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MARINE TENURE AND SMALL-SCALE FISHERIES: A SOURCEBOOK ON GOOD PRACTICES AND EMERGING THEMES

TENURE AND GLOBAL CLIMATE CHANGE PROGRAM (TGCC)

JANUARY 2017

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COVER PHOTO: Crab catch in Bohol, Philippines, USAID ECOFISH

BACK PHOTO: Burma, Matt Sommerville

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ACRONYMS AND ABBREVIATIONS

BMU	Beach Management Unit
CDCS	Country Development Cooperation Strategy
CPR	Common Property Resource
EAFM	Ecosystem Approach to Fisheries Management
FAO	Food and Agriculture Organization of the United Nations
FARMC	Fisheries and Aquatic Resource Management Council
GIS	Geographic Information System
GRT	Gross Registered Tonnage
IUU	Illegal, Unregulated, and Unreported
MPA	Marine Protected Area
MSP	Marine Spatial Planning
NGO	Nongovernmental Organization
Primer	*Looking to the Sea to Support Development Objectives: A Primer for USAID Staff and Partners*
SSF Guidelines	*Voluntary Guidelines on Securing Sustainable Small-scale Fisheries in the Context of Food Security and Poverty Eradication*
Sourcebook	*Small-scale Fisheries and Marine Tenure: A Sourcebook on Good Practices and Emerging Themes*
TAC	Total Allowable Catch
TURF	Territorial Use Rights for Fisheries
USAID	United States Agency for International Development
VGGT	*Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries, and Forests in the Context of National Food Security*

Jacks inside a marine reserve, Balicasag Island, Philippines. (photo: Tory Read)

EXECUTIVE SUMMARY

The Sourcebook examines the state of knowledge on small-scale fisheries and marine tenure around the world. Through its commitment to addressing extreme poverty, the United States Agency for International Development (USAID) is focused on understanding the specific role of marine tenure in achieving multiple development benefits among small-scale fisheries around the world. *Marine Tenure and Small-scale Fisheries: A Sourcebook of Good Practices and Emerging Themes* (Sourcebook) draws on findings from scholarly research, policy documents, development projects, and publications by development practitioners, researchers, and nongovernmental organizations to explore good practices and emerging themes in marine tenure and small-scale fisheries. During the last 30 years, a rich body of work has developed that examines governance frameworks and design principles for improving community-scale tenure institutions, including national laws and policies as well as collaborative management (or co-management) with key stakeholders such as the government. Specific elements of marine tenure institutions are examined in closer detail: debates about rights-based fisheries in the context of broader social, economic, and environmental objectives; the emergence of hybrid marine tenure institutions from the convergence of customary and contemporary marine tenure systems; the configuration of fishing

rules to support sustainable small-scale fisheries and compliance; use of mapping and marine spatial planning to support recognition of marine tenure rights and address competing and conflicting resource uses; and illegal, unreported, and unregulated fisheries. The Sourcebook provides a review of the lessons from this work and identifies some innovative new themes.

The Sourcebook is a companion document to *Looking to the Sea to Support Development Objectives: A Primer for USAID Staff and Partners* (Primer). The Primer is designed to help USAID integrate consideration of marine tenure explicitly in the design of programs and projects involving small-scale fisheries by providing tools based on good practices from the Sourcebook.

Securing sustainable small-scale fisheries is an emerging global development agenda. "Small-scale fisheries" is a simple name for a complex and large category of the global fisheries sector. Men and women fishing in nearshore waters for both subsistence and commercial catch significantly contribute to social, economic, and ecological benefits among coastal communities in developing countries. Catching about the same amount of fish as industrial fisheries, small-scale fisheries employ 25 times the number of fishers and use an eighth of the amount of fuel annually. Small-scale fisheries have so far been invisible within the global fisheries sector, even though they play a pivotal role in meeting food needs and building local as well as global economies. As modern, large-scale fisheries have grown, they have come into conflict with small-scale fisheries for the same coastal resources. Other challenges to small-scale fisheries include population growth, the growing commercialization of the fisheries sector, outmigration, and technological growth. The 2015 *Voluntary Guidelines on Securing Sustainable Small-scale Fisheries in the Context of Food Security and Poverty Eradication* (SSF Guidelines) establishes a human rights-based agenda for small-scale fishers.

Responsible governance of marine tenure is a key dimension of this global agenda. The responsible governance of tenure forms a key dimension of this emerging small-scale fishery agenda. Tenure over natural resources refers to the social relations, institutions, and rules that govern people's access to and use of land, water, and natural resources. Natural resource tenure, therefore, establishes a set of rights and responsibilities as to who is allowed to use which resources, in what way, for how long, and under what conditions, as well as who is entitled to transfer rights to others and how.

Small-scale fishers and coastal communities with secure rights over a given fishery, fishing ground, or territory have a strong interest in organizing and acting collectively to manage their resources sustainably. The diversity of community-managed marine tenure institutions in the world reflects the importance of adapting the details of marine tenure governance and resource rights arrangements to suit social, cultural, political, economic, and ecological conditions. Although these marine tenure institutions are extremely diverse in terms of membership, governance systems, technology, leadership, and geographic scope, understanding how they endure and identifying emerging threats provides lessons on how they can be strengthened in the face of new challenges such as climate change and globalization.

Small-scale fisheries provide globally significant and multidimensional contributions to rural coastal development. The vital role that sustainably managed small-scale fisheries play in ending extreme poverty and providing food security, nutrition, and livelihoods in developing countries is undisputed based on research from around the world. By recognizing this substantial and multidimensional role, USAID and its partners have many opportunities to support numerous development objectives. Historically, USAID investment in marine and coastal issues has largely focused on meeting biodiversity conservation objectives. Development partners should seek innovative ways to

diversify and align investment portfolios to support the enabling conditions for securing sustainable small-scale fisheries. An assessment of the status of country implementation of the SSF Guidelines could provide a starting point for identifying gaps and opportunities for investment.

Responsible governance of tenure in small-scale fisheries needs to be considered explicitly in program and project design. Responsible governance of tenure involves respecting the rights of small-scale fishers and fishing communities to the resources that form the basis of their social and cultural well-being, their livelihoods, and their sustainable development. National legal and policy frameworks, administrative and judicial systems, effective co-management arrangements, dispute resolution mechanisms, local participation and empowerment, and strengthened institutional capacity are all key ingredients of responsible governance of marine tenure. A more explicit approach would seek to (a) define and secure the full bundle of tenure rights, including exclusion, withdrawal/access, management, enforcement, and alienation rights; (b) identify and build the capacity of national and local tenure governance bodies to secure these rights; and (c) invest in the generation of social-ecological system knowledge to better characterize the complexities through supporting baseline assessments and monitoring. The integration of marine tenure in situation models and theories of change will strengthen development programming in rural coastal areas.

National legal and policy reform for marine tenure and small-scale fisheries can be guided by good practices articulated in the SSF Guidelines. There are few examples of countries with strong policies supporting responsible governance of marine tenure and ecosystem approaches to fisheries management in small-scale fisheries. A useful starting point is to assess the local situation while developing an analysis of the policy, law, and administrative needs at the national level.

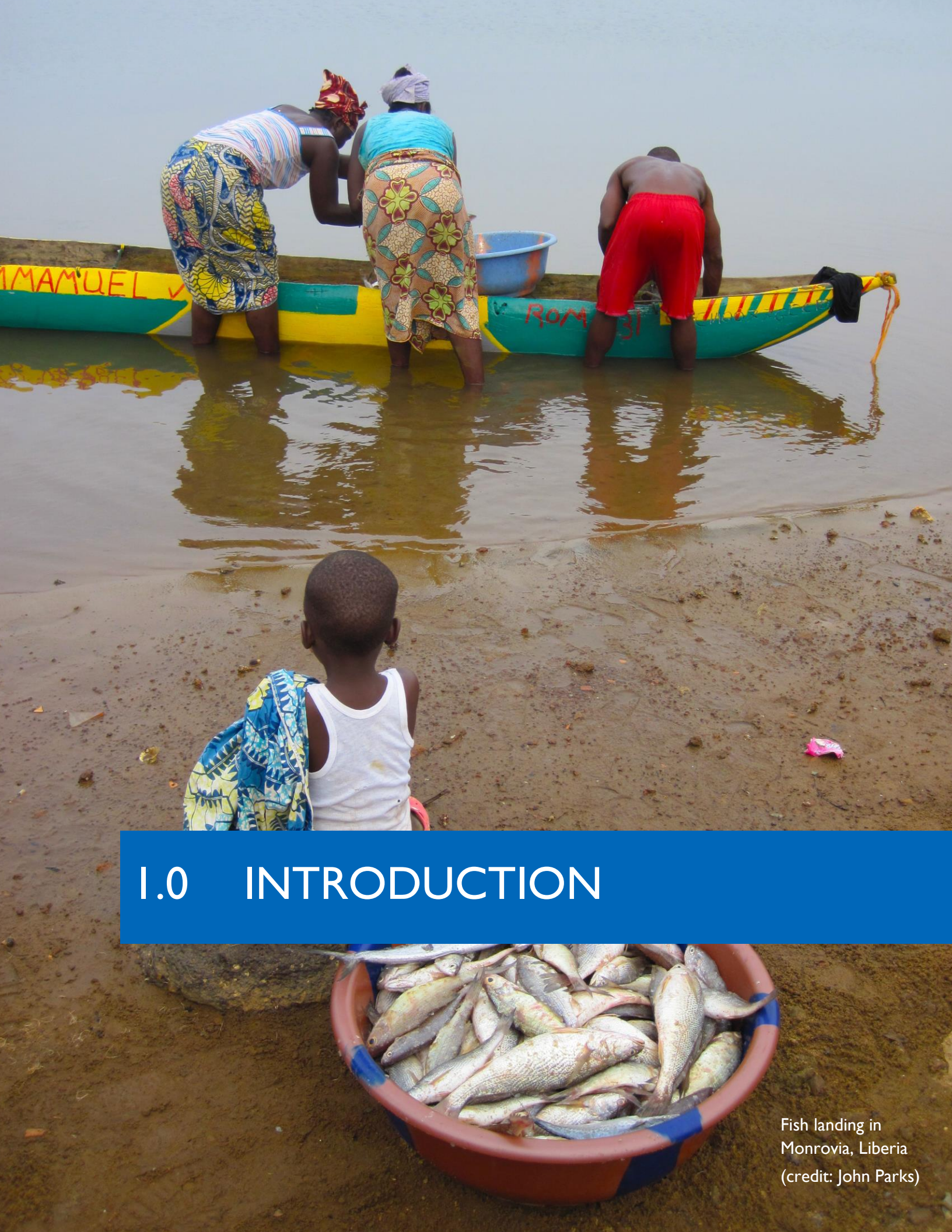
Social-ecological system knowledge from multiple sources and at multiple scales is necessary to design and monitor programs and projects involving marine tenure and small-scale fisheries. Small-scale fisheries are complex social-ecological systems. In the face of growing, complex, and often uncertain local and global impacts on marine and coastal ecosystems, knowledge of the social-ecological system will need to integrate place-based, fine-scale spatial and temporal information alongside large-scale ecological processes, which have historically not been captured in traditional ecological knowledge. Moreover, future conditions and uncertainties must be projected to provide the information needed to prepare for and adapt to change. Traditional, local, and modern scientific knowledge are all needed to understand the connectivity and interactions among the ecosystem, resource users, governance systems, and an array of social, economic, and political drivers.

Marine tenure governance institutions need to be strengthened to protect tenure rights and effectively engage in co-management arrangements at multiple scales of governance. While marine tenure considerations often focus on the tenure rules governing rights and responsibilities, it is critical to strengthen marine tenure governance institutions that design and support tenure arrangements through the creation and enforcement of associated rules. Well-designed, community-based marine tenure institutions can contribute to multiple development outcomes: food security, poverty reduction, gender equity, and biodiversity conservation. Effective co-management arrangements need to embed marine tenure systems that support ecosystem-based management as an approach for sustainable resource use. The effectiveness and direction of accountability of co-management arrangements with national and subnational government agencies need to be evaluated in terms of

support for community-based management. Meeting these goals requires long-term and consistent support to strengthen governance bodies.

A country-specific sourcebook of good practices and lessons can be developed building on a global community of practice while recognizing that "no one size fits all." Over the last 3 years, key design principles have been identified that enable success of community-based marine commons. These can be considered key components of the good practices that should be promoted among existing as well as newly created marine tenure systems for small-scale fisheries. Secure tenure rights and legal recognition provide an important avenue through which people pool their knowledge, investments, time, and labor to yield both short-term and long-term benefits securely in a spatially complex production condition. The key issues that determine success will need to be addressed: governance approaches, overarching goals of the marine tenure institutions, and how this fits into ecosystem-based planning. Because it is clear that no simple one-size-fits-all approach will work, the art of crafting effective tenure institutions lies in carefully tuned, iterative approaches to adaptive learning that can benefit from building a broader "community of learning."

Madagascar village impacted by severe storms (credit: Matt Sommerville)



1.0 INTRODUCTION

Fish landing in Monrovia, Liberia (credit: John Parks)

Through its commitment to addressing extreme poverty, the United States Agency for International Development (USAID) is focused on understanding the specific role of marine tenure in achieving multiple development benefits among small-scale fisheries around the world. "Small-scale fisheries" is shorthand for a globally significant, complex sector that includes subsistence, artisanal, and commercial fisheries. Most small-scale marine fishing occurs in nearshore environments such as estuaries, lagoons, bays, and reefs with small vessels and crew. Despite their significant role locally and globally, small-scale fishers remain among the poorest segment of society within developing countries and they are largely invisible in development programs.

Even though local communities have customarily managed their small-scale fisheries for long periods, the lack of legitimate recognition of these tenure arrangements as well as gradual breakdown of these practices through economic and political transformations is leading to a significant governance gap in effective fisheries management. Combined with the overcapitalization of large-scale fisheries and other drivers, such as illegal and destructive fishing, habitat degradation, and climate change, wild marine fisheries are in decline globally. Small-scale fishers operating in coastal waters depend on healthy wild populations of crabs, shellfish, and finfish, many of which are highly migratory. Further, there is substantial evidence that small-scale fishers and coastal communities with secure tenure over a given fishery, fishing ground, or territory have a strong interest in organizing and acting collectively to manage their resources sustainably. Tenure over natural resources refers to the social relations, institutions, and rules that govern people's access to and use of land, water, and natural resources. By securing tenure and strengthening governance of small-scale fisheries, the achievement of multiple development objectives, such as poverty reduction, food security, biodiversity conservation, and inclusive economic growth, is possible.

Marine Tenure and Small-scale Fisheries: A Sourcebook of Good Practices and Emerging Themes (Sourcebook) provides an overview of key concepts, principles, good practices, and specific examples needed to appreciate the importance of marine tenure and small-scale fisheries as a global development agenda and to inform the design and implementation of development programs and projects. The role of responsible governance of marine tenure in supporting sustainable wild marine fisheries and building resilient livelihoods among small-scale fishers is the central theme throughout the Sourcebook. This aligns with the goals of the *Voluntary Guidelines on Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication* (SSF Guidelines) (FAO, 2015), which was developed in response to the invisibility of small-scale fisheries within the global fisheries sector. The Sourcebook highlights these guidelines as the emerging global development agenda of which responsible governance of marine tenure is a key dimension. Information presented in the Sourcebook is intended to provide development professionals and practitioners working in a wide range of coastal development sectors with the information needed to consider sustainable small-scale fisheries and the important role marine tenure plays in development programs and projects.

The Sourcebook draws on findings from scholarly research, policy documents, development projects, and publications by development practitioners, researchers, and leading nongovernmental organizations (NGOs) to explore good practices, insights, and emerging themes that can help design effective and innovative strategies for recognizing and strengthening marine tenure. Based on this body of research, this document is structured to explore key entry points for programming in marine tenure and small-scale fisheries (Figure 1).

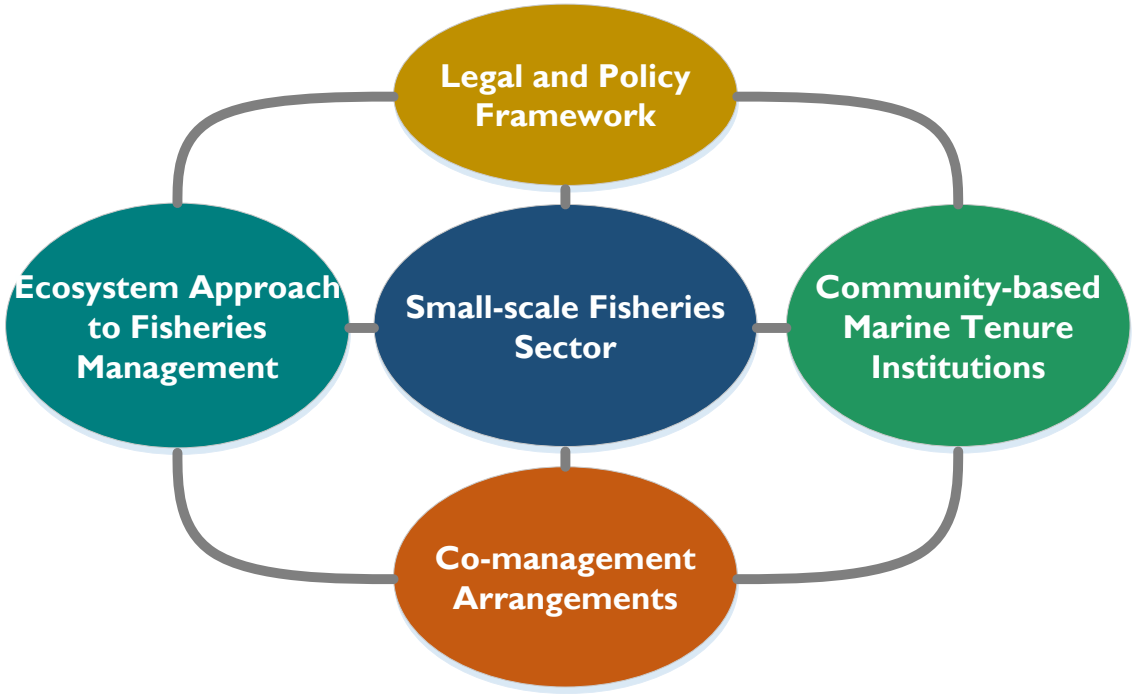


Figure 1. Key entry points for programming in marine tenure and small-scale fisheries

This first chapter sets the stage by describing USAID's interest in and rationale for exploring good practices and emerging themes in marine tenure and small-scale fisheries as a sector. The second chapter provides an overview of key concepts and design considerations that support community-based marine tenure institutions. In the third chapter, the global importance of small-scale fisheries as a sector is explained. The global agenda for securing sustainable small-scale fisheries forwarded in the SSF Guidelines is presented in the fourth chapter. The chapter presents an action-oriented reference guide that uses strategic actions and good practices based on the SSF Guidelines and that supports all the entry points identified in Figure 1. The fifth chapter explores how local, community-based management by small-scale fisheries with secure tenure rights can contribute to and have the support of an overall ecosystem approach to fisheries management. The sixth chapter then proceeds to explain how national legal and policy frameworks as well as appropriately designed co-management approaches are key elements of responsible governance of tenure that supports community-scale institutions. The final chapter provides programming considerations for each of the entry points and recommendations.

The Sourcebook serves as a companion document to *Looking to the Sea to Support Development Objectives: A Primer for USAID Staff and Partners* (Primer) (Courtney & Jhaveri, 2017). The intent of the Primer is to help USAID staff and partners consider the interconnected role of healthy marine and coastal ecosystems, sustainable small-scale fisheries, and responsible governance of marine tenure in achieving a wide range of development objectives. The Primer's guidance and tools aim to support programming and project development in the marine and coastal context throughout the USAID program cycle.

2.0 MARINE TENURE: CONCEPTS AND DESIGN CONSIDERATIONS

Fish catch in Honiara, Solomon Islands (credit: Tory Read)

Tenure refers to the relationship (whether defined under formal *de jure* law, customary law, or traditional practice) that individuals and groups hold with respect to resources on land and at sea. Marine tenure involves establishing a set of rights and responsibilities in the marine and coastal environment as to who is allowed to use which resources, in what way, for how long, and under what conditions, as well as who is entitled to transfer rights (if any) to others and how. Developing tenure rules and responsibilities over marine waters creates a common property arrangement governed by a local tenure institution.

Marine tenure rights and institutions form the overarching governance structure that enables a fishing group or community to establish exclusive rights to use resources from a defined territory. Small-scale fishers and coastal communities with secure rights over a given fishery, fishing ground, or territory have a stronger interest in organizing and acting collectively to manage their resources sustainably. Secure tenure promotes stewardship of natural assets such as fish, creates incentives to maintain ecosystem goods and services, and has the potential to support the achievement of multiple social, cultural, economic, and environmental goals.

This chapter focuses on the marine tenure concepts and design considerations beginning with a brief history of the emergence of the study of common property rights followed by an overview of the nature of marine tenure rights and responsibilities and tenure security. The characteristics of community-based marine tenure institutions are then examined from the perspective of customary, devolved, and hybrid marine tenure institutions. Factors that threaten the effectiveness or sustainability of marine tenure institutions are highlighted along with design considerations for creating enduring marine tenure institutions.

2.1 EMERGENCE OF THE STUDY OF THE COMMONS

Faced with declining fish stocks after decades of largely unregulated exploitation that began during colonial times, many developing countries initially attempted to address growing issues around fisheries through top-down, centralized management of the national fisheries sector. A centralized natural resource management approach has significant limits due to lack of detailed knowledge about resources and inadequate administrative and management capacity across a wide marine territory. It became clear in the 1980s that it was the local communities within specific coastal areas that often, informally or formally, best manage fisheries because they have good knowledge of their dynamics, could organize themselves into a functioning management body, and ensure adherence to rules. Beginning in the late 1980s, the growing disillusionment with the performance of central governments led to decentralization or the transfer of power to lower forms of government (Armitage et al., 2009). This overarching trend away from centralized management to devolved approaches occurred in many natural resource sectors such as forests, water, and pastures. It is not surprising, therefore, that a new body of scholarship on common property resource management systems emerged in the 1980s (Box 1).

Box 1. Governance of the commons: a historical perspective

The study of common property natural resource management systems emerged in the early 1980s in response to the biologist Garrett Hardin's now famous article, "The Tragedy of the Commons" (Hardin, 1968). Written during the upsurge of U.S. environmentalism and its primary concern with overpopulation, his ideas powerfully captured the public imagination with its description of how self-interested behavior among users of a common pool resource, such as a grazing area, would lead to overexploitation and hence tragedy. In the context of

Box 1. Governance of the commons: a historical perspective

fisheries, this was echoed by the argument that overfishing was the outcome of overpopulation (Pauly, 1994). At the time Hardin proposed his ideas, the main public impetus was to promote government intervention to avoid such tragedies, but as the political tide changed in the 1980s toward more neoliberal economic approaches, the primary solution being offered was greater privatization (McCay & Acheson, 1987).

By the late 1980s, however, particularly as the fiscal strength of the state waned (leading to poor capacity), the importance of devolving resource management away from the state to local community-based institutions came into ascendance. On the one hand, it meant greater power and authority for communities in managing their local resources. On the other hand, it also placed greater burdens on communities, particularly the poorer and more remote ones, to manage their local fisheries with little endowment or capacities.

Hardin's controversial article inadvertently jumpstarted our understanding of these diverse, community-scale management systems that have successfully endured over long periods of time. Given how powerfully Hardin's work began to shape the thinking of policymakers, social scientists (from across the full spread of anthropology, economics, geography, political science, and sociology disciplines) in the early 1980s began to investigate whether tragedy was, indeed, the inevitable outcome of using the commons (McCay & Acheson, 1987). In the process, they unearthed many successful and enduring cases of how communities were able to collectively manage their common pool resources, such as forests, grasslands, and fisheries. It has become clearer that interventions solely by government or individualized privatization are not the only or even best options for sustainably managing natural resources: common property resource management systems provide a viable and effective approach.

While a number of leading scholars propelled this work forward, the most famous has been political scientist Elinor Ostrom who won the Nobel Prize for Economics in 2009. Her seminal book, *Governing the Commons: The Evolution of Institutions for Collection Action* (Ostrom, 1990)**,** takes a close empirical look at numerous successful, as well as unsuccessful, examples of natural resource management by collective bodies (not coerced by the state) to derive design principles and rule systems for enduring regimes. These design principles were developed by examining a range of resource types, including meadows, forests, irrigation, and fisheries. Over time, Ostrom and others proposed a social-ecological systems framework to provide a holistic approach for understanding the connections among the ecosystem, its resources, the actors, and governance systems (Basurto, Gelcich, & Ostrom, 2013; McGinnis & Ostrom, 2012).

Establishing tenure arrangements over marine resources is a complex endeavor because of the open and fluid context in which agile and multiple fishery resources exist. Fishery resources, as with natural resources such as forests, lakes, and pastures, are typically called common pool resources. This means that one person's use of the resources subtracts from another's use (subtractability). With such resources, it is often necessary, but difficult and costly, to exclude others outside the group (excludability) from using the resource (Feeny, Berkes, McCay, & Acheson, 1990; Ostrom, Burger, Field, Norgaard, & Policansky, 1999). In coastal fisheries, the problem of excluding others is particularly exacerbated by the fluid, invisible, and mobile nature of the myriad fish and other species being caught in an expansive aquatic environment. Additionally, in the case of fishing grounds, differing types of tenure rights may exist over the lagoons, reefs, mudflats, as well as nearshore and deeper waters. One particular gap of research is on how mangrove forests are governed and what the role of enabling conditions such as tenure arrangements is for supporting mangrove management to meet multiple goals in the context of climate change (Rotich, Mwangi, & Lawry, 2016). The details of the tenure governance structure and use rights can be geared toward the community's interest in singular or multiple

objectives, such as increased income from single species catch, or goals that include broad-ranging biodiversity conservation that simultaneously support the livelihoods of the poorest.

The global movement to establish participatory forms of forest management played a key role in the successful emergence and expansion of community forestry more than 30 years ago (FAO, 2011b). Now a parallel global agenda on securing sustainable small-scale fisheries and the responsible governance of marine tenure is creating an impact within regional and national institutions. The resultant transformation of laws, policies, organizational systems, local institutions, and fishing communities through innovative and well-targeted interventions will continue to grow in the decades to come.

2.2 TENURE RIGHTS AND RESPONSIBILITIES

Marine tenure involves establishing a set of rights and responsibilities in the coastal and marine environment as to who is allowed to use which resources, in what way, for how long, and under what conditions, as well as who is entitled to transfer rights (if any) to others and how. The establishment of tenure rights and responsibilities alone does not ensure that local resource users will act collectively to manage their resources sustainably. National legal and policy frameworks, administrative and judicial systems, effective co-management arrangements, dispute resolution mechanisms, local participation and empowerment, and strengthened institutional capacity are all key ingredients of responsible governance of tenure. Further, marine tenure rights and responsibilities need to be secured at multiple ecological and governance scales to support a human rights-based approach to sustainable small-scale fisheries.

Tenure rights and responsibilities must be designed to support sustainability of the fishery (Charles, 2013). As stated in the Food and Agriculture Organization of the United Nations (FAO) Code of Conduct for Responsible Fisheries, "*The right to fish carries with it the obligation to do so in a responsible manner* (FAO, 2011a)." This coupling of rights with obligations is well defined in customary marine tenure systems (Box 2). In small-scale fisheries, customary tenure systems have often developed naturally over time and many are still in place (A. T. Charles, 2011). It is for this reason that care should be taken to understand existing customary or informal tenure rights before imposing new or hybrid systems (Aswani, 2005).

Box 2. Learning from customary marine tenure

Customary marine tenure systems are fundamentally place based, defined for specific geographic areas, individuals, clans, and tribes (Finlay, McConney, & Oxenford, 2013; Ruddle, 1992). In many Pacific islands, communal property rights are typically extended over land and sea and can include coastal and upland areas and extend to the outermost edge of the reef.

Customary tenure rights balance group and individual rights and obligations: land and marine ownership is typically held at the group level, while land use and resource access is exercised at the individual or household level (Govan et al., 2009). Therefore, they are often, but not exclusively, characterized by a mixture of both communal and individual property rights. Typically the customary owner or user group has the right to exclude outsiders (Hviding, 1991). Local people and their traditional leaders conduct access, control, self-monitoring, and the establishment and enforcement of rules and regulations.

Customary marine tenure regimes may have rules that restrict harvesting certain species, at certain times, or in certain areas, as well as other restrictions (Aswani, 2005; G. Bennett, 2012). Customary management practices have evolved over generations, informed by traditional ecological knowledge (Cinner & Aswani, 2007). There is tremendous diversity in terms of the constitution of governance bodies, leadership, gender and social inclusion

Box 2. Learning from customary marine tenure

dimensions, the role of rules in maintaining social distinctions or hierarchies, and conflict management. While customary marine tenure regimes are considered adaptive based on evolving social, cultural, and ecological knowledge, the rate of environmental and social change may overwhelm their adaptive capacity.

All marine tenure arrangements involve a decision-making institution (such as customary leaders or an elected committee) that develops rules for addressing five major bundles of rights and responsibilities: exclusion, access/withdrawal, management, enforcement, and alienation/transfer (Figure 2). The ability to exclude others from a fishing ground is a fundamental tenure right that establishes clearly defined boundaries both spatially and institutionally. In many cases, the right to exclude others from a specific fishing ground may be informally recognized by adjacent communities. In other cases, national or subnational laws may exclude fishers from local waters. The right to exclude others from a fishing ground or territory establishes the main platform from which decisions about access/withdrawal, management, enforcement, and alienation rights can be made. Within the fishing ground, access rights define who is allowed to fish and what can be fished; registration and licensing is a tool frequently used to secure access rights. Management rights determine how the overall territorial area under their jurisdiction should be maintained to meet their goals. The configuration of fishing rules and restrictions may include spatial, temporal, gear, species, and catch restrictions. Enforcement over a fishery resource may be shared among local communities and national or subnational government institutions. The transfer of fishing rights can be tricky. The transfer of fishing rights to others may provide economic benefits to a community; however, it can often undermine sustainable resource management if monitoring and surveillance is weak or only portions of the stakeholders benefit.

Figure 2. Bundle of resource use rights and responsibilities in marine tenure systems (Cinner, Daw, et al., 2012)

Resource users and other stakeholders can recognize marine tenure rights either through formal legally sanctioned processes or through "social" recognition. Statutory marine resource tenure refers to the formal recognition and protection of legitimate rights to marine resources (Aggarwal & Freudenberger, 2013). Legal protection of marine tenure rights may take many forms such as constitutionally mandated preferential use rights of subsistence fisheries, legal protection of customary tenure and territorial use rights of indigenous people, and devolved tenure rights and responsibilities to resource user groups. Informal or traditional marine tenure refers to a set of rights, rules, and practices assumed by the local resource users and stakeholders in a given geographic area and recognized by other user groups in adjacent or nearby communities. In legally devolved systems, the degree to which these rights are devolved to community-based institutions depends on national laws and local governance systems.

