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Editor's note

The global financial crisis has not spared SPC, so this year we will publish only a single edition of this Information Bulletin. We hope to be back to normal in 2010, but that is not yet certain. Hopefully, this will be only a temporary situation.

Related, is that Jean-Paul Gaudechoux has now left SPC. We wish him well. Although he long since handed over to Aymeric Desurmont, in the early years Jean-Paul worked hard to help launch and nurture this Information Bulletin, for which I was and remain most grateful.

Maria Kalenchits and Patricia Kailola of PIMRIS (Pacific Islands Marine Resources Information System) have provided a progress report, which includes a request for project financial assistance, on the Robert E. Johannes collection of books and papers donated to the University of the South Pacific. The sub-collection of grey literature (maps, letters, field notes, unpublished manuscripts, original articles, and reports) remains unprocessed, and requires formal archiving and digitising. These have been delayed by lack of staff and funds. PIMRIS needs the help of a donor to digitise the materials. Even though the amount of financial assistance would be modest, these are not auspicious times to make any application for support. Nevertheless, if anybody has any ideas about this, please make suggestions directly to Maria Kalenchits and Patricia Kailola.

Two articles make up this 2009 edition. The first is, "Women of the coral gardens: The significance of marine gathering in Tonga", by Thomas Malm. Although seaweeds and marine invertebrates of the lagoons and reefs remain a major source of food and raw materials for Tongans, marine gathering done by women has generally been overlooked by researchers. The knowledge and use of gathered marine organisms and their uses is vast, but could become partly forgotten in times of rapid economic and/or cultural change. As in most other places these days, Tonga's reef and lagoon resources, together with the indigenous ecological knowledge of the marine environment, are under serious threat from population growth and globalisation.

In the second contribution, "Achieving the potential of locally managed marine areas (LMMAs) in the South Pacific", Hugh Govan examines locally managed marine areas that build on existing community strengths in traditional knowledge, customary tenure and governance. However, success of the LMMA approach depends on broadening LMMAs to function as building blocks for the integrated management of island communities. The implications of that are examined in detail.

Kenneth Ruddle

Women of the coral gardens: The significance of marine gathering in Tonga

Thomas Malm[1]

Abstract

Seaweeds and marine invertebrates in lagoons and reefs have always been a very important source of food and raw materials for the people of Tonga. In this article I examine the gathering of these marine organisms in both contemporary and more ancient contexts, and according to a gender-based division of tasks. It is argued that although men's fishing has been well documented, until fairly recently marine gathering by women has been overlooked by researchers, even though it is of major economic significance. The indigenous knowledge concerning the marine environment, the organisms and their uses is vast, but could become partly forgotten in times of rapid economic and cultural change. Tonga's reef and lagoon resources are threatened by overexploitation, resulting from population growth and integration into the global economic system.

Introduction

Statements about pre-historic shell middens and shell artefacts are often based on the documentation of practices in historic times (e.g. Johansson 2004; Kirch and Dye 1979). We know, for instance, that people have been exploiting invertebrates in Oceania's coastal waters for thousands of years (e.g. Kirch 2000). Since the original colonists on most of the smaller islands probably found little to eat among indigenous terrestrial plants and animals, colonisation would have been almost impossible without the rich marine fauna that was immediately exploitable (Fosberg 1991:17). Studies of contemporary marine gathering can, give us important insights for interpreting certain archaeological material, and for understanding human adaptation. "All our cultures," writes anthropologist Epeli Hau'ofa (1998:403), "have been shaped in fundamental ways by the adaptive interactions between our people and the sea that surrounds our island communities. In general, the smaller the island, the more intensive are the interactions with the sea, and the more pronounced are the sea's influence on culture." Therefore, with the main exception of large islands, where inland people simply lived too far away from the sea, the bulk of animal protein has traditionally always been obtained from the marine environment. This situation is exemplified by Tonga, a Polynesian archipelago of approximately 150 islands with a total land area of about 750 km^2.

> After the products of agriculture, fish was the most important of Tongans foods. […] The store house of the sea was practically at every man's door, and that store house was a never failing source of food in vast quantities. Coral reefs and sheltered lagoons teemed with marine life, nearly all of which the natives found edible, and schools of larger fish abounded in deeper, offshore waters. Environment, therefore, exerted powerful influences to make of the native a fisherman (McKern n.d.:274).

The ingenuity of island peoples in this respect has fascinated Western visitors to the Pacific ever since early contact. One of them, Sir Joseph Banks, wrote the following about the Society Islands, which he visited together with Captain James Cook in 1769 (Beaglehole 1962, I:342):

> The Sea about them in the neighbourhood of which they always live supplys them with vast variety of fish […] more perhaps than our own Island can boast of. I speak now only of what is more properly calld Fish; but almost every thing which comes out of the sea is eat and esteemd by these people. Shellfish, lobsters, Crabbs, even Sea insects and what the seamen call blubbers [jellyfish] of many kinds conduce to their support.

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It wasn't until 200 years later that a general monograph of indigenous knowledge related to marine exploitation in a group of Pacific Islands, Belau, was published. In a note by its author, we read that "[r]eef gleaning — collecting small fish and invertebrates on the reef flat during low tide — was widely practiced by women" (Johannes 1981:3, n. 2). Johannes interviewed women twice about this declining activity, but without obtaining much information. Hence, his study was focused on men's knowledge and fishing. In the next decade, two female researchers picked up the thread, interviewing 54 women from different parts of Belau. Their study revealed that women "knew quite a lot about the species they collected: they know when and where to find particular types of seafood and the collection methods they use are usually more involved than the simple and mechanical process of stooping to pick up what they see" (Matthews and Oiterong 1995:78). They presented lists of 13 collection methods and 22 vernacular names of invertebrates plus 12 of fish that were typically collected by women for domestic or commercial purposes. This is just one of many examples worldwide of how, until recently, very little attention has been paid to gathering as a primarily female subsistence task (e.g. Dahlberg 1981; Malm 1999; Matthews 1995).

When I wrote my monograph on marine gathering (Malm 1999), the overall aim was to challenge the prejudiced view of "picking shellfish" being something uninteresting or culturally insignificant. Since the 1990s, a number of other researchers have had the same goal, and nowadays most fisheries departments in Oceania are aware that women's marine gathering is significant in local communities and involves important expertise. This article continues that approach, and is a summary of the results from my fieldwork in Tonga during 1994–1996, with some additional observations from other islands where the sea is still regarded as a "store house".

What is marine gathering?

I use the term "gathering" throughout this article, even though other terms are found in the literature. For example, Meehan (1977) speaks of exploitation of marine invertebrates as "hunting". Hill (1978:59) uses the term "reef gleaning", and states that this activity can be divided into different types of "fishing", and Clark (1991:81) writes of "reef foraging".

For two reasons, "foraging" is inappropriate when we talk about humans. First, the activity in question is not only a matter of finding food, because it also fills a number of other functions. In my studies on contemporary and ancient Tongan exploitation of marine invertebrates and seaweeds (Malm 1999, 2007a,b), I documented how more than 230 folk taxa have been used for some 50 different purposes (see Appendix). Second, as pointed out by Ingold (1996:146–148), foraging may convey a behaviour more or less identical to that of animals. Instead, he writes that hunting and gathering ought to be seen as "forms of skilled, attentive 'coping' in the world, intentionally carried out by persons in an environment replete with other agentive powers of one kind or another" (Ingold 1996:149; see also Ingold 1988).

A more acceptable term is "collecting". The problem here is that it has not only been used as a synonym to gathering, but also as a contrast to it. According to Braidwood (1960), gathering should be understood as the use, in an *irregular* way, of natural resources, whereas collecting is defined as being more developed in the sense that it involves a recurring *regular* use of natural resources following a planned, seasonal pattern. In his study of subsistence on the Polynesian outlier of Bellona, Christiansen (1975:70) states that "[m]arine gathering activities are almost all properly termed 'collecting', because they involve a planned search, often in a routine pattern, of the reefs, usually at low tide." For contemporary Tonga, irregular as well as recurring regular searches for seafood are both of importance, as was probably also the case in ancient times. When I use the term "gathering" it should not be interpreted as necessarily implying an irregular activity. It is used because it is the commonest term in the literature (as in the numerous references to "hunters and gatherers"), and because it can be generally understood as different from fishing and hunting in methods used for *producing* food and raw materials. The word "producing" is stressed here because a number of leading 19th century scientists and scholars (e.g. Darwin, Morgan and Engels) regarded hunters and gatherers as people who, like animals, were simple food-*collectors* rather than food-*producers* (Ingold 1996:146).

What term, then, is used in the Tongan language? *Fua* is used for the gathering of seaweed and jellyfish, whereas *fāngota* is a more general word for marine gathering. With varying pronunciation, the word *fāngota* occurs throughout western Polynesia, on Polynesian outliers, in some Melanesian languages, and in the Cook Islands in the east, where some inhabitants trace their origins to Samoa. In the rest of Polynesia, *fāngota* is an unknown term, according to Clark (1991), as is the related biological category *fingota,* which is usually defined as "shellfish", but in its most inclusive sense also includes molluscs without shells, jellyfish, marine worms, echinoderms, and even seaweeds, eels and sea snakes. It seems as if the basic meaning of *fāngota* — women gathering mainly "shellfish" — has independently broadened in a number of languages to mean fishing in general. This might reflect how words that are elevated from generic meaning to a major class are those that are most culturally

significant due to their distribution and cultural importance. Noting that *fāngota*, as in Tonga, is considered as unworthy of a man's attention, Clark writes that culturally it does not seem to be the most significant form of fishing. He goes on to suggest two ways in which the repeated shift in the meaning of *fāngota* might be reconciled: 1) Although it is women's and children's work (as distinct from the more prestigious fishing activities of men), it is the most frequently practiced activity, and as such it is the unmarked case of "fishing". 2) Owing to the low prestige accorded to *fāngota*, the term might have been used by men — in jest, through modesty, or perhaps for reasons of word *tapu* — to refer to more "serious" types of fishing. In any case, *fāngota* is certainly a technique for obtaining food, and has probably always been so. Many boys have gone *fāngota* with other children and women before moving on to the more prestigious open sea fishing.

The Tongan seascape

According to Ingold (1992) humans do not experience the environment as a "blank slate" in the ordinary course of life, a space simply awaiting the imposition of cultural order. Instead, he argues that people, in the course of their daily activities, can acquire direct knowledge of their environment, and that they discover meaningful objects by "extracting invariants from the continually changing optic array" while moving about in it (Ingold 1992:47). This has important implications for a study on marine gathering as an activity performed in a landscape, or rather a "seascape", where people move about.

First, what one sees depends on what one knows. As noted by Hirsch (1995), landscape has had two meanings in anthropological discourse: 1) the one that the anthropologists initially see; that is, the "objective" landscape inhabited by the people in question, somewhat like a picture being watched (which is what the word "landscape" originally referred to); and 2) the one they come to recognise and understand over time through fieldwork. In the second case, it is a matter of seeing the landscape through the eyes of the indigenous inhabitants, so to speak: the landscape that is produced through local practices and thus has emerged as a cultural process.

For millennia, the people of Oceania have gained deep insights based on interpretations made in connection to their life in and with the ever-present nature, insights that have been passed on from generation to generation and modified through new experiences. Their terminologies connected to coastal and marine features are excellent examples.

The marine environment is called *tahi* in Tongan, and can be divided into four main ecological zones, all of which are recognised in the vernacular vocabulary: 1) the shore that is exposed at low tide, 2) the lagoon and tidal flats, 3) fringing reefs and barrier reefs, and (4) the open sea. Marine gathering is done predominantly in the intertidal zones — the shores from below the high-water mark, the shallow lagoons, and the reefs that form a border to the open sea — but to some extent also the adjacent deeper lagoon and open sea areas. It has been estimated that about 65% of all marine produce in Tonga is obtained from the nearshore zone in a maximum depth of 75 m (Kingdom of Tonga 1991:136). The width of this zone varies from less than 100 m to several kilometres around the islands.

Several types of coastal landscapes are found in the Tongan archipelago. The principles for the indigenous terminology of these show that the marine environment not only includes organisms whose names, behaviour and potential uses marine gatherers need to know about, but also formations and processes of great significance for human activities.

The height and position of the coastal area are important aspects recognised in the vocabulary, because some of the islands are geologically tilted and coastal areas can be very different on opposite sides of coral islands. For example, although parts of the land near the wide shallow lagoon on the northern coast of Tongatapu, the largest island, are well below the high-water mark and are flooded often during heavy rains, the southern coast rises to over 60 m.

