

Stretching our fish stocks

Expanding price-inelastic demand is stretching fisheries resources to the limit, while business is booming, despite overinvestment and stock depletion

There is a basic contradiction in today's fisheries. Despite serious overfishing and stock depletion, and despite considerable overinvestment in fish-catching capacity, fishing enterprises remain profitable. A recent FAO report notes that worldwide, 60-70 per cent of stocks require urgent intervention to control or reduce fishing effort to avoid further decline of fully exploited and overfished resources and to rebuild depleted stocks. Nonetheless, the report notes, in spite of fully and sometimes overexploited fishery resources, most marine capture fisheries are economically and financially viable.

Reports from individual fisheries confirm FAO's global assessment of fish stocks and fishery trends: the gradual degradation of stocks is invariably followed by their sudden collapse. In the 1950s and 1960s the development of the industrialized countries' fishing fleets led to overexploitation of demersal fish resources in the North Atlantic and North Pacific fishing grounds.

During the 1970s and the 1980s, the South Atlantic and Pacific fisheries have been exploited with increasing effort by fleets of industrialized countries, operating under fishery agreements from 1983, and by the fast-growing fleets of the coastal States. Thus, in 1975, 60 per cent of the fish catch was taken in the North, while in 1993, 60 per cent of the catch was taken in the South. The transfer of surplus fisheries capital from the North to the South is also noted by FAO: "Excessive fishing capacity is largely responsible for the global degradation of marine fishery resources.... when removing surplus vessels from one fishery, care must be taken that those vessels are not transferred to fisheries where they create overcapacity." Over the past years, vessels that were taken out of

the markets in industrialized countries were often transferred to developing countries with already overfished resources.

In the case of Namibia, stocks were heavily overfished by distant-water fleets (mainly from Europe) until 1989. In spite of almost a decade of restrictive catch management, stocks have not yet recovered fully there. Demersal stocks in Morocco, Mauritania and Senegal are reaching critically low levels, and pelagic resources there have recently been targeted in earnest. The waters off southern Chile were badly overexploited in the 1980s, while fishery yields in Argentina's EEZ have been declining lately, culminating with the unexpected closure of the hake fishery in June 1999.

Stock degradation is the end result of a number of contributory factors, including subsidies, ever-improving techniques (for locating, catching, handling and storing fish), persistently weak policies for fishery management and regulation (monitoring, control and surveillance—MCS) in the coastal States, and favourable price trends. However, despite the degradation of the resource base, the fishing industries still seem to be doing not badly at all.

This article examines this surprising fact by looking at factors that affect the relationship between supply and demand.

Price inelasticity

Given that world demand today is price-inelastic (as defined in the box below), and given that increasing populations and rising per capita incomes in real terms are coming up against stagnant, or even dwindling, supplies from all major fisheries, supply and

Price elasticity

The extent to which demand for fish expands is determined by increases in population and per capita income in real terms, combined with price developments of close substitutes (i.e. meats), as in the case of most other commodities. Fluctuations in supply or basic demand causing 'over- or undersupply' are generally compensated for by falling or rising prices in the market.

This market-clearing reaction is commonly measured as the 'own price elasticity of demand'. This is defined as the ratio of percentage demand adjustment to respective percentage price adjustment.

To give an example: a 6 per cent demand increase (+6 per cent demand change) caused by a 10 per cent decrease in price

(-10 per cent price change)—with due allowance for the influence of other factors—yields a coefficient of 'own price elasticity' of $+6\%/-10\% = -0.60$.

Any elasticity coefficient between 0 and 1 implies that an 'undersupply' is overcompensated by the associated price rise in terms of revenue to the suppliers. So, given an aggregate price-inelastic world demand (expanding to that because of growing population and real per capita income), the fishing fleets would fare better financially by restraining capacities or effort. Simultaneously, of course, the extent of worldwide overfishing would be curbed.

The reality is somewhat different, of course, with every country pursuing its own ends.

demand factors may be having the strongest impacts on price and profit incentives for the fishing fleets. In other words, due to deficient MCS policies, demand dynamics are tending to push global fishing effort beyond MSY (Maximum Sustainable Yield) levels and technical progress linked to capacity/effort-bolstering subsidies are encouraging the process.

