Scaling an EAFM at the Sub-Regional Level:
Catalyzing Regional and National Actions in the Sulu-Sulawesi Seascape

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The establishment of appropriate fisheries management mechanisms is vital to ensuring the sustainability of the fishery resources and long-term food security in the Southeast Asian region. By adopting an Ecosystem Approach to Fisheries Management (EAFM), the ecological and human well-being aspects of fisheries would also be addressed. However, for an EAFM to be effective, management scales must be considered and broadened. Transitioning toward an EAFM often involves "scaling up" or "scaling down" fisheries management, and there are various scales across which an EAFM can be applied depending on the goal and objectives of management including political, governance, ecosystem, fishery, and human use, as seen through the regional example of the Sub-regional Sulu-Sulawesi Seascape EAFM Plan.

To guarantee sustainable fishery resources and long-term food security in Southeast Asia, appropriate fisheries management mechanisms should be established. Currently, policies, legal, and regulatory frameworks are focused on fisheries management driven by increased concerns about the decreasing and over-exploited fish stocks. In order to enhance national fisheries management frameworks, especially in the region, there is a need to incorporate innovative management approaches for sustainable fisheries such as the Ecosystem Approach to Fisheries Management (EAFM).

Under an EAFM, the ecological and human well-being or welfare aspects of fisheries are focused equally, providing a broader framework for marine resource management to achieve sustainable development goals through improved ecological and human well-being, including habitat protection and restoration, pollution reduction and waste management, sustainable utilization of fishery resources, as well as food security, sustainable livelihoods, and equitably-distributed wealth. Transitioning towards an ecosystem approach requires broadening the scale of what is being managed—spatially and temporally—which also involves more attention to governing across scales. One of the greatest shortfalls of conventional fisheries management—indeed, conventional environmental management—is a misalignment between the scales of governance to the scales of the system being managed. Identifying appropriate spatial, temporal, and governance scales is therefore among the most important aspects of transitioning into an EAFM.

Scale and EAFM

Transitioning toward an EAFM enables fisheries management to be "scaled up" or "scaled down" to address multiple management goals and objectives, some examples of which are shown in **Box 1**.

Box 1. Examples of "scaling up" or "scaling down" fisheries management

- Single-species management **to** management of multi-species assemblages
- Managing fish with home ranges limited to sites within country boundaries **to** transboundary/straddling stock fisheries
- Looking at isolated drivers of change **to** considering broader environmental and human impacts
- Design of individual protected areas **to** planning networks of protected areas
- Conservation of a fragment of habitat **to** comprehensive spatial management
- Larger national fisheries management area down **to** smaller-scale integrated management unit (IMU)
- Single local government **to** multiple local governments surrounding an ecosystem, *i.e.*, a bay or gulf
- One national government **to** several national governments in a region

Issues of scale include determining the appropriate scale of the marine ecosystem for fisheries management purposes and "scaling up" or "scaling down" from other management arrangements such as community-based management to a sub-regional ecosystem scale. The issues of scaling up or scaling down refer to the transferability of concepts, methods and approaches, and organizational structures from one level to another in the dimensions of space, time, and governance. Several factors that constrain scaling include, but not limited to, funding, resources, legal authorities, management structures, and voluntary basis of participation. Under an EAFM, a scale should be considered in three primary ways (**Box 2**).

Chua (2006) stated that scaling up in integrated coastal management (ICM) refers to three different contexts: 1) geographical expansion; 2) functional expansion; and 3) temporal considerations. The same contexts hold true for the scaling up in an EAFM. Geographically, a management area could be scaled up from a single small coastal community operating in a nearshore area to include a broader geographic dimension, *e.g.*, an enclosed bay being shared by several villages or municipalities/districts, a long strip of coastal area that transcends several provinces, a marine seascape.