The shore — including land exposed at low tide, the nearest supralittoral area and coastal cliffs — is directly connected to human activities in the marine environment. This is where people watch for changes in the tide, look for empty shells or crabs while foraging among the mangroves, sit down to relax in the breeze (eating some of their catch), and where outrigger canoes and other boats are kept. Before imported salt became readily available, sea salt (*māsima*) was gathered by scraping it from stones or from the leaves of trees situated on rocky sea shores (a process called *tafimāsima*) where it had become deposited by the spray from breakers (McKern n.d.:372). If no salt is available for seasoning, a fried fish can be soaked in seawater. This is also the zone where reef limestone — a white or pale-yellow lumpy mixture made up of coral, shell and algal rock, with calcite crystals as a binding material — was quarried for construction works many years ago, and is still collected for use in earth ovens. People bring white sand from here for mixing concrete or decorating graves.

Tongans have three general words for "beach", depending on if it is 1) the "front of the sea" seen

from land, 2) seen from land and includes the seafront as well as the shore that is exposed during low tide, or if 3) a coastline seen from the sea and therefore appearing as "front of the land". There are different words depending on if one talks about the shore in general or particular parts of it, or if the shore curves. Sand and rock formations are also important. For example, a sandy beach is called *ti* ("sand-edged") whereas a rocky coast with cliffs facing in various directions is a *matā'utukehekehe* and are different from a *tafataha,* which is a coast with the rock face going straight down to the sea with no beach in between.

For determining when to expect the next low or high tide, it is important to find out if the high-water mark (*matā-hūngalu*) is wet, dry or littered with debris, and to look at the direction of the water flow. Tongans often go down to the waterfront in the morning or afternoon to find out the current state of the sea by looking at these signs. So important and noticeable is the cyclical tidal process that it could be perfectly justified to state that the very size of the islands depends entirely on whether it is high or low tide. The lagoon is shallow enough in many places to walk or wade during low tide, in some areas even making it possible for free-ranging pigs to forage for molluscs and crabs on the mud flats. It then appears as an extension of the land, rather than as a shallow part of the sea. During such a period one can walk all the way out to the reef, and even to some islets, a distance that must be covered by canoe or modern boats on islands with deep lagoons. On average, the difference between high and low tide in Tonga is 1.5 m. Because there are two low and two high tides per 24 hours, falling about 50 minutes later every day, low tide is sometimes in the morning and the next one late in the evening, whereas at other times low tide may be in the middle of the day. As a result of this, mealtimes for many Tongans vary with the tides.

While the words for rocky coast refer to a fairly stabile landscape, those used for tidal activity are, literally speaking, connected to a "continually changing optic array". It so happens that the near-shore marine environment is always in motion. It does not look exactly the same from one hour to the next, and this makes marine gathering and fishing quite different from any subsistence chore going on above the high-water mark. If one waits too long to go gathering or to go by boat, a change in the tide may make it impossible for another six hours or more. As Perminow (1996:90) writes, "the perpetual motion through which features rhythmically 'come into being' and sink into oblivion has an autonomous experiential significance in the existential space of *Namo lahi* [the big lagoon] that is lost in the charted Euclidean space of absolute and stable features."

Because of its importance, there is a detailed terminology for tidal phases and the resulting seascape appearance. Because tidal characteristics — such as certain rocks becoming visible at ebb tide — are not the same everywhere, there are certain differences in the terminologies from one island to another. On Tongatapu, at least nine different words are used to describe an incoming tide and emphasise that the sea level is high. Another 9 or 10 words describe the various stages of low tide. On Tongatapu's northern coast, tidal mud or sand flats that are left more or less dry at low tide are called *toafa,* a word that is also used to desribe "empty" areas on land. Opposite the central parts of the capital, Nuku'alofa, the lagoon is only a few hundred metres wide, but widens farther west where it is possible to walk for up to 7 km during low tide. On the high southern cliff coast (*liku*), the reef is closer to the shore, and in some places along the southwestern coast there is hardly a lagoon, only an uplifted fringing reef.

For fish and mobile invertebrates that cannot survive for long periods in the air, there are three ways of surviving low tide periods: 1) follow the water and return with the incoming tide; 2) withdraw within the shell and hide among seaweed, small patch reefs or under blocks of coral to avoid evaporation and predation; or 3) seek refuge in the water-filled holes that form here and there on the sand, mud or limestone bottom. Knowledge of where to find fish and marine invertebrates during the tidal cycle is, of course, of fundamental importance for marine gatherers.

Coral reefs are far from uniform in structure. Throughout the Tongan archipelago, coral reefs are very well developed, and most types are represented (i.e. fringing reefs, platform reefs, wave-cut raised reefs, and barrier reefs on outer shelves) (Zann 1994:55). The Ha'apai group has the largest area of coral reefs in Tonga, and one of the largest in the entire South Pacific.

Among these and various smaller submerged reef formations is a zone where most marine gathering is done. *Hakau* is the coral reef that appears above or very close to the surface at low tide, as a border between the lagoon and the open sea and often a protective wall, but also as a separate structure farther out. The fringing or barrier reef is the place to search for shells during low tide, by turning over rocks (dead coral heads) that have been washed up by the surf, and digging with bars (*tao ukamea*). On the reef, men often stand fishing with rods or hand-held lines in the open sea. To Tongans, this and *not* the more-or-less wide lagoon bottom is the "reef" where one walks and gathers various marine organisms. Although terms such as "reef gleaning", "reef fishing" or "reef foraging" have been used for what I call marine gathering, it

should be emphasised that although the "reef" is very important, it is only one of the marine zones in which organisms are gathered.

A number of formations connected to the *hakau* are recognised in Tongan terminology. *Funga hakau* is the reef platform, whereas *'ulu'ulu* is the reef slope with the low-lying rocks along the reef that are exposed at low tide. On some reefs are pools (*vaihola*) that overflow at high tide and retain water at low tide, and in which small fish, some invertebrates and edible seaweeds can be found. Another significant structure, especially along Tongatapu's southwestern coast, are blowholes (*pupu'a*) with their deep tunnels in the reef, through which water is pushed in by the surf and sent high up in the air followed by a hissing sound made by the undertow. Other terms refer to reef structures that are important for seafaring, such as a passage (*ava*), or places where the reef is so low that a boat can go over it at high tide (such a place is called *fakalelenga*).

Knowing reef structures is of vital importance. Coral reefs are not always safe platforms upon which to walk, even if one's feet are protected against cuts. *Pūpūtāmaki* means that a reef is dangerous to walk on because it is hollow under a thin layer of coral. Children are also taught not to stick their heads down in the blowholes through which they can get sucked in by the undertow. Another danger, connected to reef passages, is to get *fakatau'au*, exposed to the full force of a current (*'au*). Swimmers occasionally get carried away (*'auhia*) by a current heading out through reef openings, with fatal consequences.

Just outside the reef crest, where the sea becomes deep but where it is possible to dive for fish and invertebrates, is an area called *toutu'a.* Beyond it is the open sea, which soon becomes very deep. It is referred to with two words: *vaha* signifies open or high seas, while *moana* refers to the deep sea and its characteristic colour. There is a rich indigenous terminology for submerged reef formations, different bottom types, waves, and currents of the open sea, and this is of importance for seafaring as well as fishing. *Lua,* for instance, is often the site of numerous organisms and is a submerged reef that only breaks waves in very rough weather. It can also be small islets that have been formed on such reefs.

Here and there along the reefs there may be islets where people with boats go fishing or gathering in less exploited areas. These islets are often uninhabited, but are sometimes used for agriculture by the leaseholder, who may have a small house or two on them. Farther out in the deep sea, fishing is entirely the men's domain. Most fishing beyond the reef is nowadays done from boats with outboard motors or in larger vessels. In the 19th century, double-hulled canoes went out of use, and outrigger canoes are now becoming increasingly rare throughout the Tongan archipelago (Malm 2008).

Division of marine labour in Oceania

The division of labour in Tonga resembles a pattern found in many hunting and gathering societies: men go far from home to hunt and fish while women, often having to care for children, collect fruit, nuts, roots, molluscs, crustaceans and firewood, and catch small game, usually closer to the settlement. The difference is that Tongans practice agriculture, so that most edible fruits and root crops do not have to be gathered, and also there has never been much small game. The men brought back firewood together with crops from the gardens. What remained for the women and children to do, apart from making handicrafts and occasionally picking ornamental seeds and flowers as well as medicinal plants, was marine gathering and some types of fishing (Malm 1999, 2007b).

Generally in Polynesia, catching fish and large marine animals is not only seen as men's work, but is traditionally also a part of the masculine gender identity. One could say that men are fishermen by definition, just as they were also once warriors (Schoeffel and Talagi 1989:9). The open sea is the domain of their maritime work — in Tongan discourse, only men "work" (*ngāue*) — whereas women and children search for food in the lagoon and on the reef, something that is not seen as work. When women engage in marine exploitation, it is either seen as helping men when needed — such as preparing fish poison or participating in communal fish drives — or as something defined as distinct from male activities. In Tonga, women practice *fāngota,* marine gathering in general, whereas men practice diving and "real" fishing. The latter is generally called *toutai,* but there are a number of categories for catching fish, turtles and large cephalopods with hooks, nets and harpoons, and previously (19th century up to the 1970s) also hunting whales.

In most of Polynesia, although men may also practice marine gathering it is primarily women and children who are occupied with this task. In Hawai'i, for example, it was mainly women's work to gather seaweed and marine invertebrates: "Every day they went out on the reefs and shores in numbers with children searching right along with them for everything edible" (Titcomb 1978:327). However, men also enjoy this, at least these days.

In some islands, especially in Melanesia, fishing in the general sense of the word is not strictly defined as men's work. The women there do, however, usually fish with more simple equipment in areas close to the settlement or the gardens, and there is seldom much ritual associated with their fishing

(Schoeffel and Talagi 1989:14–15). In Tonga, women and children gather seaweed and invertebrates, do some simple spearing and use certain trapping methods. They may also participate in some types of group fishing when needed. Men fish with spears, hooks, nets and traps. It is not common for men to gather any seafood by hand, except when they dive, although they may do so if they feel like it. Thus, when both groups exploit resources in the same zone, men generally engage in activities that involve the use of tools, while women and children use methods that are perceived to be simpler and less demanding.

Without a doubt, fishing in the open sea is potentially the most dangerous of all subsistence tasks, and the open sea is the zone in which people are most critically exposed to forces beyond their own control. This might be a major reason why the "outside" has become related to masculinity and power. Tonga is one of many societies where work involving long absences from home, and travel over long distances, is a male prerogative.

It could also be argued that men might have dangerous tasks conducted far away because they do not bear or rear children. However, a woman who is neither pregnant nor has a small child, and who has the appropriate skills, would not be allowed to join men in such activities. In Tonga, as in societies throughout Oceania, sexuality is endowed with symbolic significance, often in ways that not only diminish but also restrict women's activities. Although it has been suggested that notions of "female pollution", disruptiveness and danger are not common in Polynesia (Ortner and Whitehead 1981:20), Hanson (1982) points out that there are numerous examples to the contrary in the literature. He argues that these are not to be explained in terms of ideas that suggest women polluted, but can be "more fully understood according to a special affinity that was thought to link women with the supernatural." He states that fewer examples are found in western than in eastern Polynesia, but there is ample evidence of restrictions, often linked with menstruation, on women's behaviour. These restrictions are in reference to other people, sacred places, the construction and use of canoes, and the processes of producing, preparing and consuming food, especially in relation to fishing. For instance, according to a Samoan belief, fishing will be spoiled if a woman touches the canoe or gear. On Niue, a woman's presence in a canoe is believed to bring bad luck. Similar beliefs are also found in eastern Polynesia, such as in the Society Islands, where women formerly never (and by the 1930s rarely) went out in fishing canoes (Handy 1932:73–74). The reason given for the latter case was that Tahitian women were regarded as "common" (*noa*) and therefore would have neutralised the *tapu* of the craft, gear and fishermen.

Thus, the custom of limiting fishing in the open sea to men most likely goes far back in Polynesian history. Myths and related beliefs have been important for the reproduction of the gender pattern where women are exempt from fishing in the open sea, and thereby restricted to gathering in shallow waters and on the reef. However, they hardly explain the *origin* of this pattern. It could be argued that mythology is a ritualistic and symbolic elaboration of customs and relations to power, so that any *tapu* expresses socio-political interests. Nevertheless, the indigenous mythology and cosmology are of interest for understanding how the people of Oceania have come to look at the relationship between gender and the sea. For example, Abbott (1991:139–140) has suggested that women's marine gathering activities in Hawai'i might have been a result of the male-dominated religion and its food prohibitions. Hawaiian women were not allowed to eat as much taro as men, were forbidden to eat pork, and many fish species were also prohibited to them. Abbott writes that women had to seek out other types of food in the sea. This may explain why these resources became very important in Hawai'i, but since women do exactly the same thing all over Oceania, the Hawaiian customs could hardly have evolved in isolation.

Considering the potential dangers of being in the open sea, it is not surprising that many conceptions related to the sea's superhuman power remain. The sea is like a jealous women, the Tongan fishermen told Bataille-Benguigui (1988:185–186, 1994:110). If the sea noticed the presence of another woman who was accompanying the fishermen, it would hang on to all of its possessions and would not let go of a single fish. Fishing in the open sea was, therefore, not for women. Very likely, the statement in question expresses a continuity with respect to the mythology in which a number of gods were associated with the sea. Thus, instead of being seen as controlled by the old gods, who are no longer worshipped, the sea in itself is now seen as behaving like a jealous woman.

