

RESEARCH REPORTS IN THE ECONOMICS OF GIANT CLAM MARICULTURE

Working Paper No. 33

Giant Clams in Wallis: Prospects for Development

by

Nancy J. Pollock

May 1992



ISSN 1034-4294

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¹ Research for this paper has been undertaken as a part of the Australian Centre for International Agricultural Research (ACIAR) Project 8823 'Economics of Giant Clam Mariculture', with the assistance of Professor Clem Tisdell and published by the Department of Economics, University of Queensland, Queensland 4072, Australia. (See next page for more information)

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RESEARCH REPORTS AND PAPERS IN ECONOMICS OF GIANT CLAM MARICULTURE are published by the Department of Economics, University of Queensland, St Lucia, Queensland 4067, Australia, as part of Australian Centre for International Agricultural Research Project 8823 of which Professor Clem Tisdell is the Project Leader. Views expressed in these reports and papers are those of their authors and not necessarily of any of the organizations associated with the Project. They should not be reproduced in whole or in part without the written permission of the Project Leader. It is planned to publish contributions to the series over the next 3 - 4 years.

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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Giant Clams in Wallis Prospects for Development

ABSTRACT

This paper examines the possibility of harvesting clams for sale, either within the island of Wallis or beyond. An outline of the environmental social and economic characteristics of the country is provided, together with an assessment of the role of Wallis in the Pacific that is likely to affect the potential for marketing clams. Clam usage and harvesting practices are described, along with local views on the size and location of clam stocks. This data allows the views of Wallisians about the social and economic possibilities for marketing clams to be represented.

Keywords: Giant clam harvesting, Wallis, South Pacific,

JEL Classifications: Q57, Q21, Q22

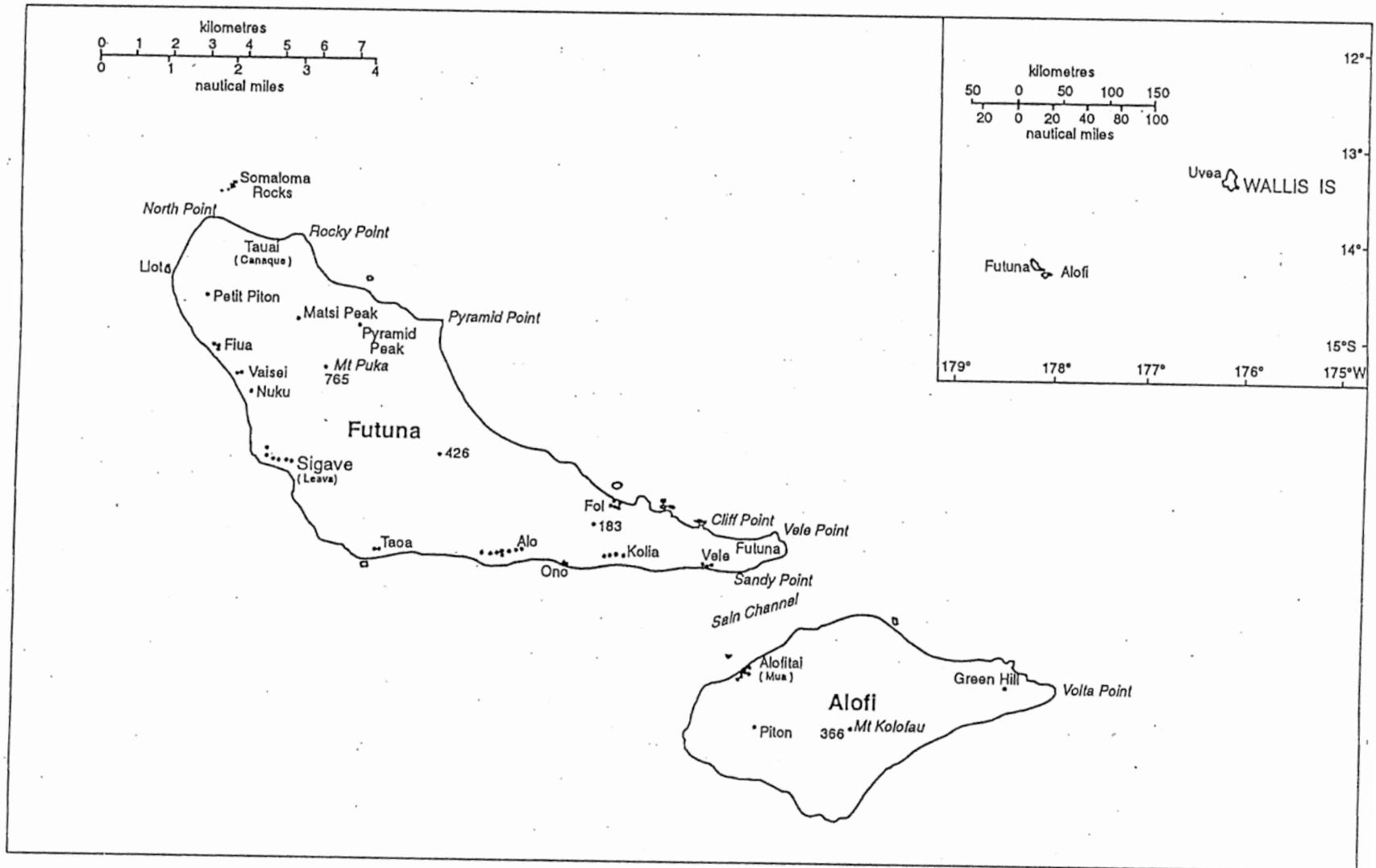
Giant Clams in Wallis Prospects for Development