Functionally, scaling up also involves taking into consideration new program interventions. For example, if the current intervention relates largely to enforcement, the functional expansion would include adding new interventions such as conserving or expanding livelihoods and/or increasing educational opportunities. Scaling up also includes integration of fisheries management into broader administrative programs of government agencies or departments. Temporally, scaling up

Box 2. Three primary ways in scaling under an EAFM

- First, it is important to understand whether the many social, economic, and institutional considerations in implementing the EAFM vary depending on the scale of the fishery (*e.g.*, local, national, regional (involving two or more countries); broader international scale that covers several sub-regions; continents) and in what manner.
- Second, in implementing the EAFM it will be important to address the challenges in managing fisheries in which: human (social, economic, and institutional) scales are different from that of the resource, or that of the harvesting activity, or there can be differences in the scales that are appropriate to deal with each component of a fishery - fish stocks, fishers, gear, science, enforcement, policy, among others.
- Third, management of a given fishery is required at multiple scales. This involves a process of "scaling up" or "scaling down." For example, if fisheries management (and an EAFM) is already implemented at a broad geographical scale (*e.g.*, state, province, nation), this would need to be scaled to work at a local level. Equivalently, when local-level or community-based management is in place within local ecosystems, this needs to be "scaled up" while allowing for spatial heterogeneity, and differing human and institutional arrangements. These situations imply the need for 'cross-scale linkages.' So that if local or decentralized approaches to management are needed to account for local conditions but the fish stocks range over larger geographical areas, an institutional arrangement is needed to help coordinate across boundaries. This could be the case for a fishery of a highly migratory stock, such as tuna, where the biological aspects are on a large scale, crossing national boundaries, while a national or sub-national scale would fit for the fishers and the management system, and indeed very local management of fleets would also be effective.

includes shifting from focusing solely on near-term issues like annual catch limits to considering and incorporating long-term climate change and ocean acidification into the management process.

Thus, the initial scale for an EAFM will vary significantly depending on the geographic area, governance structures, socio-economic conditions, and current priority issues. In general, starting at smaller spatial and governance scales, in terms of stakeholders, issues, and jurisdiction, would increase the likelihood of initial success that could be used to foster expansion. Scaling up is often easier once initial activities succeed and are sustained at demonstration sites; and undertaken to include more stakeholder groups, manage a larger jurisdiction or integrated management unit (IMU), and/or address new issues or a greater range of issues. Generally in scaling up, a new EAFM plan and agreements should be developed or existing plans modified. Spatial expansion of the IMU will require the collection and analyses of additional information as the IMU profile is expanded. New stakeholder groups and organizations should be organized and coordinated with existing stakeholder groups. As an EAFM scales up, additional funding would be needed, although scaling up also provides opportunities to broaden the funding base and potentially increase inefficiencies as communities leverage capabilities and resources for the common good. If the new scale involves multiple political jurisdictions, new legal support would be necessary.

Scaling EAFM at the Sub-regional Level to Catalyze Action

Development of a sub-regional EAFM plan can complement local, national, and regional fisheries management priorities, and help to catalyze action at all levels that may otherwise not occur. A sub-regional approach can support the development of joint or coordinated management plans for fisheries and habitats, management and control of fishing effort, and the strengthening of cooperation on monitoring, control, and surveillance (MCS) to be able to verify and certify the legal status of the fisheries, thereby reducing levels of illegal, unreported and unregulated (IUU) fishing (Torell, 2017). Harmonizing an EAFM among multiple levels is an important prerequisite for catalyzing fisheries management action successfully across multiple scales. One of the challenges of an EAFM is to establish ways to ensure that the actions of the coastal and fisheries institutions at each level of government are harmonized with one another and are consistent with agreed EAFM goals and policies. Similarly at a regional level, disconnects may occur between or across all the participating nations in the region, regardless of whether they share transboundary fish stocks or have abutting Exclusive Economic Zones.

Scaling an EAFM could also be applied at a sub-regional level, where a sub-region is defined as a space of planning that is smaller than a region but larger than a local authority, such as a nation, and is usually based on location. Within the Southeast Asian region, the Sulu-Sulawesi Seascape (SSS) can be considered a sub-region. Some of the benefits and costs or challenges of scaling an EAFM at the sub-regional level are shown in the following **Table**.

