ongoing loans programme to the Tonga Development Bank. Dr. Emberson-Bain said Tongan women demonstrate strong organisational and entrepreneurial skills in the informal and small business sectors.

However, women trying to run businesses are disadvantaged by a lack of business management and accounting skills which inhibit their ability to run their enterprises efficiently and profitably.

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SAMOA

Village-Based Marine Resource Management in Samoa

by Mark Mollica

Introduction

Due to their volcanic origin, the Samoan islands are highly inhospitable to inland population growth. Rainfall tends to seep through the porous volcanic rock lying under thin layers of soil. Because of this, there are few major rivers and they are all susceptible to wide swings in flow rate. Toward the coasts, however, as is readily apparent on the larger island of Savai'i, the rainwater surfaces as countless springs. This is one of the most significant factors influencing virtually all of Samoa's approximately 160,000 people to live within one kilometer of the ocean. The second major factor controlling population distribution on the islands is reef growth. Upolu, though much smaller than Savai'i, supports the bulk of Samoa's population. This is due, in large part, to the fact that Upolu is surrounded by a long, but thin, barrier reef that contains the large majority of Samoa's 23,100 hectares of reef and lagoon.

Since Samoa remains a "least developed country" as defined by the UN, few Samoans have removed agriculture from daily life and economics, whether cash or subsistence. In addition, the Samoan economy offers very few opportunities for employment outside the agricultural and fishery sectors. Qualified Samoans will take either one of the few government or private sector jobs, or as is often the case, leave the country. To limit options even further, Samoan agriculture is plagued by erratic productivity rates, such as the case with their fungus-induced taro blight, and dismal global prices for another major crop, copra (coconut meat).

These geological, biological, and economic factors have put a great amount of pressure on the ocean to provide protein to the islands, and so fishing is integrated into daily life. The economic factors mentioned above, coupled with foreign aid programs, have made artisanal or commercial fishing an increasingly attractive vocation.

Given this pressure and change in Samoan fishing methodology, the focus of the ensuing text is to illustrate the relationship of contemporary Samoa to its marine food resources. This includes a look at the importance of self-governance and the growing ethic of ecological stewardship that Samoans are adopting (or it could be argued re-adopting) to mitigate the increasing demands they are making on their ocean.

Traditional Oceanic Marine Resource Management

Samoan reef systems are not very extensive. Compared to an island nation such as Palau, for example, the maximum sustainable yields of these reefs are small in relation to population size. Because of this, and the fact that the growing number of rural Samoans (which is to say nearly all Samoans) are fishers to some extent, the health of inshore fisheries has become increasing critical. The numbers and size of reef fish in Samoa indicate that the reefs are overfished, and that certain restrictions must be put on the wide variety of fishing methods employed by villagers.

Traditionally, oceanic cultures have developed a wide breadth of measures to effectively manage their reefs. Fishing has long been among the most important of all daily activities and because of this, villagers have become highly sensitive to the general behavioral, developmental, mating, and migratory patterns of many species of fish. This knowledge became so acute that the world's leading marine biologists now owe a substantial part of their literature on tropical ecology to Pacific Island fishers.

A striking example of this came from biologist R.E. Johannes' collaboration with Palauan fishermen. According to Johannes (1981) "While I was in Palau in the mid-1970s, local fishermen taught me the seasons and lunar periods (as well as locations) of spawning aggregations of some 55 species of food fish. The fishermen of this tiny Pacific Island country had, it turned out, discovered more than twice as many species of marine animals exhibiting lunar spawning periodicity in their waters as biologists had described for the entire world."

Johannes then claims that this intimate awareness of marine ecology is quite common throughout Oceania. He later gathered more information on lunar periodicity from fishers in Kiribati, the Marshall Islands, Papua New Guinea, Pohnpei, the Solomon Islands, Western Samoa, and Yap.

Naturally, with this degree of knowledge, Pacific Islanders were able to decipher hazards to their livelihood. For instance, they might know when a certain species was in danger of overexploitation, or when not to fish for a certain species (such as the very beginning of their mating season), in order to ensure that the reef will continue to be a fertile provider for the village.