1. Introduction

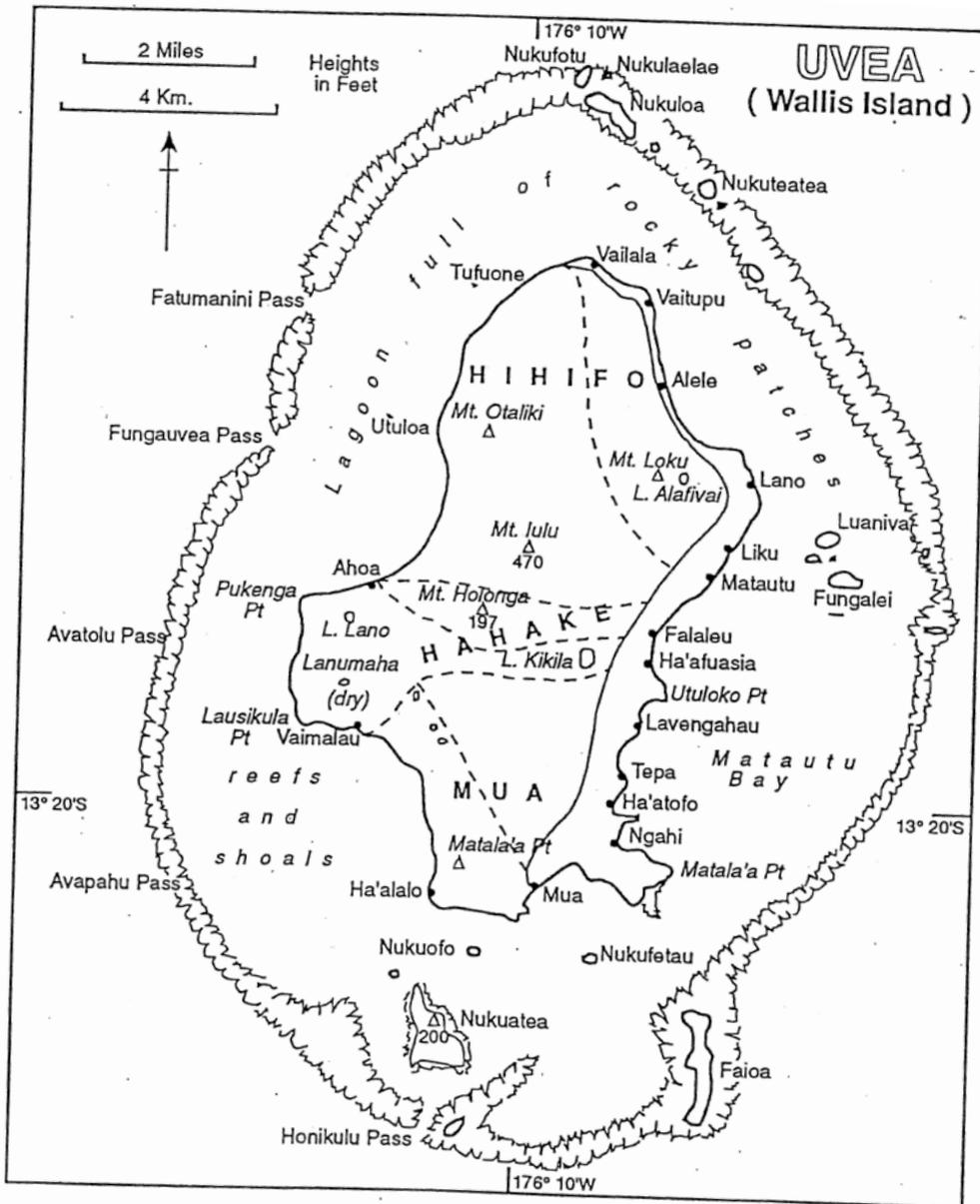
Wallis is a single island with a wide encircling reef, situated in the central Pacific; its people are Polynesian. The country has no export economy so is entirely dependent on financial support by the French as one of their overseas territories (Territoire d'Outre Mer). The island is rich in subsistence resources. But for a cash income the people migrate to work in the nickel mines, or other labouring jobs in New Caledonia, with the result that there are 8,000 there and another 8,000 living on their home island. The annual income on Wallis is \$46 p.a. (South Pacific Economies 1987).