Of comparative interest here is that for Tikopia, a Polynesian outlier in the Solomon Islands, Firth (1984) describes how both men and women exploit reef resources, whereas men dominate the high-prestige open sea fishing. Interestingly enough, female as well as male gods are believed to control the fish and the canoes, and female spirits to be involved in several ritual situations relating to men's fishing activities. Firth argues that the role of women, which is secularly excluded from the prestigious sea fishing conducted by men, actually reappears as compensation or revenge at the level of spirit control. In order to neutralise the potential danger of women's sexuality and nature, men keep them from sea fishing, but since the pervasiveness

of female activity is too powerful to be ignored, some female interventions or control is allowed at the spiritual level.

Tongan nearshore fishing methods

Whereas most of the mythological aspects of Tongans' relationship to the sea have vanished or been transformed, there is still a vast knowledge of fishing techniques. Dye (1983:249) noted that Tongans speak of marine exploitation on four levels. At the most inclusive level there is a basic division into male and female domains. *Toutai* refers to men's fishing in general, and *fāngota* to the gathering activities performed by women and children. Immediately below this level are various strategies, such as diving (*uku*), netting (*kupenga*), and angling (*tau*). At the third level are variant methods of a single strategy, for example *uku vāsua,* diving for giant clams. Individual techniques of a given method are described in everyday language.

With regard to men's fishing, Tongans have many fishing methods, and had even more in the past. McKern (n.d.:247–345) recorded 42 fishing methods in the 1920s. Fishermen are called *toutai* or *toutai ika. Toutai* can be translated as "fighter against the sea", or "tamer of the sea", and is also an old word for "navigator" that has come to cover all men who work the sea in any regular way (Helu'i 1999:113–114). However, as a fisheries term, it was originally used only for the leaders of chiefly fishing expeditions. Most fishing was carried out in fairly shallow nearshore waters, whereas deep-water fishing was mainly seen as a sport for chiefly fishermen, although the large fish were recognised as important food items (McKern n.d.:274–275). For brevity I mention only two types of Tongan fishing that belong to the men's domain. Both involve some gathering.

In Polynesia, it is not customary for women to do any deep diving. Thus, diving for shells, sea cucumbers, black coral and with spears or spearguns for fish or octopus is entirely a male task. Until very recently, diving was usually done without any costly scuba equipment, and only with goggles or a mask, and sometimes a snorkel and flippers, within a depth of 15 m. From Ramsay's (1938:ch. 29) classic tale *Tin Can Island*, which is about Niuafo'ou, one of Tonga's northernmost islands, we learn how men placed three or four fish traps baited with seaweed some 15 m apart at a depth of 6–10 m. Some fishermen could examine the traps to pick out the fish, attach them to a spear or a line, or put them in a basket, all during one dive and without going up for air.

Another important activity is night fishing using torches. This is done throughout Polynesia, and is called *ama* in Tongan. During calm nights one often sees torches moving slowly along the reef, nowadays usually a kerosene lamp or a gas lantern, although traditional torches of coconut-flower pods held together with hibiscus bark are also used. The torches are carried by men who are mainly looking for fish, but who also catch lobsters and crabs. This can be performed in the shallow lagoon as well as on the reef, but the windward reef edge is the preferred location. The men often fish in pairs, so that one can hold the torch and catch the animals while the other carries a bag or basket and helps to look for fish and crustaceans. The best times for night fishing are very dark nights with a high tide, because the animals are then easily visible. At low tide, during clear nights with strong moonlight, they move around more, or stay hidden.

During *ama vaka* (night fishing done from a canoe), the spearman (*taha ama*) stands at the prow while someone else paddles — a more and more rare sight these days, because of the rapid disappearance of outrigger canoes. Depending on the canoe's size, besides the spearman there might be just one man to paddle or steer the canoe, or there can be a steersman, a paddler and a direction giver, who is an expert in locating schools of fish and fishing spots. Formerly, the positions of spearman and steersman were usually filled by experienced and skilful elderly men. The traditional Tongan fish spear (*tao*) was as much as 3 m long, with a straight shaft and pointed with the spine from the tail of a stingray. Nowadays, however, it is equipped with up to five steel points, often lashed to the shaft with strips of rubber. In another method, *ama to,* the fish are hit and killed with a long knife.

Whereas Tongan women may help with harvesting and cleaning nets, using them is not one of their tasks. Line fishing is also not considered to be a woman's task, although women may do it in daytime as a leisurely activity. More economically important is their involvement in some group fishing methods.

Fish poisoning (*'aukava*) is still practiced in Tonga. On Niuatoputapu, for example, it was widely practiced in the 1970s, and Dye (1983:249,256) notes that it frequently employed an entire family, and that the women were in charge of pulverising plant stems that were used for poisoning. Fruit, seeds, bark and leaves from a number of trees and plants can also be used for fish poisoning in Tonga, including *Derris trifoliata, D. malaccensis, Barringtonia asiatica, Pittosporum arborescens*, and *Scaevola sericea*. The grated skin of a sea cucumber called *loli* (*Holothuria atra*) has also been used for this purpose.

The ideal sites for fish poisoning are those that are so shallow and calm that the poison is not

quickly washed away by waves or currents. These areas include 1) lagoons that are connected to the open sea at high tide (so that fish can swim in) but become isolated shallow pools at low tide; 2) still-water pools on the reefs and in the lagoons that hold fish at low tide (where women may do some spearing); and 3) leeward reef edges. The poison is thrown directly on the water or is put in small sacks that are shaken. Care is taken to ensure that it reaches under overhanging reef rocks where fish may be hiding. It is said that the best time to use the poison is in the early morning, because the fish are hungry then. Within a few minutes they become stupefied and float up to the surface, or are forced to come up gasping for air, where they can be picked by hand, speared or hit with the knife. The meat does not become poisonous to eat.

Whereas fish poisoning can be carried out by a small group of people (four on average), fish drives have been known to employ far more people. In Savai'i, Samoa, I saw it performed for the benefit of a visiting documentary filmmaker (in 2003), and it involved several dozens of people. McKern (n.d.:276) describes a fish drive (*pola*) off the northern coast of Tongatapu in 1921, where upwards of a thousand people actively participated. Methods involving entire villages are, however, rarely practiced today, because fishing has largely become a matter for individuals, immediate family members, and groups working together with boats and modern nets.

All fish drive methods follow the general principle of surrounding large numbers of fish in the lagoon (mostly on sandy bottoms) at high tide using some kind of barrier — usually a moveable one — and catching them during low tide, when the barrier stops them from swimming away with the tide. Women have been involved in some of these methods, helping to make the barrier, driving the fish and catching them. They used sharpened sticks, clubs, dip nets and baskets to catch the fish, but spears were only (or at least mainly) used by the men (McKern n.d.: 280–281). The *pola, fekesike* and *uloa* involved a large number of men, women and children under the leadership of an expert fisherman, the *toutai,* whereas the *faka'uvea* was a special method used by women. The effectiveness (and thus the importance) of these fishing methods has diminished, in part because of overfishing in the lagoon by a growing population (see Malm 2001).

For the *pola,* a rope that could be several kilometres long was used. A large number of split palms leaves were attached to the rope to prevent the fish from returning with the tide to deep sea. This barrier was arranged in a fixed semi-circular position, with the opening towards the shore. Similar but shorter barriers were used in the *fekesike* and *uloa* methods, and were moved towards the shore to pen in the fish so that they could be speared, caught with dip nets, hit or just picked up by hand. The *faka'uvea* method was used the longest, at least into the 1980s. In this case the fish were trapped in long, cone-shaped hand nets (*kenu*) made of the midribs of coconut leaflets. The nets were held in the barrier's narrow openings to catch the fish as they tried to swim back out to sea (Bataille-Benguigui 1994:127–129; Vaea and Straatmans 1954:201–202).

Tuafeo (also called *tuotua*) is a method of catching small fish with dried, woven coconut frond baskets (*'oa tuafeo*). The basket is filled with hunks of coral (*makafeo*) and placed among coral formations on the reef or in the lagoon. Women go to each rock where fish are expected to hide, poking the bottom of the rock with long sticks to scare the fish out. The frightened fish seek refuge among the coral in the basket, and are then lifted from the water. This method is mostly used by women in the Ha'apai group (Bataille-Benguigui 1994:139–141; Vaea and Straatmans 1954:202), but it has also been recorded on Niuatoputapu (Dye 1983:256). Another method, *fakalimu,* is also still practiced, especially by women in the northern part of the Ha'apai group, and is similar to the *tuafeo*, except that the frightened fish seek refuge in a basket filled with seaweed.

By far the most common type of marine exploitation by women is gathering by hand or with a knife or simple spear. Anything edible is taken. In the early morning, children and women often walk in the lagoon carrying leftover food from the previous evening's meal, and searchg for seafood for breakfast.

When women and children go to the lagoon to gather, they usually take a minimum of equipment: a knife, some kind of container (basket, plastic bottle, half coconut shell, bucket), and a wooden stick or a metal bar for prising up rocks. They may also take some coconut meat. Ideally they can spot their quarry by observing protruding eyes or mouth of fish and invertebrates that bury themselves in the sand. If they cannot, because the water is too rippled, a special technique, *fakatofu* (to make calm), is used. Coconut meat is chewed and spat in a circle close to where one is standing, so that the surface becomes temporarily calm enough for to a clear view. (Men also do this during torch fishing.)

At the sublevels below *fāngota,* there are some different strategies and methods. Many molluscs, clams in particular, are actually picked without having been previously seen. It is common to see the gatherers not only move their hands over the bottom in order to feel a protruding shell, but they also search through the bottom with their feet, especially in sea grass where shells cannot be seen.

This is called *moe*, *moe'i*, or *molomolo*. To try to find a shell with the hands is called *fāfā*, to catch or pick by hand is called *ala*. To dig for invertebrates that are hidden in the sand or mud by the beach at low tide is called *tā* (for example, *tā mehingo*, to dig for *mehingo* or tellin shells).

The importance of contemporary marine gathering

Subsistence activities remain very important throughout Tonga, but this does not mean that the economy as a whole can be characterised as a subsistence economy, because all people need money for a variety of expenses. Semi-subsistence is, therefore, a more appropriate term.

Many Tongans have become wage earners within Tonga. However, since salaries are low and prices are constantly increasing, it is important to both households and the relatives within the extended family living elsewhere and belonging to the network for mutual assistance, that there be access to the sea for fishing or gathering, something that all people are allowed to do. In 1975, 12% of all artisanal seafood production was carried out by women (Bataille-Benguigui 1994:110). According to another report, over 230 t of "shellfish" were gathered in one year by women in seven villages on Vava'u in Tonga, and almost 11 kg were consumed per household per week, 60–70% of which was shell weight (Kunatuba and Uwate 1983).

Compared with men's gardening and fishing activities, women's exploitation of marine resources is not regarded highly by men. On Niuatoputapu, lobsters taken by men during nightly fishing are, together with terrestrial coconut crabs, the only invertebrates considered suitable for presentation at feasts and public meetings, because *fāngota* is looked upon as a lowly task fit only for women and children (Kirch and Dye 1979:68). The low esteem in which marine gathering is held does not mean that women generally regard it as boring or menial labour. Ernest and Pearl Beaglehole (1941:38) noted correctly that it combines work with pleasure. Going *fāngota* is something that women and children frequently do on their own initiative, and it is not uncommon for them to spend several hours in and by the sea. They may of course also be asked or even ordered by others to do it. They often sit chatting together in the shallow water or walk along the reef searching under coral rocks. Now and then they meet someone from another area, and jokes and news are exchanged. In many ways, it is reminiscent of being in a fertile garden where one tastes the fruit and berries while picking them. Suddenly someone finds a particularly rare delicacy or maybe a beautiful shell that can be sold to the tourists after having been placed in sand or soil so that worms, ants and maggots clean it by eating its contents.

Going to the sea also means that women, who in general are not supposed to move around as much as men, get a chance to be away from the house for a while. Maybe someone else can take care of the children back home, or perhaps the children like to come along to the lagoon where they can play in the water, help, or learn about seafood gathering. From older children and the women, they learn much at an early age: the names of seaweeds and animals that can be eaten, how to obtain and eat them, which ones to avoid and, sometimes through painful experience, that they can be bitten by moray eels and burned or cut by coral if they are not careful.

It is important to understand that by following the others while going *fāngota*, Tongans become acquainted with the sea in their earliest childhood. When I asked my informants how they learned to swim, they often looked at me in surprise and asked what I meant or simply answered, "I have always been swimming" or "I just did it". Swimming seemed to be so natural for them that they did not see it as resulting from a particular learning process. McKern (n.d.:681) states that Tongans "not infrequently …. learned to swim at the same time they were learning to walk". This may have sounded strange at the time he wrote it (in the 1920s), and I cannot claim having seen anything like that in Tonga, although I have seen women carrying infants in one arm while going gathering in the lagoon, but his statement may very well be correct. For a comparison, it can be noted that the children among the Suku Laut, the sea nomads of Indonesia, swim *before* they can walk and from the age of six even contribute to the economy by diving (Schagatay 1996, Part IV:252).

