Socioeconomic aspects of oyster harvesting in the Rewa River delta area, Fiji

Jeff Kinch,[1] Bulou Vitukawalu,[2] Unaisi Nalasi,[2] Pitila Waqainabete [2] and Michel Bermudes[1]

Introduction

Small-scale fisheries provide many benefits to Pacific Island communities. However, increasing engagement with the global economy is exerting pressure on various marine resources that generate these benefits. This pressure may be offset if communities have other livelihood options.

In the Vutia District of Rewa Province in Fiji, the women of Muanaira Village harvest oysters as a supplementary income activity. This oyster harvesting is centred around the collection of an oyster species (*Crassostrea* sp.) that was introduced in the mid-1970s. Before this, the women harvested a native oyster, *Saccrostea mordax*.

The Pacific Community (SPC) and Fiji's Ministry of Fisheries (MoF) is investigating the possibility of transferring effort from harvesting oysters by Muanaira women to oyster farming.[3] The efforts of SPC and Fiji's MoF are also in line with the United Nations 'Voluntary Guidelines on Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication' (FAO 2015), as well as the Melanesian Spearhead Group's 'Roadmap for Inshore Fisheries Management and Sustainable Development' (MSG 2015), and the Pacific Community's 'Noumea Strategy' (Pacific Community 2015). These instruments call for various actions to be taken by member countries to ensure the sustainability of coastal fisheries and associated marine resources. Activities by SPC and Fiji's MoF are also in line with Sustainable Development Goal 14, which promotes the conservation and sustainable use of all marine resources for sustainable development purposes (United Nations 2015).

To help inform future work, a socioeconomic survey was conducted to understand the importance of oyster harvesting and to also explore oyster harvesters' attitudes towards oyster collection and their potential interest in oyster aquaculture.

Oyster collecting along the Rewa River, Fiji. (Image: Jeff Kinch, SPC)

[1] Pacific Community
[2] Fiji Ministry of Fisheries
[3] See article on p.12 of this issue.

Background

The first introduction of non-native oyster species to the Rewa River delta area was in 1974, when the Pacific [Japanese] oyster (*Crassostrea gigas*) was introduced to Laucala Bay (Ritchie 1974). The first batch of these oysters died during a flood event that same year, while the 1976 introduction survived. This species did not endure due to heavy predation by the mangrove mud crab (*Scylla serrata*) (Eldredge 1994). In 1975 and 1976, the Philippines oyster (*Crassostrea* sp.[4]) was introduced, possibly as an alternative (Ritchie 1975; Eldridge 1994). Muanaira Villagers refer to the Philippine oyster as the New Zealand oyster because it was introduced from New Zealand under the coordination of Apisai Sesewa, a Fiji MoF staff member at the time. The first batch of these oysters, which were introduced in 1975, died during a flood event that same year, while the 1976 introduction survived. (See Annex A for details of oyster introductions to Fiji.)

During the 1970s, Lasaro (Les) Radrodro Lalanabacari, a Muanaira Villager who is now a resident of New Zealand, was involved with these introductions. During the period of the socioeconomic survey, Les was home at Muanaira Village and provided additional details on these introductions. When he was involved in the oyster introductions, he utilised a tower system that was made of tiered fibro cement sheet and timber that measured 600 mm x 600 mm and stood 1.5 m in height. These towers were then suspended in the water. At the peak of production during 1975–1976, Les stated that he was selling between 200 and 300 dozen oysters per week at FJD 0.90 per dozen, with the largest single sale during that period being 600 dozen oysters to a local hotel. Despite this high demand, oyster production slowed because of ongoing theft of oysters from the grow-out towers. Once Les departed for New Zealand for further studies in 1976, interest in continuing oyster production waned.

Today, residents of Muanaira Village distinguish two species of oysters found in the Rewa River delta area, based on their size and the colour of their muscle scars. The native oyster (*S. mordax*) is generally small and has a white muscle scar, while the introduced species (*Crassostrea* sp.) grows considerably larger and has a black muscle scar. Preliminary sampling by SPC in November 2018 suggests that *Crassostrea* sp. now makes up approximately 40% of the oyster population in the Rewa River delta area.

Oyster midden in Muanaira Village showing predominance of introduced *Crassostrea* sp. (Image: Jeff Kinch, SPC)

Community

Rewa Province is the smallest province in Fiji and is divided into three parts covering a land area of around 272 km² (Saumaki 2007). The first and largest part of Rewa Province, encompasses the capital city of Suva and the surrounding hinterland to the west. Suva is a major commercial, shipping and industrial centre and has rapidly expanded in the last 50 years. Rewa Province is also the heart of the *burebasaga*, one of three traditional chiefly confederacies found in Fiji (Saumaki 2007).

