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SOUTH PACIFIC COMMISSION
PO BOX D5 – 98848 NOUMEA CEDEX
NEW CALEDONIA

TRADITIONAL

MARINE RESOURCE MANAGEMENT AND KNOWLEDGE

INFORMATION BULLETIN Number 6 — January 1996

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NOTE FROM THE CO-ORDINATOR

Responding to readers' requests, in this issue we have enlarged the 'information' components of the Bulletin. We have expanded the news section on recent publications and include also information on conferences / meetings scheduled for 1996, training courses available and institutional news. Included also is a brief description of the 'Circumnavigations for Coastal Life Campaign' being launched by REEF.

Two brief descriptions of traditional fishing practices are included: Hugh Govan's contribution on the **tari** net fishing of Solomon Islands, and one by John DelRosario from the Commonwealth of the Northern Marianas.

Since the topic of 'Design principles' in common property resource management systems has become a major academic focus, as well as being of great practical importance to fisheries managers and development agencies, I have included a paper on boundary issues, presented last May at the Fifth Annual Conference of the International Association for the Study of Common Property.

We end this bulletin with a section entitled 'News from the past', where we reprint two articles originally published in Pacific Islands Monthly in 1936 and 1946.

Kenneth Ruddle

Inside this issue

PIMRIS is a joint project of 4 international organisations concerned with fisheries and marine resource development in the Pacific Islands region. The project is executed by the South Pacific Commission (SPC), the South Pacific Forum Fisheries Agency (FFA), the University of the South Pacific's Pacific Information Centre (USP-PIC), and the South Pacific Applied Geoscience Commission (SOPAC). Funding is provided by the International Centre for Ocean Development (ICOD) and the Government of France. 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 **I**slands **M**arine **R**esources **I**nformation **S**ystem

Tari fishing in Guadalcanal, Solomon Islands

by Hugh Govan
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During a visit to Tambea Bay on North-West Guadalcanal during August 1992 I observed an interesting type of traditional net fishing for trevally which I have not seen described before. Information was provided by the fishermen who came from the nearby village of Tambea.

Tari fishing is named after the type of nets used. It does not take place during any particular season, but rather whenever the sea is fine and schools of baitfish come close inshore. Apparently **tari** fishing is still carried out all around Guadalcanal and also, with slight variations, in other islands. The target species is trevally (*Caranx melampygus*) known as **mamula** in Solomon Islands Pidgin and **mancholu** in the local language.

The **tari** net looks like a scoop net 2.5–3.0 m long. It consists of a length of bamboo cane bent back on itself at one end to form a long loop about 1.5 m long by 0.75 m wide. A net of 2–3 in mesh is threaded around the loop, forming a scoop net, but it is not made fast at the handle end of the loop. Thus, if a fish hits the net this will slide to the end of the loop, forming a pocket that traps the fish.

The fishing session I observed started just before dawn and continued until midday during which time the tide was on the ebb. Ten fishermen used **tari** nets, which were spaced at intervals of 10–20 m along the sandy shore. Each net was placed in the sea perpendicular to the beach, with the aperture open to fish swimming along the shore and the end of the bamboo handle propped up on a cleft stick stuck into the sand at the water's edge. Some of the **tari** fishermen and other participants also carried **panggo** (bamboo pole-and-line rods). The lines used were nylon and the lures were made of traditional materials, such as blacklip pearl shell, or more modern material, such as the shafts of spoons.

Most of the fishing session consisted of patiently waiting for the schools of baitfish to move near to the shore. When a school of baitfish was attacked by mamula, the school frequently moved into the shallows attempting to escape. This was the cue for the fishermen to jump into action, using **panggos** to attempt to hook a feeding trevally. Lures were dunked into the seething masses of baitfish and any hooked **mamula** were swung ashore. The panicking baitfish swam along the sea's edge as close to the beach as possible, some fish actually jumping ashore in their attempts to avoid the predators. The baitfish swam through the **tari** nets unhindered, unlike trevally which would hit the net with enough force to cause the **tari** to fall off the cleft stick. At this, the fishermen rapidly pulled the **tari** ashore. Small boys tied beached baitfish to hooks and threw these in the path of feeding **mamula**.

Eight **mamula** weighing around 3–6 kg were landed using **tari**, **panggo** and hand lines during the fishing session, which involved about 15 fishermen and a number of boys.

I Galaidè

by John DelRosario

At a friend's house last weekend for a barbecue, I noticed a bowl of juvenile yellowtail goatfish crushed and mixed with fresh lemon, salt, pepper, onion leaves and a little ginger. This was fish **kelaguen**. My taste buds were flooded with saliva as my belly screamed shamelessly for some of it. Personal restraint or denial was in order, so I started tracing the process it took to bring that juvenile yellowtail goatfish **kelaguen** to the table.

The family had purchased a Japanese-made fishing net, costing several hundred dollars, a while back. With his older sons, the head of the household fitted it together in preparation for July – August, when juvenile fish usually enter the various channels and head to shore to avoid being devoured by predators. Along the shore, the family spreads its net as others pace the beach with throw-nets on their arms and shoulders.

When the 20 ft deep pocket is filled with fish, the net is slowly hauled in with men behind it, lifting portions that run up against coral or large objects. On the shore, the fish in the pocket is slowly unloaded onto the beach. A good catch could net a pick-up truck full of fish or several five-gallon plastic pans full.

The owner divides the catch among the family members and relatives who joined in the outing. He

keeps at least two shares for himself—one for the use of his net, the other his individual share. Family members keep some for themselves and share the rest with relatives and neighbours. It is a tradition—spirit of sharing—that keeps a sense of community healthy and alive. This was once second nature among our people. I found that this tradition hasn't altogether disappeared nor receded with the tide. And I found it well and alive in Mr and Mrs Nicolas Reyes' family (**kapira**).

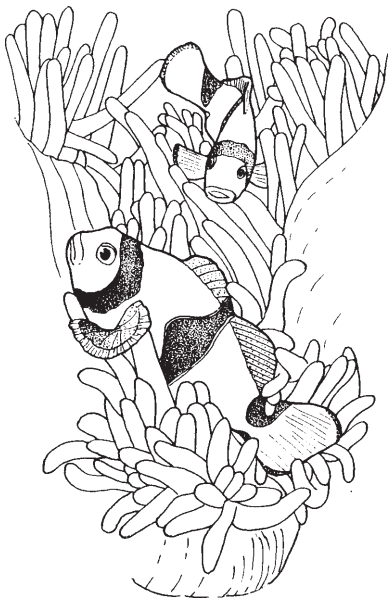
I sat there rather nostalgic for the days when this tradition was in full bloom in Lali Four village where I was born and grew up, some 40 years ago. Most of the fishers who fished the waters in our lagoon are no longer around. Some may have died or relocated to new village sub-divisions. And when they left, this tradition seems to have been uprooted as well.

It was a tradition that strengthened our sense of community. Cooperation was in abundance among our people. Indigenous people who toil the soil also share excess crops or home-grown pork, beef and chicken with friends, relatives and neighbours. I remember too that there weren't lavish dinner servings after the nine-day rosary. Traditionally, a family would purchase and slaughter a cow and divide it among those who attended the rosary. This has been replaced with a fiesta-like dinner despite the diet fad that almost everybody's into these days.

At least I had the privilege of experiencing once more a tradition that has brought family units and neighbours together. And Mr Nicolas Reyes has kept that tradition alive in his family. Most of his sons have learned how to fish, having followed their father during their younger days to the many shores of this island. They still go net-fishing together with their father and mother, and will continue fishing even if Tun Kulas is no longer with them. Tun Kulas not only taught them how to eat fish, but, most importantly, how to fish for life.

Our lagoons have provided sustenance for our people for more than five hundred years. The same can be said of our fertile soil in the hills of our island. These traditions have been complementary—sharing the riches of both land and water—though both have evolved from subsistence to a commercial level. Be that as it may, we still see these traditions practised at the subsistence level.

The fact that our lagoons have been traditional fishing grounds for our people definitely warrants the implementation of more stringent regulations to ensure that spawning areas aren't disturbed by jet skis or boats transporting tourists to and from Managaha Island. Perhaps there's wisdom too in prohibiting jet skis and fishing in and around Managaha, to enable natural flora and fauna to flourish. Let it be the breeding area for reef fish so that the supply of fish in our lagoons is replenished year-round. Let Managaha be the place where medicinal plants abound.



Managaha Island could be turned into a traditional fishing centre for posterity. Its proximity to the main island also makes it highly suitable for canoe-making. Both traditions can be revived and strengthened, involving indigenous people in various villages. We could eventually reserve at least one weekend a year to stage a 'Salute to Traditions of the Indigenous People' event, where we could proudly display our cultural traditions.

I don't quite understand the purposeful violation of the constitutionally mandated preservation of Managaha Island as a sanctuary. It has been turned into a commercial area to the exclusion of the indigenous people who also wish to operate similar business ventures on the island. Perhaps this is the result of too many greedy legal eagles in such a small community. I can't stand the arrogance with which our people have been excluded from partaking in the biggest income earning industry here in Managaha. We have to do something to break the wall of arrogance and exclusion. Look around you and ask yourself a simple question: Development for whom?

(Source: adapted from Marianas Variety News)

Back to first 'design principles': the issue of clearly defined boundaries[1]

by Kenneth Ruddle

Introduction

Codification of traditional systems of fisheries common property resource management is now a widely discussed issue, particularly in Pacific Island nations. Inevitably, it implies boundary fixing. But given the complexity of social factors involved, particularly in an era of vast and accelerating social and economic change, it is probably not desirable to attempt to fix rigidly the social and physical boundaries of traditional rights areas, at least in terms of Western-style legal systems. As is well appreciated in parts of the Asia–Pacific region, customary law may well provide a more flexible resolution, that allows for the expansion and contraction of physical, social and resource boundaries (Ruddle, 1994).

In attempting to manage the four main existing or potential problems of fisheries—*resource flows, stock externalities*, *technological (gear) externalities*, and *allocation problems*—'conventional' fisheries management assumes an open access resource regime and focuses on fish stocks and stock externalities. In contrast, traditional community-based fishery management systems focused on resolving *gear externalities* and *allocation problems*. Different, also, is the fact that their implementation is based on *defined geographical areas* with *controlled access*, self-monitored by the local fishers, and enforced by local moral and political authority.

Design principles implicit in traditional systems address the issues of gear externalities and assignment by (1) controlling a fishing area as a strictly bounded *property*; and (2) establishing precise social boundaries, by rights, to define who has access *rights* to that area. Boundaries are set by *rules of operational behaviour* that then specify assignments of time and place within the group having access. Area control is sustained by rights of exclusion, or limited access, that maintain the private area of a local community of fishers against outsiders, and intra-group operational rules are sustained by local authority that has the power to invoke sanctions on offenders.

Now 20 years old, the seminal paper by Ciriacy-Wantrup and Bishop (1975) contributed enormously to stimulating research on common property resources. But it also conveyed the unfortunate impression that common property resources, as compared with those under open access, were characterised solely by the presence of social boundaries that define persons or groups having access rights. Although boundary closure is a necessary attribute, alone it is insufficient to distinguish or even manage common property resources (Ostrom, 1990).

Although Ostrom (1990) tentatively added seven other basic 'design principles' to the list that characterises long-enduring, self-governing appropriators' institutions, she retains 'clearly defined boundaries' as the first design principle (Ostrom, 1990; 1992).

