

# From Managing Fisheries to Managing Ecosystems

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**W**henever I'm at a social function and people ask me what I do for a living, and I tell them that I am a fisheries biologist, their faces usually turn blank, and invariably, they lose interest. This before overfishing and its prevention are even mentioned! The reason is clear: in developed countries, fisheries are perceived as an exotic holdover from the past, not of major importance to society. In developing countries there is not even something exotic to generate the slightest interest. Here, fishers<sup>1)</sup> are ignored, low-income groups, fishing often being the last resort of landless people. Even if fish is a major food source globally, it is usually a commodity that is taken for granted, and few care much that we need fishers to get fish.

However, the recent spate of long, if not necessarily profound, articles in several major American and British magazines (Box), along with the riots of French fishers early this year, have helped to change the perception of fisheries: We are making headlines! People have started to realize that there is a relation between the health of the sea—a concern to many—and the health of fisheries.

## A question for fisheries scientists

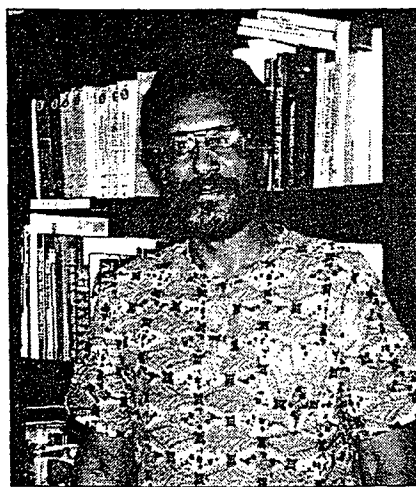
The question is now: have fisheries scientists and their institutions fully assimilated this message, and all its ramifications? One of these, for example, is that our circle of traditional "clients" (the government and other bodies regulating fisheries) and "beneficiaries" (the fishery sector) may have to be expanded, since it is hard to maintain that fishers now operating, say, in the North Sea, should be the sole owners of all the fish resources it contains, now, and forever.

Clearly, there are now more stakeholders involved, and accommodating their demands, including those that may reach beyond some current "bottom line", is necessary if our profession is to provide more than fleet management advice and pre-investment studies.

We have witnessed how in the USA, the Magnuson Act was introduced, among other things, to leave apex predators, e.g., marine mammals, seabirds, etc., a share of Nature. Also, demands for ecosystem management have been recognized even by ICES in a discussion of the need for, and problems involved in, increasing the interaction between fisheries biologists and ecologists.<sup>2)</sup>

## Fisheries scientists are uniquely prepared

We are, as fisheries scientists, uniquely prepared to provide input to managing ecosystems, far more so than general ecol-



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ogists and marine biologists. One reason for this is that we perceive our field as an applied science, practised to yield practical answers. Another reason is that multispecies fisheries models—such as the one developed by the ICES Multispecies Working Group—rank among the most sophisticated achievements of ecology. All we need is to think in more decidedly ecological terms.

The main rationale for our retooling and contributing explicitly to ecosystem management is provided, I believe, by the ecosystems themselves in which fisheries operate: these systems are being so greatly modified by the fisheries that even sustaining present harvests will become difficult.

## The fate of primary production

An illustration: in the last chapter of a book recently co-published by ICLARM, ICES, and DANIDA<sup>3)</sup>, my colleague Villy Christensen and I estimated, for shelf systems such as the North Sea, that 20-40% of observed primary productivity is required (directly or indirectly, i.e., via intermediate preys) to sustain present fisheries catches. We are currently working on extending these results to the world's fisheries, and they appear to hold globally for coastal areas.

Most colleagues whom we have confronted with these figures were surprised that they were so high. Yet the situation is very comparable to that of terrestrial systems, where 35-40% of primary production was found to be used by humans as well.<sup>4)</sup>

Clearly, without being alarmist, one can agree with Bill McKibben that we are reaching "The End of Nature"<sup>5)</sup>, in the sense that it becomes harder and harder to find bits of Nature not affected by human impacts. Imagine: every second or third phytoplankton cell working for us, as if they were grasses in a meadow!

## Cannot go on increasing catches

This high utilization tells us, by itself, that we cannot go on increasing catches; rather

we must think harder about how to allocate effort between stocks and fleets, such as to minimize damage. This is indeed one major reason why we need ecosystem management. Also important is, however, that we (or rather the decision-makers) also have to decide how the structure of the ecosystem should be: we may want to increase catches by fishing down the food web, but must also consider that this will cause conflicts between fishers and environmentalists—and eventually between fishers and the public at large as in the case of the sandeel-seabird controversy in the northern North Sea, and the capelin-cod-seal complex in northern Norway.

How do we then decide what the options are? To even begin to address this question, we need to know the components of our ecosystems, and how they interact. With this in hand we can go on to ecosystem management. Research on ecosystem dynamics should thus become a task as important for fisheries biologists as developing quota scenarios, and it may well become one at which we may be more successful than with our stock assessments, usually performed without considering the ecosystems in which stocks are embedded.

*The Economist* of 19 March 1994 correctly identifies, in its article on "The catch about fish", subsidies-driven overfishing as a major problem for the private sector and the governments of developed countries to resolve. The article also states, however, that "increasingly, boats will head for Third World waters, where the decline in stocks has not yet started".

This is erroneous: boats from Europe, North America, and Japan have been fishing in Third World waters for decades, and it is only since the still unratified Convention on the Law of the Sea became de facto international law that foreign fisheries began to pay for the fish they "traditionally" caught off the coast of developing countries (e.g., in West Africa).

Although, the "decline in stocks" in Third World countries only "started" two decades ago, coastal stocks throughout much of the developing world have been devastated. This occurred mainly due to the combined activities of industrial trawling (often for exportable shrimps) and rapidly increasing numbers of often desperate small-scale fishers (generating what is now known as "Malthusian overfishing"), whose destructive impact has been documented by research conducted, by e.g., ICLARM in the Philippines.

One major finding of this research is that socioeconomic conditions in most Third World countries preclude simple solutions such as licensing and quota schemes for fisheries, so politicians and administrators must instead concentrate on sea tenure rights, and alternative employment for small-scale fishers<sup>6)</sup>. Another finding is that there is no safety valve in the Third World for excess fishing effort from the developed countries.

1)Fisher is a gender-neutral word. It must be remembered that many fishers are women, especially in the Third World.  
2)ICES to strengthen its environmental side after wide discussion. 1992. *ICES/CIEM Information*, 19:1-2.

3)*Trophic Models of Aquatic Ecosystems*. 1993. Edited by V. Christensen and D. Pauly. *ICLARM Conference Proceedings*, 26, 390 pp. Manila.

4)Vitousek, P.M., et al. 1986. Human appropriation of the products of photosynthesis. *Bioscience*, 36(6):368-373.

5)An excellent book, incidentally, available from Random House, New York (1989).

6)I discuss these and other issues touched upon here in a collection of 27 essays titled *On the Sex of Fish and the Gender of Scientists* published by Chapman and Hall in their Fish and Fisheries Series, 1994.