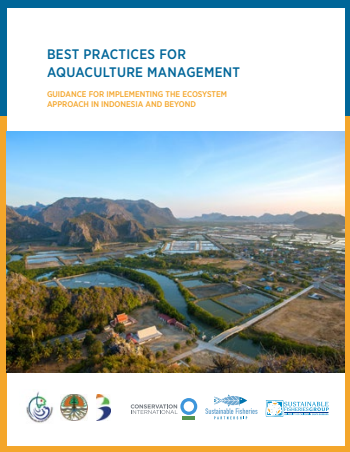

BEST PRACTICES FOR AQUACULTURE MANAGEMENT

Guidance for implementing the ecosystem approach in Indonesia and beyond

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EXECUTIVE SUMMARY

AQUACULTURE IS THE FASTEST GROWING FOOD PRODUCTION system in the world, and farmed seafood now accounts for more than 50 percent of seafood produced for direct human consumption. Despite its successful growth and potential, aquaculture is not consequence- or impact-free. Although the direct environmental impacts of aquaculture are well-documented, solutions are often limited to improvement of farm-level practices, when a more comprehensive approach is warranted. Improving the management and enforcement system(s) that govern aquaculture industries is necessary to sustain the resource base and protect aquaculture from its own impacts and those of other sectors.

Typically, aquaculture development and management has largely focused on siting, licensing, and monitoring at the farm level. This perspective fails to acknowledge that aquaculture industries are dependent on public resources (namely water and space) and are tightly coupled to the surrounding ecosystems in which they operate. Even if a farm is operating at the highest level of performance, it is at risk if neighboring farms or industries have poor environmental practices. As such, improved zonal management of aquaculture industries can stabilize production, reduce boom-bust cycles, and increase the suitability of the industry for insurance and investment. Applying a broader management approach to aquaculture – one that is ecosystem-based and integrates the industry into coastal zone management – is critical for the industry to address the persistent challenges it currently faces and to achieve its full potential in a socially, economically, and environmentally sustainable manner.

CONSERVATION INTERNATIONAL
Sustainable Fisheries PARTNERSHIP
SUSTAINABLE FISHERIES GROUP
UNIVERSITY OF CALIFORNIA SANTA BARBARA

AQUACULTURE'S KEY CHALLENGES

There are a number of persistent issues associated with aquaculture that are common across various production systems, environments, and geographies. Many of these issues can be attributed back to three fundamental challenges:

1. Conflict with other resource users

2. Exceeding waterbody carrying capacity

3. Disease amplification and transmission

The Food and Agriculture Organization developed the Ecosystem Approach to Aquaculture (EAA), which offers comprehensive guidelines to improve industry management. This document provides policy makers and industry stakeholders with actionable guidelines on how to implement the key components of the EAA, which we refer to herein as the best practices for aquaculture industry management. More detailed guidance, and specific recommendations for Indonesia, are included in the full white paper *Best Practices for Aquaculture Management: Key concepts for implementing the ecosystem approach in Indonesia and beyond*.

BEST PRACTICES FOR AQUACULTURE INDUSTRY MANAGEMENT

1. Spatial Planning and Zoning

There are numerous users of the marine environment (e.g., aquaculture, tourism, fisheries, marine transport, oil and gas), and many of these users differ dramatically in terms of their objectives, goals, and resource needs, often putting them in direct conflict with each other. Spatial planning is a systematic process through which the public and private sectors work together to influence the spatial distribution of people and activities at differing geographic scales. This process is a fundamental component of ensuring successful and sustainable aquaculture development and has been shown to minimize conflicts between competing users and maximize overall value of the marine environment. The key steps in the spatial planning process include: national-level scoping, regional-level zoning, site selection, and establishing aquaculture management areas (AMAs) – groupings of farms that are interconnected in some way.

2. Water Quality Management

Water is the fundamental common-property resource that aquaculture is dependent on. As such, it is important both for an aquaculture farm to maintain minimum levels of on-farm and effluent water quality and for the impacts of all resource users to be managed within the carrying capacity (or assimilative capacity) of an ecosystem. Integrated management practices that aim to improve water quality management include: 1) allocated zones for aquaculture in spatial plans and 2) establishment of carrying capacity for waterbodies that defines discharge guidelines, restrictions, and/or limits for individual farms and other users.