The definition of social, physical and biological boundaries around common property resources is undoubtedly a fundamental attribute and a first step in organising for collective action. But clear definition of physical, and particularly social group, boundaries seems to be especially difficult in fisheries, and is particularly problematical in tropical multi-species and multi-gear coral reef fisheries. In the Asia–Pacific region such fisheries are often characterised by complex rights and rules systems that have several or more inter-related boundary expressions, complexities that are exacerbated by rapid and multi-faceted social and economic change.

In such fisheries the prime importance of clear boundary definition must be questioned. In many instances it is probably neither possible nor desirable.

Spatial boundaries

The definition of fishing territories

In the Asia–Pacific region the sea territory of a social group is usually within the reef and commonly, but not always (*see below*), defined by proximity or adjacency to its settlement(s), and by lateral and seaward boundaries. Communities or smaller social units maintain exclusive rights to all known adjacent submerged reefs. Seaward of the reefs the degree of exclusiveness of rights gradually declines.

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[1] This is an adaptation of a paper presented in the 'Panel on Design Principles in the Governance of Common Property Resources', at the Fifth Annual Conference of the International Association for the Study of Common Property, 24–28 May, 1995, Bodø, Norway. I am grateful to Professor Elinor Ostrom for presenting the paper on my behalf

But this varies considerably according to both the local history of fissioning of human settlements and related migration, and the more recent processes of national modernisation, particularly the geographical dispersion of kin groups.

In Solomon Islands, as in other parts of Melanesia, for example, the inshore marine waters controlled by a social group are not necessarily those adjacent to its landholdings. The situation is far more complex than that.

In the Lau and Langalanga lagoons of Malaita Province, for example, whereas the coastal or 'saltwater' people hold rights to reefs and marine waters, the interior-dwelling 'bush' people also hold extensive sea rights, as well as large tracts of land in the interior of the island (Akimichi, 1978, and pers. comm.).

In some places reefs belong to inhabitants of the interior, and not to those owning the adjacent coastal land, as in parts of Rennell Island (Collenson n.d.) and Marovo Lagoon (Hviding, 1990).

At Marovo some groups have large sea territories but only small land holdings, whereas others control large land areas in the interior of the island, but have no sea territory. As everywhere, this is a consequence of historical processes of migration and settlement. In that area, to escape the endemic warfare of pre-Christian times, the ancestors of the present-day 'bush' groups hid in the interior, to escape the powerful coastal peoples.

Thus the coastal groups could establish the primary rights over sea and reefs still held by their descendants, most of whom still live in the traditional villages of 'coastal' or 'saltwater' people.

Further, inter-marriage between 'bush' and 'saltwater' people has led to some influential marine rights-holders living among the interior 'bush' groups. However, they still retain primary rights in marine areas (Hviding, 1990).

Thus it is erroneous to assume that a 'community' on which traditional management is based always refers to a physically identifiable community, such as a village or the like, that can be delimited by precise social and geographical boundaries.

A 'community' in which traditional management rights are vested is a descent-based kinship group. As a consequence of personal factors such as intermarriage, or of the alternative economic opportunities brought about by national development, among many other factors, almost inevitably these days the social boundaries of any such group will be geographically widespread.

But this is far from being the entire sea territory story. In addition to such 'secular space', the physical and social boundaries of sea territories are often complicated by claims to 'sacred space'. Examples occur in Melanesia and Northern Australia.

Sacred sea space

Such sea areas are closely related to the ancestors of the present inhabitants of an area. 'Ancestors' is defined broadly to include mythological 'ancestral beings', as among the Yolngu Aboriginal People of North Australia.

They generally regard boundaries indicating ownership as manifesting acts performed by ancestral beings while travelling over an area. For example, during a submarine journey, an ancestral being may have surfaced and re-submerged several times.

Such points are marked by physical features such as sandbars, which have a sacred significance to the Yolngu. In this way seemingly isolated sites claimed by a clan are united by reference to acts performed by an ancestral being. Such boundaries are today regarded by the Yolngu as clear ownership boundaries of their resource territories (Davis, 1984).

Schug (1995a; 1995b) has recently demonstrated that the relationship to the marine environment of Papuan New Guinean communities along the northern coast of Torres Strait extends spatially far beyond exclusive fishing rights areas.
The much broader spatial attachment of the individual communities to the Torres Strait is based on:

(a) the sacred quality and the 'spiritual essence' of ancestral figures embedded in the larger area, which has indefinite boundaries;

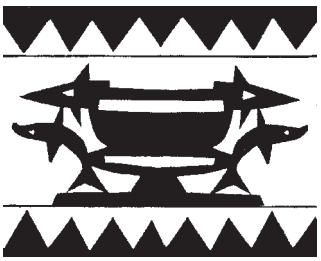
(b) a geographically and socially very widespread mesh of interpersonal relationships through centuries of trade, inter-marriage, shared land and sea territories, and other social interactions, which yields an identity claim over the entire Torres Strait region;

(c) an history of long-distance trading and resource use that extended all over the Strait; and

(d) the claim of the inhabitants to be spiritually related to dugong and turtles, that range throughout the entire Torres Strait.

Integrated resources territories

Widespread in the South Pacific is the close conceptual and ecological integration of inshore fishery resource areas with adjacent land resource units as a 'corporate estate' held jointly by a kinship-based group. Typically, these estates embrace a connected range of terrestrial and marine resource zones. Land and sea and their associated occupations are



seen as economically and nutritionally complementary domains, and not dichotomized along Western lines into 'ownable land' and 'unownable sea' (Ruddle & Akimichi, 1984; Ruddle, 1988).

Examples include the Hawaiian **ahupua'a** (Meller & Horowitz, 1987), the Yap (Federated States of Micronesia) **tabinau** (Lingenfelter, 1975; Schneider, 1974), the Fijian **vanua** (Ravuvu, 1983), the Marovo (Solomon Islands) **puava** (Hviding, 1990), and the estate of the Yolngu aboriginals of North Australia (Davis, 1984), among others.

To rigidly define a boundary limited only to just the exclusive fishing areas of individual communities is clearly not an accurate representation of local reality, where such conceptual and managerial integration occurs. Were such a boundary used as a basis for fisheries management, it would probably be seriously dysfunctional.

Social boundaries

Far more complex than defining spatial boundaries is the issue of social boundary definition (i.e., the spatial expressions of various rights and rules). Social boundaries can be based on either the individuals or social groups included.

Whereas social boundaries could be delimited and mapped, this would essentially be of academic interest only, since practical application would be so horrendously complex as to be useless.

Further, since social boundary relationships change as a response to external pressures on communities (Ruddle, 1993), their spatial expression would be in a constant state of flux, and so would require frequent redefinition. Therefore, under most circumstances, clearly defined social boundaries could never be attained.

Social boundaries are established and maintained by a combination of rights and rules. In many instances they are complexly interwoven.

Rights

Under traditional community-based systems, marine resource exploitation is governed by use rights to a property. A property right is a claim, consciously protected by customary law and practice, to a resource and/or the services or benefits that derive from it. Such a grant of authority defines the uses legitimately viewed as exclusive, as well as the penalties for violating those rights (Ruddle, 1994).

The characteristics of property rights may vary situationally. Common characteristics are exclusivity (the right to determine who can use a fishing ground), transferability (the right to sell, lease, or bequeath the rights), and enforcement (the right to apprehend and penalise violaters of the rights).

The right of enforcement, and in particular that to exclude the free-riding outsider, is a key characteristic, for without it all other rights are diminished either actually or potentially (Ruddle, 1994).

Throughout the almost all Asia–Pacific region, the members of fishing communities derive primary resource rights as members of a defined social group. Most commonly, traditional fisheries rights apply to defined areas, but superimposed on these may be the nested or countervailing rights of individuals or groups to species or technologies.

The social boundaries expressed by the two main types of right, primary and secondary, are impor

tant and complex, because overlapping and detailed regulations on the use of technologies and species are widespread.

(1) *Primary rights*

Most commonly primary rights are those to which a group or an individual is entitled via inheritance (i.e., a birthright), by direct descendance from the core of a socially-bounded, descent-based corporate group.

Primary rights are generally comprehensive, since they alone confer access to all resources within a defined territory.

Inheritance, ancestral interests, social obligations, and cooperative relationships within a defined social group provide continuity of ownership and rights.

(2) *Secondary rights*

In contrast, secondary rights are more finely bounded, often being restricted to specific fishing methods. They are acquired through affiliation with a corporate group, by marriage, traditional purchase, exchange, as a gift, or as reciprocity for services. Sometimes they may be inherited.

Secondary rights are often given to residents of inland villages lacking direct access to the coast, particularly when such villages have historical and kinship ties with a coastal village (Ruddle, 1994).

In some societies rights to fisheries, which are usually to areas, are overlaid by other rights, generally those to species and gear types. Most such 'nested rights' are quite simple, like those to stone fish-trap sites.

But in some cases nested rights are complex. Such complexity is particularly well-exemplified by Ponam Island, Manus Province, Papua New Guinea, where owners of sea and reef areas do not have exclusive ownership of their tenured waters, owing to strict limits set by countervailing, nested rights.

That rights system is composed of three main independent, overlapping and bounded elements (Carrier, 1981; Carrier and Carrier, 1983; 1989):

(a) ownership of reef and inshore marine waters;

(b) ownership of species; and

(c) ownership of fishing techniques.

Rules

Rules give substance and structure to property rights by defining how a right is to be exercised, through specification of acts required, permitted and forbidden in exercising the authority provided by the right.

Thus whereas a right authorises fishers to work a specific fishing ground, their options in exercising it are governed by rules which may, for example, specify gear type used or seasonal restrictions, among other limitations. The more complete a set of rights, the less exposed are fishers to the actions of others (Ruddle, 1994).

Basic rules related to social boundary issues are those that define:

(a) persons eligible to fish within a community's sea space;

(b) access of outsiders; and

(c) the distribution of the catch within the community.

Eligibility rules: bounding the in-group

In addition to holding rights, fisher groups in many societies are further bounded by community-based, national or cultural rules. Whereas in many societies inheritance from a defined corporate descent group and/or residence are the only eligibility rules, in others further pre-conditions must be met.

The sub-groups are defined by such criteria as caste membership, gender, marital status, and skill level, among many others.

Inter-community access rules: boundary permeability

Access controls are applied to outsiders: people from other social groups. There is often boundary permeability between neighbouring groups, a consequence of long friendship, kinship or other close association.

The more distant the 'outsider' group (socially or geographically), the less permeable are the boundaries. But increased commercial resource use often leads to the imposition of strong access controls, even on close neighbours.

Throughout the Asia–Pacific region, the rights of outsider fishers are usually closely specified by rules defining access conditions. However, there is considerable variation in local detail.

The social boundaries of individual outsiders

At Marovo Lagoon, Solomon Islands, for example, fishing rights are inherited as an integral part of all other rights and obligations entailed in kinship in a particular descent group.

Descent and inheritance are cognatic. An individual inherits group membership and associated primary rights from both parents. Thus a person's rights boundaries could embrace four group areas, if all grandparents were from different groups.

But other factors intervene. An individual's rights are normally strongest and most complete in a core area near his principal residence, but weaken progressively toward the boundaries of his rights area. They also tend to weaken through time, if not actively used.

When perceiving the exclusiveness of marine boundaries and handling questions of access in daily fishing, fishers tend to interpret kinship connections so as to operate as widely as possible. Often, their interpretation accords with that of the area's managers.