Several development plans have been proposed by French administrators in the past, but so far the greatest achievements have been in the areas of road building, electrification and telecommunications. The lack of jobs for young people has been addressed recently by plans to create one hundred or more six month and year-long jobs to enable school leavers to gain some work experience (see Pollock 1991). Plans to develop agriculture in the past have focussed mainly on the planting of pine forests behind Lano in order to arrest soil erosion in this area of *tuafa*, or scrubland. Fisheries developments have taken the form of support for boat building. The most recent French development plan (Institut d'Emission d'Outre Mer) has been rejected by the members of the Territorial Assembly (for Futuna and Wallis, see maps 1 and 2) who are anxious that any planning for their future should be carried out by Wallisians and Futunans themselves using models appropriate to the Pacific; not those derived in Paris. This raises the question of the kind of development appropriate to Wallis and its neighbouring island of Futuna.

In this paper we will examine the possibilities of harvesting clams for sale, either within the island or beyond. An outline of the environmental, social and economic characteristics of the country is provided, together with an assessment of the role of Wallis in the Pacific that is likely to affect the potential for marketing clams. Clam usage and harvesting practices are described, along with local views on the size and location of clam stocks. This data will allow us to represent the views of Wallisians as to the social and economic possibilities for marketing clams.



Map 1. Detailed map of Futuna with Wallis Island shown in inset.



Map 2: Detailed map of Wallis Island

2. Geography of the Island of Wallis

The island of Wallis, formerly known by its Polynesian name, 'Uvea, is situated in the central Pacific, half way between Fiji and Samoa. It consists of a single island of volcanic origin, its highest point being 145 meters above sea level, surrounded by a barrier reef enclosing a lagoon up to half a mile wide, with a muddy bottom in shore. There are numerous small islets on the eastern outer reef, together with two passes deep enough for traffic by large, keeled shipping (see Map 2). But ships must anchor in the lagoon as it is too shallow inshore.

The population resides on the eastern side of the island in some 14 villages arranged in three districts, Mu'a, Hahake and Hihifo (see Appendix - Photographs 3 and 4). Each of these districts is considered a very distinct political and geographic entity, with its own history.

Mata'utu, the capital and port, is located in Hahake, the central district. All government offices are located here. It has the only wharf suitable for lightering materials in small craft from ships anchored in the lagoon. The airport is located in the northern district of Hihifo.

The island is serviced by a supply ship from New Caledonia once a month, as well as by French naval craft as they carry out routine duties across the Pacific. Lying between New Caledonia in the west and French Polynesia in the east, Wallis provides a strategic base for French operations in the Pacific. Air services also link the three territories, as of 1991, so that French tourists and administrators can fly across the Pacific using French bases.

There were 8973 people living on 'Uvea at the last census in 1990 (Maesse 1990). This represents a total increase of only 10 per cent since the last census in 1983, when the population was 8,084, one of the reasons being a high rate of emigration to New Caledonia. Forty two per cent of the population is under 15. Another 9,500 Wallisians live in New Caledonia to where they have been migrating since 1952 when their labour was first needed in the nickel mines. Since 1983, the Wallisian population in New Caledonia has been larger than that on Wallis; some of these are New Caledonian born Wallisians. Many migrants do visit their home island, either by air which is very expensive, or by the regular shipping service which is cheaper, though much slower. They also send money to their relatives on special occasions such as a First Communion or a funeral

Even though Wallisians speak a Polynesian language and practice many Polynesian customs, France has chosen to administer Wallis, and Futuna, its neighbour, through New Caledonia

since 1888, rather than through Papeete, the capital of French Polynesia in the east. As one political unit, Wallis and Futuna are a Territory controlled from Paris by their Department of Foreign Affairs (see Pollock 1990a for a detailed history). The two islands achieved the status of a Territory rather than a Department in 1962. French administrators arrive through Noumea, spending a 3 year term on the island. They are responsible mainly for the links between Wallis and Futuna and the exterior world.

Futuna is administered from Wallis, receiving its budgetary allowance, and its main social services such as the health service, education and public works from Mata'utu in Wallis. The population was 5,000 at the latest census, resident in two kingdoms, Sigave in the west and Alo in the east. Historically and culturally Wallisians consider themselves to be very distinct from Futunans, though both are Polynesian speaking. Futuna has been more closely allied with Samoa, while Wallis is closely allied with Tonga. The two hundred kilometers between the two islands only serves to accentuate that divide, even though there has been considerable inter- marriage and residential interchange between the two populations over several hundred years. The future of the two islands may be very distinct.