Thus, to a large extent, degradation of the world's fisheries is being caused by demand, be it local, export-generated, through fishery agreements, or a mix of the three. For example, in Asia, the US and Europe, local inland demand is the main cause of degradation. In Africa, it is fishery agreements, while in a few Latin American countries, export earnings determine the extent of degradation.

Recent experience in the coastal fisheries of many countries bear witness to this—notably off southern Chile; in the demersal fisheries of Senegal, Mauritania and Morocco; in the cephalopod fisheries of Mauritania and Morocco; and in the Nile perch fishery of Lake Victoria. Since the late 1980s, yields from the Argentine hake fishery have been declining, and the fishery was closed in June 1999 (see SAMUDRA Report No. 20, page 3), well before expert opinion had predicted this. Recent rises in world market prices have caused substantial increases in fishing

effort to target shoaling pelagic stocks off the West coast of Africa, probably way beyond MSY levels.

The process of degradation of individual fisheries typically follows three phases. In Phase I, a hitherto 'undeveloped' fishery is integrated into the market either by developments in infrastructure, the fish processing industry, market links or by fishery agreements. The first private sector investments produce fabulous returns due to expanding demand and access to untapped resources.

This is followed by a second phase of an exaggerated surge of investment and reflagged fishing capacity. Overfishing results, and declines in both catch per unit effort (CPUE) and physical fishery yields ensue.

Meanwhile, processing and marketing enterprises are forced to pay higher producer prices as they, saddled with assets, have to compete for the dwindling quantity of fish. Price increments are, to a minor degree, handed down the transformation chain, and, in the main, they are financed by shrinking profit margins and/or subsidies.

Rising prices

Rising producer prices and subsidies enable fishing effort to be maintained for a while because they compensate, or overcompensate, for the decline in

physical yields. The collapse of the fishery occurs as soon as the production chain (catching-processing-marketing) is no longer financially viable in the market where tough competition rules—i.e. depending on respective transformation costs, the world market has a regulating effect on local prices. In some cases, adverse oceanographic conditions may curb fishery yields, thereby precipitating the event.

In Phase III, economic and social pressures caused by actual and impending bankruptcies trigger the predictable political and financial responses, while redundancies activate the trade unions.

Although fishing capacity and effort decline, increasing subsidies and tax concessions maintain them at a level that makes the regeneration of fish stocks and economically rational fishery management very difficult. A permanent state of overfishing results, with subsidies, tax concessions, remaining overcapacities and more stringent MCS measures stabilizing a socially, economically and ecologically unsatisfactory solution. There is then the danger of such 'chronically' overfished stocks collapsing completely if unfavourable oceanographic conditions intervene on top of all these factors. There are plenty of well-documented examples of such events (e.g. herring, pilchard, anchovies, wild salmon, cod and halibut fisheries).

Where foreign fishing fleets take an appreciable portion of the total yield by way of agreements, the course of events would be different: agreements are quite simply not extended at the end of Phase II because yields no longer cover costs.

World production from capture fisheries at present consists of 60 million tonnes (MT) of high- and medium-quality fish and 30 MT of industrial fish. A further 30 MT of fish is produced from aquaculture.

There is an estimated 40 per cent catching overcapacity worldwide (i.e. about 60 per cent of total capacity of the current world fishing fleet would be required to account for the 90 MT of wild fish caught from the seas). All kinds of subsidies have worked towards this situation: fuel and

investment subsidies, outflagging support (e.g. vessel transfers), compensation payments for fishery agreements, and import protection. This has led to a situation where the estimated annual costs of running the global fishing fleet amount to more than one-and-a-half times the estimated revenues.

Fish is a very heterogeneous product group in qualitative as well as price terms. At least four quality categories can be identified in a preliminary breakdown:

- small shoaling pelagics: in the North this product category is mostly used as industrial fish to produce fishmeal, but in the South it is in greatest demand among poor people (as food). Producer price levels are DM0.40 to 0.50/kg (US\$0.15-0.20). Although real prices have declined over the last 20 years, there has been a strong increase since 1998;
- shrimps and salmon (from marine catches and aquaculture production). Wholesale prices range from DM8 to 15/kg (US\$ 3.5-7.0). In the last 10 years, prices in real terms have fallen by 60 per cent;
- high-quality demersal fish (e.g. cod, haddock, hake, ling, redfish and similar white-fleshed fish). Producer price levels range from DM1 to 3/kg (US\$ 0.45-1.50), with wholesale prices three times as high. Over the last 20 years, price trends were slightly positive in real terms;
- luxury category (e.g. tuna, halibut, crayfish, lobster). Some species show very high and volatile prices, e.g. ex-producer prices for certain tuna species are as high as DM60/kg (US\$ 27.00).