Disagreement occurs where managers feel that someone has interpreted kinship ties too liberally, and should really be defined as an 'outsider', and so confined within a closer boundary (Hviding, 1990).

In Kiribati an individual could enlarge his fishing rights boundary by acquiring secondary rights in the area of another clan through marriage or as a gift. Persons away from their home island could expand their fishing rights boundary by a recitation and verification of their genealogy.

Acceptance of such an account by the clan elders enabled the claimant to take his rightful place in the meeting-house, and so to identify his relationship with others using the same place.

The logic is that those who shared the same place probably belonged to the same clan, and so would have shared land and sea rights (Teiwaki, 1988).

The permeable social boundaries of groups

In general, inter-community access is more likely to be granted to neighbouring groups than to those more distant, since neighbours are regarded as closer in kinship terms. Further, the rights of outsiders often relate not only to the general significance of a marine area to a host community, but also to the value of the resources therein.

In Lau Lagoon, Solomon Islands, for example, outsiders had the weakest claims to areas for net or trap fishing. The strength of their claims progressively increased from areas for collection of commercial shells, those for collection of shells for making shell money, areas for line-fishing or spear-fishing, becoming greatest in food shell-gathering areas (Allen, 1957).

Distribution-of-catch rules: expanding the in-group boundary

Rules that define which persons have access rights to harvested fish ascribe a social boundary of a fishery that is always wider that of just the fishing group.

These are an extremely important set of rules in many societies, since in terms of equity within a

community re-allocation of harvested fish can be as or more important than access to fishing grounds (Collier et al., 1979; Kendrick, 1993).

Distribution of the harvest is fundamental in ensuring intra-group harmony and the stability of the traditional management system, especially if distribution is from higher-status persons, with species or other special access rights, to the community at large.

Such rules include those to provision the family and community, those required as subsequent and continual repayment for the acquisition of fishing rights, and those enmeshed in general community sharing and reciprocity and related norms concerning equity and fairness (Ruddle, 1994).

Re-allocation rules assume particular importance under conditions of *de jure* open access, as in Java, Indonesia, where access to fishing is dominated by outside economic elites, but where Javanese behavioural norms that insist on equity, fairness, and 'luck-sharing' ensure that people who need fish have access to some after it has been landed (Collier et al., 1979; Kendrick, 1993).

The importance of post-harvest re-allocation rules has been recently demonstrated for Pringi Village, East Java. Kendrick (1993:50) observes that:

> . . . the strongest local institutions relating to the fishery have to do not with limiting access to the fishery resources, but with re-allocation of that catch once it reaches shore. Perhaps because of an inability to restrict access to the bay's resources, the locus of control may have shifted to land, where strong local institutions do exist for redistributing the catch of fish post-harvest.
>
> Most local people cannot compete for access with capital-intensive gear such as beach and purse seines, and have no access to these gears. A concern with equity and fairness underlies these redistributive institutions. Access is open, but local institutions . . . demand that a large catch must be shared widely among the community.

Kendrick (1993) identifies three distinctive institutions for the re-allocation of harvested fish:

(a) the share system;

(b) use of temporary extra crew members; and

(c) acceptable ways of 'taking' fish before it reaches the auction site.

Only purse seines and beach seines (large gears owned and operated by the economic elite) are subject to significant re-allocation rules. It is significant that the owners of these gears are largely non-Javanese, whereas the labourers and crew are Javanese. This is a further expression of the concept that local populations have the primary access rights to a local resource.

Further, these gears make relatively large catches of small, schooling pelagics, which are more easily re-allocated than other species, and both gears employ a large number of labourers. An estimated 10–30 per cent of the catch is re-allocated in this way from purse seine catches.

Catch distribution systems can be complex in terms of the categories of persons involved, as well as geographically extensive, as on Ulithi Atoll, Federated States of Micronesia. There, such valuable species as turtles are presented as tribute to the paramount chief, who slaughters and distributes them in a closely specified way.

Some parts are given to the women in the menstrual house on Mogmog Island. They distribute what they do not need to women on other islands and to the heads of the two highest-ranked lineages on Mogmog Island. They in turn distribute some to the heads of the lesser lineages (Ushijima, 1982).

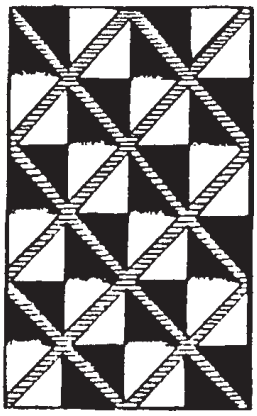
Women on Ulithi also have distribution rights because canoes, although owned by a lineage as a whole, are overseen by the women. This is because canoe hulls are made from mahogany logs obtained from Yap Island, in exchange for cloth made by the women of Ulithi.

Further, because post-marital residence is patrilocal, women are scattered throughout the various matrilineages of an island. As a consequence, the food-distribution system reaches all parts of all islands in Ulithi Atoll (Ushijima, 1982).

Fish distribution in the form of reciprocal exchange of goods also occurs among the islands of Ulithi Atoll. For example, ecologically-favoured Falalap Island provisions the rest of Ulithi with taro, breadfruit, sweet potato and banana.

However, Falalap lacks fishing grounds, and so must receive its fish from the other islands. In contrast, fishing rights areas are extensive on islands in Mangejang District, where, however, vegetable cultivation is precluded by the absence of a freshwater lens.

Thus there is an exchange of vegetables for fish between Falalap and Mangejang (Ushijima, 1982), thereby enlarging the social boundary of the fishery.



Concluding remarks

It has to be appreciated that for any resource management system the most important boundaries are a reflection of social relationships, which are recognised in physical space.

Thus the important issue becomes the definition of all the social boundaries of all the stakeholding groups involved in a fishing system, rather than just definition of the physical and biological boundaries of the system.

Further, because marine inshore ecosystems are closely linked with those in the coastal terrestrial environment, physical and biological boundaries are not immutable; they are always evolving, and so not amenable to precise and permanent definition. Appreciation of this dynamic land-sea ecological linkage is clearly reflected in the island 'estate' management concept.

Similarly, the economic boundaries of systems are not immutable, especially in modern times. Local fishing systems are now increasingly linked with the global economy, with markets in industrial-service economies now driving fishing effort and species targeting in distant local systems.

Examples are legion: the demand by Hong Kong consumers, in particular, now drives the local and deleterious live fish trade in many coralline fisheries throughout the Asia-Pacific Region (Johannes & Riepen, 1995).

It is probably not necessary to have strictly delimited physical and social boundaries when pressure on resources is light, as where human populations are small. But when pressure increases, boundaries may be more firmly established. 'Anticipatory claims', as in parts of Solomon Islands (Ruttley, 1987), may reflect a perception of this, in addition to an increasingly perceived market value for the resources. Further investigation might also show that 'anticipatory claims' can be historically validated by 'ancestor rights'.

I have tried to demonstrate that definition of precise boundaries can be exceedingly complex in a non-Western case, as in the Asia–Pacific region. In focusing on the sea space actually defined and governed locally for present pragmatic purposes, we run the risk of ignoring the larger cultural picture that includes the ancestral realm, as in the discussion of the Torres Strait. In that context, 'anticipatory claims', as in Solomon Islands, are completely valid.

By the very nature of tropical coastal marine ecology, complex social relationships, the multiplicity of stakeholders, and the pressure of external forces, boundaries will have to be flexible and so change through time to remain situationally relevant. They will have to be operational boundaries to permit the management of the existing fishing system, and must be adaptable as the fishing system changes.

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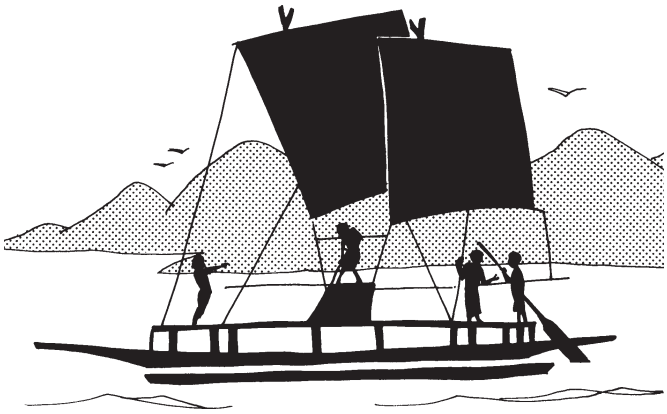


SPC runs fisheries management workshop

by Tim Adams

A Workshop on the Management of Pacific Island Inshore Fisheries was held between 26 June and 7 July at SPC headquarters. The workshop was mainly for the benefit of Government fisheries and marine resources managers in SPC member countries, but was also an opportunity for specialists from many parts of the world to discuss the current status of this discipline. The management of coral reef fisheries, particularly invertebrate fisheries, is a subject that is particularly prone to differing interpretations at the present time.

This was an attempt to provide Pacific Island fisheries managers with a clearer vision of the current options, advantages and pitfalls of the various management tools available to them.

For example, marine protected areas are widely promoted by some people for the maintenance of sustainable fisheries in adjacent areas, whilst others claim that individual transferable quotas are the universal panacea.

What measures are most relevant to Pacific Island social systems and fishery resources?

The workshop was organised by the SPC's UK-funded Integrated Coastal Fisheries Management Project. Pacific Island national nominees' attendance costs were covered by the UNDP Regional Fisheries Support and National Capacity Building Programme, jointly administered by SPC and FFA.

Additional participants were funded through SPC by the Australian Centre for International Agricultural Research and the Government of France.

SPC is further greatly indebted to all the organisations and individuals who were able to arrange their own participation in the meeting. In total, over 100 people took part over the two weeks, tabling over 100 original papers.

It cannot be claimed that the workshop achieved its ultimate goal of completely clarifying the types of management measure that should be applied to different Pacific Island fisheries, but it was certainly a very worthwhile exercise for all concerned.

Far more information was submitted than had originally been imagined possible, and discussion was always vigorous, but it almost requires another workshop to draw firm conclusions from the various topics considered.

However, the workshop succeeded in its aim of bringing together the new generation of Pacific Island fisheries managers to learn from each others' experiences and assess the relative strength of the ideas of different experts.

It will have great relevance for the direction of future fisheries management-related research and development in the region.

SPC was able to hear the views of its member countries and territories, both individually and regionally, and now has a better idea of where to concentrate its fisheries management advisory efforts.

The papers tabled at the workshop will be published with minimal editing, as a limited number of manuscript volumes, for the benefit of SPC's list of deposit libraries.