For example, a comparison of governance bodies for marine tenure in Philippines and Kenya illustrates significant differences in the nature and specific details of their bundles of rights and duties (Table 1). In the Philippines, the Municipal Fisheries Management Council has an indirect decision-making role on the bundle of tenure rights and responsibilities as an advisory body. These recommendations are forwarded to the municipal council to pass as a local ordinance. The Philippines Fisheries Code provides for a uniform local ordinance to ensure that national provisions of the law are adopted by the local government, such as prohibited gears and preferential use of municipal waters by boats less than 3 gross tons in weight. Some variations allowed by national law are adopted, such as the exclusion of fishers registered in one municipality to fish in an adjacent municipality. The Hinatuan Municipal Fisheries Ordinance in the province of Surigao del Sur delegates powers to the village level and designates the exclusive use of municipal waters to Hinatuan residents (Pomeroy, 2013). In contrast, some municipalities have banded together to manage small-scale fisheries adopting a bay-wide management plan and sharing financial and administrative resources for fisher registration and coastal law enforcement (Perez, Pido, Garces, & Salayo, 2012). Membership in a Municipal Fisheries Management Council includes not only local fishers but also, local government, private sector and other stakeholders.

In Kenya, the Beach Management Units (BMU) have a more direct decision-making role in allocating the bundle of rights (Table 1). Kenya undertook a shift toward co-management through the adopting of Beach Management Unit Regulations in 2007 (Nyambura & Jäckel, 2007). Under the regulations, BMUs have exclusive management rights over fish landing sites and consist of an assembly, an executive committee, and may have subcommittees. They are required to provide data on catches and develop co-management plans to ensure sustainable fisheries in that area. The Director of Fisheries must approve these management plans. Some fisheries management measures close areas for fishing, and restrict fishing gear and the number of fishing vessels. BMUs possess certain law enforcement powers with regard to gear regulations, registration of vessels, and protection of fishing grounds. Monitoring the performance of BMUs is conducted both by the Unit itself as well as by external, authorized fisheries officers in six-month intervals. BMUs can receive funding from the Ministry of Fisheries Development, or generate their own income through membership fees, taxes on migrant fishers, or vessel registration fees. The overall responsibility of monitoring and supervising BMUs is still vested with the Ministry of Fisheries Development. While tenure rights and responsibilities have been devolved to BMUs, capacity building is needed to close the gap between the expectations in the regulations and the capacity of fishers (Oluoch & Obura, 2008).

Pacific Island states have long recognized the importance of allocating resource rights for sustainably managing coastal fisheries to support food security, sustainable livelihoods, and economic growth for current and future generations (Heads of Fisheries in the Pacific Region, 2008). The *Pacific Islands Regional Coastal Fisheries Management Policy and Strategic Actions* (Apia Policy) states that (a) enabling communities to manage adjacent coastal waters requires granting them some degree of control, either legal or traditionally assumed, of these waters; and (b) allocating marine usage rights to fishing communities where fishing communities have no control over people fishing in adjacent waters.

Table 1. Comparison of the devolved marine tenure rights and responsibilities for small-scale fisheries in the Philippines and Kenya

Philippines – Municipal Fisheries and Aquatic Management Councils (Perez et al., 2012; Pomeroy, 2013)	Kenya – Beach Management Units (Government of Kenya, 2007)
Exclusion Rights	
• Be consulted in the formulation of necessary mechanisms for inclusion or exclusion procedures in limiting entry into the municipal waters that shall be most beneficial to the resident municipal fishers • Recommend designation of portions of municipal waters for fishery reserves or limited use, educational, research, and/or special management purposes • Be consulted on authorizing or permitting small and medium commercial fishing vessels to operate within the 10.1 to 15 kilometer area from the shoreline in municipal waters	• May exclude boats in their spatial jurisdiction, which extends from the coastline covering the landing sites that meet the minimum requirement of 30 boats out to the limit of "inshore waters"
Access/Withdrawal Rights	
• Submit to the local government the list of priorities for consideration in determining priorities among those who will be allowed to fish in municipal waters • Assist the local government in maintaining a registry of municipal fishing vessels by type of gear and other boat particulars	• Register fishing boats to operate in the Beach Management Unit (BMU)
Management Rights	
• Assist in the preparation of the village (Barangay) and Municipal Development Plan • Recommend the enactment of municipal fishery ordinances • Recommend the establishment of closed seasons for fisheries management • Advise the village/municipal legislative council on fishery matters through its Committee on Fisheries • Be consulted in the establishment of closed seasons for municipal waters • Be consulted in the establishment of catch ceiling limitations in municipal waters for conservation and ecological purposes • Be consulted on the determination of license fees for fishery activities in municipal waters	• Assist the Ministry of Fisheries to record landings • Develop by-laws to restrict certain gears, establish a fisheries closure, or other management measures, although final approval for these rests with the Director of Fisheries • Ensure the security of the fish landing station and any fishing vessels, nets, or other equipment or structures within its boundaries • Ensure compliance with applicable hygiene standards in connection with the landing storage and state of fish and fishery products • In conjunction with other relevant agencies, maintain safety and order at the fish landing station • Maintain, and as necessary, repair any buildings or structures on the fish landing station
Enforcement Rights	
• Assist the local government in the enforcement of fishery laws, rules, and regulations in municipal waters	• Assist the Ministry of Fisheries in the enforcement of fishery regulations and protection of fishing grounds in their areas of jurisdiction
Transfer Rights	
• Be consulted on the designation/establishment of zones for the construction of fish pens, fish cages, fish traps, and other structures for the culture of fish and other fishery products	• Rights cannot be permanently sold but can allow short-term access fees to be charged to non-members

The responsible governance of marine tenure involves respecting the legitimate rights of small-scale fishers and fishing communities to the local resources that form the basis of their social and cultural well-being, their livelihoods, and their sustainable development. National legal and policy frameworks, administrative and judicial systems, effective co-management arrangements, dispute resolution mechanisms, local participation and empowerment, and strengthened institutional capacity are all key ingredients of responsible governance of marine tenure. Tenure security is an important dimension of responsible tenure governance. It is the perception by users that their fisheries rights will be both recognized by others and protected from imposition, dispute, or approbation (USAID, 2013). Broadly speaking, it conveys the sense that investments of time, labor, and capital over a certain duration will produce benefits to the rights holder. Clear and secure access to marine and coastal resources and land is necessary for carrying out their multiple forms of fishing activities as well as post-harvest activities. Preferential access to fishery resources in nearshore waters can provide incentives to local fishing communities for sustainably managing their fisheries. When access to coastal resources is vulnerable to displacement, whether from large-scale fisheries moving too close to shore, new infrastructure, development projects, or disasters, then fishing communities dependent on nearshore marine resources may become poorer, which could result in a departure from fishery work and culture. Once tenure arrangements are clear and defensible, then the enabling framework for achieving a range of goals including food security, social and economic development, employment, gender equality, poverty eradication, and sustainable fisheries management is set into motion. For example, agreement on a clear boundary over fishing grounds can result in legitimate use and defense against free riders.

While clarity of tenure rights is important, it is the social context in which rights operate that is important for tenure security. Multiple sources, such as law, titling, strong administration, social recognition, and ownership of independent assets, can contribute to a perception of strong security. The overall social, legal, and cultural legitimacy of the rights is key. For example, titling, in and of itself, may not enhance security if it cannot be defended in practice. Furthermore, while the duration of tenure rights is important, the strength of that right is crucial.

2.3 COMMUNITY-BASED MARINE TENURE INSTITUTIONS

Marine tenure institutions that govern use and management of natural resources are constituted by the range of resource rights and responsibilities allocated to the tenure institution's members (USAID, 2013). A community-based marine tenure institution is a local governance body that determines rules about how key tenure issues such as access, use, management, and exclusion of a defined fishing area are developed and implemented. A diverse number of community-based marine tenure institutions in the world reflect the local social, cultural, political, economic, and ecological conditions. These institutions, called a range of names, including community-based, customary, communal, and even collective, ideally promote socially inclusive decision making through representative and participatory processes.

Community-scale tenure institutions are not new: they have been in place over the centuries, enduring major transformations. They have relied on traditional or customary forms of ecological and social knowledge, as well as adaptive management practices. Their approach has worked to reduce conflicting or competing resource uses to minimize problems for their long-term viability. The loss or erosion of these traditional management systems during colonization and their replacement with largely ineffective, top-down, centralized resource management has led to a breakdown in effective fisheries management

in many parts of the world. There is a long-standing body of work on customary and traditional marine tenure systems, especially in the Pacific (Aswani, 2005; G. Bennett, 2012; Hviding, 1991; Marine Resources Advisory Group, 1999; Putney, 2008; Ruddle, 1998; Ruddle, Hviding, & Johannes, 1992; Townsley, Anderson, & Mees, 1997; Tungale, 2008) (Box 2). Such studies have provided insight into how to structure new marine tenure systems tailored to local circumstances.

Whether tenure institutions are customary or newly created through legally sanctioned processes, they typically possess certain features in common. Typically, there are three nested levels of rules (Figure 3). The *first level* focuses on who will be involved in governance and decision making. The *second level* establishes the goals of governance, namely the policy goals. The *third level* then sets out the specific rules-in-use that help the community meet the goals it seeks to attain. A constitution or set of by-laws that govern how that institution operates will often be established. As marine tenure institutions evolve, they will likely be engaged in improving governance, to make it more participatory, transparent, and equitable. Good governance of marine tenure involves a participatory and effective decision-making body as well as a set of well-designed rules on property rights and responsibilities that match the local context (Charles, 2013).

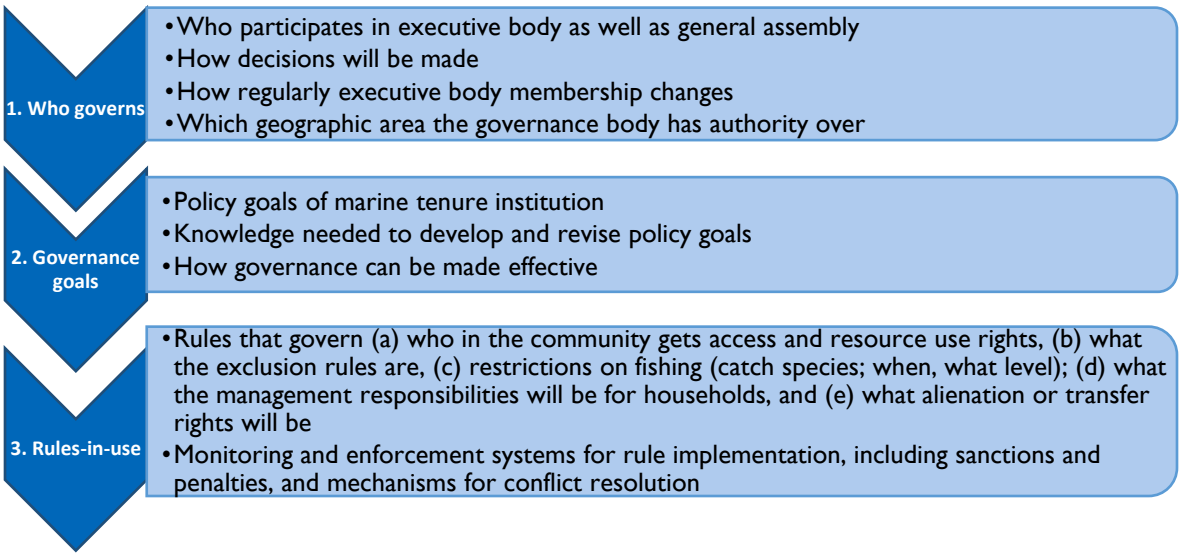
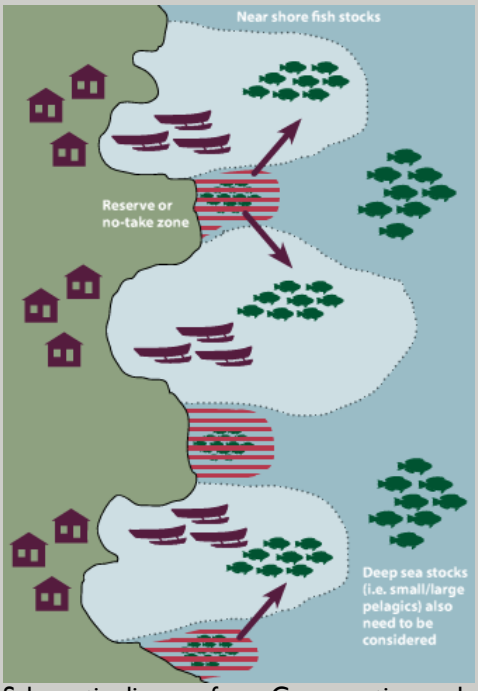


Figure 3. Steps in the formation of a marine tenure and property rights institution

Much can be learned from successful marine tenure systems, such as in the Comoros (Box 3). The Comoros is a sovereign archipelagic state in the Indian Ocean located off the eastern coast of Africa between northeastern Mozambique and northwestern Madagascar. This case demonstrates the importance of not only rules but also of strong social relationships and trust in building viable marine tenure institutions. The rules also take into consideration prior customary rights so that there is greater inclusiveness and minimal conflict in the regular operation of fisheries on a day-to-day basis.

Box 3. Effectiveness of village fishing associations in managing fisheries, Ngazidja Island, Comoros (Hauzer, Dearden, & Murray, 2013)



Schematic diagram from Conservation and Community Investment Forum (2013)

Village fishing associations across Ngazidja Island are highly effective in managing small-scale fisheries. They use an adaptive rule-making process that enables fishers to improve management with changing conditions.

Management Bodies

- Each village has a fishing association
- The management committee is made up of elected local fishers with recognized knowledge, skill, and social status
- The committee follows customary practice
- Membership is mandatory for all fisheries using motorized bodies, and it requires a fee
- Traditional canoe fisheries are full members and enjoy full rights but do not pay a fee

Rules-in-Use

- Fishing rules are informal and village-specific
- Specific regulations are developed based on gear, species, and temporal restrictions
- The management committee is responsible for monitoring and enforcement
- Membership fees are used for search and rescue (mostly of powerboat fishers), fisheries management, and development projects in the village
- Fishers from one village may fish in another village if they comply with their regulations

Reasons for Success

- High participation in decision making and the absence of access restrictions creates strong solidarity among fisheries
- Good participation in rule making creates motivation to enforce them
- A graduated system of penalties creates few violations
- Few inter-village conflicts require little state involvement
- Local communities carry out the bulk of management

Customary or traditional marine tenure systems are typically dynamic and adaptively evolving to reflect changes in social, political, economic, and cultural conditions; however, they are increasingly vulnerable to external social, economic, and political transformations. In the Indo-Pacific region, hybrid institutions are emerging that combine the goals, techniques, and institutions of customary and modern fisheries management (Cinner & Aswani, 2007). These "hybrid" institutions are emerging in many places of the world using customary governance structures, such as village councils, to 1) allocate catch quotas, 2) use traditional ecological knowledge to locate and temporarily restrict fishing in spawning aggregation sites of commercially valuable species, 3) map vulnerable benthic habitats for integration into conservation plans, 4) adaptively experiment with gear restrictions, 5) implement temporary closures to manage stocks that had no previous commercial value, and 6) establish community-owned and -managed marine protected areas. The introduction of the locally managed marine areas within customary fishing rights areas in Fiji is one example of a hybrid institution (Box 4).

Box 4. Locally managed marine areas within customary fishing rights areas, Fiji (van Beukering, Scherl, Sultanian, Leisher, & Fong, 2007)

The contribution of locally managed marine areas to biodiversity conservation and poverty reduction was examined in four different sites within four countries (Fiji, Solomon Islands, Indonesia, and Philippines). Locally managed marine areas, a form of "no-take" marine protected area, are being introduced as conservation measures within customary fishing areas. The Navakavu Locally Managed Marine Area was established as a community-based marine protected area supported by the national government's legal framework for "customary fishing rights areas" within the Fiji Fisheries Act. Navakavu is a *yavusa* (traditionally linked unit or clan) comprising three villages and two settlements. Approximately 600 people live in the area around the marine protected area. Quantitative and qualitative assessment of local stakeholders and resources revealed increased abundance and size of fish and invertebrates, as well as increased incomes, since the marine protected area was established in 2002. Community stakeholders perceived a positive relationship between conservation measures and individual assets where people now earn more net income from the harvesting of marine resources.

2.4 FACTORS THAT THREATEN MARINE TENURE INSTITUTIONS

Little attention has been given to factors that weaken or even break down long-standing marine tenure institutions. A range of different environmental, social, political, economic, and technological transformations have changed social cohesion, trust, and dependencies in the community (Box 5). Given that many small-scale fisheries are made up of remote and poor fishers, these transformations have led to greater vulnerabilities, especially for the marginalized members of communities.

Box 5. Drivers that can threaten the viability of community-based marine tenure institutions

Environmental

- Land-based pollution and siltation from mining and agriculture degrading essential fish habitat
- Decline in fish stocks at different trophic levels
- Ocean warming and acidification and changes in ocean circulation affecting fish stocks and habitats

Socioeconomic

- Competing or conflicting resource use that undermines sustainable resource use
- Ocean grabbing by large-scale fishing fleets and investors
- Increased economic exclusion and inequalities due to elite control of tenure institutions
- Increased out- or in-migration

Governance

- Outdated, inadequate, or conflicting policies and laws
- Inadequate government administrative capacity for tenure governance
- Mismatch in objectives of co-management arrangements between different stakeholders
- Political undermining of traditional leadership
- Loss of youth's interest in traditional practices

Markets and Technology

- Subsidies that cause overcapacity in large-scale fisheries
- Introduction of new fish harvesting and processing technologies
- Creation of new markets for particular fish or marine products that only benefit a few in the community
- Construction of new roads and access to markets

The twin drivers of climate change and economic globalization pose new, more intense challenges to small-scale fishers and community-based marine tenure institutions. In a study of 132 economies, the fisheries most vulnerable to climate change were found to be in western and central Africa (due to high catch, exports, and high nutritional dependence), northwest South America (due to very large landings), and four Asian countries (Allison et al., 2005). Changes in the abundance and distribution of fish stocks may create new conflict and competition for marine resources as fishers follow highly mobile fish stocks. Human migration from inundated low-lying coastal areas and islands to higher ground will change the demographics and social fabric of communities dependent on natural resources. A recent study of small-scale fisheries in Latin America highlights the importance of improving management and governance systems to build resilience in the face of both anthropogenic and climatic drivers (Defeo et al., 2013).

Fishing communities highly vulnerable to changing environmental conditions will suffer disproportionately if policy responses to climate change exacerbate their tenure insecurity. Vulnerability, increasingly, is not simply about the poverty and the marginal situation of fisheries communities, but also about permanent loss of fishing grounds and ecosystem services and growing exposure to disruptions in globalized fish markets (Daw, Adger, Brown, & Badjeck, 2009). In the context of global climate change, degrading ecosystems, increasing fishing effort, and growing human populations, there is an urgent need to assess and address the linked vulnerability of small-scale fishers, fishing communities, and the marine and coastal ecosystems upon which they depend. In modifying the standard vulnerability equation, (Marshall et al., 2009) highlight the co-dependency of ecological and social systems (Figure 4). In this model, ecological vulnerability determines the degree of social exposure to climate change and highlights that both social and ecological vulnerability cannot be reliably evaluated without reference to the other in natural resource dependent communities. This vulnerability assessment framework was applied in coastal communities along the Kenyan coast exposed to ecological changes due to coral bleaching (Cinner et al., 2013; Cinner, McClanahan, Graham, et al., 2012; Marshall et al., 2009).

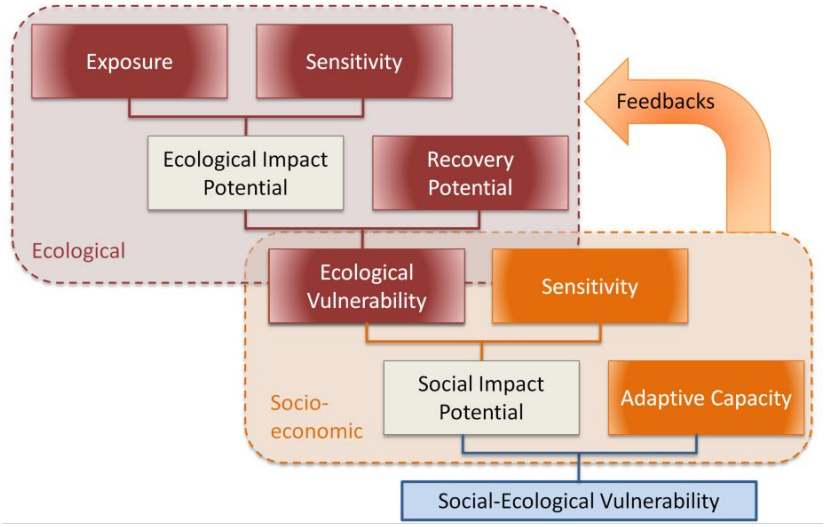


Figure 4. Linked social-ecological vulnerability of communities highly dependent on natural resources (Cinner et al., 2013; Marshall et al., 2009)

2.5 DESIGN CONSIDERATIONS FOR ENDURING MARINE TENURE INSTITUTIONS

Research on community management of natural resources over the last 30 years has produced a number of lessons on what makes these tenure institutions effective and durable. Ostrom (1990) identified eight design principles for successful tenure systems from the study of well-documented cases of long-enduring, tenure regimes. Over time, many studies have explicitly or implicitly evaluated these design principles. In a review of 91 such studies, (Cox, Arnold, & Villamayor Tomas, 2010) found that the design principles were well supported empirically with some refinements drawing from commonalities found in the studies (Table 2). These design principles, broadly construed as a set of conditions that can increase the likelihood of sustaining collective action over time, provide a general set of criteria that encompass two main dimensions: the types of activities that rules cover and how to monitor and effectively implement the rules.

Table 2. Design principles for community-based natural resource management (Cox et al., 2010; Ostrom, 1990)

Principle Description	Description
1A. User boundaries	Clear boundaries between legitimate users and nonusers must be clearly defined.
1B. Resource boundaries	Clear boundaries are present that define a resource system and separate it from the larger biophysical environment.
2A. Congruence with local conditions	Appropriation and provision rules are congruent with local social and environmental conditions.
2B. Appropriation and provision	The benefits obtained by users from a common-pool resource, as determined by appropriation rules, are proportional to the amount of inputs required in the form of labor, material, or money, as determined by provision rules.
3. Collective-choice arrangements	Most individuals affected by the operational rules can participate in modifying the operational rules.
4A. Monitoring users	Monitors who are accountable to the users monitor the appropriation and provision levels of the users.
4B. Monitoring the resource	Monitors who are accountable to the users monitor the condition of the resource.
5. Graduated sanctions	Appropriators who violate operational rules are likely to be assessed graduated sanctions (depending on the seriousness and the context of the offense) by other appropriators, by officials accountable to the appropriators, or by both.
6. Conflict-resolution mechanisms	Appropriators and their officials have rapid access to low-cost local arenas to resolve conflicts among appropriators or between appropriators and officials.
7. Minimal recognition of rights to organize	The rights of appropriators to devise their own institutions are not challenged by external governmental authorities.
8. Nested enterprises	Appropriation, provision, monitoring, enforcement, conflict resolution, and governance activities are organized in multiple layers of nested enterprises.

Despite being supported by a large number of empirical studies, there has also been some concern that these design principles may not be broadly applicable to all real-life situations or that they may be specific only to certain types of common pool resources (Cinner, Basurto, et al., 2012). A number of recent studies have examined conformance to the design principles in various locations and types of marine tenure systems. One study that examined the sustainability of Peruvian anchovy fisheries concluded that among Ostrom's design principles, only three were prerequisites for sustainability (Schreiber & Halliday, 2013). The conditions that supported the transition toward sustainability were clearly defined resource boundaries, monitoring of rule enforcement, and conflict resolution mechanisms among users and management authorities. Their results showed that greater conformity to the principles was found in the fishery when it was operating in a sustainable way, compared with its unsustainable phase.

The presence of institutional design principles was also examined in long-enduring and dynamic customary fisheries management institutions in Papua New Guinea, Indonesia, and Mexico (Cinner, Basurto, et al., 2012). Three important trends emerged from this comparative analysis:

(1) Despite the difficulty in defining boundaries around marine resources, almost three-quarters of the cases in this study had clearly defined boundaries and membership.
(2) All of the customary institutions were able to make and change rules, indicating a critical degree of flexibility and autonomy that may be necessary for adaptive management.
(3) The customary institutions examined generally lacked key interactions with organizations operating at larger scales, suggesting that they may lack the institutional connections required to confront some common pool resource challenges from the broader socioeconomic, ecological, institutional, and political settings in which they are embedded.

Another study indicates that high levels of rule compliance within no-take marine reserves was related to clearly defined boundaries and the presence of marker buoys and signs, effective resource monitoring (ecological monitoring by both advisors and the community), capacity development through training, and a formal consultation process with the community (Pollnac et al., 2010). Enforcement and adaptive management were indirectly related to compliance through correlations with other variables such as ecological monitoring, ongoing training, and defined boundaries, suggesting that compliance is related to a range of contextual conditions and processes, rather than just the level of enforcement (Figure 5).

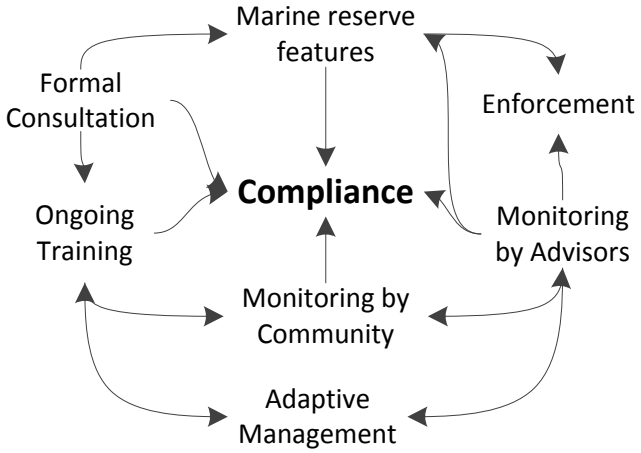


Figure 5. Factors influencing compliance with marine reserve rules (Pollnac et al., 2010)

A comprehensive review of research on commons governance concluded that the clear establishment, recognition, and support for tenure institutions means that communities gain security over their tenure arrangement and can minimize risk in investing their time, money, and labor into the use and management of natural resources, such as fisheries over the long term (National Research Council, 2002). Stern, Dietz, Dolsak, Ostrom, and Stonich (2002) identified three conditions for the emergence of self-organized institutions (Box 6). Cox et al. (2010) also raised several questions to consider about why tenure institutions work:

- Why does a community of users and managers come together to work collectively? Are they a "community of mutually vulnerable actors," or do they have a history of trust between them?
- To what extent does context such as type of ecosystem or the socioeconomic conditions among the community affect how well the tenure institution works?
- Is it the design principles that are most important, or the effectiveness of the governance process itself?

Box 6. Lessons on governance of the commons (Stern et al., 2002)

Three conditions are necessary, but not sufficient, for emergence of self-organized institutions:

1. The resource must be valuable enough for users to invest time and energy to create new institutions.
2. Resource users must have the autonomy to establish and change rules.
3. Resource users must be able to engage in direct communication with each other, including the opportunity to bargain or gain consensus.

One form does not fit all: Given ecological and social complexity, no particular institutional design can ensure successful management of all common-pool resources. Understanding the specific characteristics of resources, resource users, external factors, details of institutional design, and the interactions among these factors is critical to designing successful and enduring institutions.

"Success" means different things to different people: Resource users are often more concerned with livelihoods and well-being of humans than sustainability of any particular resource. Tradeoffs may be inevitable, and achieving multiple valued outcomes is unlikely to produce realistic models for real decisions. Sometimes, one desirable outcome, such as sustainability or equity, can only be achieved by sacrificing another, such as efficiency.

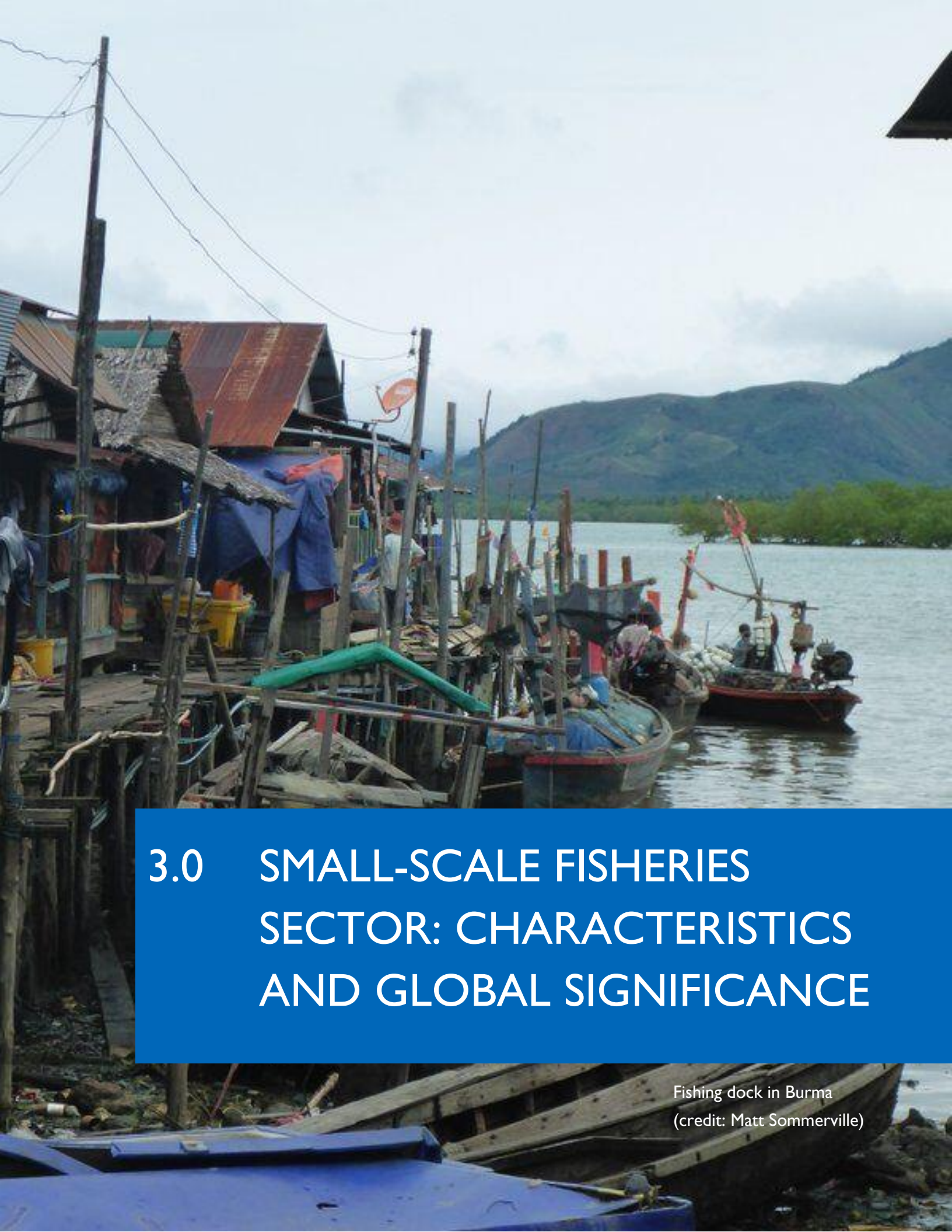
There is a growing recognition that success of a tenure institution can be defined in multiple ways. Although it is clear that no "one-size-fits-all" approach is possible given the incredible diversity found among small-scale fisheries (Charles, 2013; Stern et al., 2002), the work on commons has shown that there are some design principles that promote success. Overall, though, it is difficult to advocate for one particular tenure type because the effectiveness and result of any given tenure arrangement is distinctly related to the multi-scalar political, economic, ecological, and sociocultural context in which it is embedded.

