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Dr. T'eo I.J. Fairbairn[2]

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[1] Research for this paper has been undertaken as a part of Australian Centre for International Agricultural Research (ACIAR) Project 8823, 'Economics of Giant Clam Mariculture'.

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Research for the project *Economics of Giant Clam Mariculture* (Project 8823) is sponsored by the Australian Centre for International Agricultural Research (ACIAR), G.P.O. Box 1571, Canberra, A.C.T. 2601, Australia. The following is a brief outline of the Project:

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.

Commissioned Organization: University of Queensland.

Collaborators: James Cook University, Townsville, Queensland; South Pacific Trade Commission, Australia; Ministry of Primary Industries, Fiji; Ministry of Natural Resources and Development, Kiribati; Silliman University, Philippines; Ministry of Agriculture, Fisheries and Forests, Tonga; Forum Fisheries Agency, South Pacific; ICLARM, Manila, Philippines.

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ABSTRACT

The many island countries of the South Pacific region contain extensive areas of reefs and lagoons that provide highly favourable habitats for giant clam mariculture and related activities. These reef and lagoon areas fall almost entirely under customary forms of marine tenure whereby fishing rights are held by indigenous tribal, village or family groups. In general, these marine tenure arrangements confer upon members of each tribal and village group the right to share in the marine resources of the group, subject to any restrictions that may be imposed by custom. The customary marine areas that form the traditional fishing grounds of a tribal or village group are the usually adjacent reef and lagoon areas which extend from the land boundaries to the outer edge of the fringing reef.

The sharing of marine areas over which a particular customary owner holds exclusive fishing rights is fairly common throughout the South Pacific region. A rich tradition of sharing in the exploitation of marine resources is still found among tribal and village groups. In general, this sharing is not restricted to members of a particular customary group but extends to outsiders, particularly neighbouring villages and an element of reciprocity is usually involved in these cases.

As it currently operates among the Pacific island countries, customary marine tenure can be a significant constraint to the development of a major giant clam mariculture project. Uncertainty over ownership rights of customary groups can, for example, involve an unacceptable degree of risk for the prospective developer who will wish to locate his operations in a country and region where marine property rights favour success of the project.

To gain access and lease rights over a section of reef and lagoon that is suitable for a giant clam mariculture project, the developer has to obtain the consent of the customary group which controls the area in question. Such consent is normally the prerogative of the tribal or village leaders as representatives of their people. From the available evidence, it seems that whether or not consent is given largely depends on how villagers perceive the kind of benefits expected to derive from a giant clam mariculture project. Perceived benefits appear

to include only monetary payments but also those that can arise from a project's impact on local infrastructure, nutrition and the regeneration of fished-out reef and lagoon areas. Consent can also significantly depend on the involvement of local villagers in the development and operation of such the project, for example, by equity contribution, appointment to senior positions, and employment participation.

Giant clam mariculture can be initiated and operated by villagers themselves and this approach may be most suitable in relation to small-scale, subsistence-orientated projects. For major commercial ventures the participation of outside developers seems imperative, especially to provide capital funds and technical knowhow. Various forms of institutional arrangements are possible, including joint ventures, but a vital prerequisite is to ensure significant and meaningful participation by the local people.

Tribal and village authorities have a range of customary sanctions at their disposal which can be applied to protect a giant clam mariculture project site from encroachment by villagers. These authorities can also support such a project by assisting in the policing of the project site against both local and outside poaching.

Keywords: Pacific island countries, customary forms of marine tenure, aquaculture, tribal customs, marine property rights.

JEL Classifications: Q57, Q31

Glossary of Pacific Island Terms

FIJI

Matagali	a sub-unit of yavusa and principal group in land occupation
Tabu	taboo
Tokatoka	an extended family unit
Vanua	the broadest tribal and social unit in the country
Yavusa	a tribal lineage of the vanua

TONGA

Uloa	a form of group fishing (fish drives)

WESTERN SAMOA

Ali'i	chief
Atule	big-eyed scad
Aumaga	group of untitled males
Faipule	district representative
Fono	council, assembly for deliberations
Mata	group fishing by men
Pulenu'e	government agent in a village
Sa	a village edict or prohibition

OTHER TERMS:

Meneaba	council of elders (Kiribati)
Utu	a family unit (Kiribati)
Yako	outer part of reef (Nauru)

Customary Marine Tenure in the South Pacific Region and Implication for Giant Clam Mariculture

1. The Background

A distinctive if not unique feature of the coastal situations of Pacific island countries is the prevalence of customary rights. These tenurial systems are based on the pre-contact systems as modified (in some cases, drastically) over time, and are characterised by the ownership of fishing rights by customary owners-tribal units, families, villages and to a lesser extent, individual owners. The marine areas concerned apply to adjacent reef, lagoon and estuarine zones, normally extending from the land boundaries of a particular tribal or village group to the outer edge of fringing reefs. Essentially, usage of these areas is governed by custom and reflects traditional sharing arrangements involving members of the controlling group and frequently outside groups.

Customary forms of marine tenure can have far-reaching implications for the development and exploitation of reef and marine resources. This can be particularly true of mariculture activities including giant clam cultivation which requires a developer to secure clear property rights on a reef and lagoon site to ensure, among other things, that he is rewarded for his efforts. These tenurial systems can also have significant implications for local villages in efforts to enhance the productive potential of their marine resources which figure so prominently in their economic life. It must be recognised, however, that despite the great significance of these tenure systems for development, to date few attempts have been made to analyse them in any depth and to spell out their development dimensions.

The principal purpose of this study is to fill part of the existing deficiency in what is known about customary forms of marine property rights as they currently operate in the South Pacific region, and to spell out some of the ways these systems can influence prospects for giant clam mariculture. As set out in the project document, the primary aim of the study is to identify countries and areas where property right factors are most favourable for the development of giant clam mariculture.

This objective entails examining the following aspects:

1. Reef and marine property rights in the South Pacific as far as these may affect the development of giant clam mariculture, with more in-depth overviews for selected South Pacific countries.
2. Customary reef tenure and sharing arrangements in relation to reef resources and productive activities.
3. Institutional types of mariculture development that may be successful. The study will determine the extent to which commercial or subsistence development is likely to be viable; the possibilities for clam mariculture based on the leasing of customary reef areas to outsiders; and the most appropriate property-rights or tenurial arrangements for clam commercial mariculture development.

The study is part of a broader research project on the 'Economics of Giant Clam Mariculture' sponsored by ACIAR and coordinated by Professor C.A. Tisdell, Head of the Department of Economics, University of Queensland, Brisbane. This project involves an analysis of various economic dimensions of giant clam mariculture including markets, marketing and trade, production, property rights and the development potential of clam mariculture in the developing countries of Southeast Asia and the South Pacific. The project commenced in 1989 and is due to be completed in 1992.

The present study relies heavily on the results of case studies of reef and lagoon tenure and related aspects prepared by the writer for four Pacific island countries: Fiji, Vanuatu, the Kingdom of Tonga and Western Samoa. These case studies were based on information collected from field visits involving approximately five working days in each country, over the period June 1989 to October 1990. The case studies have been published as part of the University of Queensland's Department of Economics research reports series in "Economics of Giant Clam Mariculture" under the following titles:

- *Marine Property Rights in Relation to Giant Clam Mariculture in the Kingdom of Tonga*, (1990).

- *Marine Property Rights in Fiji: Implications for the Development of Giant Clam Mariculture*, (1990).

- *Reef and Lagoon Tenure in the Republic of Vanuatu and Prospects for Mariculture Development*, (1990).

- *Traditional Reef and Lagoon Tenure in Western Samoa and Its Implications for Giant Clam Mariculture*, (1990).

The study also draws upon the existing literature on giant clam mariculture as it has developed to date in the South Pacific. The literature includes works by regional and international organisations, individual researchers and local fisheries agencies. As will be evident from the text, the contributions by C.A. Tisdell, R.E. Johannes, K. Ruddle and S. Iwakiri were particularly informative and useful (see List of References).

Background information on Fiji, Vanuatu, Tonga and Western Samoa

The four Pacific island countries surveyed are located in the central Pacific region with Fiji occupying a medial position (see inset Figure 4). In relation to Fiji, Vanuatu lies to the west, Tonga to the southeast and Western Samoa to the northeast. Each country is archipelagic and of volcanic origin, with numerous component islands or islets which, except for Western Samoa, are spread over large areas of ocean (see Figures 1 - 4). Fiji dominates physically, with a land area of 720,000 km^2, a sea area (EEZ) of 1,290 km^2, and as many as 300 constituent islands. Tonga has the smallest land area but has jurisdiction over a large EEZ whereas Western Samoa has the smallest EEZ, equal to only 120,000 km^2. Largely due to their size, Fiji and Vanuatu have the best resource endowment which, in turn, provides a promising basis for future economic growth.

Table 1: Fiji, Vanuatu, Tonga and Western Samoa: Population and Selected Indicators

	Fiji	Vanuatu	Tonga	Western Samoa
Population (1988)[1]	732,000	151,000	101,000	168,000
Land area km^2	18,272	11,880	699	2,935
Sea area 000km^2	1,290	680	700	120
GNP/capita (1988)[1]	1,540	820	800	588

[1] World Bank, 1990 (Fairbairn, 1985, 1991)

