

MAJOR TRENDS IN SMALL-SCALE MARINE FISHERIES, WITH EMPHASIS ON DEVELOPING COUNTRIES, AND SOME IMPLICATIONS FOR THE SOCIAL SCIENCES¹

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Abstract The competition between large, industrial, and small-scale fisheries in the face of growing resource scarcity has led, in most parts of the world, to increased marginalisation of small-scale fisheries. However, the natural role of social scientists, who, given their expertise, should be informing mitigating activities, is often usurped by biologists and/or economists, as demonstrated here through a Google-based analysis. It is argued that this is based on social scientists: (1) neglecting in their field work key variables, such as catch levels, important to any understanding of fisheries; and (2) often conducting and reporting on locale-specific field work without attempting broader (and admittedly risky) generalisations -- the elements of a 'model' -- that are imperative for actual policy making. The former claim is illustrated with an example from the South Pacific, and it is shown that one result of current practices is the further marginalisation of small-scale fishers. The latter claim is illustrated with an example of a general model, which contextualises and thus explains a wide variety of phenomena related to migration within and into the small-scale fishing sector. An application of this 'Malthusian overfishing model' to the rebuilding efforts following the Asian tsunami of December 2004 is then presented. Finally, the case is made that despite their present problems, the small-scale fisheries of the world, suitably governed, are still our best hope for sustainable utilisation of coastal resources.

Introduction

One of the major trends in global fisheries is increased competition between small-scale and large-scale fisheries due to overfishing (Pauly *et al.* 2002) and overcapitalisation (Mace 1997). The two sub-sectors share numerous attributes across countries, though the boats used by small-scale fisheries in developed countries can be as large as industrial boats in developing countries.

One major result of this trend, especially in developing countries, is the marginalisation of small-scale fisheries, although they meet most of the criteria required for an enlightened fisheries policy in terms of employment and income distribution, energy intensity, product quality and distribution, and sustainability (Thompson and fao 1988; Pauly 1997; Allison and Ellis 2001; Béné 2003).

Many of these positive attributes and the governance arrangements that go with them, which social scientists love to report on, are, however, undermined by two related trends. One is the entry into coastal small-scale fisheries of landless farmers or cattle-less pastoralists, where they overwhelm the traditional fishers and local governance arrangements (Pauly 1997). The other is the limitation in productivity of tropical coastal ecosystems (Longhurst and Pauly 1987), which

cannot support ever-increasing numbers of both traditional fishers and new entrants.

Ensuring the sustainability of coastal fisheries, especially in the tropics, requires that the migratory flows into coastal fisheries be reversed. These are political problems, and they ought to be informed mainly by social scientists, not biologists. Yet fisheries biologists - I dare not speak of 'fisheries scientists' in this context - share with fisheries economists the dubious privilege of being responsible for most of today's ideas on fisheries management.

Other social scientists, notably anthropologists, have far less input. This can be illustrated quantitatively: if one enters 'fisheries' and 'ecology' into *Google Scholar*, one gets, at the top, a paper with over one hundred citations, while the subsequent papers also had noticeable impacts, as measured by citations (76,500 hits in total). This is similar for 'economics' and 'fisheries' (22,100 hits), as one would expect. On the other hand, with 'anthropology' or 'sociology' and 'fisheries' as search terms, the top ranking items are minimally cited and subsequent items are not cited (3,260 and 3,950 hits, respectively). Why is that so and what does this order-of-magnitude difference imply for fisheries research and policy?

This is an issue about which I cannot pretend to be neutral. My perspective is that of a fisheries biologist, and I answer questions about the role of various fisheries-related disciplines from that perspective (Pauly 1994). Moreover, I will not pursue inferences on the past of fisheries (prior to 1950), because these are the provinces of historical geography, archaeology and ultimately palaeontology, which will not be called upon here (but see Jackson *et al.* 2001).

The (Recent) Historical Background

By 1950, the countries of Western and Eastern Europe and other developed countries had recovered enough from World War II that they could re-launch their strongly industrialised fisheries. At that time, the majority of what are now 'developing countries' were still under European domination, or in the process of emancipating themselves from it, a process which culminated in the 1960s. As subsequent developments made clear, these countries were not only 'underdeveloped', but actively held back, and this was noticeable in the structure of their fisheries (Colonial Office 1961; Butcher 2004).

The early 1950s is also an auspicious time for the beginning of this tale, because in 1950, the United Nations Food and Agriculture Organisation (FAO), doing its part of a UN-based effort to quantify the world (Ward 2004), began to collect annual fisheries landings statistics for the entire world; an effort which continues to date, and which provides a unique perspective on fisheries and, ultimately, on their crisis. But we are getting ahead of the story.

European and North American fisheries in the North Atlantic (Pauly and Maclean 2003), and those of North Asia in the Pacific, peaked in the 1970s, with all major stocks exploited to the fullest (Grainger and Garcia 1996; Pauly *et al.* 2005). Fishing effort began to spill over from this region to areas further south such as West Africa, where it was the origin of the first distant water fleets in those waters (Bonfil *et al.* 1998; Alder and Sumaila 2004). Simultaneously, there were, in numerous countries, a multitude of fisheries development projects, then advertised as a noble effort to help the newly independent nations of the Third

World to make the best use of their marine resources. Many of these projects are now understood to have been the result of an East-West rivalry that used bilateral aid projects as part of a containment policy, which was hastily abandoned -- along with the projects -- after the collapse of the Soviet Union.

These development projects, usually staffed by biologists, largely neglected the experience of traditional fishers in the countries concerned. This is documented in classics as such as Firth (1946), in compilations such as Ruddle and Johannes (1985) and Dyer and McGoodwin (1994), and in historical accounts such as Butcher (2004). Rather, these projects sought to create local industrial fisheries based mainly on trawling and in direct competition with more traditional forms of fishing (Pauly 1996a). These were success stories in the sense that huge fisheries were developed, notably in Thailand (Panayotou and Jetanavarich 1987), which itself initiated distant water fisheries (Butcher 2002). In Africa, however, these projects did not catch on, in the sense that they failed to induce the development of large-scale fisheries, despite the presence of favourable starting conditions in some countries, notably Ghana (Lawson and Kwei 1974; Atta-Mills *et al.* 2004).

The primary reason for this was the existence of distant water fleets. Indeed, along much of Africa's coastline, especially off West Africa, the competition is still direct, between local small-scale fishers and foreign industrial fisheries (that is, distant-water fleets). In most countries of Latin America and the Caribbean, the industrial sector often consists of national fleets exploiting pelagics, and hence not directly competing with near shore, small-scale fisheries. In some other countries, distant-water fleets generate conditions similar to those in West Africa (see contributions in Agüero 1992). Whatever the route that 'development' took, the goals of fisheries development were generally 'biological' (high catches, utilisation of all resources, etcetera), to the near complete neglect of social goals such as employment, community well-being, food security, etcetera (Hersoug 2004).

These events and trends should have provided many opportunities for social scientists to contribute to the discourse in fisheries science, and even to insert themselves in actual fisheries management and policy making. This generally did not occur, as shown by the *Google* numbers above. I think this is due to two major aspects of the 'research mode' of social scientists. To put things stereotypically, social scientists working on fisheries:

- 1) Neglect key quantitative variables (this is especially true for the catch of small-scale fisheries, which social scientists could often estimate reliably, given their access); and
- 2) Fail to propose and test models of social behaviour of sufficient generality to be useful for policy making.

I will not back these claims through exhaustive citations of the literature, because proving negative statements of this sort would involve detailed hermeneutics of the key texts in social sciences and fisheries. Rather, I will give commented examples, which will also enable me to cover the ground defined by the title of this contribution.

Marginalisation of Small-Scale Fishers (I): Underestimation of Artisanal Catches

The FAO issues world fisheries statistics annually, which many take to be the world 'catch'. But these statistics are incomplete. Discarded by-catch is not officially reported, although the FAO itself has commissioned estimates of discards (Alverson *et al.* 1994; Kelleher 2005), which others have commented on (for example Zeller and Pauly 2005). Also, a significant portion of the catch is landed illegally, and not estimated (Pauly *et al.* 2002). Finally, there are many fisheries which are unregulated, either because they take place on the high seas, or because they are small-scale, and fall below the radar screen of the national statistical agencies that report national catches to the FAO (see, for example: Zeller *et al.* 2006).

For the world as a whole, the catches of marine small-scale fisheries have been estimated as upward of thirty million tonnes (Chuenpagdee and Pauly 2004), but, it is not clear (due to the non-consideration of small-scale fisheries in the statistics in a large number of countries, and their consideration in others) what fraction of these thirty million tonnes is already included in the about ninety million tonnes of global annual 'catch' published by the FAO during the last ten years, and what fraction should be added. We are working on this because we assume that the latter is a large figure, which will lead to a reappraisal of the global role of small-scale fisheries.

This issue may be illustrated for the fisheries of the South Pacific, which tend to consist of two sub-sectors: the tuna fisheries (Anonymous 1997; Gillett *et al.* 2001), conducted mainly by distant-water fleets in the Exclusive Economic Zones (EEZ) of the various countries; and what might be called the 'inshore fisheries', based on exploiting reef and other neritic fishes (Dalzell *et al.* 1996). As indicated by the FAO statistics, and reflected in the database of the *Sea Around Us* project, which presents these statistics in a geographic context (see www.seaaroundus.org), numerous South Pacific countries report no, or very limited inshore catch, although they are known to depend heavily on locally-caught fish for their nutritional needs and food security (see, for example, Chapman 1987; Dalzell *et al.* 1996).

Social scientists would be well placed to contribute this key variable, because of their local contacts, and because they are often embedded in the very institutions that take 'the pulse' of local small-scale fisheries. And social scientists should know the importance of catch levels: they are the very things that make people go fishing.