Traditionally the islands have been controlled by a hierarchy of chiefs at island, district and village levels. Wallis is run by a Lavelua who is the paramount chief, together with a Council of Ministers; Futuna is divided into two kingdoms each with its paramount chief (or *Sau*) responsible mainly for the power over land and thus over social and economic affairs of the people under the leadership of a paramount chief.

The Territorial Assembly is an elected body consisting of Wallisians and Futunans chosen to represent their people in order to make internal decisions affecting their people. The members work closely with the Lavelua and his Council of ministers on Wallis (and the two *Sau* in Futuna). It has remained somewhat quiet for most of its existence, but recently has begun exerting its influence more forcibly. Economic development has become a key concern, particularly that any planning should be subject to local discussion, rather than emanating from Paris. The issue of the relative powers of Wallis and Futuna is another significant latent issue.

A third strong political force, together with France and the traditional local leadership is the Church. Wallis is one hundred per cent Roman Catholic under the care of the Bishop who is Wallisian. He not only maintains a watching brief over his parishioners through his priests,

but also links Wallis and Futuna into the Roman Catholic Western Pacific Archdiocese, along with Catholics in Tonga, Samoa and Fiji. The Church is still responsible for running the education system as it was when it was first set up by the Missionaries in the 1840s. The three secondary schools are staffed mainly from France.

France subsidizes the Territory's public finance. The budget of 2,702 millions FCFP in 1989 (Rallu 1990:3) comes mainly from France. Imports are high, and exports almost nil; handicrafts sent to New Caledonia yield the main export revenue. There is no tourism on the islands nor commercial agriculture or fishing. The five hotels/guest houses serve the needs of visiting French administrative staff.

The income of the Wallisian people is derived from three sources, subsistence farming and fishing (60%), cash income (13%) and gifts and exchanges (17%). In 1980 subsistence income was valued at \$A9,391 per household per year, while total annual income was \$A19,800 per household per year (1980 census, Notes et Documents #16). The result is an income of \$US46 per capita per annum. According to the 1990 census, 1,385 Wallisians (12 per cent) had jobs, 1,053 of these in administration and as teachers, and 335 working in the private sector, mainly in construction. An unspecified proportion of the population receives a pension either from their work in the nickel mines in New Caledonia or because they are over 60 years of age. Thus in those households where one or two persons have an income there is a wider range of material goods than those totally dependent on their subsistence livelihood. But many households do survive with no cash income other than what relatives may send for special occasions from New Caledonia (see Pollock 1988).

The main subsistence crops are Colocasia taro, yams, bananas and breadfruit, together with some Alocasia taro, sweet potatoes and cassava. All of these traditional crops grow well on the volcanic soils around the shoreline, with irrigation where necessary. Pigs are the main form of wealth, very visible in 1989 when they were allowed to run loose everywhere, including the lagoon shore where they rooted for small shellfish; they are fed with coconut each day by a member of the owning household; they are used for feast and ceremonial occasions, and may be exchanged. They have a cash value, but very few are sold. Chickens abound in most households, being used to accompany the starchy foods on Sundays and special occasions. The whole subsistence support system is extremely vulnerable to the cyclones which wreck this and other Pacific island tree and root crops; as well as houses and public buildings.

The main daily diet consists of one or more of the starches, such as taro or breadfruit, cooked in the earth oven, or on a stove, eaten with a small accompaniment of fish, shellfish or coconut. Most people eat a starch and its accompaniment once a day, filling in with bread and coffee in the morning and evening; young men expect to have a second 'meal' in the evening, which they make of rice and canned meat or fish. Men do all the cooking. Beer and spirits are consumed in many households that have some income; drunkenness is becoming a serious problem amongst the young men.

Thus the economy, assessed by Western measures of income and wealth, is stalled. The subsistence sector is very active, more land being planted in taros, manioc and yams in Hihifo villages in 1991 than in 1988 (Pollock fieldnotes 1991). But the level of cash income is still very low. Wallisian people want more money to spend on the diversity of goods in the supermarkets, as well as on capital items such as durable houses, furniture, cars etc. And young people are very frustrated at the lack of opportunities for them once they leave secondary school.

The only tertiary facility, a two-year polytechnic, was opened on Wallis in 1990. Otherwise a small number of students are selected each year to pursue tertiary qualifications in Noumea. With only 36 per cent of the population in 1990 having secondary education, and no development on the island itself, the bright lights of Noumea, and the support of relatives established there, are a strong attraction. For young men, a year's military service for France enables them to travel abroad, gain a small amount of cash, and whets their appetite for further acquaintance with the wider world beyond Wallis.