Box 7. Marine tenure: key take-aways for programming and project design

- Small-scale fishers and coastal communities with secure rights over a given fishery, fishing ground, or territory have a stronger interest in organizing and acting collectively to manage their resources sustainably.
- Marine tenure rights and institutions form the overarching governance structure that enables a fishing group or community to establish exclusive rights to use resources from a defined territory.
- A range of different environmental, social, political, economic, and technological transformations threaten marine tenure institutions, and need to be identified and addressed through interventions at national and local levels to support enduring tenure systems.
- Institutional design principles, identified from over 30 years of study of long-enduring tenure regimes, can provide a framework for assessing and strengthening tenure institutions.
- Existing customary and traditional tenure institutions should be recognized within geographic area of interest (ecosystem, bay, cluster of villages/districts) before developing project interventions.
- Understanding the local context and history provides essential insights into factors that have supported local tenure continuity—such as trust, good rules, social norms—as well as those that have led to weakening of existing systems.
- In identifying strategies and actions to strengthen tenure institutions, remember, "one form does not fit all."

Fish drying in San Fernando, La Union, Philippines (credit: USAID ECOFISH)

3.0 SMALL-SCALE FISHERIES SECTOR: CHARACTERISTICS AND GLOBAL SIGNIFICANCE



Fishing dock in Burma
(credit: Matt Sommerville)

Small-scale fisheries is shorthand for a complex and significant economic sector that includes both subsistence, artisanal, and commercially successful fisheries operated by men and women fishers in intertidal zones or from relatively small boats nearshore. There is tremendous diversity among small-scale fisheries, and there is no agreed or accepted definition of this subsector (FAO, 2014). Very often, small-scale fisheries are invisible because there is no specific recognition of their importance to the overall fisheries sector due to the lack of sector-specific information and data. In some countries, however, small-scale fisheries have been defined within a national (or even regional) context so that laws, policies, and governance systems can be developed in its support. The types of marine tenure systems among small-scale fishing communities depends on the legal, socioeconomic, political, and technological context within which they operate. Therefore, it is essential to develop an accurate portrayal of small-scale fisheries: their characteristics, status, and challenges so that policies, laws and programming can be developed in support of their specific needs.

This chapter first provides an overview of the characteristics of small-scale fisheries. This is followed by a summary of the poverty, gender, and social inclusion conditions that small-scale fishers experience. Next, the contribution, invisibility, and conflict of small-scale fisheries are discussed within the context of a declining global fisheries sector. Lastly, "rights-based" fisheries management and catch documentation and traceability systems are described as government-driven and market-driven approaches, respectively, to address weak governance and illegal, unreported, and unregulated (IUU) fisheries from the large-scale commercial fisheries sector. The challenges and opportunities of these approaches are discussed in the context of community-based marine tenure systems.

3.1 CHARACTERISTICS OF SMALL-SCALE FISHERIES

Small-scale fisheries include subsistence and artisanal fishers who use small vessels to catch fish for household needs and sale. Socially, small-scale fisheries clearly encompass a huge diversity of cultures and histories. There are large numbers of indigenous peoples who have long had customary or traditional long-standing rights to fishing areas (Robert Charles G. Capistrano & Charles, 2012). Only some general features about small-scale fisheries are known, because neither the FAO's global database on fisheries or national government ministries of fisheries have been collecting data on them. FAO's description (FAO, 2004) of small-scale fisheries highlights the complex nature of the sector.

> *Small-scale fisheries can be broadly characterized as a dynamic and evolving sector employing labor intensive harvesting, processing and distribution technologies to exploit marine and inland water fishery resources. The activities of this sub-sector, conducted full-time or part-time, or just seasonally, are often targeted on supplying fish and fishery products to local and domestic markets, and for subsistence consumption. Export oriented production, however, has increased in many small-scale fisheries during the last one to two decades because of greater market integration and globalization. While typically men are engaged in fishing and women in fish processing and marketing, women are also known to engage in near shore harvesting activities and men are known to engage in fish marketing and distribution. Other ancillary activities such as net-making, boat-building, engine repair and maintenance, etc. can provide additional fishery-related employment and income opportunities in marine and inland fishing communities. Small-scale fisheries operate at widely differing organizational levels ranging from self-employed single operators through informal microenterprises to formal sector businesses. This sub-sector, therefore, is not homogenous within and across countries and regions and attention to this fact is*

warranted when formulating strategies and policies for enhancing its contribution to food security and poverty alleviation.

Most small-scale marine fishing occurs in nearshore environments such as estuaries, lagoons, bays, and reefs because their boats are small (Table 3). Fishing gear can be categorized into passive and active gear. Passive gear includes gillnets, trammel nets, hook and line, long-lining, pots, traps, and pond nets/pound nets, and it requires the fish to come voluntarily to the gear. Fish-aggregating devices are also a type of passive gear. Active gear, such as spears and harpoons, trolling, trawls (beam, bottom, mid-water), dredges (hydraulic, scallop, clam), seine nets (purse, beach, and other), rakes, hoes, and tongs pursue the fish. Fishers may flexibly modify their methods and gear depending on the availability of target species and weather conditions. Globally, the majority of fishing vessels are less than 12 meters in length (Figure 6).

Table 3. Physical and social characteristics of small-scale fisheries (Kittinger, 2013)

Physical Characteristics
• Vessel size ranging from no vessel to typically 5–15 meters • Engine size (horsepower) ranging from no engine to 10–60 horsepower • Vessel type ranging from non-motorized canoe to sail and motorized boats with inboard and outboard engines • Boat gross registered tonnage (GRT) typically < 20 GRT • Gear type includes equipment for shoreline gleaning, diving, and fishing from shore, as well as beach seines, small nets, handlines, longlines, spears, traps, and small trawlers • Distance fished is typically intertidal-to-nearshore waters up to 22 kilometers from shore
Social Characteristics
• Crew size typically from 1 to 6 fishers • Occupational mobility ranging from full-time to part-time fishers • Fishing unit ranging from individuals or family to small groups with some specialization and division of labor • Vessel and gear typically owned by operator • Disposition of catch ranges from the operator/household for consumption, to sales to local markets as well as national and international markets • Processing of catch from fresh or traditionally processed (smoked, salted) for human and nonhuman (for feed) consumption

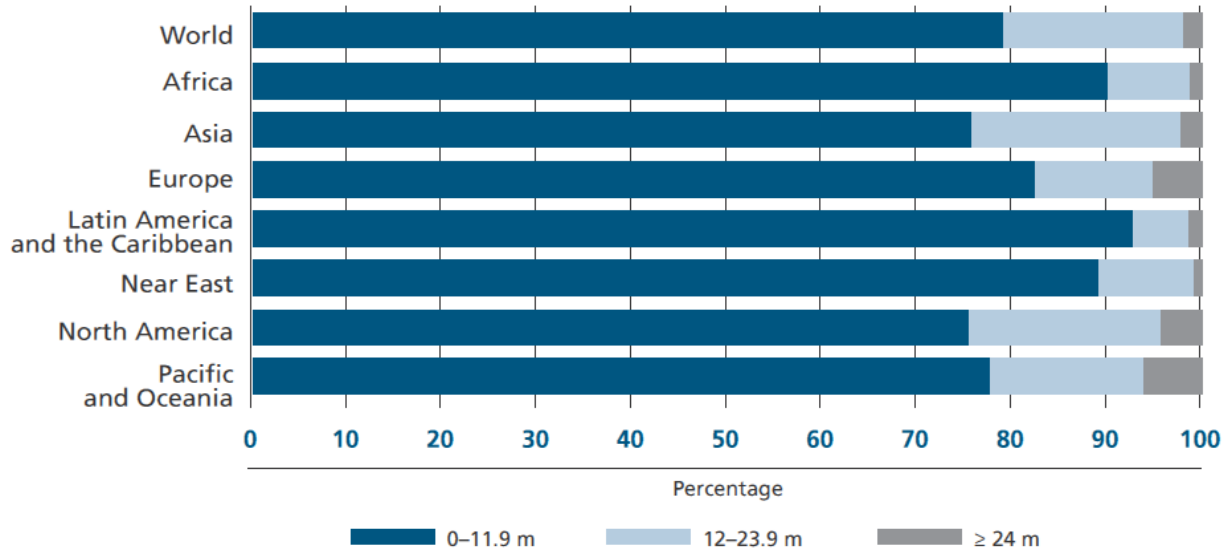


Figure 6. Size distribution of motorized vessels by region in 2012 (FAO, 2014)

Some countries have established a legal definition of small-scale fishers, based on a sole focus on subsistence fishing livelihood options. In the Philippines, small-scale fishers are defined by the 1998 Fisheries Code as operating from boats less than 3 gross tons using passive gear. In South Africa, the 1998 Marine Living Resources Act 18 classified small-scale fishers as subsistence fishers, meaning they would only be able to access marine resources for basic consumption (Isaacs, 2011). Small-scale fishers, however, challenged this categorization through a litigation process so that they could practice their livelihoods more fully. This move complemented the overall push to build a new small-scale fisheries policy in post-apartheid South Africa.

Small-scale fishers typically form the food security and economic backbone of coastal communities. Small-scale fishing is typically part of a family livelihood strategy that combines multiple livelihood activities employing different members of the household. They not only support subsistence household needs, but also engage in fish production for local and global markets. They are active all along the value chain from pre-harvest, harvest, to post-harvest with both men and women undertaking specific tasks. Since many small-scale fishers and fish workers are self-employed, often either on a full or part-time basis, they become an important part of the economy, creating multiplier effects on other sectors. They may engage in fishing half the year and in the tourism industry or agriculture the remainder of the year. Seasonal cycles of fish abundance and availability also explain the part-time fishing habits of some fishers.

The small-scale fisheries may be involved in complex ways in commercial operations working in pre-harvest, harvest, and post-harvest nodes of the value chain (Box 8). However, there is no clear understanding of the types and scale of such rapid small-scale fishery transformations given new types of integration into markets, technology transfers, and changing socioeconomic contexts, including large-scale migration (Mills et al., 2011).

Box 8. ***Types of complexity in small-scale coastal fisheries (Salas, Chuenpagdee, Charles, & Seijo, 2011)***

- Multi-species and multi-fleet operations with seasonal patterns of resource use and modes of resource harvesting
- Species availability and market demand vary, requiring flexibility and constant tailoring of fleet operations
- Spatial heterogeneity mandates spatially explicit management (for example, through seasonally closed areas or permanently closed areas), especially for sensitive areas, such as nursery grounds and critical habitats

Among small-scale fishers, there are diverse ways in which gear and vessels are owned: family lineage, cooperatives, fishing organizations, village committees, or even a single businessman or wealthy patron. Similarly, there are multiple channels of informal credit rather than formal credit sources because fishers often lack collateral or assets. Therefore, multi-functionality is an important characteristic of small-scale fisheries. They know how to diversify their targets and methods of fish production; they are able to diversify their activities along the fishery value chain; they engage in multiple livelihood activities, in which they combine fisheries with other employment opportunities, such as in tourism or restaurants; and they diversify even further outside the fisheries sector (FISHINMED, 2013). Programs that further support multi-functionality through flexibility rely on strong social institutions and networks that can help build resilience in the face of unpredictable change.

3.2 POVERTY, GENDER, AND SOCIAL MARGINALIZATION AMONG SMALL-SCALE FISHERS

While there is considerable variability among types of small-scale fishers, growing marginalization and impoverishment is a problem faced by many fishing communities. According to an estimate by the FAO and the WorldFish Center, there may be about 23 million fishery-dependent people who live on less than a US $1 a day (Jentoft & Eide, 2011). It is known that poverty found in small-scale fisheries is not simply due to low income. Poverty is multidimensional and results from structural factors, such as remoteness, lack of markets and infrastructure, lack of public services, and weak political or social rights.

Small-scale fishing, however, cannot be simply correlated with poverty (Béné, 2006). Studies of poverty and rural development have typically not attended to issues of poverty among fisher communities. Although it is a common assumption that there is considerable poverty among small-scale fisheries primarily because of their reliance on fisheries, this is likely oversimplified and needs closer examination. Poverty is expressed in multiple ways within small-scale fisheries, and there are a mosaic of vulnerabilities and coping strategies that can be found among the diverse types of small-scale fisheries (Jentoft & Eide, 2011). Although there has been a tendency to assume that poverty within small-scale fisheries relates to their livelihood as fishers, in fact, poverty is also found in fishing communities that catch substantial volumes of fish but live in areas that have poor health care facilities or little access to political decision-making institutions. Fishers are vulnerable because their ability to respond to or cope with stressors and shocks is limited: their very occupation is one of risk (of personal life and vessels); they lack clear property rights; they have access to poor public welfare services and inadequate infrastructure; and they are often challenged by distant access to markets.

It is therefore useful to assess the ability of small-scale communities to assert control over their resources and practices. There are typically four types of discrimination processes at work among small-

scale fishing communities: economic exclusion, social marginalization (including gender), class exploitation, and political disempowerment (Béné, 2003). More recently, there has been interest in understanding how these discrimination processes affect environmental degradation processes and social-ecological resilience (Jentoft & Eide, 2011; Nayak, Oliveira, & Berkes, 2014).

Another approach is to examine poverty along the "fisheries chain" (Chuenpagdee & Jentoft, 2011). Although originally developed for understanding fisheries governance, the fisheries chain can be used to understand the relationship between small-scale fishery communities and the various nodes of pre-harvest, harvest, processing, transportation, and trade of fishery products. Few studies examine how small-scale fisheries contribute to food sufficiency. In a number of countries with extensive fishing activity, such as Senegal or Cambodia, it is unclear why the problem of food insecurity remains significant, considering the abundant protein and nutrients from the fisheries (Béné, 2006; WorldFish Center, 2011).

Although there have been a number of studies on gender and fisheries over the last two decades, the lack of quantitative gender-differentiated data has been an obstacle to gender transformative change (Gopal, Ashok, & Jeyanthi, 2012; Kleiber, Harris, & Vincent, 2014a). There are clear interdependencies between men and women in small-scale fisheries that need to be made visible through gender disaggregated data collection that covers the full range of fisheries sector activities across the value chain. This could be carried out by governments through regularly conducted national census questionnaires (Harper, Zeller, Hauzer, Pauly, & Sumaila, 2013). As a result, there has been a push to develop a systematic picture of gendered dimensions of fisheries operations so that it can lead to needed reforms within a national fisheries policy agenda (E. M. Bennett, 2005; Harper et al., 2013). In addition to the need for better data, the FAO Workshop on Future Directions for Gender in Aquaculture and Fisheries Action, Research, and Development held in 2011 noted the need for research utilizing stronger, more consistent, and robust analytical frameworks (FAO, 2012a). Too often, women's reproductive rights as well as their time input in fisheries work are ignored in terms of how they impact fishing. These frameworks also need to encompass both existing and emerging issues such as climate change and disasters, together with global economic policies on trade. Women often have less access to information, and are less mobile than men, and as such, are less able to gain knowledge about likely future changes and necessary adaptive responses.

As with other natural resource sectors, women's role in the fisheries sector is significant but remains largely invisible. Women often take on multiple roles such as in India's small-scale fisheries sector (Box 9). General estimates on how many women are involved in the fisheries sector range from one-third to one-half (FAO, 2011c, 2013). Another study, carried out by the WorldFish Center in nine major fish-producing countries, estimated that women represent between 5 and 73 percent of the total capture fisheries workforce (Weeratunge, Snyder, & Sze, 2010). Men still dominate decision making on production within most fisheries management arenas, and hence traditional gender roles remain unchallenged (Fröcklin, de la Torre-Castro, Lindström, & Jiddawi, 2013). Moreover, because government engagement in the fisheries sector has primarily focused on production, fisheries catch, and the problem of overexploitation, the presumption that men's role is predominant has perpetuated the idea that women are not active members of fisheries work (E. M. Bennett, 2005; Deb, Emdad Haque, & Thompson, 2014). Yet studies show that women are active in capture (especially shoreline seafood collection), processing, and marketing sectors, as well as credit provision (Béné, 2006; Harper et al., 2013; Thorpe et al., 2014). A study among 12 communities within the central Philippines that sought to

understand women's effort in fisheries concluded that 42 percent of fishers were women, who contributed one-quarter of effort and catch mass (Kleiber, Harris, & Vincent, 2014b). Women involved in trading or fish processing, whose average incomes can frequently exceed those of the fishermen, often finance equipment and fishing operations, and they secure preferential commercial transactions with these fishers (Harper et al., 2013; Matsue, Daw, & Garrett, 2014).

Box 9. ***The multiple roles of women in small-scale fishing operations in India (Gopal et al., 2012)***

Nearly 65 percent of the fish marketed in India is fresh, with women dominating the retail fresh fish trade in all maritime states. Nearly 20 percent of the catch is processed using traditional methods like salting and drying, which is the main livelihood activity for a significant number of women in coastal areas. Indian seafood export utilizes six percent of catch, and the organized seafood-processing sector in the country employs almost 40,000 women. Women's involvement in fisheries includes nearshore fish-harvesting activities like collection of clams, mussels, and bivalves, as well as harvesting of seaweed. Other than these, some region-specific activities like involvement in aquaculture activities, prawn seed collection, fish and shrimp farms and hatcheries work, and salt loading have also been observed. Women's participation is also reported in gear making and mending.

There are many examples of fisheries or marine conservation governance arrangements working toward gender equity. Though some co-management bodies have stipulated gender equity in decision making, it may be difficult to increase women's participation in meetings. For example, in the Marine Extractive Reserve in Corumbau in Brazil, women were primarily concerned about family welfare, especially assistance with health and education. They experienced various types of vulnerability from violence; they lacked daycare centers for small children; they had few job opportunities; and they faced obstacles to owning boats (Di Ciommo & Schiavetti, 2012). At the same time, there are examples of successful women's cooperatives developed in association with marine protected areas in Mexico (Peterson, 2014).

In Senegal, the USAID Collaborative Management for a Sustainable Fisheries Future (COMFISH) project has helped women pioneer ecofriendly fish-processing methods. The women developed a code of conduct to govern their trade, the first of its kind in the women's processing sector. Development of communication approaches received special attention, such as song and dance, given the high level of illiteracy among participants. The USAID Coral Triangle Initiative on Coral Reef, Fisheries, and Food Security developed a "Women Leaders Forum," a peer-learning network for women leading projects and programs in fisheries. The forum honored six women leaders during its inception, recognizing their contribution to building sustainable fisheries.

The SSF Guidelines (FAO, 2015) will bring a much-needed focus on issues of poverty, social inclusion, and gender equality among small-scale fisheries. This area is in its early stages in terms of understanding the major types of discrimination processes at work among fishing communities. Attending to gender equality and equity, in particular, calls for the building of gender-disaggregated data so that a more nuanced understanding of the dynamics at play can be built up. This, in turn, can support empirically grounded policymaking and laws that bring fresh energy to issues of equity among small-scale fishers and fish workers.

3.3 CONTRIBUTION, INVISIBILITY, AND CONFLICT OF SMALL-SCALE FISHERIES WITHIN THE GLOBAL FISHERIES SECTOR

The contribution of small-scale fisheries to catches, employment, governance, livelihood, and food security, as well as conservation is being reevaluated globally (Chuenpagdee, 2011a). While small-scale fisheries are crucial for meeting household food and nutritional needs (Hall, Hilborn, Andrew, & Allison, 2013), there is a need to scrutinize the prevailing assumption that small-scale fisheries do not often make a significant contribution to macroeconomic indicators, but rather are simply a social welfare net that supports basic livelihoods of large swaths of the rural poor. In countries such as Sri Lanka, the small-scale fisheries sector has been identified in the post-war period as important for reviving income-generation opportunities for rural populations (Lokuge & Munas, 2011). At the 2010 World Small-scale Fisheries Congress, the Global Partnership for Small-scale Fisheries Research ("Too Big to Ignore") was launched, aiming to build a more comprehensive picture of small-scale fisheries around the world (Chuenpagdee, 2011b). Contrary to the prevailing impression that small-scale fisheries are an occupation of last resort, it is a lifestyle that holds much appeal and therefore has endured (Onyango, 2011). In light of this, it is crucial to understand the specific needs of small-scale fisheries and to develop policies and programs that enable them to build resilience in the face of dual challenges from globalization and climate change.

Béné (2006) identified seven components as possible "entry points" for examining the contribution and importance of small-scale fisheries:

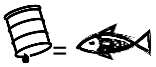
- Economic roles of small-scale fisheries,
- Social roles of small-scale fisheries,
- Environmental roles of small-scale fisheries,
- Cultural roles of small-scale fisheries,
- Food security roles of small-scale fisheries,
- Poverty alleviation roles of small-scale fisheries, and
- Interactions between small-scale fisheries and other rural activities.

These components define the range of domains where small-scale fisheries are expected to play important roles at local, national, and global levels, and their synergies are quite significant. At micro- or meso-economic levels, a small-scale fisheries sector can provide a significant contribution in household and local (community) economies and provincial economies in geographic areas (coastal, river, lakes, floodplain) where fishing is important (Béné, 2006). Through direct and indirect food security mechanisms, income and employer multipliers effect, fisheries and related activities (processing and trade) can play a significant and crucial role, especially for the poorest households who depend more heavily on these activities for their livelihoods.

Originally published in 1980, Thomson's table "the world's two marine fishing industries" (Thomson, 1980) and later updated by Jacquet and Pauly (2008), highlights the potential development contributions from small-scale fisheries (Table 4). Small- and large-scale fisheries catch about the same amount of fish for human consumption (30 million tons), yet small-scale fisheries employ 25 times the number of fishers (more than 12 million people) and use an eighth of the amount of fuel consumed by industrial fisheries annually. Fishing households typically use moderately small amounts of capital and energy, have relatively

small fishing vessels (if any), make short fishing trips (usually close to shore), and combine both subsistence and commercial operations (Garcia, 2009; Kittinger et al., 2013). They provide fish for local consumption as well as sales in markets, whether local or distant (Berkes, Mahon, McConney, Pollnac, & Pomeroy, 2001). Depending on the gear used, small-scale fisheries generally have less by-catch, resulting in less waste and greater conservation of biodiversity. More studies are needed, however, to develop a stronger understanding of by-catch by gear in small-scale fisheries (Shester & Micheli, 2011). In contrast, large-scale commercial or industrial fisheries use relatively capital-intensive fishing technologies with harvesting and processing equipment owned by commercial entrepreneurs and operated by salaried crews (USAID, 2013). In large-scale fisheries, discard rates vary depending on gear type (Shester & Micheli, 2011).

Table 4. Comparison of attributes of large- and small-scale fisheries globally (Jacquet & Pauly, 2008)

Benefits	Large-Scale Fisheries	Small-Scale Fisheries
Subsidies	$$$$$ 25–27 billion	$ 5–7 billion
Number of fishers employed	 about ½ million	 over 12 million
Annual catch for human consumption	 about 30 million tons	 same: about 30 million tons
Annual catch reduced to fishmeal and oils	  35 million tons	 Almost none
Annual fuel oil consumption	 about 37 million tons	 About 5 million tons
Catch per ton of fuel consumed	 1–2 tons	 4–8 tons
Fish and other marine life discarded at sea	 8–20 million tons	 Very little

There is still a lack of necessary information to understand the full scope of its contribution to the fisheries sector (Chuenpagdee & Pauly, 2006; Mills et al., 2011). Relatively robust fisheries information and data are available from the commercial fisheries sector because large vessels land their fish in large ports and harbors where data collection efforts can be concentrated. Landing sites for small-scale fishers

are typically dispersed across the coastal landscape. Further, small-scale fisheries production has multiple supply chains from home consumption to commercial sale of fresh, dried, or otherwise processed fish products. As a result, FAO in its *Annual State of World's Fisheries and Aquaculture* report is unable to disaggregate small-scale fisheries in the context of its contribution to the global fisheries sector. Over time, this lack of information and data has rendered small-scale fisheries an invisible and unrecognized dimension of coastal rural development.

Because marine and coastal ecosystems provide food and support livelihoods for both coastal communities and the global community at large, there has been growing conflict between small-scale and large-scale fisheries (Chuenpagdee, 2011a). Fishery products are the world's most widely traded food, with commerce dominated by developing countries (USAID, 2013). Eighteen countries (11 in Asia) catch about one million tons per year, accounting for more than 76 percent of global fish catch (FAO, 2014). Countries in Asia are among the leading players, including China, Indonesia, Japan, India, Vietnam, Burma (Myanmar), and the Philippines. In India, the fisheries sector is considered a sunrise sector because it has experienced considerable growth (Gopal et al., 2012). The total value of world capture fisheries production in 2009 was US $93.9 billion, a value greater than the global combined net exports of rice, coffee, sugar, and tea (USAID, 2013).

As such, the world's marine capture fisheries production peaked in the 1990s (FAO, 2014) (Figure 7) and has been declining with increased global demand for wild marine fish and failure in governance. About 61 percent of global marine fish stocks are either fully fished or overfished (FAO, 2014) (Figure 8). These trends have critical implications for the viability of small-scale fisheries that must compete with large-scale commercial fisheries.

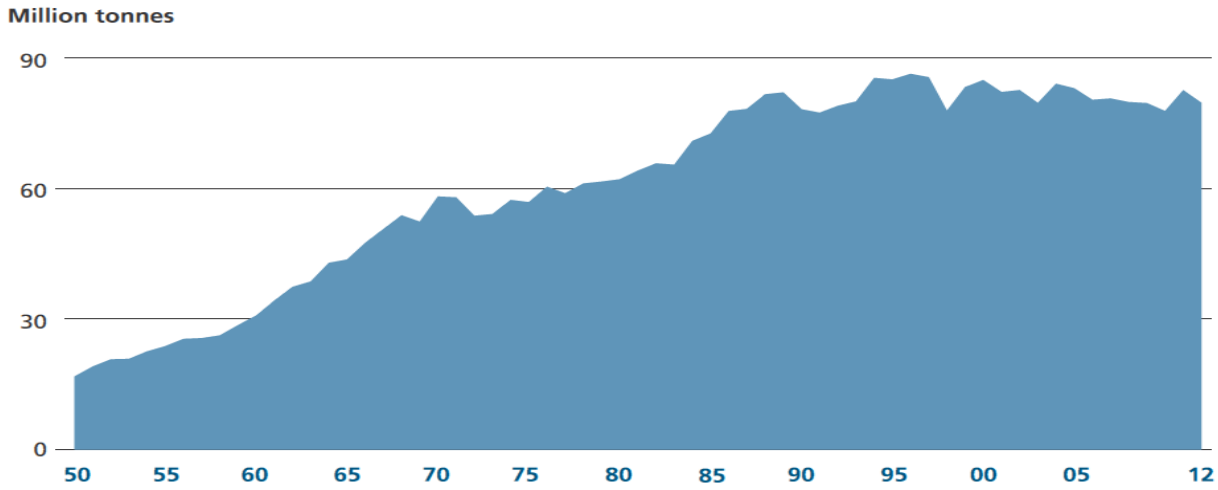


Figure 7. World marine capture fisheries production from 1950 to 2012 (FAO, 2014)

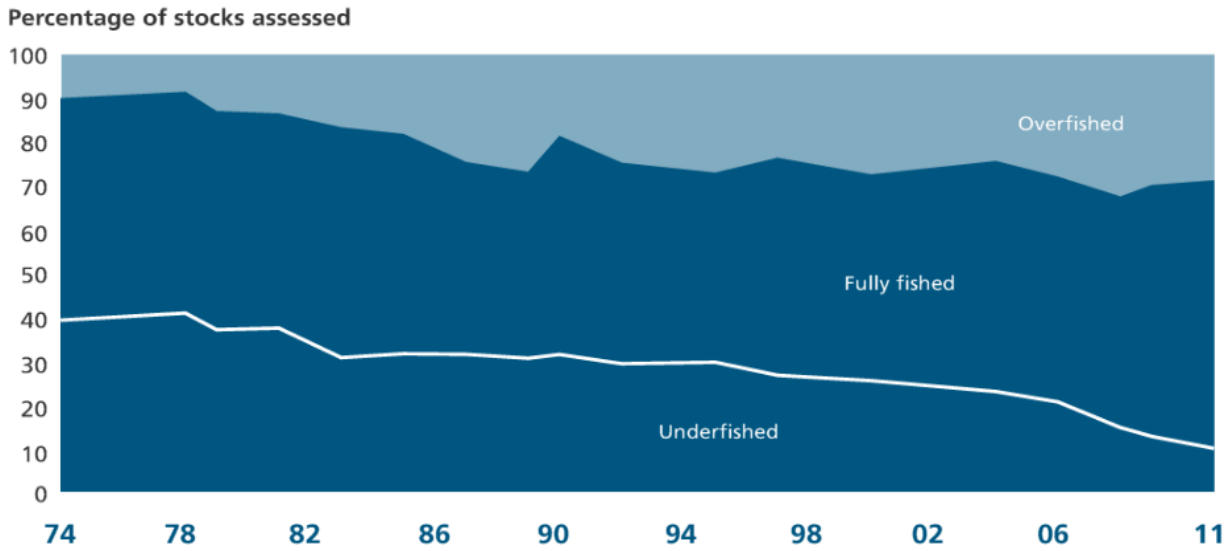


Figure 8. Global trends in the state of world marine fish stocks from 1974 to 2011 based on percentage of stocks assessed (FAO, 2014)

Large-scale fisheries have been supported by policies that include subsidies, which can lead to negative environmental effects as well as trade distortions that marginalize small-scale fisheries (A.T. Charles, 2011). Large investments made to support large-scale fisheries in shipbuilding, processing, and other post-harvest industries contribute to overfishing and competition for limited and dwindling resources (Chuenpagdee, 2011a, 2011b). The growth of large-scale, industrialized fisheries has fundamentally changed the landscape of global fisheries. As a result, large-scale fishers are competing with small-scale fishers in many parts of the world.

In their own ways, small- and large-scale fisheries contribute to overfishing problems and require mechanisms to avoid competition for limited resources. Both small-scale and large-scale fisheries can overlap in the species targeted and areas fished, so use conflicts have become ever more common. Therefore, both small- and large-scale operations have to contend with stock collapses, even as they are empowered by improved technologies and logistical capacity support (Watson & Pauly, 2013). For small-scale fisheries, weak governance, rapidly changing socioeconomic conditions, and ecosystem transformations are major challenges (Coastal Resources Center, 2006). The massive expansion of artisanal fisheries in Senegal highlights the need for regulatory transformations to support sustainable commercial small-scale fisheries through robust tenure institutions (Box 10). Communities are undergoing a "double exposure" to both climate change variability and greater interaction with a globalizing economy (O'Brien & Leichenko, 2000).

Large-scale, industrial fisheries and small-scale fisheries can compete for the same resources even if they do not fish in the same waters. Maintaining healthy marine ecosystems and sustainable ecosystem services requires a holistic understanding of the relative roles and impacts of industrial and small-scale fisheries to promote sustainable fishing practices.

Box 10. Expanding artisanal fisheries in Senegal in a poor regulatory environment (World Wildlife Fund, 2015)

The last three decades have seen a massive expansion in landings by artisanal fisheries in Senegal. Some 80 percent of Senegal's fish harvest (about 400,000 tons per year) originates from artisanal fisheries. Many factors explain this transformation: state subsidies, priority access to most coastal fishing areas, technological improvement such as motorization of wooden fishing boats, and growing access to the profitable European and American markets. Given the breakdown of traditional methods of local fish management and the limited capabilities of current management systems, there is a regulatory vacuum. There is practically no regulation of level of effort in terms of number of boats, fishing seasons, and gear. This demands an approach that brings vitality back to community-based tenure systems so that an effective governance and regulatory structure can be set into motion.