Yet, '*Words of the Lagoon*' (Johannes 1981), a classic which many fisheries anthropologists rightly attempt to emulate, does not contain the catch (and catch per fisher) data which, much better than words, would allow evaluation of the extent to which traditional Palauan fishing practices are sustainable, and also allow an assessment of the role of fisheries in the rural economy of Palau.

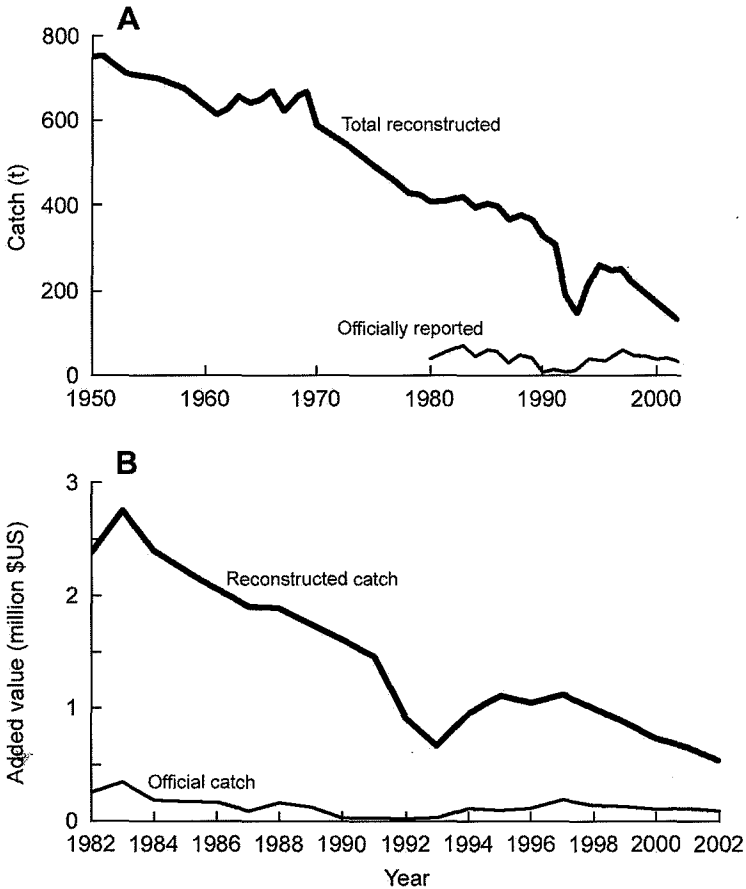


Figure 1. *Inshore (reef) fisheries catches in American Samoa; 1950-2001: catches reconstructed from grey literature and fish consumption statistics; 1982-2002: official catches, as reported to the FAO. For the latter period, the reconstructed catch is, on the average, seven times the official catch (Panel A, adapted from Zeller et al. 2006). This difference increases to ten times (Panel B) if values of the fish and downstream benefits are taken into account (adapted from Zeller et al. 2005).*

How important such a role can be, and the extent to which it is underestimated by FAO statistics, is illustrated here by Figure 1, which presents, for American Samoa, the reconstructed catch of the inshore (reef) fisheries *vs.* the official (FAO) numbers. For the period 1981 to 2002, when both time series are available, the reconstruction, although based on conservative assumptions (Gillet and Lightfoot 2002; Zeller *et al.* 2006), estimated a catch seven times higher than the official statistics, and this contributed nine times more to the rural economy than originally assessed (Zeller *et al.* 2005).

If these results can be reproduced through the region (and there are good reasons to think they can; Zeller *et al.* 2006), this will imply that the emphasis presently given to tuna in the South Pacific region may be misplaced, along with a version of food security that involves using the payment of distant water

fleet access fees for importing fish and other food (notably 'spam'). This emphasis has, at its flip side, the near complete official neglect of the inshore small-scale fisheries and their marginalisation.

Marginalisation of Small-Scale Fishers (II): Malthusian Overfishing

The next issue concerns models -- mental constructs meant to reflect important aspects of reality, such as to articulate our knowledge of it, and enable the exploration of, for example, the implication of certain policies impacting on that reality.

I assert that social scientists have rarely proposed generalisable models of fishing communities. Rather, they have tended to offer descriptions of localised situations, from which such models might be constructed, and against which they could be tested (since all the non-trivial assertions of such models should be treated as hypotheses).

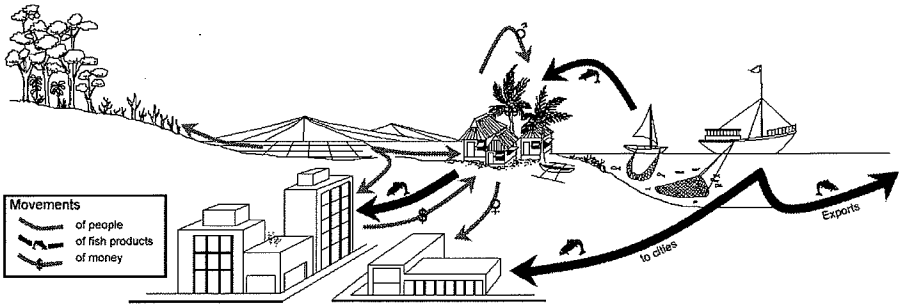


Figure 2. Schematic representation of the 'Malthusian overfishing' model of Pauly (1997), which states that the modernising and mechanising agricultural sector releases excess landless farmers, who migrate to urban, upland, or coastal areas; under this influx, traditional fisheries management collapses; the excessive fishing pressure is exacerbated by inshore industrial fishing, by the entry of the male children of fishers, and by the subsidy provided by young women working in cities to their brothers, fathers, or husbands in fishing villages. Upland deforestation, also involving new entrants, leads to siltation of rivers, and eventually, of coastal ecosystems, further reducing coastal fisheries yields (see text).

Construction, articulation, and/or eventual refutation of such models, the most successful of which become 'theories', is current in the natural sciences. The following, although not expressed in quantitative terms, and dealing with social science issues, is structurally akin to such models. This model (Figure 2) describes what I called, perhaps unfortunately, the 'Malthusian overfishing' of small-scale fisheries (Pauly 1997), although raw population growth is only one of its drivers. The major elements of this model, each formulated as a testable hypothesis, are:

- i. that a large agricultural sector (at least when compared with the fisheries sector) releases excess labour because of population growth, mechanisation and land 'reform';

- ii. these landless farmers migrate either to urban, upland, or coastal areas;
- iii. under this influx, traditional arrangements preventing open access to the fisheries gradually collapse;
- iv. this leads to excessive fishing pressure;
- v. which is exacerbated by inshore industrial fishing;
- vi. and by new recruits to fishing, as the male children of fishers pick up their fathers' trade;
- vii. and by the financial contribution of many young women who leave their communities to work in urban areas, providing a subsidy for men to continue to fish even when resources are depleted.
- viii. The migrants to upland areas accelerate and/or complete the deforestation initiated by logging companies, which leads to siltation of rivers and streams;
- ix. and eventually to smothering of coral reefs and other coastal habitats, thus further reducing coastal fisheries yields (Pauly 1997).

Since this model was formulated, on the basis of personal observations in, and literature from South America, South and Southeast Asia, and Africa, all I have encountered is an accentuation of the trends it builds on. Hence, I would suggest that it still might provide good questions for fisheries anthropologists and other social scientists to investigate and test. However, one new element that may be added to iii/iv is globalised export markets into which communities of small-scale fishers can plug themselves directly, which offer them potentially higher incomes, but which contribute to removing the last remnants of traditional, place-based management.

Malthusian Overfishing: Application to the December 2004 Asian Tsunami

The Malthusian overfishing model provided the background for recommendations on damage mitigation (Pauly 2005), following the tsunami of December 26, 2004, which devastated South and Southeast Asia, and which read as follows [original references added]:

“The tsunami that hit South and Southeast Asia on December 26, 2004, taking a horrific toll in human lives, also affected several coastal industries, including tourism and agriculture, though to what extent is unclear. As noted by Pearson [2005], the effects in some areas were exacerbated by existing environmental problems stemming from settlement and industry. The governments of Thailand and Indonesia have announced some estimates of fishing boats lost and highlighted the need for investments to restart the fisheries.

However good their intentions, I believe that Western aid agencies, and indeed, the governments of the region would be ill-advised to rebuild the fisheries as they were before the tsunami. Apart from oceanic fisheries for tuna and other large fish, fisheries in the tsunami-affected region fall into two categories: “artisanal fisheries”, relying on small (five meters or less), owner or family-operated craft, some non-motorised; and “industrial fisheries”, using larger vessels, mainly trawl-

ers but also other specialised craft with salaried crews. Jointly, their fishing activities have radically depleted the nearshore resources, down to depths of a hundred meters in places. Governments in the region have tried to encourage the industrial fisheries to operate farther offshore, but with little success, mainly because biological production, in tropical waters, is much higher inshore than offshore [Longhurst and Pauly 1987]. Hence, the artisanal and industrial fisheries essentially target the same shrimp and fish stocks, leading to intense competition. This competition and the ensuing violence, including boat burnings and riots, can be serious enough to prompt governments to take action, such as the 1980 ban on bottom trawlers in western Indonesia [Sarjono 1980]. Usually, however, government policies ignore these conflicts. Sometimes they exacerbate conflict by subsidising the construction and operation of industrial vessels, even in cases where these do not add to the total catch, but reduce that of the artisanal fishers. International aid has often aggravated this through technological and capital transfers, or donations of surplus vessels. Meanwhile, failed agricultural and social policies aggravate the situation by driving thousands of landless farmers to coastlines, where they usually fail to emulate the more sustainable ways of “traditional” fishers [Pauly 1997]. After the tsunami, the initial push will be to get people back to the jobs they know, and it will be hard to argue otherwise in the midst of the chaos. But rebuilding the fisheries without structural reform will only intensify these trends and conflicts. The challenge is to rebuild fisheries while directing as much money and energy as possible to generating land-based job opportunities for young fishers. Emphasis should be given to basic education and technical skills: many fishers in South- and Southeast Asia are illiterate, and this limits their social mobility [Bayley 1982]. Amending the old adage that teaching people to fish is better than giving them a fish to eat, we should instead be teaching them to repair bikes, sewing machines and water pumps.’