The keynote addresses on each management option covered by the agenda will be revised and edited into a somewhat slimmer volume for wider distribution. Although the workshop was not intended to formally agree any priorities for regional action, a number of points that arose during the meeting were endorsed in the final session:

1. A special interest group and newsletter on live fish export fisheries (including both fish for food and organisms for aquaria) will be set up under the SPC Fisheries Information Project. Bob Johannes and SPC will collaborate to edit the first issue;

2. One of the priorities for research in support of the improved management of live serranid export fisheries is a practical estimate of the percentage of the stock that can be sustainably harvested;

3. In view of the likely dependency of recruitment and replenishment of some reefs and reef-fisheries from distant areas, the regional importance of different 'sinks' and 'sources' of larvae needs to be assessed on a national basis;

4. A priority for research is the development of rapid appraisal techniques to assess the potential and status of coastal fisheries stocks in general. The following are major needs:

   (a) The development of basic estimates of the area of fishing grounds ('suitable habitat' or 'biotope') for different species in each Pacific island;

   (b) The collection of existing and new information on catch rates and yields of different species under different levels of fishing pressure, using different gear, in different areas, to improve indicative base-line information on the way that stocks respond to exploitation;

5. All marine species introductions and transfers to or from Pacific Islands should be based on the guidelines agreed by SPC member countries and territories at the 1994 Regional Technical Meeting on Fisheries and endorsed by the 34th South Pacific Conference (and available from SPC). In all cases the precautionary principle should guide decisions, and in all cases the onus should be on the introducer to meet all the costs incurred by the national Government in making a decision whether or not to allow an introduction;

6. For largely export fisheries, such as trochus and beche-de-mer, a comprehensive and up-to-date source of intelligence is needed on the status and forecast for their markets, particularly in East and South-East Asia. This trade seems to be

too small for international agencies to devote much effort to it, but is extremely significant to many of the small nations of the Pacific and thus to regional agencies;

7. There is a need for a regional organisation to consider maintaining a register of international entrepreneurs and operators engaged in exporting marine products from the Pacific Islands, to improve the ability of national fisheries managers to appraise the likely compliance of companies engaged in commercial coastal fisheries;

8. The possibility of developing a set of regional seafood quality standards should be investigated, and an appropriate plan of action for introducing modern quality assurance procedures for Pacific Island exports, such as Hazard Analysis and Critical Control Point (HACCP) or Quality Management Program (QMP) should be developed;

9. When the sustainable management and development of coastal fisheries are being addressed, the broader management aspects need also to be taken into consideration, preferably within the general framework of the integrated coastal management concept. Some of these broader aspects include, but are not limited to:

   (a) Habitat degradation or destruction;

   (b) Coordination and cooperation with other sectors (incuding Government, the private sector and local communities);

   (c) The major role that women play in carrying out coastal fisheries in the Pacific Islands, and thus the need to assess their catches, take into account their impacts, and harness their knowledge and community decision-making potential;

   (d) The concepts of co-management and governance;

10. Pacific Island fisheries managers should always consider the possibility of including the complete ban in their armoury of management tools, particularly if pre-emptive action can be taken in time to stop people investing in equipment. Types of ban might include:

    (a) A ban on the use of any kind of underwater breathing apparatus for certain types of fishing;

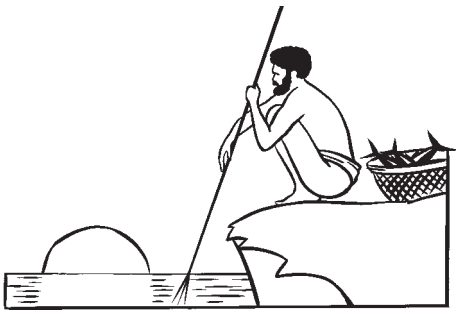
    (b) Banning the use of fishing methods that damage or reduce the carrying capacity of the environment;

    (c) A ban on certain commercial export fisheries, particularly those that take the same species as a local food fishery. Local subsistence nutrition, and the development of foreign exchange earnings through non-extractive uses of resources, may be a better national economic option.

The SPC Integrated Coastal Fisheries Management Project wishes to thank all those who took part in the workshop, with special gratitude to those who came from the other tropical small-island regions—the Caribbean and the Maldives.

TRADITIONAL MARINE RESOURCE MANAGEMENT AND KNOWLEDGE

INSTITUTIONAL NEWS



Palau Conservation Society

The Palau Conservation Society (PCS), the nation's first environmental NGO, has been established to work with the community to preserve Palau's unique natural environment and to perpetuate its conservation ethic for the economic and social benefit of present and future generations of Palauans, as well as for the education and enjoyment of visitors.

The first project of the PCS is a one-year intensive community awareness campaign. It will be conducted with the RARE Center for Tropical Conservation, an NGO from the USA.

For further information, contact: The Palau Conservation Society, P.O. Box 1197, Koror State, Republic of Palau 96940.

Coastal Zone Management Centre (Netherlands)

The Government of the Netherlands has established the Coastal Zone Management Centre (CZMC). This was done following the 1993 World Coast Conference, held in the Netherlands.

Based on Agenda 21 of the Conference on Environment and Development (UNCED), among the goals of the CZMC are to:

- stimulate, organise and facilitate Netherlands initiatives and activities in the development of coastal zone management programmes in other coastal nations;
- support the development and improvement of concepts, methodologies and tools for integrated coastal zone management;
- organise and coordinate training programmes; and
- support further development of the 'Common methodology for the assessment of vulnerability of coastal areas to climatic change and sea level rise' and facilitate and coordinate its application to low-lying nations.

For further information, contact:

The Coastal Zone Management Centre
P.O. Box 20907
2500 EX The Hague, Netherlands

Phone: (31) 70 3114311
Fax: (31) 70 3114380

Government of Australia

The Government of Australia has launched a community-based coastal programme, 'Living on the coast'. This new policy aims to ensure that activities in the nation's coastal zone are ecologically sustainable, and to build cooperation between users and beneficiaries of the coast, including national, state and local governments, industry and communities.

A major component of this policy is 'Coastcare' a community-based action programme to provide opportunities and resources for local residents, businesses and interest groups to become active managers of the coastal zone. Activities under 'Coastcare' include protection works, rehabilitation of sensitive areas, identification of natural and

cultural heritage resources, monitoring of coastal environments, and implementation of management plans.

Other components include capacity-building for coastal management practitioners and education programmes, establishment of an electronic Australian coastal atlas to monitor and reduce marine pollution; improving coastal development through integrated local area planning; and facilitating indigenous involvement in coastal management.

For further information contact: Jackie Alder, Ministry of Planning, 469 Wellington St., Perth, WA 6000, Australia. Fax: (61) 9 264 7527. (e-mail: cgeja@jcu.edu.au).

'REEF' (Remedial Ecotoxicological Expeditions Fund)

After the Earth Summit in Rio de Janeiro in 1992, the need emerged for a 'tool' to reach out to the coastal communities worldwide, especially in developing countries. REEF, an independent, non-profit, charitable corporation, was registered in 1994, to launch the world's first regularly circumnavigating research, workshop and community education workboat to address the global coastal crisis. REEF is unique.

REEF was granted official NGO status by the UN in 1994. Thus it was able to participate actively in the debates of the first UN Global Conference on the Sustainable Development of Small Island States, held in Barbados. In 1995 REEF became accredited to the Global Environment Facility (GEF), jointly administered by UNDP, UNEP and the World Bank.

Recently, REEF USA was granted non-profit, charitable corporation status (501(c)3).

For further details, see article on p. 28 and contact Thomas I. Janossy, REEF (Canada) Phone: (1) 416 5984729, Fax: (1) 416 5999540. (e-mail: axk@atina.mrec.ar).

ReefKeeper International

This organisation is developing an international network for coral reef conservation. The 'ReefKeeper Network' is:

- a national coral reef conservation information link;
- a mechanism to facilitate and synchronise grassroots advocacy by independent groups, dive clubs, conservation groups, fishing clubs and civic associations taking action for coral reefs;
- an outreach service of ReefKeeper International—the American Littoral Society's comprehensive programme of coral reef conservation through policy analysis, public awareness, advocacy and grassroots organisation—a means to empower and activate a nation-wide constituency for coral reef conservation.

As network participating members, local groups are expected to:

- assign a group member as ReefKeeper liaison to receive publications, route issue materials and facilitate group action;
- discuss and take votes on issue resolutions provided by Project ReefKeeper;
- circulate among its members group-approved petitions provided by ReefKeeper International;
- distribute at its meetings group-approved new releases provided by ReefKeeper International;
- pursue group-approved letter-writing and phone campaigns using Issue Fact Sheets and Action Guides provided by ReefKeeper International.

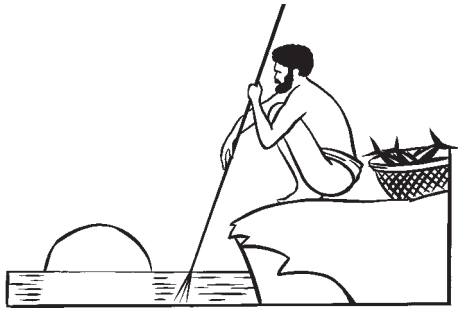
For further information contact:

Alexander Stone,
Executive Director,
ReefKeeper International,
2809 Bird Avenue - Suite 162,
Miami FL 33133 - USA.

Phone: (1) 305 3584600
Fax: (1) 305 3583030

TRADITIONAL MARINE RESOURCE MANAGEMENT AND KNOWLEDGE

RECENT PUBLICATIONS



The limits of fishery cooperatives? Community development and rural depopulation in Hokkaido, Japan

BARRETT, G. & T. OKUDAIRA. (1995). The limits of fishery cooperatives? Community development and rural depopulation in Hokkaido, Japan. Economic and Industrial Democracy 16: 201–232.

This paper explores the interrelationships between rural out-migration, long-term resource decline and cooperative organisation for one Hokkaido fishing community. Unlike other Japanese fishing communities, the three cooperatives studied have not developed a coherent response to crisis and decline.

A combination of fishing group protectionism and organisational rigidity has limited the ability of fishing cooperatives to respond to community needs in a consensual, collective fashion. The authors argue that the single stakeholder nature of the cooperative and the entrenchment of inequitable resource allocation around contemporary developments in seaweed mariculture have caused intra-community divisions. This presents obstacles to a community-focused reconstruction strategy, both within and outside the fishery.

Corresponding author's address:

Dr Gene Barrett
Department of Sociology
Saint Mary's University
Halifax, Nova Scotia
Canada.

Co-management in marine fisheries: the Japanese experience

LIM, C.P., Y. MATSUDA & Y. SHIGEMI. (1995). Co-management in marine fisheries: the Japanese experience. Coastal Management 23: 195–221.

Based on case study data, the authors argue that the active and substantial involvement of the fishers represented by a fishery cooperative association forms the core of Japanese fisheries management, supported by heavy financial subsidies and technical assistance from national, prefectural and municipal levels of government.

The continued existence of the system is attributed in large part to the fishers' conflict avoidance, compliance behaviour and cultural values. The future of the cooperative and the community as a whole is, however, threatened by population decline and the problem of finding successors in fishing units. These problems are likely to affect the already poor economic performance of the fishery, unless government support is continued.

Corresponding author's address:

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Faculty of Fisheries
Kagoshima University
4-50-20 Shimoarata
Kagoshima-shi 890, Japan.

Environmental, economic and social implications of the live fish trade in Asia and the Western Pacific

JOHANNES, R.E. & M. REIPEN. (1995). Environmental, economic and social implications of the live fish trade in Asia and the Western Pacific. The Nature Conservancy and the South Pacific Forum Fisheries Agency. 82 p.

Alarmed by the evidence that the trade in live reef fish is creating serious and widespread damage to some of the world's most spectacular marine resources, the Nature Conservancy and the South Pacific Forum Fisheries Agency commissioned this study. Johannes, a coral reef ecologist, and Riepen, a fisheries economist, provide an economic overview and market analysis of the industry, and examine some of its problems and concerns.

They also examine the opportunities for putting the industry on an environmentally and economically sustainable basis, and appraise the potential of the South Pacific nations to meet the export demand while minimising unwanted consequences.