Every time I went to a beach for a picnic with my Tongan friends, the first thing that the children did was to run down to the water with their clothes on, without any one seeming to worry much about them going there without any adult to accompany them. Accidents do happen in Tonga, as elsewhere, but the water is usually warm and some older children are usually around. Like other Polynesians, Tongan children are socialised by playing in mixed age-groups (e.g. Ritchie and Ritchie 1979). A lagoon is a marvellous playground where they learn important things at the same time as they have fun, and swimming is an excellent example. In school they may be given further instructions about how to make the proper limb movements, but to most Polynesians learning how to swim seems to be as natural as learning how to walk or talk properly. The extent to which they continue to practice swimming as they grow up varies, however. As a result of laws originally imposed by missionaries, women

always wear clothes (e.g. long skirts) in the sea, making it difficult for them to swim. Most women gather by just walking, or sitting or lying down in shallow water. One finds more experienced swimmers among men, not least because diving and harpooning are male tasks.

Whereas fishing is seen as men's work in Tonga, women do cooperate with men in selling the fish at the market — as they do on many other islands with small-scale household-based fishing economies. In the outer islands, women are often responsible for drying fish and octopus, which are kept until needed or sent to Nuku'alofa for sale. Although most of the seafood sold at market places is locally consumed, dried fish and octopus are frequently sent to relatives living overseas or are taken by Tongans leaving the islands. People on the outer islands also send lobsters and shells, especially giant clams, as gifts to relatives on the main island, often to be used for feasts. Specimen shells and handicrafts made of shells are sold by the road side, at market places, or through handicraft centres run by the women's association.

Aquaculture of seaweeds, giant clams and mussels carried out in the lagoons offers a potential for women and young people to become more involved in income-generating projects. For example, in 1997 practical studies in fishing and aquaculture (as well as mechanical engineering, construction, carpentry and farming) were introduced for students who had completed Form 5 but who had not passed Tonga School Certificate Examinations. As a part of this ongoing effort, 300 immature giant clams and a smaller number of top shells were seeded in July 1998 to help students at a college in Ha'apai to earn a living without further academic studies.

What we must realise when we discuss the exploitation of natural food resources in Oceania is that whereas increasing protein scarcity is known from a number of rural as well as urban populations (Thaman 1982), food habits are not uniform throughout the islands. A major nutritional problem is the deterioration of traditional food systems owing to such factors as population growth, urbanisation, lack of land, and dependency on money and commercial goods. That rural areas and not the urban centres in Oceania generally enjoy nutritionally superior diets as well as greater dietary variety has been known since the 1970s (Clark and Richards 1979). According to the first Tongan nation-wide nutrition study (carried out in 1986), rural people who consume more local foods tend to become overweight more than urban adults, and it appears as if overweight was more related to quantities of food consumed, lack of exercise and a related lifestyle (Kingdom of Tonga 1991:263–264). On the other hand, it could hardly be argued that the huge quantities of imported mutton flaps, which in recent decades have made up a considerable part of the diet around Nuku'alofa and other areas where a lot of food is bought, result in more healthy people. As could be expected, edible seaweeds and marine invertebrates are most important on the outer islands where there are fewer stores and more limited merchandise. In 1973, for example, "shellfish" made up 5% of all the food eaten in Nuku'alofa, whereas the corresponding figure for Foa (an island in the Ha'apai group) was 16.2%. The consumption of corned beef, canned fish and other imported foods was also considerably higher in the capital (Finau et al. 1987).

One might be led to conclude that a subsistence pattern with marine gathering as an important component is sustainable, healthy and has little environmental impact. Things are, however, not that simple. Many people in contemporary Tonga earn money by selling seafood, shells and jewellery made of shell or black coral. Surplus quantities are collected in order to accumulate as much money as possible. Spearguns, masks, scuba diving gear, outboard motors and other imported equipment associated with fisheries are important for maximising the catch. Highly desired species, such as spiny lobsters and giant clams, are at risk of becoming overexploited as a result (Malm 2001). Fewer species will probably be of importance in the future as money, imported food and influences from abroad lead to further changes in the diet and cause people to turn their backs on many former food traditions. "Outsiders" are also becoming involved in the exploitation, both as importers and exporters. Many fishermen complain about dwindling fish stocks, and I have often been told that shells in the lagoons are neither as plentiful nor as large as they were some decades ago.

Many marine organisms accumulate toxins, and over 20 years ago Chesher (1986) noted that the absence of a sewerage system resulted in organisms from many areas being unsuitable for human consumption. Other studies have shown how septic and domestic wastes entered the ground water and seeped into the lagoon areas around Nuku'alofa (Zann and Muldoon 1993) and how the placement of the Nuku'alofa dump in swamplands has resulted in a potentially serious pollution problem by micro-organisms and heavy metals contaminating invertebrates eaten locally (Zann et al. 1984).

Conclusions

As we have seen, marine gathering can comprise several activities and methods performed in an environment that is in perpetual cyclical change. The Tongan seascape terminology and related

knowledge about marine organisms represent insights acquired in connection to a specific way of life in which such terms and knowledge have been essential.

In Tongan culture, the most basic antithesis of life and thought has probably been that between sea and land. The organisation of the marine environment not only reproduces structure but also serves as a facility by which structure is enacted and legitimised on a day-to-day basis. It can be suggested that by dividing the seascape (and the landscape) according to gendered tasks, people have been able to make full use of the natural resources without role conflicts. Learning from early childhood about sharing work and resources and avoiding internal conflicts is striking in Tonga, and many other societies in Oceania.

Thus, although both women and men exploit reef and lagoon resources, they do so in different ways. Women (and children) pick seaweeds and invertebrates, and use some trapping methods for catching fish. They also participate in fish poisoning and fish drives. When they exploit resources in the same zone, men are associated with what is regarded as skill and more sophisticated methods — nets, spearing and angling — and women and children with less demanding ones such as picking by hand, catching fish in baskets filled with coral or seaweed, or doing simple spearing.

However, the different fishing techniques in which women participate and the methods used (by women and men) in marine gathering involve far more than just bending down to pick up shells. A number of specifically named methods are used for spotting and finding the animals, and for poisoning, catching or picking them. Contemporary marine gathering fills several functions: obtaining food for oneself and relatives and friends, meeting others in or by the lagoon, simply relaxing and having some fun — for example, in learning how to swim — and earning money by selling seafood and shell crafts. It is not only an important aspect of food provision but also of social life in the islands.

At the same time, the story of marine gathering in Tonga is sad. During travels and fieldwork in Tonga and other parts of Oceania for the past 26 years, I have repeatedly noticed a general decline in old traditional practices and a growing appetite for most things from overseas. This, in combination with pollution and physical destruction of coral reefs — at least partly the result of climatic change resulting in coral bleaching — led me to the inevitable conclusion that several aspects of the knowledge and practices presented in this article may soon become a thing of the past.

With this in mind, I wrote 10 years ago (Malm 1999:373): "An increased awareness through education is most essential for making it possible also for future generations to enjoy the abundant marine life of Tonga, their 'ancient treasure' (*koloa tupu'a*)". Those words could not possibly be less valid today.

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References

Abbott I.A. 1991. Polynesian uses of seaweed. p. 135–145. In: Cox P.A. and Banack S.A. (eds). Islands, plants, and Polynesians: An introduction to Polynesian ethnobotany. Portland, OR: Dioscorides Press.

Bataille-Benguigui M-C. 1988. The fish of Tonga: Prey or social partners? Journal of the Polynesian Society 97(2):185–198.

Bataille-Benguigui M-C. 1994. Le côté de la mer: Quotidien et imaginaire aux îles Tonga, Polynésie occidentale. Bordeaux: CRET (Centre de Recherche des Espaces Tropicaux de l'Université Michel de Montaigne).

Beaglehole J.C. (ed) 1962. The Endeavour journal of Joseph Banks 1768–1771. 2 vols. Sydney: Angus and Robertson.

Beaglehole E. and Beaglehole P. 1941. Pangai: Village in Tonga. Wellington: The Polynesian Society.

Braidwood R.J. 1960. Levels in prehistory: A model for the consideration of the evidence. p. 143–151. In: Tax S. (ed), Evolution after Darwin, II. Chicago: University of Chicago.

Chesher R. 1986. Pollution sources survey of the Kingdom of Tonga. Noumea, New Caledonia: SPREP/Topic Review 19.

Christiansen S. 1975. Subsistence on Bellona Island (Mungiki): A study of the cultural ecology of a Polynesian outlier in the British Solomon Islands Protectorate. PhD thesis. Copenhagen: Folia Geographica Danica, XIII.

Clark R. 1991. Fingota/Fangota: Shellfish and fishing in Polynesia. p. 78–83. In: Pawley A. (ed). Man and a half: Essays in Pacific anthropology and ethnobiology in honour of Ralph Bulmer. Auckland: The Polynesian Society.

Clark W.F. and Richards M.L. 1979. Tongan nutrition study gives an unexpected result. South Pacific Bulletin 29(1):13–16.

Dahlberg F. (ed) 1981. Woman the gatherer. New Haven and London: Yale University Press.

Dye T. 1983. Fish and fishing on Niuatoputapu. Oceania 53(3):242–271.

Finau S., Prior I and Maddill J. 1987. Food consumption patterns among urban and rural Tongans. Review (USP, Suva) 8:35–41.

Firth R. 1984. Roles of women and men in a fishing economy: Tikopia compared with Kelantan. p. 1145–1168. In: Gunda B. (ed). The fishing culture of the world: Studies in ethnology, cultural ecology and folklore, II. Budapest: Akademiai Kiado.

Fosberg F.R. 1991. Polynesian plant environments. p. 11–23. In: Cox P.A. and Banack S.A. (eds). Islands, plants, and Polynesians: An introduction to Polynesian ethnobotany. Portland, OR: Dioscorides Press.

Handy E.S.C. 1932. Houses, boats and fishing in the Society Islands. Honolulu: Bernice P. Bishop Museum, Bulletin 90.

Hanson F.A. 1982. Female pollution in Polynesia? Journal of the Polynesian Society 91(3):335–381.

Hau'ofa E. 1998. The ocean in us. The Contemporary Pacific 10(2):392–410.

Helu'i F. 1999. Critical essays: Cultural perspectives from the South Seas. Canberra: The Journal of Pacific History.

Hill H.B. 1978. The use of nearshore marine life as a food resource by American Samoans. Honolulu: Pacific Islands Program, University of Hawaii. Miscellaneous Work Papers (1978:1).

Hirsch E. 1995. Introduction: Landscape; between place and space. p. 1–30. In: Hirsch E. and O'Hanlon M. (eds). The anthropology of landscape: Perspectives on place and space. Oxford: Clarendon Press.

Ingold T. 1988. Notes on the foraging mode of production. p. 269–285. In: Ingold T. et al. (eds). Hunters and gatherers, I. Oxford, New York and Hamburg: Berg.

Ingold T. 1992. Culture and the perception of the environment. p. 39–56. In: Croll E. and Parkin D. (eds). Bush base: Forest farm; culture, environment and development. London and New York: Routledge.

Ingold T. 1996. Hunting and gathering as ways of perceiving the environment. p. 117–155. In: Ellen R. and Fukui K. (eds). Redefining nature: Ecology, culture and domestication. Oxford: Berg.

Johannes R.E. 1981. Words of the lagoon: Fishing and marine lore in the Palau District of Micronesia. Berkeley, Los Angeles and London: University of California Press.

Johansson B.M. 2004. Mollusc shells in Swedish archaeology: Occurrence, significance and potentials. Lund Archaeological Review 8–9 (2002–2003):89–132.

Kingdom of Tonga. 1991. Sixth Five-Year Development Plan, 1991–1995. Nuku'alofa: Central Planning Department.

Kirch P.V. 2000. On the road of the winds: An archaeological history of the Pacific islands before European contact. Berkeley: University of California Press.

Kirch P.V. and Dye T.S. 1979. Ethno-archaeology and the development of Polynesian fishing strategies. Journal of the Polynesian Society 80(1):53–76.

Kunatuba P. and Uwate K.R. 1983. Vava'u housewife survey of tidal area usage. Honolulu: Pacific Islands Development Program, East-West Center.

Malm T. 1999. Shell age economics: Marine gathering in the Kingdom of Tonga, Polynesia. PhD thesis. Department of Sociology, Lund University.

Malm T. 2001. The tragedy of the commoners: The decline of the customary marine tenure system of Tonga. SPC Traditional Marine Resource Management and Knowledge Information Bulletin 13:3–13.