Development planning has been seriously neglected on Wallis. The Dijoud Plan written in 1979 aimed to develop the agrarian economy in order to diversify the level of self-sufficiency in food. But there are no local markets for food, and little attempt has been made to develop an export market to supply those Wallisians in New Caledonia who would like to be able to buy taros etc. from their own island. The 1991 proposed Development Plan identified the customary system as very lively with strong customary exchange of produce persisting, the lack of produce for a market, and needs evolving more rapidly than is being admitted. Customary land rights are considered to be a major deterrent to development. The result is a high level of food imports, which include much cheap liquor and an overall dependency on France to provide the finance for the total infrastructure. Planners have identified agricultural production, exports, protection of vegetation, the pork industry, reforestation and fishing as

areas for development priority action in the 1990s. For fishing the main priorities stated are provision of collectively owned craft, professional fishing, privatising construction of boats, artisanal fishing with an aim to develop eventually a semi-industrial fishing sector (1990 Institut d'Emission d'Outre Mer). Several of these activities do not suit local needs according to Wallisian views.

This Plan, while comprehensive in addressing some fundamental issues not raised by previous plans, was rejected by the Wallisians as they had no input into its formulation. They put up an alternative plan through the Territorial Assembly, which was taken to France by the two Delegates that represent Wallis in Paris and the President of the Territorial Assembly. We await the outcome.

The difficulty with development planning here, as in other island societies of the South Pacific, is the issue of the degree to which a capitalistic system with emphasis on profit, wealth, individual enterprise, and economic growth is likely to provide the kind of lifestyle they envisage for themselves, particularly if it alienates the people from their traditional means of support, including the land and their kin ties. The alternative system that emphasizes a more communalistic lifestyle, is achieving some success in islands such as Tonga; where projects involve a number of extended family members, even to pooling land for banana plantations, for example (Fleming et al. 1990 , UNCRD report).

So the commercialization of any clam industry may well fall within the general plans for developments in fishing. It would have to be talked through with both the leaders of the Territory Assembly, and the Lavelua and his Ministers, as well as with the *pule* of the individual villages. The issue will have to be carefully handled so as not to fall between the three main political forces which have different agenda. The traditional and modern elements will have to be locally motivated rather than driven from outside. The search for marketable resources is recognized by all three parties as the next crucial step, but how, when, where and by whom will be decided locally, with French finance. This dilemma is the main deterrent to development.

3. Wallis in the Pacific

The place of Wallis, and Futuna, in the Pacific has largely been overlooked. The two island societies are frequently omitted from discussions of other Polynesian societies, and may even

be left off maps made by westerners. Nevertheless the two societies have played an important part in the early development of the Pacific. Not only were they part of the early Tongan empire in the sixteenth and seventeenth centuries, participating in exchanges of personnel and resources (see Pollock 1990b). But they also were the source of out-migrations that led to the settlement of two islands in Melanesia, West 'Uvea off the east coast of New Caledonia, and West Futuna off the east coast of southern Vanuatu. These out-migrations preceded by some 200 years the migration to New Caledonia that began in 1957. Wallis, and Futuna, thus have broad traditional ties to other Polynesian societies in the east, and to Melanesian societies in the west.

Wallis is part of western Polynesia where its closest neighbours are Futuna to the southwest and Samoa to the north east and Tonga to the south east. Fiji is just an hour's flight away to the south. Hence its close political ties between these five islands in the early history of the region.

France established its interests in Wallis and Futuna partly to protect its Catholic mission, one missionary having been murdered in Futuna in 1837, and partly to provide a buffer against the expansion of British interests in the central Pacific. French political control was not formalized until 1888 when the post of French Resident was established to provide outside protection for the islands and to promote French colonial interests. But the French language was not formally accepted until the 1930s, because the Catholic Mission which maintained control of education encouraged its missionaries to use the local language, in part as an expression of its power contra the Resident (Pollock 1990a).

The Catholic Mission formed part of the Western Pacific diocese, which under Monsignor Bataillon as Bishop was based in Wallis, but was transferred in the 1930s to Tonga. Close ties have been maintained up to the present between the various branches of the Catholic Church in the Pacific, regardless of colonial and ex-colonial affiliations to Europe.

These ties, and the propensity for Wallisians to wish to take off from the island in their local craft for other destinations, led the French Resident to impose strict regulations preventing any Wallisian leaving their home island. Those regulations were waived in order that Wallisians could provide the necessary work force for the development of the nickel industry in New Caledonia. But those restrictions have placed severe sanctions that still persist against off shore expeditions, even for deep water fishing.

Trading ties with nations other than New Caledonia have also been curtailed by regulation. Some trade existed in the early 1900s between Fiji and Wallis, when an English trader established himself in Wallis, obtaining his supplies from Fiji. And when there was no resident doctor - a major contentious issue between the Lavelua and the French naval authorities who supplied the Resident and the Wallisians (Pollock 1990a) - Wallisians went to Fiji to seek medical care, a few taking up residence there.

