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RESEARCH REPORTS IN THE ECONOMICS OF GIANT CLAM MARICULTURE

Working Paper No. 12

Marine Property Rights in Fiji: Implications for
the Development of Giant Clam Mariculture

by

Dr. T'eo I.J. Fairbairn

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Development of Giant Clam Mariculture**

by

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The technical feasibility of culturing giant clams for food and for restocking tropical reefs was established in an earlier ACIAR project. This project is studying the economics of giant clam mariculture, to determine the potential for an industry. Researchers will evaluate international trade statistics on giant clams, establish whether there is a substantial market for them and where the major overseas markets would be. They will determine the industry prospects for Australia, New Zealand and South Pacific countries, and which countries have property right factors that are most favourable for commercial-scale giant clam mariculture. Estimates will be made of production/cost functions intrinsic in both the nursery and growth phases of clam mariculture, with special attention to such factors as economies of scale and sensitivity of production levels to market prices.

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TABLE OF CONTENTS

ABSTRACT	1
1 . Background	2
2. Property Rights	4
3. Licensing Requirements	14
4. Shared Fishing Efforts	15
5. Institutional Aspects	17
6. Clam Culture - Prospects and Possible Approaches to Development	18
7. Conclusion	22
8. Acknowledgement	22
9. References	22
List of people consulted in Fiji	25
Previous Working Papers	26

Marine Property Rights in Fiji: Implications for the Development of Giant Clam Mariculture

ABSTRACT

Marine property rights in Fiji are characterised by state (the Crown) ownership of offshore waters (including seabeds) and Fijian tribal ownership of fishing rights on customary fishing grounds. These fishing grounds are extensive, covering adjacent reefs, lagoons, estuarine and mangrove areas and some outer-reef zones (as well as rivers). Rights to fish on these customary grounds are regulated by tribal groups, as represented by a tribal lineage - the *yavusa* - or a sub-division of this lineage- the *mataqali*. The rights of each tribal group over its recognised fishing area apply to the right to carry out subsistence fishing and the power to regulate commercial exploitation of these waters.

On biogeographical and ecological grounds, Fiji has the potential to develop giant clam culture as a major productive activity, both subsistence and commercial. However, as practically the entire reef area considered suitable for clam mariculture falls under customary forms of marine tenure, a major requirement is to gain access to these areas. The most critical step in this process is to obtain the consent of the tribal group in which the fishing rights are vested.

Regardless of whether a major giant clam project is initiated by a tribal group or by an outside developer, a key ingredient for success is the active support of villagers. This support is critical - to gain access to the reef area in the first instance, and to ensure local co-operation during subsequent stages of project development and operation. There are any possible avenues for fostering meaningful and close co-operation with villagers, including some form of joint venture or partnership arrangement.

Keywords: marine property rights, Fiji, *yavusa*, *mataqali*, reef tenure.

JEL Classification: Q31, Q57

Marine Property Rights in Fiji: Implications for the Development of Giant Clam Mariculture

1. Background

Fiji occupies a central position in the South Pacific and is one of the largest and most scattered archipelagic groups in the region. It lies in close proximity to the Kingdom of Tonga, Western Samoa, Vanuatu and New Caledonia. The nearest metropolitan countries are New Zealand, which lies approximately 2,100 km to the south, and Australia, which is 3,100 km to the south-west.

Fiji has a land area totalling 18,370 sq. km of which 86 per cent is accounted for by the two large islands of Viti Levu (10,390 sq. km) and Vanua Levu (5,530 sq km). In total, Fiji comprises over 320 islands of which 150 are uninhabited. Many of the component islands are very small, low-lying, coral-based structures that are poor in natural resources. The area of EEZ under Fiji's jurisdiction totals 1,290,000 sq. km.

The population of Fiji is currently around 720,000 about 90 per cent of whom live on the two main islands of Viti Levu and Vanua Levu. This population, which is multi-racial, is dominated by Fijians and Fiji Indians (who are mostly descendants of indentured labour brought from India in the last century to work on sugar plantations). Each of these major groups accounts for around 46 per cent of the total population. The remaining population comprises primarily other Pacific islanders, Europeans, Chinese and people of mixed ethnic origin. There has been a decline in population since 1987 as a result of heavy emigration by Fiji Indians following the military coups of 1987. The present rate of population growth is 1.8 per cent per year.

The economy is based on the development of Fiji's varied natural resources as well as service industries, including tourism. In agriculture, sugar both production and processing is dominant, in most years accounting for around 13 per cent of GDP and over 50 per cent of export earnings; other notable products are ginger, fruit juices, coconut products and cocoa. Tourism and related activities is a leading sector and has considerable potential for expansion, while processed fish, wood products (mainly lumber) and gold are also prominent. Manufacturing, which to date has been directed mainly at import-substitution, is modest

(accounting for 12% of GDP) but appears to be growing rapidly especially in relation to the export production of garments.

Exports are dominated by sugar, but several other resource-based items are significant, for example, ginger, wood products, gold and processed fish. Regarding fish-products, export earnings are modest and in 1987, they contributed a total of \$25 million out of total export earnings (including re-exports) of \$409 million (equal to Aust. \$22 million and Aust. \$360 million respectively), or 6 per cent. Fish exports take the form of preserved and canned fish (tuna) supplemented by a small amount of fresh and dried fish products.

A major thrust of current government policy is to encourage fisheries development both for subsistence and commercial purposes. This emphasis is based on the need to encourage full exploitation of an abundant natural resource and to open up new employment opportunities in that sector.

As outlined in Fiji's Ninth Development Plan 1986-1990 or DP9 (Government of Fiji, 1985, p. 71), the major objectives of the fisheries sector are to:

- a) generate further employment opportunities in the exploitation and processing of marine resources;
- b) increase production to satisfy local demand for fish and other marine fish products;
- c) increase value added in fish production for exports; and
- d) regulate and control the exploitation of fin and non-fin fishery products.

