Inshore resources management and conservation: current trends and alternate strategies

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Introduction

The “inshore resources” of the title of this paper refers to living marine resources associated with reefs and lagoons of the Pacific Islands. We exclude the region’s oceanic tuna fisheries because these are subject to a quite different set of problems and management principles, due to their modern, industrial nature.

The characteristics of Pacific Island inshore fisheries that have to be borne in mind in any consideration of management and conservation are: that they are carried out mainly by Pacific Islanders themselves; that they involve a very wide range of species and methods; that the majority of the total catch still does not enter the cash economy; that a broad cross-section of society participates in fisheries (including both men and women); and that Pacific Island communities in general have a much stronger proprietary or custodial attitude to marine resources than most other societies (even in cases where ownership of resources has been officially assumed by the state). There are of course other distinguishing characteristics of Pacific Island inshore fisheries, but these are the key factors to consider in management.

Governance methods that are tailored to fisheries in other regions will thus not necessarily be appropriate to the Pacific unless they at least take these factors into account. It is not, for example, realistic to expect recovery of government management costs from fisheries that are largely subsistence, even though this is becoming the norm for commercial, and sometimes recreational, fisheries in developed countries. It may not be appropriate to set up fishery oversight committees to bring government and community closer together if they take no account of existing community fishery roles. It may be necessary to recognise separate arrangements for men and women so as to avoid excluding a large component of the fishery. And it may be impossible to set up comprehensive monitoring systems for a myriad of village landing points, where most of the catch ends directly on the family table.

Status of Pacific Island inshore fishery resources

For most purposes, coastal fisheries across most of the region can be split into two categories: domestic food fisheries and export commodity fisheries, although there are of course other minor categories and sub-groups. The export fisheries are a relatively minor component—perhaps 10% of the total landed catch from Pacific Islands coastal waters (Adams, Dalzell & Ledua, in press)—but they give rise to most of the perceived problems. Most of the overfishing incidents reported in the Pacific Islands region, and the activities of most government fisheries services, are concentrated on export fisheries.

Domestic food fisheries are less of an immediate problem in most countries. Fishing effort is spread over a far wider resource base—not just concentrated on a few species that happen to be of high value in East Asia—and species important in export fisheries tend to differ from the species important in domestic food fisheries (although this will change to some extent as live food export fisheries gradually encroach on the region through western Melanesia and Micronesia). Problems in domestic food fisheries tend to be concentrated around capital cities.
Coastal fishing is extremely economically important to the Pacific Islands. Although it is a preliminary compilation requiring additional definition and detail, Dalzell et al (1996) reckon that around 100,000 tonnes of fishery products are landed annually from coastal zones in the South Pacific Commission work-area (see Figure 1). This may not appear large in comparison to the 1,000,000 tonnes of tuna taken annually from the same area (SPC, 1997), but over 90% of this regional tuna catch is taken by non-Pacific Island nations. The coastal fishery catch, by comparison, is directly to the benefit of rural societies. Even the commercially exported fraction of the coastal catch puts cash directly in the pockets of rural families, and such coastal fishery commodity exports often go a long way towards fulfilling the immediate cash needs of the largely subsistence communities in many island nations. In terms of retained dollar value, import substitution value, and the spread of benefits across a wide range of socioeconomic groups and areas (particularly “outer” islands), coastal fisheries deserve a lot more attention than they currently attract.

Most of the attention that they have had in the recent past has been from national economic planners anxious to attract foreign investment in the “teeming” bounty of the reef, without reference to the limits of such investment, or from socio-economic engineers trying to create employment opportunities, particularly for the economically and socially disadvantaged, similarly without reference to the long-term, or even the medium-term, future of such activities.

The main problem that currently needs attention is that policy-makers do not really know the status of inshore living marine resources in most parts of the Pacific Islands region. We do not even know the extent of their usage by Pacific Island societies, with any degree of accuracy. Whilst it is possible to identify the grosser problems, it is impossible to objectively prioritise those problems, particularly at the national government level. Just what level of
economic activity is possible for different fisheries? What is the current state of exploitation? What is the sustainable level for exploitation? How does recruitment and catchability vary across climatic cycles and seasons? Who fishes? What percentage of the catch enters the cash economy? The answers to many of these questions are probably known at the local and community level, but most government planners do not have this information.

But, although comparatively little is known about the details, according to the few indicators that are available, reef and lagoon food-fisheries appear to be, on average, across the region, in better shape than reports lead us to believe is the case in other regions (Adams, Dalzell & Farman, in press). Most of the major worries are generated by the export commodity fisheries, as already mentioned, and there is still time for most Pacific Island nations to erect or to strengthen governance mechanisms to tackle their food fishery problems before they reach the stage of Daniel Pauly’s “ecosystem” or “Malthusian” overfishing (Pauly, 1994).