3.4 "RIGHTS-BASED" FISHERIES MANAGEMENT

The use of the term "rights-based" in the context of fisheries has multiple meanings. As described earlier, tenure over natural resources refers to the social relations, institutions, and rules that govern people's access to and use of land, water, and natural resources. Rights-based fisheries management has typically referred to a management approach wherein property rights over a portion of the fish stock are allocated to fishers. In such an approach, a quota or "catch shares" are established for specific species or other limitations, such as the number of fishing licenses issued or area restrictions. This type of rights-based management is typically a top-down management approach used extensively for larger-scale fishing fleets in developed countries such as the United States (McIlwain & Hill, 2013a, 2013b; Poon, 2013) and European nations in which a single species is being fished and where national governments are capable of establishing and monitoring sustainable catch limits and conducting effective monitoring, control, and surveillance.

A catch share program allocates a secure privilege to harvest a specified amount of a fishery's total catch to an individual or group (groups can be community-based) (Box 11) (Bonzon, McIlwain, Strauss, & Van Leuvan, 2013). Under a catch share program, fishery managers establish a fishery-wide catch limit and then assign portions of the catch or shares to participants who are held directly accountable to stay within the catch limit. Catch shares may be allocated to individuals, vessels, groups, communities, or a combination of these stakeholders (Jardine & Sanchirico, 2012). When a catch quota or effort quota is reached, fishing must stop. Typically, governments must invest in significant monitoring, control, and surveillance programs to enforce quotas and minimize bad practices such as "high grading," in which fishers discard a portion of the fish catch at sea to keep higher-quality fish. Given that the terminology of rights-based fisheries does not explicitly address the human rights and equity dimensions of fisheries management and that it emerged from large-scale fisheries in developed countries, there has been growing concern among those advocating for small-scale fisheries that human rights must be a key guiding principle in the development of marine tenure rights (Allison et al., 2012; Ratner, Åsgård, & Allison, 2014).

Box 11. Types of catch share programs (Jardine & Sanchirico, 2012)

- **Individual Quotas:** Programs that allocate the right to harvest a portion of a fishery's total allowable catch (TAC) to an individual
- **Individual Transferable Quotas**: Individual quotas that can be bought, sold, or transferred to other individuals
- **Community Quotas:** Programs that allocate to a community the right to harvest a portion of the fishery's TAC
- **Territorial Use Rights for Fisheries (TURFs):** Programs that allocate the right to harvest a secure area for an individual, group, or community

Catch shares can incentivize good resource stewardship by allocating rights to a fisher or fishing entity to provide a secure benefit stream; however, the privatization of fishery resources through individualized quota systems has stirred considerable controversy, especially in developing countries. Catch shares are typically focused on single species (fish or invertebrate) such as abalone, scallops, sardines, and hake (Environmental Defense Fund, 2013). Catch shares focused solely on single species management has raised concerns in light of the growing emphasis on ecosystem-based management (Marine Ecosystems and Management, 2014) because the incentives apply to stewardship of the targeted stock and not necessarily the greater ecosystem. Fishers and catch share owners often see an incentive to degrade the greater environment to maximize catches and hence maximize value of the catch right.

An ill-designed, poorly implemented system may be an obstacle to achieving ecosystem-based management goals. Quota-based programs do not necessarily evolve from bottom-up processes, but are typically implemented by national or regional governing bodies (Jardine & Sanchirico, 2012) that conduct stock assessments, monitor fish catch, and establish quotas. While studies of the impacts of catch shares in developed countries indicate economic waste has been reversed, questions remain about the degree to which ecological conditions have improved. Overall, countries with catch shares have higher governance rankings, stronger economies, more valuable fishery export industries, and fewer people employed in fisheries (Jardine & Sanchirico, 2012). Within the developing world, lower-income countries are not considered to have sufficient legal, fiscal, and management frameworks needed for catch shares implementation (Leal, 2010).

That said, a well-designed and well-implemented catch share system may be able to play an important role in fisheries management in an ecosystem-based management system. In Chile, for example, a Territorial Use Rights in Fisheries (TURF) system utilizes a catch shares or quotas approach as one of many tools to regulate fishing intensity (Box 12). TURFs have existed for centuries, emerging under certain conditions that permit relatively easy acquisition and defense of exclusive rights (Christy, 1982). Sedentary resources such as oysters, mussels, and seaweeds have long been subject to territorial use rights. TURFs created anew are characterized as a co-management approach to address the open access issue in fisheries, by apportioning use rights or catch shares to individuals, communities, or corporations (Doerr et al., 2013). TURFs imply the right to limit or control access to the fishery resources within a limited sea territory, determine the amount and kind of resource use, extract benefits from the use of the resources, and benefit from future returns. TURFs are used to increase economic efficiency and equitable distribution of proceeds from co-managed fisheries (Gallardo Fernandez, Stotz, Aburto, Mondaca, & Vera, 2011).

Box 12. Territorial use rights in fisheries (TURF): a form of catch shares in Chile

In Chile, TURFs exist as part of a fisheries management system rather than a standalone management tool. They can be effective when properly planned and governed. Artisanal fisheries are a significant source of employment for coastal communities in Chile, and their harvests represent a key source of nutritional food for many rural communities. In 2012, there were 86,132 artisanal fishers in Chile. Shellfish, in particular, are a very important harvested product, largely due to the remarkably high unit value of some products in the international market (e.g., Chilean abalone or loco). Even though artisanal fishers in Chile do not tend to be subsistence fishers (i.e., they sell most or all of their catch), most depend highly on the harvest and sale of these products as a source of income. After an overfishing crisis led to critical closures of the Chilean abalone fishery in the late 1980s, Chile enacted the Fisheries and Aquaculture Law in 1991 to reduce conflict between artisanal and industrial fleets by introducing the concept of regulated access to benthic and pelagic resources. Key regulatory tools included:

- **Regulation of mobility by zoning:** Exclusive fishing access rights are allocated to artisanal fisheries within a zone that extends five nautical miles from the low tide.
- **Regionalization and registration:** Artisanal fishers are restricted to the coastal region adjacent to their area of residence and cannot register to fish in another region. Once a resource reaches the category of "full exploitation," registrations for that target species are suspended.
- **Establishment of benthic exploitation regime for fully exploited species**: A TAC is established for fully exploited target species in a particular region, and split into individual quotas among registered fishers. These quotas are non-transferable.
- **Creation of an artisanal exploitation regime for fully exploited species:** A fraction of the TAC is allocated for artisanal fishers based on registration, landing history, and other criteria.
- **Allocation of territorial exclusive harvesting rights for benthic resources:** Harvest allocations for benthic resources (seaweed and invertebrates) are granted to legally registered artisanal small-scale fishing associations under TURFs.

Local fishing associations through community-based catch-share agreements manage more than 700 separate TURFs. The TURFs in Chile, officially named *Áreas de Manejo y Explotación de Recursos Bentónicos* (Management and Exploitation Areas for Benthic Resources), are not based on any former tradition, but were implemented *de novo* (Moreno & Revenga, 2014). Critical elements that prepared the way for the transformation of fisheries governance in Chile were (1) recognition of the depletion of resource stocks; (2) new scientific knowledge on the ecology and resilience of targeted stocks and their role in ecosystem dynamics; and (3) demonstration-scale experimental trials, building on smaller-scale scientific experiments (Gelcich et al., 2010).

3.5 CATCH DOCUMENTATION AND TRACEABILITY

Illegal, unreported, and unregulated (IUU) fishing is a global problem that threatens ocean ecosystems and sustainable fisheries (National Marine Fisheries Service, n.d.). Increasing international demand for fish has resulted in an overcapacity of both large- and small-scale fisheries. Competition for fish in the absence of appropriate management practices continues to increase and intensify, resulting in the rapid depletion of resources, destruction of ecosystems and fish habitats, and diminishing economic returns. Increased entry and competition, ignorance or disregard of existing regulations, and control mechanisms are all resulting in IUU fishing practices. Small-scale fisheries both contribute to and are impacted by IUU fishing and IUU products often come from fisheries with weak marine tenure institutions.

IUU fishing in small-scale marine fisheries has serious negative biological, economic, and environmental implications for the continued availability of fish to support the communities and populations that are critically dependent on fishing and related activities. The open access nature of small-scale fisheries and

the widely scattered nature of fishing communities and fish landing sites make it difficult to regulate and report on fishing activities. Failure of national governments to manage large-scale industrial fisheries effectively results in encroachment into fishing grounds used by small-scale fishers. Large-scale fisheries deplete fishery resources in nearshore waters using highly efficient gear, which promotes illegal fishing among small-scale fishers, such as the use of explosives and poisons due to competition with large-scale fisheries. As such, addressing IUU fishing requires effective governance of both large- and small-scale fisheries.

Senegalese fisheries' resources are exploited by a number of foreign industrial fleets, both legal and illegal (Belhabib et al., 2014). About 60 percent of the catch taken from Senegal waters is taken illegally or is unreported, and of the legal catch, only about 30 percent is reported to the national government. This endangers not only the already overexploited fish stocks of Senegal, but also an entire fisheries-based sector of the economy, in particular, the artisanal fisheries whose fishing grounds overlap the areas frequented by illegal industrial fishing vessels.

Efforts to combat IUU fishing are increasing around the world with special attention to developing countries. As with wildlife tracking, efforts must address fisheries laws, practices, and enforcement, but also support the creation of demand for sustainable seafood. The U.S. recently released an action plan to combat IUU and seafood fraud (Box 13).

Box 13. US policy efforts to combat illegal, unreported, and unregulated fishing and seafood fraud

On June 17, 2014, the White House released a presidential memorandum entitled "Establishing a Comprehensive Framework to Combat Illegal, Unreported and Unregulated Fishing and Seafood Fraud." Among other actions the memorandum established a Presidential Task Force, co-chaired by the Departments of State and Commerce and made up of a broad range of other federal agencies (The White House, 2014). The Task Force was directed to report to the president within six months with "recommendations for the implementation of a comprehensive framework of integrated programs to combat IUU fishing and seafood fraud that emphasizes areas of greatest need." The Task Force released its action plan in 2015 articulating the aggressive steps that federal agencies will take both domestically and internationally. In particular, all executive departments and agencies (agencies) are directed to combat IUU fishing and seafood fraud by strengthening coordination and implementation of relevant existing authorities and, where appropriate, by improving the transparency and traceability of the seafood supply chain. All agencies and offices charged with overseeing the seafood supply chain and verifying the authenticity of its products shall implement and enforce relevant policies, regulations, and laws to ensure that seafood sold in the United States is legally caught and accurately labeled.

Catch documentation and traceability is a market-driven approach to addressing IUU fishing. Catch documentation and traceability is defined as recording and sharing verifiable information relating to a specific seafood product throughout the product's movement within the full seafood supply chain; i.e., information captured from the point-of-harvest, throughout the various buyers, processors, shippers, importers, distributers, and retailers that handle the product, all the way to the end consumer (Figure 9) (USAID, 2016, 2017). The establishment of catch documentation and traceability systems can serve as a platform for the collection, analysis, and communication of the environmental, economic, and governance data necessary for sustainable management of a fishery. When combined with strong port-state control measures to prevent the importation and sale of undocumented fish, catch documentation and traceability systems can significantly limit the market for illegal fish and reduce revenues to illegal operators, while strengthening market access for harvesters who are operating legally.

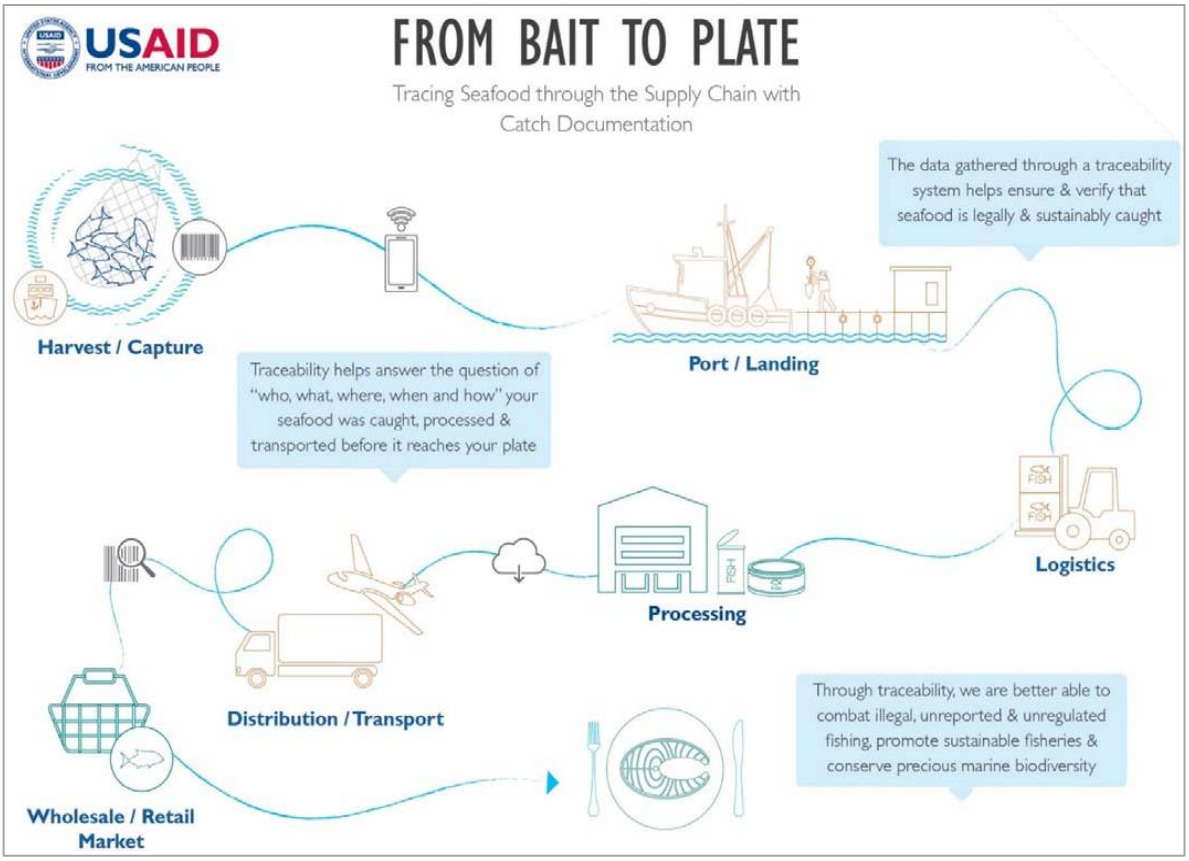


Figure 9. Catch documentation and traceability through the seafood supply chain (USAID, 2017)

There are efforts to apply catch documentation and traceability to improve the value chain in small-scale fisheries. The call for seafood traceability has grown more urgent amid rising concerns about mislabeling, illegal fishing, and diminishing stocks as well as the entrance of human trafficking and modern-day slavery into the supply chain of some of the world's most commercially important fisheries. While there are growing market incentives to support traceability, there are significant human and technological barriers that hamper broader adoption, especially in small-scale fisheries. To the extent that new standards are being set by regulators to require catch data collection for traceability, improved crew welfare and communications may also benefit.

Box 14. Small-scale fisheries: key take-aways for programming and project design

- Small-scale fisheries is shorthand for a complex and significant economic sector that includes both subsistence, artisanal, and commercially successful fisheries operated by men and women fishers in intertidal zones or from relatively small boats nearshore.
- The contribution of small-scale fisheries (e.g., to economic, social, environmental, cultural, food security, poverty alleviation, and coastal rural development) is significant and often interconnected.
- Multi-functionality, in terms of fishery value chain, multiple livelihoods, and employment in tourism and other industries, is an important characteristic of small-scale fishers and fishing communities that must be factored into project design.
- Poverty among small-scale fishing communities is multidimensional and results from structural factors such as remoteness, lack of markets and infrastructure, lack of public services, weak political or social rights, and other factors.
- Information and data on the role of women, who often play multiple and significant roles in the small-scale fisheries sector, is needed to transform their significant, yet largely invisible, contributions.
- With declining global fish stocks, small-scale and large-scale fishers compete for limited resources.
- Lessons can be drawn from managing large-scale fisheries.
- "Rights-based" fisheries management, a top-down management approach used extensively for larger-scale fishing fleets in developed countries, contrasts with a "human rights-based" approach found in efforts to strengthen community-based marine tenure institutions.
- Catch documentation and traceability systems, a market-based approach to addressing illegal, unreported, and unregulated fishing in large-scale commercial fisheries, may have application to improving small-scale fisheries supply chain.

Liberia Fanti boat landing (credit: John Parks)

4.0 A GLOBAL AGENDA ON TENURE AND SMALL-SCALE FISHERIES

Fishing drying in a Burmese village (credit: Matt Sommerville)

With the growing recognition of the significance of small-scale fisheries to food security, local and global economic growth, biodiversity conservation, and other development objectives around the world, the FAO working member states developed the *Voluntary Guidelines on Securing Sustainable Small-scale Fisheries in the Context of Food Security and Poverty Alleviation* (SSF Guidelines) (FAO, 2015). The SSF Guidelines are the first dedicated international instrument to directly address small-scale fishers, fish workers, and their families.

This chapter provides an overview of this global agenda intended to support the visibility, recognition and enhancement of the already important role of small-scale fisheries and to contribute to global and national efforts toward the eradication of hunger and poverty highlighting the SSF Guidelines, which serve as the central foundation for this agenda. This Sourcebook categorizes the SSF Guidelines into eight interconnected dimensions of securing sustainable small-scale fisheries. For each dimension, strategies and good practices were developed based on the SSF Guidelines (Figure 10).

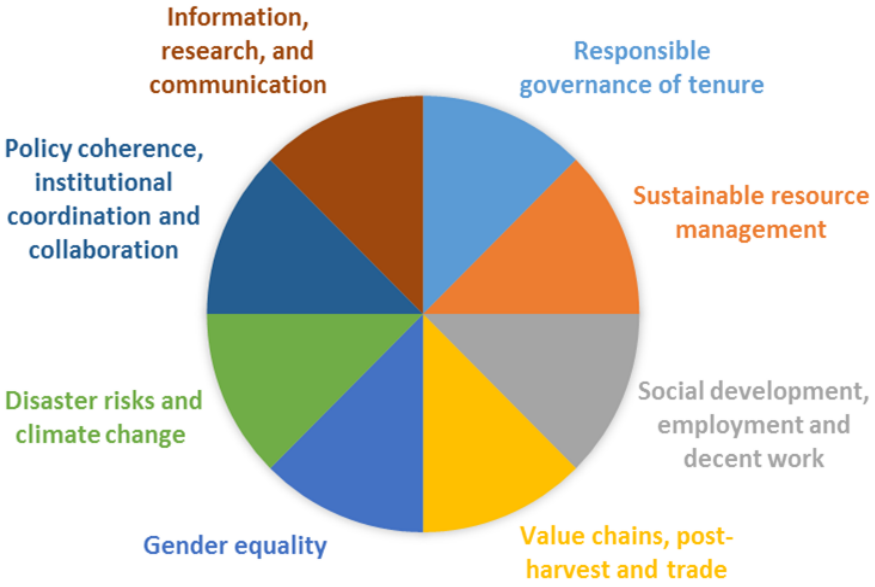


Figure 10. Eight interconnected dimensions of securing sustainable small-scale fisheries (FAO, 2015)

Two crosscutting themes in the SSF Guidelines, capacity development and implementation support and monitoring, were incorporated into the eight dimensions. Based on these eight dimensions, a tool was developed to support a country-level assessment of the status of SSF Guidelines implementation. This tool was tested in the Philippines and Indonesia and is incorporated in the Primer (Courtney & Jhaveri, 2017), a companion document to the Sourcebook.

4.1 AN AGENDA BASED ON INTERNATIONAL STANDARDS OF HUMAN RIGHTS AND RESPONSIBLE FISHERIES

The establishment of the SSF Guidelines is a landmark development that establishes the groundwork for new initiatives to promote the responsible governance of marine tenure. Because the guidelines are voluntary, the power of their impact hinges on active uptake and dedicated implementation by governments, communities, and a range of other national and regional organizations. The SSF Guidelines

open the door to tackling difficult issues including developing clear definitions of small-scale fisheries, supporting a human rights-based approach, and providing preferential access to small-scale fishers (Jentoft, 2014).

The SSF Guidelines are based on international human rights standards, responsible fisheries standards and practices, and sustainable development. A number of documents set the framework for the SSF Guidelines including: the final document of the Rio+20 Conference, 'The future we want;' the 1995 Code of Conduct for Responsible Fisheries (FAO, 2011a); and other instruments that pay particular attention to vulnerable and marginalized groups and the need to support the progressive realization of the right to adequate food. The SSF Guidelines (FAO, 2015) detail a rich, multi-sectoral compilation of good practices and needs for stakeholders to be aware of and to use to guide activities that includes strengthening marine tenure for securing sustainable small-scale fisheries.

The guiding principles of the SSF Guidelines (Box 15) provide the overarching context for rights-based fisheries that highlight human rights, respect for cultures, equity, and participation in governance. In the case of small-scale fisheries characterized by complex social-ecological dimensions, the devolution of rights and responsibilities to community-scale tenure institutions, together with capable co-management partners, can provide the enabling conditions for securing sustainable small-scale fisheries.

Box 15. Guiding principles of the SSF Guidelines (FAO, 2015)

- **Human rights and dignity:** recognizing the inherent dignity and the equal and inalienable human rights of all individuals, all parties should recognize, respect, promote, and protect the human rights principles and their applicability to communities dependent on small-scale fisheries, as stipulated by international human rights standards: universality and inalienability; indivisibility; interdependence and interrelatedness; non-discrimination and equality; participation and inclusion; accountability; and the rule of law. States should respect and protect the rights of defenders of human rights in their work on small-scale fisheries. All non-state actors including business enterprises related to or affecting small-scale fisheries have a responsibility to respect human rights. States should regulate the scope of activities in relation to small-scale fisheries of non-state actors to ensure their compliance with international human rights standards.
- **Respect of cultures:** recognizing and respecting existing forms of organization, traditional and local knowledge, and practices of small-scale fishing communities, including indigenous peoples and ethnic minorities in a way that encourages women leadership and taking into account Art. 5 of the Convention on the Elimination of All Forms of Discrimination against Women.
- **Non-discrimination:** promoting in small-scale fisheries the elimination of all kinds of discrimination in policies and in practice.
- **Gender equality and equity:** recognizing the vital role of women in small-scale fisheries, equal rights and opportunities should be promoted.
- **Equity and equality:** promoting justice and fair treatment—both legally and in practice—of all people. At the same time, differences between women and men should be acknowledged and specific measures taken to accelerate de facto equality, (i.e., using preferential treatment where required to achieve equitable outcomes, particularly for vulnerable and marginalized groups).
- **Consultation and participation:** ensuring active, free, effective, meaningful, and informed participation of small-scale fishing communities, including indigenous peoples, taking into account the UN Declaration on the Rights of Indigenous Peoples in the whole decision-making process related to fishery resources and areas where small-scale fisheries operate as well as adjacent land areas, and taking into account the existing power imbalances among different parties. This should include feedback and support from those who could be affected by decisions prior to these being taken, and responding to their contributions.

Box 15. Guiding principles of the SSF Guidelines (FAO, 2015)

- **Rule of law:** adopting a rules-based approach for small-scale fisheries through laws that are widely publicized in applicable languages, applicable to all, equally enforced and independently adjudicated, and that are consistent with existing obligations under national and international law, with due regard to voluntary commitments under applicable regional and international instruments.
- **Transparency:** defining and widely publicizing policies, laws, and procedures in applicable languages, and widely publicizing decisions in applicable languages and in formats accessible to all.
- **Accountability:** holding individuals, public agencies, and non-state actors responsible for their actions and decisions according to the principles of the rule of law.
- **Economic, social and environmental sustainability:** applying the precautionary approach and risk management to guard against undesirable outcomes, including overexploitation of fishery resources and negative environmental, social, and economic impacts.
- **Holistic and integrated approaches:** recognizing the ecosystem approach to fisheries management (EAFM) as an important guiding principle, embracing the notions of comprehensiveness and sustainability of all parts of ecosystems as well as the livelihoods of small-scale fishing communities, and ensuring cross-sectoral coordination as small-scale fisheries are closely linked to and dependent on many other sectors.
- **Social responsibility:** promoting community solidarity and collective and corporate responsibility. The fostering of an environment that promotes collaboration among stakeholders should be encouraged.
- **Feasibility and social and economic viability:** ensuring that policies, strategies, plans and actions for improving small-scale fisheries' governance and development are socially and economically sound and rational. They should be informed by existing conditions; implementable and adaptable to changing circumstances; and should support community resilience.

They provide guidance on how "to support the visibility, recognition, and enhancement" of this globally important small-scale fisheries sector and promote socially inclusive small-scale fisheries by calling for an equitable distribution of fishing rights and raise the importance of protecting all forms of legitimate marine tenure rights, from formal to informal, particularly for women (A.T. Charles, 2011; Charles, 2013; FAO, 2015; Ratner et al., 2014). Besides advocating for the development of legislation to protect diverse forms of legitimate rights (at least to prevent eviction), the guidance also calls for governments to grant preferential access to small-scale fishers for waters under national jurisdiction to achieve equitable outcomes (through spatial zoning and other approaches) as well as to engage in redistributive reform. Lastly, states should help to restore access to fishing areas after major upheavals such as natural disasters or armed conflict.

Responsible governance of tenure is a key component of the SSF Guidelines and supported by other platforms including the *1995 Code of Conduct for Responsible Fisheries*, which called for states to protect the rights of fishers and fish workers who contribute to subsistence, artisanal, or small-scale fisheries (FAO, 2011a); the *Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security* (VGGT) (FAO, 2012b); the recommendations of the *Voluntary Guidelines on the Progressive Realization of the Right to Adequate Food in the Context of National Food Security* (FAO, 2005), and the *Principles for Responsible Investment in Agriculture and Food Systems* (CFS, 2014) (Figure 11). The global momentum for supporting small-scale fisheries was expressed at the 2008 Global Conference on Small-Scale Fisheries held in Thailand. There, the agenda was framed in terms of three priority issues: securing sustainable resource use and access rights; securing post-harvest benefits; and securing social, economic, and human rights. This jumpstarted the process through which the SSF Guidelines were created and endorsed.

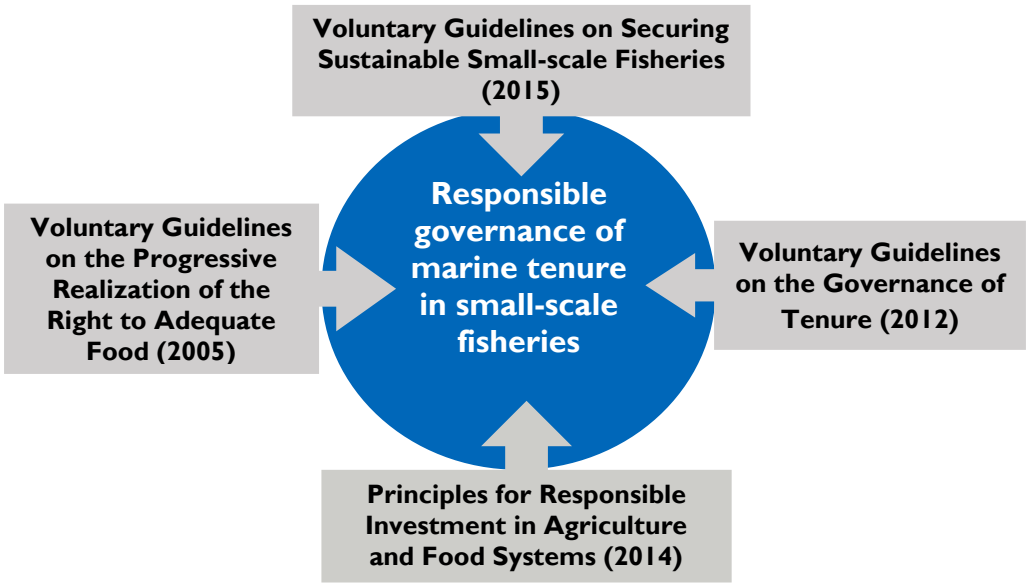


Figure 11. Multiple platforms that inform the agenda on responsible governance of marine tenure

4.2 RESPONSIBLE GOVERNANCE OF TENURE

Responsible governance of tenure forms a core theme in the SSF Guidelines and provides a springboard for strengthening national fisheries laws and policies and for recognizing and securing local community-based institutional platforms to manage coastal fisheries through an ecosystem-based management approach. This provides an opportunity for responsible governance of tenure to be aligned closely with human rights, especially in small-scale fisheries (Charles, 2013). In particular, the formal recognition of marine tenure may provide communities with the security that they can invest in and manage their fishery resources for long-term sustainability.

National legal and policy frameworks, administrative and judicial systems, effective co-management arrangements, dispute resolution mechanisms, local participation and empowerment, and strengthened institutional capacity are all key ingredients of responsible governance of marine tenure. The SSF Guidelines urge states to adopt national legislation to strengthen responsible governance of tenure of land, fisheries and forests applicable in small-scale fisheries that ensures small-scale fishers, fish workers, and their communities have secure, equitable, and socially and culturally appropriate tenure rights to fishery resources, fishing areas, and adjacent land (Table 5). Granting preferential access to fish and water through the creation and enforcement of exclusive use zones and effective and transparent mechanisms and addressing resource use conflicts are needed to protect the rights of small-scale fishers.

Table 5. Responsible governance of tenure good practices [adapted from FAO (2015)]

1. Recognize and protect legitimate tenure rights	
a.	Recognize, record, respect, and protect all forms of legitimate tenure rights, taking into account, where appropriate, customary rights to aquatic resources and land and small-scale fishing areas enjoyed by small-scale fishing communities.
b.	Ensure that small-scale fishers, fish workers and their communities have secure, equitable, and socially and culturally appropriate tenure rights to fishery resources (marine and inland) and small-scale fishing areas and adjacent land, with a special attention paid to women with respect to tenure rights.
c.	Recognize, respect, and protect local norms and practices, as well as customary or otherwise preferential access to fishery resources and land by small-scale fishing communities, including indigenous peoples and ethnic minorities consistent with international human rights law.
d.	Ensure that small-scale fishing communities are not arbitrarily evicted and that their legitimate tenure rights are not otherwise extinguished or infringed upon.
2. Grant preferential and equitable access and use	
a.	Grant preferential access of small-scale fisheries to fish in waters under national jurisdiction, with a view to achieving equitable outcomes for different groups of people, in particular vulnerable groups, including the creation and enforcement of exclusive zones for small-scale fisheries. Small-scale fisheries should be given due consideration before agreements on resource access are entered into with other countries and parties.
b.	Adopt measures to facilitate equitable access to fishery resources for small-scale fishing communities.
c.	Restore access to traditional fishing grounds and coastal lands to small-scale fishing communities that have been displaced by natural disasters and/or armed conflict, taking into consideration the sustainability of fisheries resources.
3. Address competing and conflicting resource uses	
a.	Recognize that competition from other users is increasing within small-scale fisheries areas and that small-scale fishing communities, in particular vulnerable and marginalized groups, are often the weaker party in conflicts with other sectors and may require special support if their livelihoods are threatened by the development and activities of other sectors.
b.	Consider the social, economic, and environmental impacts of large-scale development on tenure rights through impact studies, and hold effective and meaningful consultations with these communities, in accordance with national legislation.
c.	Provide small-scale fishing communities and individuals, including vulnerable and marginalized people, access through impartial and competent judicial and administrative bodies to timely, affordable, and effective means of resolving disputes over tenure rights.
d.	Establish mechanisms to support fishing communities affected by grave human rights violations to rebuild their lives and livelihoods, including the elimination of any form of discrimination against women in tenure practices in case of natural disasters and/or armed conflict.