Programmes for developing the potential of the country's fisheries are laid out in DP9 by four major sub-areas: rural fisheries development; commercial artisanal fisheries; industrial fisheries; and fish farming. Considerable emphasis is given to the role of industrial fisheries in the economy, especially the exploitation of skipjack tuna and associated processing activities.

According to DP9, the main possibilities for fish farming relate to carp on fresh water rivers and ponds, prawns and mussel farms, and seaweed (*euchema* variety) production (Government of Fiji, 1985, p. 74). A range of measures is proposed to realise this potential, for example, the promotion of fish farming techniques and assistance with the construction of

fish ponds.

The Fisheries Division's latest annual report (Government of Fiji, 1989, pp. 13-14) provides a summary of progress made so far in various areas of fish farming, including pilot and experimental projects. These areas include clams, seaweed culture, freshwater fisheries, carp and tilapia culture. The report noted that as many as 27 rural aquaculture farms were in production in 1988.

The Fisheries Division's efforts to develop clam culture are presently modest. These efforts are largely confined to hatchery work on the island of Makogai which lies north-east of Viti Levu, about 50 km offshore. However, the Division has been responsible for carrying out an extensive survey on clams which found that the main clam variety, notably *Tridacna derasa* (*vasua dina*) has been greatly over-fished. Largely based on this finding, an official ban was imposed on the export of *vasua* and will apply until stocks have recovered.

The Fisheries Division's giant clam operations on Makogai include six quarantine tanks for imported broodlings and six tanks for developing and nurturing stocks. Two more tanks are soon to be installed. The Division's plans for Makogai are to establish it as a major mariculture site designed to foster clams and other products such as bech-de-mer, trochus, pearl shells and mangrove crabs. Funds are being sought from FAO to implement these plans.

On Makogai, a tabu (taboo) has been imposed on the northern side of the lagoon so as to protect it from commercial fishing. (This protected area does not include the clam hatchery area whose development predated present clam project work). Consideration is being given to converting Makogai's offshore areas into a marine reserve. However, before this step can be taken, the consent of the Tui Levuka, a high chief on Ovalau who holds the fishing rights on Makogai's coastal areas, must be obtained. Among other things, appropriate ways to compensate the Tui Levuka for fishing rights that he will have to forego (and is presently foregoing as a result of the partial tabu) need to be worked out should agreement be reached on the creation of a marine reserve.

2. Property Rights

The background

In common with many other Pacific island countries, property rights on Fiji's coastal waters

essentially operate under a dual system whereby property rights are shared between government (or the Crown) and indigenous Fijians. This dual system is marked by government ownership of the territorial waters within which lie the so-called customary fishing grounds of Fijians, and tribal ownership of the fishing rights on these grounds. Government ownership extends to reefs, lagoons and other territorial waters and includes seabeds and mineral resources. Fijian rights are confined to recognised fishing grounds and include subsistence and commercial fishing as well as the right to authorise commercial fishing by those outside the particular tribal group in which the fishing rights are vested. These rights also apply to the right to control practices that may damage marine resources.

Government ownership of Fiji's reefs and lagoons (as well as of rivers and other inland waters) was established in 1874 with the advent of the Deed of Cession. The Deed of Cession, which was signed by a group of leading Fijian chiefs, gave Queen Victoria (and Her Successors) possession of and sovereignty over the Fiji Islands, specifically, "all lands not properly alienated and not needed by the Fijians". By this action, Crown ownership was also established over all reefs and territorial waters which contained traditional fishing grounds.

Parenthetically, it may be noted that the significance of Crown ownership of Fiji's offshore waters does not appear to have been fully understood by Fijians at the time of Cession - a feature that has persisted from the post-Cession period to the present. Apparently, the signatory chiefs fully expected- in line with their chiefly customs- that ownership over their fishing grounds, as with their lands, would, in due course, be returned to them. The question of legal ownership persists, and recently, sections of the Fijian people have sought, through legislative means, to reassert ownership rights over customary fishing grounds and all associated resources, including seabeds. (At a recent meeting of the Great Council of Chiefs, a motion was presented by the Western Chiefs to have ownership of marine resources by Fijians included in the proposed Constitution.)

While a consequence of Cession, the Fijians lost ownership rights of their fishing grounds, they retained fishing rights over these areas. Successive representatives of the British Crown in Fiji confirmed that the customary fishing rights of Fijians would be fully protected and secured. These assurances were subsequently incorporated in various official ordinances, principally, Fisheries Ordinances (1894, 1924 and 1941) and the Birds, Game and Fish Protection Ordinance (No. 20 of 1923).

According to the latter ordinance:

"It shall be unlawful for any person to fish on any reef or any *kai* (cockle) or other shellfish bed-in any water forming the ancient customary fishing ground of any *mataqali* unless that person was a member of such a *mataqali* or held a licence from the Colonial Secretary."

This basic provision protecting the customary fishing rights of Fijians has been refined and modified over time in response to changing political, social and institutional circumstances. Present legislation (e.g. Marine Space Chapter 158A, Law of Fiji), accords protection to 'any area in which the rights of any *mataqali* or other division or sub-division of the Fijian people have been registered by the Native Fish Commission in the Register of Native Customary Fishing Rights'. In relation to access for those not belonging to the tribal group which controls the fishing grounds, a permit to fish is required from the Commissioner of the Division in which such area is located.

A major problem in relation to property rights on reef areas that has had to be faced over time has been the need to clarify the fishing rights of individual tribal groups. Traditionally, tribal groups had developed their own way of defining areas over which they had control but, even so, such a system left the way open to much dispute, often leading to violence. The problem of the lack of clarity regarding the fishing rights and how far these rights apply was addressed by the Fisheries Ordinance of 1924. This ordinance highlighted the need for a clarification of fishing rights and recommended that the limits of reefs and shell fish beds belonging to different *mataqali* be defined and properly recorded. The latter recommendation provided the basis for the establishment, in 19.. of a Native Fisheries Commission (incorporated under the Native Land and Fisheries Commission) whose responsibility was to investigate and examine tribal claims for customary fishing rights over reef areas and to register these claims. The work of the Commission has made considerable progress despite the many difficulties inherent in such a mandate.

