

Fish Demand and Supply Projections

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Abstract

It has been predicted that the global demand for fish for human consumption will increase by more than 50% over the next 15 years. The Food and Agriculture Organization (FAO) has projected that the increase in supply will originate primarily from marine fisheries, aquaculture and to a lesser extent from inland fisheries, but with a commensurate price increase. However, there are constraints to increased production in both marine and inland fisheries, such as overfishing, overexploitation, limited potential for increase and environmental degradation due to industrialization. The author sees aquaculture as having the greatest potential for future expansion. Aquaculture practices vary depending on culture, environment, society and sources of fish. Inputs are generally low-cost, ecologically efficient and the majority of aquaculture ventures are small-scale and family-operated. In the future, advances in technology, genetic improvement of cultured species, improvement in nutrition, disease management, reproduction control and environmental management are expected along with opportunities for complementary activities with agriculture, industrial and wastewater linkages. The main constraints to aquaculture are from reduced access to suitable land and good quality water due to pollution and habitat degradation. Aquaculture itself carries minimal potential for aquatic pollution. State participation in fisheries production has not proven to be the best way to promote the fisheries sector. The role of governments is increasingly seen as creating an environment for economic sectors to make an optimum contribution, through support in areas such as infrastructure, research, training and extension and a legal framework. The author feels that a holistic approach integrating the natural and social sciences is called for when fisheries policy is being examined.

As a result of population and income growth, global demand for fish for human consumption will increase more than 50% at constant real prices over the next 15 years, from the present 75 million to 110-120 million t. The most optimistic FAO projections of the increase in global supply for human consumption arrives at 108 million in 2010—a 50% increase over the 1991-1993 annual average supply. The increase in supply will originate from different sources as shown in Table 1.

The imbalance between demand and supply projections indicates that a general increase in fish prices should be expected.

Constraints and Potentials for Production Increase

MARINE CAPTURE FISHERIES

Marine capture fisheries hold limited potential for production increase as many fish stocks are overfished or exploited to their maximum. The decline in global catches observed in recent years may only be reversed by widespread adoption of the Code of Conduct for Responsible Fisheries by the coastal states. Some pelagic stocks

that are presently not exploited to their maximum potential may in future be targeted for human consumption and others traditionally exploited for fish meal and oil production may also make direct contributions to food security.

INLAND CAPTURE AND CULTURE FISHERIES

Inland capture fisheries involve a variety of activities undertaken by people from a wide spectrum of socioeconomic backgrounds. The main fishing areas are rivers in major basins often associated with extensive floodplain areas, lakes, reservoirs, canals and a variety of small seasonal and permanent waterbodies. A large proportion of inland capture fisheries are for subsistence and the catches, whether commercial or for subsistence, are mainly consumed locally. The high level

of artisanal and informal activity leads to a high degree of participation, including women and children. The level of participation, particularly amongst low income, resource poor groups makes inland capture fisheries particularly important to local food security. Inland capture fisheries in larger open waters are taking on an appearance more often associated with marine capture fisheries. Management requirements for these have been developing in parallel with those for the marine sector. In many parts of the world inland capture fisheries are under threat because of environmental degradation and/or overfishing. The environmental impact of other activities, e.g., damming or diversion of rivers and land degradation through agriculture and forestry activities is the major constraint to sustaining or increasing production. In the developed world

Table 1. FAO projection of fish supplies in year 2010.

	Average annual supplies 1991-1993	Optimistic scenario 2010
Marine fisheries	50	55
Inland fisheries	6	11
Aquaculture	15	39
Reduced post-harvest losses	-	3
Total supply	71	108

rehabilitation of freshwaters is driven by recreational demands in particular. In many developing countries, particularly in Asia, the effects of the predicted rapid economic development will likely impact freshwaters severely if left unmitigated. The main problem is the industrial and household effluents entering rivers.

While most major inland capture fisheries may have reached their maximum sustainable yields, considerable potential exists for increasing catches at the local level by rehabilitating freshwater habitats. Perhaps the greatest potential for increasing catches from inland waters is by applying culture enhancement techniques. Stocking activities offer particular promise for small waterbodies and reservoirs and are already contributing significantly to the catch from inland waters in many regions, notably in Asia. In this context the division between capture and culture activities is fading, adding to the unreliability of statistics on inland fisheries. In most geographical areas the biological potential will not be a constraint. However, the socioeconomic constraints may be significant where fish stocks are common property and fisheries have open access.

AQUACULTURE

Aquaculture offers considerable potential for future expansion. Its potential lies primarily in its fundamental differences from fisheries in that far greater levels of control can be exerted between inputs and outputs and the inputs can be obtained from a range of sources, both terrestrial and aquatic, in raw material or processed form. It is important to recognize that there are many different forms of aquaculture with many different environments, systems and species involved. Aquaculture activities are associated with the culture, society and landscape of the location in which they operate. Individuals, communities and social organizations are critical in defining the nature and extent of aquaculture, irrespective of the technological context. As a result, there are substantial differences in the pattern of development

of the sector in various parts of the world. Although a substantial part of modern aquaculture is increasingly operated along intensive agro-industrial lines, by far the greatest amount of production is still from relatively simple, low input systems which are reasonably ecologically efficient and produce a range of outputs at relatively low cost. The majority of these traditional activities are carried out on a small scale and are family operated.

This trend is likely to be maintained. In making projections for the future it is important to note that a large proportion of aquaculture production is fish produced in systems for carp culture in China and India. China alone accounts for about half of all aquaculture production.

