

# THE INDUSTRIALIZATION OF FISHERIES

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## INTRODUCTION

Nonindustrial fisheries are based on the private or communal ownership of boats and other fishing equipment. ("Nonindustrial" here is taken to be roughly equivalent to "small scale," "artisanal," or "traditional.") Operations are labor intensive. Benefits to workers are largely determined by how hard they work. Fish is taken primarily for its direct food value. The product may be marketed locally, or it may be sold, bartered, or given to neighbors, with consideration given to kinship ties, status in the community, and need.

Industrialized fisheries generally are organized in the form of corporations. Operations are relatively capital intensive. Those who catch, process, and market the fish serve in the employment of others. Employees generally benefit according to the intensity of their labor, and employers benefit according to what they own. The products are sold in the marketplace, and thus are distributed according to the rules of the marketplace. The importance of fish is in its role as a commodity which can be sold, not as a commodity which can directly fulfill human needs.

## EFFECTS

### *Advantages*

The industrialization of fisheries has produced very substantial benefits. It has produced *considerable wealth*. While not accounting for a very large share of gross national product in most countries (except in Iceland where it contributes over twenty percent), fisheries frequently are important in national economies. In Japan, the Soviet Union, and China the fishing sector contributes well over three billion dollars each year to the gross national product.

Industrial fisheries typically are export oriented. Thus they make a particularly *large contribution to foreign exchange earnings*.

The industrialization of fisheries has produced very *great increases in the overall supply* of fish. The world commercial catch of marine and freshwater fish has increased from a little over 20 million metric tons in 1950 to around 70 million metric tons currently. The vast increase in quantities landed has been due primarily to the development of industrial fisheries.

As a result of the increase in total quantities available, fish has made an increasingly *large contribution to human nutrition*.

Industrialization has *accelerated the development of the technology* of catching and landing fish. Technology has also advanced the processing of fish, with beneficial results such as *improved preservation, improved quality control, improved transportability, and improved convenience* for consumers.

Improved processing technologies have permitted the expansion of *indirect uses* of fish products such as the increased use of fishmeal for livestock feed or fertilizer.

The increasingly large and diversified industry has created many *new opportunities for paid employment* in the catching, processing, and marketing of fish.

The industrialization of fishing has in some respects *reduced waste*. For example, it has permitted the use of previously neglected or under-utilized stocks, and it has reduced spoilage after capture.

### *Disadvantages*

While acknowledging the many benefits of industrialization we should also take note of some negative effects.

Industrialization has resulted in *environmental damage*, particularly by accelerating the pace of overfishing and depletion of stocks.

In some respects industrialization has led to *increased waste*. For example, the discarding of by-catches during trawler operations represents an enormous loss of usable fish. Processing operations, particularly canning, frequently discard large quantities of usable fish. Industrialized fishing is also wasteful of resources in that it requires very high levels of capital investment and of energy.

The industrialization of fisheries may contribute to the spread of *chronic undernutrition*. Much of the fish used for fishmeal could be used for direct human consumption. Of the fish that is consumed directly, most goes to people who already have enough food. Only a relatively small share goes to those

who are at risk of undernutrition. The supplies of fisheries resources for the poor are reduced because the market system tends to move fish toward those with higher incomes. This is demonstrated by the fact that most of the fish which goes into international trade goes to more highly developed countries. As a result, counting both direct and indirect use, the records indicate that people in developed countries consume more than four times as much fish as people in less developed countries (Kent 1985). The disparity might not be so great if unrecorded catches were counted, but the flow of supplies clearly favors those with more money. For the purpose of alleviating the problem of human undernutrition, much of the fish that is caught could be used more effectively.

While new opportunities for paid employment have been developed, many *workers have been displaced* from nonindustrial fisheries. This is illustrated by the many cases — in Mexico, India, Indonesia, Malaysia, the Philippines and elsewhere — in which trawlers have depleted the fishing grounds of small-scale coastal fisheries.

The improved technology has been of very great benefit to the owners of that technology, but of relatively little benefit to workers. On many fishing vessels and in many processing plants there are extremely *bad working conditions*. Some fishing vessels provide very poor accommodations which must be endured for weeks or months at a time. In processing plants, women and children work very long hours under very unhealthy conditions. Workers in the fishing industry generally receive very *low incomes* (Tadem, Reyes, and Magno 1984).