**Coastal fishery management issues**

The science, or rather art, of fisheries management is going through a period of rapid change. It is finally fully accepted that human beings are an essential part of the fisheries management equation and that fisheries cannot be managed by trying to manage resources by themselves in isolation. The imposition of a biologically-effective management measure is no guarantee that it will be socially acceptable, and a fishery management measure that is not respected, or which requires expensive enforcement, will end up being of less use than a measure which is perhaps less “scientific”, but which has the support of the community. Several current Pacific Island coastal fishery management issues are illustrated in the following discussion.

**Traditional fishery philosophy**

It should not be forgotten that the people of the Pacific Islands have been almost totally and continuously reliant on their inshore fisheries for hundreds, or in some cases thousands, of years, and that the population of some islands was probably greater before western contact than at any time since. Over a huge diversity of isolated territories there has been social selection and evolution of mechanisms for the management of exploitation of reef-organisms. Of course, some of the goals of traditional management do not necessarily coincide with the goals of either government fisheries or environment managers, and traditional hierarchies can also be a route to power for those with less-traditional values at heart. But even though policy-makers cannot afford to rely blindly on community wisdom in fisheries management, in most cases it is better to work within customary frameworks rather than try to negate or supplant them, particularly when so little is known by governments and researchers about how these fisheries are likely to respond to regulation.

One of the most common and widespread inshore fishery management mechanisms in place in the Pacific Islands region is the custom of resource or reef ownership. Both colonial and independent governments have tried to extirpate this in many islands, installing instead the western model of the marine commons, with ultimate ownership vested in the State. It may be of interest to note both that these attempts to destroy such mechanisms has been largely ineffective— legal rights have been gravely weakened in many places, but rights are still exercised at the practical level— and that many modern industrial fishery managers are now embracing the concept of fishery resource ownership as being possibly the only mechanism that will mitigate the potential for future overfishing whilst being compatible with a market-regulated economy.
The issue to emphasise here is that we should perhaps not be too eager to change the thinking of established coastal communities in their attitudes towards the resources under their control, unless assessment clearly shows that these attitudes are ultimately self-destructive, or destructive to others. And also that, rather than trying willy-nilly to adapt community fishery management measures developed elsewhere in the world for use in the Pacific, it might be appropriate in some cases to study Pacific Island community management measures and adapt them for use in other parts of the world.

**Marine protected areas**

One of the fishery management or protection measures being heavily promoted at both the global and regional level recently is the protected area. Despite warnings that this is not the ultimate panacea, it is usually the first, or the only measure actively promoted by environmental groups for the purpose of maintaining sustainable fisheries. The protected area is intuitively grasped by almost everyone as being conservative in effect, and is thus possibly an example of a measure which is both biologically effective and accepted in most social systems around the world.

However, marine protected areas do not have a good record in the Pacific. It is usually difficult to get agreement to set them up, and in areas where they do exist they are rarely respected and rarely effectively enforced. At the same time, local communities make extensive use of the temporary closed area, or extended moratorium, as a traditional fishery management measure, and this can be widely respected and require little active enforcement. Why are marine protected areas so difficult to establish here?

Perhaps the primary problem with protected area schemes is that they usually propose to extinguish usage rights by the community that has traditionally claimed ownership. In most cases, a particular community is required to give up effective ownership of an area (even if legal ownership is vested in the State) for the long-term benefit of other communities. And in many cases, the proposed protected area is far too large to either be easily accepted by the traditional owners, or to be biologically effective as a breeding reserve for the enhancement of surrounding reef fisheries, where a patchwork of smaller areas would normally be better.

In those Pacific Islands that are heavily westernised, marine protected areas have nonetheless been imposed, and usually require considerable and expensive enforcement. Even so, the efficacy of reserves for rehabilitating or sustaining surrounding fisheries has not yet been unequivocally proven (this is not to imply that we expect that their efficacy will be disproven, but that a baseline of a decade or more may be necessary to demonstrate any statistically significant effect given the insensitive survey tools at the disposal of the tropical fishery scientist) whilst their capacity to divert resources from other, perhaps more effective management and conservation methods, is well-known. One Pacific Island fisheries head, at a recent regional meeting, commented that after several years of experience he would almost prefer to ban all marine reserves “because they make politicians feel too safe and happy”. He felt that with marine reserves in place, many planners thought that nothing further need be done.