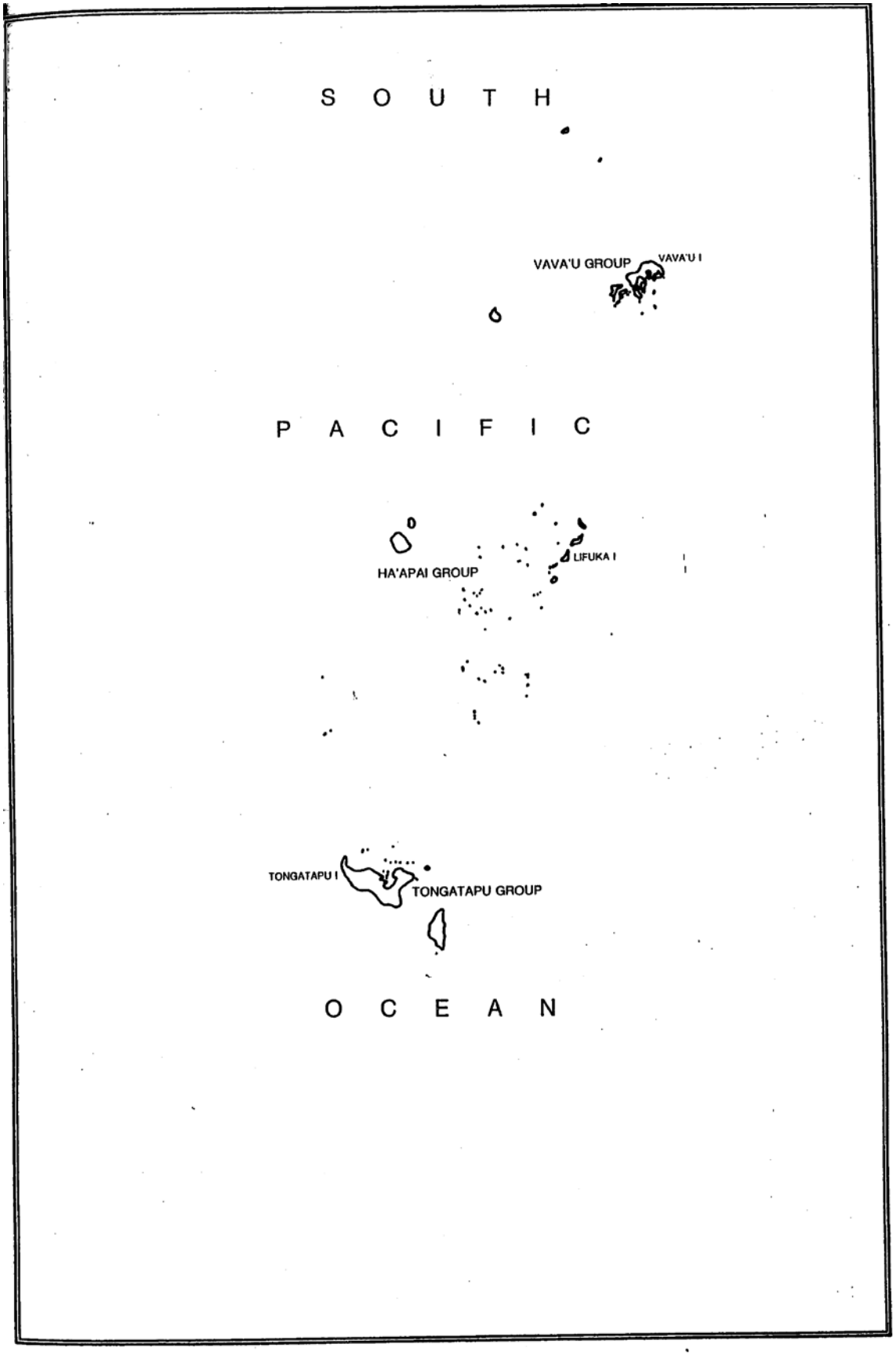

Figure 1: The Kingdom of Tonga

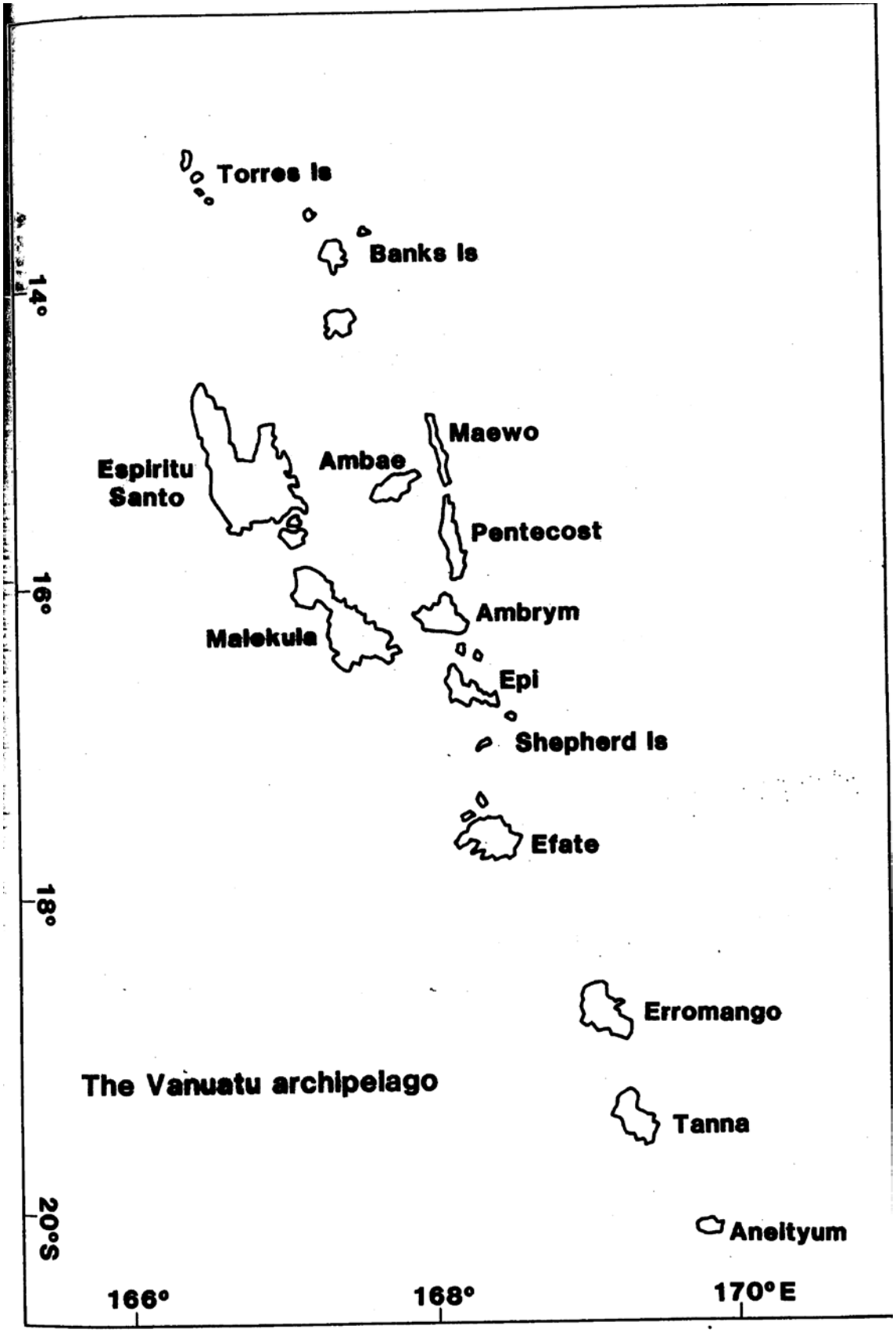

Figure 2: An overview of the Republic of Vanuatu

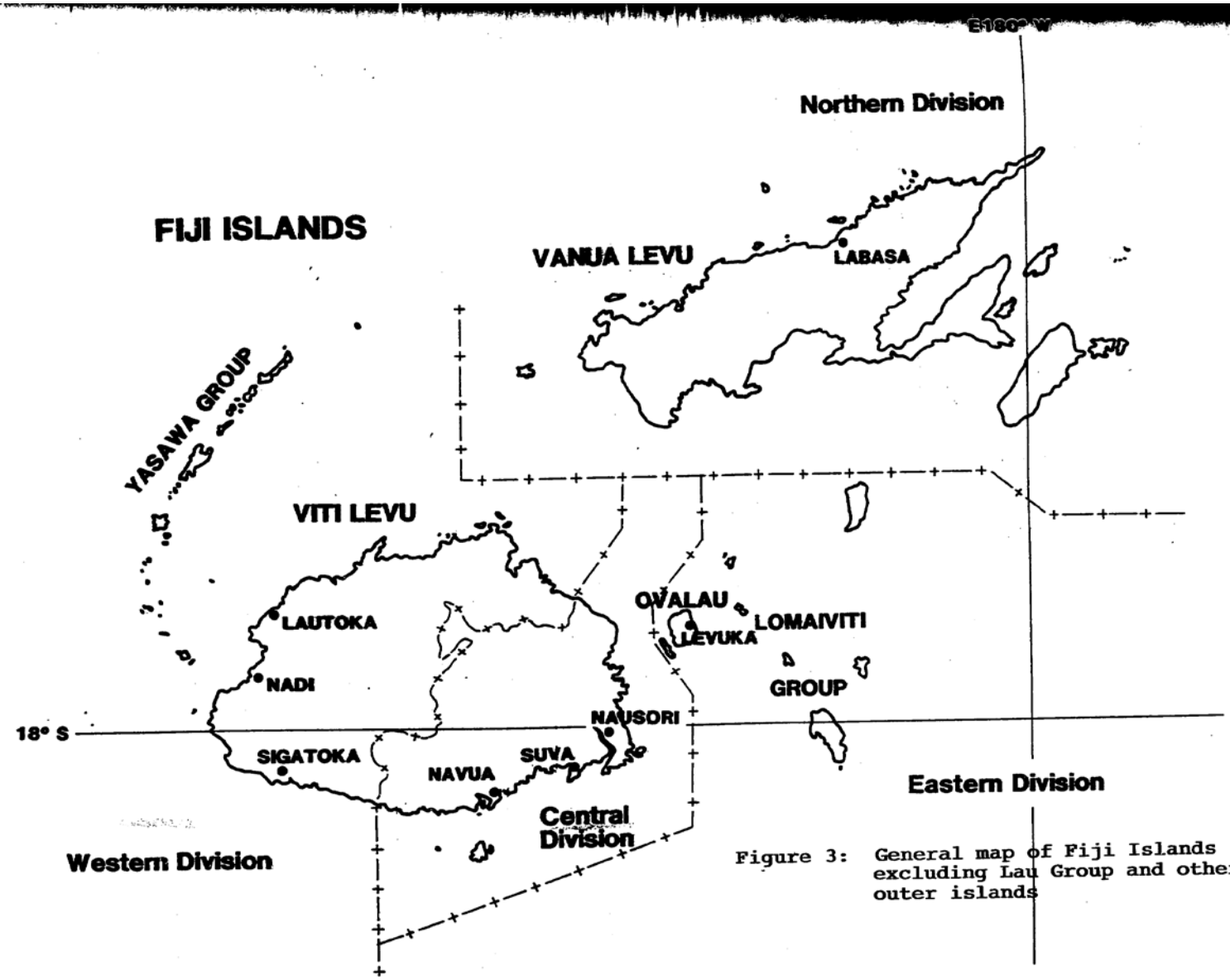

Figure 3: General map of Fiji Islands excluding Lau Group and other outer islands

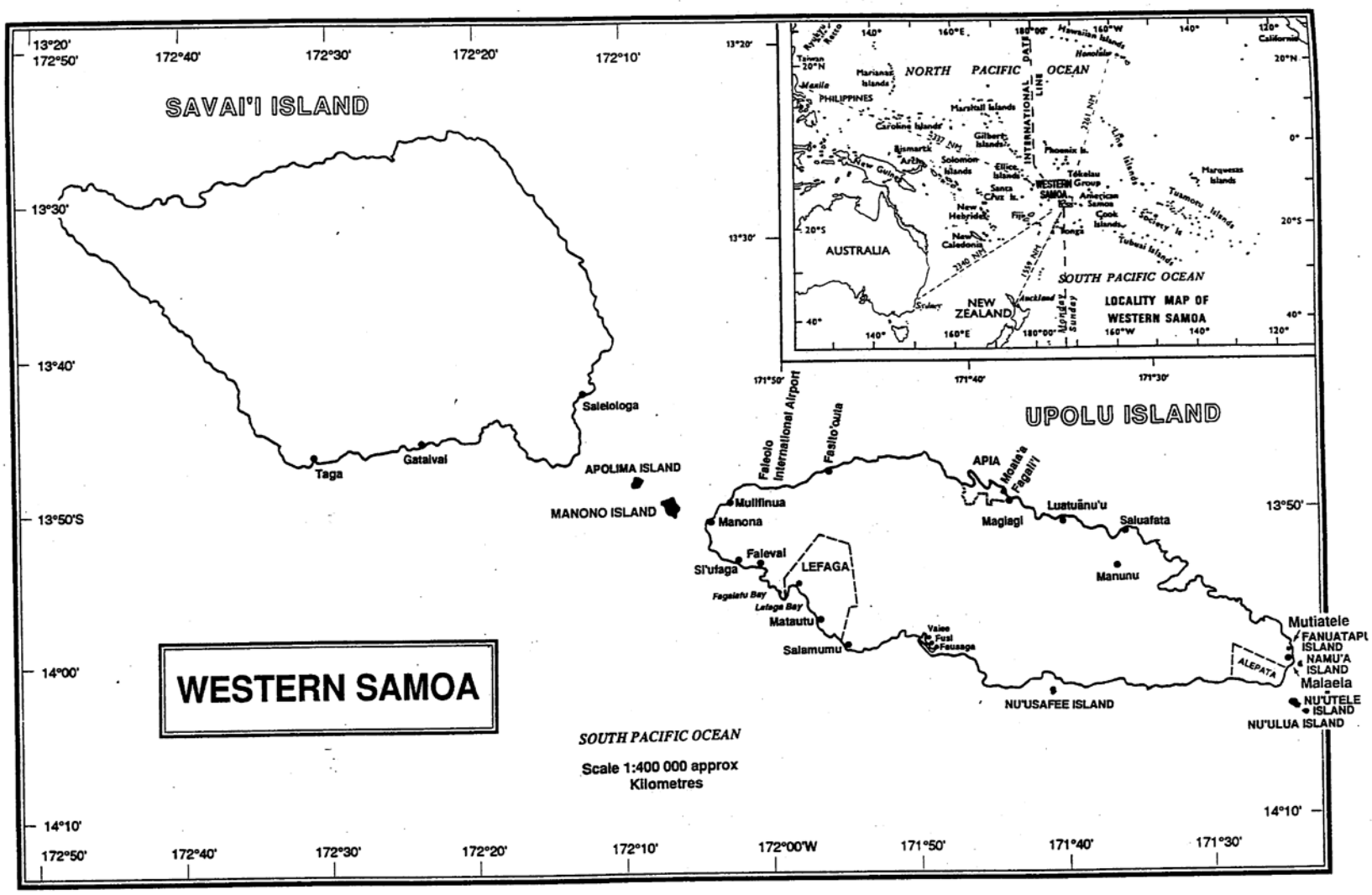

Figure 4: Western Samoa and Central Pacific locational map (inset)

The population of these countries varies from 96,000 for Tonga to 720,000 for Fiji. Tonga has the highest population density at 55 persons per km, being over twice that for Western Samoa and six times that of Vanuatu.High rates of natural population growth are a common characteristic - as high as 3.3 per cent per annum for Vanuatu - but in the case of Tonga and Western Samoa, high levels of emigration have resulted in unusually low actual growth rates (as low as 0.6% in Western Samoa). Levels of per capita income vary from US$590 for Western Samoa to US$1,540 for Fiji. (Both Western Samoa and Vanuatu are designated as a Least Developed Country or LDCs by the United Nations).

Each of the four Pacific island countries has a dual economic structure in which the modern monetary economy coexists with a substantial non-economic or subsistence component. Within this overall dual structure, the primary sector - agriculture, forestry and fisheries - is predominant, although in each case the services sector, led by government and tourism, plays a major role. With the possible exception of Fiji, manufacturing activity remains in its infancy. Subsistence production takes place largely within the village agricultural and fisheries sectors.

Primary sector activity accounts for at least half of GDP and employment in these countries and for a much larger share of export earnings. In Fiji, the leading primary products are sugar (both cultivation and processing), coconut products, canned fish, forestry products and a variety of root crops and vegetables. For the other three countries, coconut products (including copra and coconut oil) are the principal primary sector products but beef in the case of Vanuatu, vanilla in Tonga and taro in Western Samoa are also major items.

As open economies, all four countries are heavily dependent on international trade but significant differences exist in the balance of payments situation between Fiji and the other three countries. While in recent years Fiji has generally been able to achieve a state of balance between export earnings and the cost of imports; the other three countries have regularly recorded substantial deficits on their trade accounts in the balance of payments. Overall balance in their balance of payments has been possible only because these countries have benefited from substantial inflows of foreign aid, and in addition, in the case of Tonga and Western Samoa, private remittances from overseas kinsmen.

All these countries have formulated sets of national development objectives and strategies to guide their development efforts which, among other things, reflect the development

aspirations and resource endowment of each country. A common objective is that of achieving a higher rate of economic growth particularly as a basis for improving the living standards of the people and for promoting a greater degree of economic independence. A key strategy for achieving this objective is to undertake a more intensive utilisation of natural resources, both land and sea. In each country, the development potential of agriculture and fisheries is recognised as being particularly important.

Fisheries development

In all four Pacific island countries, a major component of government development policy is the promotion of fisheries, both for subsistence and commercial purposes. This emphasis is based on the need to achieve a more intensive utilisation of an abundant natural resource and on the recognition of the important role that the fisheries sector can play in the development process. As laid out in planning and related documents in these countries, the fisheries sector can make a major contribution to the economy through its capacity to:

- provide new employment and income-earning opportunities, especially in the context of the large rural sector
- satisfy an ever-increasing local demand for fresh fish and other marine products
- develop into a significant export industry
- reduce the present heavy dependence on imported canned fish
- contribute towards improving the nutritional levels of the local population

Usually as part of a Development Plan, all four island countries have established administrative structures and prepared medium-term sectoral programs as a basis for developing their fisheries resources. The fisheries agencies that have been established are normally appended to the overall ministry that is responsible for major natural resource areas - the Ministry of Primary Industries in the case of Fiji and the Ministry of Agriculture, Forestry and Fisheries in the three other countries. These agencies are responsible for developing the fisheries sector in line with national objectives and to this end, carry out a variety of specific tasks including training and advisory services, determining fish stock availability, assistance with marketing, and promoting mariculture activities.

Fisheries development programmes currently being implemented by these countries cover four main areas: rural fisheries (predominantly for subsistence), commercial artisanal fisheries, industrial fishing (mainly for tuna), and fish farming. The emphasis on artisanal

commercial operations, especially to tap outer reef resources (notably skipjack tuna) is particularly notable, and in each case is supported by a variety of activities such as boat-building, the provision of fishing aggregating devices (FADS), marketing assistance and technical training. Efforts to develop industrial fisheries (including processing) are most apparent in Fiji but are being strengthened in Tonga and Western Samoa. Fish farming via mariculture and aquaculture is relatively undeveloped.

Except for Fiji, the operation of mariculture on a commercial basis is absent, and what activity takes place is essentially experimental in nature. In Western Samoa mariculture activity is restricted to Green Mussel culture (*Perna viridis*), giant clam propagation and broodlings of Giant Malaysian Freshwater Prawns (*Macrobrachium rosenbergei*). In Vanuatu, the Fisheries Division maintains a trochus hatchery, while in Tonga, the Ministry of Land, Survey and Natural Resources has established so-called "giant clam circles" mainly for conservational and environmental reasons (Fairbairn 1990a) and has recently established a giant clam hatchery with Australian assistance.

In Fiji, mariculture and aquaculture activity has been actively undertaken over the recent period particularly in such areas as seaweed culture, carp and tilapia farming, and freshwater fisheries. In 1988, a total of 27 rural aquaculture farms were reported to be operating (Government of Fiji, 1988, pp. 13-14). Also, the Fisheries Division maintains a giant clam hatchery on the island of Makogai - a facility that may be expanded to include other mariculture items such as trochus, pearl shells, and mangrove crabs (Fairbairn, 1990b, p.29).