All Fijian villages are linked to the national government structure through their districts (*tikina)* and provincial councils. The Rewa Provincial Council was established in 1874 and is headed by the *roko tui*, who is appointed by the Fijian Affairs Board and serves the same purpose as a mayor or administrator. Under the Fijian Affairs Act, each village also has a *turaga-ni-koro,* who is also a member of the district council, which reports to the provincial council and the Fijian Affairs Board. A *turaga-ni-koro* is responsible for calling village meetings to discuss village-related matters.

In Fiji, 89% of all lands are held under customary tenure and governed by traditional leadership structures (Scheyvens and Russell 2012; iTaukei Land Trust Board n.d.). Virtually all indigenous Fijians (*iTaukei*) belonging to a village have a right to share in the natural resources that are part of their family or *mataqali* (clan) areas.

The population of Rewa Province in 2017 was 108,016 people (Fiji Bureau of Statistics 2018). Increases in the rural population (i.e. those that reside outside of Suva city) rose by nearly 21% between 2007 and 2017 to 14,533 people (Fiji Bureau of Statistics 2018). Approximately one-third of

[4] At the time of this introduction, this oyster species was named *Crassostrea iredalei*.

this rural population resides in the core Rewa River delta area, which encompasses the Vutia District Council area.

In 2004–2005, Muanaira Village was reported to have a population of 344 people residing in 80 households, with control over an area of 739 acres (Saumaki 2007). In 2018, a survey conducted by the national government health programme reported that there were 230 people (116 males and 114 females) residing in Muanaira Village (Table 1). This represents a marked decline from 2004 to 2005 due to rural–urban migration, particualry as work opportunities and superior education and health services have become available in nearby Suva. In total, there are 45 inhabited households in Muanaira Village, with a further eight houses being vacant. Houses in Muanaira Village are made of either corrugated iron, concrete block, or timber planking. There are also nine additional households that are considered to be part of Muanaira Village but located at the old village site on Laucala Island.

The majority of Muanaira Villagers moved from Laucala Island to the present location in the mid-1950s. This movement coincided with the construction of the Vutia District School in 1953, with buildings originally constructed from local bush materials. In 1957, permanent buildings were constructed with cement block and corrugated iron roofing sheets. Other structures at Muanaira Village include a community hall with a health station, and churches. There are also four tradestores operating in Muanaira Village that provide simple products in the way of rice, tinned products, soap and other items.

Government assistance provided through the Rewa Provincial Council to Muanaira Village includes water tanks, solar panels and batteries, river bed protective structures, as well as dredging some parts of the Rewa River delta to aid access and provide flood control. Muanaira Village has also received external assistance in the past from the South Pacific Regional Environment Program (SPREP) on pollution control, and Vodafone, a mobile phone company that provided funding for cyclone recovery. Muanaira Village is also a targeted project village by the International Tropical Timber Organisation, which has a focus on community-based management and restoration of vulnerable forests of the Rewa River delta.

Muanaira Village received electricity and piped water in 2008. All of the currently inhabited households have piped water to their house, with 39 of these also having flush toilets. This correlates well with assessments by Cardno (2013) who found that 80% of Fijian citizens who had water piped into their dwellings, also had a flush toilet. Most households have an indoor kitchen, while some have an outside cooking area. Most people utilise keresone stoves, with some using propane gas as well. Those cooking outside used fireplaces burning mangrove wood sourced from the surrounding mangrove forests.

As there is no road access to Muanaira Village, people are reliant on fibreglass dinghies with outboard motors, with some of these operating as water taxis. There are currently 10 dinghies with outboard engines (nine of these are made of fibreglass, with one being aluminium) and two wooden punts. The lack of road access for rubbish collection also means that Muanaira Villagers either burn, bury or dump their rubbish in the nearby mangroves and coastal foreshore, or in the adjacent river or streams.

Environment

Laucala Bay and Suva Harbour make up Suva Lagoon, which is encapsulated by a large fringing reef. The Rewa River and its associated delta is the largest fluvial system in Fiji. *Tomaniivi* mountain has a catchment area of some 2920 km^2 that feeds the Rewa River (Lata 2010). The Rewa River also obtains water from the Wainibuka, Wainimala, Waidina and Waimanu Rivers which drain into it.

Because the Rewa River delta is less than 2 m above the high tide level, it is particularly vulnerable to flooding and future sea level rise. The delta area receives an annual rainfall between 5000 and 7000 mm each year (Lata 2010). Due to the large discharge of freshwater and sediments, the barrier and back reef lagoons fronting the Rewa River have several reef openings that allow significant wave energy to reach

Table 1. Age groupings for Muanaira Village in 2018.

Age group (years)	Stage	No.
0–1	Infant	4
2–5	Toddler	10
6–12	Child	31
13–19	Teenager	36
20–59	Adult	95
60 +	Senior	24

the coast, especially during storm and cyclone surges, with subsequent river bank and shoreline erosion. Monthly mean temperature varies from 22°C to 27°C over the year.

