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The Transition in the Contribution of Living Aquatic Resources to Food Security

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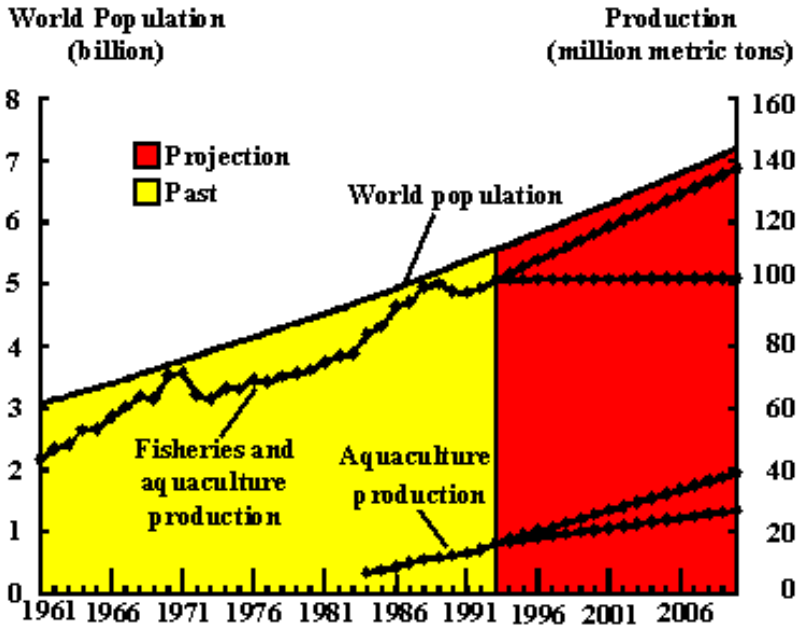
The fishing industry's aggressive and expanding search for fish from the sea reached a turning point in 1990. After many years of increasing production, the global marine and inland catch from natural stocks declined from the 1989 peak of about 89 million tons to 85 million tons in 1993. Aquaculture production did not increase enough to meet the shortfall, and total production also fell in 1990 and 1991 (Figure 1).

Figure 1--World population and fisheries and aquaculture production, 1961-93 with upper and lower projections to 2010



Source: Food and Agriculture Organization of the United Nations, *Fishery statistics: Catches and landings, 1991,* Yearbook of fishery statistics 72 (Rome 1993); *Safeguarding future fish supplies: Key policy issues and measures,* KC/FI/95/1 (Rome, 1995).

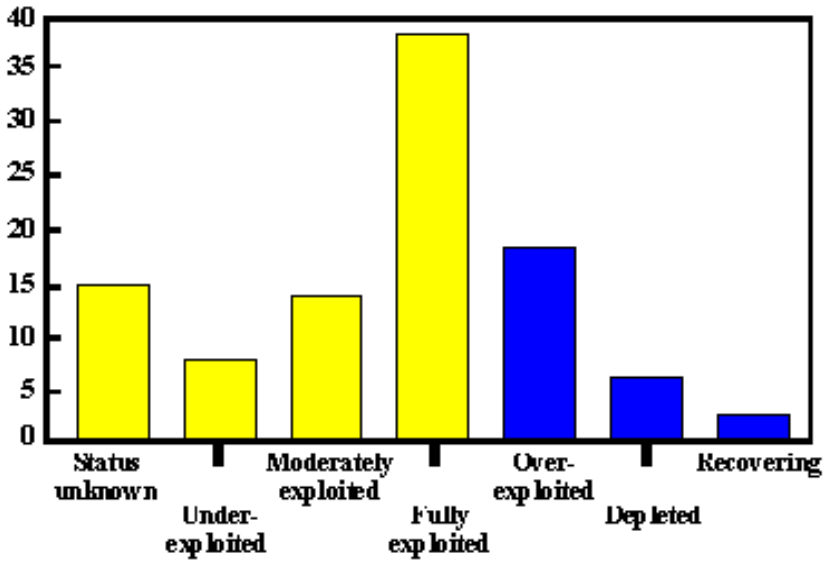
Note: Projections are based on a major expansion in aquaculture (to 39 million metric tons) and a reversal in the decline of capture fisheries through good management and better use.

It now appears doubtful that the global catch will recover and resume the fairly steady production increases that marked the period from the 1940s through the 1980s. Of the 200 fished stocks in all parts of the world, it is estimated that only about a third of these stocks are capable of increasing harvests. About one-fourth are overexploited and would produce greater catches only if returned to a healthier state, while about 38 percent are fully exploited and could not produce more without depleting the base stock (Figure 2).

Present indications are that production from natural stocks will be below the current level in the year 2020; at best, it will maintain its present level. Gains from better handling of catch, more use of "bycatch" (nontarget and discarded marine species), and the exploitation of the few remaining underused stocks will likely be at least offset by losses from poor management, protection of areas and species from fishing, and declining carrying capacity as a result of continuing environmental degradation.

Over the next 25 years the challenge will be to maintain present or near-present levels of natural harvest while sustainably increasing aquaculture production. Marine and inland aquaculture production doubled between 1984 and 1993, reaching 16.3 million tons. Production increases should continue through 2020. But aquaculture will probably not eclipse production from marine stocks and will not rise fast enough to maintain the present per capita supply of aquatic products to a growing world population.