Copra was traded, again mainly through Fiji, until the 1930s when rhinoceros beetle killed off the trees, and there ended the main source of cash. No other form of trade has been developed in the interim, except for items needed for immediate household use, including construction materials and alcohol. The major importers today are French agencies, allowing little room for the development by Wallisians of even small trading stores. Recently formed unions are attempting to gain some control of commerce for local personnel.

4. The Clam Fishery in Wallis

Given this political and economic background to present day life in Wallis, we sought to enquire into the role of clams (*Tridacna* sp.) in the household life in Wallis with a view to considering them as a possible means of economic development. We knew that Wallis fell within the zone of the Pacific in which clams had been well established (Keith Reid 1991). But the size of the local clam population and the degree to which they had been over-exploited whether by commercial or subsistence interests was unknown. Nor did we have any information on how the clams, whether the meat or the shell, were used by the local population, nor how collection processes were affected by traditional reef and lagoon tenure policies.

Field research was conducted by the author, a research colleague and a research assistant, the latter two both being Wallisian, in September and October 1991. Enquiries were addressed to local cultural authorities, prominent men in the community, and local householders who fished for clams. Specific information was sought from households in both Hihifo and Hahake districts using a questionnaire based on the one used by Vuki et al. (1991) for the Lau (Fiji) survey (see Appendix A of Vuki et al.). Questions were posed in Wallisian by the researcher, the answers translated into English by the research assistant and written down by the author. Further points of elucidation were sought from those informants who had a lot of information to share. Twelve of these household interviews were recorded. Twelve males and

seven females responded to the questions; their ages ranged between 26 and 54. Three young people under fifteen were asked whether they liked clam meat.

The household interviews about clam use were conducted in conjunction with a follow up survey of dietary patterns conducted in 1988 as part of a study of the social aspects of obesity (Pollock 1988). In those daily dietary records we had recorded the occasional use of clam meat. We followed up those 1988 interviews in 1991 by revisiting 22 per cent of the households to record daily food intake in order to establish whether dietary patterns and/or health had changed.

In addition the owner of a restaurant situated on the wharf, and generally rated as the best on the island, was interviewed about the use of clam meat in his menus which specialize in seafood. He was asked about supply, price, expressions of interest for or against clam meat and any deterrents to serving clam meat in his restaurant.

Questions regarding reef and lagoon tenure practices were posed to several prominent cultural leaders, including the Director of the Wallis Cultural Association. Local development issues were also discussed with Wallisians, both those in employment and those engaged in subsistence agriculture and fishing, following up on conversations on similar topics raised in 1988.

4.1 *Current usage:*

The clams found in Wallis are *Tridacna maxima*, known locally as *tokalalu* and *Tridacna squamosa*, known locally as *ga'ega'e* (Rensch 1984:131). These are known in French as benitiers. *Ga'ega'e* which are qualified by the local people as large (*lahi*) or small (no qualifier), were the most commonly referred to by our informants. In Futuna *Tridacna* are known by one term, *vaisua*. Occasionally the Wallisian term *vaihua* was used as a general term for clam/benitier, adapted from the Futunan term.

No scientific survey has been conducted of the population size of these two species in either Wallis or Futuna. Informants responded that there were plenty available in the right places. The numbers have not diminished over the last ten or fifteen years. Informants were divided as to whether the cyclones of 1986 and 1989 had a serious effect on clams.

4.2 *Consumption:*

The meat of the clam may be eaten as a snack or at a formal eating event (meal). Informants stated that most frequently the women eat clams on the spot when fishing for them. If they do bring home several the clam forms the accompaniment to the starch, such as taro or banana, at the main meal for all members of the family (see Pollock 1985 for discussion of Food Concepts in Pacific societies). Some people are not so keen on it as others. Children as well as adults eat it but some of them do not like it. If a family gathers more than they need they will give some away to relatives, or to the priest or sisters. One informant suggested it was good for the digestion.

Clam meat must be eaten fresh. It is prepared by removing the inky sac. If it is served at home, it is marinated in lemon juice, a process known as *ota*. French cuisine considers this a form of cooking, so the clam cannot be described as being served raw.

All informants stated they do not eat clam meat very frequently, just when it happens to be available. It adds variety to the diet, but is in no way special. It is not usually used at feasts. There are no tapu against any sector of the population eating the meat.

The amount eaten is very variable. A woman on the reef may eat two small ones, and bring back two or three of whatever size she finds for the family. Small ones average 400-700 grams, while large ones average 1200+ grams. Relative to fish, clam meat is a very incidental addition to the diet.

4.3 *Gathering Clams:*

The bottom of the lagoon around Wallis varies in depth making it difficult for people to gather clams in any but the shallowest places at low tide around the small islets (see Appendix, Photograph 3). On the eastern side of Wallis, the inshore lagoon bottom is very silty along the shore line; at low tide it comprises more mud than sand, due mainly to run-off from the land. However at the lagoon's widest points there are deep pools in the reef. These are the spots where most people fish for clams.