The authors acknowledge the difficulties of undertaking this kind of study—principally the often illicit nature of the business and the severe shortcomings of the statistical and other data available. As they say, 'Although incomplete, the information we have obtained nevertheless paints an alarming picture of the extent and impacts of the trade'.

This study has deservedly attracted considerable media attention. It is the intention of the authors to extend and augment their work on this topic over the next few years.

Thus please respond generously to the request for information made by Bob Johannes (p. 27).

For copies of the report, contact:

The Nature Conservancy
1116 Smith St.
Honolulu, Hawaii 96817, USA.

Property rights and the environmental. . .

HANNA, S. & M. MUNASINGHE. (1995). Property rights and the environmental, social and ecological issues (164 p.) and Property rights in a social and ecological context; case studies and design applications (206 p.) Stockholm &Washington DC, The Beijer International Institute of Ecological Economics and the World Bank.

As the editors say in their introductions, these two companion volumes concern the institutional dimensions of environmental sustainability. Humans interact with their environment through systems of property rights that are embedded in social, political, cultural, and economic contexts. The outcome of that interaction affects both the quantity and quality of environmental resources.

It is becoming increasingly clear that, although national and international economic policies have often ignored the environment, economic development ultimately depends on institutions that can protect and maintain the environment's carrying capacity and resilience. The knowledge of how property rights regimes, as particularly important types of institutions, function in relation to humans and their use of the environment is critical to the design and implementation of effective environmental protection.

Three papers on marine fisheries in the second volume are of direct relevance to readers of this Information Bulletin. Two deal with local knowledge and one with fisheries management. The abstracts of these are reproduced below verbatim (with permission).

- Learning by fishing: practical science and scientific practice, by Gisli Palsson

  Professional resource managers often assume that the ecological knowledge obtained by fishing skippers during years of practical experience is of relatively little use. At the same time, recent research indicates that knowledge gained on the spot, in the course of production, is of fundamental importance. This chapter explores, with particular reference to the Icelandic context, how fishers' knowledge differs from that of professional biologists and to

what extent the former could be brought more systematically into the process of resource management for the purpose of ensuring resilience and sustainability.

- The role of validated local knowledge in the restoration of fisheries property rights: the example of the New Zealand Maori, by Kenneth Ruddle

  Systematically documented and validated local knowledge of resources and environments provides persuasive evidence of traditional property rights recognised by customary law. As demonstrated by the case of the New Zealand Maori, such bodies of local knowledge are acceptable as legal evidence in the process of restoring usurped rights. The simple and culturally sensitive methodology used is also directly relevant to the codification of existing rights and customary laws within a systems of statutory law in various cultural settings. This is a contemporary process in many nations in the Pacific Basin, and one which might provide useful precedents for application worldwide.

- Distributed governance in the northwestern Hawaiian Islands lobster fishery, by Ralph E. Townsend & Samuel G. Pooley

  Alternative management approaches for the governance of the lobster fishery of the Northwestern Hawaiian Islands (NWHI) are considered. These alternatives are analysed within the framework of distributed governance: how rights and responsibilities are distributed among the central government, the industry and local communities.

For copies of these publications contact:

Publications Office
The World Bank
1818 H St., NW
Washington DC 20433, USA
Phone: (1) 202 4771234
Fax: (1) 202 4776391

Publications and other resources

KELLEHER, G., C. BLEAKLEY & S. WELLS (eds). (1995). A global representative system of marine protected areas. Four volumes. Joint publication of the Great Barrier Reef Marine Park Authority, the World Bank and the World Conservation Union (IUCN).

Contact: Environment Department, the World Bank, Room S 5-143, 1818 H. Street NW, Washington, D.C. 20433, USA. Telephone: (1) 202 4731399, Fax: 202 4770568.

MULLER, Y. (1994). Le droit international et l'aménagement du littoral. 40 p.

BOELAERT-SUOMINEN, S. & C. CULLINAN. (1994). Legal and institutional aspects of integrated coastal area management in national legislation. 118 p.

Contact: Development Law Service, Legal Office, FAO, Via delle Terme di Caracalla, 00100 Rome, Italy. Telephone: (39) 6 5225059, Fax: (39) 6 5225 4408.(e-mail:Annick.VanHoutte@fao.org).

(1994). The International Whaling Commission in the 1990s: problems and prospects.

(1994). The International Whaling Commission and the regulation of consumptive and nonconsumptive uses of small cetaceans: a critical agenda for the 1990s.

Contact: William C. Burns, Director, Pacific Center for International Studies, University Square, Ste. 184, Madison, WI 53715-1042, USA. Phone:(1)6082576309, Fax: (1)6082570417. (e-mail: pcis@ix.netcom). US$ 11.00. Overseas customers: Add US$2.00 for shipping.

PAYOYO, P.B. (ed.). (1994). Ocean governance and sustainable development of the seas. 369p.

Contact: UNIPUB, 4611-F Assembly Drive, Lanham, MD 20706, USA. Phone:(1)8002744888 or (1)3014597666, Fax:(1)3014590056.(e-mail: query@Kraus.com). US$50.00, plus shipping.

Ocean News. Elsevier Permagon Marine Sciences Newsletter. Published twice annually by Elsevier Science Ltd. No charge.

Contact: Sue Cloke, managing editor, Ocean News, the Boulevard, Langford Lane, Kidlington, Oxford, 0X5 1GB, UK. Phone:(44)1865 843591, Fax: (44) 1865 843952. (e-mail: s.cloke@elsevier.co.uk).

PULEA, Mere. (1994). Environmental legislation review.

MAIAVA, Iosefa & Bureau of Natural Resources and Development. (1994). The national environmental management strategy for the republic of Palau.

OTOBED, Demei & Iosefa MAIAVA. (1994). State of the environment report for the Republic of Palau.

Contact: South Pacific Regional Environment Programme, P.O. Box 240, Apia, Western Samoa. Phone: (685) 21929, Fax: (685) 20231.

WARREN, D. Michael, L. Jan SLIKKERVEER & David BROKENSHA. (1995). Cultural dimensions of development: indigenous knowledge systems. Intermediate Technology Publications, 640p.

Contact: Women, Ink. 777 UN Plaza, New York, NY 10017, USA. Fax: (1) 212 6612704.

JONES, T. Directory of wetlands of international importance. Part I: Africa; Part II: Asia and Oceania; Part III: Europe; Part IV: Neotropics and North America.

Contact: Island Press, Box7, Covelo, CA 95428, USA. Phone: (1)8008281302or(1)7079836432, Fax:(1)7079836414. US$20.00 per part, or US$75.00 for the set of four books.

(1994). An economic assessment of the Republic of Palau.

Contact: Bank of Hawaii, Koror Branch, Koror, Palau 96940.

STERNER, T. Economic policies for sustainable development.

Contact: Kluwer Academic Publishers, Order Dept., P.O. Box 358, Accord Station, Hingham, MA 02018-0358, USA. Phone: (1) 617 8716600.

KEOHANE, Robert, Michael MCGINNIS & Elinor OSTROM. (1993). Linking local and global commons. Published by the Workshop in Political Theory and Policy Analysis at Indiana University.

These 1993 conference proceedings are available for US$5.00 from Fax: (1)8128553150. (e-mail: workshop@indiana.edu).

KNUDSEN, Are J. (1995). Living with the commons: local institutions for natural resource management.

Contact: CHR, Michelsen Institute, Fantoftvegen 38, N-5036 Frantoft, Norway. Fax:(47)55574166. (e-mail: cmi@amadeus.no).

WELLS, S., P. HOLTHUS & J. MARAGOS. (1994). Environmental guidelines for reef coral harvesting operations. 36 p.

Contact: South Pacific Regional Environment Programme, P.O. Box 240, Apia, Western Samoa. Phone: (685) 21929, Fax: (685) 20231.

GRAY, W. (1993). Coral reefs and islands: the natural history of a threatened paradise. David & Charles, UK. 192 p.

Contact: David and Charles PLC, Brunel House, Newton Abbot, Devon TQ12 4PU, U.K.

ROLDAN, R.B. & R. F. SIEVERT. (1993). Coastal resources management: a manual for government officials and community organizers. Fisheries Sector Program, Department of Agriculture, Philippines. 40 p.

Contact: Program Director, Fisheries Sector Program, 2F Estuar Bldg., 880 Quezon Avenue, Quezon City, Philippines. Fax: (63) 987805 / 978561

United Nations Environment Programme. (1993). Monitoring coral reefs for global change reference methods, for marine pollution studies. No. 61. UNEP / Living Coastal Resources / ASEAN / Australian International Development Assistance Bureau / Intergovernmental Oceanographic Commission / International Atomic Energy Agency. 72 p.

Contact: Programme Activity Center for Oceans and Coastal Areas, UNEP, P.O. Box 30552, Nairobi, Kenya.

Bandillo ng Palawan. A monthly newsletter on the environment of Palawan Island.

Contact: Bandillo ng Palawan, 369 Rizal Avenue, 5300 Puerto Princesa City, Palawan, Philippines. Phone: (63) 2580

Caribbean Technical Cooperation Network in Artisanal Fisheries and Aquaculture. The Network News Bulletin is published and circulated biannually.

Contact: Mr Biessar Chakalall, Regional Fisheries Officer, c/o FAO office, 134–138 Frederick Street, P.O. Box 822, Port of Spain, Trinidad and Tobago. Phone:(1809)6250467/8, Fax:(1809)6230995.

Coral Reef Newsletter. Prepared by the Scientific Committee on Coral Reefs of the Pacific Science Association and the Marine Laboratory of the University of Guam. The newsletter contains information on coral reef conservation and management initiatives; upcoming meetings and conferences; research facilities, scholarships and fellowships available to coral reef researchers and new publications.

Contact: Charles Birkeland, Co-editor, Marine Laboratory, University of Guam, UOG Station, Mangilao, Guam 96923, USA.

Island Care New Zealand Trust Newsletter. Published by Island Care New Zealand Trust.

Contact: ICNZT, c/o Centre for Conservation Biology, University of Auckland, Private Bag 92019, Auckland, New Zealand.

Mangrove Action Project Quarterly News. Published by the Mangrove Action Project, the newsletter contains news and project updates on mangrove forests and coastal areas worldwide.

Contact: The Mangrove Action Project. P.O. Box 1854, Port Angeles, WA 98362-0279, USA. Fax: (1) 206 6326122.

NIE News. Published by the National Institute of Ecology. Contains information on ecological issues, especially in India and South Asia.

Contact: Dr P. S. Pathak, Editor, Indian Grassland and Fodder Research Institute, Jhansi 284003, U.P., India.

Reef Research. Newsletter of the Research and Monitoring Section of the Great Barrier Reef Marine Park Authority. Published quarterly.

Contact: the Editor, Reef Research, GBRMPA, P.O. Box 1379, Townsville, Queensland 4810, Australia.

Sanctuary Currents. The quarterly newsletter of the Center for Marine Conservation's Habitat Conservation Program. The programme is dedicated to the protection of sensitive and unique marine habitats.

Contact: Alison Merow, Habitat Conservation Program, 1725 DeSales St., NW, Washington, DC 20036, USA. Phone:(1)2024295609.

Tropical Coasts. A biannual newsletter for policymakers, environmental managers, scientist and resources users. Published jointly by the SAREC Marine Science Program, GEF/UNDP/IMO Regional Program for the Prevention and Management of Marine Pollution in the East Asian Seas and the Coastal Management Center.