Figure 2--Status of the world's 200 main fish stocks, 1990



Source: Food and Agriculture Organization of the United Nations, *Review of the state of world fishery resources*, Part 1, *The marine resources*, FAO Fisheries Circular 710 (Rev. 8) (Rome, 1992).

Aquaculture production will increase sporadically through the introduction of new areas, species, and practices and through increased production from existing systems. Major setbacks will occur from time to time as a result of disease, pollution, and poor management practices. Furthermore, other agricultural, industrial, and urban activities will compete vigorously for high-quality water, space, and other inputs such as feed, fertilizers, labor, and capital.

The next few transition decades pose a host of uncertainties for users of fisheries, consumers, and management institutions. It is also a time of opportunities, when even small actions could have important effects.

A great deal is at stake. Valued at US$70 billion in 1991, aquatic resources make up 19 percent of total animal protein consumed and 4 percent of total protein consumed. About 1 billion people--a fifth of the global population--rely on fish as their primary source of protein. About 50 million people are involved in small-scale fisheries through catching, processing, and marketing. Overall, fish production provides employment for about 150 million people.

Facing the Transition: Five Key Issues

A successful transition requires careful attention to five key issues. The first is maximizing the use of aquatic resources.

Efficiency improvements, such as reducing postharvest losses, hold great potential. Losses could be minimized by better handling of the product and the development of aquaculture species and strains that travel better to markets or the home table. Donors and investors should make more development investments in postharvest operations than in fishing vessels and gear.

It is also important to keep in mind that aquatic resources can be used either as high-quality food or indirectly for other economic ends such as livestock and aquaculture feed, crop fertilizer, food and nonfood additives, or as bases for the production of industrial, medical, and other chemicals through the application of marine biotechnology. Nonfood uses may be either more or less valuable than the value of fish sold for human food. The critical question to ask of lower-priced uses is whether a greater contribution could be made by using the resources more directly for human food or for some higher-priced alternative.

The second critical issue is resource management. In some respects this is an especially important matter because it is not yet clear how the management of fisheries should be improved.

One of the classic problems of fisheries is that they are open access resources, which often leads to overexploitation and economic inefficiency. In developed-country fisheries, the attempt to limit access has led to schemes to limit the number of fishers by regulated licensing and input restrictions and by the creation of output restraints such as quotas. Despite a high degree of regulation, many developed-country fisheries are suffering overexploitation, and there is increasing evidence of poor compliance with management regulations. Most such schemes are not practical in small-scale fisheries in the developing world.

Equity is an important component of this issue. In the developing world, small-scale fishers frequently lose out to industrial-scale operators favored by national governments because of their contributions to markets, exports, and the national economy.

Many are now suggesting that conflicts can be diminished, management better implemented, and resources better managed when user groups help develop resource management options through comanagement with state-level authorities.

The third issue is intensification. Intensification of fisheries exploitation only yields greater production up to a limit; after that point, production can be increased only by reducing the intensity of exploitation to allow recovery of the resources. To set and control fishing intensification within the limits, managers need good scientific knowledge of the stock status and carrying capacity of the environment, appropriate management schemes, and good monitoring and compliance schemes. Destructive fishing practices such as dynamite and cyanide fishing are common examples of inappropiate intensification.

There is potential for further intensification of aquaculture production, but great care is needed. There are already many examples of culture practices that have caused severe environmental degradation and outbreaks of chronic disease. In Taiwan, shrimp aquaculture production crashed from nearly 80,000 tons in 1987 to virtually nothing in 1991 as a result of such factors.

The fourth issue is the integration of fisheries and aquaculture. For too long these industries have been treated as separate sectors in isolation, a practice that has ignored important linkages. It is important to recognize the integral nature of fisheries resources and aquatic ecosystems.

The fifth and final issue is the difficult problem of balancing national versus international interests. Aquatic resources generate tension over issues such as trade, local and international market competion for fish, demands for fisheries access by foreign fleets, illegal cross-border fishing, and management of shared stocks.

For example, trade is changing fish consumption patterns. As prices of fish increase, more is being traded and relatively less consumed by the producer. Small-scale and artisanal fishers are most likely to be marginalized under these conditions and will suffer both nutritional and employment losses.

If the price of fish keeps rising, low-income urban and rural fish consumers also will be adversely affected.

The Research Agenda

To date, research for aquatic resource management has consisted mainly of resource biology and stock assessment, gear development, a small amount of economic and social research, and some aquaculture development research. In the difficult period that lies ahead, this agenda no longer suffices.

More research is clearly needed on aquatic resources in the developing world. In many developing countries, fisheries products are major contributors to food security, and this contribution is now seriously threatened.

But research investments must be appropriate. When allocating scarce research resources, many developing countries choose to emphasize aquaculture technology rather than fisheries, probably since the impact of the former is usually clearer. This decision may be short-sighted, since the majority of production still comes from natural stocks.

In both the developing and the developed world, action--including research--must start now to ensure that living aquatic resources continue to make an important contribution to world food security.

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"A 2020 Vision for Food, Agriculture, and the Environment" is an initiative of the International Food Policy Research Institute (IFPRI) to develop a shared vision and consensus for action on how to meet future world food needs while reducing poverty and protecting the environment. Through the 2020 Vision initiative, IFPRI is bringing together divergent schools of thought on these issues, generating research, and identifying recommendations. The *2020 Briefs* present information on various aspects of the issues.