applying safeguards adapted from the Green Climate Fund (GCF). The CCVAs are now replicated in other Fish Forever program countries.

Impact monitoring included measuring behavioral and social outputs such as attitudes of actors towards the EbA measures, as well as environmental outcomes of the EbA measures related to the state of the fishery. Table 1 provides some success predictors that were identified or confirmed through this project[4].

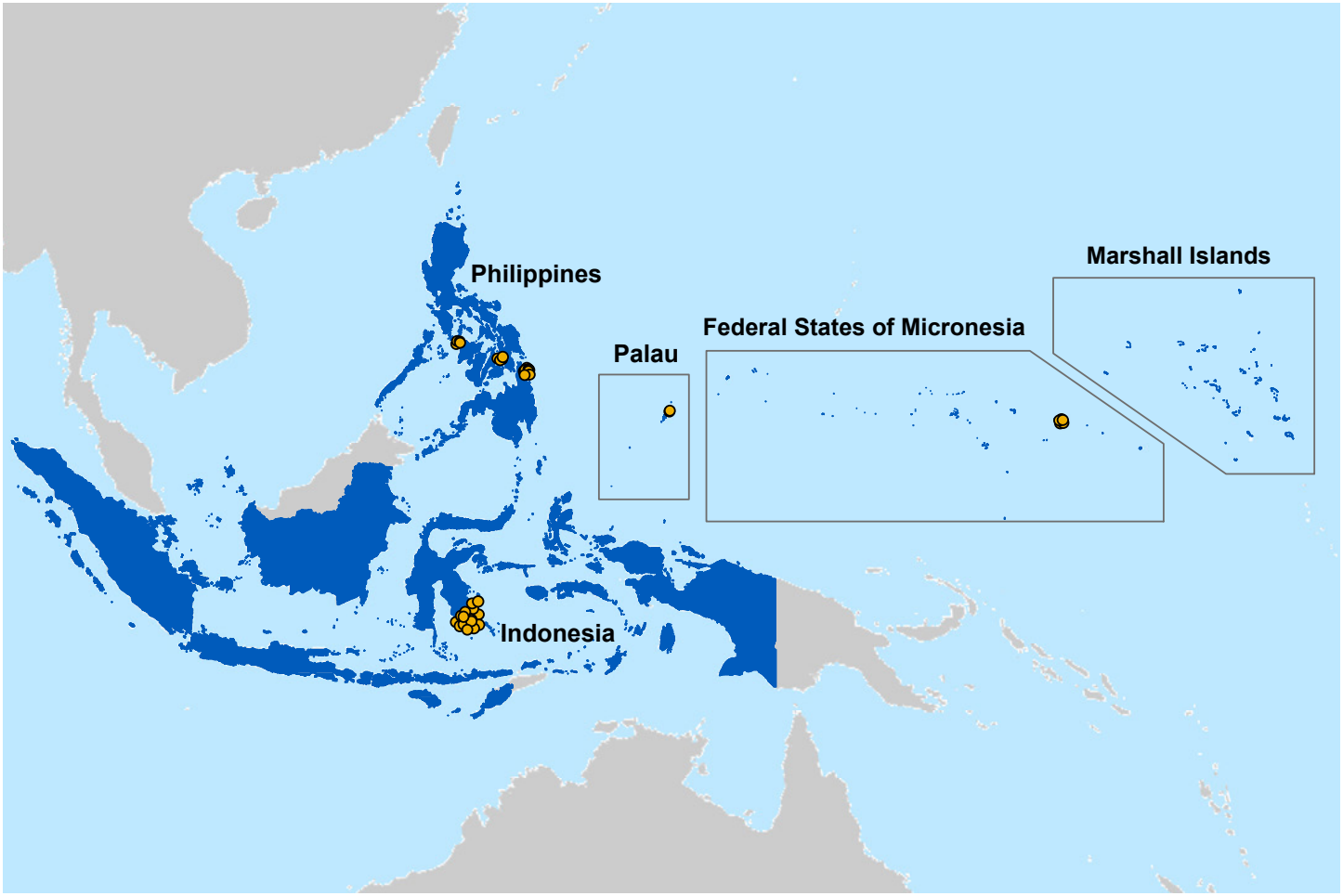


Figure 3. Project sites

2| Unfortunately, due to the restrictions brought about by COVID, planned project activities in RMI could not be implemented.
3| See https://portal.rare.org/en/ for CCVA reports.
4| See also for example Kushardanto et al., (2022) and Williamson et al., (2020).

TABLE 1

Success predictors for EbA adoption as experienced by project members

Desktop review of publicly available information, census data and maps

- Relevance of the intervention—general vulnerability statistics such as exposure to climate related disasters and calamities and those captured in the Social Development Index[5], fisheries statistics on SSF, documented regulations, policies, and management plans.
- Size of village or municipal budget relative to province average.
- Level of self-efficacy in decision making—type of governance system.
- Previous exposure to coastal resource management programs or development interventions.
- Religious affiliation—the more homogeneous the population in terms of religion, the more likely to adopt the proposed behavior.
- Educational attainment—the more similar in educational attainment between sender and receiver of the messages, the more likely the receiver will positively respond; tapping of fisher leaders to advocate for sustainable fishing behaviors among fellow fishers.
- Sense of community—residents of smaller communities (especially on islands) tend to follow community-agreed rules compared to those in mainland or more urbanized (more diverse) barangays. Residents of smaller (spatially) communities have more affinity (or sense of 'ownership') to their natural resources, they feel obliged to be hospitable or accommodating to visitors (island vs mainland).
- Distance/proximity to urban or densely populated villages or municipalities—the more isolated a community, the more likely the residents welcome introduced positive behaviors; conversely, the closer residents are to urban areas the more pessimistic/skeptical/cynical they are especially if they have been exposed to similar behavior change campaigns already (like small islands vs mainland).
- Presence of highly influential institutions—e.g., school, religious center/place of worship, strong local organizations that have the capacity/resources to reach out to the community and amplify the introduced message/behavior.
- Accessibility—presence of ports, good road network, reachable by mobile phone and with strong and stable internet connectivity (for project implementers, added factor is cost of living/logistics).

Consulting experts

- Status of coastal and marine resource use.
- Characteristics of local fishery, including interaction with larger scale fisheries.
- Nearby presence of successful MPAs and fisheries management initiatives.

Interviewing local leaders

- Cohesion of community—participation or involvement in decision making, presence of cooperatives and community institutions, community events and initiatives.
- Access to social media, radio, local and regional news.
- Presence of Traditional Chiefs and Customary Leaders in modern and formal decision-making bodies such as those relevant to state legislators.
- Existence of community savings clubs.
- Networked champion leaders (e.g., mayors active with peers across multiple areas)
- Presence of private sector leaders who invest in community capital.

Collecting primary data through surveys

- Vulnerability (social, ecological).
- Trust—in (local) leadership, neighbors.
- Household finance and income security.
- Knowledge/perceptions about link between behavior and state of fishery/ecosystems, about rules and regulations, about solutions.

5 | The Social Development Index (SDI) is an established objective and scientific system of indicators which generates information on 14 development subindexes and five population-specific subindexes.

Appropriate Approaches to Mainstream EbA measures in the SSF sector—Behavioral Context

Theoretically, relevant actors include individuals appointed in formal and informal institutions mandated to govern activities at different scales in coastal and marine waters, as well as users of coastal and marine resources who either win or lose from compliance with an EbA measure. Relevant to the solution selected for this project—the EbA measures of MA+R—the key actors are regional government and SSF fishers.

The behavioral context of these stakeholders was considered as follows:

Governments in the project countries recognize the importance of marine resources and have numerous plans, policies, and associated legislation to govern these at the national level. Marine Spatial Planning (MSP) is applied in most project countries to inform decisions about allocation of access and use of coastal and marine space to different sectors. Central governments in each country face challenges in managing user demands and limitations as they strive to optimize MSP outputs for national targets on economic development, poverty alleviation, gender mainstreaming and economic inclusion, within relatively short cycles. Commitments made internationally as well as the need to take an ecosystem-based approach to serve multiple needs, such as 1) conservation of migratory species, 2) functionality of interconnected habitats, 3) risk mitigation from land-based pollution and iv) fisheries management, further affects effective decision-making.