Fijian reef tenure

The fishing rights of Fijians apply to customary fishing grounds that tribal groups have, over time, established on adjacent reef and other coastal areas. Traditionally, control over and usage of these fishing grounds was governed by custom. Such fishing grounds comprise rivers, estuarine areas and offshore waters, usually extending from shore (high-water mark) to

the outer edges of fringing or barrier reefs. They also include lagoons and shallow coastal waters not bounded by a reef. As will be shown below, considerable variation exists in the location, size and other physical features of fishing zones controlled by the different tribal groups.

Access to the customary fishing grounds of each tribal group is open to members of that group (leaving out those from outside, fishing commercially under a fishing licence). These tribal groups are the *vanua* – the broadest tribal and social unit that is associated with an identifiable physical territory (Ruddle, 1989); the *yavusa* – tribal lineages of the *vanua*; and the *mataqali* – a sub-unit of the *yavusa* and the principal group for the purposes of land occupation. The *mataqali*, in turn, is composed of smaller family units – the *tokatoka* – which are equivalent to extended family units. The *mataqali* falls into a number of functional categories, each specialising in a particular area, for example, fishermen, farmers, builders and chiefs.

The chiefly groups who exercise effective control over customary fishing grounds vary from area to area and reflect the hierarchical and stratified nature of the Fijian social and political system. In practice, most of the customary fishing grounds that have been identified fall under the effective control or custodianship of the head of a *yavusa* (*turaga ni tokatoka*) or, in some cases, of several *yavusa* (*turaga ni yavusa*). Otherwise, this role is exercised by the *mataqali* chiefs and, in a few cases, directly by a paramount chief.

Important differences also exist regarding fishing practices used by tribal groups. As Iwakiri (1986, p. 135) has observed: "There are no written regulations on *mataqali* fishing practices because of differences in culture and tradition at each *mataqali* level. Each *mataqali* has its own identity which has been passed from generation to generation."

The areas claimed by Fijians as their customary fishing grounds cover practically the entire reef and other coastal zones of the country. A total of 410 separate fishing grounds has been defined so far and officially recorded for purposes of eventual registration (and surveying). Such grounds are recorded by *yavusa* tribal division in accordance with the ancestral fishing rights (*vanua*) of the group. In the not infrequent case where several *yavusa* share a common fishing zone, the rights of each participating *yavusa* are recorded for registration (i.e. in the Register of Native Customary Fishing Rights). The process of registration has been virtually completed, although only seven customary fishing grounds have so far been surveyed – all on

the coastal waters of the island of Beqa – to determine absolute boundaries.

Customary fishing rights apply to reef areas directly offshore from the village or groups of villages – essentially lateral extensions of the terrestrial boundaries of a particular land-holding group. However, many tribal groups control fishing rights over coastal or territorial zones which lie far from shore and in some cases, this is in addition to those adjacent to shore. Particularly complicated reef tenure arrangements can arise in relation to fishing rights on offshore islands or islets where the claims of both the inhabitants and those from other islands are often recognised.

Tribal groups generally had clear ideas of the extent and limit of their fishing grounds and they relied heavily on certain physical features as a means of demarcating boundaries. As Iwakiri (1983, p. 135) has observed, these fishing areas were usually bounded by readily identifiable marine physical features such as patch reefs, reef holes and reef passages and at the seaward end, by the outer limit of the barrier reef which is exposed at mean low water.

The use of physical marine features to identify tribal fishing areas can be illustrated by the two extracts from the Native Lands Commission (D.W. Wilkinson) records compiled in 1899 (Harness, 1940, Appendix VII). The first extract records the evidence for the *Yavusa Vusaratu, Serua*, as follows:

We (the people of the above tribe) fish upon our line of reefs and the main reef, commencing at the passage at Somosomo then following up said reef to the eastward to the Yarawa passage and the patches along our coastline within said main reef. The Tomasi of Serua and Manggumanggua (Maqumaqua) and Korovisilou have equal right and privileges on said reefs with ourselves.

The second extract relates to the *Yavusa Vusu Mbatiwai (Batiwai), Serua*:

The reefs along the coastline and the main reef and patches opposite Tolunga (Toluga) Bay, that is from the Rokosou Point on the west and Rukuni vutu on the east point; we fish in all these reefs and patches together with the towns people of Thulanuku (Culanuku) and Wainiyambia (Wainiyabia).

Key aspects of reef tenure can be highlighted with the aid of Figures 1,2 and 3. Figure 1 shows the pattern of tribal fishing grounds that has been established along the Southeast coast

of Viti Levu, Fiji's main island. It includes the area in the vicinity of the Rewa River Delta. Figure 2 shows the corresponding division for a southern section ("Coral Coast") of Viti Levu, and the offshore island of Beqa.