Needless to say, this advice was not heeded (Baldauf 2005; Chuenpagdee 2005; Erdmann 2005): the urge to subsidise was just too hard for relief agencies to resist. Never mind the devastating effects of subsidies, which can destroy small-scale fisheries as well as industrial ones (Smith 1981; Pauly *et al.* 2002).

Malthusian Overfishing: Final Comments

Google Scholar suggests that the paper in which the Malthusian overfishing model was fully developed (Pauly 1997), following briefer accounts in various outlets, was [as of Jan. 2006] cited over thirty times, but overwhelmingly by biologists. The major criticism that the ‘Malthusian overfishing’ model has received from social scientists is due to its dynamics being perceived as *caused* by industrial fisheries, which massively deplete the resources previously available to small-scale fishers. It is partly true: most small-scale fisheries throughout the world have seen their resources depleted by industrial fishing vessels, notably trawlers, fishing on or near their inshore fishing grounds. Yet this is not the whole story. An ever-increasing number of small-scale fishers operating motor-

ised canoes or similar mobile and versatile crafts can deplete the entire resource available on a country's continental shelf, and this is particularly clear in the Caribbean and the South Pacific. The local and/or foreign industrial fleets are only accelerating, albeit to a tremendous extent, an overfishing process which, if not controlled, would eventually engulf even the most seemingly benign small-scale fisheries.

Thus, for example, the foreign fleet exploiting the Bissago Archipelago in Guinea-Bissau consists of both the ubiquitous trawlers of European fleets, but also fishers on motorised canoes from neighbouring Guinea, and as far as Senegal, who set up camps in the Bissagos' outlying islands, from which they systematically deplete all resources in the neighbourhood, before returning with their catches, to be landed in Conakry or Dakar (Kaczynski 2005).

The best example of Malthusian overfishing is, however, the Bolinao reef fishery, in the Philippines, documented in great detail by McManus *et al.* (1992). In this instance, internal dynamics led to resource destruction without any 'help' from a large-scale fishery. Perhaps I should mention it is also the site that inspired the model (Pauly 1988).

Conclusion

The observations presented above can be interpreted in numerous ways and, as stated in the introduction, I can offer only the perspective of a fisheries biologist. With these caveats, here are my views of research topics that I consider worthwhile.

For fisheries economists: First, rights-based fishing seems to be at present *en vogue*. However, in most of the developing world, rights-based fisheries likely will not work, at least not in the form of individual transferable quotas (Pauly 1996b). In fact, restricting entry for small-scale fishers (and even for national industrial vessels) is not going to be politically feasible until distant water fleets are curtailed or at least invisible; in other words, far offshore. A second point regarding fisheries economics is that the emphasis on foreign exchange gain, while music to the ears of most local politicians, is not necessarily leading to economic development. A complete analysis ought to always look at whether or not this foreign exchange actually flows back into the economies of the countries in question. If not, the economic role of local fisheries, which generate substantial rural incomes, will be more important (Zeller *et al.* 2005).

For anthropologists: It is certainly the case that studying the local adaptation of a village and emphasising its uniqueness *vis-à-vis* other villages and the mainstream culture is what gets one credibility in a field where the 'local' is so prized (Geertz 1985). Yet, the negligible role that anthropology and related social sciences play in informing fisheries management should be a warning that there is a need for social-science generalisation which is presently not met, for example, to formulate people-orientated and sustainable government policies for an entire region or an entire country.

The reason why biologists and economists have come to almost monopolise the policy arena is their willingness to develop such generalisations even when they lack knowledge of the social consequences and insight in the assumptions implicit in the view of human behaviours on which these policies have been developed.

Furthermore, there is a real danger that the small-scale fisheries, if they don't manage the influx of new fishers into their midst, will be destroyed by new entrants; in this case, non-traditional fishers. Thus, there is a real need for generalisable work on the causes of migration within, into, and from coastal fisheries.

For sociologists: There are very few studies available of how collapsed fisheries are phased out, and how this affects different social groups. Yet, if the trends alluded to above hold, 'fisheries extinctions' should become common. We need guidance on how to integrate ex-fishers into other gainful activities, and how to create other sources of employment in communities that cannot continue to rely on fishing. To date, no such guidance is available, though there is a great need for it, as evidenced by the tsunami example.

Another topic that is understudied is the role of women in small-scale fisheries. Women catch fish (though often not the glamorous ones; Chapman 1987), and they process fish, too; these activities are conventionally studied. What is little studied (if at all) is how women (the wives, sisters, and daughters of fishers), by engaging in employment outside the fishing sector, and keeping the family in cash, literally subsidise male fishers, and allow them to continue exploiting overfished resources.

For all of us: The massive reduction of biomass which is the characteristic *modus operandi* of modern fisheries (for example Christensen *et al.* 2003), and the erosion of biodiversity and ecosystem function that this entails (for example expressed by the fishing down phenomenon; Pauly and Watson 2005), endangers the long term sustainability of fisheries. In the long term (two to three decades?), fisheries and fishing-based cultures will not survive if we do not manage to put small-scale fisheries and resources first, and to rein in both the floating behemoths that this industrialisation has brought us and the massive rural migration into small-scale fisheries. Realistic scenarios for such transitions exist (Pauly *et al.* 2003), but the alternative scenarios, with more overfishing by subsidised industrial fleets and neglect of the small-scale fisheries, are still more appealing to our policy makers.







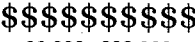





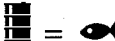


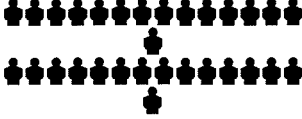


FISHERY BENEFITS	LARGE SCALE 	SMALL SCALE 
Number of fishers employed	 about ½ million	 over 12 millions
Annual catch for human consumption	 about 30 million t	 same: about 30 million t
Capital cost of each job on fishing vessels	 30,000 - 300,000	 300 - 3,000
Annual catch reduced to meals and oils	 20 - 30 million t	 Almost none
Annual fuel consumption	 About 37 million t	 About 5 million t
Catch per tonne of fuel consumed	 1 - 2 t	 4-8 t
Fishers employed for each \$1 million invested in vessels	 5 - 30	 500 - 4,000
Fish and other sealife discarded at sea	 8-20 million t	 Very little

Figure 3. Schematic illustration of the duality of fisheries prevailing in most countries of the world, using numbers raised to global levels. This duality of fisheries largely reflects the misplaced priorities of fisheries 'development', but also offers opportunity for reducing fishing mortality on depleted resources while maintaining most social benefits. The solution here is to phase out the large-scale fisheries. Based on an original graph by Thompson and FAO (1988), with updates from Chuenpagdee and Pauly (in press); Kelleher (2005); Tyedmers et al. (2005) and data on the FAO website (www.FAO.org).

I conclude with a vision of vibrant small-scale fisheries contributing to coastal communities and supplying, throughout the world, the bulk of fish for human consumption, harvested with a minimum expenditure of energy, in a sustainable fashion (Figure 3). This is what small-scale fisheries can do, once they are freed from the constraints under which they presently operate.

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Notes

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SMALL-SCALE FISHERIES, AS SEEN FROM THE NORTH

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Daniel Pauly speaks with an authority on the world's fisheries that few others can match. We can only hope that governments and international organisations are listening to what he has to say. This time Daniel has also offered some observations about our work as social scientists, which I imagine most of us would appreciate. My remarks are therefore not so much a critique as a few additional comments on some of the issues he has raised. Most of Daniel's examples and reflections on the fate of small-scale fisheries are drawn from the South. So as someone coming from as far north as you can possibly get, my perspective is naturally focused in that direction.

Social Science at the Margin

First let me note that, like small-scale fishers, fisheries social scientists are of course well aware that they are a marginal group. We hardly play any role in informing fisheries policies at various levels, and we do find this to be a paradox given that policy formation and governance are typically social science specialties. This often makes some of us feel a bit disillusioned and perhaps even a little bitter from time to time, and we ask ourselves why we bother. I think my own country, Norway, must have more fisheries social scientists per capita than most other countries. But after almost thirty years in the trade, I must confess that I cannot remember having seen any trace of our work in the fisheries policy documents that various Norwegian governments have ever produced. And I am sorry to say that I do not think that our situation is unique.

It is therefore reassuring when someone like Daniel Pauly tells us that we do, after all, have an important contribution to make: that there are issues out there requiring the effort and input that only professional social scientists can provide. He is asking us to shape up in certain respects, and I think we should take his advice seriously. We cannot deny that we are partly to blame for our lack of influence in policy processes. We are too modest sometimes; clearly, we could do more to make ourselves heard, including in the form of sweeping generalisations, as Daniel encourages us to do. The micro studies that we carry out at the community level often contain important macro messages, and we should make an effort to communicate these to the public at large. There is nothing as instructive as a well-told narrative featuring real people. But for what purpose, one may legitimately ask? What is it that social scientists aim at when we spend time in local fishing communities? I think that most of us see our effort as a contribution to the empowerment of fishing people and the building of sustainable livelihoods and healthy human communities, particularly in small-scale fisheries. And we feel that our mission is as noble as those of the biologists and the economists.