Malm T. 2007a. Mo'ui: Tongan names for plants and animals. Working Papers in Human Ecology 4. Human Ecology Division, Lund University.

Malm T. 2007b. Bendable facts: A note on the division of labour in Tonga. SPC Women in Fisheries Information Bulletin 16:3–9.

Malm T. 2008. Outriggers lost in the sea of time: An overlooked aspect of cultural change and conditions for sustainable development in Oceania. SPC Traditional Marine Resource Management and Knowledge Information Bulletin 23: 3–12.

Matthews E. (ed.) 1995. Fishing for answers: Women and fisheries in the Pacific Islands. Suva: Women and Fisheries Network.

Matthews E. and Oiterong E. 1995. Marine species collected by women in Palau, Micronesia. Micronesica 28(1):77–90.

McKern W.C. n.d. (c. 1929) Tongan material culture. unpubl. ms. Honolulu: Bernice P. Bishop Museum.

Meehan B. 1977. Hunters by the seashore. Journal of Human Evolution 6:363–370.

Ortner S.B. and Whitehead H. (eds). 1981. Sexual meanings: The cultural construction of gender and sexuality. Cambridge: Cambridge University Press.

Perminow A.A. 1996. Moving things of love: An ethnography of constitutive motions on Kotu Island in Tonga. PhD thesis. University of Oslo.

Ramsay, C.S. 1938. Tin Can Island: A story of Tonga and the swimming mail man of the South Seas. London: Hurst and Blacket.

Ritchie J. and Ritchie J. 1979. Growing up in Polynesia. Sydney: George Allen and Unwin.

Schagatay E. 1996. The human diving response: Effects of temperature and training. PhD thesis. Department of Animal Physiology, Lund University.

Schoeffel P. and Talagi S. 1989. The role of women in small-scale fisheries in the South Pacific: Report of case studies in Cook Islands, Papua New Guinea, Solomon Islands, Tonga, Vanuatu and Western Samoa. London: Food and Rural Development Division, Commonwealth Secretariat (TP/SFD/1).

Thaman R.R. 1982. Deterioration of traditional food systems, increasing malnutrition and food dependency in the Pacific Islands. Journal of Food and Nutrition 39:109–121.

Titcomb M. 1978. Native use of marine invertebrates in old Hawaii. Pacific Science 32(4):325–386.

Vaea Hon. and Straatmans W. 1954. Preliminary report on a fisheries survey in Tonga. Journal of the Polynesian Society 63:199–215.

Zann L.P. 1994. The status of coral reefs in south western Pacific Islands. Marine Pollution Bulletin 29(1):52–61.

Zann L. and Muldoon J. 1993. Management of marine resources in the Kingdom of Tonga. unpubl. Technical Annex to: Tonga National Tourism Plan. Canberra: Nicholas Clark and Associates.

Zann L.P., Kimmerer W.J. and Brock R.E. 1984. The ecology of Fanga'uta lagoon, Tongatapu, Tonga. Honolulu: University of the South Pacific and University of Hawaii Sea Grant Cooperative Report.

Young Tongan girl gathering marine invertebrates on the reef flat

Appendix

Major uses of seaweeds, marine invertebrates and coral limestone in ancient and contemporary Tonga. This list is a summary of the uses described in Malm 1999. Obsolete (or almost obsolete) uses and beliefs are marked with an asterisk (*).

A. Seafood

1. Subsistence: seaweeds, jellyfish, sea anemones, mantis shrimps, prawns, shrimps, crabs, spiny lobsters, chitons, gastropods, bivalves, squids, octopi, sea urchins, sea cucumbers.
2. Mutual assistance among relatives and friends: any seafood.
3. Gifts "in kind" to church conferences and ceremonial occasions: especially spiny lobsters, giant clams and octopi.

B. Income generation

1. Sale of food, within Tonga: any seafood.
2. Sale of jewellery, handicrafts and souvenir shells, within Tonga: precious corals, crab shells, gastropods, bivalves, large spines from sea urchins.
3. Export of seafood: especially seaweeds, lobsters, giant clams, octopi, sea cucumbers.
4. Export of jewellery: black coral, gastropods, mother-of-pearl, cultured pearls.
5. Specimens for marine aquaria: corals, sea anemones, crustaceans, molluscs.

C. Decorations and jewellery

1. Grave decorations: coral sand, crushed coral, red gorgonians, gastropods, bivalves.
2. Jewellery, small carvings: precious corals, gastropods, bivalves.
3. Inlay in wood carvings and jewellery: mother-of pearl (recently revived in the manufacture of souvenirs and replicas, including abalone shell in boar tusks and sliced whale's teeth).
4. *Exchange valuables: gastropods, bivalves.
5. Dress decorations: gastropods, bivalves.
6. *Decorations on baskets: gastropods, bivalves.
7. Decorations in houses, churches and gardens: red gorgonians, gastropods, bivalves.

D. Use of coral lime

1. *"Permanent-wave", stiffen or bleaching hair.
2. *Dyeing hair.
3. *Keeping the hair clean from lice.
4. Treating skin ailments.
5. Dyeing waist mats.

E. Seafaring and fishing

1. Scrubbing boats: seaweeds.
2. *Decoration on canoes: common egg shells.
3. Anchors: coral rocks.
4. Octopus lure: limestone, tiger cowry.
5. Fishhooks: gastropods*, bivalves (only pearl oysters still used).
6. *Sinkers for dip nets: pieces of coral, money cowry, ark shells.
7. Weights for palm fronds used in fish drives: pieces of coral.
8. Fish bait: seaweeds, shrimps, crabs, mollusc meat, sea urchins.
9. Catching fish in baskets: seaweeds, stony coral.
10. Fish poisoning: *loli* sea cucumber.

F. Utensils

1. Scrubbing hands: soft coral/sponge*, globular coral.
2. *Files, abrasive instruments: coral, clam shells, spines from sea urchins.
3. *Knives: gastropods, bivalves.
4. *Chisels, gouges, drills: gastropods, bivalves.
5. *Scrapers, graters: gastropods, bivalves.
6. Smoothen and straighten pandanus leaves: bivalves.
7. *Shaving: bivalves.
8. *Adzes: bivalves.
9. Cracking coconut shells: bivalves.
10. *Impression in ceramics: bivalves.
11. Signalling device: triton's trumpet.
12. Bowls, trays, ashtrays: large bivalves.
13. Stones for earth ovens: limestone.
14. Weights on screen nets used for covering food and/or drink: gastropods.
15. *Drawing boils: bivalves.
16. Markers in games: gastropods, bivalves.
17. *Self-mutilation at funerals: gastropods, bivalves.

G. Other uses

1. Construction works: limestone.
2. *Reading auguries: tiger cowry.
3. Revealing virginity: egg shell.
4. *Strengthening the fist of a fighting man: cone shells.

Achieving the potential of locally managed marine areas in the South Pacific[1]

Hugh Govan[2]

Abstract

In the Pacific Islands, ever-increasing pressures on limited natural resources are mainly the result of rapid population increases. Soon, these pressures will be exacerbated by the impacts of climate change. One key to successfully containing such pressures could be locally managed marine areas, which build on existing community strengths in traditional knowledge, customary tenure and governance, and are combined with a local awareness of the need for action. However, the success of the locally managed marine areas depends on broadening their scope so that they serve as building blocks for the integrated management of island communities. The implications of this are examined in detail.

Introduction

More that 12,000 km^2 in the South Pacific came under active management during an unprecedented surge in community-based coastal resource management over the last decade. This now involves more than 500 communities in 15 independent countries and territories, and includes more than 1,000 km^2 as "no-take" areas, and has facilitated the achievement of widespread livelihood and conservation objectives.[3] The approach builds on existing community strengths in traditional knowledge, customary tenure and governance, combined with local awareness of the need for action. In most cases, the impetus is a community desire to maintain or improve livelihoods where conservation and sustainable use are concepts already embedded in traditional environmental stewardship.

The acceptance of locally managed marine areas (LMMAs) has resulted from communities' perception of likely benefits, including recovery of natural resources, improved food security, improved governance, access to information and services, health benefits, improved security of tenure, cultural recovery, and community organisation.[4] Perceived benefits also include the exclusion of other stakeholders from fishing areas and working with outside agencies. Communities may perceive some acceptable combination of benefits resulting from their investment, the major one perhaps being their increased control over local resources.

Despite difficulties in quantifying the impact of LMMA approaches to livelihoods, the available information — combined with the absence or failure of alternative approaches — strongly supports community-based adaptive management as the fundamental building block of integrated island management or ecosystem approaches. Among the major innovations facilitating the spread of LMMAs have been the clusters of sites supported by regional, national and sub-national or social networks. Others include the support of agencies for simple participatory learning and action approaches, the development of more support-oriented roles by government agencies, an increased recognition of the importance of cost-effectiveness, and some development of relevant legal frameworks.

Although widespread implementation of LMMAs will result in an increase in marine protected areas (MPAs), concentrating on this alone would be costly and hard to sustain. Significant environmental or fishery benefits from more "no-take" zones are unlikely, unless communities use a greater range of management tools to address other issues in their wider fishing area and watersheds. Evidence from Fiji and Solomon Islands suggests that such integrated approaches are feasible, and that pilot-stage

1. This article is based on Govan H. (ed) 2009. Status and potential of locally managed marine areas in the South Pacific: Meeting nature conservation and sustainable livelihood targets through wide-spread implementation of LMMAs (sponsored by SPREP/WWF/WorldFish-Reefbase/CRISP), which can be downloaded from http://www.sprep.org/att/publication/000646_LMMA_report.pdf
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3. In comparison, older models of larger, centrally planned reserves have mostly failed, such that the inclusion of some 14,000 km^2 of "paper parks" in national and global databases of the region must now be reviewed.
4. Although an increased abundance of target species in closed areas has been verified quantitatively, support for other benefits is less scientific.

costs for large networks of sites could be just hundreds of dollars per community. Despite this, some conservation or science-driven approaches that continue to be implemented seem unrealistically expensive, possibly indicating a lack of emphasis on cost-effectiveness (Govan 2009).

Effective local management should be sponsored by national or provincial governments in collaboration with civil society, to develop cost-effective support and coordinate adaptive management in communities where natural resources are threatened. Collaboration is necessary to reduce costs and ensure an affordable long-term resource management strategy that is best adapted to achieving not only national commitments to protected areas, but also priorities relating to food security, resilience and adaptation to climate change.

The LMMA approach builds on local and traditional strengths in resource management that offer opportunities for conserving both the resources and the resilience of Pacific Islanders — the keys to the survival of their way of life. Incautiously attempting to either expand approaches or inject large amounts of new funding could erode the very foundation of LMMAs. As stated in 2008 by the Hon Dr Derek Sikua, Prime Minister of Solomon Islands, the "self-sufficiency of the subsistence community ... is an asset that must not be overlooked or undermined. We have a degree of self-sufficiency that provides an important protection from the risk of vulnerability."

In this respect it is fundamentally important to understand that in hundreds of locations, communities are already actively "managing" their resources. They are identifying their own problems, making decisions and then taking actions to overcome these problems. Because this provides the basic building block for resource management and sustainable development, governments and supporting agencies should nurture this "seed" as a foundation for the more holistic management of community and national development. This will require recognising the potential of the LMMA approach and developing institutional and legal support for which there is no modern precedent. This might entail either adapting traditional institutions to suit new situations, or developing new hybrid institutions. Staff and institutions would probably require a shift in mindset toward facilitating and supporting, and simultaneously abandoning, the blind command-and-control mentality. This change is already becoming apparent in some countries.

The objectives of these approaches may be explicit, but they may also be varied and unarticulated. Communities are motivated to improve livelihoods, and this often relates to food security or improved harvests. Communities would benefit from a broader discussion of problems and root causes to ensure a wider understanding of, and local compliance with, community management decisions and actions. This may help avoid the inappropriate use of tools (e.g. MPAs) in situations where these are unlikely to have much benefit. Articulating community discussions and decisions would provide essential reference points for communities in ongoing adaptive management, and would assist in with coordinating support agencies.

This does not necessarily entail complex "management plans" — easily understood, simpler and community-appropriate planning is preferable. Plans based on more-or-less defined objectives and the ongoing evaluation of progress by communities has been termed community-based adaptive management (CBAM) (Govan 2008; Govan et al. 2008a), and are common where large-scale and long-standing management is in operation. Frequently, external agencies either trigger the review process, or are at least party to its conclusions. Therefore, CBAM may be more appropriately termed "community-based adaptive co-management".

Management is primarily by the relevant user groups within a community, but also involves local and national institutional agencies and private stakeholders. This optimises the use of such social capital as existing (or assigned) resource rights, local governance, traditional and local information, self-interest, and self-enforcement.

A community sets priorities, establishes objectives and proposes actions based on local information. Actions are implemented and results are checked periodically.[5] Plans represent a community agreement and are frequently straightforward, single-page documents. Results of checking (which may be scientific or perceptual) plus new information are used to review and modify the plan. This allows new information or initiatives to be incorporated (e.g. disaster preparedness or adaptation to climate change).