2. Some Development Implications of Traditional Marine Tenure and Extent of State Ownership

The nature of property rights on marine areas of the islands of the South Pacific is highly complex and, as applied in many cases, can effectively frustrate efforts to establish secure and legally enforceable property rights for purposes of undertaking mariculture and related activities. Although in nearly all cases legal ownership of near-shore waters - notably reef and lagoons -now resides with the "Crown", the traditional fishing rights of indigenous customary owners have been safeguarded and recognised either by legislation or in a de facto sense. These rights apply to reef, lagoon and estuarine zones - usually taken to be the area extending from high tide mark to the outer edge of fringing reefs -and are exercised by traditional owners as represented by clans, village assemblies, families and chiefs (Johannes,

1989).

Traditional-based forms of marine property rights, as opposed to other forms of property arrangements (e.g. open access systems and coastal tenure sanctioned by government), can be highly complicated from the viewpoint of economic development. For mariculture projects, such as giant clam farming, the implications of customary property rights can be far-reaching. As pointed out by Tisdell (1989, p. 10), for example, these property arrangements can represent a serious constraint to mariculture and may well be the critical factor in undermining the economic viability of such a project, despite favourable geographical, ecological and market prospects.;

A major problem can arise where there is uncertainty over property rights claimed by particular traditional groups due, for example, to disputes over reef ownership or disagreement over officially demarcated reef boundaries. Given this uncertainty and associated risk, there will be little incentive for cultivating clams since the developer may not reap the reward of his effort (Tisdell 1989a, p.10). Moreover, attempts to establish clam cultures on traditional fishing grounds involve negotiating with customary owners to secure the leasing of a project site. Such negotiations can be lengthy, complicated and costly and may effectively deter investment by an outside enterprise.

Once a project has been established the cost of policing the project site can also be a major constraint to clam cultivation. Even though the consent of the customary owner may have been given this does not necessarily eliminate the need to take effective safeguards against possible intrusion by outside raiders and local villagers. Although villagers may have undertaken not to intrude into clam sites, such an undertaking may weaken over time and subsequently costly measures may need to be taken to prevent the raiding of clam stocks.

However, as will be pointed out, customary marine tenure also has positive aspects from the viewpoint of mariculture development. For example, traditional methods of control over reef and lagoon areas can help enforce non-intrusion measures into clam project sites as well as provide support for clam cultivation (particularly, village subsistence projects) for conservation purposes or as a means of replenishing fished out reef and lagoon areas.

In the South Pacific region - as in many other developing archipelagic countries - ownership rights over near-shore waters, including reefs, are usually shared between the Crown (or state) on one hand, and customary indigenous owners on the other. The nature of this sharing

varies significantly from country to country but, in practice, the prevailing arrangement is characterised by state ownership of reef and lagoon areas - usually as part of a country's territorial (and EEZ) waters - and customary ownership of fishing rights on these areas.

State ownership of these areas carries with it the right to seabed resources, such as minerals (including oil and gases), workable marine materials and related resources. Customary authorities exercising authority over traditional fishing grounds are tribal or clan groups, families and chiefs. As will be clear from below, there is considerable variation in the extent of state ownership, but such ownership rights appear to be most extensive among the Polynesian countries such as Tonga, Western Samoa and Tuvalu and more limited among the Melanesian countries of Vanuatu and Papua New Guinea. The principal difference is that the Polynesian countries state ownership extends to legal ownership of reef and related areas, including rights over minerals, while among the Melanesian countries, this ownership applies to minerals but not to reef areas as such.

In traditional pre-contact times, ownership of reef and lagoon areas in the South Pacific was vested in village communities which normally consisted of people of a single tribe or an aggregation of villages from different tribes or sub-tribes. In general, marine property rights applied to reef and lagoon areas adjoining the land owned by a community and were usually lateral extensions of land boundaries and demarcated on the seaward side by the edge of fringing reefs. Property rights extended to the ownership of near-shore areas, including reefs, and the marine resources they contained, including marine materials. They also extended to the capacity to exercise fishing rights in these areas.

The historical evidence is somewhat meagre but is clear that considerable variation existed in the nature of traditional marine property rights throughout the region. However, it is likely that the most common system of property rights was that involving ownership by clan and extended family groups residing in village communities. Overall control of fishing and other activities on these reef and lagoon areas was exercised by local tribal authorities which may be an assembly of chiefs or a group of village elders. However, marine property rights based on ownership by individuals were not uncommon. Thus in pre-contact Kiribati, property rights on some atoll communities were held by the king or paramount chief of that atoll.

As in other major areas of Pacific island life, the ownership and use of natural resources underwent drastic changes as a result of contact with the outside world. Insofar as reef,

lagoon and related areas were concerned, a major outcome of contact was a redefinition of property rights in these areas. In most cases, this process involved the transfer of legal ownership of reef zones from customary owners to the Crown but with customary owners retaining their fishing rights over these areas.

The surrendering of legal ownership of near-shore marine waters to the state occurred at different stages of each island's history and for different reasons. In most cases, state claims over these areas took place during the period of colonial rule and were part of an evolutionary process associated with the creation of the modern island state. Thus in the case of Western Samoa, state ownership was assumed during the period of New Zealand administration (1914-1961) and is embodied in legislation. The assumption of these rights by the state did not affect the customary rights of Samoans to fish on their traditional fishing grounds, as recognised in legislation.

In some cases, however, state ownership over marine areas was acquired prior to or during the advent of colonial rule. Thus, in Fiji, Crown ownership was achieved in 1874 with the signing of the Deed of Cession, giving Queen Victoria sovereignty over the Fiji islands. As a result of this change, Crown ownership was also established over all reefs and territorial waters which contained the traditional fishing grounds of the Fijians. (However, a group of Fijians are currently trying to reassert customary ownerships of the alienated reefs.)

The assertion of Crown ownership in Tonga also took place at an early stage. In 1887, the then King of Tonga issued a proclamation defining the country's territorial waters and establishing the right of the Crown over these waters. Subsequently, in 1927 a Land Act was passed which officially conferred on the Crown all land and sea areas within Tonga's territorial limits.

The claims of the state over marine areas, as established during the colonial period, have been rescinded in a number of cases with the advent of independence. This is true of Vanuatu whose Constitution, adopted with independence in 1980, provided that all land in Vanuatu belongs to custom land owners, and this ownership carries with it the right to own adjacent reef and other near-shore areas.

As noted above, customary rights over marine areas do not apply to minerals that may be present on seabeds. These rights are usually spelt out in legislation relating to either marine resources specifically or to natural resources in general. In short therefore, regardless of

whether the rights of customary owners apply to the legal ownership of these areas or just to the right to fish, the ownership of any minerals that may be present in these areas belong to the state.

3. Customary Marine Tenure: Ownership Patterns and Main Characteristics

As observed by Johannes (1982a) and Ruddle (1988) among others, and as noted above, the near-shore waters of Pacific island countries are dominated by customary forms of marine tenure held by indigenous tribal and village groups. These tenurial rights generally apply to areas extending from the mean high water mark to the outer edge of fringing reefs, and include reefs, lagoons, estuarine areas, mangroves and channels cutting through reef areas. Marine property rights held by particular tribal or village groups usually apply to reef and lagoon areas that are usually clearly demarcated and delimited by the boundaries formed by the lateral seaward extension of land boundaries on the one hand and the outer edge of fringing reefs on the other.

The rights of tribal and village groups over adjacent reef and lagoon areas which serve as their traditional fishing grounds are generally recognised in a legal sense. Most Pacific island countries have established either specific legislation or constitutional provisions that recognise or afford protection for the fishing rights of indigenous groups. Where specific legislation does not exist, there is de facto recognition of these rights

Specific legal support for the property rights of indigenous groups over near-shore areas is most prevalent among the countries of the Melanesian sub-region. In the case of Vanuatu, this support is enshrined in the country's Constitution which was adopted in 1980 (with the advent of independence). According to the Constitution, all land in Vanuatu belongs to custom land owners, and this ownership carries with it the right to own adjacent reef and lagoon areas (Fairbairn, 1990c, p.6). Land is here defined to include "land under water including land extending to the sea side of any offshore reef but no further" (Government of Vanuatu, 1980, p. 4). In Fiji, official recognition of the customary rights of indigenous groups over traditional fishing grounds can be traced back to guarantees made by successive representatives of the British Crown soon after Fiji was officially ceded to the Crown in 1874 (via the signing the Deed of Cession between a group of leading Fijian chiefs and a

representative of the Crown; see Fairbairn, 1990b, p.7[1]). While, as a consequence of Cession, the Fijians lost ownership rights over their fishing grounds, they retained fishing rights over these areas. These rights were assured by representatives of the British Crown in Fiji and were subsequently incorporated in various official ordinances, especially those relating to fishing. In general, these ordinances protected Fijian rights by making it unlawful for any person to fish on the customary fishing grounds of indigenous Fijians unless they were a member of the local tribal group or held a licence to fish from government.

The legal status of local villagers relating to customary fishing areas appears to be the weakest in the case of the Kingdom of Tonga. By Royal Proclamation in 1887, the then King of Tonga King George Tupou 1, defined the Kingdom's territorial .boundaries (between the 15°00' and 23°30' south parallels and between 173°00' and 177°00' west meridian), and claimed ownership of Tonga's territorial waters, including all reefs and foreshore areas. The Land Act of 1927 officially conferred on the Crown all land and sea areas within Tonga's territorial limits.

In establishing ownership rights over Tonga's territorial waters, the Crown appears to have failed to give specific recognition to the fishing rights of local villages and family groups. As a result, villagers have no exclusive rights, either legal or customary, to particular areas of reefs and lagoons that may have served as their customary fishing grounds, although they enjoy de facto freedom to fish anywhere on Tonga's territorial waters.

As noted, under current marine tenure systems, the right to control access to fishing grounds is normally held by district village, clan or family groups. Significant .variation exists in the clan or tribal arrangement that effectively controls access to these fishing grounds. In some cases, these rights are vested in tribal leaders or village councils while in others, they are held by individual custom owners or small family units.

Ownership of fishing rights on coastal areas by individuals or family groups appears to be an important element in the marine tenure situation in Solomon Islands, Papua New Guinea and several Pacific island countries (Haines n.d.). Detailed evidence on this ownership pattern is not available but it is apparent that there is considerable variation in the pattern of ownership

[1] The Deed of Cession gave Queen Victoria (and her successors) possession of, and sovereignty over the Fiji islands, specifically all lands not properly alienated and not needed by Fijians. As a consequence, Crown ownership was also established over all reefs and territorial waters which contained traditional fishing grounds.

rights from one country to the next and between village communities within the one country.

In relation to individual customary ownership, the rights of these owners to exploit the marine resources found in their reef and lagoon areas are often blurred. In Vanuatu, for example, the rights of customary owners are confirmed by the Constitution but, in practice, these rights rarely confer an exclusive right to fish and to undertake related activities on the reef and lagoon areas belonging to individual custom owners. As a general rule, all villagers are free, by custom, to fish in the reef and lagoon waters belonging to their village - essentially a system of common property rights. Furthermore, the responsibility for regulating and controlling fishing activities of a village normally falls on the village (and in some cases, area) councils together with the head chief and, to some extent, the custom owner. The extent to which individual custom owners can influence matters at the village council level appears to differ markedly from region to region.

Unlike Vanuatu, the rights of custom owners in many parts of Papua New Guinea are virtually free of village-wide restrictions. Here, I was told that individual owners of customary fishing grounds can enjoy more or less exclusive fishing rights to their reef and lagoon waters and that these rights are fiercely defended.

The hierarchical system of marine property rights that exists in many-parts of the South Pacific can be illustrated by the case of Fiji. In Fiji, the ownership of fishing rights resides with tribal groups and in a few cases with individual chiefs. The tribal hierarchy includes the broadest tribal and social unit, the *vanua* and its sub-unit - the *yavusa* - a tribal lineage; the *matagali*, a sub unit of the *yavusa*; and the *tokatoka*, .a branch of the *matagali* and effectively an extended family. (Fairbairn, 1990b, p.11). The chiefly groups controlling access to traditional fishing grounds appear to vary from area to area, but in practice the principal authority is the head of a *yavusa* (or several *yavusa*) and the *matagali* chiefs. In a few cases, the controlling authority is an individual, usually a paramount chief.

The dominance of village councils or assemblies- normally composed of village chiefs or elders - is common among the Polynesian and Micronesian countries. Thus, in Western Samoa, customary fishing rights on reef and lagoon areas are held by individual coastal village communities and all members of a particular village can enjoy common property rights. However, the, primary responsibility -for regulating fishing and related activities in these areas lies with the village council or *fono* comprising the chiefly group of *ali'i* and

faipule (chiefs and district representatives).

Zann (1983, p.20) reports that similar arrangements are in Kiribati and probably Tuvalu, and that authority over fishing grounds resides with the village community through the traditional *maneaba* system (council of elders)and local council groups. These local councils are empowered to make by-laws on local matters, including those pertaining to fishing.

Cases where a highly ranked or influential individual (e.g. a paramount chief) controls access to traditional fishing grounds are also found but are probably much less common than was the case during pre-contact times. The influence of paramount chiefs in Fiji was noted above. In the Marshall Islands, Ruddle (1983, p.358) has observed that on Ulul Atoll, a certain area is aside for the exclusive use of the principal chief and clan members, and Zann (n.d., p.8) records that on one of Kiribati's northern atolls one man (the so-called king) controlled a large tract of reef and lagoon and dispensed fishing rights to the various clans of the area.

Knowledge about the origin of tribal and clan rights over reef, lagoon and estuarine areas in the South Pacific region is not well documented and only fragments of evidence are available. However, as observed by Ruddle (1988, p.356), in most cases these rights derive from ancestral families, spirits or gods. Ruddle (from Taurakoto, 1984) cites the case of Vanuatu, where the boundaries of a person's fishing spot were set either by where his ancestors landed on the island or by later negotiations with other tribal groups.

According to Ruddle (1988, p.356) on the basis of these ancestral and related origins, three kinds of customary rights over marine areas can be identified: exclusive, primary and secondary rights. Exclusive rights are those that are ‘locally handed down from time immemorial through ancestral families, spirits or gods and these rights are validated by traditional associations that are partly historical and partly mythological’ (Ruddle 1988, p.356). Primary rights are conferred on a group or an individual through inheritance (birthright) while secondary rights are those that can be acquired via marriage, by traditional purchase or in return for services rendered.

Although information relating to pre-contact forms of marine tenure in the South Pacific is scanty, the available evidence suggests that in virtually all cases, significant and sometimes drastic changes have taken place. It is apparent that present marine tenure systems are hybrids - the outcome of a process of adaptation, change and significant modification to original tenure arrangements.