Possibly the conservation method most fundamental to remote Oceania was the incorporation of fisheries into the local land tenure system. Pacific Islanders have had, and continue to have, some of the most decentralized political authority in the world. Historically, the base for almost all power remained firmly in the village hierarchy. As a consequence, national resource control was extremely weak. Samoa has retained some of the Pacific's most tenacious village power. Because of the strength of local authority, Samoa tends to have fishing rights based on ties to the village. As in most states, the area from high water out to sea is legally public domain, but in practice, the inshore fisheries remain under village control.

The reason for the success of this system as a conservation method is well illuminated by scientist Garrett Hardin's eco-economic classic, "The Tragedy of the Commons." In this essay, Hardin (1968) argues that "ruin is the destination to which all men rush, each pursuing his own best interests in a society that allows freedom of the commons." This means that when a resource is shared by the general population, without taboo or privilege, the economically rational fate of the resource is over-exploitation as every actor seeks to further his or her own best interest.

In the case of a Samoan village, the fishery is indeed shared, but by a small community of people who are closely tied by kinship and form a relatively self-reliant unit of production. If a fisher catches more than he can consume, he will distribute his catch among others who are likely to return the favor at some point in the near future. When a village fisher is harvesting from a patch of reef that he must continue to use throughout his life, he is more likely to acknowledge the limits of that resource than if he could roam freely among other villages' reefs.

However, reef tenure is only the first line of defense. A fisher might still decide to fish in the most effortless but destructive way possible bringing what is known as the "freerider" dilemma. This relates directly to Samoan village controls enforced on practices such as using ava niukini, the root from a local plant, as a fish poison. In order to maintain a reef, many highly effective fishing techniques must be limited. When an individual uses fish poison simply because he is too lazy to hand-spear, he is being a highly effective fisher at the expense of the village. Similarly, because it is so easy to slingshot a crescent perch or trap a mullet, village leaders are initiating controls accordingly.

Historically, specialization would often provide yet another barrier preventing over-exploitation. Yap, for instance, developed an elaborate hierarchy that dictated exactly what form of fishing you were entitled to pursue given your social standing. Related to this, many islanders would be trained for a specific fishing method and were given no opportunities to learn, let alone practice, other methods (Falanruw 1994). This form of control helps to ensure that the village is exploiting as wide a variety of organisms as possible. For example, if there was a trained elite that could head for the open ocean and bring home shark and tuna, then they were helping to minimize the impact that usually falls on more easily caught reef fish.

Before Christianity had its enormous impact on the Pacific, religious taboos and magic were often associated with fishing. In Kiribati, fishing was given heavy meaning and was surrounded by ritual. This would inevitably tie the fisher to the sea spiritually, and give him a feeling of respect for the creatures therein. In this culture, fish catches were carefully monitored so that not a pound more was taken than was needed in a show of reverence for the ocean. Also in Kiribati, the belief that the gods were once embodied in the turtle and the ray forbids any capture of these animals and reinforces the spiritual link of fisher to resource (Taniera 1994).

Far before anyone had muttered, "marine protected area," the people of the tiny atolls of Tokelau had created the lafu system. Lafu is most closely translated as "taboo," and was, in effect, an established marine preserve. An example of lafu is prohibiting activity on the entire windward reef shortly after the

bi-annual change in direction of the prevailing wind (Toloa et. al. 1994) which not only demonstrates an understanding of the limits of reef resources, but also shows an understanding of fish mating behavior associated with these meteorological changes.

Also, Tokelauans rightfully regard offshore pelagic fishing (mostly for billfish and tuna) as a vast bounty in comparison to the resources offered by their reefs, and so a good offshore fisher is given elevated status and privileges in the village for his skill. This has the ecological benefit of encouraging fishers to extract less from the reef, where bounty is far more tenuous.

By and large, the most powerful forces undermining values like these in the South Pacific are the introduction of cash economies and the possibility of selling fish for export. The immediate effect of these interrelated phenomena is twofold: they encourage fishers to remove as much as possible from the ocean and, by switching from subsistence to cash fishing, remove that food source from the immediate vicinity. In a subsistence economy, there is absolutely no reason to remove more from a resource than can be consumed at the local level, which is usually a rural village. Cash economies and later exporting, however, provided a far wider avenue through which the catch could be allocated. This removed the most essential reason for modest, and therefore usually sustainable fishing.