It is clear that community-based adaptive management is a simple and familiar concept, given its similarity to many traditional resource management approaches (Hickey 2006; Cinner et al 2007). What is relatively new, or at least not yet widely accepted,[6] is the proposal that this approach could

5. In Fiji, about one-third of villages reportedly define quantitative goals and monitor them using more or less scientific approaches such as replicated transect surveys (Govan et al. 2008b).
6. See, for example, Johannes 1998 and the case for dataless management.

form the basis for securing the well-being of Pacific Island resources and communities.

To maximize the potential of adaptive management approaches, articulating community "plans" and regular participatory reviews of these plans should be incorporated into support strategies for all natural resource and community development initiatives. In addition, adaptive management, as "learning by doing", should be performed not only at the community level, but also by supporting agencies, because all too often staff merely repeat the assumptions and, therefore, the mistakes of the past.

Management tools selected by communities tend to be simple to implement and enforce, and include area and/or seasonal closures, restrictions on specific fishing techniques, waste management, and restoration activities.

Experience from Fiji and elsewhere (Govan et al. 2008a) suggests that some benefits should be tangible and prompt, in order to encourage continued management. Importantly, these need not be monetary benefits, and frequently consist of local perceptions of increased stocks of certain species in closed areas.

Owing to their simplicity and cultural relevance, and to varied international pressures and interests, various forms of no-take zones are inevitable (Govan et al. 2008a). However, considerable scope exists for better tailoring these to community objectives, thereby avoiding the risk of disappointing failure and de-motivation.

Other tools that should be considered for the whole area under customary tenure include closed seasons, protecting nursery habitats and spawning aggregations, and restricting destructive practices. National regulations, once understood and adapted and applied to local problems, stand a far better chance of enforcement. The key is that rules should be both simple and easy to apply fairly.

Given that improved fisheries harvests is the prime driving force for most communities, it is urgent to ensure that appropriate fisheries-related advice is available. Conservation organisations may not be best placed to provide such advice, a weakness that could be addressed through greater engagement with national fisheries departments. A caveat applies though, because much of the fisheries management experience in the region has been driven by inappropriate Western models that are data intensive, expensive, inflexible, and totally unsuited to the context of the Pacific Islands (e.g. see Ruddle and Hickey 2008; World Bank 2000; Munro and Fakahau 1992).

Implications for larger-scale implementation

1. Using customary tenure as a management unit

Owing to the limitations of small area closures as a sole management tool, the need to manage the wider fisheries or resource impacts, and indeed the desirability of more ecosystem-wide approaches, all existing and future adaptive management should consider the possibility of including the wider tenured area in community planning. In Fiji, communities manage the entire customary fishing ground (*qoliqoli*), and examples of this approach are increasing in Samoa, Solomon Islands and Papua New Guinea (Govan et al. 2008a), suggesting that community-based management of the entire customary tenured area may be feasible where boundaries are clearly accepted. This has been restricted mostly to the marine environment, which probably reflects practitioners' biases rather than major impediments.

It will be important to develop guidance for practitioners on working with tenure, improving the use of traditional ecological knowledge, and other related social factors in each country. The expansion of management to wider areas involves two levels of potential conflict. At the community or local level this could provoke or exacerbate existing boundary disputes. However, simple approaches to early identification and potential exclusion or buffering of such situations should be relatively easy to devise. National or central governments may be reluctant to validate local claims over what may be legally national or "crown" property. However, this should be simple to work around because the approach is restricted to "resource management". For example, Tonga has state ownership of all coastal resources, and passed legislation allowing for progressive community-based management (Govan et al. 2008a).

2. Sizes and constancy of "no-take" zones

The ambitious global targets to achieve large proportions of protected area coverage were the origin of much support for LMMAs in the South Pacific. Significant differences between community implemented closures and protected areas exist, and these differences should be thoroughly and urgently explored before planners design national approaches to MPA coverage or sustainable development.

Although some controversy surrounds this issue (cf. Foale and Manele 2004), traditional closures or taboos are but one of many traditional resource management tools intended largely to ensure the sustainable use of resources or to sustain communities. Thus, area closures are flexible, and LMMAs

may be either occasionally or routinely harvested, and may be small enough to be optimally suited to enforcement and tenure. This is different to some Western perceptions of protected areas.

Although smaller no-take, strict reserves or closed areas are sometimes criticized as not being suited to biodiversity conservation, this overlooks the fact that smaller reserves may be better suited to the fisheries management objectives of communities, and may be more appropriate to local tenure and enforcement capability. These closures can also be important community rallying points for other aspects of management plans.

According to Halpern and Warner (2003) and the International Union for the Conservation of Nature's World Commission on Protected Areas (IUCN-WCPA 2008), the shape of a reserve designed for biodiversity conservation should minimise edge habitat and maximise the interior protected area (i.e. a large and circular shape is optimum). In contrast, for fisheries management, the type and spatial extent of the habitat bordering the MPA may be more important than size; a large size being of little benefit and greatly reducing available fishing grounds, because this influences migration or spill over.

Some community reserves are very small, and undoubtedly could achieve more community expectations if they were either larger or configured differently. CBAM affords communities the opportunity — based on either external advice, or more likely other communities' experience — to try different temporal or spatial configurations. A change in the configuration of a reserve might be adopted if it is perceived that the benefits outweigh costs, in terms of enforcement or conflict.

Similarly, community reserves are usually intended to be opened periodically to ensure that food is available at specific times. Although less commonly adopted elsewhere for biodiversity conservation, this approach is not incompatible with certain categories of protected areas, and is a common fisheries management tool. Given the prevalence of periodic closures in the region and compatibility with traditional practices, closures may be some of the best suited fisheries management tools in the Pacific. Their role and optimization, in terms of biodiversity conservation, needs to be explored further.

Ultimately, under the prevailing LMMA approach, communities determine reserve sizes, configurations and closure regimes. This approach needs to be adopted in the context of national or ecosystem-wide management. Management and enforcement are occurring at the local level, but temporal aspects may need new approaches for monitoring or planning.

3. Achieving ecological networks or representative coverage

Social and institutional strategies have been key factors in the rapid spread of LMMAs in some areas. Agencies have usually set logistical, social and other community criteria, rather than explicitly ecological factors, to guide site selection. Criteria such as community motivation and interest, absence of conflicts, and logistical support considerations, along with an adaptive learning approach, have ensured that a large body of "successful" or pilot experiences has accumulated, which then serve to inform approaches adopted elsewhere.

Initial technical input may often be reduced to simple rules of thumb, based either on experience elsewhere or on existing scientific information. Communities that adapt technical input based on traditional and local knowledge have a starting point for implementation that can be improved, based either on experience or on new information.

These "learning by doing" approaches are ill-fitted to Western and external conservation planning. Letting external priorities decide the choice of site for implementation of community conservation is an expensive approach, one that may lead to the management of smaller areas and the increased dependence on either incentives or investment of external resources. Such an approach is linked to the long lists of failed MPAs or "paper parks" (cf. Huber and McGregor 2002; cf. data on "active sites" in Govan 2009). National governments should ensure that prioritisation does not restrict the availability of more generalised (e.g. livelihood) benefits to a wider population.

The history of protected areas in the South Pacific suggests that failure to understand the inadequacies of top-down planning and the limitations of externally imposed models results in even more expensive failures when pilot projects are applied on a larger scale (e.g. the low survival rates of protected areas established under costly regional programmes such as the South Pacific Biodiversity and Conservation Programme and the International Waters Programme, as well as large national projects such as the Milne Bay project).[7] This situation is exacerbated by the risk of undermining existing functioning or promising approaches reliant on local social capital.

7. Baines et al. 2002, 2006; Aitaro et al. 2007; Govan 2009.

Probably the most constructive and sustainable approaches observed in the study — in terms of cost-effectiveness and potential for institutionalisation under government systems — are those in Samoa and Fiji, and more recently in selected districts elsewhere. In these areas, national or sub-national approaches were used in the wide-scale establishment of LMMAs, guided by principles for successful and sustainable establishment derived from other locations. External inputs were employed to monitor biodiversity, with selective research done on key or emerging issues. In addition, field-level advice and procedures were chosen to maximise benefits.

4. Planning processes and techniques

It is often tempting to use unnecessarily sophisticated tools. However, when CBAM is promoted, the tools used should be as widely adaptable, inclusive, simple and intuitive as possible. This is essential for both communities and support agency staff.

Communities benefit from the simple tools that help rationalise planning, as well as from the support of neutral external facilitators. Processes and tools may have to be applicable to large groups and, in some cases, most of the community or stakeholders. The tools and processes employed by the community should also be directly related to agreements and implementation strategies, and be as transparent or accountable as possible. In addition, they should provide outputs that can be discussed with outsiders with little risk of misunderstanding, and facilitate internal and potentially external evaluation as part of adaptive management.

Staff from implementing organisations may come from a variety of educational and professional backgrounds, such as fisheries, conservation, university, and community development. Only rarely are there opportunities for formal training. Techniques and processes need to be easily understood, based on simple principles, and readily adaptable to local circumstances. They should also be easy to track and assess to facilitate quality control and detect systemic problems rapidly.

5. Social networks

Social networks or support "umbrellas" have been crucial in establishing and supporting communities and agency programmes. Operating at sub-national, national and international levels, these networks provide more flexible learning opportunities than do formal methods. They also allow communities to establish linkages that may promote both ecological and cultural resilience (e.g. national and regional LMMA networks, as described in LMMA 2007, and Rowe 2007). Government agencies may sometimes provide most of these network services. However, they are particularly enriched when open to all sectors. In Melanesia, for example, they were originally driven by civil society before concerted attempts were made to encourage governments to take lead roles.

The linkages that networks facilitate should not be underestimated, as they may encourage the development of new and more appropriate institutional relationships and structures, the coordination of interventions and policy at a national level, conflict management, and information flow. Networks are likely to be stifled by prescriptive approaches, and it is difficult to identify key ingredients, other than building trust and ensuring the commitment of the individual or institutional members.

Most countries have either adopted or are moving toward a decentralised approach to LMMAs. This reduces logistical challenges and costs in supporting networks, and may improve responsiveness of institutional support to local issues.

6. Information and research needs

Much emphasis has been placed on "awareness raising," and environmental education and information is of great interest to communities. However, considerable increases in effectiveness and savings can be made by improving information flow. There is much overlap in the information used by different programmes, and despite some sharing of information, donors still fund projects that "re-invent the wheel" (i.e. reproduce materials that are very similar to what already exists). A few judicious additions to existing sets of posters[8] and audio-visual aids would most likely cover the initial needs of most communities. Participatory information and awareness raising tools have been regularly used as part of LMMA planning in Fiji, Solomon Islands and Vanuatu (Govan et al. 2008a).

Some aspects of "information materials" have not been addressed adequately. This reflects either the interpretation of priority information needs by outsiders, or a lack of research. Research should be more responsive to the needs of the managers (i.e. communities and their support agencies). At present, research and capacity priorities are often

8. For example, the initiative by the Foundation of the Peoples of the South Pacific International (FSPI) to make freely available the artwork for posters on coastal resource issues, which has resulted in their adoption and translation in over seven countries (http://www.fspi.org.fj).

derived from outside the region and based on inappropriate management models. There is now considerable technical support capacity in the region, but agencies face the challenge of delivering most targeted and appropriate support discerning priorities on the ground. New approaches to improve communication between communities and their support agencies on the one hand, and research institutions on the other, are needed.[9]

Some of the key research or information needs that have emerged from communities or their support agencies include: 1) provision of management information for individual species of interest to communities; 2) the organic spread of LMMAs in order to achieve national fisheries and biodiversity objectives; 3) optimising traditional closure systems (small sizes and periodic openings) as a management tool; 4) applying similar management approaches to watersheds; and 5) ensuring that research institutions address community information needs.

7. Integrated resource management as the basis for sustainable livelihoods and conservation?

The features of LMMAs, particularly in terms of size and permanence discussed above, imply that to fulfil their conservation and livelihood potential it is necessary to boost the expansion and growth of the LMMA approach, until adaptive management becomes the norm rather than the exception at the community level. The potential of the CBAM Pacific Island experience goes far beyond achieving international goals of "representative networks of MPAs", and addresses the wider call for systems of integrated coastal (or island) management (ICM) or ecosystem-based management that address livelihoods, development, inshore fisheries and conservation as a whole (Whittingham et al. 2003; Bell et al. 2006; World Bank 2006; Jenkins et al. 2007; Ruddle and Hickey 2008).

Current assessments suggest that MPAs alone will do little for biodiversity or livelihoods in the face of increasing upstream or watershed impacts, global impacts, generalised unsustainable marine resource use and increasing population and social pressures. These threats might be better mitigated through integrated and broadly based approaches that focus on community adaptive management, and extended through networks and linkages to other stakeholders in other locations and at other scales.