Information that helps understanding of factors that influence compliant behavior with conservation and fisheries management rules and regulations is not widely available in these countries. Without rationalization of fishing capacity, the SSF sector operates in a near-open access condition, which often results in a race-to-the-bottom of different segments of the fishing sector competing to catch the last fish. Vulnerability to Illegal, Unreported, and Unregulated (IUU) fishing reduces fish stocks, creating detrimental economic impacts on fishers.

In all countries, and following a trend towards decentralization of authority, **the implementation of plans and policies through control over access to marine resources falls to different local government agencies.** These often share monitoring of compliance with local FMBs. In addition, customary coastal and marine rules are practiced in different areas of the project countries. Practices may vary from place to place but generally involve traditional communal claims over (access to) certain land/sea territories and traditional institutions and/or leaders with powers to impose these rules to manage the resources within that territory. There is some variance between countries in the formal recognition of customary laws and traditional rights resulting in some differences in interpretation of "collaborative management." However, many NGO initiatives in these countries take a community-led approach as it has been theorized that it helps build cohesion and cooperation within the community, strengthening their ability to work closely and efficiently in finding solutions relevant to the risks they are exposed to.

Mr. Omar Faustino, Mrs. Ur Elbelau, and Mrs. Lomalinda Gabriel, fisher and legislator for Melekeok in Palau and household managers respectively, have themselves seen the effects of climate change. Noting coral bleaching, algal growth, and habitat degradation, (especially the rising water levels and lower fish abundance worry them): "I support new ideas and am very supportive of the approach by the local communities, as it only improves the ability to manage our important resources, legislators cannot do it alone. I want this work to be an example for the entire country" says Mr. Omar. "Take only what we need, we must not take until the fish is depleted," adds Mrs. Ur Elbelau. "We must also work on problems that come from uphill as it will affect the fisheries as well. Wildfires will cause erosion when it rains this affects fishing areas. Let us join hands, and together make our voices heard so that if we cannot be 100% resilient, at least we can be 99% resilient," says Lomalinda Gabriel.

Mrs. Ur Elbelau. Photo Credit: Jesse Alpert for Rare.

Access to markets, the local commercial environment, and income are all dependent on access to quality infrastructure. Communities with poor quality or little infrastructure often are unable to develop local resources or bring larger investments to support further development. This sustains relatively high levels of economic vulnerability in this part of the sector. Many fish landing sites in remote communities remain devoid of basic infrastructure, such as fish handling and processing areas, distribution facilities for processed products, and cold storage, challenging these communities in their ability to provide high-quality products into discerning supply-chains and be rewarded adequately for their efforts. Potable water supply systems and sanitary facilities are also not available and consequently environmental hygiene and beach sanitation can be a problem. Furthermore, if fishing equipment and processing material are obsolete, productivity levels are low, and production and processing end up being labor intensive and time consuming with the burden often falling on women and youth.

Most SSF actors have minimal access to institutional finance as banks are reluctant to extend credit to the fishery sector, especially small-hold players. Gender disparities in asset ownership, access to formal financial institutions, and inclusion in livelihood development programs cause higher vulnerability of women to economic shocks. Many coastal households are 'unbanked'—they do not have bank accounts, and financial literacy is limited. This causes fishers to be trapped in debt bondage.

Private investment in the SSF sector faces several barriers that can be grouped in four major categories: 1) governance (lack of effective fisheries management); 2) lack of sector investment policies; 3) the regulatory environment; and 4) risks flowing from the nature of the SSF sector and conditions surrounding these. Bureaucratic and administrative burdens are particularly heavy for SSF actors who operate effectively as MSMEs. Combined, these barriers hold back expansion of investment towards a high performing resilient SSF sector. To provide an environment for investment and long-term environmental and social sustainability, data, management, market differentiation, infrastructure, finance, and investable harvester level organizations are required.

Lessons from coastal community development projects in the project countries indicate that **merging traditional and customary management practices into formal regulatory frameworks is important.** When combined with enabling of entrepreneurial livelihood opportunities through safeguarding the principles of sustainable fisheries management, this should result in positive and lasting impacts towards investment in coastal development and for the whole SSF sector. Importantly, however, the development sector identified that the SSF sector involves diverse categories of stakeholders with significant differences in capabilities and needs. In some cases, consequences of ill-designed projects led to communities getting used to 'hand-outs'.

The landscape of donors funding conservation and SSF development indicates **trends to funding local CSOs.** While global climate funding does not reach many communities through local CSOs, such approach will likely be taken as well. Donors appreciate the need for (inter)-national NGOs to support local CSOs in order that project designs are adequate to the scale at which impact is required

> **During the training provided to me at the start of the project, I learned several elements related to the changing paradigm of strengthening bottom-up and collaborative management and of the value of working with individuals respected in the community. During the implementation of the project, I learned that 70% of the project was focused on bottom-up capacity development and I was not used to it so I needed some time to digest and really master it. Now I see that this approach is so much more effective and the results are so much better."**
>
> — **Mr. La Ode Muhammad Ramadan**
> Head of the Technical Implementation Unit, Fisheries Agency of Muna District, Southeast Sulawesi, Indonesia

as well as financially and legal accountable. In the broader nature conservation and sustainable development sector, NGOs working on coastal and marine resources are starting to apply EbA measures that have already evolved from previous relatively atomistic[6] approaches. However, EbA is not yet mainstreamed in guidance for securing the SSF sector[7].

INFORMATION
Providing information about what the target behavior is, why it matters, and how to do it.

EMOTIONAL APPEALS
Using emotional messages to drive behavior.

RULES AND REGULATIONS
Enacting rules that promote or restrict a behavior.

CHOICE ARCHITECTURE
Changing the context in which choices are made.

MATERIAL INCENTIVES
Increasing or decreasing real or perceived costs, time, or effort for doing a behavior.

SOCIAL INFLUENCES
Leveraging the behavior, beliefs, and expectations of others.

The approach was designed to achieve target behavior by incorporating motivations and barriers to the actor groups operating in this context. The engagement for behavioral change of stakeholders in this project is built upon the framework designed by Rare's Center for Behavior and the Environment (or BE-Center)[8].

This framework was applied in the following ways:

6| The atomistic approach is based on the notion that events and their causes can be decomposed, individually quantified, and influenced.
7| Such as FAO, 2015. Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication Food and Agriculture Organization of the United Nations Rome, 2015. 34 pp.
8| See https://behavior.rare.org/

Information, material incentives and emotional appeals

Skills and tools were developed purposefully so that communities and government can witness and interpret change independently. Specifically:

- Collecting of information relevant to better decision-making for SSF actors at different levels (e.g., household, village, municipality, district, province, country) was supported through easy-to-use tools such as the 'OurFish'[9] application and following registration of SSF fishers. Rare's monitoring indicates that in Indonesia and the Philippines, buyers average nearly an entry into OurFish per day. Across all Fish Forever geographies, buyers enter catch data an average of 13.9 times per month, or about once every other day. The successes in Indonesia and the Philippines can point to successful implementation strategies applicable elsewhere as this creates effective information pathways through which SSF communities (including their buyers who provide important access to market) can inform (future) needs and receive support.

Jacquelyn Caranay, a fish buyer, keeping records and using the OurFish app in San Benito, Siargao Islands, Philippines. Photo Credit: Ferdz Decena for Rare

Fitri (left), the local Fishing Management Body (FMB) secretary, explaining financial literacy to a fisherman's wife. Lora, Southeast Sulawesi, Indonesia.

- Providing opportunities for women to gain insights into different elements of their families' financial stability build on social structures already existing in communities that had relevance for women such as religious or other recurrent gatherings and saving clubs. This approach not only ensures effective implementation of training activities, but provides opportunities for the women to support fishing members of their household in making better decisions about their fishing activities.

Direct benefits relevant to the well-being of SSF and their communities were considered throughout implementation of the project. For example:

- Communities monitor their catches and related financial results and share weather information for safety at sea. This supports decision making which directly affects their well-being.