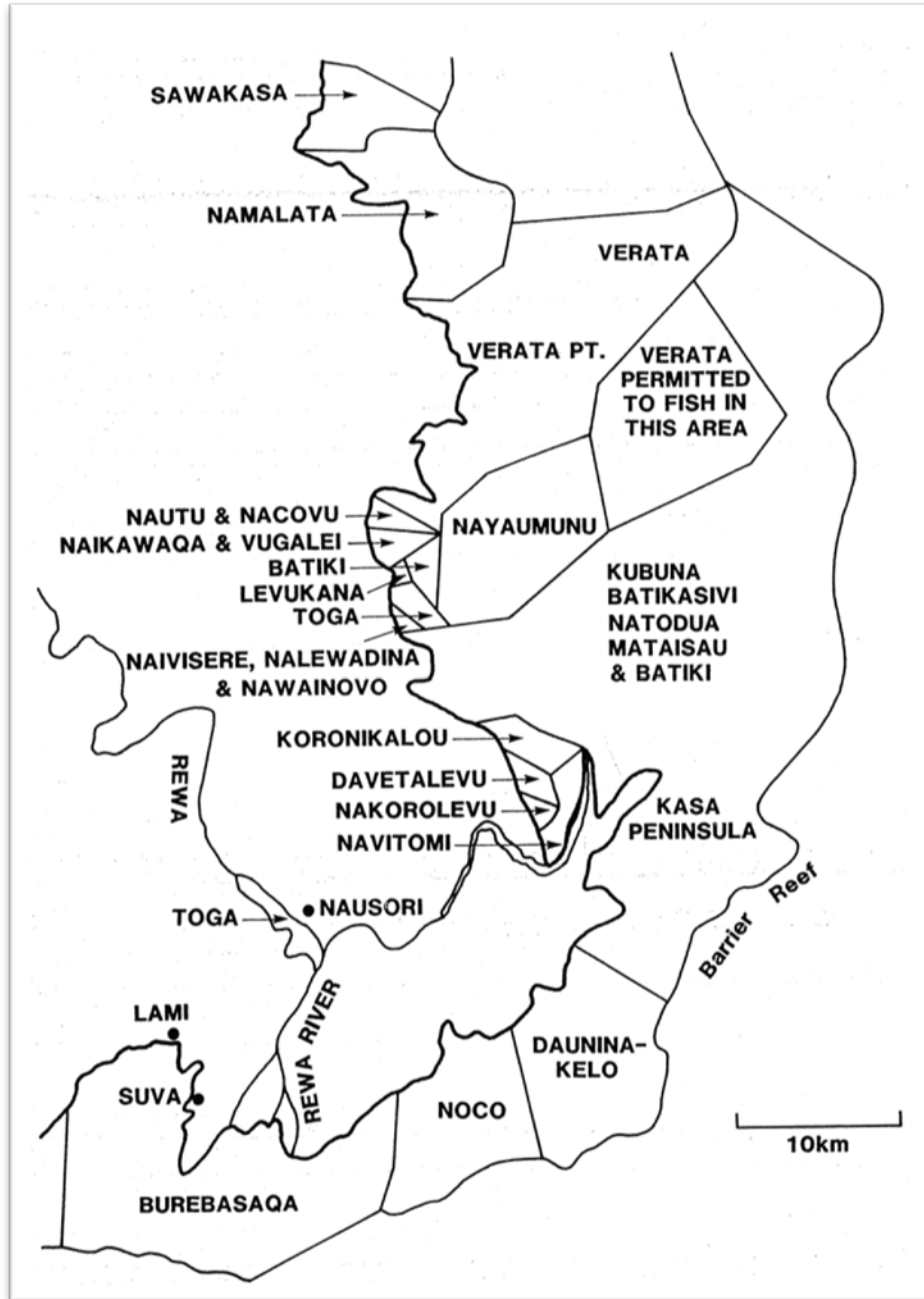


Figure 1: Patterns of tribal reef tenure along the Southeast coast of Viti Levu in an area encompassing Rewa River delta.