4.3 SUSTAINABLE RESOURCE MANAGEMENT

The SSF Guidelines urge states to adopt and implement national legislation that supports responsible fishing practices and sustainable resource use. Securing tenure rights is both implicit and explicit across the SSF Guidelines and the need to work at multiple levels is clear (Table 6). Key areas to focus on include strengthening government and local institutional capacity to build dialogue around decision-making and to develop and uphold co-management arrangements. It is particularly important to institute monitoring, control, and surveillance systems that can address IUU fishing.

Table 6. Sustainable resource management good practices [adapted from FAO (2015)]

4. Promote responsible fishing practices and policies that ensure sustainable resource use	
a.	Adopt measures for the long-term conservation and sustainable use of fisheries resources and to secure the ecological foundation for food production giving due recognition to the requirements and opportunities of small-scale fisheries.
b.	Recognize that rights and responsibilities come together and tenure rights are balanced by duties, and support the long-term conservation and sustainable use of resources and the maintenance of the ecological foundation for food production.
c.	Promote fishing practices that minimize harm to the aquatic environment and associated species and support the sustainability of the resource.
d.	Avoid policies and financial measures that may contribute to fishing overcapacity and hence, overexploitation of resources that have an adverse impact on small-scale fisheries.
5. Strengthen the capacity of stakeholders to manage resource sustainably	
a.	Enhance the capacity of small-scale fishing communities to enable them to participate in decision-making processes.
b.	Develop the knowledge and skills to support sustainable small-scale fisheries development and successful co-management arrangements.
c.	Facilitate, train, and support small-scale fishing communities to participate in and take responsibility for, taking into consideration their legitimate tenure rights and systems, the management of the resources on which they depend for their well-being and that are traditionally used for their livelihoods, with special attention to equitable participation of women and vulnerable and marginalized groups.
6. Develop effective monitoring, control, and surveillance systems	
a.	Improve availability and access to information necessary for responsible small-scale fisheries and sustainable development, including on IUU fishing.
b.	Establish new or promote the application of existing monitoring, control, and surveillance systems applicable to and suitable for small-scale fisheries.
c.	Establish effective monitoring and enforcement mechanisms to deter, prevent, and eliminate all forms of illegal and/or destructive fishing practices that have a negative effect on marine and inland ecosystems.
d.	Improve registration of small-scale fishers to support monitoring, control and surveillance systems and provide to the state fisheries authorities the information required for the management of the activity.
7. Develop effective co-management arrangements	
a.	Promote participatory management systems, such as co-management.
b.	Ensure that co-management roles and responsibilities are clarified and agreed through a participatory and legally supported process.
c.	Encourage and support the role and involvement of both men and women, whether engaged in pre-harvest, harvest, or post-harvest operations, in the context of co-management and in the promotion of responsible fisheries.
d.	Address transboundary issues with shared waters and fishery resources, to ensure that the tenure rights of small-scale fishing communities that are granted are protected.

4.4 SOCIAL DEVELOPMENT, EMPLOYMENT, AND DECENT WORK

To achieve sustainable small-scale fisheries, there is a need for workers and their families to have access to health, education, technical skills, credit, and insurance. While on the surface, this area of the SSF Guidelines may not seem relevant to marine tenure, it is the enabling environment for social service provision and links closely to the range of rights that fishers experience. States are urged to create an

environment free from corruption, crime, violence, abuse of authority, and other illegal activities (Table 7).

Table 7. Social development, employment, and decent work good practices [adapted from FAO (2015)]

8. Improve working conditions and safety for small-scale fisheries workers	
a.	Create conditions for men and women of small-scale fishing communities to fish and carry out fisheries-related activities in an environment free from crime, violence, mafia activities, piracy, theft, sexual abuse, corruption, and abuse of authority.
b.	Address occupational health issues and unfair working conditions of all small-scale fishers and fish workers by ensuring that the necessary legislation is in place and is implemented.
c.	Eradicate forced labor; prevent debt-bondage of women, men, and children; and adopt effective measures to protect fishers and fish workers, including migrants, with a view to the complete elimination of forced labor in fisheries, including small-scale fisheries.
d.	Improve sea safety, which includes occupational health and safety, in small-scale fisheries (inland and marine) through the development and implementation of coherent and integrated national strategies, with the active participation of the fishers themselves and with elements of regional coordination, as appropriate.
9. Develop human resource capacity of small-scale fishers and fishing communities	
a.	Promote investment in human resource development such as health, education, literacy, digital inclusion, and other skills of a technical nature that generate value addition for the fisheries resources, as well as awareness-raising.
b.	Support the development of and access to other services that are appropriate for small-scale fishing communities with regard to, for example, savings, credit, and insurance schemes, with special emphasis on ensuring the access of women to such services.
c.	Recognize that capacity development should build on existing knowledge and skills and be a two-way process of knowledge transfer, providing for flexible and suitable learning pathways to meet the needs of individuals, including both men and women and vulnerable and marginalized groups.
10. Diversify livelihoods and income-generating activities	
a.	Recognize the economic and professional importance of the full range of activities along the small-scale fisheries value chain: pre- and post-harvest; in an aquatic environment or on land; undertaken by men or by women.
b.	Support already existing, or the development of, complementary and alternative income-generating opportunities, in addition to earnings from fisheries-related activities, for small-scale fishing communities, as required and in support of sustainable resource utilization and livelihood diversification.
c.	Recognize and respect the role of migrant fishers and fish workers in small-scale fisheries, given that migration is a common livelihood strategy in small-scale fisheries.
11. Ensure access of children and youth in fishing communities to education	
a.	Provide and enable access to schools and education facilities that meet the needs of small-scale fishing communities and that facilitate gainful and decent employment of youth, respecting their career choices and providing equal opportunities for all boys and girls and young men and women.
b.	Recognize the importance of children's well-being and education for the future of the children themselves and for society at large.

4.5 VALUE CHAINS, POST-HARVEST, AND TRADE

The SSF Guidelines stress that the central role of small-scale fisheries in the post-harvest sector needs to be recognized along with the roles of various actors. Women should be recognized and supported as important contributors to the value chain (Table 8). Post-harvest actors may have unequal power relationships that require special support or attention dynamics that are also present from a tenure rights perspective.

Table 8. Value chains, post-harvest, and trade good practices [adapted from FAO (2015)]

12. Build capacity for small-scale fisheries to benefit from market opportunities	
a.	Recognize the central role that the small-scale fisheries post-harvest subsector and its actors play in the value chain.
b.	Recognize the role women often play in the post-harvest subsector and support improvements to facilitate women's participation in work.
c.	Enable timely access to all relevant and accurate market and trade information for stakeholders in the small-scale fisheries value chain.
13. Improve the value chain for fish and fishery products for domestic and export markets	
a.	Recognize the traditional forms of associations of fishers and fish workers and promote their adequate organizational and capacity development in all stages of the value chain to enhance their income and livelihood security.
b.	Foster, provide, and enable investments in appropriate infrastructure, organizational structures, and capacity development to support the small-scale fisheries post-harvest subsector in producing good quality and safe fish and fishery products for both export and domestic markets, in a responsible and sustainable manner.
c.	Avoid post-harvest losses and waste and seek ways to create value addition, building also on existing traditional and local cost-efficient technologies, local innovations, culturally appropriate technology transfers, and environmentally sustainable practices.
14. Reform national policies to minimize adverse impacts of domestic and international trade on small-scale fisheries	
a.	Facilitate access to local, national, regional, and international markets and promote equitable and non-discriminatory trade for small-scale fisheries products.
b.	Give due consideration to the impact of international trade in fish and fishery products and of vertical integration on local small-scale fishers, fish workers, and their communities, ensuring that promotion of international fish trade and export production do not adversely affect the nutritional needs of people for whom fish is critical to a nutritious diet and their health and well-being and for whom other comparable sources of food are not readily available or affordable.
c.	Recognize that benefits from international trade should be fairly distributed and that effective fisheries management systems are in place to prevent overexploitation driven by market demand that can threaten the sustainability of fisheries resources, food security, and nutrition.
d.	Adopt policies and procedures, including environmental, social, and other relevant assessments, to ensure that adverse impacts by international trade on the environment, small-scale fisheries culture, livelihoods, and special needs related to food security are equitably addressed.

4.6 GENDER EQUALITY

Gender equality means equal treatment of women and men in laws and policies, and equal participation, access to resources and services (e.g., justice, education, health) within families, communities and society at large (Arenas & Lentisco, 2011). Gender equality results from applying gender equity principles which refers to the process of fair and just treatment of women and men. To ensure fairness and justice, measures must be put in place to compensate for the historical and social disadvantages that prevent women and men from sharing a level playing field. Gender equality in small-scale fisheries must be mainstreamed in compliance with international human rights law. Concerted efforts are needed to achieve gender equality as an integral part of small-scale fishery development strategies. Such efforts will help to make women more visible in the fisheries sector (Table 9).

Table 9. Gender equality good practices [adapted from FAO (2015)]

15. Mainstream gender equality as an integral part of small-scale fisheries development	
a.	Comply with obligations under international human rights law and implement the relevant instruments to which they are part.
b.	Endeavour to secure women's equal participation in decision-making processes for policies directed toward small-scale fisheries.
c.	Establish policies and legislation to realize gender equality and, as appropriate, adapt legislation, policies, and measures that are not compatible with gender equality, taking into account social, economic, and cultural aspects.
d.	Encourage the development of better technologies of importance and appropriate to women's work in small-scale fisheries.

4.7 DISASTER RISKS AND CLIMATE CHANGE

While coastal and island communities dependent on marine resources have a history of adapting and being resilient to change (Cinner et al., 2009; McClanahan, Polunin, & Done, 2002), ongoing pressures on global fisheries and the impacts of climate change are expected to cause unprecedented transformations that are difficult to predict. Holistic approaches and cross-sectoral collaboration are needed to address disaster risk and climate change in small-scale fisheries and fishing communities (Table 10). The impacts of climate change on coastal communities and small-scale fisheries must be assessed at multiple scales and through the whole value chain. Marine tenure systems must be flexible enough to adapt to the changes brought about by climate change.

Table 10. Disaster risk and climate change good practices [adapted from FAO (2015)]

16. Recognize and address the differential impact of natural and human-induced disasters and climate change on small-scale fisheries and communities	
a.	Develop capacity of small-scale fishing communities to address disaster risks and adapt to climate change.
b.	Take into account the impact that climate change and disasters may have on the post-harvest and trade subsector in the form of changes in fish species and quantities, fish quality and shelf-life, and implications with regard to market outlets.
c.	Understand how emergency response and disaster preparedness are related in small-scale fisheries and apply the concept of the relief-development continuum.
d.	Promote the role of small-scale fisheries in efforts related to climate change and encourage and support energy efficiency in the subsector, including the whole value chain from fishing to post-harvest marketing and distribution.

4.8 POLICY COHERENCE, INSTITUTIONAL COORDINATION, AND COLLABORATION

Integrated ecosystem, and holistic approaches are needed to secure sustainable small-scale fisheries to address the many potential social, economic, and environmental factors that can threaten local management achievements. As such, the is an important role of government in creating the policy environment and space for tenure arrangements to succeed (Charles, 2013). International, regional, national, and subnational coordination and collaboration are needed to support a harmonized policy environment for securing sustainable small-scale fisheries that focus on the long-term vision of eradicating poverty and hunger (Table 11).

Table 11. Policy coherence, institutional coordination, and collaboration good practices [adapted from (FAO, 2015)]

17. Adopt national policies and laws that support an integrated, holistic, ecosystem-based approach to marine and coastal management	
a.	Develop and use spatial planning approaches, including inland and marine spatial planning, that take account of the small-scale fisheries' interests and role in integrated coastal zone management.
b.	Adopt specific policy measures to ensure the harmonization of policies affecting the health of marine and inland water bodies and ecosystems and to ensure that fisheries, agriculture, and other natural-resource policies collectively enhance the interrelated livelihoods derived from these sectors.
c.	Consider integrated, ecosystem, and holistic approaches to small-scale fisheries management and development that take the complexity of livelihoods into account.
d.	Recognize and address the underlying causes and consequences of transboundary movement of fishers and contribute to the understanding of transboundary issues affecting the sustainability of small-scale fisheries.
18. Establish mechanisms for institutional coordination and collaboration at international, regional, national, subnational levels	
a.	Establish and promote the institutional structures and linkages, including local-national-regional-global linkages and networks, necessary for achieving policy coherence, cross-sectoral collaboration, and the implementation of holistic and inclusive ecosystem approaches in the fisheries sector with clear roles and responsibilities and defined points of contact in government authorities and agencies for small-scale fishing communities.
b.	Promote collaboration among their professional associations, including fisheries cooperatives and civil society organizations, through networks and platforms for the exchange of experiences and information and to facilitate their involvement in policy- and decision-making processes relevant to small-scale fisheries communities.
c.	Recognize and promote as appropriate that local governance structures may contribute to an effective management of small-scale fisheries, taking into account the ecosystem approach and in accordance with national law.
d.	Promote enhanced international, regional, and subregional cooperation in securing sustainable small-scale fisheries.

4.9 INFORMATION, RESEARCH, AND COMMUNICATION

Small-scale fisheries are complex social-ecological systems. Improved knowledge of the dynamics of these systems is needed as a foundation for providing appropriate and responsible support and to ensure that informal, indigenous, and customary knowledge, practices, and tenure systems are valued and protected. Social, ecological, economic, and cultural information and data are needed to support decision making on sustainable management of small-scale fisheries (Table 12).

Table 12. Information, research, and communication good practices [adapted from (FAO, 2015)]

19. Improve knowledge of social-ecological systems	
a.	Establish systems of collecting fisheries data, including ecological, social, cultural, and economic data relevant for decision-making on sustainable management of small-scale fisheries.
b.	Ensure that the knowledge, culture, traditions, and practices of small-scale fishing communities, including indigenous peoples, are recognized and, as appropriate, supported, and that they inform responsible local governance and sustainable development processes.
c.	Encourage small-scale fisheries research and collaborative and participatory data collection, analyses, and research with funding.
d.	Promote research into the conditions of work, including migrant fishers and fish workers, health, education, and decision-making, in the context of gender relations, to inform strategies for ensuring equitable benefits for men and women in fisheries.

20. Improve access to information and data needed for decision-making	
a.	Recognize the importance of communication and information, which are necessary for effective decision-making.
b.	Prevent corruption, particularly through increasing transparency, holding decision-makers accountable, and ensuring that impartial decisions are delivered promptly and through appropriate participation and communication with small-scale fishing communities.
c.	Recognize small-scale fishing communities as holders, providers and receivers of knowledge and the need for access to appropriate information to help them cope with existing problems and empower them to improve their livelihoods.
d.	Promote the availability, flow, and exchange of information, including on aquatic transboundary resources, through the establishment or use of appropriate existing platforms and networks at community, national, subregional, and regional levels, with appropriate approaches, tools, and media for communication with and capacity development for small-scale fishing communities.

Box 16. Global agenda on small-scale fisheries: key take-aways for programming and project design

- A global agenda on securing sustainable small-scale fisheries has emerged with the growing recognition of the significance of small-scale fisheries to food security, local and global economic growth, biodiversity conservation, and other development objectives.
- The Voluntary Guidelines on Securing Sustainable Small-scale Fisheries in the Context of Food Security and Poverty Alleviation (SSF Guidelines) establish guiding principles and good practices.
- Responsible governance of tenure is recognized as a key dimension in securing sustainable small-scale fisheries and supported by other global platforms.
- The reformulation of the SSF Guidelines as an assessment tool provides an opportunity to evaluate implementation status and gaps and identify programming and project opportunities.

Madagascar (credit: Matt Sommerville)

5.0 MARINE TENURE AS PART OF AN ECOSYSTEM APPROACH TO FISHERIES MANAGEMENT

Coastal mangrove forest in Burma (credit: Matt Sommerville)

With growing recognition of the complexity and dynamic nature of marine and coastal ecosystems, the diversity and extent of human uses, and extent and often intractable nature of global and local threats, an ecosystem approach to fisheries management (EAFM) is fundamental to the sustainable delivery of ecosystem services (Flower et al., 2013; Fogarty & McCarthy, 2014; Pomeroy et al., 2013; Pomeroy et al., 2014). As underscored in the SSF Guidelines (FAO, 2015), coherent national policies and laws that support an integrated, holistic, and ecosystem-based approach to marine and coastal management are needed to sustain the ecological foundation for food security and poverty eradication (FAO, 2015). Community-based marine tenure systems with well-defined spatial boundaries and capable and defined institutional membership can form an essential component of EAFM in small-scale fisheries. Conversely, in absence of EAFM supported by collaboration between government, community, and other stakeholders, marine tenure systems are vulnerable to threats and drivers beyond the control and capacity of a community to manage. As such, science-based EAFM is an essential element of responsible governance of tenure.

This chapter highlights the co-dependency of marine tenure and EAFM in supporting the achievement of sustainable small-scale fisheries. Key features of EAFM are described and contrasted with conventional fisheries management. Selected management tools, including fisheries restrictions, marine reserves and marine spatial planning, are described with a discussion of benefits and potential consequences to community-based marine tenure institutions. Harmonization of EAFM with a clear marine tenure system offers great potential for fisheries management.

5.1 KEY FEATURES OF AN ECOSYSTEM APPROACH TO FISHERIES MANAGEMENT

An ecosystem approach to fisheries strives to balance diverse societal objectives, by taking into account the knowledge and uncertainties about biotic, abiotic and human components of ecosystems and their interactions and applying an integrated approach to fisheries within ecologically meaningful boundaries (FAO, 2003). Ecosystem-based management of marine and coastal ecosystems (K. McLeod, Lubchenco, Palumbi, & Rosenberg, 2005):

- Emphasizes place-based protection of ecosystem structure, function, and services;
- Accounts explicitly for the interconnectedness within systems, recognizing the importance of interactions between many target species or key services and other non-target species;
- Acknowledges interconnectedness among systems, e.g., air, land, and sea;
- Integrates ecological, social, economic, and institutional perspectives, recognizing their strong interdependences as part of a linked social-ecological system; and
- Promotes adaptive management that is responsive to changing conditions.

Fisheries managers are recognizing the need to move from conventional fisheries management that focuses on single target species to EAFM that recognizes the multiple target species within complex and changing ecosystem dynamics (Table 13). EAFM adopted at national and subnational levels can provide the framework to address pressures and drivers across multiple ecosystem scales and levels of management and as a result protect the tenure rights of small-scale fishers. The six Coral Triangle countries have adopted a regional framework for moving towards ecosystem-based management (Box 17). However, few developing countries have incorporated EAFM principles and management measures

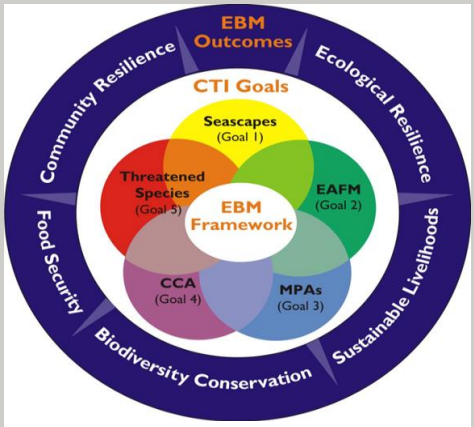
as national law and policy. EAFM also requires the interlinking of local tenure institutions with co-management arrangements. Periodic assessments are needed to support an adaptive learning approach that can move toward stated goals (Mills et al., 2011).

Table 13. Comparison of conventional fisheries management and an ecosystem-approach to fisheries management (Pomeroy et al., 2013)

Key Features	Conventional Fisheries Management	Ecosystem-approach to Fisheries Management
Management objectives	Fisheries sector	Multiple: fisheries, ecosystem, and socioeconomic goods and services
Species considered	Target species	All species in ecosystem, particularly those impacted by fishing; habitat-building species
Scale	Stock/fishery	Broader ecosystem (spatial and temporal, e.g., longer timeframes accommodating climate change), and social systems relevant to fisheries
Assessment method	Stock assessment	Multispecies and ecosystem assessment/indicators
Data	Scientific, largely target-stock specific	Scientific and traditional knowledge; includes components of the ecosystem, people, and governance systems
Governance/ management	Top-down, fishery specific	Fisheries management institutions at various scales (local, subnational, national, regional); cooperation across sectors and with communities across scale; participatory management (e.g., co-management); adaptive management
Management intervention	Mainly control of fishing	Fishing controls alongside ecosystem tools (e.g., marine spatial planning, MPAs, etc.); integrated coastal zone management; broad-based incentives; livelihoods
Stakeholders	Fishers, fishing industry, and associated supporting activities	Fishers, fishing industry, and associated supporting activities; households and communities

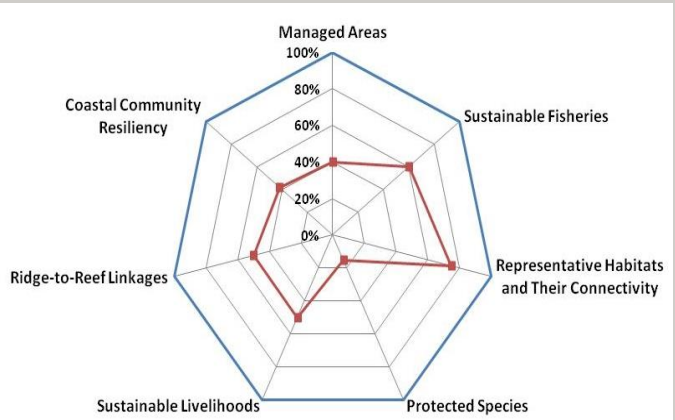
In applying EAFM in Key Marine Biodiversity Areas in the Philippines, the USAID Ecosystems Improved for Sustainable Fisheries Project considers three main components (Armada, White, & Christie, 2009): (1) fisheries management interventions should always consider a defined ecosystem boundary as resource management unit; (2) there is a need to understand the dynamics of marine ecosystems and how they respond to human-induced changes, particularly to changes resulting from fisheries; and (3) there is a need for a governance system that supports limits to fisheries resource exploitation activities. The match between the spatial extent of the ecosystem and multiple dimensions of the governance system is a key consideration in scaling up fisheries management efforts. Operationalizing EAFM continues to be a challenge especially in developing countries where resources and capacity are limited and decentralized responsibility and authority for resource management requires collaboration among communities that share the same fisheries and among communities and national and local government that often having overlapping responsibilities (Pomeroy, Garces, Pido, & Silvestre, 2010). EAFM must consider the unique social, ecological, and historical context (Christie, Fluharty, White, Eisma-Osorio, & Jatulan, 2007), incorporate knowledge of the social-ecological system, and recognize existing community-scale marine tenure systems. This knowledge should underpin the use of other management tools such as marine protected areas, limits on fishing effort and gear type, and marine spatial planning.

Box 17. Moving toward ecosystem-based management in the Coral Triangle (Flower et al., 2013)



Ecosystem based goals and outcomes adopted by the Coral Triangle countries

The six Coral Triangle countries (Indonesia, Malaysia, Papua New Guinea, Philippines, Solomon Islands, and Timor-Leste) came together in 2007 to form the Coral Triangle Initiative on Coral Reefs, Fisheries, and Food Security (CTI-CFF), a multilateral partnership that aims to safeguard the marine and coastal resources of the Coral Triangle region. The CTI-CFF Regional Plan of Action and each country's National Plan of Action set forth regional and national priorities to achieve five long-term goals



Illustrative output of a local assessment of integrated strategies as part of an ecosystem-based management approach

Working with stakeholders throughout the six Coral Triangle countries, the US Coral Triangle Initiative developed guidance and regional capacity to help marine and coastal managers, conservation practitioners, and their network of partners including government officials, communities, funders, economic investors, and other stakeholders work toward ecosystem-based approach to fisheries management (EAFM). As part of this guidance, a diagnostic tool was developed to assess the benchmarks for seven integrated strategies that can be implemented through collaborative arrangements in defined coastal and marine areas of the Coral Triangle.

5.2 CONFIGURATION OF FISHING RULES

Fishing rules are a commonly used approach to achieve management objectives that have been applied heavily in single species commercial fisheries in developed countries. They are also quite common at the local level in developing countries, but are much less used and enforced at national and regional levels for small-scale fisheries. Small-scale fishers may use a diversity of gear to exploit multiple fish species that occupy different trophic levels. This makes fishing restrictions to support sustainable fishing as part of EAFM more challenging to design. The types and configuration of fishing rules are a fundamental component of marine tenure systems in allocating access and withdrawal rights. Customary marine tenure regimes may have rules that restrict harvesting certain species, at certain times, or in certain areas, as well as other restrictions (Aswani, 2005; G. Bennett, 2012). Customary fishing rules have evolved from a long history of traditional knowledge, cultural practices and values, while contemporary fishing rules have developed from a mixed blend of approaches: scientific methods, local knowledge and practices, and as a response national or international laws and policies. A combination of rules is typically used to achieve multiple management objectives (Table 14). The specific types, number, and configuration of fishing rules all play an important role in whether or not people comply (Cinner &

Huchery, 2013). For example, too many and overly complex rules may hinder the degree to which people comply.

Table 14. Rules used to manage fisheries in customary and contemporary management systems (Cinner & Aswani, 2007)

Type of Rule	Customary	Contemporary
Spatial/Temporal Rules	• Temporary area closures for several months; permanent closures to protect cultural resources and spirits • Restricting fishing/harvesting activities during specific days, weeks, months, etc.; often short in duration (e.g., Sabbath), species-specific (e.g., trochus), and around a specified event (e.g., spawning aggregation)	• Establishing permanent no-take marine reserves to support fish spillover and biodiversity conservation • Establishing temporary area closures to protect locations where spawning aggregations of target fish species occur • Establishing seasonal closures established for spawning season • Establishing temporary fishery closures to allow stocks to replenish/recover • Defining marine spatial use zones for different types of uses allowed in a particular area of the sea.
Gear Restrictions	• Prohibiting/restricting certain harvesting technologies or techniques	• Restricting the types of gear • Prohibiting destructive gear, such as fine mesh nets, dynamite, and cyanide, that result in bycatch and destroy the habitat
Species Restrictions	• Prohibiting the consumption of certain species; often lineage-related dietary restrictions	• Prohibiting the catch, possession, or sale of threatened and endangered species to comply with national laws and international conventions
Effort Restrictions	• Limiting who can harvest certain species, use certain gears, fish certain areas	• Limiting the number of fishers, boats, and/or gear through registration or licensing
Catch Restrictions	• Restricting the quantity of a harvest	• Restricting the amount of fish extracted by a fisher in a geographic area through catch shares or quotas

Excessive fishing effort, or overcapacity in fisheries, is a major contributor to overfishing. Determining a sustainable fishing effort in small-scale fisheries is challenging. Small-scale fishers target multiple species at different trophic levels, use different gears, and depend on at least a portion of their catch for food. Such an effort requires knowledge of the social-ecological system at multiple scales and from multiple sources. The USAID Ecosystems Improved for Sustainable Harvests Project in the Philippines is working with local fishers to explore alternative scenarios to "right size" the fishing effort by evaluating trade-offs between different management objectives (Box 18).

Box 18. "Right-sizing" fishing effort in the Philippines (Armada, 2014)

Right-sizing fishing effort is a process to identify and adopt restrictions on the number and type of fishing gear used in a particular community or managed area. The process involves developing trophic systems modeling using Ecopath with Ecosim (Christensen, Walters, & Pauly, 2005) for a given spatial and governance scale. This approach can provide insights into ecosystem function and the impact of fishing. The model predicts changes in the fishing biomass and harvest by functional group under simulated gear management scenarios. Trade-offs in the number and types gear are evaluated between three objective maximizing scenarios: (1) maximizing ecosystem structure, (2) maximizing the number of fishers and jobs, and (3) maximizing profits from fishing. Each scenarios simulates the fishing effort configuration in terms of number of gear units to maximize each objective. The fishing community together with the local government reviews and agrees on the scenario they want to pursue. These allocations are incorporated into fisheries management plans and legitimized through legislation or other policy instruments. This approach to addressing overcapacity must include other management interventions such as registration and licensing, marine protected areas, and enforcement to ensure success. As with other management interventions, a participatory and learning by doing approach with stakeholders provides the best chance for successful implementation.

Credit: C. Courtney

ECOFISH Philippines right-sizing game. Participants learn the principles and practice of right-sizing, limiting the types and number of gear to maximize biodiversity conservation and sustainable fishing goals.

5.3 MARINE PROTECTED AREAS AND NETWORKS

Taking a page from terrestrial biodiversity conservation, the use of marine protected areas and networks is increasingly applied in developing countries to support small-scale fishers. Small-scale fishers target diverse marine and coastal fish and invertebrate species at multiple trophic levels. Each species has different spatial requirements to eat, live, and reproduce (Figure 12). Many marine species require distinct habitats at different times in their life cycle (Figure 13). Marine and coastal resources upon which community-based marine tenure systems depend are also embedded in larger ecosystem-scale structures and processes that include adjacent nearshore areas as well as offshore areas of the marine environment. With a greater understanding of this complexity, conservation measures, such as marine protected areas and networks have emerged as an important spatial management tool to address these complexities (Green, White, & Kilarski, 2013). This tenure regime dramatically restricts access, use rights, but poses significant management, and particularly co-management challenges.

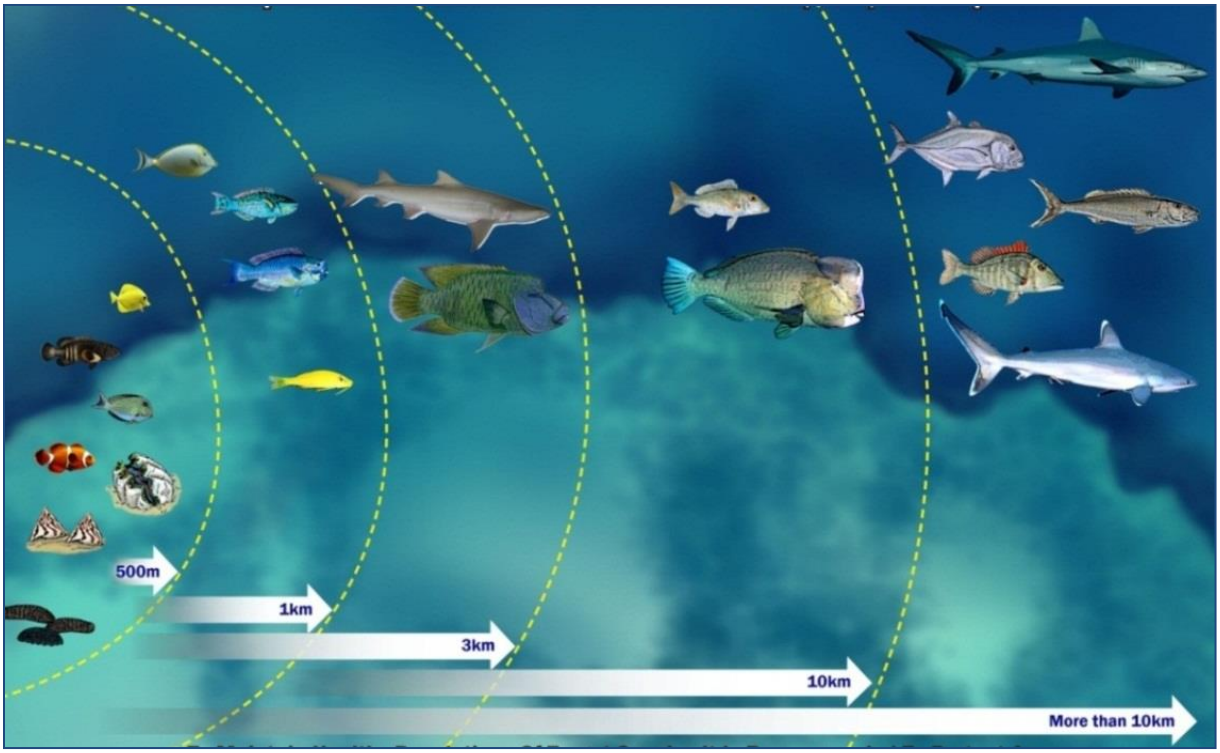


Figure 12. Marine species inhabit different geographic ranges that may include nearshore and open ocean ecosystems. Each species has a minimum area needed to eat, live, and reproduce (Green et al., 2013).