The major overall effect of industrialization, accounting for some advantages as well as some disadvantages, is the *concentration of control* in fish production, processing, and marketing. Concentration of control leads to *concentration of benefits*. In San Miguel Bay in the Philippines, for example:

Small trawlers, representing only 3% of the Bay's fishing units and employing 7% of the fisheries' labor force, earn the largest share of catch value and 50% of that part of the profits from the fishery that accrue to fishermen . . . the ownership and earnings of the small trawlers are highly concentrated: five families own 50% of the trawler fleet. In contrast, the non-trawl fleet, consisting of approximately 2,300 fishing units, is dispersed among approximately 2,000 households (Smith and Pauly 1983).

In nonindustrial fisheries large numbers of small operators each take small but roughly equal benefits. In industrial fisheries a small number of owners and managers enjoy large benefits, while a large number of workers obtain

relatively small benefits. Employers take large shares while employees take small shares.

### *Comparisons*

Taken all together, industrial fisheries produce around 24 million tons of marine fish for human consumption each year, compared to around 20 million tons from nonindustrial fisheries. Industrial fisheries produce around 19 million additional tons each year for indirect uses such as fishmeal, while almost none of the product of nonindustrial fisheries is used in this way.

Nonindustrial fisheries employ far more people, and the capital cost of establishing each job is far smaller. Moreover, nonindustrial fisheries consume far less fuel, both in the aggregate and per ton of fish caught (Thomson 1980). As the World Bank acknowledges, for each calorie of food output, coastal fishing uses only one-fifth the fuel that deep-sea fishing requires (World Bank 1982, p. 31).

The overall total market value of fish taken by industrial fisheries is higher than it is for nonindustrial fisheries. It is far higher if we take into account the value added from processing and from "sophisticated" marketing involving such things as fancy packaging and factory preparation of convenience foods. Also, since industrial fisheries generally are more export oriented, they earn much more foreign exchange than nonindustrial fisheries.

Comparisons are not made here to determine which is better, for both forms of operation make very important contributions. The point is that fisheries projects should not be evaluated simply on the basis of the earnings they yield or the foreign exchange they produce. There are many other value considerations which should be taken into account.

Nonindustrial fisheries score very well on some of these other values. If the benefit/cost calculus used to analyze projects were opened up to include considerations of social and environmental efficiency as well as economic efficiency, nonindustrial fisheries would likely be seen as deserving far more support than they now receive.

### *DEPLETION OF FISH STOCKS*

One comparison which deserves to be singled out for special attention is the influence of the different types of fisheries in causing environmental damage, particularly the depletion of fish stocks.

The world fish supply has been holding steady at around 70 million metric tons a year, giving an appearance of sustainability. Unfortunately this is an illusion. Stocks are being depleted in every corner of the globe, and

although total production has been holding steady, the effort being expended to produce that total has been increasing rapidly. As indicated in the *Global 2000 Report to the President of the U.S.*:

Increased pressures by commercial fisheries will place great stresses on living resource populations and lead to an overexploitation of traditional species . . . Future gross catch statistics therefore may show a constant or increasing yield, but the catch will become composed of progressively less traditional products. Advances in fishing and processing technologies, by helping the gross catch figures to remain high, will effectively conceal the degree to which overfishing is undermining the utility and value of the world catch (Barney 1980, p. 135).

On a global basis the evidence suggests that the world's fish stocks are being mined — exploited at a faster rate than they can renew themselves. The total world catch remains steady only because of the constant opening of new fisheries to exploitation. The process cannot continue on indefinitely into the future.

Stocks are overfished for many different reasons. Population growth leads to increasing demand. Increasing affluence leads to increasing demand. Higher capital investments and increasingly sophisticated technological developments enhance the capacity to catch fish. Open access regimes dissolve the motivation for husbanding the resource.

Both nonindustrial and industrial fisheries contribute to the depletion of stocks. Nonindustrial fisheries have their most pronounced effects in near-shore waters and in lakes and rivers. Often there are simply too many people fishing for too few fish. Sometimes, however, small-scale operators use highly destructive fishing techniques such as bleach and dynamite. This intense fishing pressure might be explained as a matter of desperation in the search for sustenance, but in many cases it is simply a matter of greed.

The vast majority of overfishing is undertaken at a large scale by highly industrialized fishing operations. Some of them deliberately sweep large portions of the sea clean, and then, taking advantage of their mobility, move on to repeat the operation elsewhere. Localized overfishing is important to local people, but on a global scale the major examples of massive overfishing — anchoveta in Peru, herring in California, halibut in the North Atlantic, whales throughout the world — have been a direct result of industrial fishing operations.

