

ARTISANAL FISHING AND ENVIRONMENTAL CONSERVATION IN SOUTHEAST ASIAN SEAS

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Fishing is one of the few activities left in which people harvest what they have not sown — an anachronistic leftover from the times of hunters-gatherers. The transition from hunting and gathering to farming on land took place several thousand years ago in most cultures; with fisheries this transition is only now beginning to take place on a large scale, and may be completed only well into the next century, when aquaculture (the aquatic counterpart of farming) will have supplanted fishing (the aquatic counterpart of hunting) as a major source of fish for human consumption.

That this transition is beginning to happen now has two simple causes. Industrialized fishing operations reached their limit in the seventies, when worldwide catches ceased to increase as rapidly as before, in spite of increasing fleet capacities. In addition to this, more people need more of the relatively cheap protein that fish provide, particularly in the tropics.

TRADITIONAL FISHERIES

Since time immemorial, people in most tropical countries and particularly in the Southeast Asian archipelago have relied on fish for a significant part of their diet. Fishing was conducted with a variety of ingenious gears, reflective of a profound knowledge of the habits of the targets, be they small coastal, reef or large oceanic fishes (Fig. 1). These traditional fisheries which had evolved as an integral part of the local cultures were, moreover, regulated by an intricate web of conventions, rules, and chiefly prerogatives, all of which had the effect of limiting fishing effort. The lack of large markets — in fact the absence of a "market" economy — had in itself the effect of limiting fishing efforts.

Also, the variety of fishing gears used were each suited to catching during a certain time of the year that kind of fish that was most plentiful. The result was that the fisheries were crop-

ping only abundant species, leaving alone those species which, for one reason or other, had been declining.

Combined, these different factors effectively resulted in a stable supply of fish — free of the ups and downs characteristic of modern industrial fisheries. I should perhaps add, lest my rendering of traditional fishery is viewed as too idyllic, that traditionally, fisherfolks everywhere in the tropics were very poor — but so was almost everyone else!

INDUSTRIAL FISHERIES

Industrial fishing methods did not become prevalent in Southeast Asia before the 1960s. Earlier attempts by the French in Indochina, the Dutch in Indonesia, or the Japanese in the Philippines had been either unsuccessful, or had remained limited in scope.

In the 1960s, however, the right gear had been found — typically a light, high-opening trawl pulled by a relatively large, but locally built, wooden trawler (Fig. 2). Starting in Thailand, then spill-

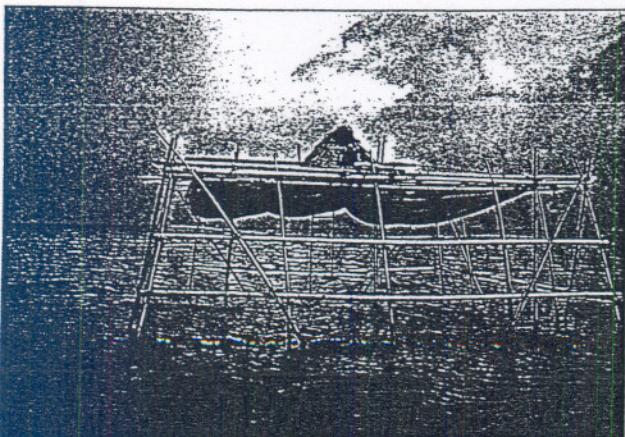


Fig. 1: A "bagan", from Serong, Indonesia: An energy-saving, fixed gear efficient at catching anchovies and other small pelagic fishes. (Photo: ICLARM).



Fig. 2: A typical South East Asian trawler from Thailand. (Photo: ICLARM).

ing over to Malaysia and Indonesia, boats were built in a frenzy, fishing effort and catches shot up everywhere, millions were made and books were written about the successful industrialization of the Southeast Asian fisheries.