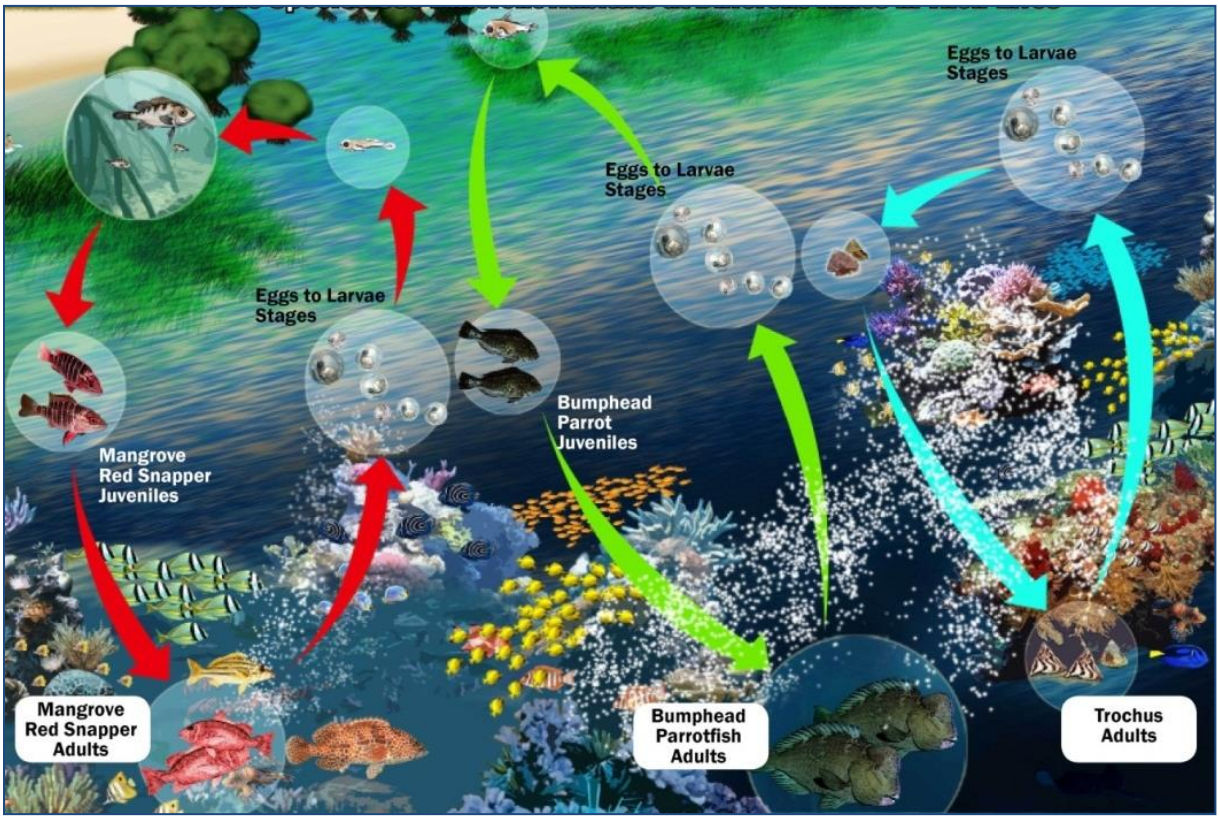


Figure 13. Marine species require different habitats at specific times in their life cycle to eat, live, and reproduce (Green et al., 2013).

Marine protected areas are areas of restricted access or activity whose primary objective is the protection of a coastal or marine ecosystem, the resources they contain, or processes essential to maintain ecosystem function and productivity (IUCN-WCPA (2008). The size, spacing, location, and degree of restrictions are factors contributing to the effectiveness of marine protected areas to achieve intended objectives (Fernandes et al., 2012).

Marine reserves, or no-take areas where all extractive activities are prohibited, provide long-term protection for the marine community to recover from human impacts as well as optimizes the long-term, permanent potential biodiversity benefits beyond the protected area boundaries (IUCN-WCPA (2008). Marine reserves established to support biodiversity conservation objectives are usually designed to reduce adult spillover whereas, marine reserves designed to support sustainable fisheries objectives often aim to facilitate adult spillover as well as persistence of the stock within the protected area (Gaines, White, Carr, & Palumbi, 2010; Halpern, 2003; Halpern, Lester, & Kellner, 2009). This spillover can create substantial benefits for fishers who will often fish the edges of the reserves.

Marine protected areas are typically used in concert with other fishing rules (Table 14) to achieve management goals by community-based marine tenure institutions. In three east African countries, all BMUs studied banned the use of destructive fishing gear, but only the BMUs that established marine reserves (no-take marine protected areas) had increased fish biomass and coral cover (Cinner, Daw, et al., 2012).

Marine and coastal resources upon which community-based marine tenure systems depend are also embedded in larger ecosystem-scale structures and processes that include adjacent nearshore areas as well as offshore areas of the marine environment. At this scale, climatic, oceanographic, and biogeochemical features impact the distribution and life history of target species over space and time (Figure 14). Among other things, this includes extreme events, such as El Niño, and anthropogenic climate change (Rosenzweig et al., 2008). Climate change is expected to result in unprecedented impacts to marine and coastal ecosystems (Bell, Johnson, & Hobday, 2011; Hoegh-Guldberg & Bruno, 2010) altering the interaction between small-scale fishers and the resources they depend on. This dynamic poses significant challenges to using local tenure systems and incentives for species management, as local communities may be asked to protect habitats, such as mangroves or sea grass beds that are important juvenile nurseries for commercial offshore fisheries. Therefore, limiting access in these nearshore areas can have a detrimental impact on nearshore livelihoods that may not be compensated by the increased catch in offshore areas.

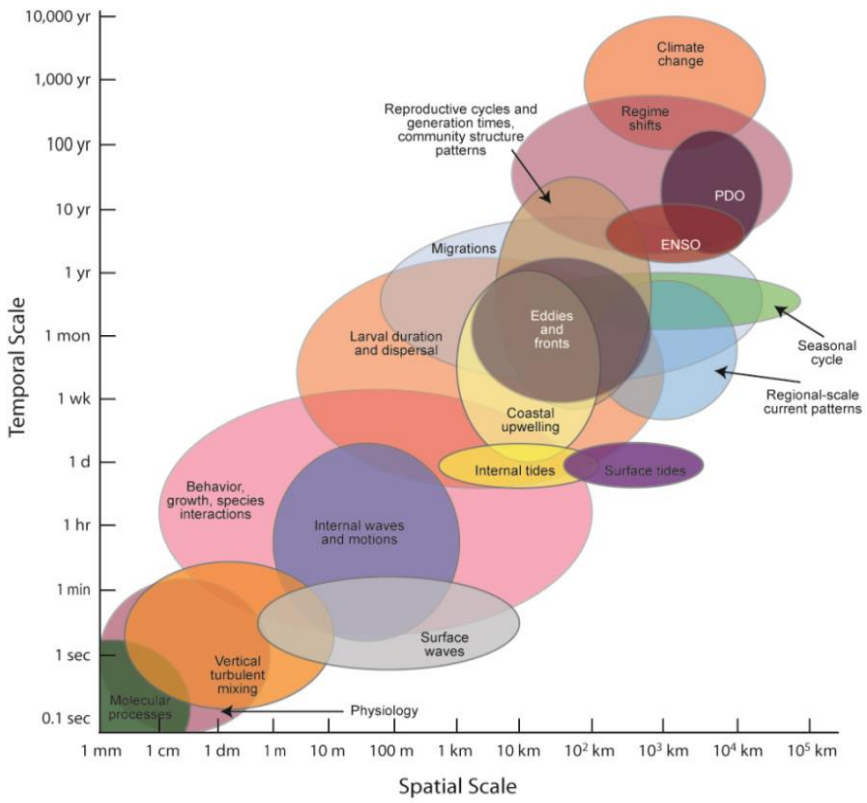


Figure 14. Variability of ecological processes as a function of space and time (Carr et al., 2011)

Understanding and maintaining connectivity between complex and dynamic ecological processes and food webs across landscapes enhances ecosystem resilience (Green, Fernandes, et al., 2014; Green, Maypa, et al., 2014; Nyström & Folke, 2001) and conservation (Hodgson, Thomas, Wintle, & Moilanen, 2009; Hughes, Graham, Jackson, Mumby, & Steneck, 2010). Well-designed networks of marine protected areas provide important spatial links needed to maintain ecosystem processes and connectivity and spread risk from local disasters, climate change, and localized management failures (National Research Council, 2001). Small and locally isolated marine protected area may not be sufficient to sustain fish and invertebrate populations. Marine protected area networks can contribute to sustainable ecological, social, and economic development goals by helping to: (a) maintain functional marine ecosystems by encompassing the temporal and spatial scales of ecological systems; (b) resolve and manage conflicts in the use of natural resource; and (c) facilitate the efficient use of resources (IUCN-WCPA (2008).

Both local and regional marine protected area networks could be considered as part of an EAFM. At a local scale, multiple habitats must often be protected to support the life cycle of a target fish to reproduce and grow (Box 19). While coral reef habitats have typically been the focus of marine protected areas, mangrove forests, that serve as nursery grounds for many fish species, natural breakwaters to coastal hazards, and forests with high capacity to sequester "blue" carbon, form a critical element of local and regional networks (Rotich et al., 2016). Mangrove forests not only offer a level of resilience in the face of constant environmental changes, but have the capacity to sequester 10 times more carbon that upland tropical forests.

Box 19. Mangrove-reef connectivity promotes the effectiveness of marine reserves across the western Pacific (Olds, Albert, Maxwell, Pitt, & Connolly, 2013)

Habitat connectivity improved the effectiveness of reserves in Roviana Lagoon (Solomon Islands), the Palm Islands (Great Barrier Reef), and Moreton Bay (Australia). Snappers (*Lutjanidae*) and rabbitfish (*Siganidae*) were more abundant on reserve reefs close to mangroves in all regions studied. These interactive effects also enhanced the abundance of sweetlip (*Haemulidae*), bream (*Sparidae*), harvested fish, herbivores, and piscivores; and it enhanced species richness in two of the three regions examined. Understanding connectivity among marine and coastal ecosystems is critical to restoring biodiversity and the functioning of ecosystems.

The development of ecological design principles have emerged to help coral reef managers, practitioners, and communities develop networks of marine reserves that support the multiple objectives of sustainable fisheries, biodiversity conservation, and climate resilience (Cabral, Mamauag, & Aliño, 2015; Fernandes et al., 2005; Fernandes et al., 2012; Green, 2016; Green, Fernandes, et al., 2014; Green et al., 2013; Horigue et al., 2015; IUCN-WCPA, 2008; E. McLeod, Salm, Green, & Almany, 2009; Varney et al., 2010). As part of the US Coral Triangle Initiative, ecological design principles were developed and applied to the design of a regional network of marine reserves (Table 15).

Table 15. Ecological principles for designing resilient networks of marine reserves (no-take areas, fisheries closures) for biodiversity conservation, fisheries management, and climate resilience objectives

Theme	Ecological Design Principles
Habitat Representation	Represent 20-40% of each major habitat (i.e., each type of coral reef, mangrove, and seagrass community) in marine reserves, depending on fishing pressure and if effective fisheries management is in place outside reserves (Green, Fernandes, et al., 2014).
Risk Spreading	Replicate protection of each major habitat within at least three widely separated marine reserves (Green, Fernandes, et al., 2014).
Protecting Critical, Special and Unique Areas	Protect critical areas (e.g., nursery, nesting, breeding, and feeding areas) in the life history of focal species (including key fisheries species, herbivores and rare and threatened species e.g., turtles, dugong and cetaceans) in permanent or seasonal marine reserves (Green, Fernandes, et al., 2014).
	Protect special or unique areas (e.g., isolated habitats with unique assemblages and populations, important habitats for endemic species, and highly diverse areas) in marine reserves (Green, Fernandes, et al., 2014).
Incorporating Connectivity	Marine reserves should be more than twice the size of the home range of focal species (in all directions), thus marine reserves of various sizes will be required depending on which species require protection, how far they move, and if other effective protection is in place outside reserves. Recommendations regarding minimum reserve size must be applied to the specific habitats that focal species use, rather than the overall size of the reserve (which may include other habitats) (Green, Fernandes, et al., 2014).
	Space marine reserves <15 km apart, with smaller reserves closer together (Green, Fernandes, et al., 2014).
	Marine reserves should include habitats that are critical to the life history of focal species (e.g., home ranges, nursery grounds, migration corridors and spawning aggregations), and be located to accommodate movement patterns among these (e.g., ontogenetic habitat shifts, spawning migrations) (Green, Fernandes, et al., 2014; Green, Maypa, et al., 2014).
	Include whole ecological units (e.g., offshore reefs) in marine reserves (Green, Fernandes, et al., 2014).

Theme	Ecological Design Principles
	Use compact marine reserve shapes (e.g., squares or circles) rather than elongated ones (Green, Fernandes, et al., 2014).
	Locate more marine reserves upstream relative to fished areas if there is a strong, consistent, unidirectional current (Green, Fernandes, et al., 2014; Green, Maypa, et al., 2014).
	Protect spatially isolated areas or populations (i.e., those that are separated by >20-30 km from similar habitats) in marine reserves (Green, Fernandes, et al., 2014; Green, Maypa, et al., 2014).
Allowing Time for Recovery	Ensure significant areas of marine reserves are in place for the long term (20-40 years), preferably permanently, to allow for full population recovery and maximum biomass export to fished areas of the full range of highly targeted species (Abesamis, Green, Russ, & Jadloc, 2014; Green, Fernandes, et al., 2014). Where strict compliance to marine reserves is required to avoid considerable delays in recovery (Abesamis et al., 2014).
	Short term (<5 years) or periodically harvested marine reserves should be used in addition to, rather than instead of, long-term or permanent reserves (Abesamis et al., 2014). Where periodic closures are used, the timing and intensity of harvesting must be carefully controlled to ensure long-term fishery benefits (Abesamis et al., 2014; Jupiter, Weeks, Jenkins, Egli, & Cakacaka, 2012).
Adapting to Changes in Climate and Ocean Chemistry	Protect refugia in marine reserves where habitats and species are likely to be more resistant or resilient to climate and ocean change including (Green, Fernandes, et al., 2014): • Areas where habitats and species are known to have withstood environmental changes (or extremes) in the past (e.g., coral communities that appear more resilient to high sea surface temperatures); • Areas with historically variable sea surface temperatures and ocean carbonate chemistry, where habitats and species are more likely to withstand changes in those parameters in future; and • Areas adjacent to low-lying inland areas without infrastructure that coastal habitats (e.g., mangroves, tidal marshes and turtle nesting beaches) can expand into as sea levels rise.
Minimizing and Avoiding Local Threats	Avoid placing marine reserves in areas that have been, or are likely to be, impacted by local threats (e.g., land based runoff) that cannot be managed effectively (Green, Fernandes, et al., 2014).
	Place marine reserves in areas that have not been, or are less likely to be, impacted by local threats including (Green, Fernandes, et al., 2014). • Areas where threats (e.g., overfishing or destructive fishing) can be managed effectively; and • Areas within or adjacent to other effectively managed marine or terrestrial areas.
	Integrate marine reserves within broader spatial planning and management regimes (e.g., large multiple-use marine reserves, and EAFM)(Green, Fernandes, et al., 2014).

MPAs and especially no-take reserves are often seen as incompatible with the traditional use patterns and for marginalizing people dependent on these areas for food and income (White et al., 2014). Planning, implementation, and management of marine reserves, regardless of the level or type of management, must consider the human communities and institutions that are usually the default decision-makers for resource utilization and protection. In the Coral Triangle region, three interrelated factors were identified as essential to improve the overall capacity and effectiveness of MPAs: (1) well

designed and effectively managed MPAs; (2) monitoring, evaluation, and response-feedback systems; and (3) integration of socioeconomic factors supporting MPAs (White et al., 2014).

The impacts of marine protected areas on five indicators of human welfare (food security, resource rights, employment, community organization, and income) are increasingly being studied (Mascia, Claus, & Naidoo, 2010). Based on this literature review, the establishment of marine protected areas increased resource use rights and improved the ability of most fishing groups to manage resources. Food security generally remained stable or increased in older, smaller marine protected areas. While marine protected areas were found to shape the social wellbeing and political power of fishing communities, they negatively affect at least a minority of fishers who may have to travel farther for access.

The emphasis on national government-led establishment of marine protected areas to meet international obligations (Convention on Biological Diversity, 2013) has spurred a discussion on possible infringements on communities' rights (Mascia et al., 2010; Sharma & Rajagopalan, 2013). Aichi targets adopted in the ten-year Strategic Plan adopted by the Tenth Conference of Parties of the Convention of Biological Diversity aims for at least 10 percent of coastal and marine areas conserved through systems of protected areas that are effectively and equitably managed, ecologically representative, and well-connected, as well as other effective area-based conservation measures. In practice, nationally designated marine protected areas are often overlaid onto customary or informal marine tenure regimes, restricting the use rights of local communities and often diverting local revenues to national accounts. In other cases, marine protected areas established by the private sector for tourism can exclude fishers from traditional fishing grounds. Despite these risks, there are cases where community-based marine protected areas provide secure rights and management responsibilities to the local level.

5.4 MARINE SPATIAL PLANNING

Small-scale fisheries are increasingly affected by both local pressures as well as external threats and drivers of change (Kittinger et al., 2013). Major drivers, such as demographic trends and economic development policies, affect human behavior and ecological processes and are typically beyond the capacity of community-scale management to address alone; hence the need for an ecosystem-based management approach and effective co-management arrangements. The combined impact of human activity both on land and sea has significantly threatened the wellbeing of marine and coastal ecosystems (Figure 15). As urbanization and land use changes occur, the rights of small-scale fishers may become marginalized. Conflicting and competing uses of the marine and coastal environment jeopardize the resource base upon which community-scale marine tenure institutions depend and the security of their marine tenure rights. Marine spatial planning is an important management tool to facilitate policy coherence at a local scale to both protect fishing territories and use rights and management rules with surrounding water and land use. As such, marine spatial planning is an iterative process that should address conflicting and competing use of land and water, in the process clarifying overlapping rights and responsibilities and creating coherence between customary and state management practices (Box 20).

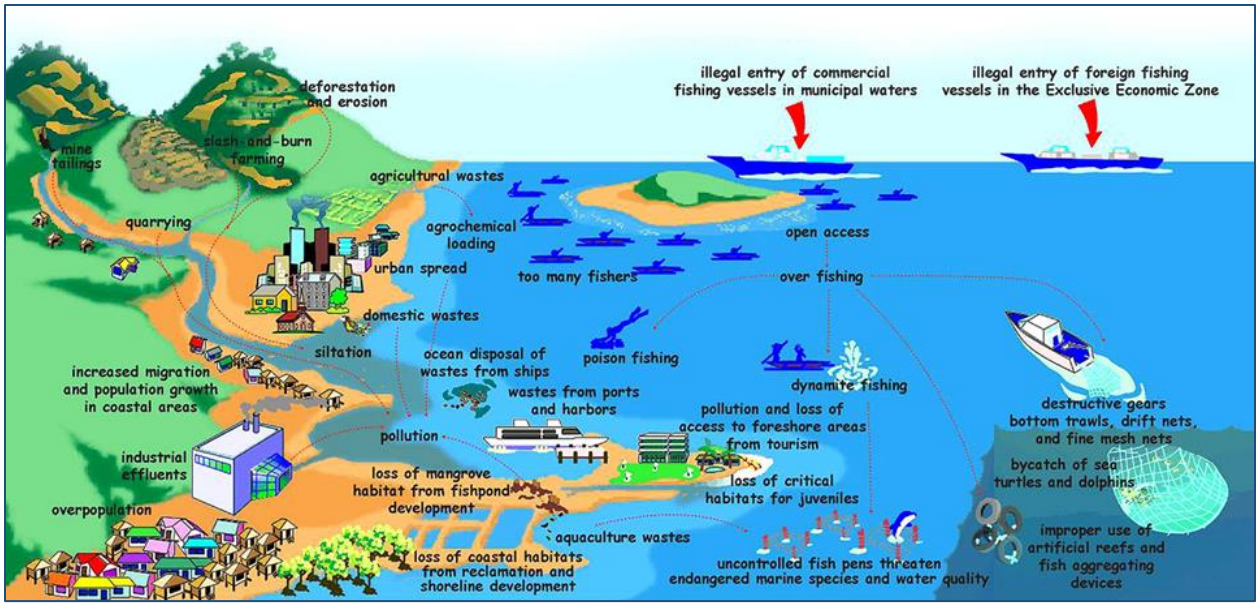


Figure 15. Human impacts on the Philippine coastal environment (Department of Environment and Natural Resources, Bureau of Fisheries and Aquatic Resources, & Department of the Interior and Local Government, 2001).

Box 20. Characteristics of marine spatial planning (Ehler, 2013)

MSP is "the public process of analyzing and allocating the spatial and temporal distribution of human activities in marine areas to achieve ecological, economic, and social goals and objectives that are usually specified through a political process." The characteristics of MSP, many of which are common to other planning approaches, including integrated coastal management and ecosystem-based management, are:

- Integrated and multi-objective, across sectors and agencies, and among levels of government, and including social and economic objectives as well as ecological ones;
- Continuing and adaptive, capable of learning from experience;
- Strategic and anticipatory, focused on the long term;
- Participatory, with stakeholders actively and effectively involved in the process;
- Place-based or area-based, focused on a specific marine area or place; and
- Ecosystem-based, balancing ecological, economic, and social goals and objectives toward sustainable development.

Marine spatial planning can support responsible governance of tenure in the context of an ecosystem-based approach to fisheries management. As a participatory and place-based process, marine spatial planning, enables stakeholders to allocate spatial and temporal distribution to human activities and uses of the marine and coastal environment to achieve multiple ecological, economic, and social goals (Ehler, 2013). The establishment of clearly defined boundaries where tenure rights are allocated is one of the critical design principles of successful common property resource management systems. Mapping the spatial extent of fishing rights to small-scale fishers and sharing these maps support broader recognition of tenure rights and are an important step in tenure security within the MSP process. These maps integrated within a marine spatial planning process provide a mechanism to address conflicting and

competing resource uses from both land and sea. Marine spatial planning provides a number of benefits, most importantly minimizing competing and conflicting uses of the marine and coastal environment (Table 16).

Table 16. Benefits of marine spatial planning (Ehler, 2013)

Economic	• Increased certainty of access to desirable areas for new private sector investments, where infrastructure is frequently amortized over 20–30 years
	• Identification and early resolution of conflicts among incompatible uses through planning instead of litigation
	• Streamlined and more transparent permitting and licensing procedures
	• Improved capacity to plan for new and changing human activities, including emerging technologies and their associated effects
Environmental	• Identification of ecologically and biologically significant areas as a basis for space allocation
	• Established context for planning a network of marine protected areas
	• Identification and reduction of the cumulative effects of human activities on marine ecosystems
Social	• Improved opportunities for local community and citizen participation in planning
	• Identification of effects of decisions on the allocation of ocean space (e.g., closure areas for certain uses, protected areas) on communities
	• Identification and preservation of social, cultural, and spiritual values related to the use of ocean space
Administrative	• Improved speed, quality, accountability, and transparency of decision making, and reduction of regulatory costs
	• Improved consistency and compatibility of regulatory decisions
	• Improved information collection, storage and retrieval, access, and sharing

There are a growing number of examples of the use of marine spatial technologies to compile and analyze scientific, traditional, and local knowledge to delineate marine tenure rights and to capture other spatial information needed for fisheries and coastal management. The USAID Coastal Resource Management Project in the Philippines assisted the national and local government in mapping municipal waters for the first time in early 2000 (Courtney, White, & Deguit, 2002). The mapping of municipal waters was an important first step in securing exclusive fishing rights for small-scale fishers enshrined in the Philippine Constitution and national laws and catalyzing municipal fisheries and coastal management (Figure 16). Spatial information on fisheries' catch and effort is essential to understanding the patterns of exploitation. The use of fishers' knowledge in a geographic information system helps capture local information on small-scale fisheries (Leopold, Guillemot, Rocklin, & Chen, 2014). In New Caledonia in the South Pacific, fishers' knowledge provided accurate quantitative and spatial information on catch size, fishing effort, and catch-per-unit effort for entire fisheries. A geographic information system database was developed to capture and map fine-scale spatial distribution of fishing activities according to target species, gear type, and landing sites. To provide a clear portrayal of existing fishing rights, fishers are utilizing their customary or traditional knowledge in conjunction with mapping techniques to assert their rights and needs for a respectful livelihood (Kumar, Saravanan, & Jayaraman, 2014).

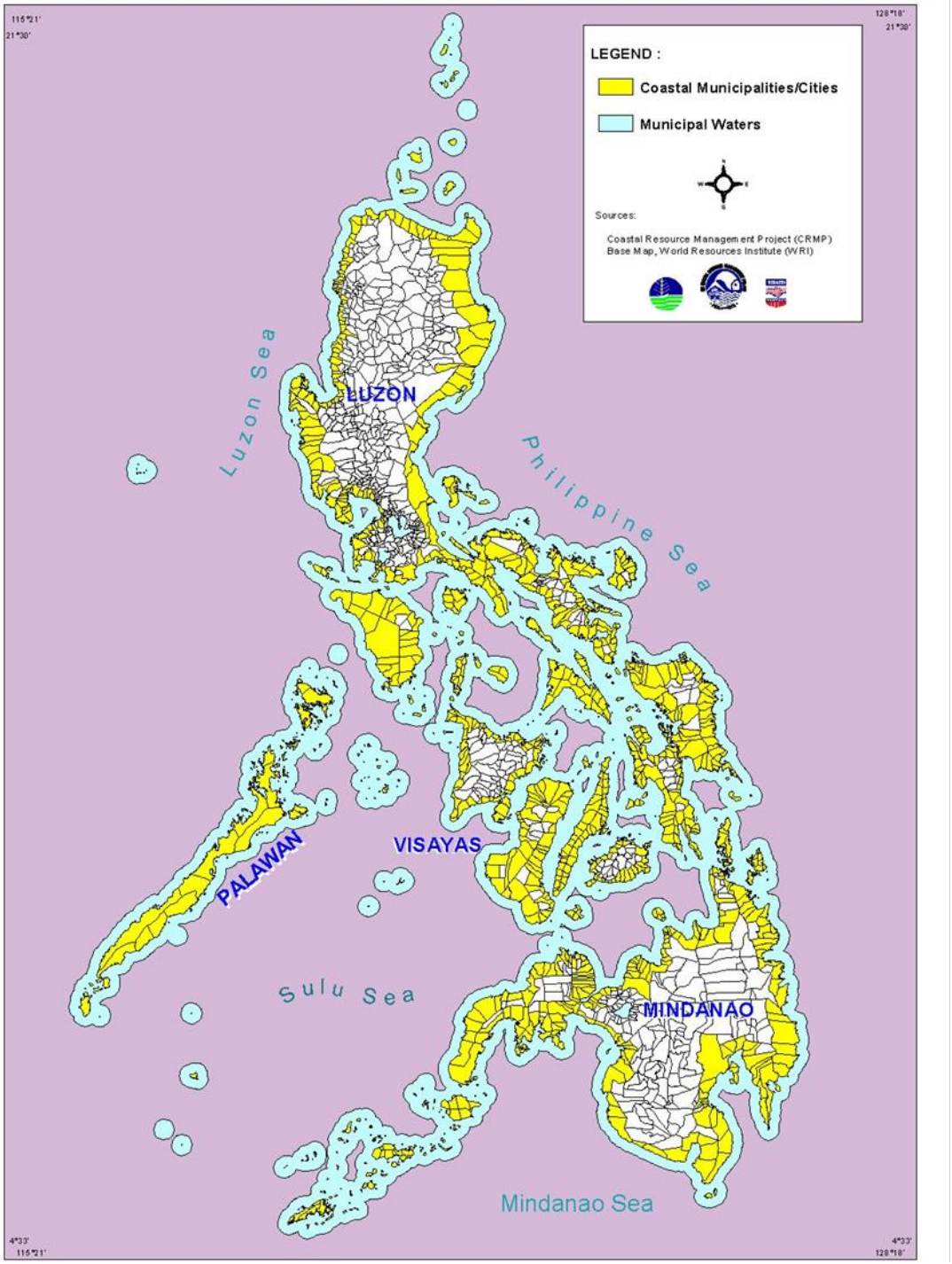


Figure 16. Boundaries of municipalities and cities of the Philippines (highlighted in yellow) and municipal waters (extending 15 km from the shoreline and highlighted in blue) where preferential use rights are allocated to small-scale fishers

5.5 ECOLOGICAL SYSTEMS KNOWLEDGE

Underpinning the design and application of EAFM is the need for knowledge of the social-ecological system at multiple scales and multiple sources (scientific, traditional, and local) to support an integrated, holistic, and ecosystem-based approach. The interaction between human activities and marine ecosystems are being increasingly characterized as interdependent social-ecological systems whose behavior is inherently complex, dynamic, and in many ways unpredictable (Holling, 1996). While marine and coastal ecosystems are complex, so are the associated social systems that use resources and benefit from ecosystem services. As such, problems, like overfishing, are rarely attributed to single causes and require a systems approach to diagnose the complexity of variables that contribute to a particular outcome, of which tenure is a significant variable (Cox, 2011). Characteristics of a social-ecological-system include (Redman, Grove, & Kuby, 2004):

- a coherent system of biophysical and social factors that regularly interact in a resilient, sustained manner;
- a system that is defined at several spatial, temporal, and organizational scales, which may be hierarchically linked;
- a set of critical resources (natural, socioeconomic, and cultural) whose flow and use is regulated by a combination of ecological and social systems; and
- a perpetually dynamic, complex system with continuous adaptation.

The social-ecological systems framework developed and refined by Ostrom (2007) is being applied to a variety of marine tenure regimes in small-scale fisheries (Basurto et al., 2013; Cinner, Basurto, et al., 2012; Gutierrez, Hilborn, & Defeo, 2011; McGinnis & Ostrom, 2012; Ostrom, 2007, 2009; Schlüter & Madrigal, 2012). This multi-tier framework provides a knowledge classificatory system that enables researchers to characterize a diversity marine resource tenure systems using an acknowledged and commonly understood set of variables (Basurto et al., 2013). Epstein, Vogt, Mincey, Cox, and Fischer (2013) argue that because the social-ecological framework emerged from institutional analysis and development, relatively little attention is paid to the natural sciences. As such a seventh core subsystem was added, Ecological Rules, to capture and apply knowledge of the physical, chemical, and biological aspects of the system (Figure 17). This further strengthens the need to understand ecological connectivity as part of an ecosystem approach to fisheries management.