Nonetheless, harmonization across scales calls for consistent approaches across the levels between national and local government and reinforces the importance of having a legally authorized inclusive framework that allows for effective harmonization of policy and operational objectives. Management decisions would be more successful in achieving ecosystem objectives when they are matched to the spatial scale of the ecosystem, to the programs for monitoring all desired ecosystem attributes, and to the relevant management authorities.

Current Applications of a Scaled EAFM Plan: Taking a Sub-regional EAFM Approach in the SSS Sub-region

The SSS sub-region, like the South China Sea and Andaman Sea, is one component of the wider Indo-Pacific Ocean Region within Southeast Asia (**Figure**), also known as the Coral Triangle Region. The SSS is one of the priority seascapes in the Coral Triangle Initiative on Coral Reefs, Fisheries, and Food Security (CTI-CFF) and its boundary functions as the regional fisheries management unit (FMU). Deterioration of the environmental conditions in the SSS indicates that resource extraction has exceeded the natural capacity of this marine ecosystem for recovery (CTI-CFF, 2015). Shared boundaries,

Table. Benefits, costs, and challenges of sub-regional EAFM scaling

Benefits	Costs/challenges
• Management of broader ecosystem and social systems relevant to fisheries • Supports multiple objectives - fisheries, ecosystem, and socioeconomic goods and services • Improved coordination, consultation, planning, and implementation of management within and across regional, national, provincial, and local levels • Greater recognition of ecological and social connections and effects that different components of the ecosystem can have on each other • Fisheries management within broader multi-sectoral approaches - such as ecosystem-based management (EBM) and integrated coastal management (ICM) • Provides framework to recognize conflicts that impact or are impacted by fisheries, accommodate multiple uses, and reduce conflict • Connects regional and national planning and policy goals with practical goals and implementation through local government • Supports determination of multiple spatial and temporal scales reflecting the natural hierarchy of the ecosystem • Capacity building and development through shared knowledge and skills • Improved transboundary management decision-making, matched to the spatial and temporal scale of the ecosystem	• Higher levels of cooperation, coordination, and participation across governments, sectors, with the public, and across jurisdictional boundaries • May require new policy and legal framework(s) • More diverse data and information to support decision-making across sectors and stakeholders • Higher management costs due to increased data and information needs, coordination, planning, and staff • Effort to organize and coordinate new stakeholder groups and organizations with existing stakeholder groups • A wider scope in monitoring, control and surveillance (MCS) and enforcement • National political and economic priorities • Harmonized work plans and budgets supporting integration across governments • Establishment of a lead organization to oversee coordination and integration

ecosystem dynamics and resources, as well as transboundary environmental issues, including human migration, justify a sub-regional approach to conserving the SSS (Miclat, Ingles, & Dumaup, 2006; CTI-CFF, 2009).

As such, a sub-regional EAFM planning approach has been undertaken for the SSS sub-region, under which an entirely voluntary agreement is proposed with all management actions 'offered' and 'maintained' at the discretion of each participating nation implementing the plan. The development of a sub-regional SSS EAFM Plan commenced in June 2015 when a workshop generated the Plan's vision, goals, and objectives, after the workshop participants revisited the results of the Transboundary Diagnostic Analysis (Sulu Sulawesi Marine Ecoregion Tri-National Committee, 2013), prioritized, and agreed on the key issues. Subsequently, the Fisheries Management Unit was defined, common vision for the SSS established, and the sub-region's main issues and threats identified, including the unsustainable exploitation of fishery resources, transboundary IUU fishing, habitat loss, and community modification.