> **Women were hesitant to join at first, but are now keen to join. We know that the coral reefs can still be saved and the fisheries can still improve. The fisheries management body is something that is required to help make decisions, but it also builds more social cohesion, and that has a lot of value for communities but also for government partners. The meetings of the FMB resulted in sharing resources and efforts for mangrove planting which immediately keep the community safe from wave action during times of storms which will come more and more because of climate change."**
>
> — **Mrs. Rosmiati Palewai**
> Community facilitator and staff of the Bombana Fisheries Agency, Southeast Sulawesi, Indonesia

9| See https://rare.org/story/tracing-fish-and-finances/

- Government officials can improve delivery of support programs and other public assistance to the SSF sector, as fishers are now registered. This already provided benefits during the Pandemic as information and aid reached remote fishing communities more efficiently.
- By participating in the CCVAs, communities were able to identify actions for reducing social and ecological vulnerabilities that could be implemented immediately, and to discuss activities relevant to impacts on their productive agricultural hinterland such as risks of crop failure from increased drought.
- In the aftermath of Typhoon Odette/Rai, pooled social funds from saving clubs created in the project boosted recovery efforts. Additionally, one concerned mayor decided to open the fisheries reserve temporarily to enable controlled harvesting of fish needed to feed local communities who were badly affected by a devastating typhoon in the Philippines. While this was a difficult decision for the local councils and mayor to make, there was not enough relief assistance at the time. The local leaders still imposed rules, allowing only hook and line fishing for a limited amount of time, after which the reserve was closed again.

Caub MPA in the aftermath of Typhoon Odette. Del Carmen, Philippines.

- Several microentrepreneurs trained in the Philippines and Indonesia on EbA are now formally registered, obliging them to follow environmental policies upholding blue finance sustainability principles and to pay tax according to their level of income. As these microentrepreneurs have a significant influence in determining the size, quality and variety of fish that enter the market, these capacity building strategies are essential to green recovery by ensuring a resilient domestic value chain and sustaining best practices for climate resilient MA+R areas. Having linked some small enterprises to banks and government agencies, access to financial services and insurance will further increase their (and their fishers') resilience to future external (climate) shocks as well. In Indonesia, some microentrepreneurs became bank agents who can help communities access financial services from banks.

> **I feel that the mayor does not have to be apologetic, as it is an important reason why we have the reserves. It's pretty good that the community and her decided to open it, even shortly. The fish inside the reserve was important during this (short) crisis. In Palau, we have strong mens' and womens' groups as we are a small island and they keep work going. So, it is not just the technical experts such as those that come through Rare. Communication is key to share relevant information to solve some challenge."**
>
> — **Dearlynn Rebluud**
> Melekeok Conservation Network Project Coordinator, Palau

Rules, regulations, social influences, and choice architecture

Territorial fishing rights were facilitated and legalized to motivate community interest in co-management. Specifically:

- Distrust among fishing communities, weak governance by local authorities, and lack of clarity about goals challenge the creation and effectiveness of fishing sector organizations. Fishers may collaborate within one village or municipality, but interactions with fishers from other villages are often extremely limited resulting in low social capital at the scale required for fisheries management. Acknowledging local leadership at the scale at which it operates, and providing motivation to stewardship through enabling ownership relevant for fisheries management had a significant impact on the willingness of project communities to even consider EbA.
- In response to potential increases in fishing violations during the pandemic, communities' surveillance systems were improved.

Mr. La Ode Muh Sidik Izhan, head of Fisher Group from Pasikolaga, officially hands over the MA+R plan to Ms. Femmy M. Yosman from the Province Office for Fisheries and Marine Affairs.

Stakeholders were engaged deliberately from the "bottom-up" and the "top-down." For example:

- Government officials in Indonesia confirmed that they learned a lot about ways to engage communities in the context of sharing management responsibilities. Even when many of the local government officials were born in the target villages or municipalities, they had previously not understood how to initiate collaborative management as described in national and provincial policy and regulations.
- To elevate the importance of local to global action, personal accounts on benefits of the holistic approach to increase resilience of SSF stakeholders were shared with a global audience by local leaders at significant global policy conferences. At the 26th Convening of Parties (COP) of the United Nations Framework Convention on Climate Change (UNFCCC) in Glasgow, Mayor Maria Liza Resurrection of Pilar, Philippines, and member of the Coastal 500 global network of local leaders, and a Rare local partner from Palau spoke at an official side event on mobilizing ocean climate action with high-level figures from Fiji, the United States, Chile, and Sweden.

> **It is important to consider that fishers are seen as professionals who provide what consumers need. Social protection provides fishers with a personal drive. It reflects that others care and instills pride of being professionals. The digital space that is now widely used since the pandemic created useful conditions to share more information through social media. This also is a unique platform that can be used to share the science and experience with motivating behavioral change. There is a lot of youth that is interested in finding purpose, so it is the right time to consider how we market specific products that are appreciative of fishers' difficulties. The digital space can help achieve success at scale."**
>
> — **Mayor Alfredo M. Coro II**
> Municipality of Del Carmen (Siargao), Surigao del Norte, The Philippines

At the 27th UNFCCC COP, Mayor Jean Te of Libertad, Antique, Philippines shared her perspective from the front lines of climate change, how her constituents are impacted, and what global leaders can do to help communities like hers adapt.

- Mayors in the Philippines greatly appreciate the opportunity provided through this project to serve this important part of their electorate—SSF actors and their families—in ways that are both supportive as well as complementary to programs of the National Bureau of Fisheries and Aquatic Resources (BFAR).
- Mayors and regional government officials interacted enthusiastically with government leaders from neighboring administrations to share the approach and project successes. In the Philippines especially, the FMBs (or locally known as Local Government Units) formed alliances to share experiences and motivate adoption of similar approaches.

Village level climate vulnerability strategies were integrated in fisheries management plans to provide a foundation for action where and when needed. For example:

- Immediate benefits were evident in the Philippines, where the response rate related to provision of emergency relief after a devastating hurricane was notably reduced.
- Using the Fishery Management Assessment tool developed to help the community apply data-for-decision making indicators such as: Optimum length (Lopt) & Percentage of fish with optimum length in the catch; Mature length (Lmat) & Percentage of fish with optimum length in the catch; Mega spawner Length & Percentage of mega spawner in the catch; Spawning Potential Ratio (SPR); Total Catch, and Catch per Unit Effort (CPUE) helped stakeholders to determine "Reference Points" for the status of their coastal environment and fisheries. Setting reference points helped community stakeholders to understand their current fisheries situation and make decisions on what actions should be taken to remain within limits determined for their areas. These decisions formed the foundation for setting MA+R fisheries regulations, which differed for each area.
- As expected, it will take some time before statistically significant improvements in fish stock biomass and habitat condition can be measured. However, Rare's monitoring indicates that in Indonesia, fish biomass, fish diversity and coral cover—which are all Ecological Adaptive Capacity measures in the CCVA—did not change statistically from 2019 to 2021. This is an important indicator that conditions did not deteriorate during this short period.
- The focus on fisheries livelihoods, which drives everyday activities of the SSF communities, motivated government partners to bring the approach to the attention of neighboring regions and the national level for inclusion in NDCs and NAPs.

> **Some of the mayors are being invited to international platforms to share their approaches. Also, the shift to using online communication platforms such as Zoom (due to restrictions related to the COVID-19 pandemic), was an interesting thing as we can learn from each other without having to move. Many people from the local projects can now share their voices in a different way. The sharing of knowledge for leadership to change behavior through story telling is important, and our sector produces a lot this way."**
>
> — **Kate Brown**
> Executive Director, Global Island Partnership (GLISPA)

TABLE 2

Process activities applied in most countries

Phase: Preparation

Behavioral Context Assessment, Site Selection, Government Partner Engagement

- Partnerships are renewed or created with national and regional government agencies, information on the project is shared to obtain necessary approvals and identify local government representatives to be involved in the project.
- Priority regions are selected considering several criteria including SSF relevance.
- Partnerships are created or renewed and introductions are made with local governments relevant to the priority regions.
- Legal and national policy assessments are conducted to identify EbA relevant pathways.
- CCVAs are conducted for priority regions to select sites for design of EbA measures—the MA+R plans.
- CCVA results are analyzed to identify high to low priority actions to guide the design of the complete solution e.g., towards a network of MA+Rs, the local fisheries management plans, and specific EbA and Climate Change elements to be mainstreamed into local and subnational policies.
- Communication 'campaigns' are designed and implemented at sub-national levels to raise awareness about benefits of applying EbA and benefits of joining national fisheries registration systems.
- Sites are selected using a scoring sheet that includes criteria including dependence on fishing livelihoods and various characteristics of the SSF sector.

Phase: Solution Design

Actor engagement and Co-Creation

- Projects are introduced at selected sites and community groups are identified or created for inclusion in trainings and consultation activities.
- Community meetings are organized to facilitate creation of MA+R designs and management plans, for example in Indonesia between 3-8 meetings are required per site, with an average of 4 to gather community input.
- Trainings are provided on catch data recording, financial literacy, monitoring and surveillance.
- Fishers are assisted to register with fisheries agencies.
- Management bodies are created and formalized.

