



THE OCEAN FOUNDATION

SUSTAINABLE AQUACULTURE, INTERNATIONAL DEVELOPMENT AND POVERTY ALLEVIATION

Two of the leading, and ongoing, issues being addressed by the international development community today are global food security and poverty alleviation, despite years of extensive funding, programming and development partnerships. Community-based agribusiness programs have long been one of the leading strategies of development assistance efforts addressing these issues. Because there are large populations of people living near the water in many developing countries, fishing can be a major income generator for those coastal communities, as well as the major source of protein for local residents. Promoting sustainable fishing practices and stronger management regimes in these fishing-dependent communities has been the focus of ongoing efforts by the development community—some successful, some not. Few efforts have been designed, however, with an eye toward helping the communities deepen their resilience to the potential effects of habitat and species loss due to *external* factors (e.g. illegal take by larger, better armed outsiders, mining and other destructive activities, or climate change).

Interestingly, few agribusiness initiatives, from either the funding side or the implementation side, have focused on aquaculture as part of an “agribusiness” solution, despite the fact that aquaculture is among the most sustainable food production systems, has the potential to achieve great results both in terms of food security and economic stability, and has been practiced successfully (and sustainably) in many developing countries for centuries. Unfortunately, in developing countries with marine resources but without a strong aquaculture tradition, commercial scale aquaculture techniques are almost always neither sustainable nor environmentally appropriate, if they exist at all—nor, generally, are they providing enough food or income to local communities.

High tech modern systems are not always appropriate in Asia and Africa where, for example, energy and water are in short supply; thus, some of the ancient forms of aquaculture (such as rice/fish polyculture cultivation), could have much more impact, more quickly and with far less cost. Further, we need to separate more clearly the ocean fisher communities and the concept of aquaculture, because fishing and aquaculture are not necessarily geographically located together, (except in the case of coastal mangrove shrimp farming).

Since more than 50% of worldwide fish consumption comes from aquaculture (compared to 6% in the 1970s!) and the UN FAO believes it should be increasing at a rate of 10% per year, sustainable aquaculture should be a key component in all programs designed to promote global poverty alleviation and food security. When implemented correctly, sustainable aquaculture not only meets the needs of the present, but also can help preserve ocean ecosystems and create long lasting results for the smaller, more isolated communities that depend on them for every aspect of their well-being by reducing commercial competition for their fish.

DEVELOPMENT PROGRAMS AND AQUACULTURE

To meet short-term food security targets, and for commercial profit motives, many developing countries are compromising long-term food supply sustainability. The development institutions (multilateral,

governmental, NGO, and for-profit) must recognize this opportunity. Sustainable aquaculture can be a significant solution to the twin challenges of food security and generating economic activity with broad community benefits. These kinds of projects can benefit both inland and fishing-dependent communities alike.

And it is not just about food and economic security—fish are a healthy source of protein for everyone. Wealthy countries can afford to pay higher and higher prices for fish that they want, but do not need. And imagine as China comes on line – an additional 350 million people pulled out of poverty over the next decade, all wanting luxury fish. We need to do more to recognize the threat and urgency this creates. Alternatives through local sustainable aquaculture are available in those countries too, and can and should be promoted aggressively in order to reduce pressure on vulnerable wild stocks,¹ and to increase the security of fishing-dependent communities along remote coasts all over the world.

- We have inland communities who put pressure on wild-caught fisheries when they could grow fish as a sustainable protein source themselves--- both poor and not poor.
- We have wealthy nations that put pressure on wild-caught fisheries of extremely vulnerable populations (both the fish and often the people who “own” the waters). These consumers could be eating fish that is locally grown, caught sustainably etc., with the proper education and pricing incentives (and our acknowledgement that some technologies will be out of reach for the poor).
- We have coastal fishing-dependent communities who need a back up for their declining food source, but also an alternative to loss of opportunity from strong protection regimes. We also have to recognize that fishers from developing nations and developed nations are not necessarily going to see aquaculture as a sufficient alternative livelihood. Just because it involves fish does not make it an equivalent livelihood.