In August 2017, the USAID Oceans and Fisheries Partnership (USAID Oceans) and SEAFDEC organized the second regional fisheries management workshop which was participated in by fisheries management agency representatives (USAID Oceans, 2017). During this workshop, the participants revised the 2015 vision, *viz*:

> *"By 2030, the transboundary fisheries of the Sulu Sulawesi Seas are ecologically healthy, and deliver ecosystem services that provide equitable benefits to our people through collaborative, safe, and legal regional fisheries management."*

From this vision, the SSS Sub-regional Plan was developed that calls for an immediate (near-term) focus on five species of high-value and economically-important transboundary small pelagic fisheries, and for a longer-term focus on seven target species of high-value and economically-important transboundary large pelagic and neritic tuna fisheries, as well as six target species of coral reef-associated transboundary fish species. The Plan's sub-regional goals, objectives, and management actions are linked to the three pillars of an EAFM, *i.e.* ecological well-being, human well-being, and good governance (*https://www.seafdec-oceanspartnership.org/resource/overview-of-the-sub-regional-plan/*). In July 2018, the sub-regional EAFM Plan was finalized during the third workshop.

The Sub-regional Plan has been developed to enable "scaling up" to link to several existing regional fisheries organizations and legal and policy instruments, including regional fisheries organizations such as the Southeast Asian Fisheries Development Center (SEAFDEC); Coral Triangle Initiative on Coral Reefs, Fisheries, and Food Security (CTI-CFF); and the Regional Plan of Action to Promote Responsible Fishing Practices including Combating Illegal, Unreported and Unregulated Fishing (RPOA-IUU). The Plan also supports the existing related management efforts that are focused at the sub-regional level, *e.g.*, the Ecoregion Conservation Plan (ECP) for the Sulu-Sulawesi Marine Ecoregion (SSME) (SSME, 2003), the SSME Regional Strategic Action Program (Sulu Sulawesi Marine Ecoregion Tri-National Committee, 2013), the Comprehensive Action Plan for SSME (Asian Development Bank [ADB], 2011).

Figure. Map of the Sulu-Sulawesi Seascape

The Plan can also be "scaled down" to link to relevant national, provincial, and local fisheries management plans within each of the three implementing countries. For example in Indonesia, the SSS Plan is linked to and supports the National Tuna Fisheries Management Plan, as well as provincial fisheries planning within Fisheries Management Area (WPP) 716, including implementation of local fisheries management efforts at the provincial and district levels within WPP 716.

To support the SSS Plan and support coordination, a voluntary coordinating governance mechanism should be established, and the existing regional fisheries organizations, such as CTI-CFF, SEAFDEC, or the Tri-National Committee for the Sulu-Sulawesi Marine Ecoregion (Miclat, Ingles, and Dumaup, 2006) and the SSME Sub-committee on Sustainable Fisheries (ADB, 2011), could serve in this institutional or organizational role. Implementation and management of the Plan could also be coordinated through the CTI-CFF Seascape and EAFM working groups, and the National Coordinating Committees in Indonesia, Malaysia, and Philippines.

Conclusions

Transitioning towards an EAFM will involve broadening the scale of what is being managed, spatially and temporally, which will also require more attention to governance across scales. Identifying appropriate spatial, temporal, and functional governance scales are among the most important aspects of transitioning to an EAFM, and in almost all situations—regardless of the degree of management centralization—implementing institutions should consider the mechanisms to scale up and scale down management decision-making within and across the community/village, municipality/district, province/state, national, and regional levels.

Torell (2017) stated that strengthened sub-regional cooperation with development of joint or coordinated fisheries management plans should be promoted, including research and studies on the social, ecological, and economic importance of fisheries, and aquatic resources utilization. This would highlight and increase the understanding of the very strong national and regional dependence on fish and fishery products for domestic food security, employment opportunities for millions of people, and in support of the very profitable fish export industries.

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The United States Agency for International Development Oceans and Fisheries Partnership (USAID Oceans) works to strengthen regional cooperation to combat illegal, unreported, and unregulated (IUU) fishing and to promote sustainable fisheries to conserve marine biodiversity in the Asia-Pacific region. USAID Oceans is implemented through a partnership between USAID's Regional Development Mission for Asia (USAID/RDMA) and the Southeast Asian Fisheries Development Center (SEAFDEC), in collaboration with regional and U.S. government agencies, including the Coral Triangle Initiative for Coral Reefs, Fisheries and Food Security (CTI-CFF) and the United States National Oceanic and Atmospheric Administration (NOAA). Learn more about USAID Oceans at www.seafdec-oceanspartnership.org.