The most drastic changes in marine tenure appears to have taken place in some of the U.S.-associated Pacific islands, especially Hawai'i, the Federated States of Micoronesia (especially Ponape) and American Samoa (Johannes, 1982a, p.258). Here, as a result of historical forces and the absence of legal protection, traditional fishing rights have largely disappeared and there appears to be little interest in reviving them. This situation contrasts with that found in the majority of the other Pacific island countries for example, Fiji, Western Samoa, Vanuatu, much of Papua New Guinea and Palau where customary rights dominate. Moreover, the rights of indigenous groups are recognised and protected by either specific legislation or in a de facto sense.

Cases where pre-contact forms of marine tenure have significantly given way to a hybrid system based on blending the old and the new can be illustrated by the experiences of Kiribati and Western Samoa - for which some information is available. In case of Kiribati, and to some degree to Tuvalu, Zann (1983, p.8) records that in the Southern Gilberts land owning clans held tenure of the reefs and lagoon adjacent to their land and that individual families (*utu*) owned sections of the reef and held exclusive rights to marine resources. Furthermore, in some of the Northern Gilbert atolls, autocratic kings or chiefs held ownership but dispensed fishing rights to clan members. These tenure systems have largely disappeared and have given way to village community control through groups of village elders and village councils.

Regarding Western Samoa, aspects of customary fishing rights of "native" Samoans were observed by von Bulow at the turn of the century (Fairbairn 1991, p.3q). According to von Bulow, these traditional fishing rights were held by communities, extended families and individual title-holders, although on certain matters (e.g. the imposition of a taboo), these owners were subject to "orders" made by the village assembly. As in Kiribati, this traditional system has been significantly altered and has given way to a "customary" tenure system based on control by the village council (*fono*).

As previously noted, customary fishing rights in the South Pacific applied to reef, lagoon and estuarine areas lying directly offshore from the coastal village community and, in general, comprised areas delimited by lines that were lateral extensions of land boundaries on one hand, and the outer edge of the reef on the other. In some cases, these fishing rights extended to the open sea or reef and lagoon waters surrounding offshore islands. The fishing

boundaries belonging to each customary unit were usually clearly known and demarcated.

Although the lateral and seaward boundaries of reef and lagoon areas over which village communities held customary fishing rights usually are unmarked, in general, tribal groups and village communities had a clear idea of the extent of their fishing grounds and they relied heavily on certain marine physical features as a means of demarcating boundaries. As Iwakiri (1983, p. 135) observes, these marine physical features include patch reefs, reef holes, reef passages and at the seaward end, are delimited by the outer limit of that part of the barrier reef which is exposed at mean low water. (He also observes that area boundaries to fishing rights are not simple extensions of land boundaries and are influenced by the location of marine features that can be used for demarcation purposes.) These marine boundaries are based on custom, as modified over time, but as Johannes (1982a, p. 280) has noted, tribal groups sometimes invented boundaries where it was to their advantage to do so.

The use of physical marine features to identify tribal fishing grounds is clear from the following description of tribal claims in Fiji made in the late 1890s (Fairbairn, 1990b, p.l3). The first description applies to the people of *Yavusa Vusaratu*, *Serua*:

> 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 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 Rukunivutu on the east point; we fish in all these reefs and patches together with the towns people of Thulanuku (Culanuku) and Wainiyambia (Wainiyabia).

Where customary sea tenure is dominated by individual or family ownership as is found in Vanuatu and parts of Papua New Guinea, physical marine features are also used as a means of demarcation. However, in cases where individual tracts of reef and lagoon areas are not so demarcated - perhaps due to the absence of distinguishing physical features - the knowledge of the owner himself becomes critical in identifying his claim and in preventing fishing by

others.

Complicated patterns of sea tenure can also give rise to demarcation problems. Complications can arise, for example, in situations where the fishing grounds of some tribal or village groups are located on the outer section of reef areas and cut off from the land by the fishing grounds of other groups. This pattern is common in Fiji as can be seen from the pattern of tribal (*yavusa*) fishing grounds shown in Figure 5. Here, the problem of determining clear sea boundaries - and fishing rights - can leave the way open for constant disputes between tribal groups.

Official recognition of customary fishing rights in the South Pacific region has not been matched by efforts to record and register customary fishing grounds. The exception is Fiji where all tribal fishing grounds have been classified and officially registered with government and, to date, at least four such grounds have been surveyed[2] (Fairbairn 1990b, p.18) This task is being undertaken by the Native Land and Fisheries Commission and was prompted by the wish to minimise inter-tribal disputes over sea boundaries. However, as noted by Tisdell (1989, p.86), (from discussions with Asesela Ravuvu), the sea boundaries recorded by the Native Land and Fisheries Commission may need to be checked to determine whether village groups accept the Commission's allocation.

While traditional sea tenure generally applies to reef and lagoon areas - leaving villagers with the right to fish freely in the open sea - many communities in the South Pacific claim fishing rights in the sea areas beyond the encircling reef and lagoon waters. Such extensions of traditional marine tenure can probably be explained by such factors as narrow reef zones, population pressure and the technical capacity to exploit deep water fisheries.

The precise factors determining the limits of traditional fishing rights in the open ocean appear to differ widely from one area to the next and it is apparent that in some cases these boundaries are often set quite arbitrarily. Ruddle (1988, p.357) points to the importance of water depth in setting this limit in the Marshall Islands while in Palau, the seaward range of homing seabirds was a limiting factor. In Tahiti it has been observed that certain families held rights to "tuna holes" in the deep seas. In the case of Nauru, Solage Pitit-Skinner (1987, p.l69) found that the outer part of reef (Yako) is the property of certain families who can

[2] A total of 410 separate customary fishing grounds have already been identified and officially recorded for purposes of registration and survey. These claims cover practically the entire near-shore coastal zone of Fiji.

carry out line fishing and diving in such areas.

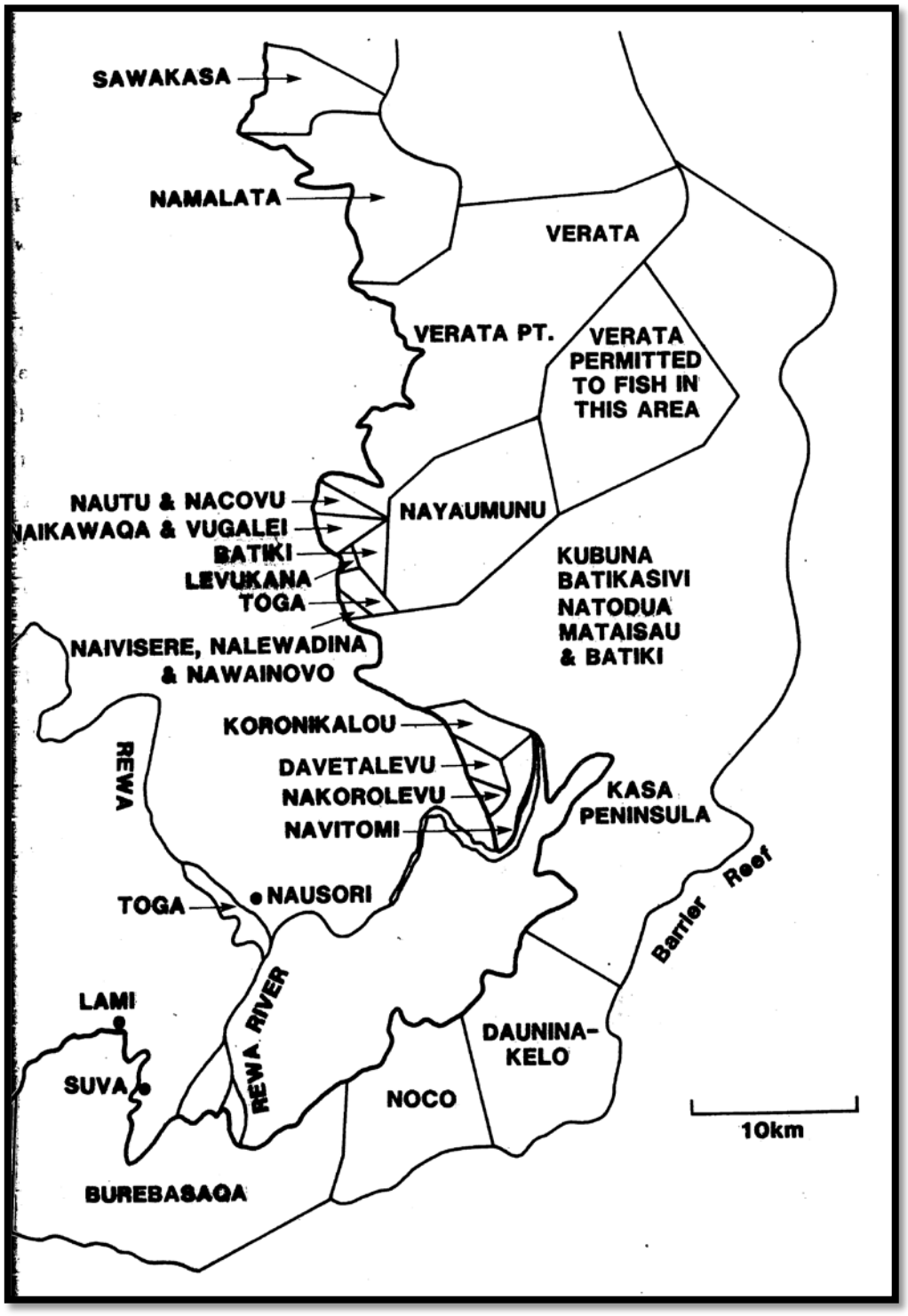

Figure 5: Patterns of tribal reef tenure along the Southeast coast of Viti Levu in an area encompassing Rewa River Delta. For more details see Fairbairn (1990b)

In Vanuatu, several instances of villages claiming additional sea areas "toward the horizon" came to my notice during fieldwork. Thus at Eton village on the main island of Efate (see Figure 6), respondents informed me that the village's seaward boundary was taken as the outer edge of the fringing reef plus an additional 50 metres (see Fairbairn, 1990c, p.l2.). At Eratap village, the villagers claimed the reef areas up to the reef edge (a distance of around 200 metres) plus an additional 100 metres beyond - an area which contained four small offshore islands (Eratap, Emal, Ekadum Lep and Eddum Rik)belonging to the village. On Uripiv Island (see Figure 2, lying offshore on the north-east side of Malekula island, the six villages on the island owned land on the nearby island of Uriv and therefore were e to claim sea rights beyond the reefs of the home island.

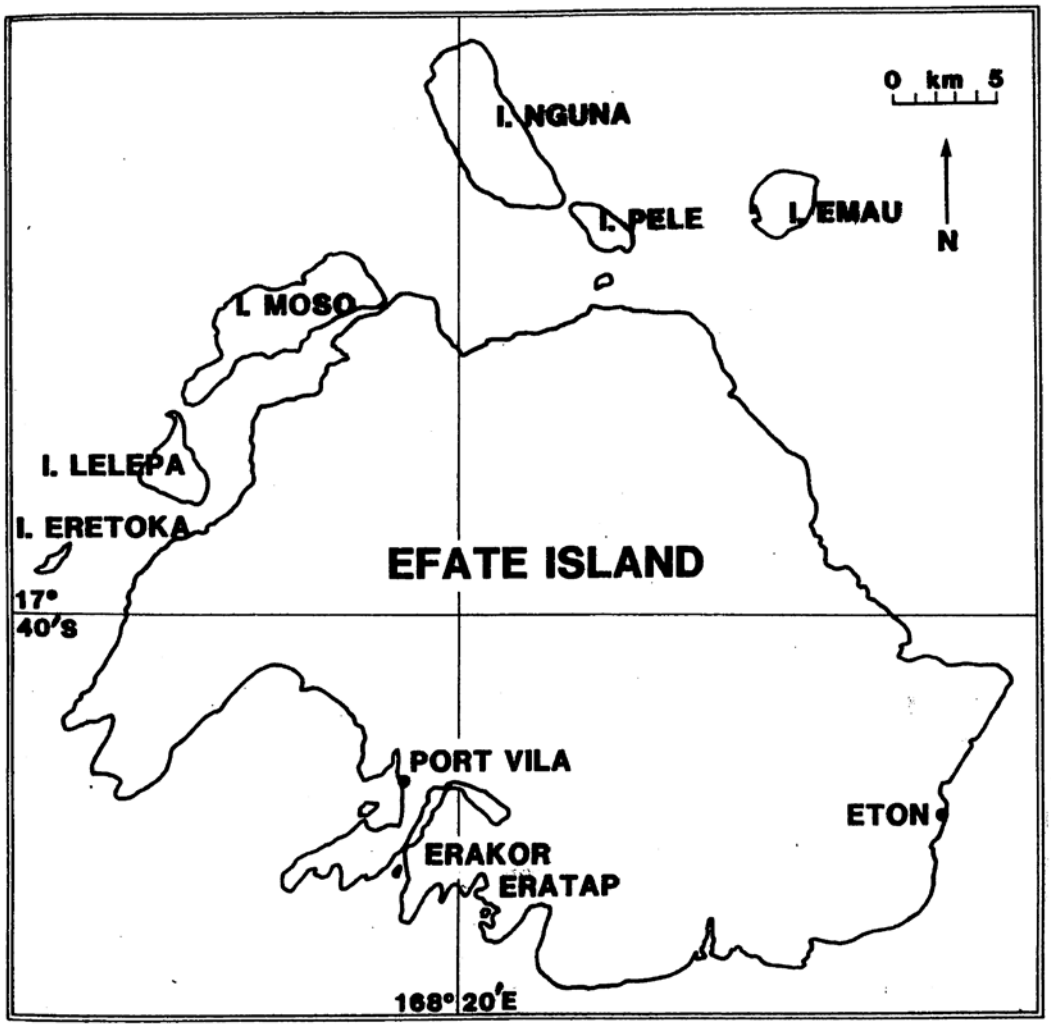

Figure 6: Efate Island, Vanuatu's main island and site of its administrative centre, with offshore islands. This map indicates the general location of Eratap, Erakor and Eton.

Interesting and sometimes unusual tenure arrangements are found among the smaller offshore islands that are found among nearly all Pacific island countries. For some island countries, including Fiji, such islands can number several hundred. Tenure arrangements governing fishing rights on these islands appear to be much influenced by their proximity to the main islands and whether or not they are inhabited.

Fishing rights on many offshore islands that lie a short distance from the main island are held by adjacent villages located on the main island. Such villages normally hold customary rights to fish on the offshore island. Examples of this tenure arrangement are found on the east coast of Upolu island in Western Samoa where several villages located in the main island of Upolu traditionally fish around the reef and lagoons of several offshore islands such as Namu'a and Fanuatapu (see Figure 7). I also came across similar cases in Vanuatu where, for example, the traditional fishing grounds of the main island village included the reef and lagoon waters of adjacent offshore islands. In general, fishing on these offshore islands tended to be free ranging in that villagers can fish anywhere on the waters of the offshore island.

