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TRADITIONAL

MARINE RESOURCE MANAGEMENT AND KNOWLEDGE

INFORMATION BULLETIN

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Group Co-ordinator and Bulletin Editor: Kenneth Ruddle, Matsugaoka-cho 11-20, Nishinomiya-shi, Hyogo-ken 662, Japan.
Tel: (81) - 798-71-2904; Fax: (81) - 798-71-4749.

NOTE FROM THE CO-ORDINATOR

Welcome to the inaugural edition of the *Traditional Marine Resource Management and Knowledge Information Bulletin*, which will provide a vehicle for communication among the members of the Traditional Marine Resource Management and Knowledge Special Interest Group (SIG).

This SIG was established as a result of Recommendation No. 12 of the Twenty-Third Regional Technical Meeting on Fisheries (RTMF), held at SPC headquarters, Noumea, 5-9 August, 1991, to provide a focus for collection, discussion and dissemination of information on traditional marine resource management systems and the traditional marine ecological knowledge on which they are based. This recommendation resulted from a one-day workshop of presentations and discussions on 'People, Society and Pacific Islands Fisheries Development and Management', held as an integral part of the 23rd RTMF (page 2).

Although the principal focus is on SPC member countries, any person with an active interest in these topics in any part of the world is invited to join the SIG and to submit information to the Bulletin. There are many benefits to be obtained from such inter-regional cross-fertilisation. (contd. p. 2)

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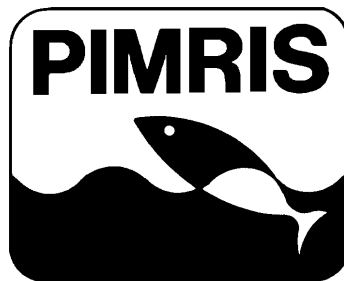
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PIMRIS is a joint project of 4 international organisations concerned with fisheries and marine resource development in the Pacific Islands region. The project is executed by the South Pacific Commission (SPC), the South Pacific Forum Fisheries Agency (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



Pacific Islands Marine Resources Information System

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.

To make this *Bulletin* useful it is of the utmost importance for members of the SIG, and others who read it, to keep us informed of their activities. In particular, we urge you to supply such items as:

- details of practical programmes to include traditional management, traditional knowledge and customary law in official government resource management, enforcement and monitoring frameworks;
- details of research activities in traditional management, traditional knowledge, customary law;
- information on forthcoming events related to these topics;
- reports on conferences;
- information on and, if possible, reviews of books;
- information on, and, better yet, copies of articles, reports, ephemera (including newspaper clippings and other 'grey' literature), for listing in the *Bulletin*, for inclusion in the 'Database and Annotated Bibliography Project' (see below), for deposit in the SPC library and for inclusion in the PIMRIS database at the University of the South Pacific.
- questions and requests for information; and
- contact addresses and other relevant information about institutions and individuals who should be receiving this *Bulletin*.

Kenneth Ruddle

The Workshop 'People, Society and Pacific Islands Fisheries Development and Management'

*by G. Preston,
South Pacific Commission,
Noumea, New Caledonia*

Fishery and fishery-related activities throughout the world are carried out by members of communities that frequently have a long, sometimes pre-historical association with the resources they exploit. This is particularly true in the Pacific Islands, where the exploitation of marine resources is interwoven with aspects of local culture, tradition and knowledge that varies greatly from place to place. Frequent characteristics of the social systems that underlie fishing activities in the Pacific include: marine tenure; differential access to resources by different social groups, (clans, tribes or villages) or by members within social groups (men and women, members of different lineages); practices that preclude the exploitation of certain areas (taboos, seasonal closures); and practices that discourage the exploitation, consumption or commercial use of given species or products.

The development of fisheries in the Pacific Islands is seen as a means to provide social, economic and cultural benefits to individuals, communities, societies and nations. In order to achieve these targets, the governments of Pacific Island countries, with extensive support from aid agencies, international organisations and other benevolent bodies, each year make a considerable financial commitment to promoting fisheries development in a variety of forms.

Despite these commitments, this sector of fisheries development in the Pacific Islands has a very high failure rate and only occasionally meets with long-

term success. In particular, economic development projects intended to generate income-earning opportunities at the village level have a history of failing when the initiators of the project leave and activities are left solely in the hands of the supposed beneficiaries. In addition, conflicts frequently arise between the project executors and the supposed beneficiaries because of differing cultural values regarding marine tenure and resource ownership.

In numerous cases the failure of small-scale fisheries development projects has been attributed to a failure to take into account prevailing social circumstances and to implement development activities in a way that reinforces the goals and aspirations of the community that should draw benefit from the project.

The management of inshore fisheries is also assuming a growing importance, and receiving more attention in the region, as commercial exploitation, or increased fishing pressure due to concentrations of population, becomes more widespread. Advising and recommending on fishery management requirements and approaches is the responsibility of national government fisheries departments or equivalent agencies. However, fishery legislation and regulations intended to conserve fisheries are often inconsistent with already-established approaches to resource use and conservation. As a result, they tend to be ignored by fishermen, and, for various reasons, difficult or impossible for the government to police and enforce.

As in the case with fisheries development projects, the non-adoption by local communities of the conservation approaches that government tries to impose often reflects the fact that they contradict local perceptions of resource management needs and the procedures that are appropriate to meet those needs.

From the foregoing, there appears to be a need to:

- a) exchange country experience in the gathering and application of social information, and the successes, failures or conflicts that have resulted from applying or not applying this information;
- b) define the social and cultural considerations that need to be taken into account in devising and implementing fisheries development activities and management measures;
- c) establish guidelines for reducing the likelihood of failure or conflict in fisheries development and management activities by incorporating existing social and traditional value systems;
- d) identify actions in this subject field that national and international bodies can take to improve the success rate of fisheries development and management activities.

In response to these issues, the South Pacific Commission organised a one-day workshop on 'People, Society, and Pacific Islands Fisheries Development and Management' as part of the 23rd SPC Regional Technical Meeting on Fisheries, held in Noumea in the first week of August 1991.

The purpose of the workshop was to promote in-depth discussion of the social context in which fisheries development and management is taking place in the region, and thereby provide Pacific Island countries with information and ideas that would assist in the rational development and management of their marine resources. Workshop participants included senior Pacific Island fisheries officials and other delegates and observers attending the RTMF, as well as a number of resource persons and participants specially invited because of their relevant expertise. (The workshop received generous financial support from the International Centre for Ocean Development, as well as from the Forum Fisheries Agency and the FAO Regional Fishery Support Project).

The workshop agenda was structured as follows:

- Introduction, workshop aims and outline;

- Traditional systems of resource management and control in the 20th century - case studies worldwide;
- An overview of customary systems of marine resource management in Oceania, and ways in which these can be put to use in today's fisheries management context;
- Applying traditional knowledge of marine resources to their management;
- Developing a resource management system in Palau;
- Traditional knowledge and management of marine resources in Tokelau;
- Fisheries development in Papua New Guinea - involving the people;
- Conflict resolution in the development of the Cook Islands pearl industry;
- Other country interventions;
- Improving opportunities for women to participate in the development process;
- Fisheries as a part of integrated rural development;
- The role of extension and communication skills in fisheries development;
- Future needs in research on, and application of, traditional and social systems and knowledge in the Pacific;
- Recommendations for action in this area by national and international agencies.

Each agenda item was supported by presentations from resource persons, participants, or SPC staff, and each presentation generated considerable discussion and, in some cases, controversy. Workshop participants emphasized the great diversity of traditional fisheries management practices and associated knowledge across the Pacific Islands and concluded that most SPC member countries would benefit from comparative studies of these practices and this knowledge. They recommended that the SPC work towards sharing information on these subjects within and beyond the region, and expressed the opinion that the SPC would be an appropriate vehicle for the publication of issues that would not normally fit in the context of international publications.

The growing problems of reconciling customary law and western law were repeatedly raised. The workshop pointed out the need for a survey and review of available information on the various approaches taken by traditional cultures (within and outside the SPC region) to the integration of western laws and traditional customs.