Methods

Interviews using a questionnaire (Bernard 2017) were conducted on 30 April and 1 May 2019 with the residents of Muanaira Village. Following a small focus group discussion with senior women in the village, 44 women were identified as being predominately involved in oyster harvesting. Men are also involved, but usually accompany their wives and assist with collection and carrying.

People that agreed to be intreviewed did not receive any incentives for participating, and people intreviewed were allowed to speak freely with their answers. All interviews were conducted in the main village. Before each interview was conducted, participants received a short briefing on the purpose of the survey (in the Bauan dialect) from one of the three female investigators, Bulou Vitukawalu, Unaisi Nalasi and Pitila Waqainabete, all of whom are Fijian. Daily breifings were also provided in English by Jeff Kinch and Michel Bermudes at the end of each day.

Data confidentiality and anonymity of each participant was assured by omitting names and contact information of each respondent in the analysis. Following Fijian village protocol, permission to interview oyster harvesters was requested from the village *turaga-ni-koro*. Participant observation and further free flow discussion was conducted with the women while they were at their harvesting site.

In total, 23 interviews were conducted representing 10% of the total population of Muanaira Village and around half of all people identified to be involved to varying degrees with oyster harvesting. Overall, the respondent group was homogenous, with 100% being native Fijians (*iTaukei*), 87% of which were female, and 13% were male. On average, female participants were 51 years of age (n = 19; range: 27–77) and the average age of male participants was 53 years old (n = 4; range: 40–62). Of the female respondents, only two were the head of the household because they were widows, one lived by herself, and the other being the matriach of a household of nine other family members. Household size was, on average, five people per household (n = 23; range: 1–10).

Oyster harvesting

As noted above, the oyster harvesting grounds used by Muanaira Villagers are open to everyone that resides there, including female respondents who had married into Muanaira Village. These respondents were allowed to harvest oysters as they were now considered part of the extended kin-network, being an affine to the members of a particular *mataqali*. Harvesting oysters is seen predominately as women's work, and women are often accompanied by their spouses, family, extended family and friends. Oyster harvesting is,

Sorting oyster spat from collectors and getting it ready for deployment in oyster grow-out baskets. (Image: Jeff Kinch, SPC)

Map 1. Oyster grounds of the lower Rewa Rriver delta exploited by Muanaira Villagers.

thus, a communal affair. Men sometimes accompany their wives to assist with collecting, but also to carry and load the heavy bags of oysters.

Oysters are harvested from the mangroves systems of Laucala Island (Map 1). Within the harvesting areas, there are several named areas: Brisbane, Cedua, Drauniwalai, Malikoso, Niakisiaga, Nukuwakai, Qasibale, Solo, Ucuinaqi, Ucuna, Valenidri, and Waikabasu. Access to these harvesting areas is by fibreglass dinghy with an outboard motor, although wooden punts that are rowed using oars are also used on occassion. Fibreglass dinghies with outboard motors are generally operated by men, as they are the owner and manager of these important assets. On average, depending on weather conditions, which will determine the route either through the delta mouth or through channels to the oyster harvesting area is about 20–30 mins and requires 20–25 litres of fuel. Fuel costs are met by the group, which will contribute FJD 5.00 each to pay for the charter, with a cost of FJD 30–40/trip. Members of a group are usually dropped off by a dinghy when it is going to Bailey Bridge Market, or to Nasilai, and will be picked up on the return journey.

Elderly respondants from Muanaira Village stated that they had begun harvesting the native oyster (*S. mordax*) when they were still girls back in the 1960s, later switching to harvesting the introduced species (*Crassostrea* sp.) when these increased in abundance from the late-1970s onwards. Other respondants began harvesting oysters when they became able to, first accompanying their mothers and later when they became responsible for their own households. Many younger women could state the actual year they started harvesting oysters, and several women (n = 8) began oyster harvesting when they moved to the village after marrying men from Muanaira Village.

Due to the nature of the mangrove environment where oysters are found, the toolkit used for oyster harvesting is realtively simple, consisting of knives, choppers, and pieces of steel. Plastic buckets and biscuit tins are used to hold collect oysters, which are then tipped into 10-kg, 25-kg or 50-kg flour sacks for transportation back to Muanaira Village. Approximately 80 oysters with shells will fill a 5-L container plastic bucket or biscuit tin.