For the less-developed Pacific Islands, where limited government resources do not permit the effective policing of reserves, and where awareness of tradition precludes the imposition of such measures without full agreement, the long-term moratorium, as used traditionally in many Pacific Island societies, can fulfil many of the ecological functions as the formal marine protected area. If ownership or local use rights are not extinguished, and if the owner community can maintain control over the disposition of any resultant benefits, the prospects for compliance are greatly increased, and most of the protection would be carried out by the owning community itself. Such mechanisms often require outside information, support and
encouragement, particularly after decades of government attempts to extinguish them, but have been proven workable in several cases (eg. Amos, 1995; Adams, in press).

**Gillnets**

Gillnets are not the ultimate engines of destruction that some recent publicity might lead one to believe. Gillnets can be deployed in ways that produce little bycatch or wastage, particularly in Pacific Island multispecies artisanal fisheries where almost everything caught is consumed. In addition, they can be the most appropriate way of catching non-carnivorous or planktrophic fish that are low on the food-chain, and which are thus a more sustainable target for high-volume staple food fisheries than the higher trophic-level predators that tend to be selected for by hooks. However, gillnets are not always used appropriately: they may be left unsupervised in the water for excessive periods of time (particularly in areas where there is a tradition of using passive, stationary gear like fish weirs and fish-fences); mesh-sizes are often inappropriately small (or the hanging-ratio is adjusted to reduce the effective mesh-size in places where size limits are in force); and in places where fish move along well-defined and restricted routes such as reef-passages and estuaries, a few strategically-placed nets during the spawning season can have a major impact on certain stocks of reef-fish.

As a result, many communities regret that the use of gillnets has become widespread, and many would wish to restrict their use. At the same time, they recognise the advantage of using efficient ways to catch fish, particularly when livelihoods are marginal, or when the need for cash to fulfil modern obligations is pressing. Most Pacific Island government fishery managers lack either the evidence, or a formal structure for action, to effectively restrict gillnetting. Where there are no formal fishery management plans in operation (as in most Pacific Island nations), such initiatives generally have to arise from the community itself. For example, the Fiji Fisheries Division struggled unsuccessfully for 15 years to get a legal measure approved that would increase the minimum mesh size for most classes of gillnets, but the owners of the customary fishing rights along the Macuata coast, in Vanua Levu, were able to jointly decide at a single provincial meeting to entirely ban the use of commercial gillnets in their fishing grounds. This management measure, which arose at the local level, and was enforced at the local level (albeit with the full sanction of the Fisheries Division), has been effective, and is still in place after more than 5 years. Of peripheral significance to this discussion, but of great interest generally, is the fact that this ban on commercial gillnetting does not appear to have harmed the local fishing economy. Commercial fishing has diversified and become more efficient as a result of the re-structuring forced by the ban, and this coastal fishery is now a major supplier of fish to the Suva conurbation.

There are many other recent examples of controls being put on gillnetting, or spearfishing, at many places around the Pacific, and it is notable that most of these decision have arisen, and have been enforced at the community level. For example, the Island Council of Aitutaki in the Cook Islands has, after several years trying to unsuccessfully enforce a limited set of restrictions, reached agreement on banning gillnets entirely from the island after a short phase-out period. Here, the mainstay of the economy is likely to continue to be tourism, and most people accept that environmentally-minded tourists are more likely to be attracted to a lagoon with fishing controls in place than otherwise, whilst the older fishermen are happy that the seasonal reef-fish migrations will be safe once more from nets set in the channels. Again, the national government is fully supportive of this move, but did not initiate it.

**Conservation needs**

Conservation of exploited marine species should arise directly as a result of effective fisheries and coastal zone management. However, effective coastal zone management is almost non-
existent in the Pacific Islands, and conservative fisheries management has not always been noticeable either at the community level or the government level in the past, particularly for slow-growing, low natural mortality species exploited for export. Turtles and the larger giant clams are the best-known examples in the region where over-exploitation has brought with it a danger of extinction, and also where active attempts to bring the problem to public attention and to severely restrict exploitation over the past decade have brought about a real improvement in the prospects for recovery (at least from the effects of fishing). Other slow-growth, long-lived inshore organisms that need to be carefully monitored include the crocodile, the coconut crab, the greensnail (*Turbo marmoratus*), and some of the larger groupers (*Serranidae*). These more vulnerable marine species tend to occur mainly in the west of the region. As well as having a naturally lower level of coastal marine biodiversity at the species level, Polynesian islands also appear to have a greater percentage of cosmopolitan, more resilient organisms in their inshore biota, and endemism is nowhere near as significant as it is in terrestrial and fluvial environments. Biodiversity conservation *per se* is arguably a less pressing need in nearshore marine environments than it is for terrestrial taxa in the Pacific, particularly in Polynesia.