Some larger Pacific Island nations contain many customary marine tenure systems about which little is known, and the structures and operations of such systems vary greatly within these countries. Rapid surveys of these systems are needed especially in order to determine which among them most need further more detailed studies in order to better facilitate their continued effective functioning.

Pacific Islander's knowledge of their marine environment (including such phenomena as seasonal, lunar and tide-related migrations and spawning aggregations of various food fishes) can be of exceptional value to government resource managers. This information is no longer always being transmitted effectively from generation to generation in the region. The workshop strongly supported research efforts to record traditional marine environmental knowledge, and where practical, put it to increased use in government marine resource management.

Community-based customary marine tenure and associated traditional management systems are facing a number of widespread modern pressures. The workshop strongly supported research on how traditional marine resource management systems respond to such pressures as major demographic changes, commercialisation of marine resources, aquaculture and marine resource enhancement, other coastal developments (including tourism), government marine resource management and enforcement programmes, and to the wider issues of integrated rural development and gender-specific role in fisheries.

The meeting nominated a sub-group of three participants to formulate specific recommendations to SPC for action in these areas, as follows:

- The workshop **recommended** that the Inshore Fisheries Research Programme set up a Special Interest Group on traditional marine resource management and knowledge in the SPC region to provide a focus for collection, discussion and dissemination of information on these subjects.
- The workshop also **recommended** that the Inshore Fisheries Research Project assist, in consultation with member countries and, where

appropriate, in collaboration with other regional organisations, in the design and use of customary marine tenure questionnaires building on the experience of Solomon Islands in their survey of 43 customary marine tenure systems in that country.

The information bulletin you are reading at present is the first product of the SIG that has been established in response to the first recommendation. As regards the second, the IFRP has obtained and circulated copies of the Solomon Islands questionnaire, plus the report of the survey which contains an analysis of the results obtained. The report in question is an FAO document (from the Fisheries Law Advisory Programme, Western Pacific and South China Sea Region: FL/WPSCS/87/16) entitled "Analysis of replies to a questionnaire on customary fishing rights in Solomon Islands" by Hilary Lewis Ruttley. It should be available by writing to FAO, but if you have trouble obtaining it, as we did, we can provide you with a photocopy of our not-very-good photocopy.

Many of the presentations at the workshop were very good, and as a result we are preparing a volume of workshop proceedings. Titles to be included are:

The value today of traditional management and knowledge of coastal marine resources in Oceania by R. E. Johannes, K. Ruddle and E. Hviding;

Conflict resolution in the Cook Islands pearl industry by J. Dashwood;

Resource owners as implementing agencies of Papua New Guinea coastal marine resources management regulations by M. R. Chapau, P. M. Lokani and C. D. Tenakenai;

Using customary practices in marine resource and coastal management in Yap state, Federated States of Micronesia by A. Smith;

Traditional marine conservation in Tokelau by F. Toloa, R. Gillett and M. Pelasio;

Women and fishing in traditional Pacific Island cultures by E. Matthews; and

Contribution to a bibliography of Pacific Island traditional fishery practices by R. Gillett, K. Ruddle, R. Johannes, M. Pelasio and E. Hviding.

The proceedings are in preparation and will be published as soon as possible, and circulated to group members when available.

TRADITIONAL MARINE RESOURCE
MANAGEMENT and KNOWLEDGE

I N F O



Decentralised nearshore fisheries management in Oceania — report of an FFA workshop in Niue

by *R.E. Johannes,*
CSIRO,
Hobart, Tasmania, Australia

This workshop was held in conjunction with the 6th Technical Subcommittee of the Forum Fisheries Committee, in Niue, 27–28 April, 1992. Two major themes were taken up by the workshop: (1) Scientific support for decentralising management of inshore fisheries, and (2) Legal and political support for decentralised management.

An awareness in Oceania of the need to decentralise marine resource management is clearly gaining momentum, as demonstrated by recent developments in the Cook Islands, Fiji, Palau, Papua New Guinea, Solomon Islands and Yap. Island governments are seeking ways to turn over more management responsibilities to local resource rights holders, while continuing to direct some very important activities from the national central office. How, then, can traditional resource managers be provided with technical knowledge to enhance their effective managerial capacity? At the same time, how can exchange of information be promoted between the traditional marine resource managers and government administrators, to increase opportunities for management responsibilities to be shared, integrated and supplemented? This topic dominated discussions during the workshop. Accordingly, it was decided to focus the workshop on ways of encouraging experiments in decentralisation and the transfer of information between rural marine resource users on the one hand and central legislators and fisheries personnel on the other.

Some such experiments are already under way in the region. A good example was provided by Moses Amos, of the Vanuatu Department of Fisheries, concerning a trochus re-seeding project that he supervises. Mr Amos locates villages in Vanuatu where customary authority over marine resources remains strong and where rights holders are interested in obtaining management advice from the Department of Fisheries. Advice is given on such simple but important things as the importance

of maximum and minimum size limits in trochus, and how long the local trochus fishery should be closed in order to rebuild stocks and realise better sustainable returns. Other advice might include demonstrating to the local resource manager the advantages of staggering closed seasons for trochus, lobster, beche de mer, coconut crab, and other species, so that at least one commercial species is always available for exploitation. Mr Amos locates villages where such an approach might be promising by informing rural fishermen, via radio messages, that the Department of Fisheries will provide such a service for anyone who asks. He takes pains to ensure that important information flows both ways. For example, learning from villagers about the locations and movements of various marine populations in local waters provides essential information for him to use in helping the villagers formulate their management policies.

This is but one example. Given the growing awareness of the potential for using fisheries officers to encourage local management of marine resources, the workshop participants considered how training in the region might provide the appropriate skills for carrying out such work. It was concluded that the best approach will undoubtedly vary greatly among countries and even within countries. Thus it would be impractical to tackle this job at all locations simultaneously.

Discussion of the related subject of legal and political support for decentralised management re-emphasised that to help local people manage their resources more effectively, they require legal and political support in addition to scientific support. One of the toughest problems facing those who wish to manage their local natural resources is the reconciliation of customary rules and regulations with the formal legal system of the courts. Although some Pacific Island countries have *begun* to lay the foundation for addressing this issue, in others the government and courts do not formally recognise

the legitimacy of customary law. Although such a recognition is hard to put into practice, workshop participants felt that customary regulations are not often *adequately* acknowledged and supported in national legislation.

These and other concerns of the participants were reflected in 14 recommendations, about the recording of relevant traditional knowledge, research on customary practices, national profiling of traditional knowledge and customary practices,

reviewing regional constitutional and legislative provisions and international law relevant to customary marine tenure and management systems, case studies and potential for transfer of known effective customary marine resource management systems, compilation of literature and other databases, mechanisms for the collection and dissemination of information, educational and training requirements, and specialised workshops and other events. Further information can be obtained from the Forum Fisheries Agency.

Database and annotated bibliography project

by K. Ruddle

A database and annotated bibliography project on traditional marine resource management and knowledge is being conducted by Kenneth Ruddle, supported by the Centre for Development Studies, University of Bergen, Norway, through a small grant from the Royal Norwegian Ministry of Foreign Affairs. The objectives are:

—to provide users with a PC-based standardised database of existing published and unpublished literature (including reports, students' papers and theses, newspaper clippings, etc.) on traditional marine resource management and knowledge; and

—to publish an annotated bibliography on the same topics.

Some 1,000 items for inclusion have been collected so far from around the world, but with a special emphasis on the Pacific Basin. Members and readers are urged to assist in making the coverage as comprehensive as possible by searching their files and any libraries or archives to which they have access and send copies of relevant material to the editor of this *Bulletin*, for processing and entry into the database and bibliography. (We will arrange to have these deposited eventually in the SPC library.)

Traditional marine environmental knowledge is invaluable for fisheries management, protected areas planning and environmental impact assessment

by R.E. Johannes,

CSIRO,

Hobart, Tasmania, Australia

Knowledge of the local marine environment and the movements and behaviour of marine animals is remarkably rich in some Pacific Island fishing cultures. It offers resources managers a short cut to some vital basic natural history data needed for managing nearshore marine resources.