Research Agenda

Daniel Pauly asks us to focus our research on issues that have not yet received the attention they deserve, and I think we should listen to what he has to say. Important questions remain as to what is really happening to small-scale fisheries. There are a number of high quality small-scale fisheries social science case studies available, but the data we have at an aggregate level is not as solid as it should be. Who are small-scale fishers, and what motivates them? To what extent, why, and how are small-scale fisheries becoming marginalised? What are the main reasons and driving forces behind this process? For instance, how does globalisation contribute to marginalisation? How do those who face marginalisation perceive it?

Daniel has provided us with an interesting research question on marginalisation with his Malthusian model. However, although intriguing, I think we do wisely, as Daniel also suggests, if we consider it a hypothesis yet to be tested. We may find many examples of Malthusian mechanisms in fishing; it seems to fit well with what I know from South India through the IDPAD project¹ where the fishing population has drastically increased in recent years. But the lot of small-scale fishers may also be determined by a whole range of other factors which may have little to do with biology and economics. Marginalisation, for example, usually results from ineffective organisation, and hence little or no political clout. We should take notice of the fact that marginalisation is a gradual process. It rarely occurs overnight. Tsunamis are, after all, exceptional events. Small-scale fishing people were marginalised before the tsunami, and there is every reason to assume that they will continue to be so, also as a consequence of this tragedy.

The Malthusian model emphasises a push factor that results from a lack of alternative employment opportunities. People overfish because they are poor. Thus, providing them with other ways of sustaining themselves will help relieve the pressure on the resource. This assumption is the opposite of Garret Hardin's, that people are poor because they overfish: When there is open access and no effort restriction, fishers will eventually bring ruin to themselves. We would do better, I think, if we recognised that in many instances both are probably true and that this is a two-way process and a vicious circle. Our research focus would then be broader, and the policy options would increase. Access and effort restrictions would have to be matched with the creation of alternative employment opportunities and welfare systems. This should, one would expect, release pressure on the natural resource and make fishing communities more resilient. We should not, however, be oblivious to the fact that small-scale fisheries often provide an important safety valve for poor people in times of crisis. If we were to remove this buffering utility of small-scale fisheries without providing people with other safety nets, closing the fisheries would lead to more poverty, more anguish, and hence greater pressure on fishing communities and marine resources because people, when they get hungry enough, will fish regardless of what the government tells them not to do. In the fisheries of many countries, banning people from fishing is impossible.

Three more comments and then a final remark:

Science versus Politics

Social scientists have a job to do in filling small-scale fisheries knowledge gaps. How widespread is Malthusian overfishing? What other factors are contributing to the dismal situation of small-scale fisheries? However, many of the problems facing small-scale fisheries are not necessarily scientific: they do not result from holes in our knowledge that natural and social scientists could and should fill. They will therefore not be resolved by more research. Rather, these problems are political in nature, stemming from unrestrained power, special interests, and government inaction. Sometimes they originate from arrogant decision-makers who are biased in favour of large-scale fisheries. Thus, it is often power, rather than lack of knowledge, that makes things stay as they are. No doubt, governments could do a lot to alleviate poverty and help small-scale fisheries based on what is already known. I am afraid that sometimes the constant requests for more research fit well into government's non-decision strategy, which is to avoid provoking powerful interests with policies that would redistribute wealth. Doing something that would effectively help small-scale fisheries and communities, such as shielding them from large-scale, industrial fleets; building stronger local economies to fight unemployment and hence reduce pressure on fisheries (as Daniel argues); establishing welfare schemes that would keep people safer; fighting corruption; enforcing laws, etcetera -- these are actions that governments could take right away. Therefore, more than anything else, including more research projects, there is a need for bold political initiatives to change the current conditions that lock small-scale fishing people into destitution. If there is a job for the social scientist here, it is to shed light on what keeps governance systems from addressing these issues.

North versus South

I think Daniel is correct in talking about the marginalisation of small-scale fisheries as a global phenomenon happening in both the South and the North. But I believe that small-scale fishers in the North and South are becoming marginalised for very different reasons. The policy implications may therefore also be very different in these two situations. For example, I do not perceive in the North a Malthusian effect similar to the one Daniel has described in the South. In developed countries in the North, where fisheries tend to be an occupation of last resort, people -- and most particularly young people -- want to get out of, rather than into, fisheries. If not for any other reason, it will be the lack of new recruitment that will eventually kill small-scale fisheries, with all the negative impacts that this will have on coastal communities and lifestyles and, we should add, marine resources, since more aggressive large-scale operators will quickly take their place. The reasons for this lack of new recruitment are of course multifaceted. One reason is that small-scale fisheries are becoming less and less attractive as a career, relative to other career opportunities. This is only partly due to the fact that, in the North as well, small-scale fisheries are experiencing intensified pressure from large-scale fleets, although perhaps not to the same extreme as that described by Daniel Pauly in the South.

We often think of the marginalisation of small-scale fisheries as something occurring in spite of management, or because of a lack of functional management. This is no doubt true to some extent. But there is also a lot of evidence to suggest that the marginalisation of small-scale fisheries is happening *because* of the management systems that have been put into force. Small-scale fisheries are quite simply losing out as a consequence of the management systems that currently exist. Thus, I think that Daniel's reservations with regard to rights-based systems, such as Individual Transferable Quotas (ITQs), are well put, but that they apply to the North as well as to the South. It is true that such systems would work under very different conditions in the North than in the South, because of the Malthusian effect, for example, but their impact on small-scale fisheries and fishing communities may be just as detrimental.

Poverty

Daniel's description of the Malthusian model leaves us with a general point that I think is equally relevant to the North and the South. The fishing industry is not always its own problem producer, but rather the receiver. Thus, most potential problems would be more effectively resolved if they were addressed at their point of origin rather than at the point of arrival. Let me add to this that the marginalisation of small-scale fisheries and its causal mechanisms may well be common knowledge but they are still not addressed, because governments lack the necessary resolve and turn a blind eye to them, and because the general public does not care all that much. Nor are the problems experienced within small-scale fisheries necessarily unique. They may be experienced just as strongly in other sections of society. Thus, fishing people may be poor for the exactly the same reasons as people are poor in other parts of society. Women in fisheries may be discriminated against for exactly the same reasons as they are discriminated against in society as a whole. There is a danger that we as fisheries social scientists may regard fisheries as a special case, when in reality they may not be all that different from the rest of society. Therefore, poverty alleviation and gender inequality correction in fisheries require broad social reforms that encompass more than the fisheries alone. And that would be true for the South as well as the North.

Our Credo

Finally, let me suggest that fisheries social scientists have particular reason to pay close attention to the fate of small-scale fisheries. The marginalisation of small-scale fisheries would have a negative effect on our discipline, since we thrive on them, as Daniel rightly observes. We need them, as it were, and they could ideally benefit a great deal from the work we do. Thus, our discipline and the destiny of small-scale fisheries are inter-connected, and we may therefore both risk becoming extinct species. The day fisheries are a super-efficient, large-scale, profit-driven, capitalist enterprise and, hence, removed from their social and cultural roots (which might not be a distant scenario for the North), social scientists will lose interest in them. I think I would. I must confess that I find Norwegian fisheries less and less interesting, as there is less and less for us to do. Who cares

about the profit margins of the new harvesting machines that are now being introduced? Who worries about the fate of the big corporations that are now taking over? Perhaps business economists and marketing researchers might find such fisheries intriguing, and the biologists would certainly still be alarmed about what is happening to the fish stocks and ecosystems. But social scientists will turn their attention to other, more rewarding areas and to where their particular expertise is more valued -- and no one will miss them. Then the MARE conference will draw fewer participants, and that I should be sorry to see. So, let's strive to make our future turn out differently. In the North as well as in the South, small-scale fisheries are still worth fighting for. If we as social scientists need a political credo, and I guess we do, that might be it.

Notes

¹The project is called 'Co-operation in a Context of Crisis: Public-Private Management of Marine Fisheries in South Asia'. It is coordinated by the Centre for Maritime Research (MARE), at the University of Amsterdam and funded by the Indo-Dutch Program for Alternatives in Developments (IDPAD).

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INTERACTIVE APPROACHES TO GLOBAL AND LOCAL FISHERIES MANAGEMENT:
A Challenge for Fisheries Social Scientists

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A second discussant always has the privilege of responding to two voices. And I must say that I was really pleased to be given the opportunity to respond to an authority in fisheries biology *and* to an authority in fisheries social science. I think both Daniel Pauly and Svein Jentoft raised a number of issues that not only this conference, but everyone involved in fisheries - be they scientists, administrators, managers, the fishing industry, environmentalists, or other stakeholders - should take note of. Adding to Svein's remarks, I would like to reflect on Daniel's observations about the potential role of social science in fisheries.

Although I now work for the fishing industry, I am a fisheries sociologist by background. And like Svein, I was always oriented to fisheries in the North: north-western Europe to be more precise. I worked in small-scale and industrial fisheries (although I am not that happy with this terminology since small-scale can be industrial too). When Svein said that, like small-scale fishers, fisheries social scientists are a marginalised group too, I could not help smiling. This was exactly why I decided to leave academia to start working for the fishing industry where I felt I could make a difference by becoming an active part of the policy process. Do I make this difference? On the huge European fisheries management scale I am not so sure. So I might as well have stayed a working fisheries social scientist. But frankly I do not regret my career change. Only by becoming part of the policy process did I really learn how difficult it is to translate the messages from the natural and social sciences into sound fisheries management and did I understand the kinds of ecological, socio-economic, and cultural complexities that are involved. When I hear Svein responding to Daniel saying that he unfortunately does not see any trace of social scientists' work in the policy documents of various governments, I think I can enlighten you as to why this might be.