Women are the most frequent gatherers of clam meat though young men may also dive for them. Women gather them only at extremely low tide, while standing in shallow pools with the water only up to their knees. They prise the shell open using a machete or big knife or

piece of metal.

The shells are hard to open so the collector has to be both quick and adroit. If the small ones can be prised loose and the boat is close then they may bring the whole shell home. But generally the meat is taken out and the shell left in the reef.

They gather them only around the islets on the outer edge of the reef in the district of Hihifo (see Map 2). We were unable to ascertain whether the people in Mua gather clams around their islets. But since these are close inshore they are likely to be both over fished and covered in mud and silt. The northern islets are a considerable distance (up to a kilometer in some places) from the shore, so a boat is necessary to reach them. Only some families in Vaitupu and Vailala (where this data was collected) have boats with an outboard engine, so not everyone can go out to collect clams. Paddling a canoe is too much hard work as the wind and tide can be strong even in the lagoon.

Since all the villages are on the eastern side of the island, a boatload of people will go out to one of the islets which is close to their village. Off Vaitupu there are several such islets (see Map 2). The island of Nukuteatea was cited as the favourite place to gather clams, as the waters between it and the neighbouring islets become very shallow at low tide (see Photograph 3). On Nukutapu (NE), the Catholic Church built a church and a statue which were maintained by the people of Vaitupu parish. This required regular monthly visitors by parishioners as rostered by the priest. Families designated by the mission to clean the land around the church would take their boat and use the occasion for a picnic after the work was completed. Then the children would swim and paddle and the women would collect clams if the tide was right. However, the church and the statue were demolished in the cyclone of 1990 so families no longer have to make regular visits to the islands. Thus fewer clams are being collected, (see Appendix, Photograph 1).

Clams are also to be found in the open ocean, *tai*. There the shells are rolling round loose on the bottom, so they are easier to access, but more difficult to open. They can be obtained only by diving in deep water, a sport of young men.

An abundance of clams is to be found, according to informants, on the south and western side of the island, off the area of land known as Muli (see Map 2). But this area is difficult to reach either by sea or by road as no one lives there, and the track is subject to wash outs. So the clam populations there are virtually untouched. It is an indication of the lack of great

interest in clam meat that few people visit these clam beds. Since there are no villages there, the clams would be completely free from bacterial contamination from run off or sewerage. The reef is slightly narrower, with less distance from shore to cover but there are no islets north of Nukutapu to use as a base while fishing, or as shelter in a storm.

Women are to be seen on the reef near the villages at low tide searching for small fish and shellfish. But they rarely find *Tridacna* clams because the inshore bottom of the lagoon is so muddy and they have probably been fished out. Muddy conditions are ecologically unsuited to giant clam mariculture. However large untouched beds of clams are reported to exist in the southwest corner of the reef of Wallis island, far from habitation.

4.4 Shells

The shell is most often found embedded in the reef, so is difficult to extricate, and is not considered worth the effort. They are not carried back to shore, unless specially requested. Sometimes young men who have been out diving beyond the reef will bring home several shells they have found rolling loose on the sea floor, if they have been requested to do so.

The most usual use for the shell is as ornamentation around the border of a garden. Alternatively the shells may be used as ash trays. A church may use a large one as a baptismal font. Shells may also be found embedded in the coral that is used to build walls around gardens located on the shore line (see Appendix, Photograph 2).

Several years ago, one of the fathers wanted shells to line the garden around the presbytery so the parish organized several expeditions to bring back enough shells to complete that job. Otherwise there is no call for the shell today. In former times, *Tridacna* shell was highly valued for making adzes necessary for construction work with timber whether for building houses or canoes (Kirch 1976). They were prized because the shell is so hard.

5. Rights of Access

The reef on Wallis is considered a public place, even though people's family tenure rights extend in principle to the edge of the reef. People are free to cross the water and to fish anywhere in the lagoon and to gather shellfish. People of one district can visit an islet in another district and can collect clams there. There is, however, a strict restriction on taking sand from the lagoon, except in front of your own village. Each district is the main

controlling entity, but even those boundaries are not as strictly regarded on the lagoon as they are on land.

Hihifo people said that Mu'a people can and do come up to fish off the six islands in the north. And they may collect clams while they are there. Hihifo people seldom go south. But people don't often make a special expedition for clam meat; it is only incidental to the diet. Rather they will collect clam meat if out on a picnic, or some other expedition.