The timing and location of reef fishes' movements provides a good example. Year after year many reef fish migrate to specific locations on the reef, to aggregate there for several days, usually in a particular moon phase, in order to spawn. Local fishermen often know the precise timing and pathways of these migrations and the locations of the aggregations into which they feed. For example, a few years ago, the fishermen of Palau provided me with information on the lunar periodic spawning

aggregations of more than twice as many species of reef fish as such information could be found for in the scientific literature for the entire world (Johannes, 1981). I have since obtained similar information in Yap, Pohnpei, the Marshall Islands, Kiribati, Papua New Guinea, Western Samoa and the Solomon Islands*.

Such information is very valuable for stock assessment. Populations of most species of coral reef fishes are normally scattered over large areas. Under these conditions it is almost impossible to get a useful notion of stock sizes. But the difficulties are greatly reduced if the biologist knows where and when a species aggregates to spawn, and can carry out visual surveys there.

* For reasons I do not understand, I have been consistently unsuccessful, however, in obtaining such information for isolated, lagoonless islands.

Spawning aggregations also provide a useful focus for management, that is, for the regulation of fishing pressure, because exceptional catches are often made from them. For a detailed discussion of the potential applications of aggregation-based management of reef fishes see Johannes (1980).

Some spawning aggregations have been wiped out by overfishing or by coastal development projects that blocked their migration routes before marine resource managers became fully aware of their existence and the need to protect them. These include not only a number of grouper spawning aggregation in the Caribbean (e.g. Olsen and LaPlace, 1978) but also a grouper spawning aggregation in Palau (Johannes, 1981) and a number of bonefish and goatfish spawning runs in Kiribati (Johannes, unpub.). Many more such runs have undoubtedly been destroyed without any record. Island fisheries divisions need to catalogue as many as possible of those that remain as a first step in ensuring their protection. The task can be greatly simplified by tapping the knowledge of local fishermen.

Traditional marine environmental knowledge can also play an important role in the siting and the management of coastal protected areas (Johannes and Ruddle, in press). It is often superior in important respects to information gained by means of conventional resource surveys performed by imported consultants constrained by insufficient time and money.

Local fishermen's knowledge of the timing and location of significant biological events is not restricted to spawning aggregations. Certain otherwise unremarkable beaches may serve as nookeries for nesting sea turtles, or come alive with spawning land crabs during certain lunar periods and seasons (Johannes, 1981). What may look like an insignificant and relatively barren islet to a reserve planner during a site inventory made in one season may be thronged with breeding seabirds, sea turtles or, in rarer cases, sea snakes, in others. In the absence of such local knowledge, protected area planners are thus liable to overlook areas with high conservation value.

Traditional environmental knowledge can also be invaluable in environmental impact assessment in coastal areas (Johannes, in press). Local people can help greatly in identifying local vulnerable species and habitats, and locating them in both space and (in the case of migrating animals) time. For this reason Maragos and Elliot (1985) relied heavily on the environmental knowledge of local fishing communities in producing marine resource atlases

for a number of Pacific Islands.

Such knowledge is disappearing as the older people who possess it die without finding anyone who is interested in receiving it. Recording it is thus an urgent matter. Allowing it to disappear is like watching a library full of unique and priceless documents burn without raising a hand to quench the flames.

In later issues of this bulletin I will deal with some of the methods that have proven useful in obtaining and using such knowledge, and with why efforts to do so have sometimes failed.

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Traditional marine resource management in the north of New Caledonia

by M.H. Teulières,
*Agence de Développement de la Culture Kanak
 Noumea, New Caledonia*

These are some brief notes on Kanak traditional knowledge and customary marine tenure in northern New Caledonia. Mechanisms which limit the access of resource users to marine resources, and which might therefore provide possible avenues for indirect management of fisheries, are described. This article is condensed from a longer paper entitled "Traditional marine resource management in the north of New Caledonia" that was presented at the SPC Workshop on Inshore Fishery Resources held in Nouméa in March 1988.

This study of traditional fishing techniques was carried out in the Nenema zone (Figure 1), which at the time of the study supported a population of about 470 Kanak people, distributed both on islands and on the extreme north of the mainland. The study involved about nine months of field work, carried out in two phases between 1983 and 1987, during which time I lived in the fishing communities in question and collected information on traditional fishing techniques and the social organisation of the fishing community through participant

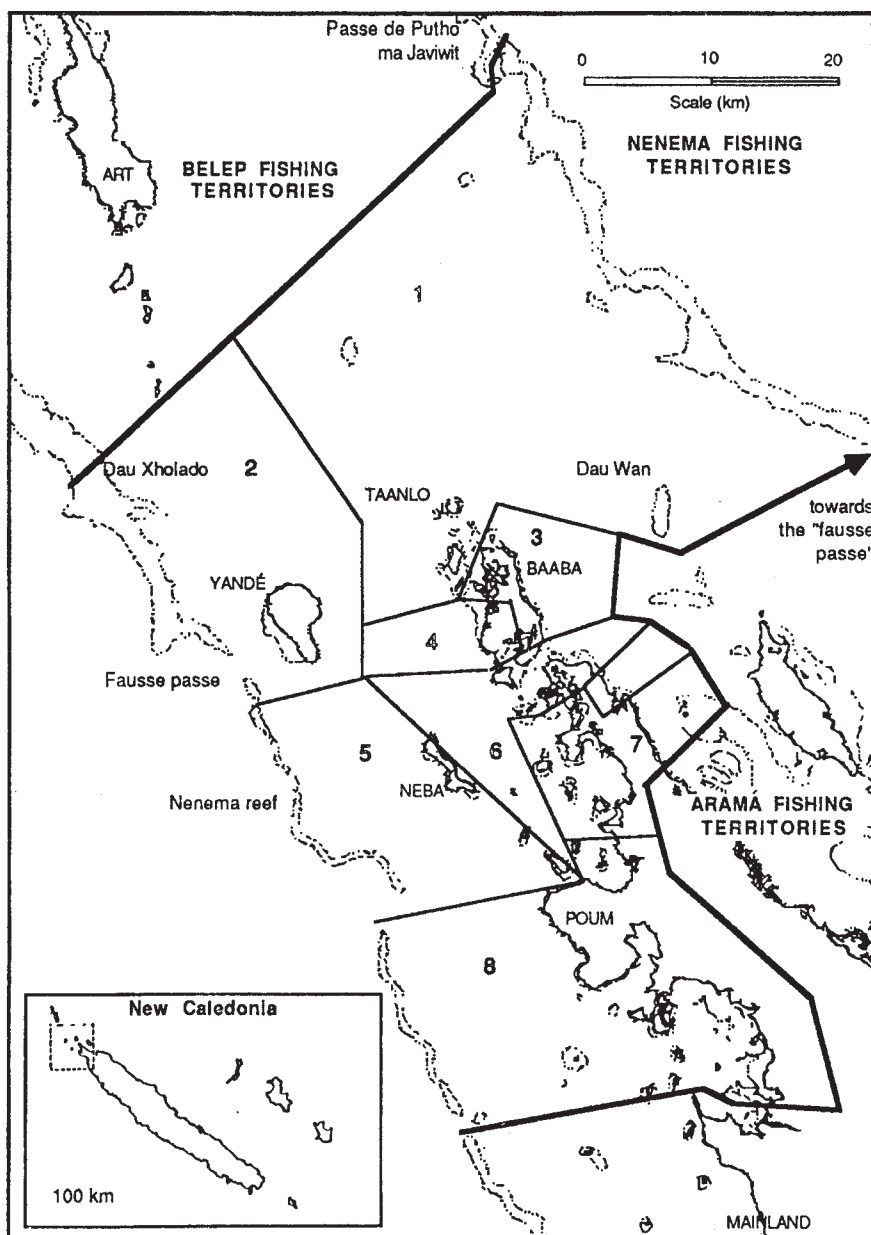


Figure 1. Fishing territories of the north of New Caledonia

observation, structured interviews and informal discussions.

The Nenema zone is one of 28 linguistically distinct areas of New Caledonia, and is composed of numerous islands and islets, of which the main ones are:

- Taanlô (81 ha) and Tia (43 ha - uninhabited today);
- Baaba (2120 ha);
- Yenghebane (138 ha);
- Tie (45 ha);
- Yande (1325 ha);
- Neba (357 ha - uninhabited today).