Phase: Completion

Formalization, Resourcing for Solution Implementation

- Baseline budget allocations needed to mainstream EbA measures are calculated with management bodies and regional government agencies.
- Plans are submitted to local and provincial governments for approval.
- Technical and financial support is provided for management bodies to implement their activities, for example through basic equipment for enforcement patrols.
- Project impact is monitored and data are analyzed.
- Project results are shared for strategic communications related to global, regional, and national policy advocacy.

Part II: Project Results

The project enhanced climate resilience of coastal SSF communities through increased adaptive capacity for social and environmental resilience through adoption and formalization of EbA measures. Policial leadership has been created at project sites and practices are being shared throughout the region with other SSF communities. A model is now available for mainstreaming EbA measures into this key sector of the target countries as well as into relevant climate adaptation plans, policies, and processes. Many of the project results are now informing policy advocacy and country support needed to implement and enhance their NDCs and NAPs, which contribute to meeting the goals of the Paris Agreement.

Reduction of vulnerability

The value of the project outputs is recognized by local government partners and women groups and the nature of provisions made by communities and their governments, indicate clear interest by these stakeholders in strengthening resilience to future change.

Sustaining compliant behavior is needed to enjoy benefits of the EbA measures as ecosystems require time for generation of measurable positive impacts and reduce vulnerability of the SSF sector. Motivating compliance with EbA measures has generally been difficult in these countries. However, as a result of the vulnerability assessments conducted at the start of the project with target communities and relevant government officials, communities and government are now making further provisions to reduce vulnerability to future impacts of climate change (Table 3).

While several of the items listed in this table are provisions for EbA actions to be implemented once exposure to climate change increases, the table also lists repeated activities—indicating change in behaviors—providing immediate benefits for well-being of people engaged in SSF.

Rare's project monitoring also indicates that measures of well-being improved broadly across project geographies. Political trust increased in all countries, in some cases dramatically, and all countries now have majority-positive responses in this indicator. Social trust was similarly positive, with most countries improving by 10 percentage points or more and all countries reporting over 70% positive responses. Trust in local decision makers was also relatively high, with increases or stable responses resulting in majority-positive responses in all countries. It would also be relevant to consider the possible effects of community cohesion experienced during the Covid-19 Pandemic and of increased access to emergency funds facilitated by governments. Yet, these results point to the relevance of building on fishing communities' strengths of strong social bonds that encourage fair decision making.

In numbers:

A total of **393** communities were engaged to consider and adopt EbA measures. An estimated total of **20,072** direct beneficiaries were reached of which **47%** are women. A total of **37,965** people were reached by behavioral adoption campaigns. As a result, a total of **2,502 km²** of coastal waters are now co-managed fishing grounds and a total of **3,085 km²** of blue carbon ecosystems are protected in newly established reserves.

These results, when sustained through compliant behavior, will provide reduction in all three types of climate change impact vulnerabilities. As the MA+R interventions were included in **17 local government annual investment plans**, benefits from their actual implementation will likely accrue to the respective SSF communities and support enhanced resilience to future impacts of climate change.

TABLE 3

Examples of EbA activities implemented and provisions created as responses to different drivers of vulnerability.

EXPOSURE

Driver of Vulnerability: Bleaching potential (e.g., Protect herbivore populations; Promote water quality improvement; Restrict ecologically stressful activities during periods of high-water temperature; Establish no-fishing zones around reef areas that did not bleach)

Primary Actions: No-fishing zones were created around reef areas that did not bleach in all 16 MA+R sites in Indonesia.

Mangrove saplings prepared by the community for mangrove planting activities in Langgalu Village, Southeast Sulawesi, Indonesia.

ECOLOGICAL SENSITIVITY

Driver of Vulnerability: Fish susceptibility (e.g., Establish reserves that protects breeding grounds).

Primary Actions: In Indonesia a total of 13,926 hectares of reserves area were established that protect breeding grounds in all 16 MA+R sites.

Driver of Vulnerability: Fish catch change (e.g., Conduct a fisheries management assessment and adapt fishing regulations; Enforce fishing regulations)

Primary Actions: In the Philippines, data from the Fisheries Management Assessment Tool is discussed during a fixed agenda point of the regular meetings of the Fisheries and Aquatic Resources Management Council (FARMC) or the Coastal and Fisheries Management (CFRM) Board in their regular meetings in municipalities in Camotes and Siargao. Provincial Planning and Development Offices in Camotes and Siargao expressed the need to expand similar planning sessions to other coastal municipalities within the province. The Province Agriculture Office of Antique province has asked for support to train Fisheries Technicians of other municipalities in Antique in the use of Ourfish App.

In Indonesia a total of 228,381 hectares of Managed Access area were established to secure access for small fishers in all 16 MA+R sites following fisheries management assessments. The FMB Community Surveillance Units at Indonesian project sites conduct monthly community-based surveillance to monitor and protect their reserves & educate resource users at sea on fishing regulations. Results of the surveillance are written down at sea on paper forms by the surveillance groups and are uploaded and communicated online (to communities and governments who can access this online) by the FMB Surveillance group using Pengawasan Berbasis Masyarakat Provinsi Sulawesi Tenggara -› Dasbor Pengawasan. FMBs proactively and routinely source funding from different sources (e.g., Village Fund) for conducting surveillance and enforcement operations. Governments (and law enforcers) have access and regularly check the community-based surveillance data posted online. Pengawasan Berbasis Masyarakat Provinsi Sulawesi Tenggara › Dasbor Pengawasan (google.com) In May 2022, Dec 2022 & Feb 2023, the Indonesian Marine Police apprehended fishers using destructive (dynamite) fishing gear in different MA areas of SE Sulawesi.

Driver of Vulnerability: Mangrove presence

Primary Actions: Following dissemination of information and knowledge on the impacts of climate variability on fishing communities and ecosystems, 2 villages in Bombana District, Indonesia (mobilized through leaders of the FMB) planted over 300 mangrove seedlings in 2019 in areas where mangroves required rehabilitation efforts and to prevent sea surges into their villages. Following this, the FMB allocated funding to rehabilitate mangrove areas in 2021 (supported by Rare's small grant mechanism by a different donor), which involved 6 villages in 2 subdistricts and planting of ~5000 mangrove seedlings. An additional village in the District, inspired by and learning from the other villages has now approached their FMB and is receiving mangrove seedlings from the District Office for Forestry to support mangrove rehabilitation—to restore areas that have previously been harvested/exploited for firewood and building materials.

Driver of Vulnerability: Seagrass presence (e.g., Protect established seagrasses; Encourage seagrass rehabilitation)

Primary Actions: To reduce risk from storm surge, mangrove and seagrass rehabilitation is planned for when needed in all MA+R sites.

Sartini, a local fisher, depositing her savings and recording it in her ledger during a savings club meeting in Pasi Kolaga, Southeast Sulawesi, Indonesia. Photo Credit: Jason Houston for Rare.

SOCIAL SENSITIVITY

Driver of Vulnerability: Economic dependence on fishery (e.g., encourage livelihood diversification; Support intercommunity exchanges to build work experience in alternative livelihoods)

Primary Actions: From September 2020 to December 2022 64 Savings clubs were established across 7 Districts in Southeast Sulawesi, Indonesia. Total accumulated savings is USD 65,500, USD 10,010 loan released, USD 3,403 social/emergency funds. Savings Club members regularly attend savings club meetings, every 2 weeks, or 10 days (based on their Savings Club rules of operations). Each Savings Club agreed on a time and place for meetings. If there are changes to the time and place of the meeting, the members will notify each other directly (word of mouth), or via the WhatsApp group. 10 out of 64 savings clubs made uniforms as means for 'group identity', using a portion of social funds and their personal funds. This idea came from the groups and was carried out after the close of the first savings cycle (12 months). 16 out of 64 Savings Clubs have disbursed social funds for various purposes, such as donations to cover members' illness costs, donations to members'/member's family death, donations to the births of members' child, fishery related community services, and religious related community services. The purpose and amount of the donation is determined based on members agreement during their regular meeting.