Social scientists have an incredibly difficult message to sell. As Daniel rightly argued, most of us tend to focus on the local, on case studies, on socio-cultural diversity, etc. The message of social scientists to policy makers is often: 'generalised and top-down policy does not work, instead we need bottom-up and tailor-made management'. This is a macro message that originates from micro studies and a message that makes sense. But imagine that you are an administrator having to deal with a nation's or even a whole continent's fisheries management system. Then suddenly bottom-up and tailor-made management becomes very difficult indeed. Think of the implications for implementation of a vast number of different regulations and their enforcement, let alone the equity issues involved. So just arguing the case for people-oriented fisheries management -- which is nice to hear from a biologist for a change -- will not bring us that far. And I agree with Svein that simply doing more research will not solve the problems small-scale fisheries, but also industrial fisheries are facing, since most of

them are political in nature. Disclosing how governance systems work, as Svein suggested, should be one of our jobs. But I also believe that what is needed from fisheries social science more than anything -- and this touches upon Svein's remark about our role in empowerment processes -- is a more action-oriented approach towards the development of effective tools for bridging gaps between administrators, fishers, and other stakeholders to jointly work towards problem appreciation and solution. I personally find it very encouraging that at least in north-western Europe, a number of initiatives and governance experiments, which could be classified as interactive fisheries projects, have started from which we could draw really important lessons.

Daniel asks us to generalise the social in fisheries. He proposes that by being willing to develop generalisations, biologists and economists have been able to monopolise the fisheries arena. Administrations prefer generalised policy and regulations, so what could be more successful than a generalised message? And when I hear Daniel speaking, and knowing that right now his name and ideas are buzzing in the corridors of the European fisheries directorate and finding their way into policy discussions, he has proven this point well. But there is also an inherent danger in generalising, a danger which at the same time provides the social sciences with a challenge.

Generalisations may lead to prejudice, and while listening to Daniel, I could not help but notice certain preconceived ideas or perhaps 'stereotyping' towards 'small is beautiful' and 'big is bad'. In his attempts to explain the marginalisation of small-scale fisheries -- a phenomenon that occurs all over the place, and I would argue also in the industrial fisheries in the North -- one of his arguments is that the industrialisation of fisheries accelerated the marginalisation of small-scale fisheries. Daniel has a strong point there. But things are changing, although perhaps not as fast as we all would like. Criticism from people like Daniel and from non-governmental organisations has led, for example, to what you could call breakthroughs in how some industrial fishing companies now deal with their fisheries agreements in the South in order to bring real benefit to local communities instead of merely filling the pockets of often corrupt governments. These positive examples have, at least within the European Union, led to policy changes with respect to third country agreements and have also been picked up by governments in Africa. We can also see co-management systems emerging in the Northern industrial fisheries that were once governed by top-down policy, which despite good intentions was detrimental to fisheries. Equally there are many examples where small-scale fisheries, in spite of their appealing name, have caused severe ecological and social problems, as Daniel showed in his presentation.

Social scientists are often inclined to study the perhaps more romantic local fishing community, but disclosing the processes involved in the operation of industrial fisheries is in my view of even greater importance. After all, industrial fisheries in the South and North provide the bulk of fish. They are here, whether you like it or not. And with an ever-increasing global demand for food, with fish being a relatively cheap but high-protein food source -- but also in view of increasing demands on product quality in the North -- it is unlikely that industrial fisheries will disappear altogether. It is exactly because of the impact industrial fisheries can have on fish stocks, the ecosystem, and on social systems and the economy, that these fisheries need our immediate attention. Only by understanding

how they work, and what drives them, will it be possible to facilitate a transition towards responsible fisheries from an ecological and a social perspective. But if we keep depicting industrial fisheries as the 'capitalist bad guys' and small-scale fisheries as the good guys we should embrace, it is unlikely that we will make this move and more likely that we will instead lose interest as Svein Jentoft confessed. Social scientists should care about profit margins and the introduction of harvesting machines because these are part of a transformation process in fisheries that affects fishers and fisheries communities in the South *and* the North, small-scale *and* industrial, and ultimately our own future. We should also care about the frequent interdependence between these fisheries and between fisheries and their larger social and economic contexts; with the effects of rising fuel prices Daniel mentioned being a good example.

Finally, by generalising, there is a risk that we may overlook the perceptions and discourses that shape fisheries management or worse, that we may impose our own categories or stereotypes thereby failing to explain how fisheries management (or non-management) comes about. After all, fisheries management is socially constructed, not only by fishers and other stakeholders, but also by scientists. So we have to find ways of dealing with this problem.

If we as social scientists want to make a valued contribution towards responsible fisheries management, then we should continue to fight for small-scale fisheries, as Daniel and Svein argue, but we should also have the courage to put preconceptions about capitalist entrepreneurship aside and dive into the world of industrial fisheries. And I regret to say that only a few of us have decided to leave the safe haven of researching small-scale or local fisheries. By shedding light on the processes involved in the governance or non-governance of 'bad' and 'beautiful' fisheries alike -- the interests, images, attitudes, values, discourses, interactions, struggles, and so on -- we can make an invaluable contribution. Not only by increasing public and political awareness of our fisheries resource, but also by providing a basis for the development of tools for administrators, scientists, fishers, and other stakeholders to work towards solutions for truly responsible management.

ON THE AMBIGUITY OF USING MARGINALITY AND SECTORAL DIVISIONS TO TALK ABOUT COASTAL FISHERS (AND THEIR ANTHROPOLOGISTS)

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In a very dense, incisive, and provocative keynote address, Daniel Pauly proposes a reappraisal of the global role of small-scale fisheries from a biologist's point of view. In doing so, he frames new tasks for social scientists, particularly anthropologists. This unusual exercise with the intent of bridging the gap between natural and social sciences is welcome, especially in light of his call for '...vibrant small-scale fisheries contributing to coastal economies and supplying the bulk of fish for human consumption...in a sustainable fashion...once freed from the constraints under which they presently operate'. This is indeed a noble statement of principle, of high ethical and political scope, which until now cannot be said to form part of the agenda of world agencies such as the World Bank, the International Monetary Fund, and the World Trade Organisation. Such a transition in the view of fishing, especially in the tropics, which harbour in South and South-east Asia the immense majority of small-scale fishers, implies reversing the overwhelming flow of landless or cattle-less newcomers expelled from the land. While current small-scale fisheries are still sustained by relatively rich marine biodiversity and social systems founded on extended families as the smallest economic unit, the basis of their largely extractive economic activities is being increasingly eroded. These livelihood strategies of traditional fishing communities and their governance arrangements ruling access to marine resources in the coastal zone are put at risk by migrants. Pauly formulates a model and suggests it 'might provide good questions for fisheries anthropologists and other scientists', who 'have failed to propose and to test models of social behaviour of sufficient generality to be useful for policy making'. Pauly proposes that this lack of generalisation capacity, rooted in the 'prizing' of the local as the basis for credibility in anthropology, is the reason for the 'negligible role of anthropology and related social sciences' in the production of the ideas of fisheries management, as attested by the paucity of hits on Google Scholar that result from the entry of the key words *anthropology* and *fisheries*.

Beyond the Google Scoring: the Contributions of Maritime Social Sciences

Twenty-five years ago Acheson (1981), in his review of developments in the 'anthropology of fishing' already remarked on the dominance of biology and economics in the field of fisheries management. Dyer and McGoodwin (1994) did the same and asserted that in spite of the pioneering works of Johannes and Ruddle and, in the 1980s, a 'florescence' of studies focusing on folk management (more than twenty citations), 'regretfully this new literature has not made much impact in fisheries management circles'(Dyer and McGoodwin 1994:7). In Europe this 'florescence' was equally impressive, as seen with the European Un-

ion funded *Social Science Concerted Action in Fisheries* headed by D. Symes as a major example. This effort pooled the research of a large group of social scientists in seven volumes and in a single issue of a journal, between 1996 and 2001. Recent developments in the maritime anthropology of southern Europe and South America have been recorded by Alegret (1998), Pascual Fernandes (1999), and Diegues (1999).

The analysis of change in inshore coastal fishing communities is at the very heart of the many anthropological and geographical studies that have followed the lead of Breton (1977), who focused on the study of social reproduction of inshore fishing communities. These studies have worked out with a precise and high level of generalisation the forms that the social and economic transition process takes. Inshore coastal fishing societies do not belong at all to a 'sector' but are a *social halieutical morphology*, they are the expression of a way of life, a way to appropriate and to deal with marine nature to make a livelihood. It is a little bit disappointing to note the resounding silence about this tradition of study from scholars who, in the framework of the broad church of the International Association for the Study of Common Property, have analysed the structural conditions and prerequisites for 'protecting' and 'reinventing' the commons, and 'making them work', while proposing models and strategic pathways, including for the Mediterranean's fisheries (Collet 1989, 1999, 2001, 2002).

In the Mediterranean, the disaggregation of long enduring inshore fishing communities is mainly driven by a hard competition between very destructive semi-industrial extractive activity and marine culture (expanding tuna farming); the shrinking of the sea's fishing territory by the growing pressure of tourism, urbanisation, and recreational fisheries; coastal pollution; and the will of the state, like in France, to hinder the regeneration of fishing folk (the French *Prud'homies* grow old). The marginalisation of traditional inshore fishing communities has proceeded from the same reduplication of state promoted fisheries maldevelopment, based on productionist trends aiming at the maximisation of economic profitability and leading to the erosion of marine biodiversity and functions of the marine ecosystem coined as the process of *fishing down marine food webs* by Pauly, Christensen, Dalsgaard, Froese and Torres (Pauly *et al.* 1998); Pauly's response, looking at the Pacific and at recent studies of the South Pacific Commission and the World Bank, challenges anthropologists to scrutinise the inshore catch where the undervalued evidence of the effective marginalisation process would be found.