Two areas of the mainland are also included in the zone: Tiabet (300 ha) and Poum (the reserve of Tic, 106 ha). The Nenema zone thus totals about 5,000 ha, the islands and islets themselves covering a surface of 4,563 ha.

The zone is characterised at the same time by relatively abrupt massive serpentine and olivine rock formations — for example in Poum, and on the island of Yandé — and low-lying areas which are all that remain of a region that has been drowned by the sea — the islands of Taanlô, Yenghebane, Tie and Baaba. There are one or two very short waterways (creeks) of a torrential nature, but no substantial rivers. Taanlô, Yenghebane and Tie possess no creeks of any sort. The climate is dry most of the time, annual rainfall being about 1,000mm.

Within the waters of the Nenema zone are many small scattered islands and reefs within an extensive lagoon seldom exceeding 25 meters in depth. Shallow sandy banks and extensive littoral flats dry at low tide. There are many mangrove pockets and coastal swampy areas. Apart from the areas of living reef, most of the lagoon floor is sandy or silty with occasional beds of sea-grass.

Today, the islands of the North function largely as dormitory-islands, with very low populations for most of the year. Populations may increase by a factor of five in several hours on the occasion of marriages, funerals, etc. or to a lesser extent during school holidays. Mining activity in the region had slowed considerably at the time of the study, so the commercialisation of fishing activities had become an important means of discouraging economic emigration. This helped prompt the formation of a GIE (economic self-sufficiency group) by the fishermen of Nenema.

The Nenema country is an area that is geographically, politically and linguistically self-

contained. It comprises 8 independent units or **kavebu** ("chiefdom"), the largest political and social unit in the Nenema zone. Within the **kavebu** are several **yamevwuk** ("great clan"), which designates the largest unit of kinship, and which is divided into sub-clans or **duabo**. The French Administration has, for its own convenience, superimposed a system of "great-chiefdoms" on the traditional order. These often have no real social or cultural basis, but function rather as administrative groupments for the purposes of local government.

Throughout New Caledonia, the maritime zone inside the lagoon is associated with the land-based domain and is everywhere delimited and subject to ownership. In the Nenema area, the zone is divided into territories that are owned at two levels:

- At the level of the Nenema "great chiefdom", as opposed to the neighbouring "great chiefdom" of Belep in the North, Aonvase (Arama) in the South-east and Koumac in the South-west (see figure1);
- Between the different Nenema **kavebu** within each "great chiefdom".

The territorial limits fixed for each **kavebu** are established by taking landmarks from the crests of hills or the embayments of creeks, the points of capes, and, as limits at sea, submarine reefs, channels, or passes in the barrier reef.

Beyond the barrier reef — outside the lagoon — access to the sea is not limited in the eyes of the Nenema. Access to the maritime zone, however, is subject to certain rules. It is required practice from one **kavebu** to another to ask authorisation to fish in a territory which is not one's own. Authorisation to fish is rarely denied; the different **kavebu** are often united by the links of kinship, from which frequent exchanges of goods and favours arise in connection with ceremonial events (marriages, funerals, etc). However, certain **kavebu** impose more restrictions than others. The people of Yandé, for example, prohibit commercial fishing by members of neighbouring **kavebu**, reserving the resource for themselves.

There are a number of strongly and universally held beliefs about the consequences of transgressing the rules of access to fishing grounds. If a fisherman fishes without authorisation in a **kavebu** which is not his own, he will be unable to catch fish unless he succeeds in not being seen by the people of this **kavebu**. Guilt at his transgression will probably result in his becoming physically ill.

To cure the sickness, he must ask the pardon of the chief of the **kavebu** that owns the fishing area concerned. It may be the chief or another representative of his own **kavebu** who has to go to ask forgiveness of the offended **kavebu**, on behalf of the fisherman. The traditional system, which demands respect of the maritime or terrestrial territory of one's neighbours, is still very strong among Kanaks.

The sexual division of labour which is in force among the Nenema people traditionally confined the access of women to those marine foods that are harvested by hand on the reef flat (octopus, shells, etc) or in the mangroves (mangrove crabs, etc). Net fishing, for example — which usually necessitated transporting several fishermen by canoe — was exclusively reserved for men. Today, although these customs are no longer observed, Nenema women do not usually use nets for fishing — and especially not in the presence of men — except for European-style castnets, which are a recent introduction.

Certain fishing methods that were formerly restricted to women, including the capture of **shalaga**, or mangrove crabs (*Scylla* spp.), are now also practised by men, notably during important fishing expeditions. The technique itself remains practically unchanged, but the growth in the number of the participants, added to their tendency to fish more intensively (mangrove crab sells well and can be caught when fishing trips to sea cannot be made because of bad weather or equipment breakdowns) may have contributed to the depletion of these species in the Nenema zone.

If the Nenema people did not traditionally manage their stocks in the modern sense of the term, they made sure nevertheless to avoid catches they were not able to consume. Wastage of fish was condemned. Efforts to protect certain species were also made in response to interference from outside. For example, some fishermen from Yandé, fearing that the Europeans would take too many fish from their waters, are said to have used a "magic stone" in their possession to chase the fish away, and draw them to the outside of the barrier reef.

Fishing is never conceived as a "sport" — i.e. for other purposes than providing food — among the Nenema. Overfishing has always been associated with commercialisation, and with the resources that present economic opportunities, for instance crabs and lobsters.

Certain fishing methods such as poison fishing were known to be very effective, resulting in extremely large catches, but because they were also considered destructive, were not systematically used, although the fishermen still know the poisons

used. One of the reasons put forward to explain this is the fear that currents spread the area affected by the poison too widely. In other areas — the Isle of Pines and Maré, for instance — poison fishing seems to have been the object of local regulations: it needed, for example, the authorisation of the chief, who gave it only rarely, such as at times of famine.

Traditionally, efforts were made to preserve favoured fishing habitat in order to ensure the continued presence of fish, crustaceans, etc. In fishing for mangrove crab, for example, care is taken not to damage the animal's burrow (for instance, avoiding digging another hole too near the probable end of the burrow, even if this would allow more rapid access) as this increases the risk that the burrow will not then be reoccupied by other crabs.

Many Kanak commercial fishermen avoid working the same spot that they fished on their previous trip, only returning there as a last resort, if fishing is poor elsewhere. In addition, fishermen reserve certain areas near where they live in which they only fish to satisfy their own requirements, thus ensuring a continuous subsistence supply.

Traditional restrictions on the capture of certain species, which exist for reasons unrelated to resource conservation, may nevertheless function to this end, especially if the species concerned are the targets of commercial fishing. Certain marine animals have, for example, a special relationship with a given clan (**yamevwuk**). They are often species which, during a migration they undertake each year at a precise time and according to a known route, leave the zone that they occupy for the major part of the year in order to spawn in another area. During the course of the migration they may be briefly found close to a part of the shore that they do not normally occupy, subsequently returning to their original habitat.

In Taanlô, we find in this way, associated with a particular clan, two species of fish — a rabbitfish, **aalaat** (*Siganus* sp) and a trevally, **nok daalaak** (f. Carangidae) — the first of which migrates at the full moon around November, the second around March (see figure 2) into a basin in the lagoon. According to the fishermen of Poum, the arrival of the schools of rabbitfish draws other fish with them in their migration.

At present, the fish of Taanlô that are captured on these migrations are not destined for commercial use because of their sacred nature. Their capture is apparently reserved for members of this clan only. In other times, these fish were caught in encircling nets (as they are today) but were protected from being speared — another consequence of the 'special relationship' with the clan.