Now that the dust has settled, twenty years after the boom, the time has come to reassess things. The development of the fishery was a completely anarchic scramble, as the fleets were soon far larger than were needed to harvest what, after all, was a limited resource (Fig. 3). Competition between fishermen led to the use of smaller and smaller meshes and to systematic encroachment on inshore fishing grounds, traditionally the reserve of artisanal fishery. This led to violent conflicts between trawl operators and artisanal fishermen, often leading to loss of life and limb.

Indeed, fortunes were made, but the bottom line is blight — the Gulf of Thailand became barren, with frequent reports of desperate fishermen involved in piracy against "boat people". In Indonesia, social conflicts had degenerated so much that the government, after futile attempts to regulate the trawl fisheries, had to ban it altogether in 1980, handing over what was left of the resources to its hundred-thousand artisanal fishermen. All this happened because of the common-property or openly accessible nature of the resource — whoever caught the fish first, owned it.

THE STATE OF RESOURCES

Whereas traditional fishermen, by periodically shifting from less to more abundant kinds of fish, had in effect stabilized the resources they exploited, trawlers had the opposite effect, cat-

ching everything in their path, whether abundant or not. Moreover, the small meshes that they used in order to catch valuable prawns — usually much smaller than those used by traditional fishermen — also caught the juveniles of larger, highly valuable fishes. These juvenile fishes were either dumped overboard or used, along with "trash fish", to feed ducks and other animals.

This latter form of fishing destabilizes multispecies resources and causes massive changes in species composition. This may include the localized extinction of slow-growing low-fecundity fishes such as rays, as has been documented for such fishing grounds as the Gulf of Thailand or the San Miguel Bay, in the Philippines (Fig. 4). While the populations of most species declined, often spectacularly, certain groups have held their ground, or even managed to increase in numbers, e.g., squids and prawns. In a sense rather unfortunately, these two groups fetch high prices, and help keep the pressure on the overall stock, subsidizing as it were an otherwise bankrupt fishery.

Conventional methods of fishery management (gear and area regulations, area closures, etc.) although attempted are generally unenforced — and probably unenforceable — as shown by the drastic measures to which the Indonesian government had to resort when it totally banned trawling.

ARTIFICIAL REEFS: A POSSIBLE SOLUTION

The basic problem with fish resources in most countries is that they do not belong to anybody until they are caught. The solution of this problem is thus that somebody has to care about management to control fishing effort. Who could be better