Marine property rights on inhabited offshore islands tended to be more complex. In general, fishing rights on the reef and lagoon areas of these islands either belonged to the inhabitants or were shared with mainland villages. Fishing rights were often divided, with each family or village unit having its own fishing ground. However, numerous examples exist where marine property rights were not so sub-divided and where free access to the entire reef and lagoon areas was available to all villagers. Thus on the offshore island of Uripiv, lying on the northeast side of Malekula island in Vanuatu, no tenurial restrictions were imposed and the inhabitants of all six villages were free to fish anywhere on the island. Similar arrangements are found in some of the offshore islands in Fiji and appears to be associated with islands whose inhabitants were members of a common clan or were related.

In some cases, fishing rights on small offshore islands belong to individual custom owners, usually individuals of high rank. This is true of the island of Makogai, located about 50 km northeast of Viti Levu, the main island of Fiji. Here, fishing rights on Makogai are held by the Tui Levuka; a high chief of nearby Ovalau island. However, members of this high chief's tribal group traditionally enjoyed access to the reef and lagoon waters of Makogai.

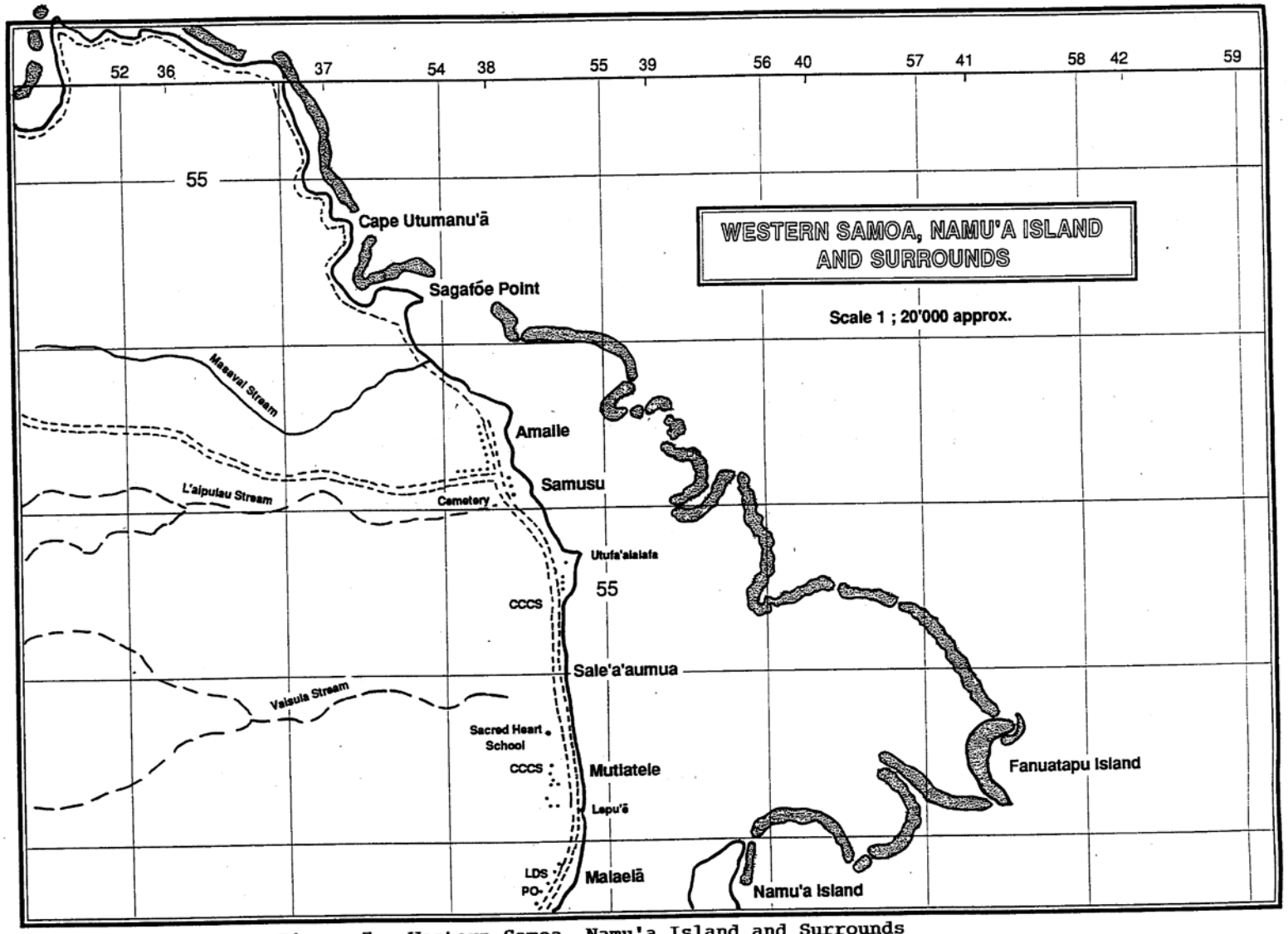

Figure 7: Western Samoa, Namu'a Island and Surrounds

4. Customary Marine Tenure: Use Rights and Sharing Arrangements

Fishing and related rights over reef and lagoon resources held by tribal and village groups in the South Pacific are based on custom and, as noted, are officially recognised by legislation or in a *de facto* sense. These rights are essentially rights to use and exploit near-shore marine areas and with the exception of some of the Melanesian countries, do not imply ownership of these areas in the sense that is commonly understood. As pointed out by Ruddle (1988, p.354), among others, these customary marine tenure and fishing rights closely reflect social organisation and power structures prevailing in each society - predominantly, clan, sub-clans and family groupings.

In traditional Pacific island societies, attitudes to marine and terrestrial resources were essentially custodial in nature rather than possessive (Ruddle, 1988; p.355). Such attitudes remain pervasive today, and reflect the fact that these societies continue to maintain a close affinity with their natural surroundings and resources. As Ruddle (1988, p. 55) notes: ‘Land and reefs are not viewed as commodities to be sold or exchanged - although certain use rights might be granted by resource "custodians" or "owners".’

Custodial rights .appear to go beyond fishing and related activities; they also confer a sense of responsibility on village authorities to manage and regulate reef and lagoon resources in a way that will protect the long-term interest of the tribal and village group as a whole.

The concept of custodianship in relation to customary marine tenure is apparent from my visits to Western Samoa and Fiji where, in both cases, legal ownership of reef and lagoon waters resides with the state. In Western Samoa, in relation to reef and lagoon areas, village leaders clearly saw their role as one of looking after the marine areas belonging to them and overseeing the use of these marine resources (Fairbairn, 1991, p .18). This perceived role included control of fishing in these waters. As noted in previous sections, recent legislation has served to enhance the authority of village chiefs over village affairs including matters pertaining to near-shore fisheries.

The notion of custodianship in relation to customary marine areas is also apparent in Fiji whose marine tenure is dominated by tribal groups, notably the *yavusa* and *matagali* units. These tribal groups exercise custodial rights to manage and regulate the activities of villagers

on traditional fishing grounds (see Ravavu, 1983). However, it may be noted that in the view of some sections of the Fijian people present custodial relationships imply more than just controlling and managing the use of reef and lagoon areas. These people argue that Fijians are the legal owners of traditional fishing grounds since, in their view, these areas were transferred temporarily to the Crown during the time of Cession. Accordingly, attempts have been made recently to introduce formal legislation to regain the legal ownership and control of these marine areas.

The rights of tribal and village groups to exploit reef and lagoon resources are essentially based on customary rights as developed over the historical past. The most common system of property rights is one where common access prevails with all members of a tribe or village enjoying equal rights to exploit the fishing grounds belonging to his or her village. Common property rights of tribal groups apply even where, as in Vanuatu, ownership rights of individual custom owners are recognised. Cases where individual or family groups have exclusive rights over a portion of the reef and lagoon zones belonging to the tribal or village group appear to be most prevalent in some parts of Papua New Guinea and Solomon Islands.

As members of a tribal or village group, local villagers normally enjoy the right to fish and to collect other marine resources from the reef and lagoon waters belonging to their group. Fishing is primarily for subsistence but commercial fishing is also carried out and in some cases (e.g. Fiji) can be quite significant. Villagers also enjoy other rights such as the right of passage, recreation, and the right to take marine sediments and other materials. However, while normally villagers are entitled to exercise these rights they are also subject to various forms of restraints, both customary and official, that can significantly influence their fishing activities (see below). For example, regulations affecting fishing practices on reefs and lagoons have to be observed by villagers, while village authorities often impose taboos to control overfishing.

Fishing methods used by villagers to exploit reef and lagoon resources include hand collection, fish traps and the use of small craft or canoes. In some cases, fish poisoning is resorted to despite efforts by both central government and traditional authorities to ban such methods. In addition to fishing for a wide range of reef fish, villagers also fish for a variety of marine products such as shell fish, sea slugs, octopi and other shallow water sea growths.

As indicated above, all members of a tribal or village unit can enjoy what are effectively

common property rights on customary fishing grounds belonging to them subject to any restrictions that may be imposed by village authorities or by central government. In practice, however, certain other constraints - some cultural in essence - also apply to restrict the fishing activities of villagers. For example, in Western Samoa, the opportunity to fish freely on reef areas adjacent to households located on the water's edge tends to be restricted in deference to these households, possibly in recognition of their right to a degree of privacy. The area concerned is normally around 5-10 metres from land at high tide, and other villagers respect this right by keeping a respectable distance away. Also, and as will be outlined below, the fishing rights of villagers may be curtailed by the admission of outside fishermen. This form of sharing of resources limits the opportunity for home villagers to exercise exclusive fishing rights.

The fishing rights of villagers can also be constrained by customary rules and conventions regarding fishing practices and the catching of certain species of fish. These customary restrictions are not well documented but are believed to be widespread. A common restriction is the banning of the use of certain plant material (e.g *Derii elliptica*) as a fish poisoning device[5]. Customary restriction were often placed on the catching of turtles, a species which, in some cases (e.g. Western Samoa) could only be distributed by village chiefs. In the context of Western Samoa, Johannes (1982b, p.l2)has observed that on the island of Savai'i, fishing for "whitebait" during the annual run is the exclusive right of the village of Gataivai, while Van Pel (in Johannes, 1982, p.12) noted that around the small island of Manono, only the inhabitants may catch mullet and *atule*.

At the other extreme are cases where marine tenure rights are held by individual custom owners, such as in many parts of the Melanesia and in some of the countries of Micronesia, such as Palau, Kiribati and Tuvalu. However, individual ownership does not necessarily imply that these owners maintain and enforce exclusive rights to fishing in their tract of water. It appears that in the majority of cases fishing by clansmen and fellow villagers is permitted in what are essentially customary sharing arrangements. Such arrangements are often made on a reciprocal basis. However, as already noted, many instances occur where individual custom owners of reef and lagoon areas appear to exercise exclusive rights over

[5] *Derii elliptica* is a noxious plant used in many parts of the South Pacific as a fish poison. It appears to have spread from Papua New Guinea.

the marine area under his control.

Where individual customary owners permit a sharing of their portion of reef and lagoon areas, the rights of these owners are not always clear. This lack of clarity can be illustrated in Vanuatu where although reef and lagoon areas belong to customary land owners, in general, open access is permitted to all village members. The rights of custom owners are recognised by both custom and legislation (although claims to many reef and lagoon areas may be unclear as a result of land disputes by rival tribal groups) and include the right to lease reef sites (although this is usually subject to final approval by the village council and chiefs). They may also include an exclusive right to use sea areas close to land for special purposes, including the mooring of fishing crafts, the erection of fish traps and the establishment of breeding areas for clams and other shellfish. However, the authority of individual customary owners is not paramount - as may have been the case in pre-contact times – in effect being subordinate to that of the village authorities. It is the village council (and in some cases, the area council) that effectively exercises control over the reef and lagoon resources belonging to the tribal group or village. To what extent individual customary owners can influence decisions regarding the use of marine areas by the village.as a whole is not clear but presumably an important factor is the social status of the owner within the village hierarchy.

The rights of villagers to fish commercially on reef and lagoon areas are not always clear and it is apparent that, in many countries, commercial fishing activity is posing, a major problem for local village authorities. Traditional systems of marine tenure evolved out of subsistence-based societies and, as such, are not always responsive to the need for change that can arise from increasing pressure from villagers to engage in fishing for commercial markets. Given this pressure, the response on part of the village authorities has typically been to permit villagers to fish commercially but within reasonable limits. Such limits appear to relate to a variety of factors such as the supply condition of reefs and lagoons and the need to restrict fishing by individuals and groups in order to allow an equitable village-wide sharing of available resources. Where commercial fishing threatens to deplete reef and lagoon areas, the village authorities will usually step in to regulate or halt such fishing.

In Fiji, the fact that commercial fishing on traditional fishing grounds by both local villagers and outsiders requires a fishing licence provides a mechanism to prevent exploitation of resources. A fishing licence can be obtained through the Fisheries Division, the Ministry of Agriculture, Forests and Fisheries, but a fishing permit must be obtained beforehand from

tribal leaders (usually at the *matagali* level). However, in practice local villagers can usually carry out small-scale fishing for commercial markets without a fishing licence.

As noted previously, effective control of fishing and related activities on reef and lagoon resources belonging to a particular tribal or village group is normally exercised by village councils and chiefly groups who act as custodians of these resources. In some cases, as in Vanuatu and Papua New Guinea, individual custom owners also play a part in controlling the activity of villagers on marine areas although the nature of this role is sometimes ambiguous. Undoubtedly, given the diversity of customary situations, the functions and responsibilities exercised by these traditional authorities differ widely throughout the region. However, as established by custom, their main task would appear to be is to oversee and regulate fishing and related activities of villagers on customary fishing grounds in the interest of the tribal and village group as a whole.

From the available evidence, the specific functions that these traditional authorities are expected to carry out include:

- to uphold the overall usage of the group's fishing ground in accordance with custom;
- to control fishing activity of- villages to prevent over-exploitation of marine resources;
- to apply and enforce traditional forms of sanctions to protect reef and lagoon resources;
- to enforce fishing regulations affecting reef and lagoon usage as set by central government;
- to control the erection of fish traps and other structures on beach and near-shore areas;
- to control the exploitation of reef materials and beach sands;
- to act on behalf of the tribal and village unit in controlling commercial activity on reef and lagoon sites, including leasing and investment proposals;
- to regulate commercial fishing on traditional fishing grounds.

Regarding fishing, these tribal and village authorities are empowered by custom to provide specific regulations designed to control the exploitation and utilisation of their marine resources. The most common areas for such action include defining the species of fish that may be exploited (or the species to be protected), excluded reef areas, and allowable methods of fishing. Village leaders may also introduce customary regulations regarding conservation

measure that need to be observed as well as particular species that are reserved for exploitation by a specific group within the village.