In cases where the danger of extinction is mainly a result of habitat reduction, or alteration, rather than over-exploitation, there is little that fisheries management or restrictions on exploitation can do to solve the problem. And, if the carrying capacity of the environment is reduced, then the sustainable level of catch will be reduced and the fishing community may find itself overfishing without having increased its fishing effort (e.g., Saucerman, 1995). Although there are cases in the Pacific where fishing communities can bring such situations upon themselves by using fishing methods which directly reduce the carrying capacity of the environment, such as explosives, it is generally the case that artisanal reef fisheries are on the downstream side of terrestrial developments, and there are few terrestrial developments that actually improve the state of nearshore waters as fishery habitat. The development of general coastal zone management mechanisms that give marine stakeholders a voice in the planning of terrestrial activities is an urgent requirement in most Pacific Island nations. The setting-up of such mechanisms is naturally hampered by the suspicion that different sectors and government departments have for one another, and the extreme breadth of vision that is needed not just to initiate and sustain these activities, but to present them in such a way that they catch the imagination of the public.

**Alternate strategies?**

Almost every strategy is “alternate” when it comes to Pacific Island reef fisheries. At the government level, so few formal management policies are in place in most islands that any direction is new. In a different sense, at the community level there are so many different jurisdictions in place using so many different techniques, that alternate strategies abound.

Concentrating on the strategies needed by governments and institutions, it is clear that information is one of the main bottlenecks. Many Pacific Island nations have not yet made up the skilled human resource shortfall resulting from decolonisation, particularly in specialised disciplines like fisheries ecology and sociology. There is great pressure on government fishery departments to put formal plans in place to ensure sustainable coastal fishery management without either being able to monitor the status of most coastal fisheries, or even to know what level of exploitation is actually sustainable. Although it does not require an intimate knowledge of the biology of a target species in order to manage a fishery - in simplistic terms this can be accomplished by reducing exploitation if catch rates start to fall - it definitely does require feedback from the fishery on catch rates, and this kind of statistic is almost totally lacking in the region.
It is unrealistic to expect that Pacific Island coastal fisheries can be managed on a rigorous species-by-species basis like western industrial fisheries, by reason of this information gap, without even considering the problems of developing appropriate legislation or effective enforcement. Pacific Island Governments and institutions will have to continue to rely on fishing communities to accomplish most of the management of their food fisheries, and will have to continue to concentrate their efforts on the few fully-commercial fisheries, particularly exports.

However, they may also want to pay more attention to the problems of artisanal food-fisheries around capital islands and cities, where urbanisation and immigration often render traditional measures problematical, as well as facing the special environmental problems of urbanisation. Many Governments will need to introduce more formal coastal fisheries management plans in the future, even if only to satisfy obligations made under international treaties, and these plans would most effectively concentrate on providing the framework within which community decision-making can operate, and providing appropriate back-up in cases where traditional community cohesion is ineffective, such as in urban situations, and where there are major external factors involved such as an export market or foreign investment.

At the same time, government must play an active part in this relationship if it is to be effective, and thus mechanisms for getting information to and from the fishing community is necessary. For the monitoring of fisheries themselves, appropriate biological, economic and social indicators may need to be developed to reduce the data-gathering burden to the level of feasibility. These indicators may be linked into management plans to provide an objective measure for triggering action under appropriate circumstances.

There are some interesting times ahead for Pacific Island reef fisheries, but the path to effective management and conservation is not insurmountable. Indeed, the Pacific Islands region is probably a lot further along this path than most other tropical developing regions. Coastal fisheries over much of insular Southeast Asia are suffering from excessive population pressure and widespread use of damaging fishing methods, despite their high basic productivity, and several island food fisheries in the Caribbean are said to have collapsed. Many developing regions are moving towards community measures and co-management of artisanal fisheries of a kind that is already practised over much of the Pacific.

This is no cause for complacency. The overall status of institutional coastal fisheries management in the region does not seem to be actually improving at the present time, particularly when much of the attention of Pacific Island fishery policy-makers is fixed on important developments in the management of regional tuna fisheries. In the coastal zone there are notable problem fisheries and problem areas that deserve concentrated attention, and there is a dwindling level of interest and support from possible sources of assistance in the outside world.

Faced with a dilemma like this, the traditional response of many Pacific Island communities would be to liquidate a little natural capital to meet the immediate shortfall. To perhaps harvest a luxury item of seafood, high-priced enough on the commercial market but not a staple that would jeopardise the subsistence food-supply, such as a few giant clams, or a container of bêche-de-mer. However, most fishery departments do not have that immediate option, and will hopefully find ways in coming years to re-deploy existing resources into new modes of operation.
References