Integrated or ecosystem management may be best approached in a similar "learning by doing" fashion, building on similar simple and intuitive participatory processes. Using CBAM institutions as the basic building blocks for representation at larger scales, these stakeholders can coordinate and interact with wider-scale institutional stakeholders. Many of the participatory planning tools and processes used at the community level are also suitable at this scale. The focus would be on achieving active and tangible management, rather than on comprehensive but ultimately inapplicable technical understanding. Experiences in Fiji and elsewhere suggest that this is not an unrealistic scenario, provided it builds on local culture (Tawake et al. 2007; Inglis et al. 1997; Thaman et al. 2005). International obligations are more likely to be met, in a more sustainable and locally relevant way as community-based approaches usually generate the most enforceable examples of closed areas and/or MPAs, and often serve as stepping stones to larger systems of protected areas or conservation initiatives (Whittingham et al. 2003; Bell et al. 2006; World Bank 2006; Jenkins et al. 2007). Achieving the potential of ICM based on CBAM will involve developing strategies that integrate previously separate conservation, fisheries and livelihoods sectors, and address some relatively neglected but vital areas.

8. Institutional and legal frameworks

In Polynesian countries, governments have often played a central role in implementing LMMAs within a relatively clear legal context. In contrast, in most Melanesian countries, civil society has assumed the main role in promoting and sustaining support for LMMAs.

Although it is widely recognised that it is neither appropriate nor sustainable for NGOs to play a long-term and central supporting role to LMMAs, there have been mixed results in attempts to build government capacity to support these networks. Where progress has been made, it is clear that long-term and patient investment in staff training and government institutional priorities are required, including cost sharing of staff and other support. Future initiatives should ensure appropriate government involvement, from the design stage to hand-over to communities.

In most countries, fisheries departments are perceived as the most appropriate lead agency. However, in other countries there is some confusion. Fisheries departments seem appropriate, because communities are interested primarily in livelihoods or fisheries benefits. In addition, fisheries departments typically have better resources and relatively

9. Wilson (2007) warns that self interest frequently clouds the priority setting capacity of researchers.

large numbers of decentralised field staff (provincial fisheries officers and so on), enabling them to provide the long-term support that communities will require.

Departments of the Environment could emphasise their crucial role outside of the routine extension-type work needed to support LMMAs. Well placed in terms of access to expertise and possibly external funding, they could ensure an overview of the more ecosystem-wide issues, including the fulfilment of national obligations within the context of the expanding network of LMMAs. In addition, selective monitoring of such key issues as vulnerable ecosystems and endangered species could inform and help coordinate the community based work to achieve the maximum environmental benefits. Specific gaps, such as breeding areas for endangered species, might be identified, and, if not addressed under the LMMA system, could need special protected area approaches. In relation to terrestrial protected areas, or other forms of management, it may still be beneficial for Department of Environment staff to engage with these issues through existing CBAM processes of coastal LMMAS, where these are relevant.

It will be important to strengthen and adapt national and sub-national policy and institutional frameworks in support of ICM/EBM (based on community-driven adaptive management) to ensure robustness to such external drivers as population increases, market pressure, climate change, and terrestrial impacts. The strengthening of institutional capacity will require innovative approaches from NGOs and donors, imaginative and tailored institutional structures that may adapt or hybridise traditional or national institutions. Bridges between these and other stakeholders can be built using networks and umbrellas, examples of which are now established in the region (Cinner et al. 2007; Cinner and Aswani 2007; Anderies et al 2004; Ostrom 1990; Berkes 2004; Tawake et al. 2001; Tawake 2007). These support networks or umbrellas have proven useful in the advancement of national community-based management in Fiji and also Solomon Islands and Micronesia (Fiji LMMA, Solomon Islands LMMA, Pacific Islands Marine Protected Areas Community – PIMPAC), and allow for effective partnerships between government and civil society.

A number of agencies have overlapping responsibilities (e.g. environment, fisheries and disaster preparedness/adaptation), which could interface with communities through an integrated community-based adaptive management approach, thereby cutting costs and ensuring uniformity in processes. It would be important to examine ways to encourage or at least support interdisciplinary and cross-sectoral approaches in appropriate and sufficiently flexible legal frameworks.

Melanesian countries are still working on the legal backing or support for LMMA approaches. This support is not yet essential, but will become more important as additional sites are included, and especially if government departments formally take over implementation.

It is essential that such legislation not hinder community implementation. This already occurs and is holding back community initiatives, forcing them to depend on external assistance to fulfil requirements. Requirements should be as simple as possible, hopefully in line with products and processes that communities are already preparing as part of planning exercises. In addition, these should not be subject to the production of additional regulations or legislation by central government, which again would represent a constraint beyond the control of communities. Some features of such legislation might include:

- A requirement for a simple management plan covering key agreed-upon points such as major resources, key problems and community-approved solutions. This should be "community appropriate" (e.g. flip chart, matrices, and just a few pages in length);
- Evidence of minimum criteria met by the plan regarding process (participation of appropriate stakeholders, wider community and time span), content (structure, objectives, simple to understand), context (existing legislation, ecological issues, wider coastal zone, national or ecosystem issues); and
- The continued acceptance of a community plan into registry or national database and its legal status is subject to demonstration of regular community review (e.g. every three years).

9. Meeting international obligations

Several problems emerge when attempting to assess the extent to which Pacific Island countries have met their obligations under the Convention on Biological Diversity (CBD) and the Durban Accord and Durban Action Plan to "effectively manage at least 10% of marine and coastal ecological regions", or to cover at least 20–30% of each marine habitat with strictly protected areas (*cf*. Benzaken et al. 2007; Spalding et al. 2008; Wood et al. 2008). There is little agreement regarding the extent of marine or coastal areas to which the commitments refer, possibly because of the lack of complete basic datasets on national marine areas (except in the cases of exclusive economic zones and coral reef area).

Although dependent territories and associated states maintain a relatively reliable record of MPAs, independent states do not. Most countries do not maintain an up-to-date national list, and

have relied on data submitted to the World Database of Protected Areas. Data submitted appears to be extremely variable, generally under-reporting active community conserved areas (CCAs) but, of far greater concern, vastly inflating marine management area coverage with inactive or inappropriate sites, particularly in Tonga, Papua New Guinea and Solomon Islands.

Another issue is the extent to which wider managed areas and no-take zones or taboos equate with "effective management" and "strict protection" in the conventions. This, and also the mechanisms and criteria by which extended tracts of land and sea under customary tenure could be considered as CCAs, should probably be debated at a high political level, in the context of wider national development agendas.

Fiji may be the only independent country that is well-advanced in extending some sort of management to its inshore areas or reef habitat. Targets for the remaining independent countries appear extremely distant.

Given these countries' other national and international commitments to poverty alleviation and sustainable development, it may be appropriate to examine how wide-scale coverage of marine resource management can be achieved, as in Fiji (and to a lesser extent Samoa). Approaching this piecemeal, based on individual MPAs, would likely be both impossible and produce comparatively little national benefit.

10. Financial costs of expanding LMMA networks

The most cost-effective approaches to achieving objectives and targets of food security, poverty alleviation and conservation in South Pacific countries would be integrating LMMAs into national resource management strategies. This includes inshore fisheries management, integrated coastal management strategy, disaster preparedness, biodiversity and endangered species, and climate change adaptation. Key criteria for such a resource management scenario integrating LMMAs in Melanesia would include: 1) their design to fully integrate into government functions over the medium term; 2) being decentralised into logistically functional management areas (provinces or similar); 3) being highly cost-effective and with a likelihood of sustainable financing; and 4) being based on a staggered or cumulative approach optimising trickle down or snowballing effects.

11. Integrating government support for national LMMA networks

Various levels of government are the appropriate providers of long-term core services required to establish and service managed marine areas. It makes sense for the fisheries authority to be a lead organisation because they have both the largest presence (national and provincial levels) and the greatest capacity to address the principal motivations of most marine managed areas, whose communities identify fisheries management as their major priority. Associating biodiversity conservation with more economically driven marine resource management is a sensible approach, and departments of the environment are well placed to ensure consideration of ecosystem-wide issues, vulnerable ecosystems and endangered species, as well as to conduct essential monitoring. They can also address issues concerning adaptation to climate change.

The most practical investments with potential for long-term impact are those for enhancing the capacity of government agencies to provide the long-term support mentioned above and, equally important, to secure recurrent budgets for this purpose. Whereas an ultimate goal might be to ensure governments prioritise marine resource management budgets, some sort of conditional trust fund arrangement may be vital to guard against reallocation of essential operating budgets.

Most governments have either established or are actively considering units appropriate to supporting community-based inshore management. Political will and capacity are the two major challenges. However, the incentive provided by international commitments and major funding initiatives may make progress on the former, while experiences in Fiji and elsewhere suggest that with time and NGO commitment, capacity can be transferred to counterpart government institutions. Fiji and recent Solomon Islands experiences suggest that with high-level institutional commitment, functional partnerships between government and NGOs can be achieved, and indeed will be vital.[10]

12. Decentralising support for local management

All countries have shown clustered and decentralised approaches to establishing and supporting LMMAs. Aside from the ecological functions of such networks, there are significant logistical and cost benefits to the approach. Staff time and transport account for most of the costs, because supporting community sites from national and sometimes

10. National LMMA networks, while initially NGO-led, are now coordinated from fisheries departments in both countries, and national policies are being adapted to reflect this partnership.

even provincial capitals is both expensive and time consuming. The definition of optimum management units will be important, and criteria for them should weigh logistical, administrative, social and cultural factors, as these will facilitate implementation if carefully chosen. These units may correspond to provincial jurisdictions or islands in Vanuatu and Solomon Islands, and districts or some provinces in Papua New Guinea. Such practical considerations as the existence of a functioning provincial fisheries office may be a determining factor. Decentralisation presents challenges for coordination and capacity building, so the role of social networks may be crucial. NGOs might need to consider seconding staff to government field offices.

13. Improving cost effectiveness and sustainable financing

As noted above, Melanesian countries face serious development issues, and their financial resources are stretched thin. The national environment and fisheries departments have extremely low budgets relative to the large areas and challenges they face. If LMMAs are to secure long-term recurrent support within national budgets, they must be demonstrably cost-effective. Arguably, the fundamental tenet of "sustainable financing" is to ensure that their financial requests are as cost-effective as possible. Few, if any, pilot projects have referred explicitly to seeking cost-effective approaches, and many have been unjustifiably over-financed.

14. Implement gradually

Major national and regional projects are both notoriously ambitious and infamously wasteful of resources. Further, direct engagement with every coastal community in Melanesia would be astronomically expensive. Therefore, a gradual approach aiming both to increase the enabling environment for community management, and focus on establishing a decentralised capacity government through successful large-scale examples of LMMA networks, would likely be both affordable and achievable.

References

Aitaro J. L., Alik L., Bakineti R., Fakaosi S., Leolahi S., Lovai N., Mesia P., Nimoho L., Paniani M., Raea T., Saloa K., Singh S., Tafileichig A. 2007. Lessons for Pacific Island environmental initiatives: Experiences from International Waters Project National Coordinators. IWP – Pacific Technical Report 44. Apia, Samoa: Secretariat of the Pacific Regional Environment Programme.

Anderies J.M., Janssen M.A. and Ostrom E. 2004. A framework to analyze the robustness of social-ecological systems from an institutional perspective. Ecology and Society 9(1):18.

Baines G., Duguman J. and Johnston P. 2006. Evaluation of Milne Bay Community-based Marine and Coastal and Marine Conservation Project, PNG/01/G31 Interim Evaluation of Phase 1, July 2006 (unpublished).

Baines G., Hunnam P., Rivers M.J. and Watson B. 2002. South Pacific Biodiversity Conservation Programme (SPBCP) Terminal Evaluation Mission Final Report to UNDP. Unpublished terminal evaluation on Project RAS/91/G31/E/1G/99.

Bell J.D, Ratner B.D., Stobutzki I. and Oliver J. 2006. Addressing the coral reef crisis in developing countries. Ocean and Coastal Management 49(12):976–985.

Benzaken D., Miller-Taei S. and Wood L. 2007. Status of policy and target development and implementation for marine protected areas/marine managed areas in the Pacific Islands Region — A preliminary assessment and future directions. Apia, Samoa: Secretariat of the Pacific Regional Environment Programme.

Berkes F. 2004. Rethinking community-based conservation. Conservation Biology 18:621–630.

Cinner J.E. and Aswani S. 2007. Integrating customary management into marine conservation. Biological Conservation 140(3–4):201–216.

Cinner J., Sutton S. and Bond T. 2007. Socioeconomic thresholds that affect use of customary fisheries management tools. Conservation Biology: online early articles.

Foale S. J. and Manele B. 2004. Social and political barriers to the use of marine protected areas for conservation and fishery management in Melanesia. Asia Pacific Viewpoint 45(3):373–386.