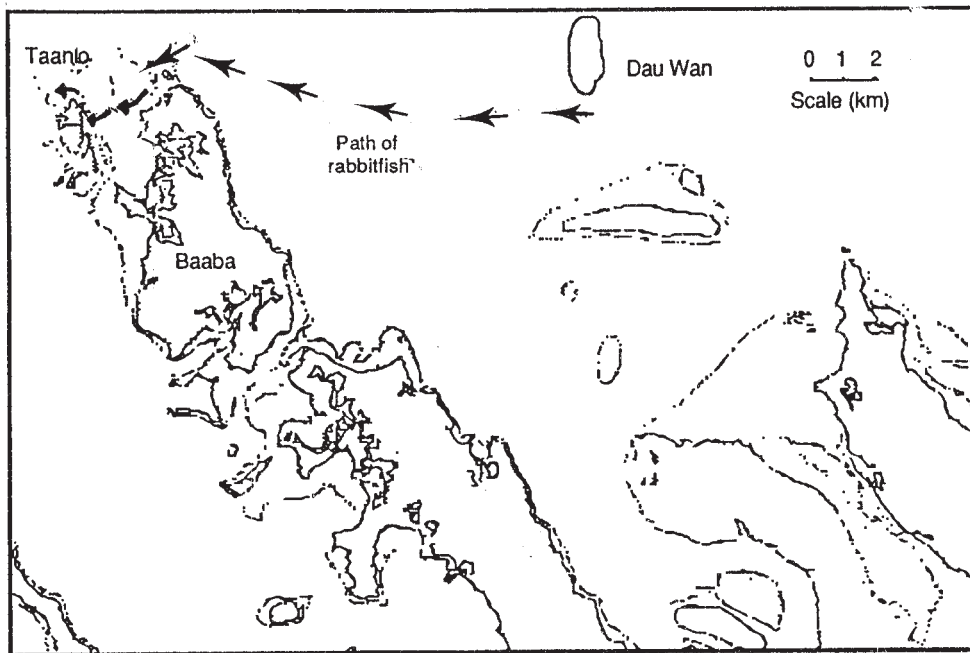


Figure 2: Path followed by the rabbitfish towards Taanlô

Milkfish, *Chanos chanos*, are said to migrate from the South-east of the mainland to Lifou. The route they take is seen as being related to the path taken (over many generations) of the women (no doubt of a certain clan) as they changed their place of residence on marrying. In a very schematic way, the presence of these fish is a manifestation of the ancestry of the clans founders, and they are the direct link between the ancestor of the clan and his descendants.

Other bans, which appear to work a little differently, also have a bearing on the capture of certain species. Turtles in Lifou, for example, are reserved for the chief, and may not be captured without his authorisation. It is obligatory for each turtle captured to be brought to him, which in itself often involves a complicated journey, to the point where the fishermen prefer to avoid catching turtles. Numerous clans have some form of relationship to a species of fish or crustacean, as a result of which it is protected from being exploited commercially.

Another factor which reduces fishing pressure on certain species but is not linked to a cultural consideration is the existence of ciguatera poisoning, called **shan** in the Nenema area. This influences the capture and consumption of fish according to their species, their size, and the place and season of their capture. Nenema fishermen tend to avoid eating large fish "especially when they are fat. They have **shan** when they are fat". They also avoid:

— **phuru**: under this term the Nenema fishermen distinguish at least four lutjanids; *Lutjanus*

fulviflamma, *Lutjanus kasmira*, *Lutjanus lineolatus*, and *Lutjanus quinquelineatus*. **Phuru** are not eaten if they are fished from certain places (in the closed basin on the west coast of Yandé, and the one which lies between the island of Yowowé and Poum, for example), although other fishes are. Elsewhere, these four species can be eaten;

- **deee**: under this name, the Nenema people distinguish several serranids, or coral trouts. The one which is not to be eaten is "black with white marks on the back. We find it inside and outside the big reef. We find it everywhere inside the big reef on the west coast and we do not eat it anywhere". It may be *Plectropoma melanoleucus*;
- **bwavu**: *Plectorhynchus picus*; this pomadasid is not eaten at Yandé from the time that the **wââric** (*Semecarpus atra* (Vieil)) flowers and bears fruit, until the season when yams are planted.

The customs and beliefs described here play, to differing degrees, roles in the traditional management of marine resources by the Nenema fishermen. These practices may not always fit western concepts of optimum yields or freedom of the seas, but they are nevertheless accepted and put into practice by the resource users. Only knowledge and understanding of this type of 'management' will permit resource managers to cooperate with the interested parties in developing their positive aspects within the framework of a modern management regime.

Roviana women in traditional fishing

by *Lamour Gina-Whewell*,
Solomon Islands College of Higher Education,
Solomon Islands

Introduction

One of the nine islands of the Solomons, the island of New Georgia, is home to the Roviana people. It is one of the main islands in the Western Province.

The Roviana people were noted for their widespread head hunting raids and their **Tomokoy** (black war canoes). The head hunting raids ceased early this century. Now the Roviana people are peaceful and serene, still practising many of their traditions and living a mainly subsistence lifestyle of gardening and fishing.

In many Solomon Islands communities, a major part of regular fishing is done by women. In the Roviana communities, traditional fishing management has a system of variable division of labour between women and men. This division of labour and fisheries is complementary and allows an extensive utilisation of marine resources. The Roviana women (children, adolescents, adults and old women) traditionally glean from the beaches, rocky shores, reefs, mangrove areas, streams and rivers and dive in shallow lagoon waters. They gather varieties of salt water molluscs, crustaceans, seaweed, fish and fresh-water molluscs. The fishing activities, done on a daily basis, provided their families a regular supply of the much-needed **baso** (protein in Roviana) to complement the carbohydrate diet.

Women's work

The most skilled part of the Roviana women's fishing is locating the fish. For example, **kapehe** (mud crab) burrow into the mud leaving only their eyes protruding above the surface by which they can be located; or the **osanga** (black-spotted emperor) burrow into the sand leaving only part of the fins sticking out. In some cases other senses are used. For example, to locate **deo** (a species of clam) in the murky waters of the mangrove, the hands and feet are used to feel for the hard shells.

While keen and alert senses are used to locate many of these target species, it can take nimble dexterity to catch them. For example, clumsiness while attempting to catch a **roqa** (a species of crab) can lead to loss of the crab or loss of a finger. The **osanga** (usually found burrowed into the sand with its fins sticking out) is caught using only one hand, this reduces the chance of startling the fish. The hand is lowered into the water with the thumb and

forefinger extended, the fish is slowly approached from the front or from the side (if the fish is approached from the rear, there is danger of being injured by the protruded fin). When close enough, the thumb and forefinger are quickly pushed into the fish's eyes. Thus rendering it blind. Therefore, if the fish is not caught on the first attempt it can still be easily chased and caught.

Species that are 'cemented' onto rocks are hit off with a rock. For example in order to loosen the **nakolo** (a species of bivalve) which is firmly attached to the rock by its base, it is hit at the base, because hitting the shell from anywhere else can smash it and spoil the flesh. **Kuravaho** (a species of clam), which is cemented firmly on the mangrove roots, is prised off at the base by jamming with a sharp pointed mangrove stick between the shell and the root. Species that cling loosely on rocks, dead logs and mangrove roots by suction can be plucked off by hand. For example, **sise** and **popu** (two species of snails similar to the green snail) have to be picked quickly at the base to break the suction. If an attempt is made to pluck the **sise** and **popu** from the top, or they are plucked too slowly they will not come off easily. The **sise** and **popu** react to touch by strengthening their grip on the rock.

Some species found in the waist-deep water must be dived for. **Ununusu** (a species of clam) is an example. The gatherer dives into the water (with eyes open of course) and picks hands full of **ununusu** and puts them in a basket that is placed beneath the water at a central point. The basket of **ununusu** is lifted into the canoe once enough is collected.

Kuluma and **koro** (fish species) when found in shallow reef pools are chased into holes in the rocks where they can get caught easily. Once the fish is in the hole the gatherer has to wait a few minutes to allow the fish to settle, then carefully push one hand in the hole (so as not to startle the fish). When close enough it is grabbed quickly by the tail. The **hohobulu** (a species of giant clam) is picked up carefully with two hands (lifting from the base) and gathered on nearby reefs and kept as 'clam farm' until required for eating. It is usually collected when the day is calm and the water is clear. (It is easily seen during this time.)

Weather variation

Most of the molluscs, crustaceans, and seaweed are gathered all year around. However, the Roviana

women gather certain molluscs and crustaceans at particular times of the year depending on the weather and tides. At the beginning of the year (January, February and March), in the cycloning period, the women hunt and collect **roqa** in the mangrove areas. It is plentiful in the night. In the Roviana vernacular it is called '**gitani rane bonghe**' (food for stormy weather).

