Perspective from the World Wildlife Fund

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BACKGROUND

Since the early 1980s, aquaculture production in near and off-shore locations has increased rapidly. This increase is a result of the rising demand for cultured seafood and the advent of appropriate structures that can withstand intense weather events that would otherwise destroy the infrastructure.

The rise in mariculture production has brought with it many concerns, both real and perceived. Some of these concerns include:

- blocked access to fishing grounds;
- nutrient loading in near-shore systems;
- wild fish incorporation into aquafeeds;
- lack of reporting on wild fish capture for fattening in cages;
- impingement of sea mammals on longlines and other mooring devices;
- unaesthetic views of seascapes;
- release of chemicals such as therapeutants into natural and public waters;
- transmission of diseases from cultured to wild fish;
- exotic introductions;
- escapes;
- benthic disruption; and
- habitat change and degradation.

Not all impacts will occur at every mariculture site, and further these impacts may be specific to particular species. Nevertheless, the key concerns of those stakeholders that raise these issues and can be affected by the culture activity should be addressed.

The World Wildlife Fund (WWF) has been working on aquaculture-related issues for approximately ten years – identifying the threats that aquaculture can pose and finding viable alternatives to lessen these impacts. In 2002 WWF initiated the Salmon Aquaculture Dialogue to identify the real vs perceived impacts of salmon farming. The approach of the Salmon Aquaculture Dialogue is largely based on the consensus-building process of the Consortium on Shrimp Farming and the Environment (WWF/World Bank [WB]/Network of Aquaculture Centres in Asia-Pacific [NACA]/Food and Agriculture Organization of the United Nations (FAO)/United Nations Environment Programme [UNEP]), which collectively raised awareness and brought a wider and stronger understanding of the impacts of shrimp farming and ways in which those impacts could be mitigated or eliminated. The key to the Consortium's

work, along with the various WWF-initiated dialogues, is to build consensus around the body of scientific knowledge present to understand the effects of these aquaculture activities. The largest area of conflict between environmental nongovernmental organizations (NGOs) and producers has been disagreement with or distrust of the science put forth by both sides.

In the Salmon Aquaculture Dialogue and the later Mollusc Aquaculture Dialogue, a wide range of stakeholders including NGOs, producers, buyers, retailers, government officials, community representatives, investors and other influentials are first brought together to identify the key concerns that account for the bulk (75–90 percent) of all of the impacts of culturing a specific species or species group. There are numerous concerns that stakeholders typically raise, but the effort of the dialogue is to focus on the key impacts rather than getting bogged down in developing a comprehensive list of all of the impacts a particular production system might cause. Subsequently, the dialogues seek to expand on the impacts to develop measures to quantitatively reduce these impacts to acceptable levels.

These consensus-building discussions have been widely heralded as a means to identify the true impacts and build collective support on what are the key ways to reduce the impacts of aquaculture. The lessons learned from the dialogues were shared with meeting participants in hopes of promoting a participatory approach to identifying and reducing the negative effects of aquaculture, and in the context of this meeting, more specifically, mariculture. It should be noted that the reason WWF became involved in aquaculture is the acceptance that this form of aquatic animal production must be present to relieve the heightened pressures on wild fisheries stocks.

CONCLUSIONS AND SUGGESTIONS

The workshop was incredibly informative to those who were not familiar with mariculture in the People's Republic of China, and bringing these issues into a regional perspective is critical for the success of producers and the sustainability of the environment. The organizers provided a myriad of regional perspectives on the mariculture of molluscs, fish and seaweeds in the region. From this, it became apparent that the sharing of this information would prove vital to the continued productivity and enhancement of the coastal environment. There are several concerns that, from an environmental NGO perspective, need to be addressed.

- Education – Above all else, there is a need for education both at the producer level and the government level. This education appears to be needed at some of the most basic levels where coastal ecosystem organism co-dependence is explained.
- Coastal zone planning – Where are the different regions as far as zoning and management of the coastal zones? Any effort to improve on these systems needs government participation and acceptance.
- Vision – Is there a clear vision of what the process of bringing regional perspectives together is trying to accomplish? Sharing knowledge promotes better management and avoidance of duplicated impacts. But this process and effort could be most beneficial if regional producer associations could be developed and tasked with furthering the information sharing at a more grassroots level.
- Baseline data – To measure any impact, baseline data is necessary. Monitoring of the current coastal ecosystems by no one else except the producers that inhabit them is important and should be encouraged in a standardized manner.