In most Pacific island countries, central government relies on traditional village authorities as a means of influencing the fishing activities of villagers on near-shore areas. In particular, these authorities are expected to assist in enforcing the provisions of fishing regulations among villagers, for example, those related to illegal fishing practices. As in Western Samoa, reliance on these traditional village authorities has considerable merit. For one thing, they tend to be well respected by villagers and this can make for effective enforcement and they permit the enforcement of regulations that would otherwise not occur given the fact that the staff and financial resources of central government - especially those allocated to fisheries agencies - are usually inadequate.

Village authorities have at their disposal a range of measures, both customary and modern, for asserting their authority and enforcing their regulations, the most powerful sanctions being customary forms of control or taboos. Although in many parts of the South Pacific these taboos no longer apply, or have been weakened, they are still an important form of social control in most island countries. As a rule, taboos appear to be most influential in areas that are still strongly traditional and remote from urban centres.

Village groups also have other means of enforcement including the imposition of fines and banishment from the village. In addition, in some cases villages have the power to make by-laws as a complement to their power to apply traditional forms of control.

The capacity of village authorities to apply traditional sanctions to influence the fishing activities (and activities in allied areas) has several advantages: the fact that they are imposed by recognised village authorities ensures compliance by villagers; they can apply to different areas of village life and can be introduced quickly and for specific periods (but usually for less than one year); and they can play a significant role in achieving a particular objective quickly, for example, an outright ban on fishing on a given reef area pending the preparation of longer-term measures, including legislation.

In support of customary sanctions, the tribal and village authorities can generally apply penalties against those who break sanctions. As in Western Samoa, these penalties commonly take the form of fines which may be paid in cash or in kind. In Western Samoa, these fines vary considerably in severity but, apparently, in many villages they are fixed at around 100

tala (approximately Aust$60) and 100 head of taro or its equivalence in trade goods (e.g. bread, canned fish and meat).For severe offences, punishment can take the form of banishment from the village or the performance of village labour.

From my visits to Fiji and to Western Samoa it was apparent that customary sanctions were still widely used. In Fiji, customary sanctions (*tabu*) were applied in 1975 to prohibit fishing in Suva Harbour, pending the preparation of supporting legislation and they were also used to ban fishing on the northern side of Makogai Island, located on the southeast of the main island of Viti Levu, as a step towards turning that area into a national marine life park. In Western Samoa, I came across several instances of customary sanctions (*sa*), including the banning of fishing on a reef area on an offshore island (*Namu'a*) adjacent to the east coast of Upolu Island, which was being used for the purpose of clam farming. In Western Samoa, the use of such sanctions is common practice.

In some Pacific island countries, village councils or assemblies have power to make by-laws regarding fishing activity as well as other areas of village life. In effect, this power, complements the capacity of these village bodies to impose traditional sanctions and can mean a considerable enhancement of such powers to control key aspects of village life, including marine resource exploitation. As already noted, in Kiribati, power to make by-laws is held by local council groups and through legislation, has recently been acquired by village councils (*fono*) in Western Samoa. In Western Samoa, the framing of a by-law by a village council first requires discussion with the Fisheries Division of the Ministry of Agriculture, Forests and Fisheries and approval by the Director of Agriculture. Once approved, the submission becomes a by-law and a legal instrument enforceable by the village council.

The sharing of fishing rights held exclusively by tribal and village groups under customary tenure appears to be a common practice among many Pacific island countries. As Ruddle (1988, p.356) notes, "...through the acquisition and transfer of rights, the system of exclusive marine tenure permitted temporary and occasionally shared usage (of marine resources by other social units". He cites examples where, in peacetime, people would seek species in the marine zones of another group when these were not available in their own reef areas and where communities were allowed to fish in other marine areas when waters were temporarily rough. In these cases it appears that a portion of the catch was often given over in exchange for the temporary right to fish.

Ruddle (1988, p.356) also notes that exclusive fishing rights (as observed by Johannes, 1981) were sometimes transferred permanently from rich to poorer communities and he cites the case of Palau when, in 1931, the municipality of Ngeremlengui ceded fishing rights to the neighbouring municipality of Ngatpang.

It would seem likely that the sharing of traditional fishing rights far more prevalent in the South Pacific than may be supposed. This impression was confirmed by my field-trips to the four Pacific island countries. The nature of such sharing arrangements appears to vary considerably from one country and area to the next, but it would seem that a common requirement is that the outside group seeking fishing rights in the waters of another community must first obtain the consent of that community. Without this consent, fishing would amount to poaching and would invariably cause friction and resentment between the two groups.

An extreme example of the sharing of marine resources prevails in Tonga. As a result of historical and legislative changes, Tonga has in place a system of common property rights which allow all Tongans the right to fish anywhere (apart from certain marine reserve areas) in the Kingdom's coastal waters.

Although in Fiji, Vanuatu and Western Samoa - and, no doubt, many other Pacific island countries - exclusive rights to reef and lagoon resources are held by local tribal and village groups, there is normally a degree of flexibility in relation to the admission of outsiders. In Fiji, one aspect of this form of sharing is access to traditional fishing grounds for commercial fishing via the securing of a fishing licence. Another common aspect is the customary sharing of fishing grounds between different tribal groups (*yavusa*). Such sharing tends to occur on outer reefs or coastal zones and, in many cases, on the coastal areas of offshore islands. Thus, on the small island of Beqa; lying offshore from Viti Levu, seven separate tribal fishing grounds exist of which three are shared between from two to four tribal units (Fairbairn 1990b, p.14).

In Vanuatu, fishing by neighbours and other outsiders is forbidden but many villages will allow fishing by outsiders provided they have been informed beforehand and have given their consent. Such consent is normally a matter for the village council (and sometimes the area council). In some cases it appears that reciprocal arrangements allowing inter-village fishing have been long standing.

It is apparent in Vanuatu that many villagers are becoming increasingly influenced by the commercial motive when entering into sharing arrangements. At one of the villages (Erakor) I visited, for example, I was told that outside fishing is permitted only in exchange for a monetary fee. At the time of my visit, this village was hosting two outside fishermen - one from the island of Malekula, who was fishing for bech-de-mer, and the other from Pentecost, who was collecting trochus. The fee each of these fishermen was being charged for the right to fish amounted to several thousand (Australian) dollars.

In Western Samoa, the sharing of marine resources is extensive although much less prevalent than was the case in pre-contact time. Many villages consent to fishing by neighbouring villlages in what are usually reciprocal sharing arrangements. Such fishing tends to be restricted to outer reef areas thereby reserving the inner reef zones for the exclusive use of the local villagers.

The tendency for Samoan villages to restrict fishing by outsiders appears to have increased in recent years and this process seems likely to continue. Such restrictions tend to take the form of a traditional sanction (*sa*) on outside fishing and can apply to the entire reef and lagoon area or part thereof, to a particular species of fish, or to a fishing practice or system. A major reason for increased restriction on outside fishing is the heavy demand on reef resources due to population changes and the increasing tendency towards commercial fishing. This tendency has been accentuated and facilitated by recent legislation enhancing the authority of village councils to impose restrictions on fishing by outsiders.

Sharing arrangements also extend to many villages that are located inland and without reef and lagoon areas of their own. Such arrangements tend to apply to those inland villages that are not too far - and hence reasonably accessible - from the coast and which have close historical and kinship associations with the reef and lagoon owners. (Many of these villages were originally settled by people from the coast who have been able to maintain meaningful contact over time.)

Access to the traditional fishing grounds of coastal villages by inland villages depends on a continuing understanding between these groups and their ability to stay in good terms. In some cases, as is common in Vanuatu, the rights of inland villagers to fish on coastal areas depend on the observance of certain customs, including a payment for the right to fish. This payment normally takes the form of a presentation of traditional gifts such as pigs, kava, taro

and other valued items.

In Vanuatu, other reciprocal arrangements are found. I learned, for example, that in the island of Tanna, some coastal villages permit fishing by people from the interior in exchange for hunting rights on land belonging to the inland village. Reciprocation appears to be common in these instances although, as I found in Western Samoa, forms of reciprocation are often embodied in a complex network of customary activity and transactions.

Disputes often break out between tribal and village groups over customary fishing rights. These disputes can arise as a result of such factors as poaching, fishing without a licence in those cases where significant commercial fishing is allowed, and, in the case of Fiji, differences over the issue of a fishing permit (as can occur where two or more tribal groups share a common fishing ground). Another significant source of inter- tribal dispute is misunderstandings over fishing boundaries which are sometimes not clearly defined.

Lack of clarity over fishing boundaries is currently a major source of inter-group dispute in Vanuatu and reflects the high incidence of land disputes among customary owners. (Such land disputes seem particularly common where rivalry exists between tribal owners over ownership rights on previously alienated land. In Fiji disagreement over tribal fishing boundaries is often caused by current attempts to record and register the customary fishing grounds of each tribal unit. Friction can arise through the need for agreement when drawing precise boundaries and in establishing claims over marine areas where traditional ownership rights have not been clear.

In most Pacific island countries, customary channels exist to settle inter-tribal or inter-village disputes over fishing rights but these channels are usually complemented by official agencies and institutions. Thus, in Vanuatu, these disputes can be dealt with by village councils and, as a last resort, by settlement facilities under the auspices of central government. In Western Samoa, inter-village disputes over reef and lagoon usage and boundaries are normally matters for village councils but if need be, they can be referred to the Land and Titles Court in Apia for final settlement. In the case of Fiji, the Native Land and Fisheries Commission can assist tribal groups in settling disputes over fishing boundaries and infringement of fishing rights.

Customary means of extracting compensation for poaching and related infringements appear to vary widely, but are usually transacted through customary channels. A common method of compensation is through the traditional presentation of valued objects such as pigs, kava and

certain root crops. However, it appears that such compensation now often involves the exchange of money.

To an increasing extent, tribal and village groups wishing to discourage or ban outside fishing on their traditional fishing grounds resort to the use of radio. In Western Samoa, villages frequently make public announcements over the local radio station informing other villages that a ban has been placed on fishing on their reef and lagoon areas and that no outside fishing is permitted. In Vanuatu, in addition to radio announcements, many villages install public notices along their land boundaries warning other villages against poaching in their fishing areas.

5. Intra-group Sharing Arrangements

Fishing by village groups involving a sharing of the catch is an important element in village fishing in the South Pacific, although such a practice appears to be far less common than in the past. It remains particularly important for those countries, notably Fiji, Tonga and Western Samoa, and Kiribati, where the tradition of communal fishing has always been strong. It is less important for other countries, for example, Vanuatu and Solomon Islands, where more individualistic traditions have been the norm. Within individual countries themselves, group fishing is most common in rural environments, including outer islands, where tradition remains a dominant force. A significant factor behind the apparently diminished incidence of group fishing in recent years has been the increasing tendency of villagers to use motorised craft which tend to reduce the element of mutual dependence and fosters greater individualisation of effort.

It is clear from the limited evidence available that sharing arrangements differ markedly from one Pacific island country to the next. Perhaps the most common sharing arrangement is where each member of the fishing group shares in the distribution of the catch. This does not necessarily imply that the catch is shared equally among members of the group for, as is true of many Pacific island countries, the distribution of the catch is made in accordance of customary formulas in which distribution is often strongly influenced by rank and status. Thus, it may mean that a larger-share of the catch is given to the head fishermen or shared with village elders, chiefs and pastors. Certain species of fish may also be reserved for the head fisherman or chiefs.

Another form of group fishing and sharing is where the entire catch is given over to the village for consumption or distribution. These arrangements are fairly common when the village faces a special occasion such as a meeting of village elders or chiefs, the opening of a church building or school, or a meeting to welcome official guests. Here, the catch will normally be used to feed those taking part in the special event. Sharing arrangements of this kind seem particularly common in Western Samoa.

Sharing arrangements may also involve the act of fishing together.as a group but with each participant keeping his catch. The individual fisherman - or his family - is free to use the catch as he sees fit, for example, for family consumption, presentation to other families as a customary gift, or to sell the in local markets.

Group fishing is largely confined to adjacent reef and lagoon areas that constitute the traditional fishing grounds of the tribal or village group. However, in some countries, for example, Tonga and Western Samoa, group fishing on the open sea is still practiced and the catch shared, with efforts usually directed at catching open sea species such as shark and tuna. Presumably, the more difficult conditions found in open sea fishing have been an important consideration in perpetuating cooperation in this area.

Group fishing by villagers is primarily directed at meeting their subsistence needs and, as noted above, these may take the form of fishing to meet the needs of the village as a whole during a special occasion or fishing to meet the regular consumption requirements of the household. However, in some instances, group fishing directed at commercial sale is significant. The most notable example is in Fiji where groups of young men in rural areas fish commercially under a cooperative form of organisation. As many as 40 such rural fishing groups are said to be operating and sharing arrangements are made in accordance with cooperative principles.

Women are active participants in group fishing on a shared basis. Fishing on reef floors at low tide is largely the preserve of women, usually operating in small groups, numbering from two to as many as twenty. Fishing mostly entails the collection of a range of shellfish, octopi, giant clams and seaweed. Women also carry out fishing drives in groups as a means of trapping fish with each participant sharing in the catch. Fish drives by groups of women are said to be still common in Tonga, Western Samoa and Fiji.

Fishing by village groups is not always restricted to members of a tribal group or village; in

some cases fishermen from neighbouring villages are admitted as part of the group. Thus, in Tonga the undertaking of fish drives (*uloa*) can involve from three to as many as 20-40 villagers (Fairbairn, 1990a, p. 5). The catch is divided between the villagers, usually with the head fisherman receiving a larger share. Fiji's rural fishing cooperatives can also admit fishermen from outside the immediate tribal or village group.

The kind of fishing activity that is undertaken on a group basis appears to vary widely throughout the South Pacific region, but, four main categories can be distinguished. The first is group fishing carried out essentially in the form of fish drives for the entrapment of fish. These fish drives are practised in most Pacific island countries (but not in all regions), including Fiji, Tonga, Vanuatu and Western Samoa, and usually involve fairly large groups totalling as many as 40 participants. Fish drives can be undertaken by male or female groups or on a mixed gender basis. The method of fishing usually entails the participants forming a circle and then, by beating the water or by use of some other device, driving the fish to a central point where they are trapped. The catch is usually shared along customary lines.

A second major method of group fishing is that carried out by villagers using canoes or similar fishing crafts. Usually undertaken by male groups, it is a form of fishing that is popular among villagers in Fiji, Western Samoa, Tonga and several other Pacific island countries, but less so among the Melanesian countries such as Vanuatu and Solomon Islands. The traditional master fisherman usually leads the group and various techniques are used to catch the fish, including, gill nets, spearing and (illegal) the use of poison and dynamite. In Western Samoa this form of fishing (*mata*) is widespread and is the main source of supply for both village community and individual household requirements.

A third form of group fishing is that concerned primarily with fish trapping on reef platforms and openings. Such fishing usually involves small groups and appears to be particularly common among coastal villagers in Vanuatu. Small fish varieties are normally caught and shared among the participants.

A fourth approach is the hand collection of various forms of marine products on reef and lagoon floors. As noted above, this form of group (and individual) fishing takes place at low tide and is dominated by women's groups. Sharing arrangements appear to be somewhat informal.