After a series of trainings involving the Kendari Geophysics and Meteorology Station in Indonesia, 13 FMBs have received windsocks to help small fishers forecast weather. In Kulisusu (North Buton District), for example, the FMB members have been teaching their fellow fishers to look out for windsock before they go out to sea, to guide decisions on fishing behaviour (e.g., when and where to fish). The communities, who are relatively new to this, were thankful for this piece of infrastructure which is observed daily (mornings usually before fishers head out), by fishers in the communities. Another example is in Moramo, where local fishers read the windsock daily to help decide whether it is safe enough for them to venture out to the sea, the direction they boat out and place their nets.

Municipal government of Libertad, the Philippines, allocated resources to further support the Federation of Saving Clubs (SC) in the municipality. They trust that SC members are managing their finances well so they have confidence in providing additional resources to the group. This is related to the win of the nationwide "Galing Pook" award by Libertad for their Fish Forever Savings Club program. This award recognizes outstanding innovative local governance programs across the country that can be replicated and scaled.

Driver of Vulnerability: Coastal slope (e.g., Invest in resilient infrastructure; Prepare an emergency response plan with assigned gathering points, signed evacuation routes, and practice drills)

Primary Actions: Although the creation of Municipal Technical Working Groups is not new in the Philippines, in Siargao, the creation of an MTWG for coastal fisheries management through an executive order of the mayor became a model for other local government unit services such as the San Isidro solid waste management and Del Carmen's Municipal Agriculture Office's livestock program. The Fish Forever templates for the EO and other documents helped local government staff in making the other MTWGs functional.

Savings Club members in the Philippines have initiated regular shoreline clean up in their respective coastal areas of Libertad in Antique Province and municipalities in Camotes Island, Cebu.

ECOLOGICAL ADAPTIVE CAPACITY

Driver of Vulnerability: Hard coral cover (e.g., Raise awareness about relevance for EbA design)

Primary Actions: Across the project, areas of high habitat quality (live coral cover) were prioritized for placement of reserves.

Driver of Vulnerability: Reserves in place (e.g., Increase outreach efforts on the benefits of marine reserves and protected areas; Establish optimally sized and located reserves)

Primary Actions: In the Philippines, amidst the devastation wrought by super typhoon Odette, some FMB members (including community members in Burgos and Socorro) in San Benito asked themselves whether they did the right decisions on the location of their MPAs and moving forward what they could do to ensure ecological resilience. They appreciated the science shared during the MA+R designing workshops. These conversations did not happen before Odette.

A fisher group presents their MA+R Management Plan to Ms Femmy from the Province Office for Fisheries and Marine Affairs in Pasi Kolaga, Southwest Sulawesi, Indonesia.

SOCIAL ADAPTIVE CAPACITY

Driver of Vulnerability: Responsive governance (e.g., Institute periodic public meetings and forums to encourage participatory government; Develop a government monitoring group to advance accountability)

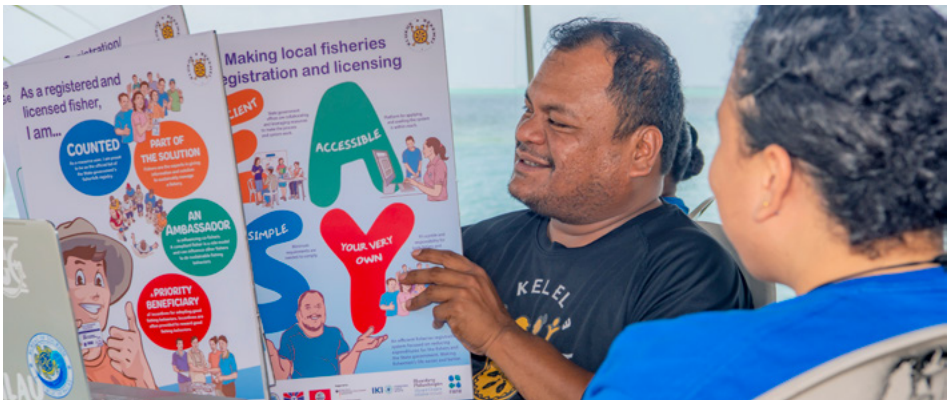
Primary Actions: Mayors in Siargao island, the Philippines, have been attending fisheries association meeting more frequently and expressing their support to the fishers.

As many as 143 Village Heads in Indonesia have formally pledged their support on MA+R Program. The South East Sulawesi Provincial government in Indonesia adopted the guidelines for community-based surveillance and introduced the approach to areas beyond existing MA+Rs as well. The number of women participating in FMB management meetings has been promoted initially through government and community leaders identifying women leaders or individuals who best represent coastal communities. 24% of all FMB members (total membership of core FMBs = ~512) are now women. Active participation and decision making by women is promoted by techniques/operational rules that enable womens' participation and decision making in the FMBs including; invitations to women (and men) representatives for every meeting through community messaging (e.g., WhatsApp); allocation of a % of spaces for women representation on the FMB; separation into women and men group sub-meeting discussions if required on specific issues; ensuring meetings are held when women are best able to attend. Women now also have leadership positions in the FMBs, mostly as leaders, treasurers, and small business/enterprise leaders, ensuring that women's ideas, issues, local economic, livelihood and collective actions (e.g., community mobilization events such as mangrove planting, beach cleanups; group fishery-based enterprises/businesses) are captured/assisted by FMB decision making and management.

Policial leadership—policy and practice

Political leadership is evident both through supporting policy as well as practice. Specifically:

- The governor of Southeast Sulawesi, Indonesia and five municipalities in the Philippines approved climate resilient MA+R areas benefiting nearly 23,000 fishers across 117 coastal communities. Combined, these policy milestones give small-scale fishers the legal basis to access and co-manage 244,865 ha of fishing grounds and 5,460 ha of reserves. This is supported by a decree outlining the guidelines for community-based enforcement within the MA+R areas to ensure rightful use of authority and sustainable fishery management.
- Then-Vice Mayor Alfredo Coro II of Del Carmen, the Philippines, who was an Equity Initiative fellow after starting a social protection program for the farmers and fishers in his municipality when he was still mayor, saw an opportunity to expand work throughout Siargao when a call for proposals was made by Equity Initiative. He pitched the idea for integrating the grant of USD 100,000 into the Fish Forever program particularly linking insurance enrollment during the annual registration of fishers. The project kicked off in April 2021 which proved very provident as super typhoon Odette (Rai) devastated the island in December of that year. With this, more Philippines fishers have recognized the importance and benefits of registration as well as planning and investing for future needs through savings clubs and enrolling in insurance programs.
- The Indonesian Buton District's Village Empowerment Agency and Legal Division issued a regulation requiring local leaders to prioritize marine and fishery-related activities in their village funds. This policy enabled 15 villages to allocate USD $69,000 for marine protection activities.



Rare's Kevin Mesebeluu, Program Implementation Manager (PIM) for Palau, speaking with Kristen Udui, a recreational fisher, about fisher registration. Photo Credit: Jesse Alpert for Rare.

- In Palau, Rare is working with state officials to produce the MA+R design and management plan for the Ngardok Nature Reserve. With the Bureau of Fisheries, Rare developed the national fisher registration system and turned it over to the government to gather relevant information on fishers, gear, and licensing. This information will help fishery managers protect the ocean from destructive fishing practices thus increasing its resilience to other threats including climate impacts.
- The Mayor of Sta. Monica in the Philippines, who is an agriculturist by training and profession, and has been actively involved in many of the Fish Forever activities,

Since he participated in weather-related trainings by Kendari Geophysics and Meteorology Station, Darson—a FMB member of Siotapina Lasalimu Selatan Site in Buton District Indonesia—consistently reminds his fellow fishers about weekly weather forecast through a WhatsApp group. He revealed that he is happy he can help other fishers by forwarding the information to his communities. "We are aware that going fishing in a bad weather is a huge risk, and we want our fellow fisher to return home safely. That is the reason I remind my friends about the weather. By using WhatsApp, it makes communication easier," he said through a phone interview.

is now a champion of fisheries management. His project pitches and messages when doing his rounds already includes coastal and fisheries themes. Also, some resort owners are now more involved and aware of coastal fisheries significance and needs for climate resilience and carry these themes in their businesses. For example, through the facilitation of Rare staff and other environmental groups, the private sector-led (Ayala family) Suyug youth camp carried a climate resiliency theme. Participants were youth and students from different Siargao municipalities as well as children of affluent families from Manila.

- Community leaders in Indonesia set aside part of the village development budget to be spent for mangrove rehabilitation if required. One village leader decided to provide daily information on weather conditions to his community, and another village leader shares pictures of successful catches including large fish through his community WhatsApp group.