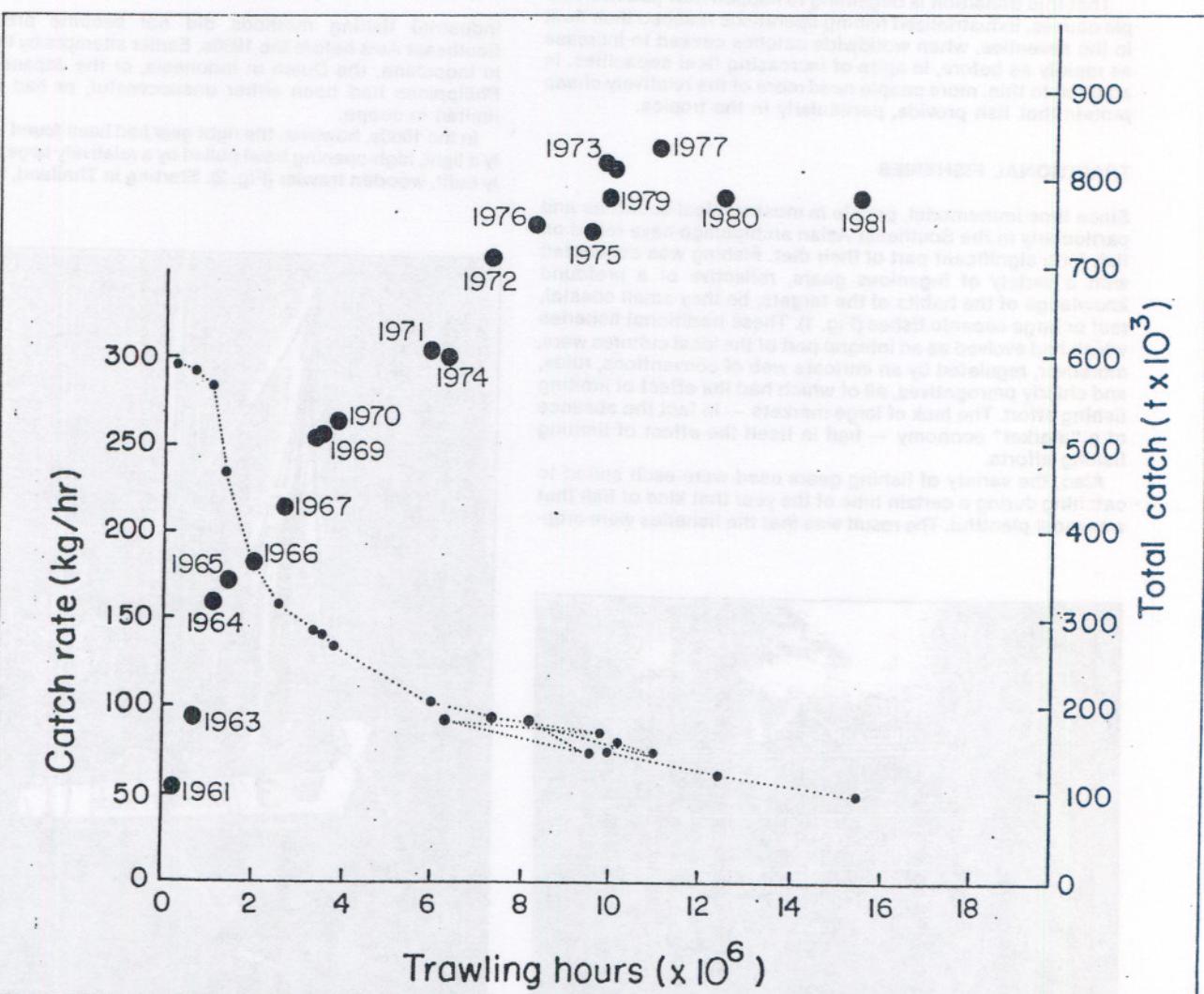


Fig. 3: Evolution of total catch and catch per effort in the Thai demersal trawl fishery, 1961 to 1981. The price of increased catches has been the steady decline of catch per vessel per hour, and hence the steady decline of net returns from the fishery, down to bankruptcy for many trawl operators (adapted from Boonyubol and Pramokchutima 1984).