6. Development Approaches: Habitat and Support Facilities

The island countries of the South Pacific region have physical environments that appear to offer highly favourable habitats for giant clam cultivation, both subsistence and commercial. While most of these countries are archipelagic in structure and are well endowed with reef and lagoon areas, practically all possess some area of coastal water that can sustain giant clam and related forms of mariculture. Within these coastal waters are areas that offer optimum or near-optimum conditions for giant clam cultivation in the sense that, among other things, they contain stretches of shallow and protected bay areas as well as clean and sandy reef and floors.

It must be recognised, however, that ecological conditions vary considerably among Pacific island countries and this variation can significantly affect prospects for giant clam cultivation. The best endowed countries appear to be Fiji, Vanuatu, Western Samoa, Tonga, the Cook Islands and the many islands of the Micronesian sub-region. Typically these countries are favoured with extensive reef and lagoon areas and some of them possess numerous separate islands or islets. Almost the entire coast of Fiji, for example, is ringed by reef and lagoon areas and there are as many as 300 islands (which partly accounts for the large areas of coastal reef and lagoon). By contrast, several other island countries are not so well endowed. This is true of Niue, a raised coral atoll with negligible areas of fringing reefs and lagoons and American Samoa, which is characterised by a rugged and rough coastline.

However, the presence of favourable ecological conditions is not a sufficient condition to ensure success in the development of giant clam mariculture. Also essential is the existence of a favourable system of marine property rights, adequate infrastructure and related services, the absence of heavy human population settlement, and receptive attitudes on the part of local tribal and village groups. Marketing and economic prospects are also vital in the case of export activity, an aspect that will not be touched upon here (these aspects are the subject of detailed study in other parts of the *Economics of Giant Clam Mariculture* project).

The importance of marine property rights for the success of giant clam mariculture has been pointed out by Tisdell (1986, p. l9) and will be discussed in the next section. Particularly in the case of commercial ventures, it is essential to establish clear property rights over a project site to ensure that the developer is rewarded for his efforts. This will normally call for the drawing up of a lease agreement between the developer and the legal owners - in many cases

the state- conferring on the developer the right to use the reef and lagoon site for a specific period as well as the terms and conditions of such a right. Where state ownerships is involved, the consent of the tribal and village groups who hold traditional fishing rights over the reef and lagoon area in question usually needs to be obtained.

Reef and lagoon areas that are under dispute by rival tribal claimants appear to be particularly common in some countries in Melanesia, such as Vanuatu and Solomon Islands. These disputes can arise over reef boundaries or over legal ownership rights, perhaps reflecting changing ownership patterns on formerly alienated lands. Commercial developers will wish to avoid such disputed areas.

The population situation of a particular coastal area that, on ecological grounds, offers possibilities for giant clam mariculture is also important. In selecting a suitable project site, there are clear advantages in opting for an area of low population density or an unsettled area adjacent to village centres. The location of a project in such an area has the advantage that it will tend to minimise the danger of encroachment by outsiders, including village fishermen. It has the added advantage that the project can draw upon the people of adjacent villages to assist in the project either as labourers or as local informants. Reef and lagoon areas that are adjacent to densely populated villages are normally subject to heavy fishing and are not likely to be attractive for mariculture purposes. In general, waters adjacent to heavily populated urban centres are not suitable sites for giant clam mariculture.

Adequate infrastructure is also essential for successful giant clam cultivation particularly for export markets. Physical infrastructure, such as roads, airstrips, ports, as well as basic services, including electricity and tapped water, are particularly important. The larger island countries of the region such as Fiji and Vanuatu appear to be have sufficient infrastructure (Tisdell 1986, p.96), but smaller countries, such as Tuvalu and Kiribati, appear to be less well placed. Small and remote coral atolls, which commonly lack the most basic infrastructure would appear to be poor locations for giant clam and any other form of mariculture development even if ecologically they may be highly suitable.

Certain social factors also have to be considered in selecting a suitable location for the development of a giant clam project. The attitudes of local villagers are particularly important - whether they are receptive and cooperative on one hand or hostile and indifferent on the other. Where villagers are development oriented and the proposed giant clam project is

perceived to advance this process, village attitude will most likely be receptive. As a general rule, it would seem that much depends on the potential benefits that such a project promises to bring to the participating village. In contrast, villagers that are involved in disputes over fishing rights are likely to show a lack of cooperation in such a project and may not show an interest until such disputes have been resolved.

As noted above, Fiji, Tonga, Vanuatu and Western Samoa are among those Pacific island countries that appear to be well endowed with habitats suitable for giant clam mariculture. This position was borne out by evidence collected during my field visit to these four countries.

Fiji appears to have considerable potential for the development of giant clams as a major mariculture venture, either for subsistence or commercial and export markets. Given its archipelagic spread, Fiji has considerable areas of reef, lagoons, shallow shelf areas and numerous islands of varying size that offer opportunities for giant clam mariculture. However, while Fiji is ecologically well placed, some locations are preferable when other factors are taken into account. It is believed, for example, that particularly favourable conditions for clam mariculture are present on many islands of the Lau Group which lies on the eastern side of Fiji. This group comprises many islands of varying size and is generously endowed with areas of reef and lagoon. These islands are generally lightly populated and offer a rich diversity of habitats, including those favourable to giant clam cultivation.

Vanuatu has many reef and lagoon areas that could be the basis for giant clam mariculture. However, many such sites suffer from geographic isolation and lack adequate transport and related infrastructural services and are therefore unsuitable for mariculture. (An example is the Banks Islands, located on the northern extremity of Vanuatu.) The most attractive locations are said to be selected sites on two of the larger islands of Vanuatu, located in the western part of the country – Espiritu Santo and Malekula. Both these islands have extensive reef and lagoon areas, suitable sites with access to village populations and reasonably good transport services. On Malekula, two locations appear to be particularly attractive for giant clam development - Uripiv Island on the north-east coast and the Maskelynes Islands on the south-east coast. These small offshore islands are well endowed with reef and sheltered bay areas and are only a short distance from the main island of Malekula where port and air facilities are available at Lamap (see Fairbairn, 1990c, p.25).

Western Samoa is generously endowed with good natural habitats which are among the best in the South Pacific region for the purpose of giant clam mariculture. This is especially true of the main island of Upolu which is encircled by extensive reef and lagoon areas for almost the entire coastline and marked by the presence of numerous bays and sheltered waters. (The other large island, Savai'i, is less well endowed as a large part of its coastline is covered by lava leaving limited areas of reef and lagoons available for mariculture and related purposes.) The most attractive sites on Upolu are located on the south-east and south coasts of the islands particularly in the vicinity of such villages as Fagali'i, Matautu, Salani and several offshore islands, including Namu'a and Nu'usafe'e. Large offshore islands, especially Manono which lies a short distance from the north-west end of Upolu towards Savai'i, offer many possibilities. Although the extensive north-west coast of Upolu is well endowed with reef and lagoon areas, high population density combined with heavy fishing on customary fishing grounds make this area less attractive for giant clam mariculture.

As with the above countries, Tonga offers many suitable locations for giant clam mariculture but, again, the selection of the most favoured site will be influenced by other factors, including transportation facilities and proximity to village communities. On the basis of a broader criteria for evaluating suitability, many possible locations are possible, but the potential of the Ha'apai group of islands was said to be particularly good. This group of islands lies halfway between Tonga's main island group of Tongatapu in the south and Vava'u group in the north and comprises a scattered archipelago of 51 islands only 17 of which are inhabited (Fairbairn, 1990a, p.l6). The reef and lagoons found in Ha'apai are extensive and rich in marine life. Although geographically remote from Tongatapu, Ha'apai has relatively good transportation services. Moreover, the people of Ha'apai are considered to be the most industrious in Tonga and appear to have the potential to make a success of a giant clam mariculture venture.

The establishment of a major giant clam mariculture project invariably involves a degree of government intervention, direct or otherwise. This intervention may relate to the procurement of a lease over a possible project site, the issue of a licence to undertake a mariculture project, and assistance in the settlement of tribal and village disputes over fishing fights. Most important, too, are the rendering of technical and advisory assistance which is usually channelled through a government fisheries agency (usually entitled Fisheries Division or Department). Such government intervention is almost always crucial for ensuring a

successful outcome, given present arrangements, the need for coordinated fisheries development and similar factors.

Regarding the securing of a lease over a section of reef and lagoon, legal ownership by the state as is the case in Fiji, Western Samoa, Tonga and many other Pacific island countries, means that government is directly responsible for the issue of a lease. This process normally involves government first seeking the consent of the tribal and village groups who control fishing rights on the marine area of interest. Terms and conditions of a lease will normally be strongly influenced by these tribal and village groups. Tonga appears to be the main exception since the customary rights of local villages over specific areas of reef and lagoons are no longer recognised.

Where reef and lagoon areas are owned by customary owners, individuals or families, as is characteristic of Vanuatu and several other Pacific island countries, negotiation over leases will be undertaken directly with these owners and with village council groups who normally exercise overall control of these marine areas. Nonetheless, government assistance is usually required in negotiations and is necessary for the formalisation of a lease.

Different arrangements exist in different Pacific island countries for the servicing and handling of leases. Thus in Fiji and Tonga, the responsible entity is the minister in charge of fisheries, and in Western Samoa, the responsibility falls under the minister in charge of Lands and the Environment.

The establishment of a giant clam mariculture project may also require an authorising licence or permit, for example, a fishing licence to allow mariculture activity. The practice in relation to a fishing licence appears to vary widely, but in most countries it is necessary to secure a fishing licence or permit as. a precondition for undertaking commercial fishing, including aquaculture and related activities, on the traditional fishing grounds of indigenous groups. This requirement applies in Fiji, Tonga and Vanuatu, but not to Western Samoa for reasons that are not clear. (In Western Samoa, most motorised fishing crafts used for the purpose of commercial fishing have to be registered with the Fisheries Division.)

Applications for a fishing licence in Fiji to fish on the customary fishing grounds (i.e. inside demarcated areas or IDA) must be accompanied by a permit signifying consent by the tribal and village group controlling the fishing rights in question. This permit is granted by the local District Commissioner who is responsible for liaising with the custodians of traditional

fishing grounds.

Applications for commercial fishing licences (and, in some cases, the registration of fishing crafts) are mostly handled by the official fisheries agency in each country. (In Tonga, a fishing permit is issued by the Department of Police and, for foreign ventures and pelagic fishing projects, by the Privy council.) In many cases, as in Tonga, Fiji and Vanuatu, the licensing of foreign fishing in deeper waters is usually the responsibility of government at cabinet level.

Other government support facilities can play a major role in the development of a major giant clam venture. Thus in Fiji, the Native Land and Fisheries Commission, under the Ministry of Fijian Affairs and Rural Development, is in a position to provide valuable information and advice for the settlement of inter-tribal disputes over ownership of fishing rights. No doubt, other Pacific island countries (e.g. Western Samoa and its Land and Titles Court) provide similar facilities that can assist potential developers and tribal groups negotiate over leases and related matters that are essential for the development of a giant clam project.

Also of interest is government support in the form of local resident agents who can provide valuable assistance at the village level and act as an intermediary between the respective negotiating groups. Usually, these agents are appointed by government and drawn from the local village itself. Examples of these agents are the so-called Town Officer in Tonga, the *Pulenu'u* in Western Samoa, while the role of District Commissioners in Fiji has been noted.

7. Development Approaches: Institutional and Cooperative Requirements

As noted in the previous section, when assessing the overall suitability of project site for a major giant clam venture, there are many factors other than ecological conditions to be considered. Certainly, one crucial factor is the system of property rights that govern the use of reef and lagoon areas whether these property rights are vested in a tribal group, such as in Fiji; in a village group, as in Western Samoa; or are exercised by individual customary owners and families. These different systems of marine property rights have varying implications for the advancement of giant clam mariculture and similar developments.

Where customary marine tenure is characterised by tribal and village ownership of fishing rights, as in Fiji and Western Samoa respectively, the process of securing a lease over a

project site can be complicated and, in the final analysis, costly. Problems can arise, for example, over the task of persuading village leaders of the merits of establishing a mariculture project in their village but such tenure systems also appear to have several advantages from the viewpoint of negotiating a lease and the implementation of a giant clam project. The process of negotiating a lease can be simplified by having to deal with a single body - such as the village council or the chiefly heads of tribal groups - who act on behalf of the village. Moreover, once consent is given, it can be expected that the entire tribal or village group will comply and honour the terms and conditions of an agreement made by their leaders, and village leaders usually can apply traditional forms of sanctions that serve to protect the project against poaching.

Marine property rights that are characterised by individual ownership of fishing rights (and, marine zones themselves as in Vanuatu), can also be accommodative in relation to a giant clam development project. For example, negotiations over a lease can be facilitated by having to liaise with a single customary owner or his immediate family as this will involve minimum cost (in terms of both time, effort and money). However, such a tenure system can have a number of negative features - at a later stage the customary owner may lose his ownership rights through loss of status, death or some other cause; he may lack the authority to control poaching by other villagers; and he may prove personally unreliable and capricious.

On balance, the system of marine property rights based on tribal and village control of reef and lagoon areas - as opposed to individual ownership - appears to offer more scope for stability and continuity. It also has the advantage of facilitating the tribal or village-wide cooperation that appears to be a key element in a successful mariculture venture (see below).

Areas of reef and lagoons that fall under government control are not subject to claims by customary groups also offer possibilities for the development of giant clam mariculture. Such areas have an advantage in that a lease can be negotiated directly with government, resulting in significant cost savings and these areas may also be free from intensive fishing by villagers. However, for most Pacific island countries, near-shore areas under the control of government are limited or non-existent, thereby restricting the scope for development. The main exception would appear to be Tonga where the primacy of state ownership of coastal waters is recognised.

Various forms of organisational arrangements can be considered as a basis for establishing a

giant clam mariculture project. Possible approaches may include informal organisations established by tribal and village groups themselves, perhaps based on traditional structures (Tisdell, 1986, p.95). Another approach may involve various kinds of joint venture arrangements, formed between the owners of the fishing rights and outsiders, either local enterprises or foreign investors. Another possible approach is a that involving an outsider establishing operations on reef and lagoon areas leased from customary owners or government.

Whatever approach may be thought appropriate, a key requirement for success is to ensure that the project is adequately integrated into the social life of the local people. As noted by Tisdell (1986, p.94), the establishment of giant clam mariculture will invariably mean introducing new technologies and commercial procedures into the village (as well as creating additional pressures on marine resources) that may prove to be socially and culturally disruptive. Tisdell also stresses that it is desirable that mariculture operations should take a form capable of being supportive of local socio-cultural structures, and that in the case of an outside commercial enterprise, arrangements should be made that fit within the traditional system of property rights.

