Aquaculture & Wild Fisheries
Key Considerations & Best Practices for Co-Management

Why Co-Management?
Aquaculture is a major source of food and employment in many coastal communities.

Aquaculture tools can be used in a variety of ways to provide coastal communities with economic support and additional tools to manage their fisheries. This policy brief provides key considerations and best practices for decision makers looking to sustainably manage aquaculture in coexistence with small-scale fisheries. In order to do so, managers should first develop an understanding of their communities’ goals for aquaculture and how existing management institutions might affect these goals.

Potential Goals of Co-Managing Aquaculture & Wild Fisheries

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<td>Supplement income from fishing by selling aquaculture products</td>
<td>Diversify livelihoods of community members. Buffer against fishery downturns</td>
<td>Restock an overexploited fishery with farm-raised fish</td>
<td>Enhance catches of an existing fishery above previous levels</td>
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Understanding Interactions Between Aquaculture and Wild Fisheries

Aquaculture and wild fisheries interact in a variety of different ways—spatially, ecologically, and through markets.

In the absence of effective management, fish farmers may adopt unsustainable practices that maximize short-term profits but cause negative ecological and social damage to wild fisheries, for which they are not held accountable. On the other hand, inefficient or overly burdensome regulations can dissuade potential farmers from pursuing sustainable aquaculture because of too much uncertainty. Successful outcomes require a complete understanding of existing trade-offs, the integration of management decisions for both activities, and cooperative fishing, farming, and profit sharing efforts.

"The species being farmed and the environmental conditions of the farm location are the most important planning considerations."

THE ROLE OF MARINE SPATIAL PLANNING

A critical step in co-managing aquaculture and wild fisheries is deciding where each activity should occur. Marine spatial planning (MSP) is an integrated process to achieve ecological, economic, and social objectives by analyzing and appropriately allocating different uses of marine space. By overlapping and evaluating spatial data, MSP engages all stakeholders and illustrates tradeoffs to support decision making. The MSP process can minimize social conflicts between fishers and aquaculture farmers as well as optimize aquaculture site selection in a way that maximizes production while minimizing ecological impacts.

Key Considerations

Ecological

Native - Only species native to the region should be considered for mariculture. The introduction of an exotic species can have irreversible negative impacts on an ecosystem and traditional local fisheries.

Feed - Unfed mariculture species, such as seaweed and shellfish, have minimal environmental impacts relative to fed species (like grouper) but generally fetch lower prices.

Capture-based vs. hatchery-based - Capture-based mariculture collects wild juveniles to raise in captivity while hatchery-based mariculture raises captive-bred fish. The two strategies present different ecological and economic tradeoffs.

Spatial

Avoid sensitive habitats - Farms should not be sited over sensitive habitats such as seagrass beds or coral reefs, nor should these habitats be altered to make room for farms.

Restrict fishing within farms - The structure of mariculture farms can act as a fishing aggregating device. Fishing these aggregations can be efficient but may result in overharvesting. Alternatively, if fishing is prohibited, farms may aid conservation by functioning as a de-facto MPA.

Spatial Property Rights - Spatial property rights are essential for sustainable aquaculture and should also be considered within the context of a TURF, if appropriate.

Social

Cooperative management - Farming activities should be cooperatively managed, with fishers having the opportunity to engage. This collective decision making will minimize conflicts between fishing and farming objectives and facilitate mutually beneficial outcomes.

Diversified livelihoods - Fishing and aquaculture are inherently risky occupations. Individuals and communities with diverse livelihoods are more resilient to shocks, and management strategies should focus on developing individuals who are both part-time fishers and part-time farmers. This approach can help community members buffer against downturns in either sector.

Economic

Re-investment - Aquaculture profits should not be re-invested in fishing capital in such a way that facilitates increased fishing pressure. Such reinvestment can jeopardize recovery efforts and make fishers more financially dependent on the fishery.

Product diversification - Identifying value-added products for farmed species can help farmers gain negotiating power over prices, increase profitability, and buffer against market downturns.

Profit sharing - Aquaculture farms impose costs on fishers by decreasing fishing grounds and on farmers by requiring them to partially give up fishing. Profit sharing is a known solution to this problem that communities with co-managed wild fisheries and aquaculture are well-positioned to implement.
Case Studies

Tam Giang Lagoon, Vietnam

Tam Giang Lagoon is a lagoon system covering roughly 22,000 ha in the Thau Thien Hue Province of central Vietnam. The lagoon ecosystem is believed to directly support 100,000 people living nearby through capture fisheries and/or various forms of aquaculture.

Traditionally, capture fisheries were the main source of food and income for inhabitants around the lagoon, but the introduction of aquaculture in the late 1980s substantially altered fishing practices and sparked a chaotic scramble for space in the lagoon. Those who took up aquaculture practices essentially privatized the lagoon by setting up aquaculture ponds, net enclosures, and stake traps ad hoc, reducing the size and connectivity of communal fishing areas. The unplanned placement of aquaculture not only excluded traditional fishers but also restricted the lagoon’s water flow, leading to poor water quality and increased incidence of disease.

The rapid rise of aquaculture and the resulting convoluted property rights created a management nightmare. Regulation attempts have not been successful, so local participation has arisen as a primary tool for management. Fisheries authorities are now allocated administrative duties at the provincial, district, and commune levels, and territorial use rights fisheries (TURFs) are being implemented as part of a co-management strategy among national, district, and local authorities. The TURF strategy has encouraged support and participation by lobbying for individual spatial rights, allowing for localized management and enforcement, and expectedly improving aquaculture conditions in the lagoon.

New Zealand

Introduced in the 1960s, commercial aquaculture in New Zealand has expanded substantially to include 23,000 hectares of allocated ocean space, employ over 3,000 Kiwis, and contribute NZ$500 million in revenue to the national economy in 2015. New Zealand’s aquaculture products are exported at a premium worldwide and the government promotes industry-wide growth to reach NZ$1 billion in production by 2025.

Proposed aquaculture activities in New Zealand were traditionally required to obtain the approval of fishery quota holders potentially affected by the proposed farm. However, in 2011, the New Zealand government decided this requirement was hindering the expansion of sustainable, economically desirable aquaculture and implemented a number of progressive policies. Under the 2011 reforms, proposed aquaculture projects are evaluated for their impacts on fisheries resources, and those found to pose no “undue” adverse effect are allowed to move forward.

Once a proposal is selected, a formal arbitration process formally compensates fishermen who will be affected by the aquaculture farm. Additionally, farmers have the opportunity to offset potential adverse effects of their proposed farm through approved mitigation strategies.

New Zealand’s approach promotes sustainable aquaculture while ensuring traditional fisheries are adequately protected. This approach is a promising example of how progressive management can allow both fishermen and farmers to have their voices heard.