The effect of these modern wants at the village level has often been to undermine an ecologically sound relationship between the fishery and its fishers. Even in the islands of Palau, where people are raised in a profoundly intimate relationship with the ocean, Japanese influence during the Second World War had local fishermen using fish bombs to such an extent that stocks seemed dismal. To the blessings of most of the local fishers, dynamite fishing was banned after the war, yet as late as the 1970s, there remained a number of fishers hoarding and using fish bombs.

Village-Based Marine Resource Management in Contemporary Samoa

In Samoa, where many villages have undergone population changes and have lost (or less likely, never had) a great deal of their traditional conservation taboos, awareness of the limits of the ocean is surfacing. A rapidly growing number of villages have been requesting the assistance of the local Fisheries Division in order to assess the health of their reef and take steps to improve that reef and therefore, their well-being. Modern Samoan fishers are virtually all reef fishers, while only those with expensive motor boats and a decent landing area head for the open ocean. The motor boats tend to aggregate as private enterprises near market areas, as in Salelologa and Apia, and do not tend to distribute their catches among the local people communally. Because of this, villagers who do not own a motor boat (which is nearly all villagers) remain removed from the offshore fishery, and therefore put a great amount of stress on inshore resources.

Today, the primary concern in Samoan marine resource management is to get villagers offshore where food resources are exponentially more resilient. In the near future, the most influential factor in this effort is likely to be an E.U. subsidy that provides 65% of the cost of outfitted 15' motor boats. These boats are reasonably affordable to village committees and other groups that are likely to use the boat more communally than the larger alia - the FAO-designed, aluminium vessels currently used for commercial offshore longlining and bottom fishing.

As was stated earlier, the seat of power in Samoa remains almost entirely within the matai, or village chiefly system. Because of this, and the small funds afforded by the Samoan tax base, hiring boats and officials to monitor fish catches and methods is impossible. Fishing regulations must be enforced at the village level or they are as good as nullified. Therefore, the best enforcement method is to persuade the matai that it is in their village's best interests to fish in an ecologically sound way. With this understood, they will take it upon themselves to enforce the measures appropriate to their village. This not only exponentially increases the level of monitoring on the reef, but also minimizes expense to the national government.

In a program initiated by the Australian aid agency, AusAID, and the Samoan government, the Samoan Fisheries Division has carried out the philosophies of village-based resource management, providing motivational and educational support to the village through extension officers. At the invitation to the Division by the village, extension officers and villagers begin a multiple-step process toward developing a unique Village Fisheries Management Plan. In the early stages, the key problems are assessed through a series of meetings with different village groups. By speaking with the villagers in meetings based on status (e.g. separate matai, untitled men, and women's groups) less inhibited expression than the hierarchical fora of a village-wide meeting is encouraged.

After each of these groups sketches out what it considers to be the village's key problems and what possible solutions there might be, they nominate three people from each group to move onto the village Fisheries Management Advisory Committee (FMAC). The FMAC continues to meet with extension officers to refine the problems, solutions, and

actions to be taken by the village and the Fisheries Division. The Committee then prepares a draft of the Management Plan, which is again discussed and refined. The Village Fisheries Management Plan is, according to King & Faasili (1999) "in the form of an agreement between the village and the government in that it lists the resource management and conservation undertakings of the community, and the servicing and technical support undertakings required from the Fisheries Division." This agreement, finalised in a formal ceremony with the Senior Fisheries staff and the village council, essentially ensures that the Fisheries Division will provide whatever technical assistance the village needs as long as the village is active in enforcing the Management Plan. Penalties for violations are decided by the FMAC for each crime; some numbers I obtained at a meeting in Vailoa in the Aleipata district include a $SAT200 fine for fishing the Marine Protected Area and a $SAT100 fine for violations of net mesh size.

Some of the controls established by villages in the Management Plan include:

Fishing Methods

- bans on the use of chemicals and dynamite fishing.
- bans on the use of plant poisons.
- bans on other destructive methods such as smashing coral to catch sheltering fish.
- mesh size limits.
- village-level enforcement of national laws regarding minimum size limits.
- restrictions on underwater flashlight fishing.
- controls on chicken-wire fish fences.

Conservation Measures

- establishment of small Marine Protected Areas in which all fishing is banned in part of their traditional fishing areas.
- organising regular collections of crown-of-thorns starfish, *Acanthaster planci*.
- bans on rubbish dumping in lagoon waters.
- bans on the sale of sea cucumbers for export, and the sale of live corals to the aquarium trade. These have been imposed by villages with commercial export experience.
- bans on the destruction of mangroves.
- bans on the removal of beach sand.