In the rainy periods the women gather **sise** as they are plentiful at that time. The **sise** clings onto rocks along the rocky shores, dead logs along the beaches and the mangrove roots. At low tides in the night the women gather **sise**, **popu** and **tatadu** (chiton). They use dry coconut leaves tied together as torches.

In the middle of the year, during the dry season (June-July) the tide is low during the days. Women, children, and even men glean the dry reef tops for all sorts of molluscs, crustaceans, and fish. In the mangrove areas, **ropi**, **deo** and **kuravahe** (species of clams) are plentiful. During this time most of the diet consists of these foods. For a few days either side of the full moon, **kapehe** are plentiful and can be readily collected. During high tide, **ununusu** are plentiful. Women dive for them.

At certain low tide periods in the year, a species called **haqamuqe** (species of algae) releases substances from its body into the lagoon water. The substance discolours the water (greenish when only a few **haqamuqe** are around, and reddish when there are a lot), and as a result the women do not collect **deo**, **rik kosiri**, **sakaputi** (species of bivalves), or clams. These foods taste bitter, and through trial and error the Roviana people have found that people get very sick (i.e. headache, feeling lethargic, vomiting, and diarrhoea) if they eat these foods during this time. It is an irregular occurrence and only affects the collecting for a short period.

During the last few decades there have been many changes in men's fishing practice with the introduction of new equipment and techniques and increased mobility with the use of outboard motors. Some of the changes are due to fishing being commercialised. This 'modernization' of men's fishing has not greatly affected the women's fishing practices.

However, this 'modernization' has indirectly affected the fishing activities of the Roviana women in that the women are now also involved in fishing activities that used to be carried out only by men: fishing with a line from the canoe, diving, netting, and spearing fish.

The most notable change to the Roviana women's

fishing is that it is now more efficient and therefore requires less time, the reasons being that they use steel knives, picks, crowbars, modern torches, diving goggles another modern tools. For example, a large quantity of flesh can be prised off in a short time using a steel butter knife; picks can be used to hit off a desired amount of **nakolo** in no time at all; a bag of **popu** can be collected in the night within an hour using bright modern torches; and with the clear view gained by the use of diving goggles, collecting **ununusu** becomes a very easy task and a basket can be filled very quickly.

Because more can be collected in a shorter time and with less effort, there has been a tendency in some areas to over-exploit the resources. In some parts of Roviana (Munda, and parts of Vona Vona especially) **gulumu** (a species of giant clam), **nakolo** and **ununusu** are slowly being depleted, as a result of women using modern technology to gather their food.

With the recent development of clam and seaweed farms in some parts of Roviana, women, who are the traditional exploiters of these resources are not involved. It involves only the men. So it appears that the women's knowledge of this resource has not been given any recognition.

Conclusion

Over a long period of time the Roviana women have developed a traditional scientific system which classifies molluscs, crustaceans, fish and seaweed species, describing not only their habitat and behavior, but also the weather and tidal cycles that affect the relative abundance of these different species.

Also, it is interesting to note that although the women's fishing may be considered as 'just collecting shells, not involving interesting technology' (Haque & Tietze, 1988) and having little economic significance, their regular supply of protein to the family diet significantly contributes to the nutritional status of their families.



Management of marine resources by Kanak fishermen in New Caledonia: towards what evolution?

by M.H. Teulières,
Agence de Développement de la Culture Kanak
Noumea, New Caledonia

The research work summarised by this title is presently under way in the North Province of New Caledonia* and has three principal objectives:

1. Analysis of the potential application of "Kanak maritime law" for resource management

The expression "Kanak maritime law" refers to the specific usage rights claimed by a particular clan as a result of its historical association with a portion of the maritime territory. Marine territories — which are precisely delimited — are just like the rest of the land, under the jurisdiction of a clan which, in the local languages, is said to be the "master of the sea" or "the eyes of the sea". The arrival of Europeans has not made these rights disappear — the "master of the sea" clans are still perfectly well known among the Kanaks, as are the limits of the marine territories of each country or chiefdom.

The exploitation of the resources — in the ocean just as in rivers or on the land — was limited and codified by a certain number of rules. Since everybody was conscious of the risks they ran by transgressing the rules (suffering sickness or misfortune, which could happen to the transgressors or to members of their families), the control of these maritime territories — some of which were limited in extent and observable with the naked eye — was often fairly easy.

Exploitation of these resources generally took two forms: either by coastal dwellers for their daily subsistence needs, which was regular but of limited quantity (and within which also operated a sexual division of activity); or, less frequently but more intensively in connection with customary ceremonies (funerals, births, etc), to support the needs of a group and its allies. In these cases, the members of the clans that organised the ceremony requested the person in charge in the "sea master" clan to be responsible for the fishing, since only he had the right and the power — written in his history — to carry out and to succeed in the harvest. To maintain and justify their role of guardians of the maritime territory, the members of the clan concerned, and especially the person in charge of that task, were expected to know perfectly the species that frequented the lagoon in that area and which were of significance to the life of the

community. Furthermore, certain species which the clan was expected to provide at the times of customary ceremonies were "maintained" — in other words, to ensure their presence, the person responsible fed them regularly (the same thing also happened for hunting). As a result of this knowledge, the fishing techniques used were also very well mastered and adapted.

As a tool, maritime law had to be efficient among the Kanak clans that managed it, because it was connected with their survival — as much alimentary as social. One of the objectives of this study is to describe the knowledge of the species and of the fishing techniques held by these "masters of the sea" inside a specific territory, mainly for two reasons:

- first, to show clearly the advantages and the disadvantages of a management system which combines the social control of territory and men with the knowledge, and even control, of the resource and of fishing techniques;
- secondly, so that those rules connected to the conservation of the resource that are applied by the "masters of the sea" clans because of their knowledge could be advertised to and, hopefully, respected by other fishermen, preventing them from spoiling the maritime environment.

2. Study the effect of the superimposition of French maritime law on Kanak maritime law

Consequences on the control of the maritime territory:

The intervention of the "master of the sea" clans to provide fish during social events is still normal practice today. But, because of the arrival of Europeans, the associated population movements, the introduction of new laws giving open access to the sea, and the development of commercial fishing by Kanaks themselves, fishermen are now more numerous and more diversified than before. Controlling maritime territories in the same way that it was done before is very often impossible nowadays. Nevertheless, fishing cooperatives or Economic Interest Groups (GIE) still cannot be established among Kanak fishermen without the

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approval of the clan in charge of the marine territory. Part of the present study is to find out how the system of control of their territories and their resources practiced by these clans works in a situation of increasingly commercialised fishing.

Social and ecological consequences of increasing numbers of fishermen and fishing effort:

These changes have brought about many conflicts, either between local fishermen coming from neighbouring areas but who belong to different "territories", or between local fishermen and professionals from outside the area. In addition, the unsystematic leisure-time exploitation of the resource by local residents — whether European public servants or Kanak people belonging to clans from the interior of the country — who don't know enough about the marine environment — is problematic, even if in that case it's not possible to speak of "conflicts". But, whatever the case, the local fishermen insist on the necessity of protecting the resource. The present project aims to analyse the different types of problem occurring among the fishing communities of the North Province as they

attempt to manage their marine territories and resources, and to study the solutions proposed by the fishermen themselves.

3. Analyse the present-day administrative evolution of marine tenure rights in New Caledonia, especially in the North Province.

The Matignon Accords have modified the competencies of the three Provinces which administer New Caledonia. Will they use that opportunity to give more responsibility for the control of the resource to the local population because of their knowledge? What elements of Kanak maritime law could be absorbed into the resource development plans of each Province? How will the administrations manage to integrate the specific features and characteristics of each community without preventing the development of a coherent global fisheries development strategy for each Province and the whole territory? These topics will also be studied in this project, and will be compared, in as far as literature and personal contacts allow, with contrasting situations in other Pacific countries.

Members of the SPC Traditional Marine Resource Management and Knowledge Special Interest Group

*by J.P. Gaudechoux,
South Pacific Commission,
Noumea, New Caledonia*

We had received completed questionnaires from the individuals listed below at 22/7/92. If you are on the list and your name and address is wrong, please send us a correction. If you are not on the list and want to be, fill in the form enclosed with this bulletin or write us for a new form.