Giant clam mariculture projects that are initiated and carried out by villagers themselves can take various forms. For example, they may be carried out under the auspices of individuals, family groups or by traditional groups such as fishermen, young males and women's organisations. Such operations are usually intended to meet the subsistence needs of the group, undertaken on a small scale and easily integrated into the social life of the villagers. Technical and advisory support for these projects can usually be secured from local fisheries agencies and, in some cases from overseas donors.

Regarding giant clam mariculture on a commercial basis, the participation of outsiders, including foreign investors, would seem to be necessary. Such participation can be particularly useful when it involves a significant degree of collaboration with local people.

Foreign enterprise participation can be particularly beneficial in developing giant clam mariculture at the commercial level, including export ventures. Foremost among the benefits that foreign participation can bring to a giant clam project are the input of capital, managerial skills and technical expertise, all of which are in short supply in the South Pacific region. Other important potential benefits that the foreign partner can bring into the project are those

that derive from having access to overseas markets and research facilities and the capacity to impart mariculture skills and knowledge to the local people.

Various forms of joint venture arrangements between the customary owners and the outside developer are possible. However, given the socio-economic circumstances of the local people, such arrangements will need to be approached in an innovative manner. For example, local people are not likely to have access to substantial amounts of investment funds and so provision will have to be made to encourage other forms of participation in the venture, for example, via directorships. Also, alternate arrangements may have to be made to allow villagers to gain some financial benefit from the project, once it is a going concern, since their entitlement from dividends may be limited.

There are many other possible forms of business arrangements that can be considered as a basis for collaboration. One possibility is a form of informal partnership between the developer and the villagers, allowing the local people the right to share in the benefits from the projects as the expected advantages are realised. Many kinds of sharing arrangements are possible and may take the form of cash payments or contributions in kind, for example, foodstuffs. An example of this type of informal arrangement is found in Western Samoa where the outside developers of a giant clam mariculture, located on an offshore island (Namu'a), make regular contributions of money and foodstuffs to the people of the adjacent villages on Upolu, island - largely in appreciation of the support from these villagers (Fairbairn, 1991). As with joint venture arrangements, an essential requirement is to ensure that the villagers participate in a meaningful way and can gain some benefit from the project.

In some cases the success of a giant clam mariculture project may be considerably enhanced by establishing a formal working relationship, including a joint venture, between the developer and the traditional tribal and village organisations. In most, if not all Pacific island countries, there will be at least one organisation within a village that can serve as a counterpart to the developer. Such a counterpart group can play an integral role in mobilising and enlisting local support for the developer, and in integrating the project into the social life of the community.

The type of village groups that may be suitable, and with which the writer is familiar, include those that are directly involved in fisheries development in the region. Among the possibilities are the so-called rural fishing groups that are found in Fiji. These groups operate

along tribal (*mataqali*) lines for commercial purposes and under the co-operative form of organisation. Tonga's Fisheries Association is another notable example, the Association was recently formed (1988) to serve as a formal mechanism for Tonga's fishermen to discuss vital issues and exchange views on fisheries development in the country, including small-scale fishing (Fairbairn 1990a, p.9). Practically all villages in Tonga have joined the Association.

Other possible counterpart groups may involve village organisations not directly engaged in the fisheries sector. The groups of most interest are those that are usually highly active in other spheres of village development and therefore have a potential for participation in giant clam and other forms of mariculture. In Vanuatu, co-operative organisations are an example; highly active in rural communities, co-operatives can, in some cases, strengthen their economic positions by diversifying away from their primary retailing functions and into the area of mariculture. In Western Samoa, among the various village organisations that have a potential for entering the field of giant clam mariculture are women's committees and the group of untitled males (*aumaga*).

However, for large commercial mariculture projects, it is likely that the principal village authority, such as a council of chiefs or elders, will want to take a leading role in the development of the project and in dealing with the developer (see below). The reason for this stance may relate to the fact that a major mariculture project will invariably have a significant impact on the social and economic life of the community as a whole and therefore requires the attention of the overall village authorities. The strategic role of the tribal and village authorities means that the various forms of village groups noted above are unlikely to be major players in the development of a major giant clam mariculture project. If they are to play a role at all, it seems likely that this role will be largely confined to small-scale basically subsistence ventures.

The development of a major giant clam mariculture project on marine areas under customary tenure requires the consent of the customary owners. As will have been clear from earlier sections of this report, customary marine ownership patterns are far from uniform throughout the region. In some cases, for example Fiji, the consent of customary groups has to be sought from the heads of tribal groups and sometimes from paramount chiefs. In others, for example, Western Samoa and Kiribati, support will have to be sought from village councils or assemblies, while in others, as in parts of Papua New Guinea, from individual owners.

Alongside-the consent of tribal and related authorities, a prospective developer normally will also have to secure a lease over the reef and lagoon area intended as a project site. A formal lease will have to be negotiated with the government in those countries (the majority) where legal ownership of near-shore waters is held by the state. In these cases, the agreement of indigenous groups who hold customary fishing rights is usually a precondition for the granting of a lease by government. Where legal ownership of reefs and lagoons is vested in customary owners as in Vanuatu, leases can be negotiated directly with the owners, although government usually assists in this process.

A crucial requirement in efforts to secure the consent and support of customary owners is to ensure that the project proposal is clearly explained to the local people. It is essential to give the villagers the opportunity to gain a clear understanding of the purposes and implications of the project from their point of view. It is particularly important that the local people have a clear idea of the aims of the project, expected benefits, how project operations will affect their fishing rights, and what kinds of responsibilities are expected of them in relation to the project.

To properly explain these and related aspects, a formal meeting between the developer and the local authorities will normally be required. In such meetings, participation by representatives of the local fisheries agency can be particularly valuable, if not essential, first, to act as an impartial intermediary between the developer and the village group and, secondly, to provide essential technical information that the village leaders may request. Participation by local government agents who are based either at the village or district level, can also be valuable. How successful these meetings are sometimes depends on the sensitivity of the developer in observing certain customary practices, such as the presentation of kava and other valued items.

It is essential that, through meetings and other forms of contact, both the developer and the customary owners gain a clear idea of their respective roles and obligations. (In relation to formal arrangements, for example a joint venture, an agreement laying out specific terms and conditions is drawn up as a normal procedure.) On this issue there would appear to be some merit in drawing up a formal agreement between the participating groups, outlining the key parameters of the project and the responsibilities of each party. Specifically, such an agreement would spell out project objectives, mode of operation, project duration, the extent of village participation and obligations, and how the village is to share in the expected

benefits. Such a procedure may be necessary as a means of avoiding possible misunderstanding that may arise on either side.

My discussions during field work revealed that whether or not the tribal and village authorities are prepared to give their consent to a major giant clam mariculture project appears to depend heavily upon two key elements: the extent of, local participation on one hand, and village expectations of project benefits on the other.

An essential requirement for the successful operation of a giant clam mariculture project is the need to work closely with the local community and to gain the support of the people. According to many villagers I interviewed, this support can be expected to be forthcoming if villagers are involved in the project in a meaningful way and can be made to feel that they have a vested interest in it. The most favourable scenario is where village involvement had reached a point at which the people began to feel that the project was something that belonged to them.

The involvement of local people in a giant clam mariculture project through the establishment of a joint venture has been discussed above. The importance of a significant employment impact on the village economy has also been noted. Other possibilities include involving village leaders in decision-making perhaps by appointing some as directors and advisers. Such an involvement would allow local people to contribute their knowledge about traditional forms of clam culture and marine resource exploitation and conservation which may benefit the project. Scope also exists for the appointment of local villagers to supervisory and related positions (e.g. as care-takers to a project site).

The value of a giant clam project to local people can be related to what they perceive as the benefits that are likely to result from the project as it operates over time. According to my observations, villagers showed most interest in the kind of benefits that are practical and tangible in terms of enhancing village life and promoting their development aspirations. In the view of many village leaders, such benefits need not come in the form of a monetary payment, such as would accrue under a formal venture arrangement. Rather, in-kind benefits were also valued including improvements to village infrastructure that may be possible as a result of a major mariculture operation.

The responses from villagers in Vanuatu and Western Samoa are illustrative of the kind of benefits expected from a major giant clam project. In Vanuatu, they emphasised the need for

tangible results as a precondition for giving their support to such a project (Fairbairn l990b, p.28). Villagers pointed to the value of employment creation, income generation (including that from leases), and the opportunities that would arise from their ability to obtain clam breeding stocks from the project which they would use to reseed and rejuvenate their reefs and lagoons.

In Western Samoa, many respondents stressed the importance of such a project for the future well-being of the village and the opportunity to share in the harvest when the project was viable. Other respondents highlighted the potential benefits in terms of improved nutrition for the villagers and possibilities for improving local infrastructure such as roads, power and water facilities.

The importance of tribal and village support during the development and implementation stage of a giant clam mariculture project goes without saying. The consent of the village authorities for the establishment of such a project implies village-wide acceptance of :the project and a commitment to cooperate to ensure a successful outcome. As such, (local villagers can be expected to refrain from disturbing clam beds and, in general, from fishing in the vicinity of the project site. Villagers can also be expected to assist in the policing of the project so as to discourage poaching by both local and outside villagers.

An important corollary of village support is the benefit that can derive from the application by the village authorities of various forms of traditional sanctions as a means of protecting the project site from outside intrusion. As noted in earlier sections of this report, the capacity to apply traditional sanctions remains very strong in many Pacific island countries and represents a valuable mechanism for controlling village activity vis-a-vis giant clam cultivation and related forms of mariculture.

8. Summary and Concluding Comments

On ecological grounds, the island countries of the South Pacific offer a rich diversity of habitats suitable for the development of giant clam mariculture. Ecological advantages derive from such factors as geographic location, archipelagic structures and (reflecting these) extensive reef, lagoon and estuarine areas. However, whether or not a giant clam mariculture project is a practical proposition can often depend critically on the operation of customary forms of property rights and tenure that dominate the near-shore areas of the South Pacific

islands.

In this report, the central aim has been to examine customary forms of marine tenure as they operate in the South Pacific region as well as their implications for giant clam mariculture and related forms of mariculture. As outlined in the report, customary forms of marine tenure confer upon the traditional indigenous owners the right to exploit reef and lagoon areas for fishing and related activities and, in some cases, ownership by customary groups extends to legal ownership.

These areas normally apply to adjacent marine areas that extend laterally from the land boundaries of a customary group to the edge of the outer reef. The customary groups who control fishing rights on these areas include tribal units (or sub- branches thereof), villages, and individual customary owners and their families. Other common characteristics of customary marine tenure include: the exercise of exclusive fishing rights by tribal and village groups on their customary fishing grounds (although in practice, the admission of outsiders is common); a sharing of marine resources by the ownership group in what are effectively a system of common property rights; and effective overall control of a group's use of reef and lagoon resources by tribal chiefs or village councils.

Given that customary marine tenure arrangements are far from uniform throughout the region, a prospective giant clam mariculture project developer will need to identify those countries - and particular locations within a country – that appear to be most favourable for development. Other things being equal, the developer will tend to locate his operations in a country where marine property rights are most accommodative. On this question, it was pointed out in this report that customary systems of marine property rights in which overall control resides with village councils or chiefly groups are likely to be more favourable than systems where ownership rights are exercised by individual customary owners. One reason for this claim arises from the fact that dealing with a village council is more likely to ensure village-wide cooperation and support.

Customary systems of marine tenure can be highly complicated from the viewpoint of developing a major giant clam mariculture project. Common access rights exercised by members of the tribal or village group can pose a major problem. A developer will need to establish property rights - usually through lease arrangements -in order to ensure that his efforts are rewarded. Other complications can arise from tribal disputes over reef areas and

the possibly costly process involved in negotiating with tribal and village groups over a lease.

To gain access to customary reef and lagoon areas for the purpose of establishing a giant clam project, it is necessary to secure the consent of the tribal and village group that controls fishing rights. To do so, the developer will have to approach the appropriate village authority for its support – a task that usually necessitates the assistance of representatives of the local fisheries agency and government agents at the village or district level. The essential aim is to secure tribal or village consent for the use of a section of the reef and lagoon that is intended to serve as a project site and possibly to secure a formal lease over such an area. Whether or not consent is given depends on many factors, but the extent to which local people are involved in the project and the expected benefits of the project for the community are likely to be major factors.

There are many ways of involving local people in a meaningful way in a major giant clam mariculture project. Villagers can be encouraged to participate through joint venture arrangements, with the developer, although their capacity to contribute equity to the venture may be limited. Furthermore, village leaders can be encouraged to participate in decision-making by appointing some of them as directors in the venture and as project advisers. Significant employment and involvement in supervisory positions in the venture can also be important. Any of these, or combinations thereof, is possible, but the essential requirement is to foster local involvement to the point where villagers themselves begin to identify with the project and feel that they have a vested interest in the venture.

The benefits that local people expect to receive from a major giant clam project are probably the key consideration determining whether or not they will consent to the project. The impression gained from field enquiries suggests that villagers invariably show interest in projects that promise to bring about practical and tangible benefits for the community as a whole. Such benefits need not necessarily mean monetary benefits, but rather, can take other forms such as improvement to village roads and related infrastructure, improvement to nutrition through the consumption of giant clams as the project succeeds and opportunities for the restocking and regeneration of depleted reef and lagoon areas.

While village groups themselves can initiate and operate giant clam mariculture projects, such efforts are likely to be restricted to small-scale, subsistence-oriented ventures. For the establishment of large, commercial projects, including those for export markets, the

participation of outside groups will almost always be required mainly because of the need for capital funds and technical and marketing knowhow. This participation will call for the forging of cooperative linkages with local tribal and village organisations, notably, village councils, groups, cooperatives, women's groups and youth organisations. For most countries, the circumstances of community life dictate that direct links with the paramount village authority, (a village council, chiefly groups etc) are necessary since these are the bodies that effectively are the custodians of the overall group's marine resources.

The support of the tribal and village authorities is vital not only for securing access to a marine site but also for ensuring ongoing cooperation from the villagers as a whole once the project reaches the implementation and operational stage. Most importantly, the village authorities can apply various forms of traditional sanctions or taboos as a means of protecting project operations against encroachment by local villagers and outsiders. Moreover, villagers themselves can play a key role in policing project sites and in looking after these sites, for example, by acting as care-takers.

The above observations represent the principal findings emerging from this study which, it is hoped, will prove useful in achieving a clearer understanding of customary forms of marine tenure and how these systems affect the development of mariculture and the implications for giant clam mariculture in the South Pacific region. However, a caveat is in order in relation to the limitations of this study which relied heavily on only four country case studies and the few published works that were available. Much more work is needed to achieve more definitive results, for example, detailed case studies are needed the marine tenure systems in the Melanesian countries such as Papua New Guinea and Solomon Islands.

A study of the socio-cultural dimensions of mariculture development in the context of small island communities would also be valuable. Given the considerable importance of reef and lagoon resources for the well being of the Pacific Island peoples, and the need to understand the development implications of traditional marine tenure systems, such an effort seems clearly warranted.

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