Contact: The Executive Editor, Tropical Coast, P.O. Box 2502, Quezon City 1165, Metro Manila, Philippines.

Reef Notes. A series published by the Great Barrier Reef Marine Park Authority. It includes topics such as 'Sea birds', 'Coral cays', 'Fringing reefs', 'The coral polyp'.

Contact: Great Barrier Reef Barrier Reef Marine Park Authority, P.O. Box 1379, Townsville, Queensland 4810, Australia.

Save our coral reefs: a coral reef care manual. Focuses on coral reefs in the seas around the Philippines, but the information and conservation principles apply to coral reefs anywhere. 126 pages on coral reefs with water proof colour cover, as well as 100 figures with cartoons, drawings and photos.

Contact: Ocean Voice International Inc., P.O. Box 37026, Ottawa, Ontario K1V OWO, Canada. Phone: (1) 613 9908819, Fax: (1) 613 5214205.

International coral reef NGO directory. The directory is a combined effort of Greenpeace Pacific and the Centre for Clean Development. It lists over 160 non-governmental organisations (NGOs) worldwide involved with coral reefs. US$5.00.

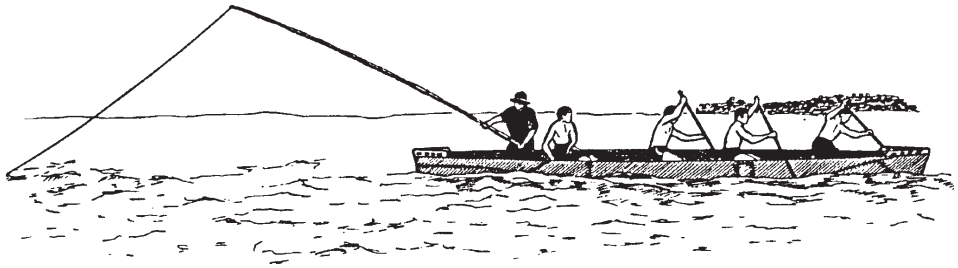
Contact: Center for Clean Development, 1227 West 10th, Eugene, OR 97402, USA *or* Greenpeace Pacific, Private Mail Bag, Suva, Fiji.

Coastal zone simulation model. The coastal zone simulation model (COSMO) demonstrates the main steps in design, analysis and evaluation of coastal zone management plans. The program is an interactive tool that allows coastal zone managers to explore the impacts of development projects and environmental and coast protection measures. Minimum hardware and software requirements are a PC with an 80386 processor, 3.5 inch floppy disk drive, high density and MS Windows 3.1. The demonstration version of COSMO can be obtained free upon request. The COSMO interactive version, developed for training purposes, includes a manual and costs US$150.00.

Contact : The Coastal Zone Management Center, P.O. Box 20907, 2500 EX The Hague, The Netherlands. Phone:(31)703114311, Fax:(31)703114380. (e-mail:beuk@rikz.rws.minenw.nl).

PERNETTA, J.C & D.L ELDER. (1993). Cross-sectoral, integrated coastal area planning (CICAP): guidelines and principles for coastal area development. A Marine Conservation and Development Report, IUCN, Gland, Switzerland. vii + 63 p.

Contact: IUCN Marine and Coastal Areas Programme, rue Mauverney 28, 1196 Gland, Switzerland. Phone: (41)229990001, Fax: (44)229990002. (e-mail: mail@hq.iucn.ch).



New journal

The Journal of Coastal Conservation

Editorial Board

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Managing Editor: V. Noest, Uppsala.

Book Review Editor: P. Jones, Cardiff.

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The Journal of Coastal Conservation is a new scientific journal for integrated research and management of the coastal zone. The emphasis will be on natural resources and their sustainable use in the context of past and future social and economic developments. The journal focuses on the European situation, but authors from outside Europe are also invited to contribute. The editors especially welcome thematic volumes and conference proceedings.

The journal covers both the natural and the human sciences, as required for a thorough understanding of the patterns and processes in coastal systems, particularly geomorphology, physical geography, hydrology, soil science, plant ecology, animal ecology, vegetation science, landscape ecology, recreation studies, urban ecology, coastal engineering and planning.

The journal was scheduled to start in 1995, with 2 issues per year and about 200 two-column pages, but it is anticipated to grow to about400 pages per year.

Opulus Press, the publisher of this journal, aims at producing high-quality journals and books at reasonable prices. The Journal of Vegetation Science, published since 1989, serves as a model. Manuscripts can be published within four months after acceptance.

In an effort to make journals available to as many scientists as possible throughout the entire scientific community, personal subscription rates are very low. The Opulus Press manages funds for sponsoring subscriptions (both private and institutional) in countries with currency exchange problems.

Contact:

Opulus Press AB,
Box 25 137.750 25 Uppsala
Sweden
Phone: (46)18320662
Fax:(46)18321368
e-mail: OPULUS@VAXTBIO.UU.SE

Life reef fish trade

New Special Interest Group established by SPC

A new Special Interest Group (SIG) on The Live Reef Fish Trade (Food and Aquarium Fish) has been set up by the SPC Fisheries Information Project, with supplementary support from The Nature Conservancy. The purpose of the SIG is to establish a network of individuals working in or concerned about the live reef fish trade, to encourage the sharing of ideas, experience and information.

The group coordinators are:

For reef food fish:

Bob Johannes
8 Tyndall Court
Bonnet Hill
Tasmania 7053, Australia
Fax: (61) 02 298066
e-mail: bobjoh@ice.net.au

For reef aquarium fish:

Larry Sharron
Coral Reef Research Foundation
P.O. Box 1713
Koror, Palau 96940
Fax: (680) 4882305

The principal focus is on SPC member countries, but persons with an active interest in these subjects in any part of the world are encouraged to join this Special Interest Group, submit information to the bulletin and receive the bulletin free.

Since the live reef food fish trade in the Pacific is inextricably linked with East Asia, and the marine aquarium trade is also very significant in the latter region, people from East Asia with an active interest in the subject are especially encouraged to participate.

Contributions to the newsletter are sought, including:

- details of research programmes on these subjects;
- statistics on the trade, including quantities of live fish exported / imported to various countries;
- descriptions of efforts to put the trade on an environmentally sustainable basis—management measures;
- forthcoming conferences, workshops and other events;

- copies of reports and newspaper articles for inclusion in the annotated bibliography of recent publications and reports in each newsletter;
- reviews of significant reports, documentaries etc;
- questions and requests for information (and responses thereto);
- contact addresses and other relevant information on people who ought to receive the newsletter;
- reports on conferences and workshops.

The first issue is scheduled for publication early in 1996.

Live reef fish food trade: devastating effects

Summarised very briefly below is a just-released 33,000 word report on the environmentally devastating but largely unrecognised live reef food fish trade that is spreading from its centre in South-East Asia into the Western Pacific.

Written by Bob Johannes and Michael Riepen, the report is based on an investigation which took the authors to nine countries in the region and involved interviews with several hundred individuals, including fishermen, divers, dive tour operators, social and biological researchers, members of national and international NGOs, live reef food fish exporters and importers, government officials, aquaculture experts, fish farmers and village leaders.

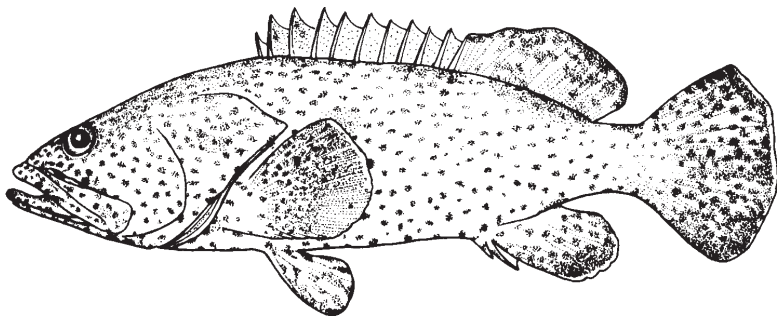
A billion-dollar restaurant trade in live reef fish has grown up over the past decade in Hong Kong, China, Singapore, Taiwan and other Chinese population centres. To stun and capture reef fish for this market, hundreds of tons of sodium cyanide are being pumped annually into the coral reefs of South-East Asia, degrading the most species-rich marine communities in the world. In addition, intensive hook-and-line fishing to supply this market has completely eliminated some grouper spawning aggregations in the region.

The Philippines and Indonesia are being rapidly depleted of target species in consequence, and because of escalating demand for live reef fish, especially in China, these fishing practices are spreading into the Western Pacific islands and the Indian Ocean. Fishing companies involved in the trade are especially optimistic about prospects in Papua New Guinea.

The trade is destructive not only to the marine environment but also to the economies and the social fabric of coastal fishing communities in the region. It is also resulting in the death or paralysis of many untrained divers due to the bends. Despite the appalling destruction being caused by this industry, it could be put on an environmentally and economically sustainable basis. The authors propose a series of actions to bring this about.

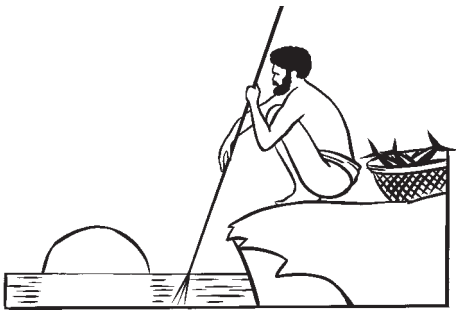
Copies of the full report can be obtained from Carol Fox of the Nature Conservancy in Honolulu, Fax: (1)8085452019. For more information, contact Bob Johannes, 8 Tyndall Court, Bonnet Hill, Tasmania 7053, Australia, Phone: (61) 02 298064, Fax (61) 02 298066. (e-mail: bobjoh@ice.net.au).

A five-page summary of the report, including recommended strategies for placing the live reef food fish trade on a sustainable basis, will be published in the SIG Bulletin on Live Reef Fish Trade early in 1996 (see also Bob Johannes' request for information on p. 27).



TRADITIONAL MARINE RESOURCE MANAGEMENT AND KNOWLEDGE

INFORMATION ON PROGRAMMES AND PROJECTS IN THE REGION



1996 Conferences

Voices from the Commons: The Sixth Annual Common Property Conference of the International Association for the Study of Common Property, Berkeley, California, USA, 5–9 June 1996

Practitioners and scholars from all disciplines are invited to the 6th Annual IASCP Conference in beautiful Berkeley, California, 5–9 June 1996.

We encourage theoretical and empirical explorations of all aspects of common property rights regimes. Panels of people who use and manage commons are particularly welcome.

There will be a student paper contest. Look for details in the December issue of *CPR Digest.*

Transportation and accommodation

Berkeley is easily accessible by air (San Francisco and Oakland airports), train (Berkeley train station), bus, ship (San Francisco harbour), and road. The elegant city of San Francisco is 20 minutes away by clean and efficient public transportation.

Accommodation will be available on-site in the dorms of the Clark Kerr Campus of the University of California at Berkeley. Current accommodation prices range from US$168.50 to US$260.50 depending on room size and sharing.

This price includes four nights, four breakfasts, three lunches and one dinner. Commuter rates for meals will be available for those not staying in the dorm. Hotel information will be forthcoming for those who wish to spend more.

Registration fee

The registration fee will be low (around US$125.00).

Financial assistance

Some funds for assisting participation by citizens of developing countries will be available.