Govan H. 2008. Overview: Reclaiming "Protected Areas" as a livelihood tool for Pacific Island people. p. 1–5. In: Cohen P., Valemei A.D. and Govan H. 2008. Annotated bibliography on socioeconomic and ecological impacts of Marine Protected Areas in Pacific Island countries. WorldFish Bibliography No. 1870. Penang: The WorldFish Center.

Govan H., Aalbersberg W., Tawake A. and Parks J. 2008a. Locally-managed marine areas: A guide to supporting community-based adaptive management. The Locally-Managed Marine Area Network. (http://www.lmmanetwork.org)

Govan H., Tawake A., Comley J. and Vave R. 2008b. Fiji biological monitoring update and proposed next steps. Locally Managed Marine Area Network. USP-IAS internal document, 20 June 2008.

Govan H. (ed) 2009. Status and potential of locally-managed marine areas in the South Pacific: Meeting nature conservation and sustainable livelihood targets through wide-spread

implementation of LMMAs (sponsored by SPREP/WWF/WorldFish-Reefbase/CRISP). Retrived from: http://www.sprep.org/att/publication/000646_LMMA_report.pdf

Govan H., Tawake A., Tabunakawai K., George S., Alefaio S., Troniak S., Maltali T., Tafea H., Walton H., Bartlett C., Jenkins A. in press. Community conserved areas: A review of status and needs in Melanesia and Polynesia. ICCA regional review for CENESTA/TILCEPA/TGER /IUCN/ GEF-SGP. Gland: IUCN. Available at: http://www.iucn.org/about/union/commissions/ceesp/topics/governance/icca/regional_reviews/

Halpern B.S. and Warner R.R. 2003. Matching marine reserve design to reserve objectives. Proceedings of the Royal Society of London, Series B, 270:1871–1878.

Hickey F.R. 2006. Traditional marine resource management in Vanuatu: Acknowledging, supporting and strengthening indigenous management systems. SPC Traditional Marine Resource Management and Knowledge Information Bulletin 20:11–23.

Hickey F.R. 2008. Nearshore fisheries and human development in Vanuatu and other parts of Melanesia. SPC Traditional Marine Resource Management and Knowledge Information Bulletin 24:9–18.

Huber M. and McGregor K. 2002. A synopsis of information relating to marine protected areas. IWP Technical Report 2002/01. The International Waters Programme, Apia, Samoa: Secretariat of the Pacific Regional Environment Programme.

Inglis A., Govan H. and Guy S. 1997. Local voices to the surface: Participatory coastal zone management in the Solway Firth. PLA Notes 30.

IUCN-WCPA. 2008. Establishing Marine Protected Area Networks—Making it happen. Washington, D.C.: IUCN-WCPA, National Oceanic and Atmospheric Administration and The Nature Conservancy.

Jenkins A.P., Jenkins C.L. and Reynolds J.B. 2007. Successes and challenges of managing coral reefs in Papua New Guinea through locally managed marine areas. Alternate Visions LLC. Accessed: 10 June 2008 from http://www.alternatevisions.org.

Johannes R.E. 1998. The case for data-less marine resource management: examples from tropical nearshore finfisheries. Trends in Ecology and Evolution 13(6):243–246.

LMMA (Locally Managed Marine Area network), Annual Report. 2007. Available at: (www.lmmanetwork.org)

Munro J.L. and Fakahau S.T. 1992. Management of coastal fishery resources. Pacific Islands, report 92/68. Honiara, Solomon Islands: Forum Fisheries Agency.

Ostrom E. 1990. Governing the commons. The evolution of institutions for collective action. New York: Cambridge University Press.

Spalding M.D., Fish L. and Wood L.J. 2008. Toward representative protection of the world's coasts and oceans — Progress, gaps, and opportunities. Conservation Letters 1:217–226.

Rowe A. 2007. Review of the LMMA network. Draft final report. Unpublished. Available at: wendy@lmmanetwork.org

Ruddle K. and Hickey F.R. 2008. Accounting for the mismanagement of tropical nearshore fisheries. Environment, Development and Sustainability 10(5):565–589.

Tawake A., Parks J., Radidedike P., Aalbersberg W., Vuki V. and Salafsky N. 2001. Harvesting data and clams. Conservation Biology in Practice 2(4):32–35.

Tawake A. 2007. Scaling-up networks of locally managed marine areas (LMMAs) to island wide ecosystem management while decentralising the effort of Fiji LMMA network and its implementation from national to provincial levels. A Kadavu Yaubula Management Support Team (KYMST) case study draft unpublished. Available from the author at: alifereti.tawake@jcu.edu.au

Thaman B., Robadue D. and Ricci G. 2005. Strengthening a nested system of coastal management in Fiji: Progress and lessons learned towards integrated coastal management on the coral coast and their implications for national policy. A joint project between the Government of Fiji, Institute of Applied Sciences, University of the South Pacific and Coastal Resources Center, University of Rhode Island. unpublished report.

Whittingham E., Campbell J. and Townsley P. 2003. Poverty and reefs: A global overview, DFID–IMM–IOC/UNESCO. Paris: UNESCO.

Wilson J. 2007. Scale and costs of fishery conservation. International Journal of the Commons 1(1):29–41.

Wood L., Fish L., Laughgren J., Pauly D. 2008. Assessing progress towards global marine protection targets: Shortfalls in information and action. Oryx 42:340–351.

World Bank 2000. Voices from the village: A comparative study of coastal resource management in the Pacific Islands. Discussion Paper No. 9, Papua New Guinea and Pacific Islands Country Management Unit, East Asia and Pacific Region. Washington, D.C.: The World Bank.

World Bank 2006. Scaling up marine management: The role of marine protected areas. Report #36635-GLB. Washington, D.C.: The World Bank.

Robert E. Johannes collection at PIMRIS (Pacific Islands Marine Resources Information System)

Maria Kalenchits[1] and Patricia Kailola

Robert E. Johannes (1936–2002) devoted much of his working life to research in communities in the Pacific Islands and Southeast Asia. His personal books and papers were donated to the University of the South Pacific (USP) after his death, and are now held in the PIMRIS collection, in the university's Lower Campus library. These books and copies of periodicals have already been processed by the PIMRIS library (with generous assistance from the Secretariat of the Pacific Community), and are available to the public via the library's catalogue.

However, Bob Johannes' extensive sub-collection of grey literature (maps, letters, field notes, unpublished articles, original articles and reports) remains unprocessed: it requires formal archiving and digitising. This sub-collection is stored temporarily in six, four-drawer filing cabinets, but has to be organised and processed according to correct archiving requirements. After that, full and unrestricted access can be provided to this important source of scientific heritage and traditional knowledge. The processing of the grey literature will start in 2009. Digitising the primary documents from this collection will expand its accessibility to the global fisheries and maritime anthropological community, among others, which we hope will encourage both respect for traditional Pacific resource knowledge and enhance the sustainability of marine resources in the region.

The unique nature of the Bob Johannes' archives was confirmed by Pacific Manuscripts Bureau executive archivist, Mr Ewan Maidment, who visited PIMRIS in February 2008. The academic staff of USP's School of Marine Studies also acknowledges its value, although the uniqueness of the reprints and pre- and semi-published documents has to be assessed, since many of them contain Bob's personal notes and corrections. Processing the archives includes classifying and identifying the unique primary material.

However, lack of staff and funds at USP have held up organising and digitising, to create a digital repository that will be available on the USP library website. Unfortunately, we have not yet been able to identify a donor to cover both the expenses of the technical staff who will digitise the materials and a Scientific Adviser. Such financial support would also have to cover the cost of a one-week training course in archival techniques and procedures for the library staff involved in the project. (The course could be conducted by the Pacific Manuscripts Bureau's archivist.)

Pacific Islanders and many others have long been greatly influenced by Bob Johannes' published works and lectures. Perhaps just an equally important body of knowledge may lie hidden in his archives. Yet we will never know unless they are first investigated, accessed and documented. Searching for knowledge and respecting the legacy of a pioneer drive our application for urgently needed funds to undertake this final processing of Bob Johannes' papers.

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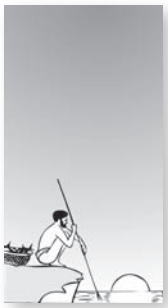
PIMRIS is a joint project of five international organisations concerned with fisheries and marine resource development in the Pacific Islands region. The project is executed by the Secretariat of the Pacific Community (SPC), the Pacific Islands Forum Fisheries Agency (FFA), the University of the South Pacific (USP), the Pacific Islands Applied Geoscience Commission (SOPAC), and the Pacific Regional Environment Programme (SPREP). This bulletin is produced by SPC as part of its commitment to PIMRIS. The aim of PIMRIS is to improve the availability of information on marine resources to users in the region, so as to support their rational development and management. PIMRIS activities include: the active collection, cataloguing and archiving of technical documents, especially ephemera ("grey literature"); evaluation, repackaging and dissemination of information; provision of literature searches, question-and-answer services and bibliographic support; and assistance with the development of in-country reference collections and databases on marine resources.

PIMRIS

Pacific Islands Marine Resources Information System



New publications

Learning and knowing in indigenous societies today

UNESCO. 2009. Learning and knowing in indigenous societies today. Edited by Bates P., Chiba M., Kube S. and Nakashima D. UNESCO: Paris. 128 p.

The loss of their specialised knowledge of nature is a grave concern for many indigenous communities throughout the world. Education, as it is understood in a Western context, occupies a pivotal role in this process, highlighted by many as both a major cause of the decline of indigenous knowledge, and also as a potential remedy for its demise. Commendable efforts are being made to better align educational curricula with indigenous realities and to incorporate local knowledge and language content into school curricula, but the interrelationship and balance between these two different ways of learning remain delicate. These issues, and attempts to address them, are explored within the UNESCO publication "Learning and knowing in indigenous societies today".

The book is organised into three sections. The first addresses the link between indigenous knowledge and indigenous language, and explores the opportunities this interconnection provides for understanding and countering declines in both. The second section examines how the loss of indigenous knowledge due to insensitive school programmes may be countered by integrating indigenous knowledge and languages into school curricula. The third section explores the need for the revitalisation of indigenous ways of learning, generally outside of a classroom environment, and how this may be practically viable in modern contexts.

To download the full publication [PDF 7.5Mb] go to: unesdoc.unesco.org/images/0018/001807/ 180754e.pdf

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The van chai of Vietnam: Managing nearshore fisheries and fishing communities

by Kenneth Ruddle and Tuong Phi Lai

Time-tested, non-Western systems of marine resource and community management are widely used in small-scale, nearshore fisheries throughout the world. In Vietnam, the more than 300-year-old van chai offers an outstanding example of such a system.

The van chai is a system of community fisheries management rooted in spiritual beliefs. Its main principles are the veneration of deities and ancestors, combined with the sacred obligations of mutual assistance within the community. At the heart of the system is the veneration of "'whales" (a generic term for cetaceans) and community ancestors as deities. Based on that sacred core, the van chai is a comprehensive management institution that addresses several basic and interrelated resource and community issues simultaneously.

These are: 1) assuring mutual assistance among fishers; 2) controlling the behaviour, rights and obligations of fisheries stakeholders; 3) regulating the disposal of the catch and profit-sharing; and 4) regulating fishing operations by enforcing rules made by the local community regarding the eligibility and seasonality of the main gear types, conciliating fisheries conflicts, and meting out punishment.

Only relatively recently has it been acknowledged that such pre-existing rights-based systems can provide potentially important alternative approaches for managing modern fisheries. Indeed, all contributors to this volume stress the future importance of the indigenous van chai in providing a foundation for organising viable local management of the nearshore fisheries and fishing communities of Vietnam. Such a system, based on Vietnamese cultural roots, would be more politically acceptable and culturally satisfying than one constructed on the abstract and unproven imported concepts currently being promoted.

Organised by the editors of this volume, a "Special Session" devoted to studies on the van chai by Vietnamese researchers was included in the "IFFET 2008" conference of the International Institute of Fisheries Economics and Trade, held at Nha Trang University, 22–25 July 2008. Preliminary drafts of some of the chapters included in this volume were presented at that event.

This volume contains seven chapters. These are: 1) "The importance of pre-existing local management systems, and their context in Vietnam" (by Kenneth Ruddle and Tuong Phi Lai); 2) "The van chai and its role in the hierarchy of fisheries administration in Vietnam" (Ha Xuan Thong and Nguyen Duy Thieu); 3) "The role of floating fishing villages in the social life of fishers in the South-Central Region" (Nguyen Duy Thieu); 4) "Van chai in fisheries village development and management in Binh Thuan Province" (Kenneth Ruddle and Luong Thanh Son); 5) "Van chai in Thua Thien Hue: Tradition, present and future challenges" (Nguyen Quang Vinh Binh); 6) "Whales in the spiritual life of coastal fishing villages in Binh Dinh Province" (Tran Van Vinh); and 7) "A comparative analysis of fisheries management via pre-existing van chai and contemporary cooperatives" (Le Tieu La and Tuong Phi Lai).

This volume is copiously illustrated, with 55 half-page colour photographs, published here for the first time.

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