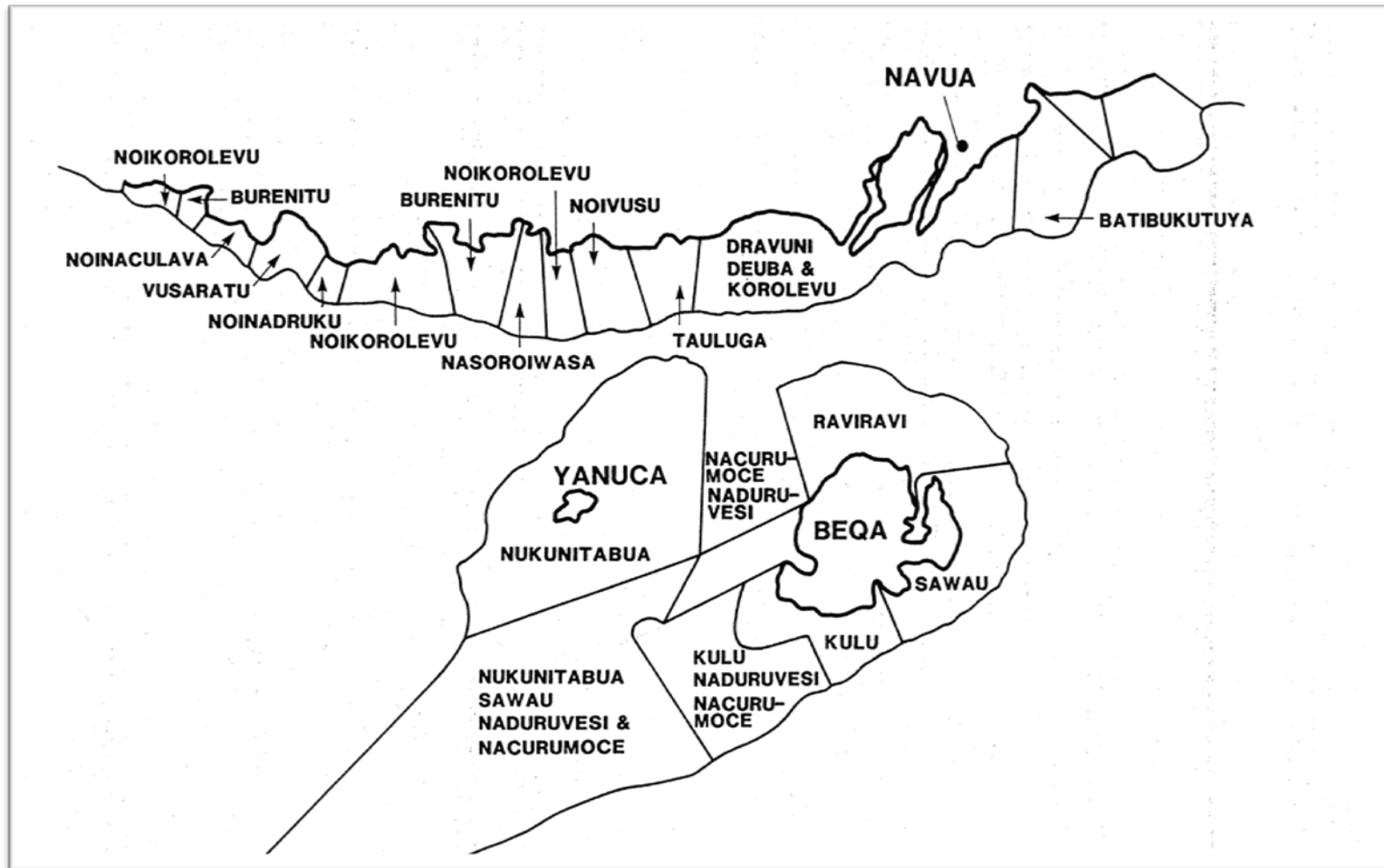
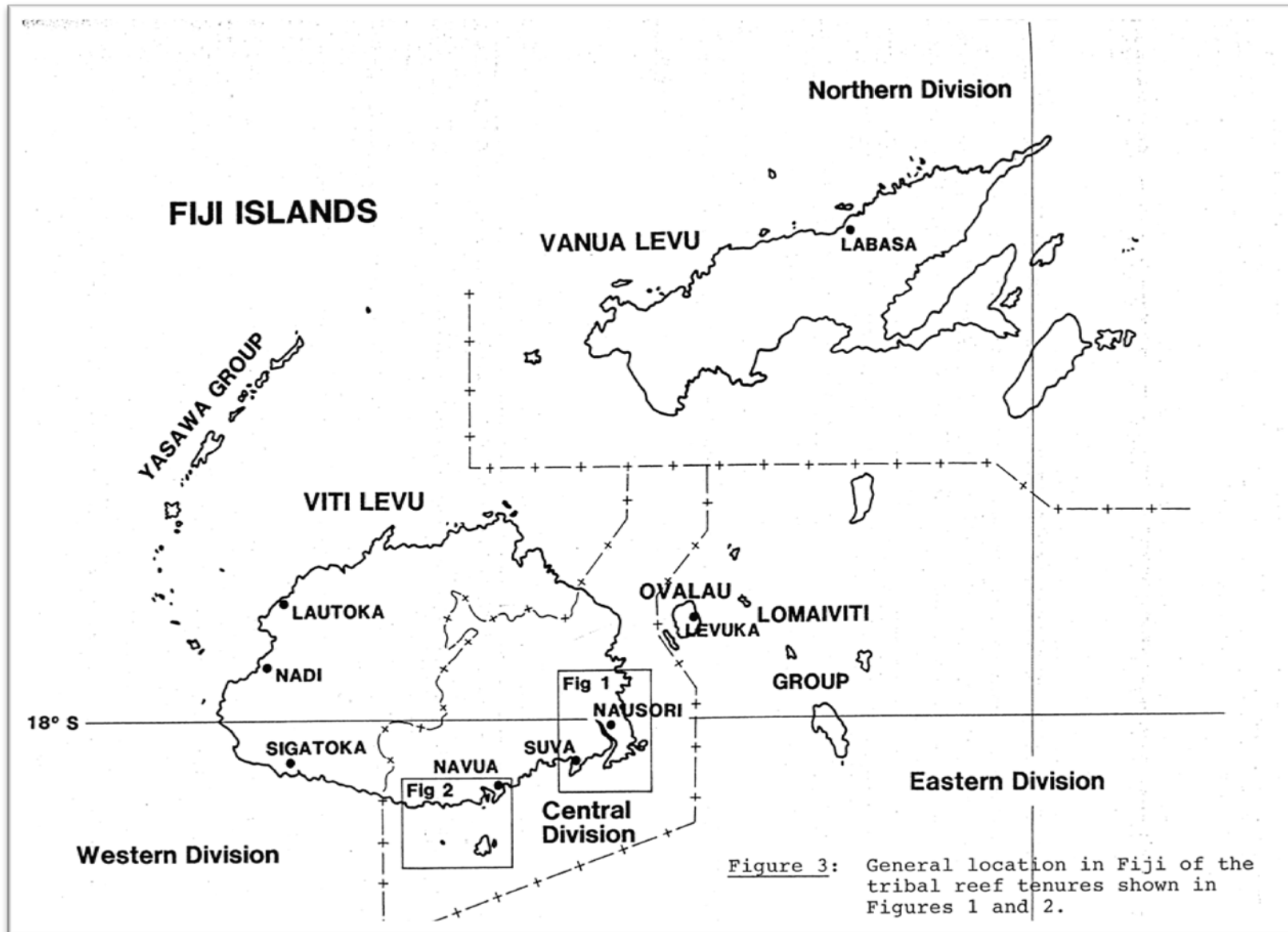


Figure 2: Patterns of tribal reef tenure along the South coast of Viti Levu, the 'Coral Coast' and for the offshore islands of Beqa and Yanuca.



Apart from confirming the dominance of reef tenure in which customary fishing grounds are essentially extensions of village or tribal boundaries, Figures 1 and 2 show other important features of reef tenure:

- the fishing grounds of some groups are located on outside coastal waters and cut off from shore by the fishing zones of other tribal groups. Examples are the Vanua ni Nayaumunu in Figure 1, and Vanua ni Nukunitabua in Figure 2. These 'outer' fishing grounds appear to lie on extensive shallow areas in which smaller islands are sometimes found.
- the sharing of customary fishing grounds between different *yavusa* is common; such sharing tends to occur on outer reefs or coastal zones, for example, that shared by Kabuna, Batikasivi, Natodua, Mataisau and Batiki in Figure 1. In some cases, a sharing *yavusa* has exclusive fishing rights elsewhere as, for example, the case of Nukunitabua in Figure 2.
- significant variation exists in the size of customary fishing grounds. In Figure 2, Nukunitabua is large as compared with Burinitu and in Figure 1, Verata is many times larger than say, Nakorelevu. According to estimates made by the Fisheries Division the size of these fishing grounds varies from several square kilometres to around 30 square kilometres.