Historically, when most fishing took place within relatively closed communities, a sense of the need for the protection of natural resources evolved

naturally. Traditional Pacific island communities, for example, developed elaborate systems of *kapus* or prohibitions to limit fishing pressure (Johannes 1981). Under the influence of westernization, however, the basis for fishing was changed:

Under this fundamentally new economic order goods are bought and sold, not shared; the fisherman finds himself competing for money, and therefore for fish. In order to compete effectively he must buy better equipment and fish harder. This process is self-reinforcing. The need to spend more money to get more efficient gear to harvest more intensively increases as the numbers of fish decrease. As equipment becomes more sophisticated, its price ultimately rises beyond the means of the average fisherman. A new profession, moneylending, arises. The fisherman borrows to finance his purchases, and he often falls into debt. Employment opportunities diminish as more efficient modern boats drive out native craft. The fisherman becomes further impoverished, and profits, such as they are, end up largely in the pockets of a few entrepreneurs. This pattern is all too familiar in tropical artisanal fisheries. It is part of the oft repeated sequence of events whereby self-sufficient, internally regulated subsistence economies are converted to money-based economies, governed ultimately by decisions made in market centers thousands of miles away (Johannes 1978, pp. 336-337).

When fishing is undertaken on a commercial basis by corporations with no local roots, community values no longer exercise a constraining influence (Pendse 1984). The development of distant water fishing fleets has institutionalized detachment from community constraints. When it is outsiders who fish, those who reap the benefits are not the ones who bear the costs of depletion. Local stocks are depleted for much the same reason that locally caught fish are shipped away: it is not the local people who manage the fishing enterprise, and it is not primarily in their interests that the enterprise is managed.

This transition from subsistence to commercial fishing has been based on a radical change in the motivations for fishing. When people fish for their own food there is such a thing as sufficiency. In the commercial orientation, however, when people fish for profit, there is no such thing as enough. As one observer put it, "technology makes overfishing possible, but profits provide the incentive" (Barnet 1980, p. 163).

The many different forces which contribute to the depletion of the world's fish stocks have only recently become plainly visible. There is a real danger that these forces might all be converging at once, no longer striking haphaz-

ardly but systematically moving more and more fisheries beyond the threshold of recoverability, economically if not biologically.

There are early signs of this in the rich tuna fishery of the western Pacific. That fishery developed with incredible speed in the late 1970s, leading to the building of "superseiners" of a size never seen before. The fishery weakened just as quickly over the next few years. With mortgaged vessels of limited life expectancy there really is little interest in sustainability among those who have invested the capital. Moreover, tax structures generally enhance the incentives for using up capital investments, thus working against the interests of sustainability. Given the economic forces at work in industrial fisheries, the systematic depletion of fish stocks should not be surprising.

### *EXPLANATIONS*

Nonindustrial fisheries generally are embedded within the local community. Catchers, processors, marketers, and consumers relate to one another directly, often on a face-to-face basis. Their transactions are influenced by a broad mix of values, including, to some degree, concern for one another's welfare and concern for the community as a whole.

In industrial fisheries, particularly in export-oriented fisheries, the distance between producers and consumers is very great, both geographically and psychologically. The range of values which guide the transactions in the chain from producer to consumer is narrowed. It collapses practically to a single dimension: the goal of the enterprise (as set by the employers) is the maximization of profit. Most other considerations are sacrificed. Human relationships are distorted or disappear altogether. Industrialized fisheries drive toward the achievement of economic efficiency, and as a result they sacrifice social efficiency.

The industrialization of fisheries would not have such negative effects if it were undertaken by small-scale nonindustrial fishworkers themselves in an attempt to better their own lot. Typically, however, industrialization is undertaken by outsiders. These outsiders may be from another country or from the same country; they do not come from the fishworkers. In Southeast Asia, for example, the industrialization of fisheries has been accomplished largely by foreign investors working together with local business people and government officials, not with local fishworkers.

The industrialization of fisheries produces very substantial benefits. But most of the benefits go to employers and to middle and upper class consumers. For many fishworkers and many low income people who depend on fish as a basic part of their diet, industrialization has had very negative effects.

It might be argued that if industrialization increases the overall amount of wealth that is produced, employees would be better off even if their shares are relatively small. However, fishworkers' benefits tend to remain small in absolute as well as relative terms. They are constantly marginalized, held to levels of living which are only minimally adequate. For many, their share of benefits vanishes altogether as they are driven out of the business.

Fishworkers are endlessly marginalized because they have little bargaining power. In the "negotiations" between employer and employee over wage levels, the levels are determined primarily by the employer. The employer sets those wage levels according to his own interest, which is to maintain wages at that minimal level which will just keep the worker working.