Finfish production may increase 2.5 times from 1992 to a total of 25.5 million t in 2010. Of this, nearly 23 million t will be freshwater fish and about 2.5 million t marine and diadromous fish. Production of (marine) molluscs may triple to a total of 11 million t. Production of crustacea may double to about 2.1 million t. Underlying future advances will be technological improvement, the genetic improvement of cultured species, improvements in nutrition, disease management, reproduction control, and environmental management. There are many respects in which aquaculture may be operated in a complementary manner with other activities. Examples include agricultural, industrial, wastewater and other linkages. At present there are more technical opportunities than social and other organizational incentives to carry out such integration. The bulk of aquaculture operations, as practised today in developing countries, carry minimal potential for aquatic pollution. The problems that have been described are mostly associated with high resource input systems, particularly in coastal areas. It is rather the negative impact on the external environment from other users that is causing problems for aquaculture; aquaculture development is increasingly constrained by reduced access to suitable land and good quality water resources, due to aquatic pollution and habitat degradation.

Policy Issues Related to Long-Term Increase in Supply of Fish for Human Consumption

State participation in production has not proved to be the best way to promote the fisheries sector. The appropriate role for governments is increasingly seen as being the creation of an enabling environment for economic sectors to make the optimum contribution to economic and social well-being. This includes infrastructure, research, training and extension, legal framework etc.

In marine capture fisheries the key policy issues include:

1. adoption of management approaches that restore and/or maintain fish stocks at high sustainable output levels, promote efficiency and equity;
2. reduction of fish discards and un-intended bycatch;
3. avoidance of the degradation of the aquatic environment and the restoration of critical habitats;
4. reduction of post-harvest wastage; and
5. increased use of underutilized species.

In inland fisheries, the key issues are:

6. avoidance and abatement of water pollution; avoidance or mitigation of adverse effects on fish habitats through the alteration of water flows and water qualities in rivers, lakes, floodplains, etc.;
7. expansion of stocking and complementary measures to enhance yields; and
8. adoption of participatory management regimes which involve the resource users in decisionmaking.

In aquaculture, the key policy issues include:

9. integration of aquaculture into rural and agricultural development and water management;
10. adoption of a proper environmental management of coastal aquaculture;
11. development of appropriate

- institutional infrastructure and capacity building; and
12. introduction of technological improvements and disease management.

Issues on and Need for Fisheries Policy Research

Policy measures to address many of the issues mentioned have long been identified and build on knowledge generated within the various disciplines of the natural and social sciences and technology. However,

where seemingly appropriate measures have been taken, experience shows that they have often failed to generate the results hoped for. This not only calls for a more systems oriented research within well established disciplines but for new holistic approaches which integrate the natural and social sciences. One such new area of research, which has a strong bearing on many of the key policy issues, is how humans interact with natural resource systems through property rights regimes (rights and rules). Most environmental problems

can be seen as problems of incomplete, inconsistent or unenforced property rights regimes. Other areas for fisheries policy research include the study of the impacts on fisheries of the increase in world trade in fisheries products and other macrolevel policy developments.

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Demand for Fish in Sub-Saharan Africa: The Past and the Future

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Abstract

The sub-Saharan region of Africa accounted for only 5.5% of the world's demand for fish from 1989 to 1991, in spite of comprising 9% of the global population. This study was carried out to determine the future demand for fish in the sub-Saharan region. Fish accounts for approximately 10% of animal protein consumed. It is prominent in the diet of the poor since cured and smoked fish is a cheaper source of protein than meat or eggs. The average per capita consumption in 1992 was about 8 kg compared to 13 kg globally. Fish is prominent in the diets of people near coastal areas and large inland water bodies and a total of 40% of fish consumed is freshwater fish. Consumption is rising in the coastal areas but falling inland, probably due to drought and overexploitation resulting in an inadequate supply. Aquaculture has not been widely adopted and does not contribute substantially to the region's supply. To determine future demand and trends, a regression analysis was carried out at the country level with FAO data on fish consumption from 1960 and 1992, using several proxies for disposable income, cost of fishery products, changes in tastes and national differences in the tradition of fish consumption. An aggregate increase in fish consumption of nearly 2.7% annually over the next few years was predicted with a strong correlation between increases in income, prices and population. Real income was a significant and positive determinant of fish consumption, even though consumption increased more slowly than income. Given the high projected rate of population increase, the growth rate in overall fish consumption actually implies a reduction in per capita fish consumption of 0.31% annually. If technological progress can improve production and supply, aquaculture could have a significant impact on fish consumption in the region.

Few studies address the current and future demand for fish in Africa, and the continent rarely gets much attention in the discussion of world fisheries issues. While the countries of north Africa are significant producers and consumers of fish, sub-Saharan Africa (hereinafter referred to as "Africa") is a very small participant in the world market for fish, consuming only 5.5% of global utilization in 1989-1991, in contrast

to its share of over 9% of global population. Its share of world fish consumption has remained fairly stagnant (5.2% in 1969-1971), although it did increase in the 1970s (6.1% in 1979-1981) during the period of economic growth. Africa's share went down again with the economic downturn of the 1980s. However, the future may show different consumption trends—with increasing population and income, the demand for fish will grow in the coming years

if the relative price of fish to meat does not increase.

According to data from the Food and Agriculture Organization (FAO), fish accounts for roughly 10% of the animal protein consumed in sub-Saharan Africa; 98% of this is finfish. Smoked or cured fish is a cheaper source of protein than meat and eggs and comprises over half the fishery products consumed, figuring especially prominently in the diet of the poor.