Another aspect of interest relates to reef tenure on some outer islands where the entire reef and other coastal zones are open to all inhabitants of that island. This form of access is usually made possible by the existence of a single or dominant tribal group.

The present marine tenure arrangements can give rise to several kinds of disputes. Disputes often arise over fishing boundaries where there is a lack of precise demarcation. These disputes often come to a head as a result of present attempts to register customary fishing rights. Often the source of the dispute relates to poaching, fishing without a licence and disagreement over the issue of fishing permits (especially where fishing areas are shared by different tribal groups).

3. Licensing Requirements

Fishing activities on customary fishing grounds are dominated by subsistence fishing and some small-scale commercial fishing, mostly to supply local urban markets. Subsistence fishing does not require a fishing licence and the scale of activity is usually controlled by local chiefs.

Fishing methods employed include hand collection, fishing lines and traps and the use of small craft. In addition to reef and bottom fishing, the reef products include a wide variety of shell fish, sea slugs, octopi and other shallow water sea growths. Part of the subsistence (unlicensed) catch is sold informally in local markets but such activity normally takes place on a small scale.

Commercial fishing on customary fishing grounds is open to both members of the home tribal group and to those outside this group, but it should be noted that under the Fisheries Regulations commercial fishing on these areas requires a fishing licence. Such a licence is designated as an IDA (inside demarcated areas), the dividing line being the low water mark of fringing reefs. (Note that the holder of an IDA is permitted to fish outside customary fishing grounds.) However, members of the tribal group which owns the fishing rights do not require a licence if they fish with a spear or line from the shore.

Application for a fishing licence is made through the Fisheries Division but where fishing is to be carried out on customary fishing areas, the applicant must first secure a permit to fish from the tribal group whose fishing grounds are the object of the application. Application for such a permit must be made through the District Commissioner for the area in which the fishing ground in question is located. Approval by the Commissioner is contingent on the consent of the tribal group and the outcome of consultations with the Fisheries Division. Insofar as the fishing licence is concerned, a small fee is charged by the Fisheries Division and renewal is made on an annual basis.

The main authority determining whether or not a fishing permit is issued is the tribal group – the *yavusa* or *mataqali*. These authorities, in approving an application, can recommend that certain conditions or a combination of conditions, be met. These conditions usually relate to:

- the species of fish that may be harvested by the permit holder

- excluded areas
- conservation of reef resources
- allowable method of fishing

Apart from being responsible for issuing fishing licences, the Fisheries Division is also charged with the task of registering the fishing vessels of holders of a licence, and for this it charges a nominal fee (four dollars).

Under existing legal arrangements, no provision is in place to compensate Fijians for allowing commercial fishing on their grounds by outsiders. Apparently, this situation has arisen because Fijians do not have ownership of the fishing resources. However, in practice, compensation is made on an informal basis - apparently a form of "goodwill" payment - and now appears to be a common practice when issuing a fishing permit. Information on the level of such compensation is not available, but it is believed that, at least for non-Fijians, these 'fees' vary from zero to \$500. For Fijians, such payments are low and, in many cases, made in kind.

Present access arrangements relating to the customary fishing grounds are based on the recognition of the fishing rights of individual tribal groups. These fishing grounds have been classified over time and are in the process of registration by tribal groups. Registration will do much to minimize inter-tribal disputes over fishing boundaries, as these have been common in the past. However, two problems that need to be addressed relate to the activities of commercial fishermen on these fishing grounds and the question of compensation for villagers for admitting outside commercial fishing, as noted earlier. With regard to commercial fishing, a serious problem relates to the possibilities of overfishing by individual licensees which can lead to resource depletion and the deprivation of village members. Clearly, an effective means of controlling and regulating commercial overfishing needs to be established.

4. Shared Fishing Efforts

Most coastal villages still practice traditional fishing activities involving group cooperation and sharing of the catch. Communal fish drives (*qoli kubu*) are widely found while joint fishing activities by women on reef zones are common.

Fish drives usually involve participation by the whole village and take place under the direction of a traditional master fisherman (the *Gonedau*). The mechanics of a fish drive have been described by Iwakiri (1983, p. 139) in relation to fishing on Beqa Island. These drives entail the use of several fishing crafts, a net (woven from coconut fibre), a long cord or rope (usually a liana-type vine) and sticks, as well as the active participation by up to 40 villagers. To catch the fish, the villagers, linked together by a cord, form a semi-circle on the seaward end of the reef; then, moving shoreward they drive the fish toward the net which acts as a trap. The villagers work the fish toward the net by pounding the sea floor with sticks. The whole operation takes about an hour.

Communal fishing of this kind is usually carried out on special occasions and is primarily for subsistence purposes.

Fishing on reefs at low tide is dominated by women mainly relying on hand collection methods. This form of 'reef collection' is carried out both by individuals and small groups of women. The main activities are digging for mussels and other shellfish and collecting crabs, giant clams, crayfish and seaweeds.

Communal fishing by women is also carried out on shallow reef waters using nets. Nets of different sizes can be used and the number of participating women – usually organised in pairs – can vary from 12 to 60. The largest nets used measure up to 4 metres long and just over 3 metres wide and are slung between two poles, affixed at each end. To catch the fish, the women form a line at the deep end of the reef, holding their nets horizontally and somewhat below the surface of the water. The women then slowly move toward shore, forming a circle and sweeping the fish as they move in with their nets, forming a trap. The fish are caught by raising the nets and closing the sides off so as to prevent possible escape. The catch is shared among the women along traditional lines.