- Rare collaborates with other NGOs to share project results and insights for external publications co-authored with others. Publications include lessons relevant to achieving global goals such as climate actions under the Paris Agreement (UNFCCC), biodiversity progress under the Kunming-Montreal Global Biodiversity Framework and the Sustainable Development Goals (SDG). The recent award through the Coastal Fisheries Initiative Challenge by the World bank, provides additional sharing opportunities.

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A holistic model for resilience building of SSF stakeholders

In line with its dual purpose, the project was able to embed EbA measures and test their value for generation of a more holistic model that also builds resilience of SSF communities vulnerable to climate change. An enhancement for the Fish Forever program, the model offers a more fine-tuned approach to capacity building, governance, legalization, and financial investment (Figure 4).

The activities required approximately 3 years for each site in the Philippines and Indonesia initially. At the start of the project, the EbA solution design process took 2 years and approval by the relevant authorities added another year. Towards the end of the project, Rare and partners finalized approaches and tools, so that going forward, local MA+R plans can be created by the communities to a stage that they are ready for approval by authorities within 1 year.

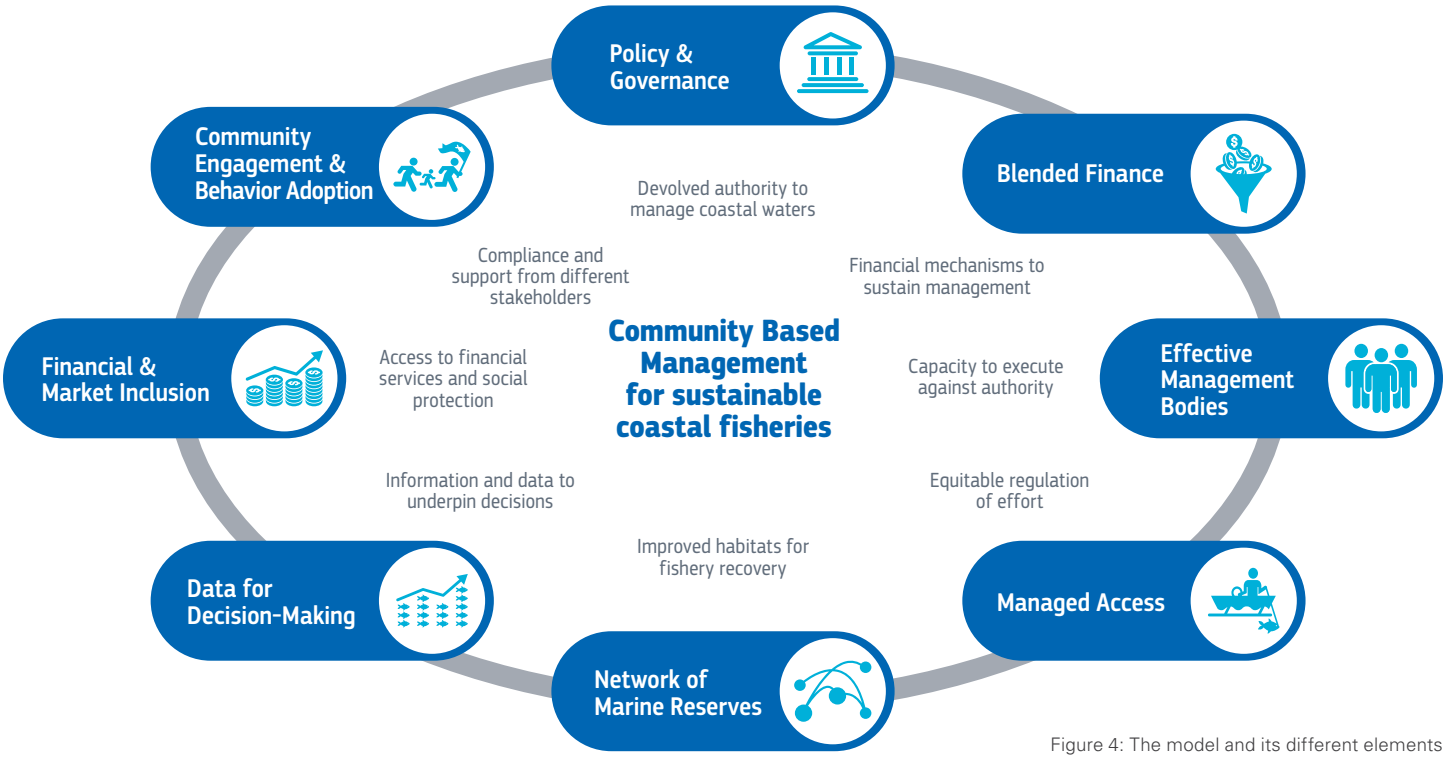

Figure 4: The model and its different elements

Mainstreaming EbA in the SSF Sector

Data collected and analyzed throughout the project support a strong case for targeting the well-being of SSF as a way to achieve coastal ecosystem resilience and compliance with EbA measures at levels where this matters immediately. The commitment by the main partners—local and provincial government on financial support required to continue operations of the FMBs and on the formalization of access right arrangements will sustain EbA implementation at these levels. However, policy commitments from national government agencies need to be forthcoming in support of public and private investments that enable the entire SSF sector to benefit in target countries.

The results provide strong arguments for applying behavior adoption science to motivate mainstreaming of EbA in the SSF sector. Using the model, behavior change will need to be scaled up to include stakeholders making decisions at levels where replication of the approach can be systemized and where adequate resources can fuel scaling. To serve this, the next section offers a summary of insights and key lessons that could be distilled from project outcomes and are valuable contributions to the field of marine conservation and management of the SSF sector.

Part III: Take Aways

Ecosystem-Based-Adaptation measures are proving their value for Small-Scale Fisheries in vulnerable coastal communities. Use of managed access reserves and marine reserves encouraged sustainable fishing practices, linking eco-system management and habitat conservation to community-led increased SFF resilience. Allocation of focal MA+R areas where multiple villages or municipalities have been granted formal legalized authority to manage their marine resources essentially allows now for boats classified as SSF to exclusively fish in this 'zone'. In Indonesia this is critical for scaling the approach as the 0-2nm zone has essentially become one massive TURF area.

EbA and disaster risk reduction measures can be mainstreamed into the SSF sector as well as into relevant climate adaptation plans, policies, and processes. The project provides multiple points of proof that managing access to fishing through local inclusive stakeholder platforms, informed by information on the state of their fisheries, their household finances, and factors risking these, provides an effective path to reduced vulnerability of SSF communities to impacts of climate change in Indonesia, the Philippines, FSM, and Palau.

Enabling SSF and their families in the coastal communities to have more influence over their lives reduces vulnerability to change. Granting exclusive access rights is key in preventing further damage to the coastal fisheries and ecosystems that these communities rely on for their livelihoods. This indicates how ownership motivates and stimulates stewardship.

Most progress towards sustainable fisheries came from the bottom-up—from provincial, municipal and community level fishers, women, and other groups. This confirms the importance of community-led and behaviour-centered approaches for growing resilience of SSF. Continued collaboration between SSF and provincial and national governments is key to enacting policies that can durably impact the sustainability and resilience of these fisheries.

Access to financial services for micro-enterprises that adopt EbA measures and support MA+R management and rules, opens opportunities to grow sustainably and retain economic resilience. Placing SSFs within the context of MSMEs, and creating an 'access to finance' fund or facility to support the specific needs of MSMEs in coastal areas could support scaling.

Provided with appropriate tools, local leaders are easily motivated to collaborate across political jurisdictions if this serves ecological resilience through networks of MA+R—illustrating the value of networked approaches for scaling. For example, local Filipino leaders from San Francisco in the Camotes Group of Islands that also includes Poro, Tudela and Pilar, in Central Visayas, demonstrated a strong interest to work through alliances and revived the One Camotes Sea Alliance with 5 neighboring municipalities to harmonize and create synergy in protecting the fishery and marine resources. The alliance aims to build strong constituency through harmonized policies, ordinances, coordination and sharing of resources to collaboratively implement the coastal resource management program.