Applying a broader management approach to aquaculture — one that is ecosystem-based and integrates the industry into coastal zone management — is critical for the industry to address the persistent challenges it currently faces and to achieve its full potential in a socially, economically, and environmentally sustainable manner.

3. Coordinated Disease Management

Disease is one of the top challenges facing the aquaculture industry and is a primary constraint to continued growth. Addressing disease issues is necessary to improve stability in production. This will, in turn, reduce economic risks, lower environmental impact of fish loss due to disease, and attract new investment to the aquaculture industry. Farm-level better management practices are important for animal husbandry; however, further development and adoption of coordinated management across an aquaculture industry is needed to help farmers and protect the industry as a whole. Key elements to establishing coordinated disease management practices include: 1) understanding the key drivers and risk factors for disease transmission (create a contact network map), 2) establishing AMAs (as identified by the contact network map), and 3) coordinating operational and emergency response procedures across AMAs to reduce disease risk and impact.

RECOMMENDATIONS TO GOVERNMENT FOR IMPLEMENTATION

- Develop and publish spatial plans that identify suitable areas for aquaculture while considering and addressing diverse uses and users of space.
- Incorporate the protection of critical habitats in the spatial-planning process.
- Identify carrying capacity limits of waterbodies and use these to inform aquaculture siting, licensing, and production limits.
- Establish aquaculture management areas – clusters of farms where disease management practices are coordinated.
- Establish and implement a protocol for tracking, monitoring, and reporting the spatial footprint of aquaculture.

RECOMMENDATIONS TO INDUSTRY FOR IMPLEMENTATION

- Initiate and support aquaculture improvement projects that focus on coordinating practices among groups of farmers to improve water quality and/or disease management and reporting.
- Request government agencies to develop and publish spatial plans that identify areas that are suitable for aquaculture development in relation to other uses and users. A protocol for tracking, monitoring, reporting, and enforcement of the spatial footprint of aquaculture should also be implemented.
- Establish producer organizations and develop mandatory Codes of Good Practice requiring and supporting members to use best practices for industry management.
- Encourage leading aquaculture certifications to integrate these industry management principles into their standards.

CONSERVATION INTERNATIONAL

Building upon a strong foundation of science, partnership, and field demonstration, CI helps societies responsibly and sustainably care for nature, our global biodiversity, for the wellbeing of humanity. We operationalize this mission through the integration of three key elements: protecting our natural wealth, promoting sustainable production, and fostering effective governance. Founded in 1987, CI has helped support 1,200 protected areas and interventions across 77 countries, safeguarding more than 601 million hectares of land, marine, and coastal areas.

SUSTAINABLE FISHERIES PARTNERSHIP

SFP's mission is to engage and catalyze global seafood supply chains in rebuilding depleted fish stocks and reducing the environmental impacts of fishing and fish farming. Our work is organized around two main principles: making available up-to-date information on fisheries and aquaculture for the benefit of major buyers and other seafood stakeholders; and using that information to engage all stakeholders along the supply chain in fisheries and aquaculture improvements and moving toward sustainability. Founded in 2006, SFP now has a staff of more than 60 globally and projects in more than two dozen countries.

SUSTAINABLE FISHERIES GROUP

The Sustainable Fisheries Group (SFG), founded in 2006, is a research team that is run collaboratively between the Bren School of Environmental Science & Management and the Marine Science Institute at the University of California Santa Barbara (UCSB). The mission of SFG is to provide leadership to develop new science and transform it into solutions for sustainable oceans. Since its inception, SFG has leveraged the strengths of the Bren School, drawing upon student and faculty talent.

PHOTOS: COVER, ALEXANDER MAZURKEVICH/SHUTTERSTOCK; PAGE 2, BIG EYE TREVALLY, INDONESIA, DRAY VAN BEECK/SHUTTERSTOCK; BELOW, FISH FARMING NEAR LAKE TOBA, INDONESIA, KATALEEWAN INTARACHOTE/SHUTTERSTCOK