Fishing along basically communal lines is also undertaken by so-called rural fishing groups. These fishing groups operate in co-operatives in which members have to pay fees to join, and directors and other executive officers are appointed (Iwakiri, 1983, p. 138). The members of a fishing group are normally drawn from the same village or *mataqali* but participation by those from neighbouring villages is common. Fishing is directed mainly at supplying local markets and the value of the catch of a particular group can be substantial. Up to 30 such fishing groups are believed to be in operation.

5. Institutional Aspects

In addition to the Fisheries Division, several other institutions and agencies are playing a key part in developing Fiji's fisheries resources, including those on customary fishing grounds. These other agencies include the Native Land and Fisheries Commission, the Divisional Commissioners and village wardens.

The Fisheries Division of the Ministry of Primary Industries is the principal official organ responsible for fisheries development - subsistence, artisanal, large-scale commercial and aquaculture. The Division's work is organised into three key units: resource assessment and development, technical services (including training and boat-building) and extension services. Part of the resource assessment task is the compilation of production data by various fisheries categories, and the Division is also responsible for the registration of fishing vessels and the issue of fishing licences. Upon request, the Division will carry out resource assessment surveys on customary fishing areas and make recommendations for the Native Land and Fisheries Commission.

The Native Land and Fisheries Commission was established soon after the passage of the fisheries ordinance in 1942 and operates under the Ministry of Fijian Affairs and Rural Development. The Commission is responsible for the identification and division of customary fishing boundaries of individual tribal claimants, regulations over these areas, and in general, protecting the interests of Fijians in relation to their ancestral rights. The Commission is guided by the tribal groups in setting boundaries, which prior to registration, need to be approved by these groups.

The Commission plays a key role in resolving disputes over fishing boundaries and can call on other agencies, including the Fisheries Division, for assistance. As a result of the Commission's work to date, all tribal fishing grounds have been identified or are in the process of being identified before the point of registration.

The District Commissioners play a key role in the application process associated with fishing on tribal fishing grounds. The Commissioners have the power to grant a fishing permit once the request has been approved by the chief or chiefs acting on behalf of the tribal group on which the fishing area is located. Under existing legislation, the Commission has power to approve (or veto) such requests and, in this respect, can seek the advice of the Fisheries

Division which is responsible for issuing the fishing licence once a permit has been approved.

The appointment of fish wardens is provided for under the Fisheries Act (1978). Wardens are appointed by the Minister of Primary Industries – usually based on a request by the tribal group. The responsibility of wardens is to detect and prevent offences under the Act. Their duties include the patrolling and policing of the customary fishing areas of their communities, particularly to ensure compliance with licensing requirements and other conditions that may be attached to the licence. However, wardens have not been effective in carrying out their functions, a reason for this being that in many cases wardens - as honorary officials - have not been provided with funds to offset their expenses.

6. Clam Culture – Prospects and Possible Approaches to Development

Fiji offers considerable scope for the development of clams as a major mariculture project, both subsistence and commercial. The country, which is one of the largest island groups in the South Pacific, offers a rich variety of physical features that are favourable to clam culture. Given Fiji's archipelagic spread, the country has considerable areas of reef, lagoons, shallow shelf areas and numerous islands of varying size that offer opportunities for clam mariculture. It is also apparent that the supply - and present stocks - of clams in Fiji has been reduced to extremely low levels as a result of over-exploitation in recent years. For these reasons alone, the case for regeneration and expansion of supply is compelling.

It is also apparent, that properly approached, a major clam project has a good chance of being smoothly integrated into the traditional social and economic life of Fijian villagers (see Tisdell, 1986, p. 93). Among the various reasons for this are prospects that the project will enhance the availability of clams for subsistence consumption and villagers can develop a commercially viable project based on the adaptation of their traditional skills. Prospects of integration are probably best for projects initiated and developed by tribal groups themselves but externally initiated projects can also be approached in such a way as to minimize the disruptive effects on the village.

Efforts to develop a major clam project in Fiji - whether subsistence or commercial can be a matter of some complexity, given the nature of existing reef tenure. Key issues that have to be faced and resolved include the formal leasing of project sites, licensing requirements, negotiations with tribal groups over the use of customary fishing grounds, and meaningful

ways of involving villagers in the project. The process of development calls for close co-operation between key government organisations, including the Fisheries Division, divisional officers and tribal groups, ranging from paramount chiefs to heads of *yavusa* and *mataqali* chiefs. It also calls for close collaboration with local villagers to ensure policing and to prevent encroachment into project sites.

Insofar as the legal requirements are concerned, the fact that ownership of the offshore areas and seabeds is vested in the Crown means that a lease over the site chosen for a project must be secured from government. This requirement also applies to a few small privately-owned sites (e.g. Mago Island in the Lau group), since private ownership does not extend to property rights on marine space (Tisdell, 1989, p. 86). Lease arrangements relating to seabeds on foreshore areas are provided for under the Crown Lands Act and require that anyone whose rights are infringed is adequately compensated (Adams, 1989, p. 3). An essential step in lease negotiations is to obtain the consent of the tribal group whose fishing areas are the subject of the lease. In addition to a lease, a fishing licence and permit are needed. A licence for mariculture as such cannot be issued. Both the lease and the fishing licence (and permit) provide a basis for exercising exclusive rights over these fishing resources, and for taking safeguards against poaching interference.

Under present legislation, no recognition is given to the right to own organisms under mariculture. Strictly speaking, ownership of the mariculture organisms is vested in the Crown (and fishing rights with tribal owners). As such, mariculture operators are not legally entitled to the product of their efforts clearly a major disincentive to investment in mariculture. There is therefore a need to revise the law to allow mariculturalists to own what they grow and to establish a new permit system covering mariculture.