For more information contact: Louise Fortmann, Department of Environmental Science, Policy and Management, 145 Mulford Hall, University of California at Berkeley, Berkeley CA 94720-3114, USA, Fax: (1) 510 6435438. (e-mail: commons@globetrotter.berkeley.edu).

16–24 June 1996. PACON '96. The Seventh Pacific Congress on Marine Science and Technology. Honolulu, Hawaii. Contact: PACON International, c/- Department of Civil Engineering, University of Hawaii at Manoa, 2540 Dole Street, Homes 383, Honolulu, HI 96822 USA Phone: (1) 808 90566163, Fax: (1) 808 9562580.

24–29 June 1996. 8th International Coral Reef Symposium, Panama. Contact: Convention Manager, 8th International Coral Reef Symposium, STRI Unit 0948, APO AA 34002-0948, USA Phone: (1) 507 28 4022, Fax: (1) 507 280970.

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28 July – 2 August 1996. Second World Fisheries Congress, Brisbane, Australia. Contact: Congress Secretariat, P.O. Box 1280, Milton, Brisbane, Queensland 4064, Australia. Phone: (61) 7 3690477, Fax: (61) 7 3691512.

September 1996. International Wetlands Symposium. Murdoch University, Western Australia. Contact: Prof A.J. McComb, School of Biological and Environmental Sciences, Murdoch University,

Perth 6150, Australia. Phone: (61) 9 3602488, Fax:(61)93104997.

December 1996 or January 1997. International Conference on Creativity and Innovation at Grassroots Level. India. Society for Study of Common Property Resources and others to be determined.

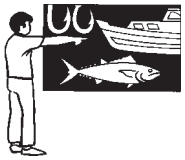
Currently in the planning stages, this conference will focus on four major dimensions:

- innovations (institutional, technological, and socio-cultural);
- education (linking formal and informal knowledge systems; pedagogic and curricular innovations);
- compensating creativity (intellectual property right regimes; non-material forms of individual and collective compensation; ethical issues in accessing people's knowledge about biodiversity and other resource use strategies);
- market-based incentives for commercialisation of sustainable technologies (certification of organic products; development of green markets; consumer awareness; social consciousness about non-sustainable strategies of growth).

A local organising committee will be formed, including colleagues from IIMA and some other national institutions.

An international organising committee will also be set up to generate wider support.

Contact: Professor Anil K. Gupta, SRISTI, c/- Indian Institute of Management, Ahmedabad-380 015, India, Phone: (91) 79 407241 (ext 4922), Fax: (91) 79 427896. (e-mail: anilg@iimahd.ernet.in).



1996 Training

14 January – 8 March 1996, 12th Intensive Training Course on Environmental Assessment and Management. Aberdeen, Scotland.

15–19 January:	Course registration and introduction
22–26 January:	Environmental assessment and sustainable development
29 January – 2 February:	Technical assessment of impacts
4–9 February:	Environmental assessment exercise
12–16 February:	Field course
19–23 February:	Environmental assessment review and strategic environmental appraisal
26 February – 1 March:	Environmental management and business
2–8 March:	Individual research assignments

The course programme is designed to enable participants to attend the whole course or selected one-week modules.

Contact: The Centre for Environmental Management and Planning, AURIS Business Centre, 23 St. Machar Drive, Old Aberdeen, AB2 1RY, Scotland, UK. Phone: (44) 1224 272483 / 272479, Fax: (44) 1224 487658.

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1 February – 7 May 1996. Center for Island Management Studies, School for Field Studies, Palau.

Principles of Resource Management. This course introduces practical tools used in addressing complex environmental problems, including coastal zone planning, guidelines for ecologically-sustainable development, environmental impact assessment, fisheries management techniques and protected-area planning and management.

Environmental Policy and Socioeconomic Values. This course provides insight into the broad social context which surrounds the natural resources under study and which will determine, in part, which approaches to resource management are practical.

Contact: The School for Field Studies, 16 Broadway, Berverly, MA 01915-4499, USA. Phone: (1) 508 9277777, Fax: (1) 508 9275127.

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22 April – 24 May 1996. Rural Projects: Design, Monitoring and Evaluation (Australian National University, Canberra).

This course aims to provide participants with the practical skills required to successfully formulate, design, manage, implement, monitor and evaluate rural development projects. Participants will consider the role of community participation for each stage of the project cycle, issues of gender and development, and evaluation of environmental impacts in project design and appraisal. In addition to gaining computer skills for project planning, design and appraisal, participants will complete a two-day practical component on cost-benefit analysis and the economic evaluation of community-based projects.

Contact: Brian Brogan, Managing Business in Asia Program, The Australian National University, Canberra A.C.T. 0200, Australia. Phone: (61) 2 2493892 or, after hours, (61)22302622, Fax: (61) 2 2494895, Telex: AA62760 NATUNI marked 'Attention ANUTECH'.

3–28 June 1996. The 1996 Summer Institute in Coastal Management, University of Rhode Island, Rhode Island, USA.

This intensive four-week program is directed at professionals in resource management and environmental agencies, non-governmental organisations, universities and research centres, and bilateral and multilateral development agencies and banks. The overall goal of the programme is to build participant skills in the use of effective approaches to solving coastal management problems.

Emphasis is placed on how to: (1) identify major management issues, analyse their underlying causes, and recognise challenges to improve management; and (2) design and implement integrated coastal management programmes, including selecting issues for a programme's focus, building public awareness and support, selecting appropriate management tools and techniques to address issues in a given environmental and socio-political context, and programme evaluation.

The course is organised by the Coastal Resources Center at the University of Rhode Island and is open to all applicants. However, participation will be limited to 25 individuals in order to maintain the quality and highly interactive nature of the programme.

Contact: The Training Coordinator, Coastal Resources Center, University of Rhode Island Bay Campus, Narragansett, RI 02882, USA. Phone: (1) 401 792 6224, Fax: (1) 401 7925436 or (1) 401 7894670, (e-mail: markd@gsosun1.gso.uri.edu).

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3 June – 9 August 1996. Training programme on 'The entry into force of the United Nations Convention on the Law of the Sea, its Implementation and Agenda 21'. International Ocean Institute, Dalhousie University, Halifax, Canada.

Specifically designed to benefit developing country mid-career professionals who are responsible for the various aspects of marine management of their Exclusive Economic Zones. The programme covers oceanography, sustainable development, management of living and non-living resources, coastal zone management and national legislation and infrastructure.

Conctact: Margaret J. Wood, Director, IOI Halifax, International Ocean Institute, Dalhousie University, 1226 LeMarchant Street, Halifax, Nova Scotia, Canada B3H 3P7. Phone: (1) 902 4946623, Fax: (1) 902 4942034.

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17 June – 27 July 1996. Transition to Markets (Australian National University, Canberra).

Designed for those with some previous professional training in policy analysis, this course aims to give a broad understanding of the economic principles underlying market economies and the steps needed to achieve and manage them. The emphasis will be on the practical measures involved in the transition from central planning to markets and the policy and institutional changes required to sustain the process. The course will include seminars, lectures and visit to relevant Australian national and State government agencies.

Contact: Brian Brogan, Managing Business in Asia Program, The Australian National University, Can

berra A.C.T. 0200 Australia. Phone: (61) 2 249 3892 or, after hours, (61)22302622, Fax: (61) 2 2494895; Telex: AA62760 NATUNI marked 'Attention ANUTECH'.

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9 July – 9 August 1996. Environmental Management in Development. University of New England, Armidale, Australia.

This course will equip planners, project managers and policy-makers from government, NGOs and other organisations to integrate environmental issues into their development plans and policies. Topics include ecosystems, agricultural development and ecological sustainable development; environmental impact assessment; geographic information systems; ecotourism; land and water evaluation and management; and the conservation and management of flora and fauna.

Contact: The Program Director, International Development Training Program, University of New England, Armidale, NSW 2351, Australia. Phone: (61) 67 733248, Fax: (61) 67 733799.

Society membership

International Association for the Study of Common Property (IASCP)

For membership information and to receive copies of the *CPR (Common Property Resources) Digest*, contact: Charlotte Hess, Workshop in Political Theory and Policy Analysis, Indiana University, 513 N. Park, Bloomington, IN 47408, USA.

Request for information

Bob Johannes, a marine ecologist and Michael Riepen, a fisheries economist, are carrying out a study of the live reef food fish trade throughout South-East Asian, western Pacific Island and contiguous regions.

Information on the following subjects would be gratefully received:

1. Statistics on imports and exports of live food fish;
2. Human health risks due to the use of cyanide, sub-standard diving gear or inadequate training in the use of diving gear in connection with the live reef food fish trade;
3. Destruction of corals through the use of cyanide;
4. Targeting of spawning aggregations of reef fish by fishermen and the perceived consequences;
5. Examples of sustainable live reef food fisheries in operation;
6. The cage culture of the Napolean (bumphead) wrasse, *Cheilinus undulatus*, for the live food fish trade;
7. Methods, locations and other information relating to the collection of wild fingerlings for cage culture for the live reef food fish trade;
8. Examples of dumping of massive amounts (rather than just squirting from squirt bottles) of cyanide into marine habitats.

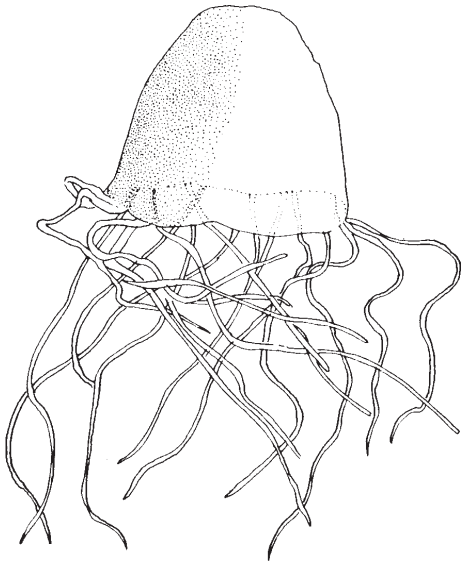
Anyone supplying such information and requesting a copy of Johannes and Riepen's report on the live reef food fishery in the region, will receive one later this year.

Please contact Dr. R.E. Johannes, 8 Tyndall Court, Bonnet Hill, Tasmania 7053, Australia, Phone: (61) 02 298064, Fax: (61) 02 298066. (e-mail: bobjoh @ice.net.au).

The 'Circumnavigations for coastal life' campaign of REEF (Remedial Ecotoxicological Expeditions Fund)

Traditionally the coastal zone has been ideally suited for the development of housing, food gathering, transportation, communication, recreation, and for industrial activities. The majority of the earth's human inhabitants (75% or 3.5 billion people) live on or within 60 kilometres of the shores. This coastal population is expected to increase to 7 billion by 2015.

Today, however, coastal ecosystems, especially in the tropics, remain poorly understood, insufficiently surveyed, often polluted and mismanaged. The search for edible fish or shellfish is a daily struggle for many of the coastal communities.



From a global peak of 100 million tonnes of marine fish in 1989, catches had fallen by 30 million tonnes by 1995.

This is mainly due to overfishing and disturbance of coastal nursery grounds. Recently the Canadian Navy fired at a friendly nation's fishing boat, signalling the gravity of natural resource depletion and alerting all of us to take seriously the global coastal crisis.

Where once we thought endangered species were the problem, we now face the loss of entire ecosystems. The collapse of coastal ecosystems and migration towards the cities pressure local institutions to respond to ever-increasing environmental and socio-economic problems.