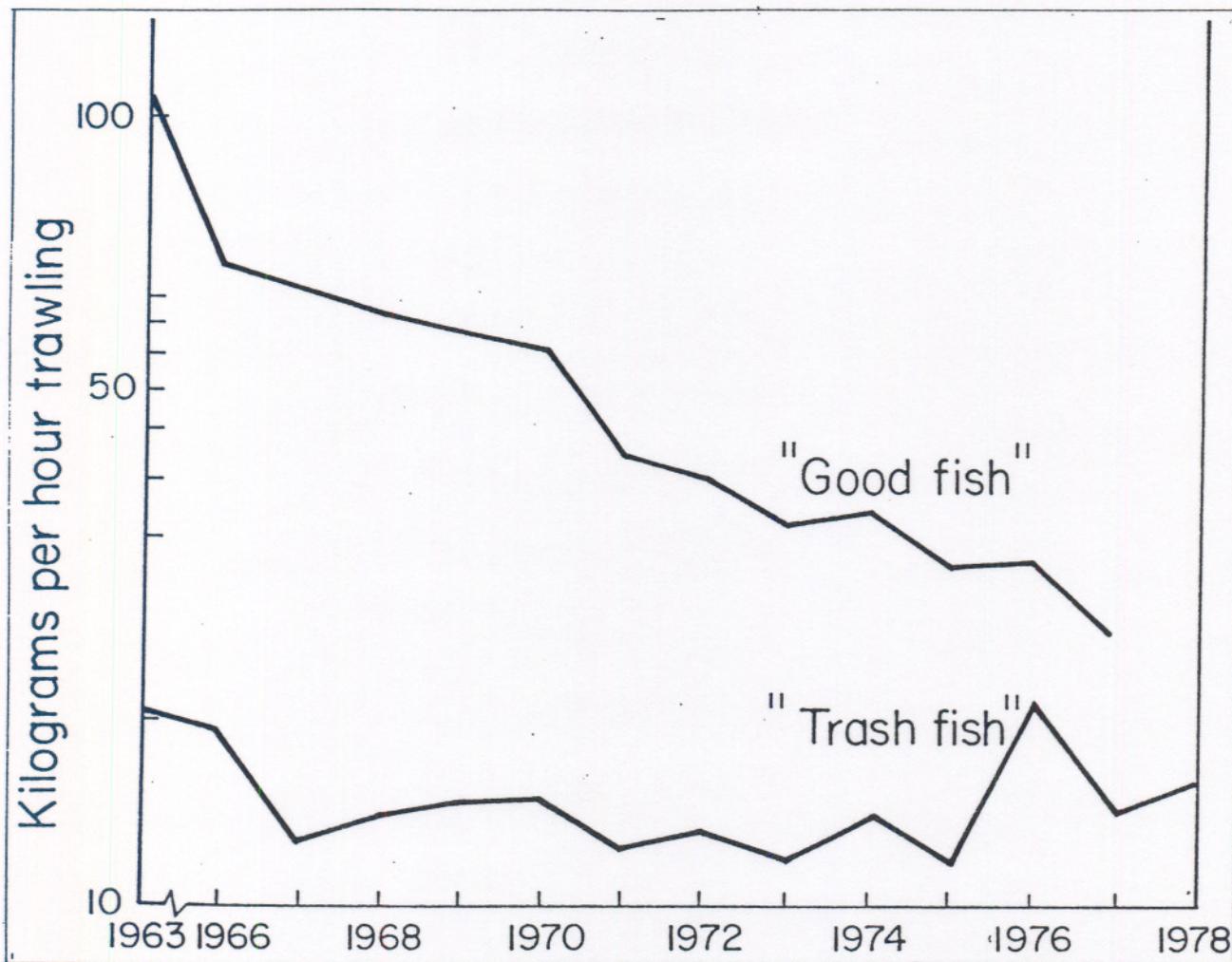


Fig. 4: Trawl-induced changes in size and species composition of catch and bottom communities are usually massive. This graph illustrates the relationships between "good fish" and "trash fish" (partly the young of "good fish") in the first 2 decades of the Thai demersal trawl fishery (redrawn from Beddington and May 1982).

caretakers than traditional fishermen themselves?

Thus, the transition alluded to above from "hunting" fish to farming them will have to involve fishermen too, not only "aquaculturists" operating ponds dug on land. A scheme which would allow for this transition in coastal waters exists; it involves setting up artificial reefs, large and sturdy enough to be effective obstacles to trawling, and structurally complex enough to maintain their own population of fish. Such reefs, of which sufficiently large numbers would have to be present such as to actually prevent trawling, would reestablish the intricate bottom relief and those communities which trawls destroy when dragged on the sea floor. These artificial reefs would allow for the reestablishment of the diverse fish fauna of the pre-trawling days.

Thus, one could conceive of the shallow parts of the Gulf of Thailand, or of the North Java coast — two areas that are presently badly overfished — being covered with artificial reefs, under the communal ownership and control of fishing villages, exploited by fishermen using energy-efficient gill nets, traps, long lines and sailing vessels. Such reefs, homes of large populations of invertebrates and reef dwelling fishes, would supply the adjacent villages with food for local consumption and for export to the cities. It would be almost like going back to the good old days... minus the poverty!

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