The Southeast Asia SEAPLANT Network: an initiative of IFC-PENSA

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SEAPLANT.NET is an initiative of the International Finance Corporation Program for Eastern Indonesia SME Assistance (IFC-PENSA). The programme is funded by the IFC, the Asian Development Bank (ADB) and the governments of Australia, Canada, Japan, the Netherlands and Switzerland. IFC-PENSA products and services provide technical assistance and capacity building facilities to SMEs in Indonesia and the Philippines where the programme is known as PEP Philippines.

Initial emphasis is on *Kappaphycus* spp. (*K. cottonii*) and *Eucheuma* spp. (*E. spinosum*). These tropical seaplants are grown primarily in the Philippines and Indonesia where total combined production of almost 200 000 tonnes per annum produces farm gate revenues of more than US$150 million per year. These plants are the world's major source of the biopolymer known as carrageenan.

The focus of SEAPLANT.NET is on working with MSME (micro, small and medium enterprises) to make them effective business units. Special emphasis is laid on the aggregations of family farm units that comprise most of the enterprises involved in seaplant production. The tools and solutions provided by SEAPLANT.NET facilitate the availability, access and applicability of the six groups of essentials that are necessary before any enterprise can prosper. These essentials are fair finance; fair access to global markets; communication and logistics; essential goods and social services; strategic alliances; and science and technology.

The SEAPLANT.NET value proposition is that value chains can be sustainable if stakeholders benefit from transparently adding value… not from processes that make value chains opaque. The overall seaplant approach is to link sustainable seaplant sources through near-source "mini-factories" to end users through a system by which crops are transparently "tolled" through process facilities.

With tolling systems, farmers are aggregated into enterprise units that retain crop ownership as value is added and farmer enterprises get paid for value-added products rather than for raw crops. The end-products of SEAPLANT.NET-facilitated seaplant value chains are "ingredient building blocks" such as dried seaplants, solid concentrates and liquid concentrates. These are marketed globally to further processors, value solutions providers and technically advanced end users.

In the long run, SEAPLANT.NET will facilitate sustainable growth in seaplant value chains by expanding the number of crops grown, promoting integrated coastal zone development, developing sustainable, appropriate systems for adding value near seaplant sources, and facilitating the development of more innovative products for wider local and global markets.

Health issues in mariculture in the Asia-Pacific region: an industry perspective

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Asian aquaculture contributes more than 90 percent to total world production. Nevertheless, the industry is paying a price for this achievement in view of the deterioration in environmental and health conditions in fish farming areas. Coupled to this, the intensification of aquaculture in the region has led to disease problems and heavy economic losses. Health problems have two fiscal consequences for the industry: loss of productivity due to animal mortality and morbidity, and loss of trade due to food safety issues. From an industry perspective, we are facing the following health issues:

- Lack of capacity in disease diagnosis and epidemiology. Most Asian farms operate on a small scale and technical support, including disease diagnosis and training, is lacking at the farm level. Asian aquaculture is characterized by an enormous diversity of species, with several dozen marine species being farmed. Consequently, either more resources are needed to understand the basic epidemiology of diseases in the various species or we have to focus our limited resources on fewer species. Once more data are available, better networking and data sharing between scientists in the region will be required.
- Poor health management practices: In Asia, most individual fish farms produce several species of fish. Poor husbandry methods are often practiced, e.g. the use of trash fish as feed. Fry are often sourced from the wild or derived from wild-caught broodstock. These practices are a simple way for pathogens to gain entry to the farm. Furthermore, legislation for and implementation of farm licensing and zoning policies are not in place in most Asian countries. Coupled with a "gold rush" mentality, this often results in too many fish and too many farms in a concentrated area, which in turn facilitates disease transmission.
- Irresponsible movement of live aquatic animals and low awareness of biosecurity: Increased trade of live aquatic animals and the introduction of new species for

farming without proper quarantine and risk analysis in place have resulted in the spread of diseases within and between countries.

- Improper use of antibiotics and chemicals: Irresponsible use of antibiotics and chemicals in aquaculture can lead to residue problems, an increasing consumer concern and the development of drug resistance among bacterial pathogens.
- Unavailability of fish vaccines: In Asia, with the exception of Japan, few vaccines for marine fish are yet available on a commercial scale. The major advantages of vaccination over therapeutic treatments are that vaccines provide long-lasting protection and leave no problematic residues in the product or environment.

The combination of all the above-mentioned factors, together with the diversity of aquatic animals in tropical waters, has led to a truly challenging disease situation in Asian aquaculture. Under the threats of disease epidemics and consumer pressure on food safety, the industry must undergo change and pay more attention to health management. Collectively, this includes the use of healthy fry, quarantine measures, optimized feeding, good husbandry techniques, disease monitoring (surveillance and reporting), sanitation, vaccination, and proper control and biosecurity measures when diseases do occur. Overall, the emphasis must be on prevention rather than treatment.