The complexity of coastal problems requires solutions that are scientifically well-founded, economically feasible, and socially acceptable. The participation of local stakeholders is important to ensure the solutions' acceptance, institutionalisation and ownership by coastal communities.

REEF will address the global crisis by launching in 1996 the world's first regularly circumnavigating research and education workboat *Stella Maris*, that will circle the world's oceans once every three years. The islands and coasts of the Atlantic, Pacific and Indian Ocean will be served for about a year each.

Thus, the workboat will become a focus and clearing-house for interdisciplinary dialogue, sustainable development, and island and coastal resources management. The low-cost, high-tech workboat will be equipped to respond to local information needs, sample and monitor the coastal environment and educate coastal communities.

Conduct of the campaign

About 600 visiting scientists on *Stella Maris* will conduct interdisciplinary coastal (terrestrial, riverine and marine) research (while serving about 100 coastal communities) within a circumnavigation.

Research (participatory research) topics include: aquaculture, climate change and its effects, coastal diversity, coral reefs, ecotoxicology, eutrophication, fisheries, mangrove forests, marine parks, pollution, parasitology, planktons, sea grasses, sediments, indicators of sustainable resource management, etc. REEF strengthens inter-island and inter-coast co-operation with the option to revisit sites every three years for follow-up or long-term studies.

Volunteers (non-scientist) may join expeditions and spend a week or more aboard the workboat as an unique 'working holiday'. They will be asked to donate about US$2,450 (tax-deductible) for one week on board (US$350 / day). No special skills are required, however, highly skilled volunteers can apply for lower contribution rates. Scientists' family members can also participate as non-scientist volunteers. Volunteers' skills, enthusiasm and financial donation will help scientists fulfil their mission.

The workboat's research and baseline data gathering will be aided by a foldable, four-seater amphibian airplane, a ROV (Remotely Operated Vehicle), an AUV (Autonomous Underwater Vehicle), a research submarine, and an all-terrain amphibian vehicle. The workboat's multibeam echosounder will map the seafloor, with the option of low-cost map production at sea.

The airborne remote sensing instruments will provide image data for Geographic / Environment Information Systems (GIS / EIS) applications, will monitor water quality, coral reefs, mangroves and other coastal resources, and will be used for mapping, planning and impact assessment. The seaplane could be dispatched to survey 'hot spots' (e.g. coral bleaching and pollution).

To solve local problems, training is most effective when carried out in the field . On-board workshops will be offered to over 10,000 policy makers and resource users / planners (per circumnavigation), including women who are usually managers of local resources on which everyday life depends.

Capacity-building will be aided by:

(i) the on-board video-conference facility (via satellites);

(ii) gathering missing information in the field or via satellites (Internet) as the workshop goes on;

(iii) leaving behind scientific reports or a workshop's action plan by using the on-board printing facilities.

The coastal education campaign, as part of REEF's human-centred development, has six components:

(i) showing (self-produced or acquired) educational films to over 100,000 people per circumnavigation;

(ii) setting up on-board product demonstrations and mini trade shows / exhibitions on the floating platform (attached to the workboat) or onshore, focusing on environmental technology transfer;

(iii) having access, through satellite links (phone, fax, e-mail), to resource centres;

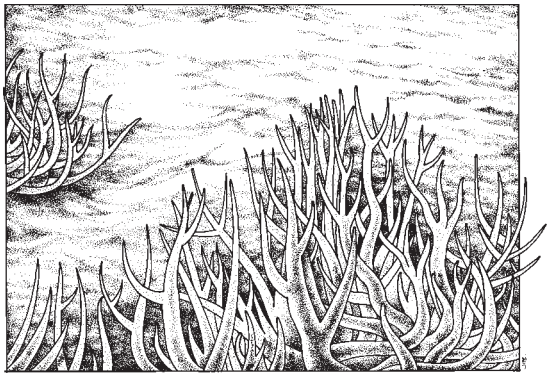
(iv) accessing on-board book, CD-ROM and film library and REEF's Global Coastal Expert Network;

(v) publishing globally and locally-focused educational materials, periodicals, books, CD-ROMs;

(vi) video-documenting success stories in sustainable development (TV films will reach millions).

Sustaining the campaign

REEF's fundraising goal is six million US dollars over three years (the boat will be self-sufficient after the second year of operation). Contributions are tax-deductible in Canada and US. Membership categories (half-price in low-income countries): US$20 Regular (US$10 in low-income countries and CA$25 in Canada), US$50 Expedition, US$50 Institutions / Libraries, US$100 Sustaining, US$500 Corporate, US$1,000 Patron, US$3,000 Global Investor, REEF Club (US$7,500 and up).



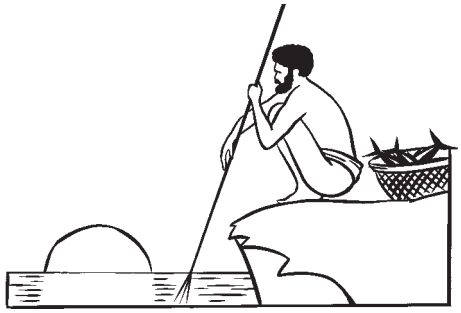
Visiting scientists will be expected to use their research grants to cover their on-board expenses (about US$2,100 / week or US$300 / day). REEF's state of art mapping / survey, environmental impact assessment, resource planning (and 'fast-response') capabilities will generate additional revenue by serving governments, NGOs, institutions, developers, and others.

Crew members' combined skills and knowledge (GIS / on-line, remote sensing / mapping and resource management experts, etc.), aided by REEF's Global Coastal Expert Network, will offer a large body of useful expertise. Revenues will sustain workboat operation and keep running REEF's grant programmes.

REEF's Research / Education Grants will fund on-board investigators / workshop participants from low-income countries. REEF's Small Grants will help the implementation of locally important small coastal projects.

TRADITIONAL MARINE RESOURCE MANAGEMENT AND KNOWLEDGE

NEWS FROM THE PAST



This 'new' section presents articles published 'some' years ago in several regional magazines (Pacific Islands Monthly, South Pacific Bulletin). We have left the rather 'colonial' vocabulary untouched. In the first article on fishing methods used in Papua in 1936 dugongs are said to be doomed to become extinct. It is good to realise that, 60 years after, dugongs still exist...but it is also sad to realise that they are still threatened with extinction...

Tropical fishing: some methods in Papua

Source: Pacific Islands Monthly 17 June 1936

A Papuan missionary told me of many ways in which fish are caught by the natives of Papua.

Big nets and little nets are used; spears and fish traps made of cane-like baskets; hand scoop-nets, used by the women and girls; bows and arrows managed by small boys to catch fish in the pools on the reef when the tide is out.

A number of fish are caught in pools on the coral reef with poison. The poison is the juice of the crushed root of a vine. It is tied to a stick and pocked about under. The fish soon succumb to it.

A kite is also used to snare some kinds of fish. The kite is flown over the water and the snare dangles on the surface.

Nets are made of strong cord. The cord is made of fibre and the fibre is obtained from banana, wild cotton, pandanus and the stalk of a strong creeping vine whose root is dug up for food.

The fibre for string and cord and rope is in the pith of the aerial roots of the pandanus tree—roots that grow down from the branches or trunk to the ground. It is wonderfully strong.

The fishing kite is made from a dried pandanus leaf. A light string about 40 feet long is attached to the tail of the kite about half-way down. At the end of this string is suspended an egg-shaped ball of strong spider's web.

The fisherman rows out in his boat and flies the kite; the ball of web trails along the surface of the water. A fish leaps at the ball; its teeth become hopelessly entangled in the web; and the native draws it into the boat.

Dugong are found all along the coast of Papua. The dugong, or sea-cow, is the siren and mermaid of a thousand legends. When suckling her only babe, the cow raises herself in an upright position with her head well out of the water and clasps her little one to her breast, so that it may breathe while feeding; she is a great mother. Old-time sailors fancied that the dugong was a human creature—hence 2000 years of romance.

Dugong's bones are heavier than the bones of any other animal. The skin is one inch thick, in an old cow, and very hard with bristly hair. The creature nips off the marine grass and seaweed at the bottom of the sea with its thick, hard lips, and chews it with its teeth.

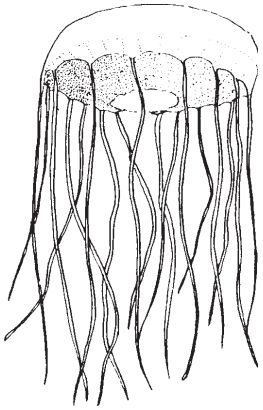
Men catch the dugong in the Fly River district with harpoons. As the animal swims through the water it leaves a white phosphorescent line of light behind it. It comes to the reef for food and natives watch the place.

They build a platform there and rub sweet smelling leaves on the sticks of the platform. The fisherman stands on the platform with the harpoon in his hand. The dugong is attracted by the smell: it makes a funny noise. The immortal 'Song of the Siren' is, if anything, a huff and puff, a snort and a grunt. The man makes the same kind of noise with his lips. The dugong thinks a friend is there and swims to the platform. The native jumps down into

the water and plunges his harpoon into the animal. He clings to the end of the rope attached to the harpoon and is dragged quickly through the water by the wounded sea-cow.

His mates paddle hard after him in a canoe and he calls out to them all the time. The dugong swims away to deep water, pulling the man behind him, but soon wearies. The canoe men pick up the spearsman and tie a rope to the tail of the sea-cow, thus preventing it from lifting its head to breathe. It dies by drowning.

Sluggish and inoffensive, the dugong is doomed to become extinct. Its flesh is needed for food, its hide for leather, and its blubber for oil.



Sea snakes killed by reef temperature

Source: Pacific Islands Monthly April 1946

Again this year the Mangaia 'beachcombers' of the seaward villages searching the reef-pools for small fish, have had their expectations agreeably fulfilled by something better.

The phenomenon known locally as **tua,** which appears to be a heating of the reef-pools in bright sunshine beyond their normal temperature, resulted in the death of many **kerekere**, or spotted sea-snake, which floated lifeless on the surface of the pools in gratifying numbers.

Other fish do not seem to be affected by the increased temperature of the sea water, for it is only the snakes that succumb when there is a **tua.**

The local sea-snake is good eating, and when obtained thus easily, is hailed by villagers with appreciation. Under normal conditions it lives in a hole in the coral and has to be enticed out with a small hook on the end of a palm-frond and suitably baited.

The angling entails submergence of the fisher, who generally wears a pair of locally-made water goggles, and he may be rewarded with a nasty bite from the **kerekere** if he is rash enough to get a finger within reach. These snakes are not venomous.

It would be interesting to know to what extent the reef-pools heat up in **tua** time, and if any chemical change takes place in the water.

The dead snakes exude oil when picked up, which is not the case with those caught alive on a hook; the **tua** harvest is, of course never given time to decompose—the fish come to the cook-huts straight from the pools.

This, and the annual run of sardine-like fry of the **tutai-nui** has been a valued help to native larders in the poor months of the off-season.

PIMRIS is a joint project of 4 international organisations concerned with fisheries and marine resource development in the Pacific Islands region. The project is executed by the South Pacific Commission (SPC), the South Pacific Forum Fisheries Agency (FFA), the University of the South Pacific's Pacific Information Centre (USP-PIC), and the South Pacific Applied Geoscience Commission (SOPAC). Funding is provided by the International Centre for Ocean Development (ICOD) and the Government of France. 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