

Sustainability and Efficiency in Fish Production

Capture fisheries and aquaculture have had diverging routes in the long history of human's utilization of fish as food. However, there is at least one thing in common between the two sectors: the fish. Whether we harvest fish from rivers or the sea, or we grow fish in ponds and cages, better understanding of fish and their environment can help ensure that there will be fish on our tables for a long time to come.

Capture fisheries have gone through tremendous changes during the later part of 20th century and early 21st century. Declining and/or depletion of major commercial fish stocks have given us wakeup calls that even the most "enduring" fish such as Atlantic cod can be depleted with modern harvesting technologies if the fish and the technology are improperly managed. Most of us now agree that old single-species management strategies aiming for the maximum sustainable yield for each and every species or stock have never worked and have resulted in biological as well as socio-economic catastrophes around the globe. Although still in early stages of theory and development, ecosystem-based management that encompasses ocean environment, fish and other living elements, and fishers and their communities will result in a more sustainable ocean and fisheries.

Aquaculture, both freshwater and marine, is still rapidly developing in many parts of the world. With ever increasing demand for fish and leveled production from capture fisheries, heavy burdens have been laid on aquaculture to meet this demand. However, many aquaculture operations do not increase the total amount of fish available for human consumption, as fish that are used as feed often exceed the amount of fish produced. In addition, many coastal waters are fully utilized as aquaculture sites, and sometimes are polluted. And increased competition for use from other ocean users will hamper further development in many coastal waters. The future may lie in the development of offshore and deep water aquaculture technologies.

The challenge to both capture fisheries and aquaculture is how to supply sufficient amounts of fish sustainably and efficiently. Sustainability may include sustainable environment, sustainable ecosystem, and sustainable fishing community. Efficiency can be measured by energy use, feed consumption, waste production, environmental impact, and capital investment. With the ever increasing fuel price, both capture and culture industries require innovation in energy-efficient means and methods in order to stay commercially viable.

There may be areas where capture fisheries and aquaculture may work together. For example, "trash" fish otherwise discarded may be utilized as fish feed. And there are possibilities that capture and culture may be merged, working as catching-holding-growing-fattening operations. There is no reason for undersized fish to be discarded while they may be kept and grown. While limited examples currently exist, the global growth of integrated operations may require fundamental changes in philosophy in fishery management and significant improvement in technology in both capture fisheries and aquaculture industries.



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