> **A lot of our coastal resources have been harvested illegal and with destructive methods in the past, but now that the communities who work with Rare are controlling and monitoring the area, this means that the government can spend less budget on enforcement. Government can support communities now in other ways. I share this experience widely as I am often requested to be an expert reference at national level conferences and meetings."**
>
> — **Professor Ir. H. La Sara**
> Rector Institute of Marine Technology
> Buton, Southeast Sulawesi, Indonesia

Lessons learned

New insights into motivations and barriers for behavior change were generated particularly relating to the required shift from competing for harvesting fish resources to collaborating for managed access to fish resources—which underpins effective fisheries management.

Taking a holistic approach to enhance all three categories of resilience (environmental, social, and economic), focused on generating benefits for nature and people, has been an important driver for communities to consider EbA measures. Importantly, however, outreach regarding benefits of local EbA in countering future climate change impacts and at a larger than local scale proves difficult. Instead, a narrative which includes more immediate benefits from formally recognized territorial rights and inclusion in village, municipal or district level decision-making processes appears a strong motivator for initial adoption of measures. Focusing on creating evidence of direct benefits early in the project accelerated mainstreaming of EbA in local decrees and regional policies relevant to SSF. To enjoy long-term benefits however, compliance with the EbA measures that will deliver ecosystem resilience is needed. The likelihood of MA+R as EbA measure to be sustained also depends on other vulnerabilities being addressed through economic, policy and social interventions. It is relevant to consider that without these, tendency for non-compliance with MA+R during a crisis will be high.

The holistic approach taken requires adequate skills to motivate behavior change of different types of actors. Increasing adaptive capacity across all levels is required to achieve success in dealing with an altering environment. Both fisheries mismanagement and climate change are threats that need to be addressed by relevant institutions and sectors. Therefore, scaling of project impacts will require engagement or additional and different decision-makers. This calls for acceleration of knowledge about the value of behavioral change science for facilitation of different actors, something that Rare's center for Behavior and the Environment is well-positioned for. This BE Center[10] is the world's first center dedicated exclusively to behavioral science and design for the environment. With a diverse team of world-class behavioral and social scientists, designers, and trainers, the Center connects research and insights from behavioral and social sciences and design thinking to practitioners on the frontlines of our most urgent environmental challenges.

To create conditions for compliance, traditional and customary management practices can be merged with formal regulatory frameworks resulting in exclusive access rights. As this underpins economic stability of SSF actors, motivations for local adoption of EbA measures will be high. However, as many ecosystems and fish stocks require time to recover from human-related threats, the quality of the design of the EbA measures is critical for delivery of intended resilience and other benefits. With access to fisheries resources being open to anyone, sustainability of the solution requires attention. Actors must stay the course and other communities must respect the new measures and adopt similar interventions.

Anecdotal or perceived evidence of impacts of the project on SSF actors and their families motivated local leaders in motivating others to consider EbA measures as well. Well-being is measured by economic and social dimensions and

Behavioral science approaches are already adopted by the Siargao Island Protected Landscape (SIPLAS) protected area management office (PAMO) in the Philippines. Rare provided a lot of ideas included in the annual celebration of SIPLAS Week (including the 'Siargao Bahandi Kaw' song and awards). Also, some of the enumerators engaged during the household surveys were motivated to use fisheries themes in their creative works, which could become useful for future outreach. Surigao del Norte State University Del Carmen campus director—Jun Sunico—expressed appreciation for the tools and methods for learning which they can easily adopt as an academic institution that also offers a fisheries program.

Fish Forever mural in Del Carmen, Siargao Islands, Philippines. Photo Credit: Ferdz Decena for Rare

10| https://rare.org/program/center-for-behavior-the-environment/

this often includes recording target beneficiaries' perceptions on their wellbeing, which is not a strong metric. Social aspects include greater community cohesion, increased trust and levels of cooperation mainly motivated by benefit sharing. Economic value for SSF actors is mostly driven by an increase in fish abundance and profitability. As profitability is not only influenced by the state of the ecosystem and fish stocks, a "Livelihood Stability" metric that considers ecologic resilience may be useful going forward, especially when linked to the status of ecosystems relevant to the SSF sector.

Social capital in remote coastal communities may be strong within the community, however weak environmental governance and the lack of that social capital extending outside the community, can reduce long-term success. Fish populations themselves must remain healthy in order to provide long-term benefits to small-scale fishing communities, but with access to fisheries resources being open to anyone, sustainability is a concern. Also, competition with larger fleet targeting similar stocks can limit fisheries resources available to the SSF. This calls for consideration of the value of EbA measures at larger geographic scales.

A focus on equity (e.g., facilitating TURFs in Indonesia) and inclusion (by creating opportunities for women to share insights into family household finance for fishing-related decision making and participating in FMBs or as fisheries enumerators) underlines the relevance of empowerment and inclusion strategies to motivate collaborative stewardship. Currently, however, local gender and cultural norms dictate the level and type of women involvement as male involvement within a fishery is more common in rural villages. Gender transformative interventions must be designed to enhance participation of women in decision-making and increase their agency within households and community. Coordinating through existing social structures, or creation of savings groups, is well-regarded by communities throughout the region.

Skills and knowledge at the household level varies with the size of family unit, level of education, and leadership ability. Not only do these factors determine the quantity and quality of the available workforce, but they are also relevant to achieving sustainable livelihoods. The project used participatory capacity development methodologies and locally situated project facilitators. Results illustrate that joint decision making and benefit sharing across households (i.e., by establishing livelihood groups), empowers communities even when initial skill levels may be low. Also, enhancing skills of individual local government leaders was a strong motivator for them to guide and support behavior changes towards adoption of EbA measures.

Approaches that build on trust already existing or easily created are most likely to succeed. The project confirmed that key actors in Indonesia and Philippines are open to collaborating with NGOs on environmental issues, when this contributes to addressing barriers faced by small-scale elements of the sector responsible for food security. For other project countries, FSM, and Palau, impacts of the pandemic and other factors such as political transitions and cultural sensitivities related to obtaining project approvals from administrative and cultural leaders, caused delays in visible progress. As adequate conditions now exist in all project countries, the model generated provides effective pathways to accelerate impact but also to consider other types of ecosystems important for the SSF sector.

Some states in Palau still have traditional chiefs serving in the state legislator, while others have done away with this system in their constitution. When chiefs are automatically seated in the state government as active legislators, the village usually has 'political peace'. This does depend on the strength of the chief and their relationship with the Governor. For some states, the constitution names both Governor and the High Chief as both Heads of State, with the Governor taking on the bulk of the administrative work. One significant benefit of this system is that government projects, trainings, and community work can arrive at the state government, and the Governor will ask legislature to approve these projects. Once approval is reached, they can request the support of the community organizations like the men's and women's groups. This can also happen vice versa, where the community chiefs and groups have a project, and they can request the assistance of the state government and its resources and equipment. It connects modern and traditional forms of governance but it must be noted that this practice is currently under review by the Special Prosecutor of Palau regards the risk of violations of ethics, meaning using government assets and resources to benefit individual households or organizations.

Outcomes generated through this project provide foundational conditions for review of the value of EbA measures for pelagic fisheries. Rare's ecologists and fisheries scientists already identified limitations related to 1) the applicability of the interventions to other types of ecosystems that support SSF livelihoods and to 2) the currently available knowledge about the actual resilience of the ecosystems at the project sites to climate change. Until now, Rare's scientific capacity focused on facilitating inclusion of nearshore fisheries related harvest strategies in the design of local MA+R interventions. The MA+R interventions could benefit SSF communities engaged in nearshore pelagic fisheries as well, when similar fisheries indicators are used to design local regulations. Few studies have assessed ecological responses to reserves for pelagic fisheries, leaving substantial uncertainty over their efficacy. Considering project outcomes generated so far, it will be relatively easy for Rare to help its partners consider harvest strategies for pelagic fisheries within the managed access areas through already established FMBs. This will require adequate ecological knowledge for the design of measures. For example, increasing protection of spawning locations at times when spawning aggregations form, can increase survival chances for "mega-spawners." Spawning aggregation sites could be selected for the highest level of protection, based on predicted temperature extremes at their locations.

The need to communicate to donors and other NGOs about lessons learned through the project is high as pathways to scale impact (through funding and adoption of similar approaches) depend on it. To ensure adequate application of EbA measures, international donors will appreciate continued engagement of international NGOs and experts as local CSOs are enabled to consider and apply the model in other areas. Discussions are already ongoing with potential partner organizations, in support of complementary joined efforts to support local CSOs for effective delivery of on-the-ground work with communities and other local SSF partners. For effective scaling, sharing information about benefits and details of the approach must be accelerated with the very project partners who co-created the model for success.