Ecological Rules (*ER*) ER1 Physical rules. ER2 Chemical rules. ER3 Biological rules.		
	Social, Economic, and Political Settings (S) **S1 – Economic development. S2 – Demographic trends. S3 – Political stability. S4 – Other governance systems. S5 – Markets. S6 – Media organizations. S7 – Technology.**	
	Resource Systems (RS)	**Governance Systems (GS)**
	RS1 – Sector (e.g., water, forests, pasture, fish) RS2 – Clarity of system boundaries RS3 – Size of resource system RS4 – Human-constructed facilities RS5 – Productivity of system RS6 – Equilibrium properties RS7 – Predictability of system dynamics RS8 – Storage characteristics RS9 – Location	GS1 – Government organizations GS2 – Nongovernment organizations GS3 – Network structure GS4 – Property-rights systems GS5 – Operational-choice rules GS6 – Collective-choice rules GS7 – Constitutional-choice rules GS8 – Monitoring and sanctioning rules
	Resource Units (RU)	Actors (A)
	RU1 – Resource unit mobility RU2 – Growth or replacement rate RU3 – Interaction among resource units RU4 – Economic value RU5 – Number of units RU6 – Distinctive characteristics RU7 – Spatial and temporal distribution	A1 – Number of relevant actors A2 – Socioeconomic attributes A3 – History or past experiences A4 – Location A5 – Leadership/entrepreneurship A6 – Norms (trust-reciprocity)/social capital A7 – Knowledge of SES/mental models A8 – Importance of resource (dependence) A9 – Technologies available
	Action Situations: Interactions (I) Outcomes (O)	
	Activities and Processes:	Outcome Criteria:
	I1 – Harvesting I2 – Information sharing I3 – Deliberation processes I4 – Conflicts I5 – Investment activities I6 – Lobbying activities I7 – Self-organizing activities I8 – Networking activities I9 – Monitoring activities I10 – Evaluative activities	O1 – Social performance measures (e.g., efficiency, equity, accountability, sustainability) O2 – Ecological performance measures (e.g., overharvested, resilience, biodiversity, sustainability) O3 – Externalities to other SESs
	Related Ecosystems (ECO) **ECO1 – Climate patterns. ECO2 – Pollution patterns. ECO3 – Flows into and out of focal SES.**	

Figure 17. First and second-tier attributes in the SES framework with the addition of a seventh core subsystem: ecological rules (ER) (Epstein et al., 2013). Shaded attributes have particularly large relationships to marine tenure principles.

Within the last decade, significant progress has been made with respect to interdisciplinary investigation and modeling of coupled social-ecological systems (SES). Researchers have developed and applied different approaches to study the interaction between the social system and the ecological systems. A review of 10 prominent frameworks was able to classify these frameworks based on: (a) whether a framework conceptualizes the relationship between the social and ecological systems as being uni- or bidirectional; (b) whether it takes an anthropocentric or an ecocentric perspective on the ecological system; and (c) whether it is an action-oriented or an analysis-oriented framework (Table 17) (Binder, Hinkel, Bots, & Pahl-Wostl, 2013).

Table 17. Frameworks used to generate social-ecological system knowledge

Framework	Social/Ecological Orientation	Action/Analysis Orientation
Driver, Pressure, State, Impact, Response	Antropocentric: S > E	Action oriented
Sustainable Livelihood Approach	Antropocentric: S > E	Action oriented
The Natural Step	Ecocentric: E > S	Action oriented
Turners Vulnerability Framework	Antropocentric: S > E	Action oriented
Earth Systems Analysis	Ecocentric: E > S	Analysis oriented
Ecosystem Services	Ecocentric: E > S	Analysis oriented
Human Environment Systems Framework	Antropocentric: S > E	Analysis oriented
Material and Energy Flow Analysis	Ecocentric: E > S	Analysis oriented
Management and Transition Framework	Antropocentric: S > E	Analysis oriented
Social-Ecological Systems Framework	Antropocentric: S > E	Analysis oriented

USAID has adopted a the social-ecological systems framework for biodiversity conservation programming modeled after the Conservation Measures Partnership (The Conservation Measure Partnership (CMP), 2013). This framework would most likely be categorized similar to the "Driver, Pressure, State, Impact, Response Framework" included in Table 17, as anthropocentric and action-oriented. The development of a situation model provides a graphic representation of a problem analysis to succinctly represent a set of observed or presumed causal relationships among factors that impact one or more biodiversity focal interests (ecosystems and/or species). Situation models are useful tools for biodiversity program design teams, as they provide a way to work together to build and agree upon a model that represents a common understanding of what they want to conserve (biodiversity focal interests) and the various factors influencing those biodiversity focal interests, both negatively and positively. This common understanding provides the foundation for good strategic planning and data gap analysis. The development of situation models and corresponding theories of change as described in USAID's How to Guides provide an opportunity to explicitly consider marine tenure in programming and project design (Stem & Flores, 2016; Stem, Margoluis, & Flores, 2016). This explicit consideration begins with generating information and data on existing marine tenure systems and ecosystem conditions and dynamics in the region or focal area combined with knowledge of management weakness, overlapping governance regimes, conflicts and competing uses, and external drivers of change.

While knowledge of the social-ecological system is an essential component of EAFM, the complexity of social-ecological systems makes it difficult for any one institution or entity to possess the full range of knowledge needed to manage resources (Berkes, 2006). Further, reliance on historical knowledge and trends will not be sufficient in the face of climate change where projections of future conditions will need to be generated to support tenure security and resource sustainability. Climate change and societal responses will disrupt existing tenure regimes by contributing to the forces that drive migration (Freudenberger & Miller, 2010) and that alter the distribution and health of resources upon which

coastal communities depend. As such, both traditional and local knowledge as well as modern scientific knowledge is needed to improve management decisions at the community scale as well across seascapes or large marine ecosystems (Benkenstein, 2013).

The integration of traditional ecological knowledge of the Huave and Zapotec ethnic groups who have fished sustainably since pre-Hispanic times with contemporary scientific data and methods was used to support an ecosystem-based management approach for the Huave lagoon (Espinoza-Tenorio, Wolff, Espejel, & Montaño-Moctezuma, 2013). In-depth knowledge of the fine scale social-ecological characteristics of the lagoon ecosystem was used to characterize the area into six fishing seascapes (river mouth, wetland, shoreline, shallow lagoon, lagoons, and islands and channel) that represented combinations of biological, spatial, and fishing variables based on interviews with long-time, dedicated fishers. Local knowledge of the social-ecological system was integrated with a transdisciplinary modeling approach to analyze the implications of different management strategies, such as gear restrictions to reduce bycatch. The involvement of the fishers in the development of the model not only contributed valuable information, but also may have reduced some conflicts among fishers, technology gear, established marine tenure systems allowing flexible, rapid rule-making and changes, and strong social cohesion supporting compliance with the periodic closure.

Community-based management as part of an EAFM is strengthened with this combined knowledge underpinned by participation, appreciation of multiple perspectives and knowledge, and collaborative learning and decision-making thereby increasing adaptive capacity under changing conditions (Andrew & Evans, 2009; Granthum et al., 2011). This reflects a process where local level information is not only collected, but also shared back and used for collaborative decision-making.

Fish catch in Honiara, Solomon Islands (credit: Tory Read)

Box 21. Ecosystem approach to fisheries management: key take-aways for programming and project design

- EAFM is an essential element of responsible governance of tenure.
- Community-based marine tenure systems with well-defined spatial boundaries and capable and defined institutional membership is an essential component of EAFM in small-scale fisheries.
- In the absence of EAFM supported by collaboration between government, community, and other stakeholders, marine tenure systems are vulnerable to threats and drivers beyond the control and capacity of a community to manage.
- Marine spatial planning can support responsible governance of tenure in the context of an ecosystem-based approach to fisheries management by addressing conflicting and competing uses of the marine and coastal environment that jeopardizes the resource base upon which community-scale marine tenure institutions depend and the security of their marine tenure rights.
- Well-designed networks of marine protected areas that recognize existing tenure rights support sustainable fisheries.
- Fishing restrictions are needed to address excessive fishing effort, or overcapacity in fisheries, a major contributor to declining fish stocks.
- Social-ecological system knowledge needs to be generated at multiple scales and multiple sources (scientific, traditional, and local) to support an ecosystem-based approach that respects existing tenure rights.
- Traditional and local knowledge as well as modern scientific knowledge is needed to improve management decisions at the community scale together with seascapes or large marine ecosystems.

Small-scale fishers in the Philippines (credit: Alan White)

6.0 SUPPORTING THE RESPONSIBLE GOVERNANCE OF MARINE TENURE

Off to market, Monrovia, Liberia (credit: John Parks)

Responsible governance of tenure involves respecting the rights of small-scale fishers and fishing communities to the resources that form the basis of their social and cultural well-being, their livelihoods and their sustainable development. National legal and policy frameworks, administrative and judicial systems, effective co-management arrangements, dispute resolution mechanisms, local participation and empowerment, and strengthened institutional capacity are all key ingredients of responsible governance of marine tenure.

The recognition of community-based marine tenure rights forms the core of an effective approach to coastal fisheries management that supports small-scale fishers. To securely govern these fisheries resources, there first needs to be legal and policy frameworks established at the national and sub-national levels that affirm the importance of a devolved and adaptive approach to small-scale fisheries management through an ecosystem-based approach. These legal and policy frameworks need to be supported through impartial, competent, and accessible judicial and administrative services that enable the frameworks to be effectively and equitably put into practice. Secondly, a collaborative or co-management approach, in which communities work together with key stakeholders—particularly the government, NGOs, civil society organizations, and researchers—can strengthen their capacities in working toward an adaptive ecosystem-based approach.

This chapter sets out the importance of establishing a clear and integrated framework for a national approach to building the responsible governance of marine tenure and developing co-management approaches whereby small-scale fisher communities and other stakeholders collaborate in managing fisheries.

6.1 NATIONAL LEGAL AND POLICY FRAMEWORKS

National policies, laws, and administrative structures are necessary to establish an enabling framework within which the "social" recognition of local tenure rights by small-scale fishery communities can take place and be successful. This provides a legitimate platform for meeting a range of national development outcomes, such as sustainable fisheries, poverty alleviation, and income generation. The SSF Guidelines indicate the need for states to adopt legislation to ensure that small-scale fishers, fish workers, and their communities have secure, equitable, and socially and culturally appropriate tenure rights to fishery resources, fishing areas, and adjacent land, as well as sustainable resource management (FAO, 2015). Further, national policies and laws should support an integrated and ecosystem-based management approach to secure sustainable small-scale fisheries (Pomeroy et al., 2013).

The evolving history of fisheries governance highlights a return to community-scale management. As top-down, centralized management was shown to be largely ineffective in sustainably managing diverse and dispersed small-scale fisheries, national governments have established laws that decentralize and devolve resource use rights and responsibilities to subnational government and community levels with various degrees of co-management (Figure 18). The experience across a range of countries indicates diverse types of trajectories through this devolution process (Table 18).

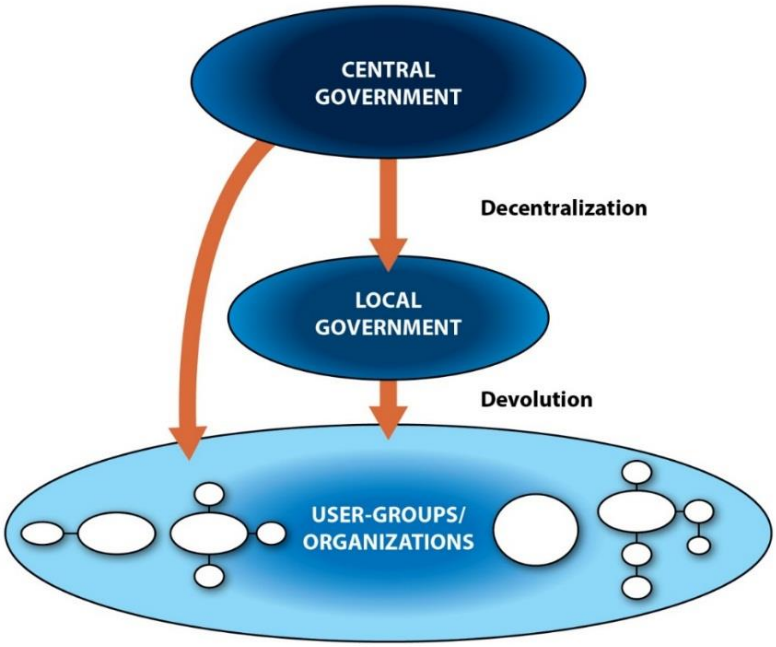


Figure 18. Decentralization and devolution in natural resource management [modified from Berkes (2010)]

A range of factors, some of which have a catalytic effect, can prompt the move toward strong devolution in small-scale fisheries management. These can include a crisis in fisheries stocks in a given coastal environment, the necessity to revive coastal livelihoods after a prolonged conflict period, donor agencies recommending a review of national fisheries policy, national data that reveals significant food security issues among coastal communities, persistent conflicts between large-scale fisheries enterprises and small-scale fishing operations, a campaign by small-scale fishers demanding stronger laws and policies in support of their interests, or a global push to find effective ways of adapting to climate change. Ideally, it becomes part of a new development strategy to reduce obstacles to economic growth, particularly after a crisis or a war, as in the case of Sri Lanka (Lokuge & Munas, 2011).

The gradual process to devolution or decentralization can follow a number of different pathways. This has involved, in some cases, recognition of traditional or customary practices among small-scale fishers through new policies. In other cases, laws or policies have been created anew to formally devolve rights and responsibilities to existing and new tenure institutions in communities. In the process, local institutions are given differing levels of autonomy to self-govern depending on the political context, with governments involved in key aspects of planning approval, knowledge development, licensing, and even conflict management. Devolution is tailored to the national and local context and is carried out in a way that builds on collaborative approaches that strengthen local institutions even as they are integrated into the administrative system of a national fisheries regulatory structure. This trend toward devolution is a continuing one: the main issue now is how to strengthen this process through the legal recognition and clarification of community-based tenure rights so that effective national, ecosystem-based approaches to fisheries management can be put into action.

Table 18. Evolving fisheries governance in selected countries

GHANA (Coastal Resources Center, 2013)	MEXICO (Basurto et al., 2012)	PHILLIPPINES (R. C. G. Capistrano, 2010)	JAPAN (Brown, Staples, & Funge-Smith, 2005)
• **Pre-colonial era:** Traditional fisheries management led by chief fishermen and chief fishmongers in each shorefront community responsible for defining and enforcing the rules in their immediate areas. • **Colonial era (1850–1957):** British colonial government established a Department of Fisheries with the goal of maximizing catches. • **Post-colonial era (1957–1980):** Fisheries Law of 1964 continued to promote the "development" of Ghana's fisheries by introducing new methods of fishing and providing technical support and subsidies. • **Decentralization era (1980s and 1990s):** Movement to decentralize government gave the District Assemblies explicit responsibility for the licensing of canoes and preparation of bylaws that support the implementation of national fisheries regulations; attempts to establish co-management arrangements were not effective, and little evidence of this effort remains today. • **Current fisheries law:** A top-down management system remains in effect with fisheries policy and regulations, with monitoring and enforcement being the responsibility of central authorities; however, traditional authorities remain respected members of fishing communities and often assume leadership roles.	• **Pre-colonial era**: Farming and subsistence-fishing societies with communal land and sea tenure systems. • **Spanish colonial era (1521–1821):** Loss of traditional system of communal land and sea tenure. • **Post-colonial (1921–1970):** First fisheries law (1925) determined the duration of fishing seasons, delineation of fishing areas, and fishing gear specifications to be regulated through permits to fish buyers. • **Current fisheries law:** Indigenous communities granted formal rights to a portion of their historic coastal territory in the form of common land use rights in the mainland, using the *ejido* system of communal land tenure. Fishing permits, granted to any corporate entity (typically a cooperative) or individual for periods of 1 to 5 years with no specified limit on the number of permits a cooperative or individual may hold, remain in use as a primary management approach.	• **Pre-colonial era:** Subsistence fishing societies managed by indigenous people through tribal village management systems. • **Spanish colonial era (1521–1898)**: Colonization by Spain and then America resulted in loss of tribal lands and resources; and authority was replaced by top-down management. Trade in fisheries expanded. • **American colonial era (1898–1946)** First fisheries act (1932) excluded large-scale fishing vessels from area within 3 nautical miles from shore. • **Post-colonial (1946–1991):** Constitution (1987) protects the rights of subsistence fishers to exclusive use of marine resources. Local government code (1991) assigned responsibility for managing nearshore area (15 kilometers from shore) to municipal and city governments. Community-based coastal resource management initiatives emerged to address declining fish stocks. • **Current fisheries law:** Indigenous Peoples Act (1997) protects the rights of the indigenous in the utilization of natural resources within their ancestral domain. The Fisheries Code (1998) strengthened decentralized fisheries management designating municipal waters, out to 15 nautical miles from the shore, for the exclusive use of small-scale fishers (vessels less than 3 gross tons), and providing mechanisms for local government to consult with small-scale fishers and other stakeholders in establishing fisheries management regulations and adopted an ecosystem approach to fisheries management	• **Early feudal era (1603–1700):** Communities controlled adjacent coasts and were responsible for establishing rules for exploitation. The offshore areas were open access. • **Late feudal era (1700–1886):** Fisheries became labor intensive and controlled by a few wealthy operators. Large-scale operators exploited offshore areas. • **Modernization (1868–1901):** Government attempted to introduce top-down management systems (and failed). It returned to customary arrangements, with communities controlling adjacent coast. • **Meiji fisheries law (1901–1945):** Fishing rights were granted to local societies and individuals. • **Current fisheries law:** Fishing rights granted to both cooperatives and associations to exploit coastal areas. Licenses are granted to individuals for exploiting offshore areas.

At present, the development of policies for small-scale fisheries is in its early stages globally. Often, even where there is a clear recognition that small-scale fishers need to be provided with support for national reconstruction, such as in Sri Lanka, in practice policies actually continue to favor joint ventures with large-scale Asian fishing companies and industrial-scale fishing. In South Africa, too, there is a contradiction between the new small-scale fisheries policy, which supports poorer fishers, and the country's reliance on an approach that tends to work in the interests of large-scale fishers.

There are a number of reasons why fisheries policies for small-scale fisheries will need to be rethought or newly developed. In the context of South Africa, for example, the transition to democracy in 1994 resulted in a new South African Constitution in 1996, which sought to redress past injustices and provide greater rights for marginalized communities, including recognition of "customary living law" (Sowman, Raemaekers, & Sunde, 2014). After a 2005 legal action by traditional fishers against the minister responsible for fisheries, a court ruling mandated the development of policies that supported small-scale fisheries (Isaacs, 2011; Sowman et al., 2014). In 2012, some five years after the court ruling, a small-scale fisheries policy was finally promulgated.

Where discrete interventions are developed in the absence of coherent small-scale fisheries policies, as in the case of the 1999 Executive Order in Ecuador giving legal recognition to communities' ancestral rights to mangrove concessions, there can be negative side effects for sustainable fisheries (Box 22). In this case, the exclusion of those cockle collectors who were not eligible to be members of these concessions resulted in intensified pressures on open access areas. Therefore, an integrated, ecosystem-based management approach that utilizes spatial planning helps bring about policies supporting the equitable inclusion of small-scale fishers in devolved tenure institutions.

Box 22. Sustainable management of cockles in mangrove concessions in Ecuador (Beitl, 2010, 2011)

The conversion of coastal mangrove wetlands for shrimp farming has threatened artisanal fisheries and the social-ecological resilience of coastal communities worldwide. Mangrove concessions for shellfish harvesting have been shown to have great potential in promoting ecological and economic sustainability through mangrove conservation and habitat restoration. In Ecuador, despite the existence of laws that protect mangroves since the 1980s, mangroves have declined as a result of the increased number of shrimp farms. Along with ecological degradation, mangrove deforestation has also resulted in numerous social impacts, such as community displacement, loss of livelihoods, erosion of resource rights, reorganization of local economies, increase in economic disparity, and social conflict.

In aiming to address the problem, a 1999 executive order established the legal recognition of ancestral rights to develop community-based mangrove concessions (*custodias*) for sustainable use and stewardship. This produced positive results. Not only were cockles (clams) sustainably harvested from the roots of mangrove trees, but also it led to community empowerment; local autonomy over resources; mangrove conservation and recovery; higher cockle catch shares; and larger shell sizes. These concessions were managed through periodic and rotating closure periods (Beitl, 2010, 2011).

However, local residents were not able to establish *custodias,* and independent collectors ended up having to compete for shellfish outside of the concessions in open-access areas. Here, however, overexploitation continued, which led to fewer and smaller-size catches. This implies that while devolving control to local management groups was very successful, the lack of an integrated approach by the government resulted in an intensification of the problem in the remaining open-access areas. Identifying solutions to ecological problems requires an ecosystem-based management approach and careful examination of the linkages between social and ecological systems.

The evolution of fisheries laws in Ghana and the Philippines offers important insights into the establishment of national legal and policy frameworks targeting small-scale fisheries. As is the story in many developing nations, Ghana's colonial era was marked by unregulated exploitation of natural resources and the loss of traditional management authorities, knowledge, and practices. The marine environment of the Western Region of Ghana, shaped by three main rivers flowing into the ocean, was abundant in natural resources and provided the region with a source of livelihoods for thousands of years (Coastal Resources Center, 2010). Seven years after Ghana's independence from Great Britain in 1957, the parliament adopted a fisheries law to provide an administrative framework for technical assistance in support of fisheries. During this period, fisheries were largely unregulated, and fisheries-related issues were left to the community level to be addressed by the traditional chief fisherman.

Fisheries management responsibilities were later decentralized to district assemblies in the 1980s, as the central government was ineffective in responding to local fisheries concerns. Their responsibilities were to adopt regulations to manage artisanal fishing. The National Fisheries Department retained the responsibility for setting policy, monitoring, and enforcement. Although district-level officials were given authority over fisheries management, they were, in fact, primarily agricultural specialists. Further, it became evident that district assemblies had no capacity to address the rapidly increasing commercial trawlers, intrusion of foreign vessels, or conflicts among the industrial and canoe fleets. Therefore, community-based fisheries management committees were established in 1997, supported by donors, to encourage resource users to participate in and advise district assemblies on fisheries issues and management needs for the canoe fleets operating from community landing sites. Although this has been a positive move, the committees' effectiveness has been constrained by the reliance on district assemblies to establish laws; the absence of an overarching national policy and legal framework; and an inability to influence the most pressing fisheries issues, especially intrusion of commercial and foreign fleets in waters used primarily by artisanal fishers.

Philippine national laws and policies recognize the exclusive right of small-scale fishers to marine resources in nearshore waters. The 1987 Philippine Constitution assigns ownership of all waters and aquatic resources to the state, and mandates the government to protect the rights of subsistence fishermen and coastal communities to the exclusive use of marine resources (USAID, 2010). In addition, the 1991 Local Government Code devolves responsibility for managing coastal resources in municipal waters to the over 850 coastal municipalities and cities of the Philippines (Figure 16). The Local Government Code established "municipal waters" as extending from the shoreline to 15 kilometers away as the exclusive fishing area for municipal (artisanal) fishers. The 1989 Organic Act for the Autonomous Region in Muslim Mindanao provides for self-governance in Mindanao within the framework of national sovereignty. Furthermore, the 1997 Indigenous Peoples' Rights Act recognizes the rights of indigenous peoples to their cultural integrity and self-government as well as customary property rights to ancestral domains and lands (USAID, 2010). This has given indigenous communities enormous powers to (re)claim territorial control including coastal areas.

Later, the 1998 Philippines Fisheries Code promoted decentralized coastal resource management as a national strategy and reinforced the primary role of local government as well as Fisheries and Aquatic Resource Management Councils (FARMC) for co-management of fisheries and habitats in municipal waters. FARMCs at the national, municipal, and village (*barangay*) levels are the institutional bodies through which fishers and other stakeholders can advocate for marine resource tenure rights from the local government (Pomeroy et al., 2010). Municipal- and *barangay*-level FARMCs' composition is dictated

by Fishery Administrative Order 196 and includes representatives from the legislative and executive branches of the local government, a nongovernmental organization, and the private sector, with at least 75 percent of the membership from fishers and fish workers, including youth and women.

While devolution has been occurring, there has been limited translation of EAFM principles into national fisheries policy and operational objectives (Pomeroy et al., 2014). Many countries continue to rely on conventional fisheries management with a focus on target species, stock assessments, and top down governance. In a review of countries in the Coral Triangle region, this slow transition has been attributed to: (a) lack of priority; (b) lack of capacity; (c) concern about "management overload;" (d) lack of institutional coordination and cooperation; (e) lack of policy and legislation; (f) concern about cost and funding; and (g) concern about data and information needed to support EAFM.

Despite the robust legal and policy framework, constitutionally recognized rights to the preferential use of nearshore waters for small-scale fisheries, national fisheries plans, externally funded fisheries programs, and thousands of local initiatives, failures and inadequacies in the governance of small-scale fisheries persist (Perez et al., 2012). The management capacity and political will of the local government to restrict access and reduce fishing effort remains limited. Community-based no-take marine protected areas have emerged as a mechanism to limit access and improve fish stocks outside of these areas. These informal rules are legitimized through local municipal ordinances. In many cases, technical expertise is lacking, and local governments must rely on donor-funded projects for technical assistance. Further, local governments must also address land-use issues, economic development, and other basic services to its communities.

6.2 CO-MANAGEMENT ARRANGEMENTS

Although the development of enabling legislation and policies that devolve marine tenure to local small-scale fisheries communities provides the strongest form of security for community-based management, many other conditions are needed to support successful outcomes. Co-management arrangements with government and other stakeholders are needed to work in partnership with local communities in developing resilient and workable approaches for managing fisheries. The diverse types of community-based tenure institutions, to a larger or smaller extent, often work in some type of collaborative or co-management approach with the government and other key supporters (Figure 19) (Pomeroy, 2007; Pomeroy & Berkes, 1997; Pomeroy & Rivera-Guieb, 2006).

Figure 19. Co-management relationship between autonomous community-based management and government-led centralized management (Pomeroy & Berkes, 1997)

Box 23. Four main pillars needed to mainstream co-management within fisheries (Brown et al., 2005)

1. Enabling policy and legislation
2. Empowering communities
3. Linkages and institutions
4. Human and financial resources

Four main pillars are needed to mainstream co-management within fisheries (Box 23). Co-management, from the point of view of the government (be it the central or local), often involves ensuring that local groups are following established regulatory structures and protocols that typically require approvals and licenses from the government for specific activities. From the point of view of the community, they may seek the technical and capacity-building support of the government and NGOs to ensure that their governance and management systems can achieve their objectives in practice. Ideally, co-management involves a sharing of power and responsibility between the state and resource users in which participatory processes form the central approach to collaborative decision-making (Jentoft, McCay, & Wilson, 1998). Co-management is considered a recommended best practice for small-scale fisheries management (FAO, 2015). One of the benefits of co-management is the ability to develop integrated management goals and plans that operate at larger geographic and ecosystem scales. In this way, a coherent and effective national program of action can emerge.

In practice, co-management covers a broad spectrum of management arrangements, and, as such, is often considered a rather vague concept that implies collaboration of some type. These varied co-management approaches can range across a spectrum from centralized management to autonomous community self-governance (Figure 19).The specific nature of these arrangements can be categorized into one of the following types (Berkes et al., 2001; Pomeroy & Berkes, 1997; Sen & Raakjaer Nielsen, 1996):

- **Instructive:** A minimal exchange of information exists between the government and users that is only somewhat different from centralized management in that the government informs users of its decisions.

- **Consultative**: Some form of consultation mechanism is available for the government to discuss plans with users, but the final decision rests with the government.
- **Advisory**: Users advise the government about its decisions for endorsement.
- **Informative**: The government has delegated decision-making authority to users, and users then have to inform the government of its decisions.
- **Cooperative**: Government and users cooperate as partners in decision-making. This is the ideal scenario of co-management.

The degree of devolution, direction of accountability, and its effectiveness varies among countries (Cinner, Daw, et al., 2012). Part of the design mix in co-management involves key stakeholders other than the government, such as nongovernmental organizations, academic and research institutions, and other fisheries stakeholders, such as boat owners, fish traders, moneylenders, and tourism establishments (Table 19). All in all, co-management requires consideration of how to bring together key stakeholders working at different scales, from national to the local, to develop good governance within small-scale fisheries. The embeddedness of local tenure institutions within higher-level organizational and legal processes means that the responsible governance of marine tenure requires the careful development of multi-scalar governance modalities, and understanding where power and legitimacy lies to promote action. This aims to make the best use of complementary strengths in terms of knowledge, technology, management skills, record-keeping, conflict resolution, and long-term commitment. A recent global review of local tenure in mangrove systems found that for many countries, authority over mangrove forest management is overwhelmingly vested in state institutions, that state-led mangrove protection is a central objective, and local communities have no or minimal substantive use of its natural resources. (Rotich et al., 2016). Often in these circumstances, government has little to no enforcement capacity, leaving a clear governance gap.

Crucial to the creation of effective co-management arrangements is the "governability" of fisheries in a given country (Kooiman & Bavinck, 2013). Governability refers to the capacity or quality of interactive governance that builds links among state, market, and civil society. It is considered to be an important dimension of creating successful outcomes. Understanding how co-management can work in any given situation requires close analysis of the power differentials and capacities of key stakeholders. Co-management can help bolster effectiveness along a number of dimensions: (a) data gathering; (b) decisions, such as who can harvest and when; (c) allocation decisions; (d) protection of resources from environmental damage; (e) enforcement of regulations; (f) enhancement of long-term planning; and (g) more inclusive decision-making (Pinkerton, 1989).

Table 19. Roles and responsibilities of co-management players (Brown et al., 2005)

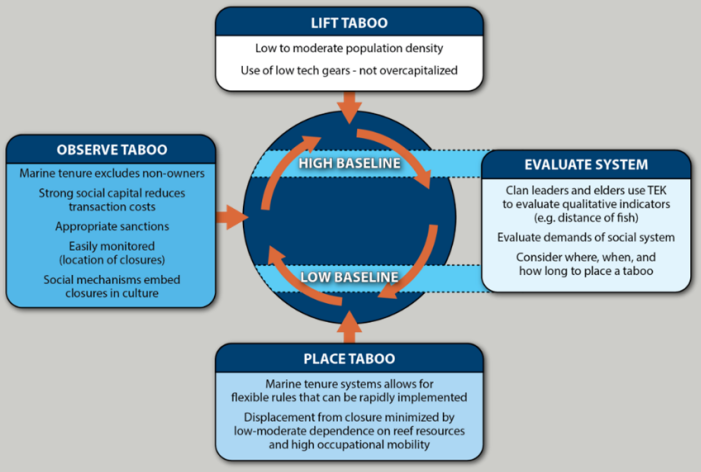
Players	Role and responsibilities
GOVERNMENT AND ITS INSTITUTIONS • Central/national/federal • Provincial/regional/state/local	*At the national level:* • Provide an enabling environment through the specification of policy and legislation • Technical support/advice/human resource development • Empowerment, incentives, equity • Facilitate a participatory process/partnership • Ensure linkages • Standard setting • Quality control, trade and market support *At the local level:* • Execute policy • Implement management plan and measures • Issue local administrative rules, regulations and ordinances • Keep records, coordinate with other sectors • Engage in local project planning
FISHER INSTITUTIONS • Communities • Groups • Organizations, etc.	• Local governance, planning, and implementation • Custodian/stewardship over resources • Sustainable exploitation of resources • Formulation/observance of local rules and regulations • Conservation and resource enhancement • Participation in objective-setting and planning • Facilitation of participatory process/partnership • Involvement in national/regional processes
INDIVIDUAL FISHERS (not included above) • Individuals • Groups outside formal systems • Migrants	• Stakeholders not currently in a marine tenure institution, but who use the resources and are expected to follow management interventions • May be "outside" the formal arrangements but still need to be considered/involved
PRIVATE SECTOR • Small-scale entrepreneurs • Larger-scale/industrial	• Role in market development
FACILITATORS AND SUPPORT GROUPS • Intergovernmental agencies • International, local NGOs • Trade unions • Advocacy groups	• Financial support and pilot implementation of projects • Capacity building • Advocacy • Horizontal networking • Extension and model pilots • Standard setting
MEDIA	• Raise awareness, information flows/exchange

Adaptive co-management has emerged to build a bridge between co-management approaches on the one hand, and adaptive management on the other (Armitage, Berkes, & Doubleday, 2007; Berkes, 2010). Adaptive management is an orientation that continually improves the management approach in the face of emerging challenges and lessons learned. Indeed, it can be said that if co-management does not become adaptive, it is likely to fail (Bown, Gray, & Stead, 2013). Adaptive co-management focuses on learning (experiential and experimental) and collaboration (vertical and horizontal) to improve our

understanding of, and ability to manage complex social-ecological systems (Armitage et al., 2009). Local institutions must have the capacity to interpret and respond to changing resource conditions and be flexible enough to allow for adaptive resource use practices and governance regimes (Gunderson, 1999). Again, we can learn from customary marine tenure systems that implement an adaptive management cycle based on traditional ecological knowledge and local experiences (Box 24).