Real price trends

With the exceptions of industrial fish and fish from aquaculture, and compared to prices of agricultural substitutes (beef, pork, chicken, lamb), real prices have developed very favourably for fish producers in the long term. In contrast, the prices of industrial and cultured fish have

developed in much the same way as agricultural prices, until recently.

Price trends, of course, would have been determined by supply and demand factors. For example, in the cases of fishmeal and fish from aquaculture, substitution and production expansion can well explain the respective downward price trends of these two quality groupings. In the case of fishmeal, soya meal is a close substitute as an ingredient in animal feed, while aquaculture production has grown by about 13 per cent per annum over the last decade.

Due to degraded stocks, for the last 15 years, the annual world catch of high-quality fish has stagnated at around 55-60 MT. Expanding demand would normally have led to a strong positive trend in real prices (by an order of magnitude of +3 per cent per annum). However, on the demand side, substitution by fish from aquaculture, and ever cheaper meats from agricultural production, have restrained (producer) price developments. On the supply side, this has been attained by the combined cost-reducing effects of technical progress and subsidies.

Until now there have only been about a dozen reasonable analyses of national fish demand carried out worldwide. Such dull matters really get interesting at this point!

Putting aside any misgivings about estimation procedures and the reliability of data, one aspect stands out: price-elasticities of demand typically range between 0 and 1. The aggregate worldwide figure would probably fall somewhere between 0.50 and 0.70. This implies that, in terms of revenue, a basic supply shortage is being overcompensated for by a corresponding rise in prices.

In other words, expanding price-inelastic demand, faced with stagnant-to-shrinking world supplies in the medium- to high-quality categories, is causing rising real revenues for the industry. These are partially handed back to primary producers, who then, as a rule, share the same experience: stagnant or falling catches, but relatively faster growing real prices and thus higher revenues.

Such price increases, particularly when supported by subsidies and technical progress, increase profits. There is, therefore, little or no financial incentive provided to cut back on overcapacity, particularly where subsidies help to stabilize or reduce financial costs (both capital and running costs).

Divergent trends

This mechanism explains much of the divergent trends of fish and meat prices over the last 20 years, and certainly, to

Namibianisation: an example to follow?

In the early years of the development of the fishing industry (1949-59) in what was then known as South West Africa (now Namibia), low levels of exploitation, combined with careful conservation and regulation, sustained available stocks. However, corporate pressure from the South African fishing industry, coupled with the illegal status of South Africa's occupation of Namibia after 1966, led to the abandonment of these careful management policies from the beginning of the 1960s. During the 1960s and 1970s, all the controls on fishing were either diluted or abandoned. Arguably, the main reason for this was that the South African government became both the (self-appointed) referee and exploiter. In 1966, the UN revoked South Africa's League of Nations mandate. This effectively made the South African administration in South West Africa illegal. The impact of abandoning conservation policies and regulation regimes is demonstrated by the case of the hake resource. Between the late 1960s and 1990, and despite the establishment, in 1969, of the International Commission for Southeast Atlantic Fisheries (ICSEAF), the hake biomass in Namibia's waters was reduced by over 80 per cent.

Since independence in 1990, the Namibian government has set itself the goal of utilizing "the country's fishery resources on a sustainable basis and to develop industries based on them in a way that ensures their lasting contribution to the country's economy

and overall development objectives." The goal has been pursued through the two main strategies of stock rebuilding and 'Namibianization'. This has been supported by the strict implementation of an effective fishery management system.

A central policy plank of the 'Namibianization' strategy has been the promotion of land-based processing of the fish catch. This has been achieved through a system of quota allocation (non-transferable) and licence and landing fees that both favour Namibian citizens and provide incentives for vessels to land their catches locally. This has enabled the country to reap the benefits of shore-based value-adding fish processing, maximizing government revenues, encouraging investment in Namibia, and creating wealth and employment.

Five years after taking control of its fisheries resources at independence, Namibia had created 6,000 new jobs, doubled wage employment in the fisheries sector, tripled foreign exchange earnings, generated tax revenue thrice the Fisheries Ministry's budget, and integrated the fisheries sector more fully into the wider Namibian economy.