Quantitative Assessment, Marginalisation, and the Role of Women: Opening Our Eyes about Oceania

The marginalisation of small-scale fisheries is evident from the failure of many states to collect adequate coastal catch data. Coastal gleaning by women on Pacific reefs, and the catch from other forms of subsistence fishing do not make it into government fisheries statistics. Many anthropologists, following the seminal contributions of Slocum (1975), Chapman (1987), and Johannes (1981, 1991), have underlined the role of women as main protein providers in fishing communities in the Pacific, but without giving catch figures. In Pacific islands, seventy to eighty percent of the catch from inshore fishing is used for subsistence purposes

(Dalzell *et al.*, 1996). A large percentage is taken by women who thus contribute to the overfishing of reefs and put at risk the function of reef ecosystems. If Pauly only suggests such a social process, World Bank studies assert it (Gillet and Lightfoot 2002; DemEcoFish Project, South Pacific Community 2001-2003). At the global level, small-scale fisheries have thus begun to be 'reappraised' *only* because they probably catch more than thirty million tonnes, which is equivalent to one third of global catches. Anthropologists are therefore asked to open their eyes and provide 'good' figures because they are well 'embedded' in these societies and because the Food and Agriculture's (FAO) Fisheries Department is criticised for providing truncated statistics. Instead of calling anthropologists to open the public's eyes to the well-known fact that more than eighty percent of fishing people capture only one third of the global catch (the remaining twenty percent that are industrial fisheries capture two thirds) social scientists are enjoined to understand how women 'subsidise' their fishermen husbands...

The obsessive preoccupation of the state in the nineteenth century was to record the numbers of the extremely numerous and dangerous poor of the working class (Joseph and Fritsch 1977; Leclerc 1979; Collet 1982). Today the South Pacific Community is targeting women and children for eroding the reef bounty in the insular Pacific (DemEcoFish Project, South Pacific Community 2001-2003). Do women and children do this? Surely yes, but it is at minimum a very complex and difficult issue. Recent statements assert that the grand 'epic colonisation of Polynesia' was 'a rolling wave of destruction' (Wilson 2003:95) and Jackson *et al.* state that 'humans have been disturbing marine ecosystems since they first learned how to fish' (Jackson *et al.* 2001:629). If indigenous people and modern man have always been horrible 'planetary killers' (Wilson 2003:39-72), such ideologically equalising appraisals make it impossible to design precautionary governing arrangements, conservation ethics, and to understand the reasons for the existence of those which may have worked in the Pacific and elsewhere in the world, often by the means of sacred refuges. On the contrary, we have to be able to distinguish between forms of *haliectual appropriation* -- and this is where the social science perspective is fundamental.

As the Pacific example shows, how can we explain the evidence that archaeologists and biologists at Matenkupum (New Ireland, New Guinea) have revealed for the longest continuously exploited lagoon fisheries in the world -- an astonishing period of more than 32,000 years -- which has not affected the insular coastal ecosystem? Allen, Gosden and White (1989) explain their relevant findings by suggesting a form of rotational cropping of the shellfish population, which supposes a mental construction of marine abundance and the conduct of a collective form of restraint. As reported by Chapman (1987:275), that was indeed the case with the ancient Hawaiians and many tribes of the Northwest Pacific Coast, and very probably for the Phoenician's marine-based settlements in the Mediterranean (Collet 1991, 1995). In light of what could be called a 'back to the future' logic, *women's sea commons* or *sea gardens* have been reinvented with success today in the Solomon Islands as rotating reef protected areas in the framework of community based management arrangements implemented by women anthropologists who do their ethnography and act with people in the pursuit of sustainable livelihoods (Aswani and Weiant 2004). These are people asserting their right to autonomously exist and develop at their own pace.

In that respect, Ruddle (1998), Hviding (1996), Sharp (1996), Cordell (2001) and R. Johannes, whose death in 2002 has created an irreplaceable void, are much more qualified than the South Pacific Community to continue to analyse the dilemmas and to frame the institutional, political pathways for reinventing the Pacific customary marine tenures or *halieutical commons* and rebuilding healthy marine-human nexuses. These are inalienable because they are common and they support the formation of identities and personhood (Battaglia 1990).

The Tasks of Anthropologists in Light of the Code of Conduct for Responsible Fisheries

However, the task of anthropologists remains to continue to explore the black box of the eco-social fabric of traditional inshore fishing communities in the mind and in the practices of human subjects, both women and men. How women relate¹ to marine entities, and how women construct the representation of the future, including marine bounty, is still a crucial issue (Williams, Hochet and Nauen 2005; Collet 2005). Without searching to understand the social and cultural structures by which humans rule their relations with non-human marine entities, in the framework of an ecosystem approach as developed by anthropologists as early as 1963 (Moran 1984, 1990), it is hardly possible to design adequate pathways for the sensitive preservation of these fragments of social-natural biodiversity. As in the past, anthropologists are still at pains to foster these intrinsic values in a destructive global process driven by the continual re-expansion and the deepening of capitalism aimed at creating new forms of commodities (Shiva 1998). Under tremendous pressure to gain access to the world market, many agrarian developing economies have implemented structural adjustment, or, in other words, the privatisation of the commons. As happened more than 200 years ago in Great Britain, this process leads to the 'release' (expulsion) of landless farmers and pastoralists, who swell the masses of the poor in shanty towns, or seek desperately to escape to the European fortress, often at the price of death. Only strong political and civil movements, aiming at transferring massive development aid, removing debt, promoting equitable trade, and dismantling Euro-American agricultural subsidies, can cope with the catastrophic process which is now indeed omnipresent and having a particularly strong impact on coastal fishing communities in South Asia and Africa. Political ecology is welcome in what must be the high priority of rebuilding the world's marine ecosystems, as long as it does not lose sight of the social justice imperative.


In conclusion, the co-operative and interdisciplinary understanding of highly complex and extremely dynamic natural-social systems such as fishing appropriation continues to represent a very daunting challenge. Fisheries management is, after all, nothing more than the ruling of social appropriation practices or conducts. Ethics have been there for a long time, too, and were very often embedded in fisher folk management forms in order to put some limits and benchmarks on the disruptiveness of human action. In that respect, the Code of Conduct for Responsible Fisheries (CCRF) (FAO 1995) continues to represent at a global level, in the long history of the modes of appropriation of nature, a normative *aggiornamento* of high historical significance (Collet 1999:118,125), especially in regard to artisanal and subsistence fisheries (see articles 6.2; 6.4; 6.6;

6.18; 7.2.2; 7.6.6; 8.4.5; 10.1.3; 12.10; 12.12). Elaborated mainly from ecological, social, technological, economic, and political positions, the CCRF is today the most advanced and complete guiding ethical framework for human and environmentally friendly fisheries policies. The CCRF should thus constitute an overarching instrument for interdisciplinary collaboration on behalf of fisheries.

Notes

¹An exceptional and complex example of the powerful role of women in Melanesia in relation to the marine sea territory and environment is given by Deborah Battaglia. Such a vivid ethnographic statement is for social natural scientists and policy makers a strong incentive to think of the absolute otherness and beauty of a female way (clashing with many western modes of constructing marine nature) of ordering access and relating to marine entities in the context of a gift exchange. 'The afterbirth is placed in a personal basket and taken by an unmarried woman of the mother's clan to the edge of the reef. When the tide is low: she leaves the basket and its content there for the fish to eat, and it is thought that sharks, stingrays and other "dangerous fish" in particular are attracted to the smell and subsequently reek of it when caught and cooked. This gift of the "first skin" is an essential sacrifice. Without it the child would have no right later to take fish from the sea' (Battaglia 1990:43).

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THREE CHEERS FOR THE FISHERIES BIOLOGIST...
... AND AN ANTHROPOLOGIST'S *ORATIO PRO DOMO*

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Casting his net widely, biologist Daniel 'Fishing Down the Food Chain' Pauly in a handful of pages draws up the balance sheet of social science's contribution to fisheries policy and management. Unsurprisingly, he assesses its impact as rather poor. From his Google quick scan it would appear that sociologists and anthropologists do not really count in fisheries science and policy. In looking for an answer as to why this should be so, Pauly turns to the social scientists' 'research mode'. He admits to putting things 'stereotypically' in remarking that social scientists 1) neglect key variables (that is, catch estimates) and 2) fail to propose and test models of social behaviour that are sufficiently general so as to be useful for policy making.

While Pauly is looking for intrinsic reasons for social science's poor performance, one could find a rather simple answer as to why sociologists and anthropologists are less visible in a Google search than biologists or economists. For one thing, their relative numbers make an important difference. Compared with biologists and economists, there are not many sociologists and anthropologists who focus on fisheries 'stuff' and those who do have begun to do so rather recently, usually for a limited period of time and with an emphasis on the developed world and large-scale fisheries. For example, the sub-discipline of maritime anthropology or anthropology of fishing developed in the 1970s and it was only in the late 1980s that many of its practitioners moved from more general issues of culture and social organisation to a predominantly applied type of anthropology dealing with policy and management issues. As newcomers to the fisheries scene, their access to institutions where biologists and economists were firmly established has not been easy and their voice is hardly heard. Contributing to the discourse in fisheries science and playing a role in fisheries policy and management requires quite another position than being relegated a place in the periphery. The fact that biologists and economists -- according to Pauly in contradistinction to anthropologists -- have been willing to develop generalisations has little to do with this.