Blaber S.J.M.
CSIRO Div. of Fisheries
PO Box 120 - Cleveland - QLD 4163
Australia

Bralely R.D.
Aquasearch
6-10 Elena St. - Nelly Bay - Magnetic Isl. - QLD 4819
Australia

Alder J.
Queensland Dept. Environment & Heritage
PO Box 2066 - Cairns - QLD 4870
Australia

Bremner A.
International Food Institute
QDPI - 19 Hercules St. - Hamilton - QLD 4007
Australia

Aquilina B.
Paspaley Pearling Co.
PO Box 1006 - Broome - WA 6725
Australia

Brown R.A.
Aqua-select
PO Box 7142 - Cairns - QLD 4870
Australia

Beumer J.
Dept. of Primary Industries
GPO Box 46 - Brisbane - QLD 4001
Australia

Byrne M
University of Sydney
Zoology A08 - Sydney - NSW 2006
Australia

Blackney R.J.
Gemini Ocean Farms
PO Box 242 - Wickham - WA 6720
Australia

Cartwright I.
Australian Maritime College
PO Box 21 - Beaconsfield - Tasmania 7251
Australia

- Cropp D.A.
Aquatech Australia Pty Ltd
15 Wignall St. - North Hobart - 7000 Tasmania
Australia
- Dybdahl R.E.
Western Aust. Marine Research Lab.
PO Box 20 - North Beach - WA 6020
Australia
- Garrett R.
Fisheries Branch - Dept Primary Industries
PO Box 5396 - Cairns Mail Centre - QLD 4871
Australia
- George C.D.
C. Dennis George & Sons
PO Box 5811 C.M.C. - Cairns - QLD 4870
Australia
- Head P.K.
Department of Foreign Affairs and Trade
South Pacific Region, Section - Canberra ACT 2600
Australia
- Herr R.A.
University of Tasmania - Dept of Political Science
GPO Box 252 C - Hobart - Tasmania 7001
Australia
- Hunter G.D.
AIDAB - Centre for Pacific
Middle Head Rd - Mosman - NSW 2090
Australia
- Johannes R.E.
CSIRO
PO Box 1538 - Hobart 7001 - Tasmania 7001
Australia
- Lee Long W.J.
Fisheries Branch - QDPI
PO Box 5396 - Cairns M.C. - QLD 4871
Australia
- Leong A.
Imperial Seafoods Pty
PO Box 488 - Capalaba - QLD 4157
Australia
- Loo S.
Ausitops Pty. Ltd.
7 Beluga St. - Mount Eliza - VIC 3930
Australia
- Lucas J.S.
James Cook University
Dept of Zoology - Townsville - QLD 4811
Australia
- Nash W.J.
Tasmanian Department of Sea Fisheries
Crayfish Point - Taroom - Tasmania 7053
Australia
- Poiner I.R.
CSIRO - Division of Fisheries
PO Box 102- Cleveland - QLD 4163
Australia
- Preker M.
University of Queensland
Heron Isl.Res. Station Via Gladstone - QLD 4680
Australia
- Sanders S.
Darwin Pearl Oyster Hatchery Project
2/132 East Point Rd - Fannie Bay - NT 0820
Australia
- Trendall J.T.
CSIRO - Div. of Fish. Research
Bungalow PO - Cairns - QLD 4870
Australia
- Zigterman R.
Dept of Environment & Heritage
16 Andrews St. - Stratford - QLD 4870
Australia
- Williams D.
Australian Institute of Marine Science
PMB 3 - Townsville - QLD 4810
Australia
- Hinchberger B.
Third World Magazine
Rua Da Gloria 122, Sale 105 - Rio De Janeiro
Brazil
- Campbell A.
Dept of Fisheries & Oceans
Namaimo - British Columbia V9R5K6
Canada
- Hamel J.F.
Université Du Québec - Rimouski
310 Allée Des Ursulines - Rimouski - Québec
Canada GSL -3A1
- Argue A.W.
Dept. of Fish. and Oceans - Policy Planning Branch
4050 Lockehaven Drive - Victoria - BC
Canada V8N 455
- Jamieson G.S.
Pacific Biological Station
Nanaimo - British Columbia
Canada V9R 5K6
- Caughley T.
New Zealand Representative
PO Box 21 - Rarotonga
Cook Islands
- Howard N.T.
Ministry of Marine Resources
PO Box 85 - Rarotonga
Cook Islands

- Neale A.F.
Tairoto Pearls Ltd.
Tauhunu - Manihiki Isl.
Cook Islands
- Newham R.
Tauhunu
Manihiki
Cook Islands
- Curren E.F.
Pohnpei Marine Resources Division
PO Box B - Kolonia - Pohnpei 96941
Federated States of Micronesia
- Dahl C.R.
Community College of Micronesia
PO Box 159 - Kolonia - Pohnpei 96941
Federated States of Micronesia
- Edwards A.
Community College of Micronesia
PO Box 159 - Kolonia Pohnpei 96941
Federated States of Micronesia
- Fagolimul J.O.
Dept. of Resources & Development
PO Box 251 - Colonia - Yap 96943
Federated States Of Micronesia
- Falanruw M.C.
Institute of Natural Science
PO Box 215 - Yap 96943
Federated States of Micronesia
- Friberg C.S.
Yap Fishing Authority
PO Box 338 - Colonia - Yap 96943
Federated States of Micronesia
- James S.
Community College of Micronesia
PO Box 159 - Kolonia - Pohnpei
Federated States of Micronesia 96941
- Maito M.M.
Truk Maritime Authority
PO Box 789 - Truk 96942
Federated States of Micronesia
- Paatmag P.N.
Marine Resources Management Division
PO Box 251- Colonia - Yap 96941
Federated States of Micronesia
- Pekalibe P.
Yap Fishing Authority
PO Box 338 - Colonia - Yap 96943
Federated States of Micronesia
- Syne D.S.
Community College of Micronesia
LRC/library - PO Box 159 - Pohnpei 96941
Federated States of Micronesia
- Iou J.B.
Marine Resources Management Division
PO Box 251 - Yap State - Western Caroline Island
Federated States of Micronesia 96943
- Alatoa H.G.
Commonwealth Youth Programme
USP - PO Box 1168 - Suva
Fiji
- Bibi H.
Fisheries Division
PO Box 358 - Suva
Fiji
- Bolabola C.
Fiji Centre - Extension Services
University of The South Pacific - Suva
Fiji
- Eade J.V.
CCOP/SOPAC
Mineral Resources Dept. - Private Mail Bag - Suva
Fiji
- Esaroma L.
Fisheries Div. - Min. of Primary Ind.
PO Box 358 - Suva
Fiji
- Gillett R.
FAO/UNDP
Reg. Fish. Support Pgm - Private Bag - Suva
Fiji
- Lagibalavu M.
Fisheries Div. - Min. of Primary Industries
PO Box 358 - Suva
Fiji
- McDowell R.
Library - University of The South Pacific
PO Box 1168 - Suva
Fiji
- Naqasima M.
SPAS - University of The South Pacific
PO Box 1168 - Suva
Fiji
- Ram V.
IMR - University of The South Pacific
PO Box 1168 - Suva
Fiji
- Roseman S.
Aquarian Management Service
PO Box 1123 - Lautoka
Fiji
- Sharma S.P.
Fisheries Division Lami
PO Box 358 - Suva
Fiji

