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Environment Notes

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Building Institutional Capacity for Environmentally Sustainable and Appropriate Mariculture

Global aquaculture production is growing at more than 10 percent per year, making it the world's fastest growing food production sector. The rapid expansion of the industry is expected to continue due to declines in capture fisheries production and increasing world demand for aquatic food products. To help ensure environmentally sustainable and balanced growth in this new sector, the U.S. Agency for International Development and its environmental partners have begun implementing enhanced capacity building and governance interventions in selected countries and regions.

Trends and Issues

Of the approximately 30 million metric tons produced from aquaculture in 1998, mariculture and brackish water aquaculture account for 35 percent and 6 percent of total production, respectively. These are collectively referred to as 'mariculture'. Mollusks (47 percent) and seaweed (44 percent) dominate marine production, while shrimp (57 percent) dominates brackish water production. Other significant marine and brackish water species include salmon, oysters, mussels, mullet, and milkfish. Many of these species, such as salmon and shrimp, represent the upper end of the price range for seafood that provides incentive for rapid growth of the industry. In some developing countries where mariculture is well established it ranks as one of the leading export sectors and sources of foreign exchange.

However, the increasing trend towards farming carnivorous fish and invertebrates such as salmon and shrimp for the high-end markets may not be ecologically sustainable or appropriate, and may be undermining food security. Rather than relieving pressure on ocean fish stocks, the aquaculture of carnivorous species is actually contributing to the collapse of wild fisheries. For example, recent studies indicate that the production of a single pound of fish-eating species such as shrimp or salmon requires 2 to 5 lbs. of wild caught fish that is processed into meal and oils for feeds. Unfortunately, the short-term economic incentives associated with these species often override long-term development and food security issues.

Photo: Coastal Resources Center/Global Aquaculture Alliance

Shrimp samples are taken from this pond in Honduras in order to monitor growth rate and adjust feed supply accordingly.

Mariculture production is dependent on clean water and healthy environments, but in places where it is successful and has grown to a significant scale, it can also be one of the causes of degradation of these same natural resources. There are still many challenges to mariculture development, but there is increasing recognition that many of the greatest challenges are neither technical nor related to production, but are environmental, institutional, and related to planning, coordination, and policy implementation.

Strategies for Building Institutional Capacity for Sustainable Mariculture

Three USAID-funded projects in Tanzania, Honduras, and Indonesia demonstrate approaches to enhancing institutional capacity and good governance of the mariculture sector. Each of these projects is funded through a cooperative agreement with the Coastal Resources Center of the University of Rhode Island. The approaches include:

- Participatory development and institutional capacity building at the national and district level in Tanzania;
- Working with the Honduran aquaculture producer association to enhance organizational capacity to voluntarily develop and adopt good management practices for shrimp mariculture production; and
- Working with a coastal community in Sumatra, Indonesia to enhance capacity for self-management.

In **Tanzania,** where little mariculture development currently exists, there is interest in promoting this industry to generate alternative coastal livelihoods. The Agency's coastal management project identified improved national policy and legislation, and clarity in government decision-making authority and permitting procedures, as priority needs to promote an environmentally balanced development of the sector.

In contrast, mariculture is well established in **Honduras,** the second largest shrimp producing country in Latin America. The private aquaculture association in Honduras is well organized and cohesive, and has a history of involvement in monitoring and analysis of environmental quality and applied research on effective practices for pond management. There is interest to constrain further shrimp mariculture expansion and protect the environment upon which the future of successful shrimp production rests.

Mariculture is also a major industry in **Indonesia**. Shrimp culture is highly profitable relative to other coastal livelihood options, and locally operated farms and hatcheries have had a major positive impact in terms of local employment and increase in standard of living in otherwise very poor communities. However, government oversight, policy coordination and legal arrangements are weak and the industry is not well organized. In the past decade, rapid and unplanned growth has resulted in serious problems of mangrove destruction, erosion, flooding, and disease.

Lessons Learned

An important lesson from these cases is that the repertoire of potential management actions and environmental and natural resource policy instruments for promoting sustainable mariculture development is extensive. The challenge for the practitioner, therefore, is to tailor the strategy to the context, resources, and needs. A further lesson is that certain key factors need to be in place for any intervention to be successful. Facilitative conditions in each of the cases associated with successful project implementation include a perceived need for change and commitment from key stakeholders, multilevel involvement and participation of beneficiaries, continuity of effort, agreed upon roles and responsibilities, trust, and clear and shared objectives.

Finally, it is important to point out that strategies for capacity building such as those described here should be nested in a broad and cohesive governance package in which management actions and interventions of actors at different levels are mutually reinforcing and complementary. This is a great challenge but well worth the effort for the preservation of our coastal heritage and the well being of coastal residents.

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