As to Pauly's remarks regarding social science's research mode, they are indeed stereotypical. To begin with, he says little about what anthropologists and sociologists in fact *have done* or *do*; he limits himself to the question of what they *could do*. Pauly hardly cites social science publications at all but more than a third of his references are to work authored or co-authored by him. Consequently, what Pauly says about fisheries social science boils down to unsubstantiated guesswork. Apart from this ill-informed point of departure, I fail to see why social scientists should be better positioned than biologists to collect Third World small-scale fisheries catch statistics. It is not -- nor should it be -- their core business to do so. The fact that Pauly refers to Bob Johannes's *Words of the Lagoon* in this connection is interesting, for despite his commendable crossing of disciplinary

boundaries the late Johannes was trained as a marine biologist not an anthropologist. Anthropologists and sociologists should focus on the social and cultural dimensions of fishing and fishing communities. Although making occasional laudable remarks, Pauly succeeds in painting a caricature of anthropology. Clifford Geertz is the straw man who receives a bashing for his emphasis on the local context. However, being sensitive to the local context and offering 'descriptions of localised situations' do not mean that anthropologists fail to go beyond the community. On the contrary, if anything anthropological work is usually comparative at root. Although perhaps not the kind of 'general models' Pauly would like to see, anthropologists have come up with heuristic models, testable hypotheses and syntheses in regard to fisheries and fishing communities -- even quite early on (compare: Smith 1977).

Pauly's own 'Malthusian overfishing of small-scale fisheries' model is certainly useful and goes beyond the generic 'anthropogenic causes' to which many biologists and ecologists refer when explaining overfishing. But his self-congratulatory stance apparently prevents him from taking a serious look at what social scientists have indeed contributed to understanding the modes of behaviour and thinking of fisher folk -- whether they can be generalised or not. At any rate, perhaps anthropologists would do well not to indulge in developing general models too much. They do a much better job at inventorying socio-cultural adaptations to marine environments, the wants and needs of fishermen and fisher families, and the social impact of management measures -- intended and unintended, anticipated and unanticipated, desirable and undesirable. Precisely because of their sensitivity to local contexts, they are good at translating and mediating bottom-up desires and interests and at proposing rules and regulations that stand a better chance of being complied with than the top-down command-and-control regimes usually favoured by biologists and economists. If we take into account the present state of the world's fish stocks, the record of what generalising biologists and economists have been able to achieve in the fisheries policy and management arena does not merit any self-righteous demeanour. There would be much to gain for the fisheries and fisher folk if social and natural scientists began to communicate across the discursive rifts of their respective disciplines. That, by the way, was what Bob Johannes did and what made him an inspiring pioneer. But unilaterally and haughtily telling social scientists what they could -- or should -- do is not much help.

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ESTABLISHING THE IMPORTANCE OF SMALL-SCALE FISHERIES:
The Need for Interdisciplinary Research

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Daniel Pauly starts by identifying the marginalisation of small-scale fisheries relative to industrial fisheries, especially in developing countries, as a major trend, and concludes by stressing a vision of 'vibrant small-scale fisheries contributing to coastal communities and supplying, throughout the world, the bulk of fish for human consumption, harvested with a minimum expenditure of energy, in a sustainable fashion'. A vision, he says, that could become a reality once the small-scale sector is freed from the constraints under which it presently operates.

One cannot but support such a vision. While there are, no doubt, multiple constraints facing the small-scale sector, Pauly focuses mainly on resource-related constraints -- those that contribute to overfishing and unsustainable use of resources. He refers to, among others, the in-migration into the sector; the breakdown of traditional governance agreements and the subsequent problem of too many fishers and too much pressure on the resource base; industrial fisheries, particularly when fishing in inshore waters; the targeting of export markets by the small-scale and the related weakening of existing institutions; and so on.

It is worth noting, though, that activities outside the fisheries sector that affect the health and productivity of the fisheries resource base, often in highly damaging ways, have not been referred to in any explicit way. Reports from fishworker organisations throughout the world indicate the increasing extent to which pollution and habitat degradation from land and sea-based activities, other than fisheries, are affecting the livelihoods of small-scale fishworkers. These factors are not reflected in the model proposed by Pauly. In fact, many of the elements proposed in the model do not find resonance with issues and trends currently being highlighted by fishworker organisations and those working to support them.

It is also not difficult to identify numerous situations where several of the assumptions in the proposed model do not hold, or where other issues, not reflected in the model are, in fact, more important. This raises important issues about the value of such generalisable models, pointing rather to the need for context specificity. For example, while the causal relationship posed in the model between in-migration into the sector, breakdown of governance arrangements, too many fishers and overfishing may be true in some situations, it may not in others. An increase in the number of fishers and boats may or may not translate into overfishing, depending on the gear being used, the level of technology available, the nature of demand and market linkages, the stocks -- pelagic or demersal -- being targeted, etcetera. These factors need to be taken into account, as policy proposals may vary substantially -- from recommending the exit of fishers from the fishery, to recommending the status quo as long as the level of technology or pressure on the resource does not substantially increase.

Perhaps a really weak link in the model is the way women's work has been hypothesised. It is highlighted that women, by taking up jobs outside the sector, in effect, subsidise the continuance of their men in fishing, even after it becomes uneconomic. While this may be observed in certain limited situations, a different trend has been stressed by women in fishworker organisations. They emphasise, rather, the importance of women's productive roles *within* the sector and the organic link between the harvest and post-harvest sector, relating this to issues of resource sustainability. They have pointed out that as fishing operations become more capital-intensive, export-oriented and centralised, women of fishing communities are often displaced from their earlier roles of processing and marketing fish, or at least find themselves at the lower end of the profit chain, handling low-value fish with lower profit margins, or as wage labourers. This also means that even as middlemen, exporters, and merchants corner larger shares of the returns from the industry, the income coming back to the community declines. This has obvious repercussions for the quality of life within communities and access to education and health services that, in turn, make it difficult to acquire skills and opportunities to diversify from the sector, if and when needed. The link between poor quality of life and higher population growth, partly stemming from the need for more hands to feed more mouths, has also been much discussed.

Clearly, the policy implications flowing from a better recognition of the trends highlighted above would be very different. Thus, while the proposals for post-tsunami rehabilitation made by Pauly relate mainly to fishing, organisations of small-scale fishworkers and those supporting them, in a statement to the Food and Agriculture Organisation's Committee on Fisheries (COFI) in March 2005, recommended that:

'strategies for the rehabilitation of the post-harvest sector, a sector that provides a significant source of livelihood for women of fishing communities, should emphasise the use and dissemination of employment-intensive, locally appropriate, low-cost and hygienic technologies'.¹

The paper also questions the role -- or, rather, the lack of it -- that social scientists, including anthropologists, have played in influencing fisheries management policies, as compared to fisheries economists and biologists. It makes the case that the social sciences, by almost celebrating the complexities and uniqueness of communities, have been unable to draw out these insights to more 'generalisable' levels through policy proposals, preferred by the political class, to support small-scale fisheries.

In the first place, it is not very clear why the weight of responsibility for making policy proposals supporting small-scale fisheries should fall primarily to the social sciences. Pauly, a fisheries biologist, for example, points out that small-scale fisheries meet most of the criteria required for an enlightened fisheries policy in terms of employment and income distribution, energy intensity, product quality and distribution, and sustainability. If indeed the small-scale sector needs to be defended from a biological/ecological perspective, it is as much the role of fisheries biologists, concerned with the sustainability of ecosystems, to conclusively establish this and to offer appropriate policy proposals supporting small-scale fisheries. Similarly, if small-scale fisheries are known to play such an important role in providing employment, income and food security to diversified

and remotely located rural populations, why have economists not been effective in supporting their case with data and analysis? Why have economists not been able to undertake enough work that supports Pauly's assertion that 'emphasis on foreign exchange gain, while music to the ears of most local politicians, is not necessarily leading to economic development'?

The problem, rather, seems to be that those convinced of the essential soundness of the small-scale model of fisheries development -- whether social scientists, biologists or economists -- have been unable to join forces across disciplinary boundaries, to sufficiently challenge the 'mainstream' view that has influenced fisheries management policies. The goals of fisheries development have thus largely been economic -- seeking efficient technologies for higher production and higher revenues, as reflected in gross domestic product (GDP) figures, with the expectation -- largely misguided -- that with such development, social goals will be addressed.

Supporters of the small-scale model, irrespective of disciplines, have been unable to ensure due recognition to the value and importance of biodiversity, of diversified and sustainable livelihoods which current GDP calculations may or may not capture, and of women's labour, much of which does not figure in GDP calculations but which is fundamental to the survival of societies and communities.

If anything, what is needed is good, interdisciplinary, context-specific research that goes towards building a political consensus on the need to promote sustainable and equitable small-scale fisheries. And, as Pauly rightly points out, it is as important for researchers to recognise the dynamism, change, and increasing differentiation within the small-scale sector itself. The sector today, given technological and other changes, can, if not well regulated, negatively impact the resource base. The changes within the sector also mean that it can today target resources that could earlier only be targeted by the industrial/mechanised fleet. To the extent that this development contributes to harvesting resources in more sustainable ways, while providing greater employment within fishing communities, it would need to be supported.

Notes

¹ See: www.icsf.net/jsp/english/stmt_area/statements_icsf/1118126622515***cofi.pdf.
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REJOINDER :

Towards Consilience in Small-Scale Fisheries Research

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The five responses to my keynote address range from the mostly positive ('observations about our work as social scientists, which I imagine most of us would appreciate') to the mostly negative ('unsubstantiated guesswork'), with one even orthogonal to what I said and wrote. In this rejoinder, their content is best addressed by author, rather than thematically.

