

Tragedy Made Simple: Where Have All the Fishes Gone?

By William J. Bennetta

"I believe," said the English biologist Thomas Henry Huxley in 1883, "that the cod fishery, the herring fishery, the pilchard fishery, the mackerel fishery, and probably all the great sea-fisheries are inexhaustible; that is to say that nothing we do seriously affects the numbers of fish."

Much has changed in the intervening century, and many of the Atlantic fisheries that Huxley knew have been destroyed or badly depleted. Consider, for instance, what has happened to the Newfoundland cod fishery: The government of Canada, a few months ago, put a moratorium on cod-fishing operations in Newfoundland's coastal waters, because the cod stocks have been so badly overexploited that the fishery seems ready to collapse. This is a recent case, but hardly an unusual one. There have been many others like it.

Why have people enacted, again and again, this sad drama of destruction -- not just in the Atlantic but in all the oceans, and in many freshwater settings as well? Greed? Yes, greed plays a role here, but no single word can tell us what is going on (or why) when people ruin one fishery after another.

To understand the actions of these people we must understand "the tragedy of the commons," a potent explanatory idea that is prominent in contemporary thinking about environmental affairs and the managing of natural resources. It is easy to grasp, offers important and counterintuitive insights into historical trends, and should be presented in every high-school textbook of world history, biology, or environmental science. That most such books fail to acknowledge it is a disgrace.

The tragedy of the commons takes its name from the title of an article that the biologist Garrett Hardin published in *Science* on 13 December 1968. (*Science* is the weekly of the American Association for the Advancement of Science.) The heart of the

piece is a parable about a "commons"—a public pasture that is open to all local herdsmen. Each herdsman owns his cattle, but nobody owns or controls the commons. Each herdsman is free to use the commons at will, and each herdsman is free to choose the number of animals that he will graze on it. Hardin describes what happens under these conditions:

It is to be expected that each herdsman will try to keep as many cattle as possible on the commons. Such an arrangement may work reasonably satisfactorily for centuries because tribal wars, poaching, and disease keep the numbers of both man and beast well below the carrying capacity of the land. Finally, however, comes the day of reckoning, that is, the day when the long-desired goal of social stability becomes a reality. At this point, the inherent logic of the commons remorselessly generates tragedy.

As a rational being, each herdsman seeks to maximize his gain. Explicitly or implicitly, more or less consciously, he asks, "What is the utility to me of adding one more animal to my herd?" This utility has one negative and one positive component.

The positive component, Hardin tells, is the money to be gained by raising and selling the additional animal—and all that money will go the herdsman in question. The other herdsmen will get none of it. The negative component is the damage that will be done to the vegetation and soil of the commons if the commons is overgrazed. But the economic impact of this damage will be shared by *all* the herdsman, so only a fraction of the impact will actually be borne by the herdsman who owns the extra animal. Hardin continues:

[T]he rational herdsman concludes that the only sensible course for him to pursue is to add another animal to his herd. And another; and another.... But this is the conclusion reached by each and every rational herdsman sharing a commons. Therein is the

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tragedy. Each man is locked into a system that compels him to increase his herd without limit—in a world that is limited.

The same perfect logic dictates the destruction of any and every resource, without exception, if the resource functions as a commons—that is, if it is controlled by nobody and can be exploited by everybody. In the case of a high-seas fishery, the resource is a stock of fish instead of a stand of grass, and the people are fishing-boat captains instead of herdsman, but the reasoning is identical. If a captain takes one more haul of fish, the economic benefits will be his alone, but the economic harm (arising from depletion of the stock and impairment of the stock's ability to produce future generations) will be spread among all the captains who fish the same waters. Hence the captain's behavior is quite predictable: He will take the additional haul of fish; then he will take another; then another.... Taking one more haul will *always* be sensible, for it always will promise him more individual benefit than individual harm.

The other captains will think and behave in the same way, and the destruction of the fishery will be inevitable. Moreover, all this destruction will be done by men who are acting rationally and intelligently, not crazily or stupidly. They will continue their rational work until the stock of fish is so small that fishing no longer pays. Then they will sail away and look for a new stock, a new commons, that they can exploit in the same way.

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