The restriction on gathering sand anywhere but in front of one's own village is indicative of possible complications arising from any aquaculture endeavour using the lagoon. If clam farming was introduced it might prove difficult to introduce a new restriction and to keep out 'visitors' who did not have rights to the farm. The question as to whether a nuclear family or an extended family would share rights to a farm and its produce was too hypothetical for informants to be able to answer. They no longer have fish parks or weirs for holding fish, as they did in the past. These would have the closest analogy for a clam farm. Pearl farming has not been practiced here.

6. Commercialization

Clams appear to Wallisians to be a very insignificant resource, so they could not conceive that they might be farmed, or have commercial value. Only two of the men interviewed were remotely interested in the idea of farming clams for export, but they saw more difficulties than benefits.

The need for wider support for such a farm, such as might be given by a Department of Fisheries, has no precedents here; rather it is to be feared as a case of the state interfering in village life. And the Territorial Assembly might impose taxes and the Lavelua and ministers extract their form of taxes. The farmer would have little power over his own enterprise.

Without such support an individual would find it difficult to succeed. Boats, engines and their maintenance are all very costly here, and subject to family skills rather than any centralized infrastructure. And he would need a shore-side base including trucks, and refrigeration facilities. Since fresh water is metered on Wallis this could prove an additional expense.

Then there is the question of markets for the clam meat, and for the shell. There is little demand on Wallis for the meat. A small proportion of the resident French ex-patriate

population might buy some on occasion. Otherwise the restaurants are the only other likely local purchasers. Their clientele is irregular. The restaurateur we spoke to saw little demand in his business for clam meat - he can obtain all he can sell already by just asking relatives and neighbours to supply it as he needs it. And he sells very little. He was not interested in the commercial development of clam meat.

Overseas markets are thus the only option as an outlet. The viability of clam meat sales in New Caledonia would need further exploration. Wallisians there, as well as other island communities may be interested in buying clam meat on an irregular basis. If that did not produce an adequate enough return to compensate for shipping costs, including refrigeration, then the Taiwan, Malaysia or Japanese markets as under evaluation (Tisdell et al. 1991) would have to be assessed for feasibility. Shipping costs would have to be calculated via New Caledonia, unless a precedent could be set for shipping through Fiji which is much closer.

7. Development Possibilities

It is clear that unlike other Pacific islands, the stocks of clams around the coast of Wallis may be abundant, though needing verification as to the exact size of the biological population. As such clam farming may be a venture well suited to the development of this under-developed island nation.

The highest return for an investment would come from development of clam farming on the south western reef area of Wallis, if an on-shore infrastructure could be developed to the people's satisfaction. There is a precedent in this southwest corner of Mua where another venture has been established. But the involvement of the Wallisian people themselves at the levels of the Territorial Assembly, the District and the village is absolutely vital.

Several individual Wallisians are looking for ventures that can help their families to gain a cash income, using skills and know-how gained in New Caledonia. But there is suspicion of all such ventures as little has been tried and little has succeeded. As Cancian (1966) noted in his assessment of the three groups of people likely to take risks with a new enterprise in Mexico, the poorest and the richest groups each have too much to lose if the project fails, whereas the moderately well to do who have experienced a little success, as well as failure, are more willing to try a new project. This middle group is most likely to take the risks of a new development.

Wallis has had very few such risk takers, certainly on their home island. Such a middle level group would be identified as families in which one or more persons have experience of business either in New Caledonia or Vanuatu, someone has a skill such as teaching or building on which family members can fall back if necessary, and where someone has the readiness to learn new skills such as marketing.

In such a case a project such as clam farming may well be worthy of consideration by one or two such modest risk-takers. They may have the money to invest, and the vision of lateral benefits from the success of such a project. But they have to be assisted to overcome the obtuseness of the hierarchies both in the traditional social system, as well as in the modern social system and the colonial system. And they may find it difficult to find their way through the lag time (10 years according to Tisdell et al. 1990) before the profitability of such a venture becomes evident.

If such a venture were to be mounted it would necessitate close cooperation between the various sectors of the Wallisian polity, by negotiators fluent in French and with a trusted Wallisian colleague who is respected in the community. Members of the South Pacific Commission may well be useful adjuncts to such a project as they have French speaking members of their Fisheries section who have carried out projects in Wallis.

Such a project would be the first of its kind for Wallis. The timing is right, in that the Territorial Assembly is concerned to formulate a plan of its own for the people's benefit. The main detracting factor is that the clam is not regarded as a resource of note, and with a ten-year lag time to any profitability, the people may lose interest in maintaining any investment in clam farming.

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APPENDIX I

(Photographs)



Photograph 1: Wallis: Vaitupu Village and Nukuteatea



Photograph 2: Wallis: Vaituu Village and Nukuteatea



Photograph 3: Wallis from the Air: Nukutapu and Eastern tip Nukuteatea



Photograph 4: Wallis from the Air: Eastern Reef from N.E. at left Nukutapu and Ululu'utu



Photograph 5: **A small clam shell – 10cms in length**

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