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

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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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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.