- Tanaka H.
South Pacific Aquaculture Dev. Project
UNDP - Private Mail Bag - Suva
Fiji
- W.N. King Obed
University of The South Pacific
PO Box 1168 - Suva
Fiji
- Raievsky Y.
Catering Express
2 Quai Laffite - 34000 Montpellier
France
- Cabral P.
EVAAM
BP 11 - Avatoru - Rangoroa
French Polynesia
- Cheneson R.
Service de la Mer et de L'Aquaculture
BP 20704 - Papeete - Tahiti
French Polynesia
- Galzin R.P.
Centre de L'environnement - Antenne EPHE
BP 1013 - Moorea
French Polynesia
- Yen S.
EVAAM
BP 20 - Papeete - Tahiti
French Polynesia
- Lujan R.J.
Division of Aquatic & Wildlife Resources
Dept. of Agriculture - PO Box 2950 - Agana
Guam 96910
- Gawel M.
120 Bengbing St.
Y Papas Estates
Guam 96929
- Balazs G.H.
National Marine Fisheries Service
2570 Dole St. - Honolulu
Hawaii 96822-2396
- Brock R.E.
Institute of Marine Biology - Univ. of Hawaii
MSB 210 - 1000 Pope Road - Honolulu
Hawaii 96822
- Fassler R.
Aquaculture Devt. Programme
335 Merchant St. - R. 348 - Honolulu
Hawaii 96822
- Gates D.E.
National Marine Fisheries Service - SW Region
1320 Aupapaohe St. - Kailua
Hawaii 96734
- Harman R.F.
West.Pacif.Reg.Fishery Management Council
1164 Bishop St #1405 - Honolulu
Hawaii 96813
- Holland K.
University Of Hawaii
PO Box 1346 - Coconut Island - Kaneohe
Hawaii 96744
- Naughton J.J.
National Marine Fisheries Service
2570 Dole St. - Room 106 - Honolulu
Hawaii 96822-2396
- Nitta E.T.
NOAA Fisheries - Sw Region - Pacific Area Office
2570 Dole Street - Honolulu
Hawaii 96822
- Sims N.A.
73-4369 Old Govt.
Mauka Rd
Hawaii 96740
- Mienis H.K.
Zoological Museum
Hebrew University - 91904 Jerusalem
Israel
- Gianuzzi-Savelli R.
Societa Italiana De Malacologia
CP 22 - 90146 Palermo
Italy
- Ruddle K.
Matsugaoka-cho 11-20
Nishinimiya-shi - Hyogo-ken 662
Japan
- Yamaguchi M.
University of The Ryukyus
Dept. of Marine Sc.-Nishihara-Okinawa 903 01
Japan
- Beniamina R.
Ministry of Natural Resources Revelopment
Fisheries Division - PO Box 276 - Tarawa
Kiribati
- Corbett T.
Island Trading Co.
PO Box 8 - Bairiki - Tarawa
Kiribati
- Diffey S.J.
Outer Island Fisheries Project
PO Box 508 - Betio - Tarawa
Kiribati
- Uan J.
Fisheries Division
PO Box 276 - Bikenibeu - Tarawa
Kiribati

- Yeeting B.
Biosystems, c/o USP Centre
Teaoraereke - Tarawa
Kiribati
- Almatar S.
Kuwait Institute For Scientific Research
PO Box 1638 - Salmiya 22017
Kuwait
- Vanderbilt C.F.
International Ocean Institute
PO Box 524 - Valletta
Malta
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Province Sud
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New Caledonia
- Teulières M.H.
22, rue de Verteuil
Sainte Marie - Nouméa
New Caledonia
- Kaly U.
University of Auckland
Zoology Dept. - Private Bag - Auckland
New Zealand
- Painter C.
Idea (Centre For Int. Dev. Education and Action)
PO Box 11345 - Wellington Aotearoa
New Zealand
- Pollock N.J.
Victoria University - Dept of Anthropology
PO Box 600 - Wellington
New Zealand
- Rees T.A.V.
University of Auckland
Leigh Marine Laboratory - R.d Leigh
New Zealand
- Rennie H.G.
New Zealand Ministry of Foreign Affairs
Wellington
New Zealand
- Coffen-Smout S.
Dept. of Agriculture and Fisheries
PO Box 74
Niue
- Leolahi S.H.
Fisheries Division Government of Niue
Dept of Agr. Forest. and Fish. - PO Box 74- Alofi
Niue
- Asigau W.
Department of Environment and Conservation
PO Box 6601 - Boroko
Papua New Guinea
- Baibuni J.G.
Dept of Fisheries & Marine Resources
PO Box 165 - Konedobu
Papua New Guinea
- Hill L.
Biology Department
University of PNG - PO Box 320 - Walgani
Papua New Guinea
- Kalowai M.
Div. of Agriculture, Stock & Fisheries
PO Box 1 - Esa'Ala - Milne Bay Province
Papua New Guinea
- Kalinau D.
East Sepia Youth Fishing Project
PO Box 554 - Wewak
Papua New Guinea
- Kuk R.
Dept. Fisheries Marine Resources
PO Box 1343 - Port Moresby
Papua New Guinea
- Landu H.
Dept. of Fisheries & Marine Resources
PO Box 165 - Konedobu
Papua New Guinea
- Lokani P.
Department of Fisheries & Marine Resources
Fisheries Research Station - PO Box 337 - Kavieng
Papua New Guinea
- Mobiha A.
Dept. of Fisheries & Marine Resources
Fish. Research Lab - PO Box 54 - Daru - West.Prov.
Papua New Guinea
- Mungkate A.J.
University of Papua New Guinea
Biology Dept. - PO Box 320 - Waigani -
Papua New Guinea
- Polon P.
Fisheries Research Lab.
PO Box 54 - Daru - West. Prov.
Papua New Guinea

- Rajeswaran N.
Dept of Fisheries & Marine Resources
PO Box 165 - Konedobu
Papua New Guinea
- Rubaha B.
Community Education
Community Education Office - Buala - Ysabel Prov.
Solomon Islands
- Rodwell L.J.
Dept of Fisheries and Marine Resources
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Fisheries Division
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Solomon Islands
- Vonole R.
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Papua New Guinea
- Toata Molea
ICLARM Coastal Aquaculture Centre
PO Box 438 - Honiara
Solomon Islands
- Wangi P.K.
MLRV - Faculty of Medicine
PO Box 5623 - Boroko
Papua New Guinea
- Kasilingam V.
Kasi Sea Foods Co.
11b Beach Rd - Mt Lavinia - Colombo
Sri Lanka
- Wararu W.
Dept of Fisheries & Marine Resources
PO Box 165 - Konedobu
Papua New Guinea
- Miller S.j
Eastern Technical Institute
20 Central Rd. - Batticaloa
Sri Lanka
- Williams I.
Masurina Lyd
PO Box 80 - Alotav - Milne Bay Province
Papua New Guinea
- Sugendran V.
Navakiri Irrigation Project Farmers Org. (Nipfo)
Sengunthar Rd - Araipattai-2 - Kattankudy
Sri Lanka
- Ladra D.F.
Bureau of Fisheries and Aquatic Resources
860 Arcadia Bldg. - Quezon Ave. - Q.C.
Philippines
- Koloa T.
Ministry of Agriculture, Forestry & Fisheries
Fisheries Division - PO Box 14 - Nuku'Alofa
Tonga
- Mingoa S.S.
Marine Science Institute
Univ. of Philippines - Diliman - Quezon City 1101
Philippines
- Latu T.F.
Ministry of Agriculture, Fisheries & Forest
Fisheries Div. - PO Box 14 - Nukualofa
Tonga
- Ahukela A.
Ministry of Natural Resources
Fisheries Division - PO Box G 24 - Honiara
Solomon Islands
- Tint Tun
Dept of Marine Science
Univ. of Mawlamyine - Mawlamyine
Union of Myanmar (Burma)
- Diake S.
Fisheries Div.- Ministry of Nat. Resources
PO Box G 24 - Honiara
Solomon Islands
- Brautigan A.
Center for Marine Conservation
15 Herbert St. - Cambridge CB4 1AG
United Kingdom
- Leqata J.
Fisheries Division - Min. of Nat. Resources
PO Box G24 - Honiara
Solomon Islands
- Wells S.M.
IUCN - The World Conservation Unit
56 Oxford Road - Cambridge CB4 3PW
United Kingdom

Yakolev Y.

Institute of Marine Biology
690032 Vladivostok
URSS

Zingmark R.

University Of South Carolina
Columbia - SC 29208
USA

Hahn K.

14431 Holt Ave
Santa Ana - CA 92705
USA

Meava S.M.

Fisheries Department
PO Box 129 - Port Vila
Vanuatu

Schechter M.G.

Michigan State University - Int. Studies & Prog.
East Landing - MI 48824 1035
USA

Toloa F.

Office For Foreign Affairs
PO Box 865 - Apia
Western Samoa