For reasons noted above, Fiji offers a wide range of possibilities for the development of a major clam project. The evidence suggests that because of differences in natural conditions within Fiji, some locations are better than others for development. For example, particularly favourable natural conditions for clams are believed to be present on many islands of the Lau Group which lies on the eastern side of Fiji. The Lau Group comprises many islands of varying size, with considerable areas of reef and lagoon. Another factor that will tend to influence the choice of a suitable site is whether or not fishing rights on a particular area are under dispute. Current efforts to clarify the customary fishing grounds of particular tribal and village groups have brought many disagreements to the surface, particularly over boundaries.

It may be many years before such disputes are resolved. Such disputed areas should be avoided.

Assistance on the selection of possible sites can be obtained from the Fisheries Division which can advise on an area's natural suitability and whether it is under dispute. On the latter, the Native Land and Fishing Commission can also be consulted.

Few precedents exist regarding lease negotiations for mariculture. Such a process calls for the outside developer to approach the tribal owners of the fishing rights for consent. As noted, the appropriate tribal authorities, who represent the owners, are the heads of tribal groups, and for purposes of consultation and negotiation they may be approached through the Fisheries Division and the district commissioners.

The appropriate tribal authority differs from one part of the country to another, depending on the prevailing chiefly structure and distribution of power and related factors. In some cases, for example, in many of the Lau Group of islands, it is customary for negotiations with local tribal groups to be preceded by consultation with the paramount chief of those islands (presently the Prime Minister, Ratu Sir Kamisese K.T. Mara). However, in most cases, the relevant authority is the head of the *yavusa* or the chief of the *mataqali*. In these negotiations, it is common to mark the occasion with a traditional ceremony such as the drinking of *yagona* and the presentation of symbolic gifts (notably the *tabua* or whale's tooth).

Apart from the formal requirements associated with gaining access to the use of reef areas for mariculture, it is also essential to secure the support of the local villagers. The support and co-operation of local villagers is vital for the successful implementation and operation of the project. Among other things, local people can be most effective in policing the project site and they can be expected to refrain from disturbing clam beds. Their knowledge and expertise about traditional forms of clam culture and conservation as well as the local marine environment can also make a significant contribution to the project.

Meaningful participation by local villagers can take a variety of forms and can include some kind of joint venture, the appointment of local leaders as supervisors and advisers as well as other informal arrangements. Specific forms of participation can be worked out with villagers and tribal leaders, but the essential requisite is to gain the support of the villagers so that they will feel that the project is in their interest and will bring them tangible benefits.

A possibly useful precedent for Fijian involvement in mariculture projects is provided by a seaweed farm that was recently established in Kasavu Village, Vanua Levu. This farm is a commercial venture involving Australia, New Zealand and Fijian ownership. Active local participation is represented by the appointment of the village chief to the board of Directors and the fact that up to 30 villagers are employed on the farm, part-time. (It may be of interest to note that, unlike giant clams, no fishing licence is required to harvest seaweed - seaweed does not exist in a legal sense as this product is not covered by the Fisheries Act.)

The protection of clam project sites against poachers can be largely achieved by securing the co-operation of villagers as noted above. Failing that – or by way of complementing and reinforcing such co-operation – a traditional form of sanction – the so called *tabu* – can be used as a form of control. Under *tabu*, tribal chiefs can prohibit villagers from intruding or interfering in project activity. In its application the *tabu* can be directed at prohibiting different kinds of activity on and around the project site, for example, the taking of clams, fishing of any kind, and entry by villagers. *Tabu* is normally applied to meet short-term needs but can be imposed serially where a project such as clam mariculture calls for a longer period of protection.

Tabu has recently been used on a number of occasions to protect offshore fisheries resources. In 1975, it was used to prohibit commercial fishing on Suva Harbour which had been depleted by over-fishing. Similarly, in 1987, a *tabu* was applied to the northern area of Mokogai Island – under government instigation – as a step toward converting the area into a marine life park. In both cases, *tabu* proved to be a valuable initial step in the protection of resources, that was followed-up by supporting legislative measures (for example under Regulation II of the Fisheries Regulations applying to the classification of restricted areas).

It appears that the *tabu* can still play a valuable role in the development of clam culture, as with other mariculture projects. This role is thought to be particularly useful in rural and outer island communities where Fijian custom and traditions are still powerful forces. It is likely to be highly respected by Fijians where proper regard for traditional ceremony has been observed, including the serving of *yagona*. The value of *tabu* lies in the fact that it can be applied quickly, is still respected by Fijians and can be imposed for specific purposes and for specific periods (normally up to a year). It has so far proved a useful means of controlling fishing activities pending the preparation of more complex legislation.

7. Conclusion

Fiji's extensive reef and lagoon areas offer considerable scope for clam culture and other forms of mariculture. However, efforts to establish a major clam project – especially on a commercial basis – can be complicated and need to be handled carefully. The main source of complication relates to the system of property rights on offshore waters which is characterised by Crown ownership of these waters (including seabeds) alongside tribal ownership of fishing rights on so-called customary fishing grounds. These fishing grounds, which cover nearly all reef and lagoon areas, are highly fragmented, with fishing rights divided among different tribal groups. A vital requisite for the establishment of a clam project is to secure the consent of tribal and village groups for mariculture activity on their fishing grounds.

Assistance in identifying a suitable project site and in negotiating with tribal groups can be obtained from the Fisheries Division, the District Commissioners and the Native Land and Fisheries Commission. Regarding possible project sites, the smaller outer islands, such as those in the Lau Group, appear to have many attractive features including small (human) populations for clam development. A factor to be considered is whether or not a particular area is under dispute.

A key requirement for a successful clam project is to secure the support of local tribal and village groups both to gain initial access and to ensure successful implementation and operation. Local villagers can be particularly useful in policing project sites, while local leaders can contribute meaningfully to the project through constructive involvement, managerial levels possibly at supervisory and managerial levels.

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