

In 1981, the average daily catch with typical gear by fishers in the Maqueda Bay, Samar Sea area of the Philippines, was at least 8 kg/day. By 1991, it was only 3.5 kg/day.

Of 250 fish species recorded in the area, 50 were considered to be of major commercial importance in 1981. In 1991, only 10 commercially important species remained! What happened?

I was project leader of a Philippine-German Fisheries Project survey in 1979-1982 that included this area. A ban on commercial fishing resulted in doubling of small-scale fishers' catches and of the standing stock within one year. It was described in the *ICLARM Newsletter* (Jan. 1981, p. 3-4). Ten years later, I took part in another survey, this time for a major international donor, to investigate the feasibility of a development project in Samar with emphasis on agriculture and fisheries.

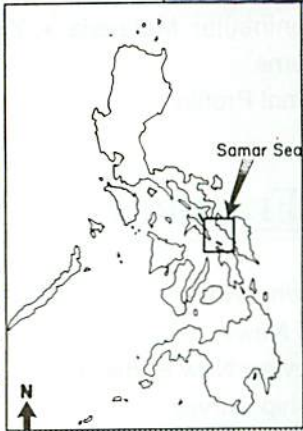
On a national level, the number of marginal fishers in the Philippines has doubled every 10 years since the beginning of the 1960s, equivalent to an annual increase of 7.5%. In the social ranking scheme of the rural population, small-scale fishing is the lowliest occupation and is normally resorted to when all other income-generating efforts like agriculture fail. With an average annual income of P22,500 (P25=US\$1.0) and an average family size of 6.1 persons per household it is safe to say that 100% of these fishers live below the poverty line. Indeed they live below the "food threshold" of P2,000 per month.

Due to time constraints - 14 days were allocated for field work and data collection in Eastern Samar - the findings of our

# The Samar Sea, Philippines:

## a Decade of Devastation

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Fishing boats in the Samar Sea.

Photo: John McManus

waters that are claimed to be reserved for small-scale fisheries operation only.

In addition to these active commercial fishing gears, a large number of fixed gears, mainly fish corrals, were set up during recent years. Among these are so-called "deep sea fish corrals", which stretch from the shore line to water depths of 15 m, often covering distances of 500 m.

We heard three underwater blasts during an excursion on the fisheries patrol vessel. Dynamite fishing seems to be widespread. In fact, a British volunteer, surveying coral reefs in the Samar Sea, was disabled after being blasted accidentally by a fisher in 1991 (see box).

Illegal as well as government-sanctioned logging has taken its toll in the degradation of marine resources. After major watersheds were destroyed through logging, marginal agricultural lands were rendered unproductive.

Farmers were forced to leave their lands and joined the increasing numbers of small fishers. The high rate of siltation from denuded mountains has choked to death those coral reefs that were not yet destroyed by other human intervention and only 5% of the reefs remain in reasonable condition.

In upland areas of Samar Island where annual rainfall may be as high as 6,000 mm, annual siltation rates of up to 10 cm are observed (Stefan Cramer, pers. comm.). Rocks and large stones protruding from hillsides were marked at soil levels; in the consecutive year, soil levels were an average of 10 cm below marks.

1991 survey cannot claim to be the result of a comprehensive scientific study; numerous interviews with small-scale fishers and field observations, however, allowed us at least to enumerate and describe some of the major problems.

### Resource Degradation

During a flight in a light plane at low altitudes over Maqueda Bay and the Samar Sea, at least 50 commercial vessels were counted. The boats mainly employed ringnets and "baby-rings" at distances of 10 to 20 km from the coast, i.e., in



## One Hazard in the Samar Sea - On Being Dynamited

Just another day's work, diving on the coral reefs of Samar, looking for one which is still relatively intact. This afternoon, we found one - big branching corals, a few fish and lots of colors. "Great, no dynamiting here!", I thought, and continued along a transect at 10 m depth.

Then - a dynamite blast at close range, thrown right at us as it turns out, by a hungry fisher (who thankfully was on his way home and only had one small charge left). This was enough to make me black out for a short time and it smashed my mask. It's difficult to think clearly when your lungs won't work and the ocean is thundering about one's skull, but eventually I remembered to press the button to inflate my B.C. and come to the surface where I found my buddy holding onto the boat of the dynamite fisher - he was as shocked as us. It transpired later that he dove down after throwing the dynamite and - on seeing my purple wetsuit and long hair - thought he had killed a mermaid and immediately retreated to his boat in fear.

### Lesson

Try not to look like a mermaid when diving. The fisher had seen our bubbles at the surface and mistaken them for those of surfacing *dilis* (anchovies). Since then, I too have observed divers' bubbles and found their similarity to those of *dilis* quite frightening.

Sunil Kadri, VSO Volunteer

As a result of this erosion rate, up to 2,000 t/ha of soil are carried down rivers which during rainy seasons turn into mudflows. What is observed along river beds during strong rains is nothing but a constant and most abrading flow of solid material, just suspended in a minimum amount of water, reminiscent more of flowing concrete than of a river.

It is probably not coincidence that Maqueda Bay and the Samar Sea area was the site of the Philippines first major toxic red tide outbreak in 1983, when several hundred cases of paralytic shellfish poisoning were reported, including more than 20 deaths. There was a second equally damaging outbreak in 1987 and the red tides have occurred there irregularly since.