Aquaculture clearly offers a potential solution to most of these issues. When done correctly, communities can learn how to produce sufficient and appropriate fish and other aquatic food to feed their own families, and provide a sustainable livelihood as well. In addition, when aquaculture is done properly, other products such as vegetables and rice can be grown together with the fish in a symbiotic manner. This polyculture approach is not only environmentally sustainable but also very easy and more cost effective to manage by local communities in terms of labor and other inputs.² However, many communities lack the models, the training, and the immediate financial incentives to begin this process of changing from fishing to aquaculture. These communities need the expertise to know which type of aquaculture is the most appropriate for their situation and their community.

Local governments need the awareness and the regulations in place to ensure that aquaculture is done appropriately, sustainably, and with the least negative impact on the environment and the local community as a whole. When done correctly, aquaculture is one of the answers to solving the global food security issue and raising families and communities from poverty.

AQUACULTURE—THE QUESTION OF SCALE

For the most part, we are focusing on small-scale sustainable aquaculture that can promote poverty alleviation, food security, community resilience to disasters, and economic empowerment in the developing world. We are seeing the development of low technology solutions, but also of high technology that is accessible to those in developing nations. And, we can envision a modular low-capital (or micro-loan-able) system that can be easily replicated in many small communities in a manner that minimizes capital demands in international development. Such facilities emphasize low water usage, are easy to build, can be powered by solar and wind, and are operable by women in

¹ Unfortunately, there is no evidence to date that aquaculture curbs fishing on wild stocks. And, it may not be growing fast enough to keep up with increasing demand/need for fish.

² Polyculture reduces other environmental impacts of commodity cereal production – for example it is incompatible with pesticide treatment; but yields can remain good because the tilapia (or catfish, pacu, etc.) naturally munch on the pests.

places where men often migrate to cities to work, or where women are the primary breadwinners for the family.

In the developed world, smaller scale distributed production can also meet and encourage the locavore movement, including its concerns around the carbon footprint of food, and greater transparency and traceability of food (retailers and restaurants will know exactly what kind of product they are buying and/or serving). And, all of these small-scale facilities are replicable, and can be placed near population centers that create market demand, or nutritional need for fish.

However, is there a role for sustainable aquaculture to play in guaranteeing food security at the global scale?

- Is it credible to suggest using sustainable aquaculture to meet the massive demand of the commercial food supply chain without repeating the industrial farming mistakes of the meat and poultry industries?
- Can this be achieved with a distributed network rather than centralized facilities, or do we lose economies of scale?
- Can we support larger-scale farms with fewer social benefits if they meet our other (sustainability) criteria?
- How do we ensure that we avoid industry consolidation and the creation of quasi-monopolies?

We do have a bias toward small-scale, community-based farms in economically depressed urban areas, or in developing nations; however, to meet demand driven by large distributors/wholesalers/end-users of fish products, we need to study the issue of “going to scale.” For example, if we think about commercial buyers of shrimp, salmon and other aquaculture products such as Darden Restaurants, and Wal-Mart and perhaps McDonalds (someday), can we at The Ocean Foundation play a role to help find the right balance (or size) of an aquaculture facility?

A large facility brings “economies of scale” and may be big enough to use fully integrated systems that grow food, grow fish fry, grow out fish, process fish, and ensure reuse of waste and by-products. And because feed is still a major issue to be solved for making aquaculture sustainable, one area of study is to ask whether large-scale production may make more economical the production of feed that does not rely on vacuuming up the little fish from the ocean.

We see that there may be a way to start with distributed cooperatives / collectives and scale up over time, especially if we use great care in siting them with disaster resilience in mind, and wherever possible, in incorporating short supply chains for low carbon footprint delivery.