Fishworkers are in a bargaining relationship with others, whether those others are employers, ships' captains, creditors, or buyers. If they improve their productivity, much of the gain will be absorbed by these others. Fishworkers generally retain only a small share of the benefits of their labors. They accept low prices for their products and low wages for their labor because they have little choice.

### *REMEDIES*

Some fisheries — like those for tuna, anchoveta, sardines, krill and other high-volume stocks — can be exploited efficiently only with industrialized operations. Certainly, some industrial fisheries should be retained and developed. However, it should also be recognized that, in focusing on industrialized fisheries, national and international agencies have provided relatively little support to nonindustrial fisheries. The World Bank, for example, acknowledges that "small-scale fisheries provide most of the fish consumed by people in developing countries," but at the same time reports that in the twenty-seven fishing projects funded between 1964 and 1981, "the major objective has been to increase production for export. Nearly 60 percent of the loans were utilized for large-scale fishery development" (World Bank 1982, pp. 6, 8, 47).

Research, development and planning efforts generally favor industrial fisheries and give little attention to nonindustrial operations. Reef fishing from canoes, for example, is important for local nutrition — particularly of poor people — in many areas, but there has hardly been any research to assess its value or to develop ways in which it might be carried out more effectively. Similarly, small-scale home processing techniques for preserving fish or for making processed products have received very little attention. Most



support goes to where it yields the highest payoff in commercial terms. More support should be based on responding to local needs. These too are payoffs.

The issue is one of balance:

So far, the development of high-seas fisheries has claimed the major share of national and international attention. Small-scale fishermen in inland and coastal areas, who now contribute about 50 percent of the production of fish used for direct human consumption, have yet to benefit significantly from existing development policies and production programs. It must be recognized that high-seas fisheries development is strongly skewed toward capital- and energy-intensive technology and production schemes — technologies and schemes that have an inherent tendency to magnify existing social and economic inequities. Therefore, development strategies are needed which will promote a more balanced pattern of development and which will address not only food production but employment and the overall economic status of the poor (ICLARM 1976, p. 24).

Apart from the issue of balance between industrial and nonindustrial fisheries, there is a need to recognize that while industrial fisheries produce significant benefits, they also produce significant negative effects. Research and reporting on these effects should be intensified, both by professional researchers and by fishworkers themselves. More substantial efforts should be undertaken to ameliorate the negative effects. Trawling operations, for example, should be controlled more tightly. Fish exports which deplete locally needed supplies should be limited. Inequalities in the distribution of benefits in large-scale industrial operations should be reduced by providing for more equitable control over those operations. Workers should be permitted to unionize or to obtain some equity share in the enterprises in which they work.

Governments can take direct action in behalf of those who are harmed by the industrialization of fisheries, as in the many cases in which inshore trawling has been restricted to protect traditional fishing operations. However, enforcement of such actions is often lax and ineffective. That should not be surprising. People in traditional fisheries have low bargaining power not only with buyers and employers but also with government itself.

National and international agencies could do a great deal, but they have many constituencies and many interests to which they must be responsive. Action in behalf of fishworkers is most reliably undertaken by those most concerned with their interests — fishworkers themselves. The major determinant of one's bargaining power is the quality of one's alternatives. Fish-

workers stay in their low income positions because they do not see good alternatives available to them. This lack of alternatives is the major factor which obligates them to accept low prices and low wages. Thus if fishworkers are to improve their conditions they must cultivate alternatives.

Fishworkers should do what they can to improve the options they already have, and they should do what they can to devise other options. These alternatives may include such things as finding different fishing waters, becoming more involved in processing, buying shares of ownership in the enterprises in which they work, finding other buyers, and so on. In any concrete situation there will be only a limited variety of options which could sensibly be pursued, but there always are some. And there always are more possibilities than are immediately obvious.

The alternatives that are explored should include possibilities for *not* working in the fishing industry. Sentimental insistence that one can only fish, and nothing else is possible, can only be costly. The alternatives *to* fishing should be cultivated in order to draw greater benefits *from* fishing. It is only with the bargaining power that is provided by having alternatives that one can press for better terms in the wages and prices that one accepts.

So long as fishworkers remain competitive with one another they are doomed to continue living lives of minimal quality, working to serve the interests of buyers and employers more than themselves. Collective action is essential. The improvement of the quality of life of fishworkers requires their organizing into associations, unions, cooperatives, or informal groups. The improved organization of fishworkers locally, nationally, and globally would enhance their bargaining power and thus help them to develop on an equitable basis with others.

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