This has been achieved against a background of adverse environmental conditions (the 'Benguela Niño' of 1993-94 in the fishery), a major reduction in the Total Allowable Catch (to promote stock recovery) and a 30 per cent reduction in fish landings.

some degree, the business performance of fishing enterprises worldwide to which, as noted above, the FAO refers.

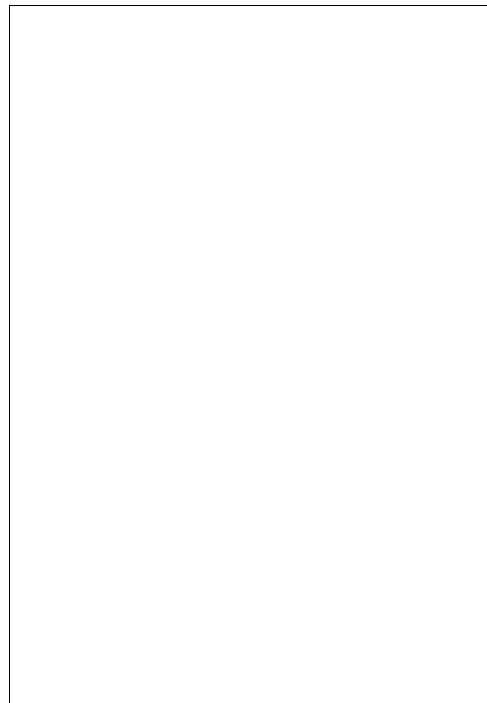
Of course, subsidies and technical progress have similar positive effects on the profitability of fishing enterprises. To better understand the problem, a complete rethink is required on the way we analyze global fisheries production. In concrete terms, this means incorporating demand-and-supply dynamics as well as subsidies into our general fisheries production model. We should also question the standard textbook expectation that ITQ (Individual Transferable Quota) policies will result in both economically and ecologically efficient fisheries, given the scenario of

stagnating supplies from fish catches worldwide, subsidized variable costs, declining growth rates of aquaculture production, and expanding price-inelastic demand for fish.

Growing demand, with stagnant and even dwindling supplies from capture fisheries, appears to be the likely long-term future scenario for global fisheries. It is, however, doubtful whether aquaculture can sustain the growth rates of the last decade, as it is facing serious ecological problems.

Demand side

On the demand side, there is also a tendency to prefer wild fish for quality reasons. Furthermore, it is also quite uncertain when and how seriously the



highly energy-intensive industrial fleet will have to face up to the pressures of rising energy prices in real terms. Although the subsidy problem might be tackled in the context of the next WTO round, it might, in all political likelihood, be solved to only a degree.

Indications are that real import prices of fish are set to increase by up to 1.5 per cent per annum at c.i.f. prices. But this is no more than a guesstimate. There is simply not yet sufficient information available to undertake a reasonable price projection exercise.

It is likely that prices and subsidies will continue to burden the taxpayer/consumer, on the one hand, while, on the other, they will continue to provide strong incentives to producers to at least maintain fishing capacities and effort.

Of particular concern are the low-income consumers in a number of coastal developing countries, with their maize- and root crops-based diets, who are likely to suffer increasing shortages of essential amino acids, due to real price developments curtailing their fish consumption. Given the prospect of the demand developments and the capacity/effort sustaining factors discussed above, any positive marine-ecological outcome will very

much depend on two kinds of intervention:

- the future success of direct government actions to reduce worldwide catching overcapacities, and the co-ordination of these actions at the international level; and
- the successful propagation of ecologically, socially and economically rational fishery policies.

As the example of the Namibian case, with its INRQ (individual non-transferable renewable quota) and strict MCS policies, proves, development of co-operation, and the involvement of civil society in fishery policy matters can greatly contribute to achieving such ends. In this case, successful stock management, MCS and industrial processing policies have been installed since 1990, costing less than 4 per cent of total primary revenues and probably less than 25 per cent of the total fishery resource rent of the country. **3**

This article has been written by Dr Hartmut Brandt of the German Development Institute (DIE). These issues are dealt with in greater depth in a study published by DIE entitled *The EU's Policy on Fisheries Agreements and Development Co-operation: The State of the Coherence Debate*. Published in German, it will be published in English in October 1999