Next steps

As the concern that climate change may be further compromising the future benefits of fisheries grows, either by reducing stock productivity or by causing stock displacement because of changes in ocean temperatures causing changes in oxygenation-levels, it will be valuable to zoom out. Rare can consider larger geographic scales for which improved fisheries management could offset any negative impacts to the SSF sector as well as the value of EbA measures for pelagic fisheries in the SSF zones. This is not in the least because fishers that engage in deeper fisheries affected by stock displacement may start crowding the shallow waters as well once their fishery collapses. Experts interviewed consider that the best way to deal with that is to have frequent monitoring of which fishers are part so that adjustments can be made accordingly. By helping fishers understand what is going on with their target stocks, they can make decisions and adjust. This is exactly what was developed through this project. This increases the urgency of scaling to increase resilience of ecosystems and communities relevant to fisheries around the world.

Rare will complete its work at project sites and assist local partners to ensure durable outcomes, and the organization will consider the bigger picture surrounding the SSF

> **Sustainability of project impacts is the biggest challenge. Not all management functions can be devolved to the local authorities and communities only. In the Philippines, women in fisheries are already being empowered. For example, in the fisheries and aquatic fisheries councils, women are very much involved and while that can be operationalized better, women are strong and assertive enough. Now they have information relevant to their participation, they can really contribute to resilience building. The Philippines fishers folk cooperations can use the financial literacy skills to better help their sector and gain access to finance and credits and marketing support. Once you are part of such cooperative, enterprise development can occur more effectively."**
>
> — **Dr. Noemi SB. Lanzuela,** Regional Director from the Bureau of Fisheries and Aquatic Resources

sector by forging strategic partnerships across the Asia-Pacific region and through its global Fish Forever program. Specifically Rare will work to:

- Increase use of the model and behavioral change science by local CSOs as path to scale;
- Increase adoption of project insights into policy and for design of public and private investment in climate adaptation programs; and
- Expand work on solutions that connect ecosystems for reduced vulnerability and as relevant to the SSF sector.

Conclusion

Until recently, there were few intentional, well-documented examples of adaptive management approaches that specifically respond to climate change. Adaptive strategies would have to include rapid reactions to management failures at specific locations, increasing levels of protection at other known sites. This makes Managed Access and Reserves, the EbA measures applied in this project a valuable approach. The unique approach taken in this project and fine-tuned to provide a model for success, however, is the main contribution to the field of practice, that has struggled to motivate creation of adequate fisheries management measures and compliance with ecosystem and biodiversity conservation strategies such as Marine Protected Areas.

In fact, considering the model for designing and implementing climate-change-adaptive management systems will be more profitable than business as usual as it also addresses some of the main barriers to private and public sector investment in the SSF sector. The project uncovered factors that explain changes towards more favorable behavior of key actors in areas where dependence on climate-vulnerable ecosystems is very significant. This may aid holistic integration of environmental, social, and economic interventions in other types of climate change adaptation projects as well.

Taken together, these could be major contributions to more effective project design by the international development sector and for effective government public spending aimed at the SSF sector. Through this project, Rare and its partners generated knowledge and examples essential to ramp up policy advocacy. This must result in advancement of national and regional policies that strengthen the legal context for adoption of holistic approaches to adaptation that mainstream EbA, as well as prepare for an investment climate to finance work that achieves change at the scale required for vulnerable SSF communities to be resilient against impacts of climate change.

Additionally, this project demonstrated how local level EbA actions and policies are relevant to national policies such as NDCs and NAPs. For island and coastal states aimed at supporting vulnerable ocean-dependent communities, this project could serve as an example for how to support a government in formulating national policies inclusive of EbA measures and local implementation. It is appropriate that ocean-based climate actions are primarily geared toward coastal and marine conservation, and this project demonstrates the relevance of EbA in a holistic context with results for nature and people. It will be important to note, however, that management reforms aimed to promote climate adaptation or EbA benefits may need to consider the negative impacts from a changing climate and its increasing greenhouse gas emission scenarios. For sustainable fisheries management approaches to realize their climate adaptation potential, it is critical to also reduce global greenhouse gas emissions through other mitigation strategies.

> **Climate change will cause some fish stocks to increase others to decrease. The best way to deal with that is have frequent monitoring of which fishers are part so that adjustments can be made accordingly. By helping fishers understand what is going on with their target stocks, they can make decisions and adjust."**
>
> — **Dr. P.J. Mous**
> Fisheries Scientist

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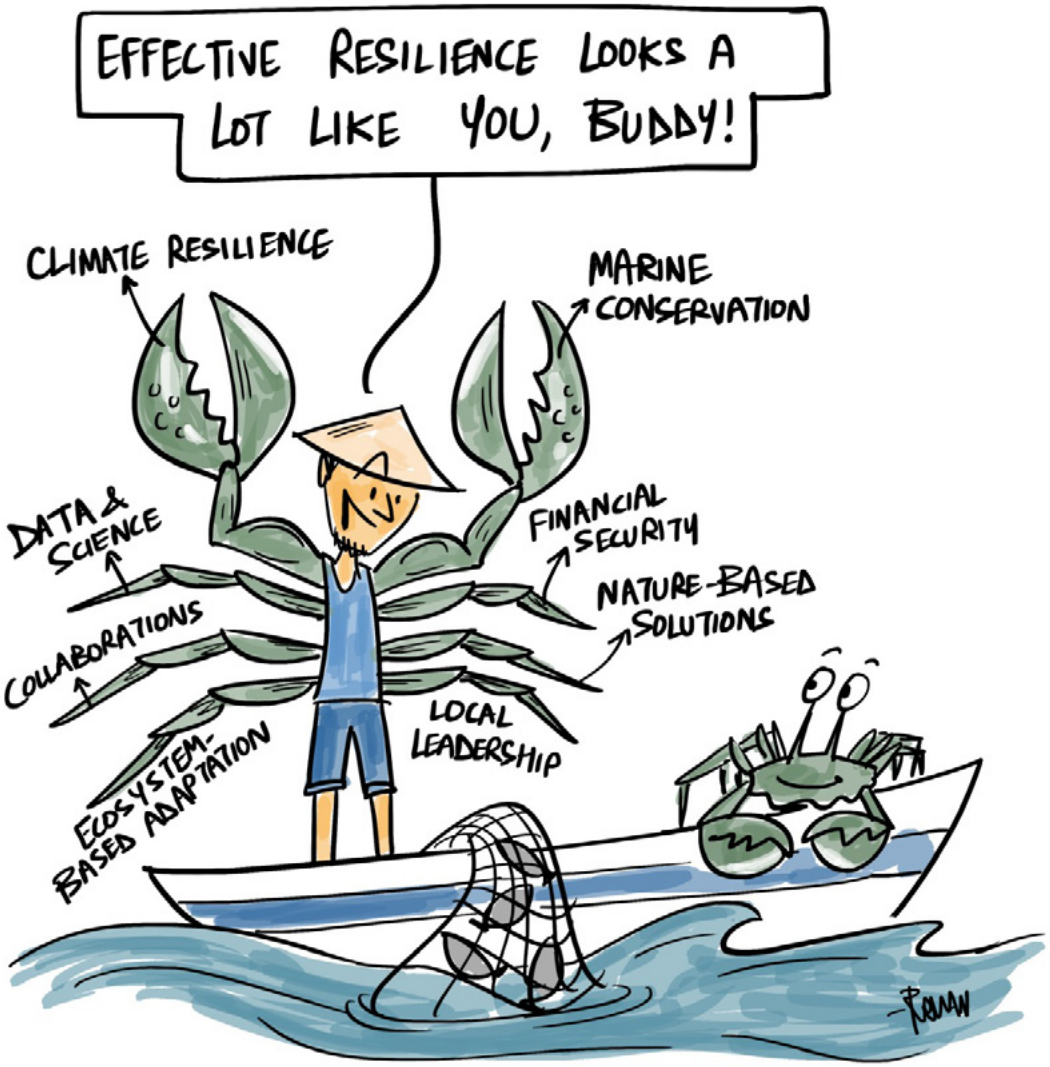

Developed as part of a side event hosted by Rare and the Global Island Partnership at the UNFCCC COP27 in Sharm El-Sheikh, Egypt, this illustration visualizes the discussion between policy makers, practitioners, private sector partners and local community leaders on the topic of climate resilient coastal fisheries. Illustration Credit: Rohan Chakravarty for Rare.