Box 24. Adaptive management in customary marine tenure systems

Customary marine tenure systems draw on a long history of traditional ecological knowledge to manage resources. In Papua New Guinea and Indonesia, periodic closures of fishing grounds (taboos) based on traditional ecological knowledge are used to maintain social and ecological benefits from coral reef fisheries (Cinner, Marnane, McClanahan, & Almany, 2006). The adaptive management cycle occurs in four phases: evaluating the condition of the resources, placing the taboo, observing the ecological impact of the taboo, and lifting the taboo/harvesting the resources. Taboos were placed and lifted during periods of high and low fish abundance based on observations of time and distance needed to catch fish as well as other indicators. The effectiveness of periodic closures was demonstrated by an increased fish biomass and size compared with open access areas in this controlled setting.



To facilitate adaptive co-management, the adaptive capacity of both communities and governments has to be enhanced (Armitage, 2007). This requires bolstering the endowments, entitlements, and capabilities of vulnerable communities within a supportive policy environment that is more agile and flexible in the face of new challenges. While innovative solutions to problems can emerge from undertaking an adaptive co-management pathway, the crucial limits for innovation and reflective learning are that they require time and additional resources. By including them in project design, these costs can be streamlined and reduced. Core features of adaptive co-management include innovative institutional arrangements and incentives across spatial and temporal scales and levels; learning through complexity and change; monitoring and assessment of interventions; the role of power; and opportunities to link science with policy. Based on case study evidence, 10 key "conditions for success" must be largely met to achieve success in adaptive co-management (Table 20).

Table 20. Conditions for success in adaptive co-management (Armitage et al., 2009)

Condition of success	Explanation
Well-defined resource system	Systems characterized by relatively immobile (as opposed to highly migratory and/or transboundary) resource stocks are likely to generate fewer institutional challenges and conflicts, while creating an enabling environment for learning.
Small-scale resource use contexts	Small-scale systems (e.g., management of a specific rangeland or local fishery) will reduce the number of competing interests, institutional complexities, and layers of organization. Larger-scale resource contexts (transboundary stocks, large watersheds) will exacerbate challenges.
Clear and identifiable set of social entities with shared interests	In situations where stakeholders have limited or no connection to "place," building linkages and trust will be problematic. In such situations, efforts by local/regional organizations to achieve better outcomes may be undermined by non-local economic and political forces.
Reasonably clear property rights to resources of concern (e.g., fisheries, forest)	Where rights or bundles of rights to resource use are reasonably clear (whether common property or individual), enhanced security of access and incentives may better facilitate governance innovation and learning over the long term. Such rights need to be associated with corresponding responsibilities (e.g., for conservation practices, participation in resource management).
Access to adaptable portfolio of management measures	Participants in an adaptive co-management process must have flexibility to test and apply a diversity of management measures or tools to achieve desired outcomes. These measures may include licensing and quota setting, regulations, technological adjustments (e.g., gear size), and education schemes.
Commitment to support a long-term institution-building process	Success is more likely where stakeholders accept the long-term nature of the process, and recognize that a blueprint approach to institutions or management strategies is probably not advantageous. Short-term donor projects do not facilitate such an orientation. Commitments of this type can provide a degree of relative stability in the context of numerous changes and stresses from within and outside the system.
Provision of training, capacity building, and resources for local, regional, and national stakeholders	Few stakeholder groups will possess all the necessary resources in an adaptive co-management context. At the local level, resources that facilitate collaboration and effective sharing of decision-making power are required. Regional and national entities must also be provided with necessary resources.
Key leaders or individuals are prepared to champion the process	Key individuals are needed to maintain a focus on collaboration and the creation of opportunities for reflection and learning. Ideally, these individuals will have a long-term connection to "place" and the resource, or, within a bureaucracy, to policy and its implementation. Such individuals will be viewed as effective mediators in resolving conflict.
Openness of participants to share and draw upon a plurality of knowledge systems and sources	Both expert and non-expert knowledge can play productive and essential roles in problem identification, framing, and analysis. The tendency in most resource management contexts is to emphasize differences in knowledge systems. However, there are substantial contributions to social-ecological understanding, trust building, and learning, where the complementarities between formal, expert knowledge and non-expert knowledge are recognized.
National and regional policy environment explicitly supportive of collaborative management efforts	Explicit support for collaborative processes and multi-stakeholder engagement will enhance success. This support can be articulated through federal or state/provincial legislation or land or sea claim agreements, and through the willingness to distribute functions across organizational levels. Additionally, consistent support across policy sectors will enhance the likelihood of success and encourage clear objectives, provision of resources, and the devolution of real power to local actors and user groups.

The role of local knowledge and how it intersects with other forms of knowledge within adaptive co-management arrangements is of particular interest. The Kenyan Beach Management Units case helps illustrate the importance of scientific data generated through co-management arrangements with government and NGOs, together with local knowledge to adapt rules to improve outcomes (Box 25).

Box 25. Adaptive co-management in Kenya's Beach Management Units

The adaptive co-management process of learning, knowledge sharing, and adapting was explored between the Kenyan national government and recently devolved beach management units (BMUs) (Evans, Brown, & Allison, 2011). Institutional, sociocultural, and political factors, as well as history were found to influence each phase of local and state decision-making. Fishers were knowledgeable about their fishery's condition and threats, but were not able to recognize larger ecological trends or the changing nature of threats. In this context, annual communication of fish catch data along the Kenyan coast helped to shape management debates and decisions (Cinner, Daw, et al., 2012). Some landing sites restricted the use of seine nets, leading to increased catch in some of the compliant landing sites (McClanahan & Mangi, 2004). The wider sharing of this information lead to improved compliance, as it was confirmed that seine net use was the cause of the declining catches. Subsequent monitoring of the catch has shown a continuing increase in fish catch metrics and income (McClanahan, 2010).

The Kenyan government transitioned to co-management of fisheries resources and devolved some marine tenure rights and responsibilities to BMUs in 2007. A BMU is composed of boat owners, managers, fish processors, fish traders, local gear makers or repairers, and fishing equipment dealers led by an executive committee of stakeholders. BMUs are defined geographically in terms of where fishers land their catch. BMUs can comprise one or more landing sites. In most cases, to qualify for registration as a BMU, a landing site needs to have a minimum of 30 boats, among other requirements (Cinner et al., 2009).

The spatial jurisdiction of a BMU extends from the coastline covering the landing sites (that meet the minimum requirement of 30 boats) out to the limit of "inshore waters." Within their area of jurisdiction, the BMUs are responsible for assisting the Ministry of Fisheries in recording landings and enforcing fisheries regulations (Cinner et al., 2009). BMUs can also develop their own bylaws that may, for example, restrict certain gears or establish a fisheries closure. However, decisions about registration, spatial jurisdiction of a BMU, and any other activities that a BMU may be engaged in rests with the Director of Fisheries.

Despite this long-standing interest in co-management approaches within fisheries, there have been few general or multidisciplinary empirical analyses of the impacts of co-management in small-scale fisheries (Gutierrez et al., 2011). Metadata reviews of fisheries' co-management arrangements across a range of countries and sites produced distinctly different types of insights. One review indicated that co-management delivers benefits to end-users through improvements in key process indicators, namely participation, influence, rule compliance, control over resources, and resource conflict (Evans, Cherrett, & Pemsl, 2011). Their data from across 90 sites in 50 countries, however, was dominated by Philippines cases. They therefore concluded that it is hard to make generalizations given the lack of comparative data. They recommended the identification of more comparative data, as well as systematic approaches for assessing and evaluating governance frameworks.

Another study of 130 co-managed fisheries in 40 countries (with different development levels, ecosystems, fishing sectors, and resource types) concluded that strong leadership was the prime attribute of successful co-management, followed by individual or community quotas, social cohesion, and protected areas (Gutierrez et al., 2011). Less important were such conditions as enforcement mechanisms, long-term management policies, and life history of the resource. This general conclusion is potentially confirmed by another study of how social capital is utilized by leaders of small-scale fisher

organizations in Chile's coastal benthic co-management systems (Marin, Gelcich, Castilla, & Berkes, 2012). They found positive and strong correlations between co-management performance and leaders' ability to link social capital.

Co-management in coral-reef ecosystems was evaluated in 42 co-management arrangements across five countries: Kenya, Tanzania, Madagascar, Indonesia, and Papua New Guinea (Cinner, McClanahan, MacNeil, et al., 2012). This analysis showed that: (a) co-management is largely successful at meeting social and ecological goals; (b) co-management tends to benefit wealthier resource users; (c) resource overexploitation is most strongly influenced by market access and users' dependence on resources; and (d) institutional characteristics strongly influence livelihood and compliance outcome, yet have little effect on ecological condition (Cinner, McClanahan, MacNeil, et al., 2012).

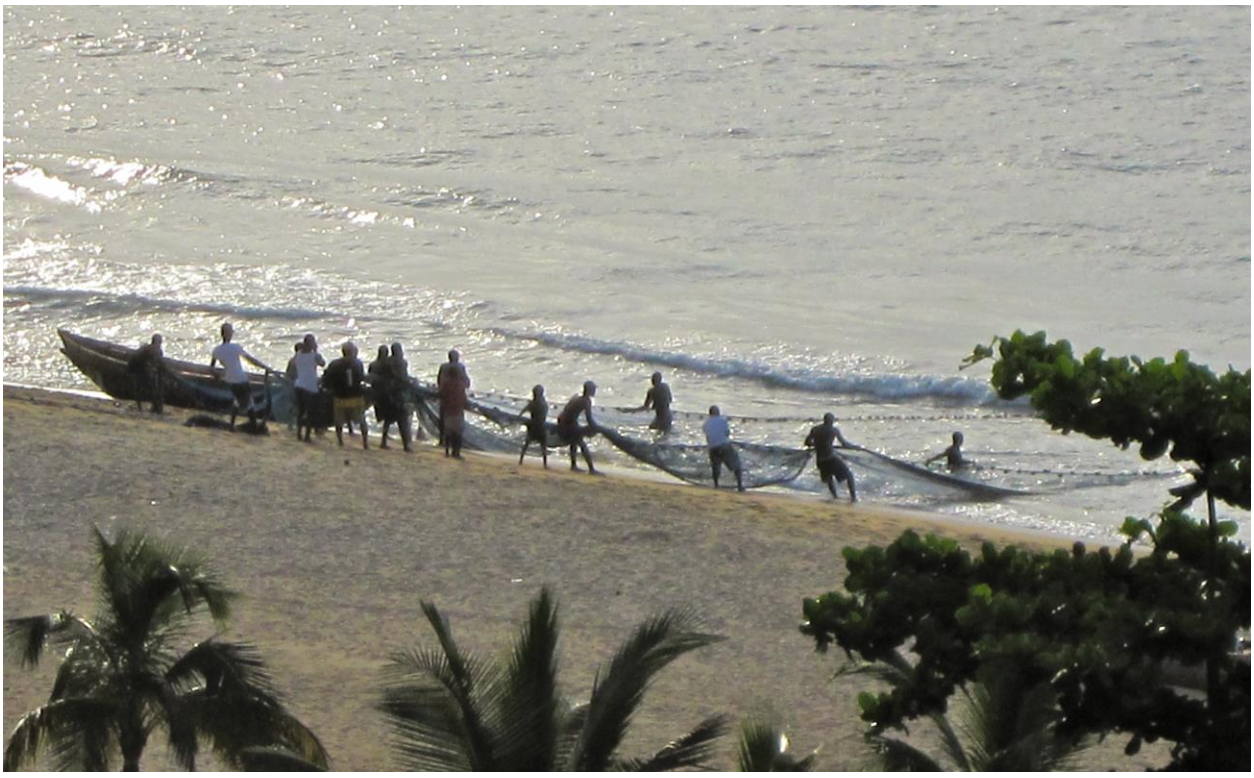
The process of marine resource management devolution and transition toward co-management in three east African countries was found to be driven largely by donor ideology and subsequent support (Cinner, Daw, et al., 2012). Further, while the transfer of power to local resource users created a degree of participation in resource management, accountability remained upward to national governments rather than downward to local actors.

Finally, in a comprehensive literature review of co-management of coral reefs, Wamukota, Cinner, and McClanahan (2012) found that a systematic evaluation of measures of success was absent, possibly reflecting the interdisciplinary nature of co-management, the diversity of goals and the large number of potential dimensions of success including attitudinal, behavioral, economic, ecological, and project sustainability.

While legal and policy frameworks are needed to provide the enabling conditions for responsible governance of tenure, the nature of co-management arrangements for devolved marine tenure systems needs careful attention. It is in part the nature of the co-management arrangements that highlight the difference between a "rights-based" fisheries management approach with a "human rights-based" agenda. In a "rights-based" fisheries management approach, co-management arrangements are typically top-down, where total allowable catch is allocated and strictly monitored by national or subnational levels of government. In community-based marine tenure systems, the devolution of rights and responsibilities are key ingredients in generating the interest of small-scale fishers and communities to organize and act collectively to manage their resources sustainably. Under these conditions, co-management arrangements must have downward accountability to local resource users providing a range of technical, administrative, and financial support to promote enduring local tenure institutions in a changing world.

Box 26. Responsible governance of tenure: key take-aways for programming and project design

- Responsible governance of tenure involves respecting the rights of small-scale fishers and fishing communities to the resources that form the basis of their social and cultural well-being, their livelihoods and their sustainable development.
- National legal and policy frameworks, administrative and judicial systems, effective co-management arrangements, dispute resolution mechanisms, local participation and empowerment, and strengthened institutional capacity are all key ingredients of responsible governance of marine tenure.
- Co-management must be adaptive focusing on learning (experiential and experimental) and collaboration (vertical and horizontal) to improve understanding of, and ability to manage complex social-ecological systems
- Co-management arrangements need to have downward accountability of national or subnational entities to community-based tenure institutions providing a range of technical, administrative, and financial support as part of responsible governance of tenure within a "human rights-based" approach.



Beach Seine Liberia (credit: John Parks)

7.0 KEY FINDINGS AND RECOMMENDATIONS FOR DEVELOPMENT PROGRAMMING

Timor-Leste (credit: Tory Read)

The substantial body of evidence developed by researchers, resource managers, and practitioners and long enduring customary and traditional tenure systems clearly demonstrates that small-scale fishers and coastal communities with secure rights over a given fishery, fishing ground, or territory have a strong interest in organizing and acting collectively to manage their resources sustainably. Even though local communities have customarily managed their small-scale fisheries for long periods of time, the lack of legitimate recognition of these tenure arrangements as well as gradual breakdown of these practices through economic and political transformations has led to a significant governance gap in effective fisheries management. Further, a range of environmental, social, political, economic, and technological transformations have changed social cohesion, trust, and dependencies in the community and the condition of the resources upon which coastal communities depend.

The contribution of small-scale fisheries (e.g., to economic, social, environmental, cultural, food security, poverty alleviation, and coastal rural development) is significant and often interconnected. Multi-functionality, in terms of fishery value chain, multiple livelihoods, and employment in tourism and other industries, is an important characteristic of small-scale fishers and fishing communities that must be factored into project design. In the face of growing, complex, and often uncertain local and global impacts on marine and coastal ecosystems, an ecosystem-based approach and effective co-management arrangements are needed to support community-based tenure institutions. Social-ecological system knowledge is needed to responsibly develop programs and projects based on multiple scales and sources of knowledge.

Given the extreme crisis in fisheries globally, the increasing vulnerability of the communities that depend on them, and urgency to take action, it is imperative that this growing body of knowledge is used to design and improve programs on marine tenure and small-scale fisheries. The SSF Guidelines provides a platform to support responsible governance of tenure and sustainable small-scale fisheries for poverty alleviation, food security, inclusive economic growth, biodiversity conservation, climate resilience, and other development objectives. This chapter puts forth key findings and recommendations for consideration in developing programs and projects with a final strong caveat that "no one size fits all."

Recognize the substantial and multidimensional contribution that sustainable small-scale fisheries can provide to reduce extreme poverty in country development strategies and portfolios. Most coastal and island developing countries have large maritime jurisdictions that support a complex and often conflicting and competing array of human uses. Small-scale fishers are at the heart of this "blue development space." The vital role that sustainably managed small-scale fisheries play in ending extreme poverty, providing food security, nutrition, and livelihoods in developing countries is undisputed based on research from around the world. Further, ample evidence exists that sustainably managing wild stocks of fish and diverse marine habitats can support food security, biodiversity conservation, climate resilience, and other development objectives. Our ability to characterize small-scale fisheries, in terms of amount of catch, number of boats and fishers, and accounting of economic contribution, is still hampered by a lack of legal definitions, social and economic assessments, and data on fish catch. All of this is complicated by diverse types of small-scale fisheries in terms of widely dispersed landing sites and diversity of targeted fish species. As a result, small-scale fisheries and marine tenure have emerged as a global agenda for which innovative programming and empirically based policies are needed. By recognizing this substantial and multidimensional role, USAID and its partners have many opportunities to support multiple development objectives (Table 21).

Table 21. Looking to the sea to support USAID development objectives

USAID Development Objectives (USAID, 2011)	Marine and Coastal Nexus
Conserve biodiversity and ecosystem services for sustainable, resilient development	• Addressing pressures and drivers of marine biodiversity loss improves the health and resilience of marine and coastal ecosystems and rebuilds the natural capital required for sustainable, resilient development
Increase food security and nutrition	• Managing small-scale fisheries sustainably provides food security to a growing coastal populations where fish are a significant source of protein and nutrients
Reduce extreme poverty and promote sustainable, inclusive economic growth	• Securing preferential use rights of small-scale fishers to nearshore waters while providing equitable distribution of benefits from other marine and coastal industries including large-scale fisheries, oil and gas development, and coastal tourism is a key facet of the promotion of sustainable, inclusive economic growth
Prevent and respond to crises, conflict, and instability	• Addressing competing and conflicting uses of the land and sea improves stability for vulnerable populations
Increase resilience to the impacts of climate change and promote low emissions growth	• Reducing local human impacts to marine and coastal ecosystems can provide substantial climate mitigation and adaptation benefits needed for climate resilience
Expand and sustain the ranks of stable, prosperous, and democratic states	• Promoting representative and participatory local institutions in managing marine and coastal resources sustainably is a key component of the responsible governance of marine tenure of small-scale fisheries
Support disaster mitigation	• Conserving marine and coastal habitats, such as coral reefs, mangroves, marshes, sand dunes, and other natural features mitigates impacts of coastal hazards including inundation from severe storms, tsunamis, and sea level rise

Explore entry points for programming on marine tenure and small-scale fisheries. Key entry points for marine tenure and small-scale fisheries highlight the need to (a) develop coherent national policies and laws; (b) secure preferential use rights; (c) strengthen community-based marine tenure institutions; (d) improve the capacity, effectiveness, and direction of accountability of co-management arrangements to support community-based institutions; and (e) embed community-based management in an ecosystem approach to fisheries management. Some initial programming considerations are provided in Figure 20.

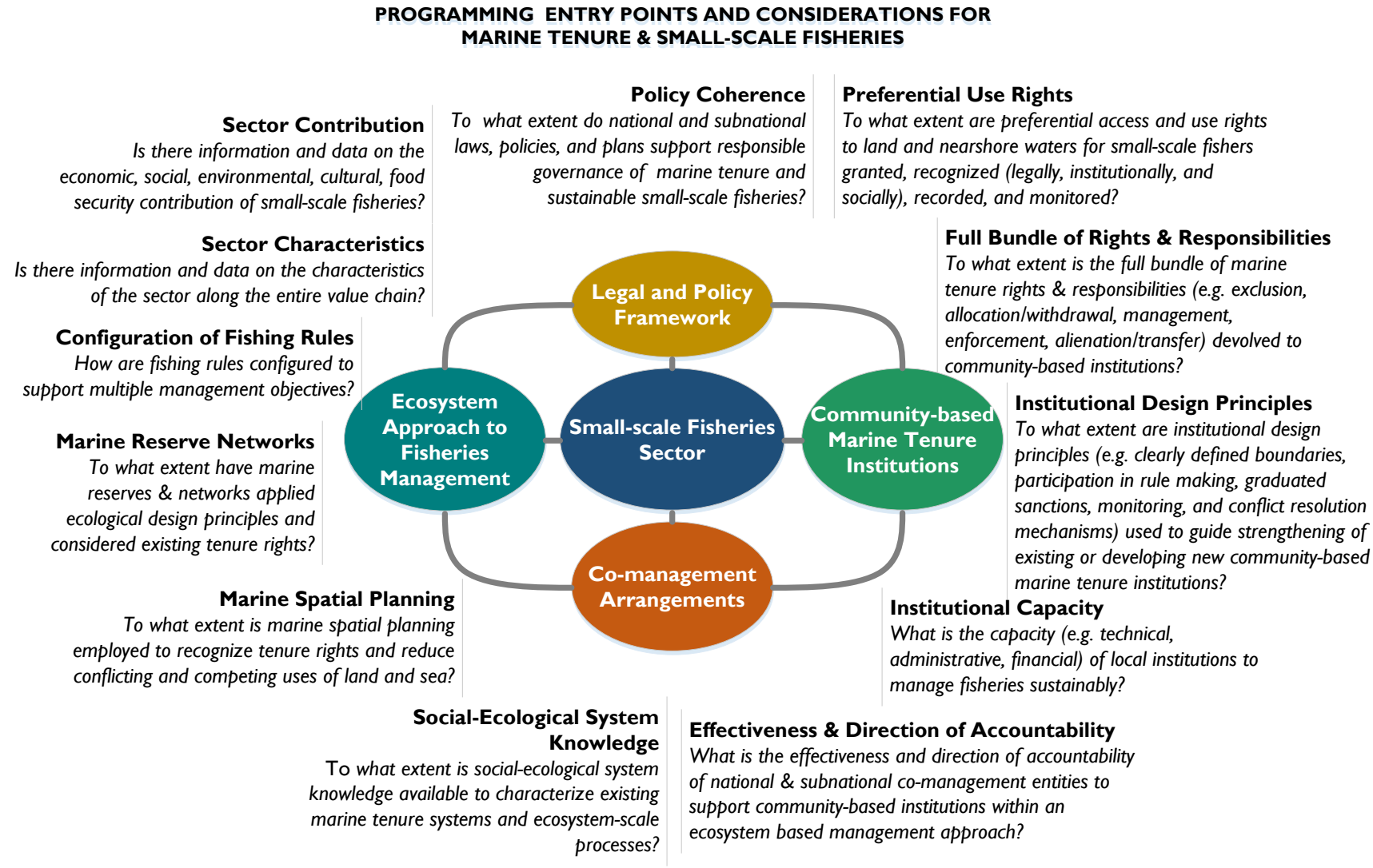


Figure 20. Key entry points and programming considerations for marine tenure and small-scale fisheries

Diversify and harmonize investment portfolios to secure sustainable small-scale fisheries. Historically, USAID investment in marine and coastal issues has largely focused on meeting biodiversity conservation objectives. Existing global agendas such as the SSF Guidelines provide a platform to justify, diversify, and harmonize investments from multiple sectors. Development partners should seek innovative ways to diversify and align investment portfolios to support sustainable small-scale fisheries. An assessment of the status of country implementation of the SSF Guidelines could provide a starting point for identifying gaps and opportunities for investment. A national policy review on small-scale fisheries could identify priority reforms and strategies that could be supported by different programs within the mission such as eliminating harmful subsidies that promote overfishing or supporting a more inclusive coastal economy. At a local level, a coordinated place-based investment strategy could leverage multiple technical resources and funding streams.

Consider responsible governance of tenure in small-scale fisheries explicitly in project design. Responsible governance of tenure involves respecting the rights of small-scale fishers and fishing communities to the resources that form the basis of their social and cultural well-being, their livelihoods and their sustainable development. National legal and policy frameworks, administrative and judicial systems, effective co-management arrangements, dispute resolution mechanisms, local participation and empowerment, and strengthened institutional capacity are all key ingredients of responsible governance of marine tenure.

Promoting the responsible governance of marine tenure is a substantial undertaking that has to be developed sequentially over time through collaborative forms of learning. It can be approached in multiple ways: existing marine tenure institutions among coastal settlements can be supported in improving their key activities; or national-level policies and enabling governance and planning frameworks that recognize community-based marine tenure institutions can be created. In both approaches, there needs to be recognition that governance systems must be able to respond flexibly and adaptively.

A more explicit approach would seek to (a) define and secure the full bundle of tenure rights, including exclusion, withdrawal/access, management, enforcement, and alienation rights; and (b) identify and build the capacity of national and local tenure governance bodies to secure these rights. Approaches to strengthen rights could include (a) examining the role of local resource users in decisions making; (b) supporting more effective co-management arrangements and dispute resolution mechanisms; and (c) providing the administrative, legislative, and other mechanisms to recognize tenure rights.

From a national development programming perspective, therefore, a good starting point will be to develop a systematic understanding of the range and diversity of marine tenure institutions among coastal communities. This will provide an assessment of the status, and identify arenas for engaged intervention at national and local levels. While there is considerably more knowledge of good practices within local marine commons, the emerging themes concern the development of a strong understanding of co-management and national enabling frameworks. Innovations can also be weaved into existing institutional formats, such as the use of mobile technology for developing transparent and accessible forms of planning tools, for example marine spatial planning at the ecosystem and national levels.

Analyze and strengthen national legal and policy frameworks for marine tenure and small-scale fisheries guiding by good practices articulated in the SSF Guidelines. There are few examples of countries with strong policies supporting responsible governance of marine tenure and EAFM in small-scale fisheries. A useful starting point is to assess the local situation while developing an analysis of the policy, law, and administrative needs at the national level. At the local level, community-based tenure institutions are important platforms through which communities can reduce their risks as fishers are working within a marine terrain that is dynamic and at times unpredictable, and as productivity can only be sustained by combining good measures for maintaining strong, regenerative capacity based on sophisticated, empirical knowledge of coastal fishery conditions.

Invest in social-ecological system knowledge generation from multiple sources and at multiple scales to design and monitor programs and projects involving marine tenure and small-scale fisheries. Small-scale fisheries are complex social-ecological systems. In the face of growing, complex, and often uncertain local and global impacts on marine and coastal ecosystems, knowledge of the social-ecological system will need to integrate place-based, fine-scale spatial and temporal information and large-scale ecological processes historically not captured in traditional ecological knowledge. Moreover, future conditions and uncertainties must be projected to provide the information needed for to prepare for and adapt to change.

Traditional, local, and modern scientific knowledge are all needed to understand the connectivity and interactions among the ecosystem, resource users, governance systems and an array of social, economic, and political drivers. Baseline assessments should include not only ecological and socioeconomic conditions but also characteristics of existing marine tenure rights and institutions. Informal or weak marine tenure systems often go unrecognized during project design and implementation. As many fishing households are landless, tenure assessments should also provide an understanding of their land tenure security.

It is noteworthy that few scientific studies have attempted to draw direct causal links between marine tenure and social or ecological outcomes. Given the complexity of these institutions, studies have typically focused on parts of the social-ecological system, not necessarily the whole system. Indeed, a systematic review of the literature on social outcomes (livelihoods and equity) and ecological outcomes (sustainability) within common property resource management systems indicated that less than 20 percent of fisheries-related studies explicitly analyzed the relationship between resource governance and livelihood/sustainability outcomes (Agrawal & Benson, 2011). Even fewer (less than ten percent) analyzed equity outcomes, with still fewer (three percent) analyzing the tradeoffs among the three outcomes of livelihoods, equity, and sustainability. This underscores the continuing need to build our collective understanding of and evidence for how tenure governance operates in complex and dynamic small-scale fisheries.

Strengthen marine tenure governance institutions to protect tenure rights and effectively engage in co-management arrangements at multiple scales of governance. While marine tenure considerations often focus on the tenure rules governing rights and responsibilities, it is critical to strengthen marine tenure governance institutions that design and support tenure arrangements through the creation and enforcement of associated rules. If designed well, community-based marine tenure institutions can contribute to multiple development outcomes: food security, reducing poverty, gender equity, and biodiversity conservation. Engaging stakeholders in decision-making and creating rules that

promote sustainable resource use support increased compliance and reduced resource user conflicts. Depending on how tenure institutions are designed, they can be structured to achieve single or multiple goals. The membership and capacity of the governance body are key criteria for ensuring this institutional vehicle delivers good fisheries management.

Marine tenure systems need to be embedded within effective co-management arrangements that support ecosystem-based management as an approach for sustainable resource use and to address a broad range of threats. Co-management efforts between the government, resource users, and other stakeholders must recognize and support the community's resource use rights and manage other competing or conflicting uses of the marine and coastal environment and macro-scale drivers of change and ecosystem-scale pressures such as climate change that threaten community-scale marine tenure institutions.

By providing consistent support to strengthening governance bodies, an effective institutional modality can be created through which multiple objectives can be pursued over time such as biodiversity conservation, food security, economic growth, and climate change resilience. In the absence of capable and transparent local institutions, special interests can threaten tenure security. Further, land tenure for small-scale fishers has also generally not been considered in project design. An assessment of how well co-management arrangements are working could provide insight into the key gaps and challenges.

Develop a country-specific sourcebook of good practices and lessons building on a global community of practice while recognizing that "no one size fits all." Over the last 30 years, key design principles have been identified that enable success of community-based marine commons. These can be considered key components of the good practices that should be promoted among existing as well as newly created marine tenure systems for small-scale fisheries. Secure tenure rights and legal recognition provide an important avenue through which people pool their knowledge, investments, time, and labor to securely yield both short-term and long-term benefits in a spatially complex production condition. A key ingredient is having a clearly defined marine area that communities are entitled to both use as well as exclude outsiders. This permits a substantive reduction in risk and produces certain basic guaranteed parameters for fishing.

There is no ready-made template that will work in all situations. Moreover, simply setting up or supporting a marine tenure institution is not sufficient. The key issues that determine success will need to be addressed such as, governance approaches, overarching goals of the marine tenure institution, and how it fits into ecosystem-based planning.

In practice, context and challenges, both locally and nationally, will need to be addressed in very unique and particular ways. They will require a careful consideration of the synergies, contradictions, and tradeoffs between the multiple goals of the marine tenure institution. There is ample opportunity to learn from the diversity and range of approaches within the expansive world of coastal fisheries around the world. This requires the development of forums through which experiences can be shared for learning and adaptive innovation. Because it is clear that no simple one-size-fits-all approach will work, the art of crafting effective tenure institutions lies in carefully tuned, iterative approaches to adaptive learning that can benefit from building a broader "community of learning."

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