### The Fishers

The number of small-scale fishers has almost tripled since the Samar Sea Survey of 1980. Individual interviews with approximately 120 fishers/farmers revealed the following:

- 40% of fishers are part-time employed in fishing only ("farmer by day, fisher by night");

small-scale fishers and commercial gear on the other, as the main reasons for "overfishing". Another reason given for the poor catches was the uncurbed blast fishing that is still practiced by some fishers. (These, however, in all instances of the interviews, come from a neighboring village);

- 75% have 7 or more children; a further 8%, recently married, have 3 or fewer children;
- 1% (i.e., only one fisher) conceded that he believes in "responsible parenthood", announcing that he and his wife will have not more than the two children they already have;
- 40% were farmers before they became fishers. Almost all persons in this group (80%) said they would rather take up farming again, if they had the opportunity;
- 100% with fishing experience of more than 25 years said that catches in the 1960s were about 30 kg/day with identical or smaller gear; and
- 100% of fishers with experience of 30 to 50 years said that the number of fishers in their village was about one-tenth to one-fifth during the years 1940 to 1960; they also confirmed that a large number of fish species that were once common do not show up in their catches any more.

### Gear Competition

In the classical categorization by fisheries policymakers, passive gears like



fish corrals normally rank as the "good ones" and are rarely subject to mesh size regulations. Thus, owners of fish corrals and similar gears such as filtering nets and fish traps, which are large-scale gears and in which catchability is high at all mesh sizes, tend to use fine mesh nets because, in addition to large, high value species, there is always a large volume of small fish and fry that fetch some price in the market.

Indeed the constant and abundant supply of undersized fish at low prices, mainly from fish corrals, has led to a new development in mariculture that is hailed by some policymakers: the proliferation of fish pens for the culture of high-value fish. I counted six large pens with areas of at least 4 ha each, enclosed by bamboo fences during a flight over the Samar Sea and Maqueda Bay in 1991. These fish pens are for growing groupers. Juvenile groupers are normally caught in trapping gear like fish corrals nearshore; they are fed trash fish which is bought from processors of dried fish or from operators of fish corrals.

Harvested fish are exported live to Manila and some are forwarded to HongKong for speciality restaurants.

Meanwhile, the small-scale fishers use set nets like gill nets, which are subject to regulation, and which are highly selective; only a certain, easy to define, range of sizes of fish will be caught.

If the fisher is interested (and he normally is) to harvest a good quantity of high-value (i.e., large) fish, he has no choice but to seek a compromise between size of the target species (quality) and quantity of his catch. If fishers would not do so, their catch would consist only of small and low-value fish. In essence,

## And how long does it take to rehabilitate a fishing area?

### **Fish**

If the problem is overfishing tropical trawling areas, Jürgen Saeger's report about the Samar Sea in this magazine 12 years ago shows that recovery can be quite rapid. One year after closing the fishery there to commercial vessels, the fish biomass more than doubled, as did small-scale fishers' catches.

### **Coral Reefs**

Fish recruitment on coral reefs is generally dependent on the presence of coral. A recent survey by Terry Done shows that the rate of recovery of coral reefs damaged by the crown-of-thorns starfish could range from 40 to 100 years depending on the type and size of coral. Similar rates would apply to reefs substantially damaged by fishing.

### **Mangrove Ecosystems**

Short of cutting them down, pollution is the worst problem for mangroves as well as for their fauna. Despite at least 157 major oil spills in tropical seas from 1974 to 1990, there has been little work done on their effects on shoreline communities. A study by Kathryn Burns et al., just published, combined chemical and biological assessment methods to demonstrate that a time period of up to 20 years or more is required for deep mud coastal habitats to recover from the toxic impact of catastrophic oil spills. The study was about long-term assessment of an oil spill into a coastal mangrove ecosystem in Panama.

### **Further Reading**

- Burns, K.A., S.D. Garrity and J.C. Levings. 1993. How many years until mangrove ecosystems recover from catastrophic oil spills? *Mar. Pollut. Bull.* 26:239-248.
- Done, T.J. 1987. Simulation of the effects of *Acanthaster planci* on the population structure of massive corals in the genus *Porites*: evidence of population resilience? *Coral Reefs* (1987) 6:75-90.
- Saeger, J. 1981. Do trawling bans work in tropical waters? *ICLARM Newsletter* 4(1):3-4.

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these small-scale fishers do not have any other choice but to use relatively large meshed nets, and they effectively help in optimizing use of the resources at least to some degree.

It seems then that fisheries regulations favor large-scale rather than small-scale gears, and nonselective rather than selective gears.

Yet, it can be very well argued that the problem of overfishing is compounded by the use of nonselective gears, and that in principle the fishery would be well balanced and self regulating if only highly selective gears like the majority of those used by small-scale fishers would

be operated. The ongoing reduction of diversity of marine species could certainly be reversed this way.

## **Fishing Down the Food Chain**

Based on the observations made during the recent survey, the conclusion is that all symptoms of what D. Pauly described as "Malthusian overfishing" (see *Naga* Jan. 1990, p. 3-4) occur in the area.

One consequence of Malthusian overfishing is that fishers begin taking organisms further and further down the food chain. The removal of most small and intermediate predators in the area has allowed jellyfish populations to bloom. Processing jellyfish has become a new industry there, with four major plants and numerous backyard enterprises taking part.

The jellyfish prey on larvae and juveniles of all kinds of fish and what they miss is almost certainly caught at the juvenile stage by nonselective gear such as fish corrals and used to feed the groupers.

The conditions described characterize a generalized "eco-cide", both on land and in nearshore waters, with only few fishers or entrepreneurs managing to benefit from the

changed conditions, while most suffer. Turning this extreme situation around is a hard test both for the regional government and for the project due to start there. One can only hope the next decade will be one in which further destruction is halted and rehabilitation initiated.



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