The first contribution, by Svein Jentoft, agrees with the thrust of my argument, and I, unsurprisingly, agree with the thrust of his. It reiterates positions of which I first read in Jentoft (1998), and which greatly influenced my thinking. Agreements do not generate sparks, however, and even less light, so I will amplify one little point of disagreement, or at least non-overlap, pertaining to the 'Malthusian' part of the 'Malthusian overfishing' concept. Malthus (1798) wrote about human population growth leading to conflict because 'demand' (assumed proportional to population size) would always, in the long term, outgrow supply (for example, productivity of cultivated land). However one might feel about this with regards to agriculture (the jury may be out, still), this is certainly true in fisheries, whose productivity (= 'supply') has an upper limit set by natural processes. Thus, any fishery can get into a Malthusian squeeze, if 'demand' (via effective fishing effort) is allowed to increase beyond a certain level, set by the local environment. The driver of increasing 'demand' need not be the growth of the fishing population. It can be, for example, the use of a more effective technology. Indeed, Fitzpatrick (1966, cited in Garcia and Newton 1997) published data from which one can calculate that the effective effort of fishing crafts, ranging from motorised pirogues to large trawlers, increased by an average of 4.4 percent per year between 1965 and 1995. In other words, every fifteen years or so, the effective fishing effort around a small port, in both the developing and the developed world, is doubling, even when the number and size of its fishing boats remain the same (and they usually do not). This, ultimately, is what undermines sustainability, even in relatively well-managed fisheries, and even in countries where fisher populations stagnate.

I should now turn to the fact that Svein and I basically agree. Agreement between practitioners of different disciplines is not saying the same thing in different disciplinary languages. It is rather a matter of saying things that are mutually compatible: one set of observations and the intellectual constructs that give them meaning 'jump together', that is, are consilient with one another, though they may be of different disciplines, and address different issues (Wilson 1998). Such consilience is to be expected if, and only if, the observations and their interpretative frameworks reflect the same underlying reality. Consilience thus provides, in the form of what may be called 'multi-dimensional' tests, an added benefit of interdisciplinarity.

Finally, I appreciate Svein's point about lack of interest in the ledger sheets of the multinational companies that now dominate large-scale fisheries. They pose, indeed, few questions of scientific interest, except perhaps by providing exemplars of corporate behaviour for students of applied ethics (Barkan 2004).

This last point is the reason why I feel so awkward responding to the contribution by Nathalie Steins. Obviously, the mobility between academia and the private sector is a good thing -- especially given the dearth of real jobs in the academic world. However, retaining openness to inquiry when transiting from academia to the private sector must be difficult. In this case, for example, I cannot help but notice the rapidity with which the peculiar vocabulary of corporate spokespersons was adopted. Thus, the predicable use of words such as 'romantic' to characterise positions in support of small-scale fisheries. I do not hold romantic notions about small-scale fisheries. Rather, I make the case, based on the cold facts in my Figure 3, that our society is, in many cases, better served by small-scale fisheries. An example that comes to mind is the annihilation, within two decades, of the massive cod stock off Newfoundland and Labrador by trawl fisheries (Walters and Maguire 1996). This is a stock which was exploited by trap and line fisheries for centuries, while supplying national and international markets. It was overfished by industrial trawling and is now gone, quite unromantically.

Also, the language of corporate spokespersons can make one forget that numbers about stocks and catches are estimates of these things, not the things themselves. Thus, for example, the assertion that '[a]fter all, industrial fisheries in the South and North provide the bulk of fish' is true only if reduction fisheries are added to the fish used for human consumption. If only the latter is considered, the landed catches of industrial and small-sale fisheries are about the same (again, see Figure 3). ✨

Indeed, this illustrates the point that was made earlier about field scientists (of different disciplines) not recording the catches of small-scale fishers. The reputedly low catches of small-scale fisheries then make industrial fisheries appear more important than they are. Indeed, one could say, with the same insouciance as displayed here, that 'after all, small-scale fisheries feed and employ millions more people than industrial fisheries, and therefore, they must have priority in any conflicts that oppose these two types of fisheries'.

Then we have Dr. van Ginkel, wielding Latin as if it were an argument ('*si tacuisses...*'), calling me names, and feeling really, really defensive about a stereotyping, self-citing (Pauly 1994; Pauly and Stergiou 2005) biologist who tries to invade his turf. Maybe I exaggerate, but frankly, I did not sense any real appreciation of an attempt at bridge building between our disciplines, if only by identifying what would be carried across these bridges, once built.

Thus Dr. van Ginkel disposes of the suggestion of reporting observed catches in fisher communities: 'I fail to see why social scientists should be better positioned than biologists to collect Third World small-scale fisheries catch statistics. It is not -- nor should it be -- their core business to do so'. When performing field work, anthropologists live for extended periods of time -- often years -- among the people they study. Anthropologists who study fishing cultures thus live and observe people who fish (contrary to most fishery biologists), whose entire culture is centred on fishing, and whose livelihood depends on securing access to an elusive resource. This is what they do, and their success is measured by their catch. What 'core business' can anthropologists have that ignores (as

many anthropological accounts do) the 'core businesses' of the people they study? In fact, it can be done, although my best examples do not involve marine fishing communities (Ruddle 1983, 1986; Ruddle and Chesterfield 1977).

Imagine we wanted a bridge, or better, a common currency between maritime anthropologists, fisheries biologists, economists and policy makers. What better currency than catches? Fishing cultures celebrates them, biologists try to maintain them, economists follow them as they flow through rural and urban markets, and finally, catches animate a whole human coastal system impacted by policy, in which anthropologists should participate. But not if they do not care about the core activity of the people they study.

I knew Bob Johannes, and chose him deliberately for my example. What Dr. van Ginkel saw as 'commendable crossing of the disciplinary boundaries' however, was a one-way trip. Indeed, in his later years, Bob very much rejected the notion of basing fishery management decisions on insights other than those gained directly from fishers. He had come to reject the natural sciences in which he was trained -- and in which he excelled and to this date provide most of the citations his publications get. Bob crossed all right, but afterwards, he was never seen near the bridge.

As for Clifford Geertz, he certainly was no 'straw man', and citing him was not caricaturing anthropology. In fact, '[d]uring the past thirty years, Geertz and a number of like-minded colleagues and followers have been at the height of academic authority not only in anthropology but also in history, the social sciences, the study of literature, and the emergence of the field known as cultural studies' (Windschuttle 2002). The reason I cited him is because in his work, Geertz not only argued for the primacy of the local, but explicitly rejected science (as also in 'social sciences') and what might be called 'human universals' (Brown 1991). Such universals, however, are required for generalisations of the type I advocated to have any validity.

On the one hand, I may have presupposed too much: human universals are still much contested in anthropology. On the other hand -- and I admit being prescriptive here -- anthropology (the discipline, not the caricature) desperately needs to air its nether parts with a fresh dose of human universals. The alternative is that it continues to emit whiffs of that old colonial stench, the one that prevailed when the discipline was born. (Such airing is presently occurring in all biological disciplines involving humans, and these disciplines will be much the better for it.)

The fourth comment, by Collett, contains many statements, which confirm and extend statements I made in my paper. Some other statements contradict, or even refute mine. But the fact is, I cannot disentangle the thread of Collett's argument, let alone write a coherent rejoinder. Perhaps it is because Collett does not deal primarily with methodological issues -- about which we could exchange opinions -- but rather with the results of studies on Pacific Island, Mediterranean and other fisheries, most evaluated in normative mode. Here, I shall let the reader do the work.

As for *Google Scholar*, which Collett alludes to in his title, its performance is comparable to that of Thomson ISI (Pauly and Stergiou 2005), commonly used for comparative evaluations of research impact. It is tempting to dismiss such quantitative tools for evaluating oneself, or one's discipline, but more difficult to demonstrate that their output is meaningless. In fact, even when bias is

present, useful information can be gained, such as the citations patterns of colleagues working in the tropics (Pauly 1984).

This brings me back into familiar territory: the contribution by Chandrika Sharma. I agree with her observation that in India, 'middlemen' are a very significant factor in the life of small-scale fishers, and that the 'Malthusian over-fishing' model, which does not include them explicitly, is thus incomplete. I have a sense, though, that the dominant, even overwhelming, role of middlemen is very much a phenomenon limited to South Asia and parts of Southeast Asia. In other regions of the world, marketing tends to be performed by female relatives of the fishermen, or through relationships, which, although involving an asymmetry of information and benefits (for example in the 'suki' in the Philippines; Cuyos and Spoehr 1976), may not necessarily embody the crass power imbalance, and hence extremely exploitative relationships, that Chandrika Sharma has in mind. Moreover, at least some of the money lending 'middlemen' operate where the frequent occurrence of typhoons represents a risk which no bank would ever assume, for example along the coast of Vietnam, and where their social obligations include, in the case of death at sea, taking care of bereaved households (Ruddle 1998).

She also notes that I did not include pollution as a factor influencing the yields of small-scale fisheries. I do agree that in many areas coastal pollution -- and also coastal development -- can have a strong impact on coastal fisheries. I do fear, however, that at regional and national scales, pollution cannot be a driver of the same magnitude as overfishing, which can and does destroy fishery resources. Remember the 4.4 percent mean annual increase of effective fishing effort alluded to above. In the absence of data to the contrary, this rate of increase can also be thought to prevail in India, with all the consequences that it entails.

As for her remark that it should not be only social scientists who should speak on behalf of small-scale fishers, I can only say *touché!* Fisheries biologists have indeed tended to study small-scale fisheries anecdotally, and not systematically. The best evidence of this is the absence, to date, of a comprehensive database of key information on the small-scale fisheries of the world.

Thus, I conclude this rejoinder by announcing that, a number of colleagues in and around the *Sea Around Us* Project (see www.seaaroundus.org) will publish online a global database of small-scale fisheries catches, constructed as described by Chuenpagdee and Pauly (*in press*). This database will feature definitions (small-scale fisheries do differ), number of fishers, and their annual estimated catch (as minimum input) for all countries and territories of the world. Perhaps more importantly for maritime anthropologists and other social scientists interested in fisheries, it will also include, to the extent that we secure the required collaborators, portraits of the fisheries in question, and hopefully, documentation for these (in PDF format). This, then, is the bridge that I propose to contribute to.

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