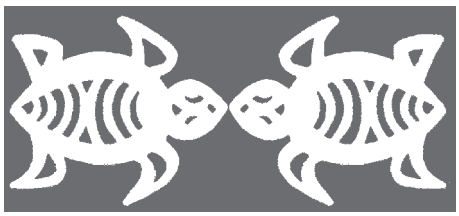
Because fishing taboos compounded by the already depleted reefs make pre-recovery fishing very unproductive, the Fisheries Division made some reciprocal efforts to assist the villages. For example, they have started to restock giant clams in the participating villages' reef areas, and have initiated tilapia fish farming in some. Tilapia are fresh water fish that grow quickly to large sizes in small ponds and have proven acceptable to some Samoan tastes. They are very easily cared for; only a manure fertilizer is needed to grow the algae on which they feed. The Fisheries Division also facilitates the purchase of EU-subsidised boats in order to get fishermen offshore. These efforts are designed to offset the initial scarcity in food supply that the village is likely to experience when commencing their Management Plan.

Conclusion

Traditional response mechanisms to Samoa's growing marine scarcity remain somewhat active at the village level, but have proven to be inadequate if excellent inshore fishery health is sought. Because of this, the Fisheries Division has commenced a subsistence fishery program that reinforces what the villagers usually already know about conservation, and motivates them to establish rules for caring stewardship that will bring them times of abundance in the future. This is influencing fishing methodology from trapping to netting to traditional poison fishing.

Perhaps more importantly, Samoan fishers are involved in making decisions to change their fishing grounds as well as their methodology, moving away from the reef in order to harvest some of the relative bounty of the deeper ocean. This has brought more food, but also increased danger to the fishers as great numbers venture into waters wherein they have very little experience. This danger should lessen as the modern offshore fishery matures and safety education programs take effect.

Comparatively speaking, Samoa is in a fairly good position with regard to its fishing methods and management capabilities despite its modest wealth. Because of their biodiversity and resilience, Samoan inshore waters could recover immensely if given the chance. With the support that Samoan extension officers have been receiving over the past few years, there is good reason to believe that they will be given that chance. The inshore fishery also has the advantage of being in a country with few rivers, sewage systems and little industry. Lastly, the limitations of national governance in fisheries management is more than offset by the wealth of power seated at the village level.



References

JOHANNES R.E. (1981). Words of the Lagoon: Fishing and Marine Lore in the Palau District of Micronesia. University of California Press, USA. 245 p.

HARDIN G. (1968). The Tragedy of the Commons. Science 162: 1243-1248.

FALANRUW M.V.C. (1994). Traditional Fishing on Yap. Science of Pacific Island Peoples: Ocean and Coastal Studies. Vol.1. Institute of Pacific Studies. University of the South Pacific. Fiji.

TANIERA T. (1994). Traditional Fisheries in Kiribati: Survival and Sustainability in Science of Pacific Island Peoples : Ocean and Coastal Studies, Vol.1. Institute of Pacific Studies, University of the South Pacific, 1994.

TOLOA F., M. PELASIO & R. GILLET (1994). Adapting Traditional Marine Conservation in Tokelau. Institute of Pacific Studies, University of the South Pacific.

KING M.G. & U. FAASILI (1999). Community-based management of subsistence fisheries in Samoa. Fisheries Management and Ecology, UK. 6: 133-144.

AUSTRALIA

Native claim made over Torres Strait

A native title claim is to be lodged over the entire Torres Strait, which separates northern Queensland in Australia from Papua New Guinea. The Chairman of the Island Co-ordinating Council, Getano Lui said his organisation and the Torres Strait Regional Authority will lodge the claim after recent archaeological discoveries in the Murray Islands. Scientists have found artifacts that suggest continued human existence on the island of more than 3,000 years.

Lui said the claim would cover the sea and land in the Torres Strait. "This would be unique to Torres Strait, simply because of the fact that I believe now is the time to strike. It's a matter for the (Australian) Government really to prove to us that we didn't exist, and not for us to say to the Government why we existed. So I think the ball is squarely in both the State and the Federal Governments' court," he said.

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