When asked why they selected the introduced oyster (*Crassostrea* sp.), respondents stated that they were easier to open than the native species (n = 10) (*S. mordax*), or because their size was bigger (n = 12). Other food items collected while oyster harvesting included *kaikosa* (*Anadara cornea*, n = 12), seaweed (*lumi,* n = 4) and fish (n = 2). Twelve respondents usually collected between one or two 25-kg bags of oysters on each harvesting trip (Table 2). Out of 21 respondents, 10 stated that they harvested oysters once a week, 5 stated they harvested on a fortnighly basis, while a further 4 said that they harvested once a month, with another 2 stating they harvested only occassionally. Oysters were collected for food, sale, and community events such as custom and church activities. The average size of the introduced oyster (*Crassostrea* sp.) was 79 mm (n = 100, range: 52–144 mm), while for *kaikosa* (*A. cornea*), the average size was 57 mm (n = 50, range: 39–71 mm).

Table 2. Average number of bags of oysters harvested by Muanaira Villagers.

Bag size	No.	No. of responents
10 kg	1	1
25 kg	1	6
	2	6
	3	0
	4	2
50 kg	1	2
	2	4
	3	1
	4	1
	Total:	23

In general, post-harvest processing of oysters includes soaking them over night and then cooking and removing them from the shell. After this has been done they are refrigerated. Only one female respondent added value to her oysters by adding flavours such as lemon, chili, onion and vinegar. Two female respondents stated that they sold oysters shelled and unshelled, but uncooked.

Oyster shells that are left over from processing are either dumped in middens near people's houses or in the mangroves. A recent use for discarded oyster shells has been to use them as fill material for making concrete walking paths through the village, and for making small wharves, essentially an extended midden from the foreshore.

Income and expenditure

Most villages in the Rewa River delta are located along the banks of the river, and rely on it as a daily source of food and income. With the fringing reef and open sea nearby, fishing and gleaning are important activities for villagers as well. Agricultural and plantation production are all important for subsistence and income.

Due to the nature of village life, many households find it difficult to detail their household income or expenditure even for the previous week (Fisk et al. 2017). This observation was the same for Muanaira Villagers, given the short time to conduct the surveys. Households in Muanaira Village with electricity using the Cash Power system stated they utilised between FJD 10 and 20 per week for electricity. The purchase of store-bought food was around FJD 70–100 per week. With the rising cost of food, households are likely to spend a higher percentage of their income on this commodity in the future. There may be additional costs for school children, including fees for specific activities and events. Providing goods, food, labour and support to the church is also very important, especially for special fundraising drives and other activities, which can use up a significant amount of household income.

Saturday is the main market day for Muanaira Villagers, with many making the trip to Nausori, the Bailey Bridge Market, or the main market in Suva. The sale of oysters depends largely on orders from family and friends residing in Suva although one female respondent stated that she sends oysters to relatives in Lautoka on the west coast of Viti Levu.

The sale of oysters was only a primary economic activity for two female respondents (Table 3). The most common sources of income reported were the sale of coconuts, the sale of *sasa* brooms made from the rib of coconut fronds, followed by fruit and vegetables. Two households reported that their husbands' salaries were their main source of income.

Table 3. Type and importance of economic activities for residents of Muanaira Village

Item	Total	Ranking				
		1st	2nd	3rd	4th	5th
Coconuts	16	12	3	1		
Brooms	11	1	7	3		
Fruit and Vegetables	8	3	2	2	1	
Fish	6	2	3	1		
Oysters	5	2	1	1		1
Salaries	2	2				
Baked goods	2		2			
Mud crabs	1	1				
Boat hire	1	1				
Mats	1				1	

The main market area is the Bailey Bridge Market in Suva with only three respondents making the effort to sell at the main market in Suva. All female respondents stated that oysters that had been processed for sale were sold in 2-L ice cream containers earning FJD 50 per container, with two women also selling oysters sealed in plastic bags earning FJD 15 per sale. No respondents used ice to keep the oysters cool while being transported or sold, or waiting to be given to relatives.

In addition, all female respondents who sold oysters stated that they were able to keep up with demand and could expand their sales if new markets were available (n = 9). Three respondents suggested targeting hotels, and another four suggested that export markets were possible if there was an opportunity. (Note that some respondents provided multiple responses.) This would require however, an increase in harvesting, or an increase in oyster farming to meet this demand, as well as addressing other issues such as transportation, food safety, and packaging issues.

Costs associated with getting to the various markets is detailed in Table 4. Prices vary for charter trips versus those involved with being a passenger (Table 4). Freight costs are charged in addition to charter fees or passenger fares. Once arriving at a specific place, additional trip costs may include bus or taxi fares (FJD 1.55–16), cost of a market table (FJD 3.60) and lunch (FJD 6).

Oyster-related health risks

Filter feeding shellfish, such as oysters, have the ability to accumulate toxic chemicals and pathogenic organisms in their tissues in concentrations greater than the levels found in the surrounding water, thus often becoming hosts for human pathogenic organisms. For the Laucala Bay area, Morrison et al. (2001, 2006, 2013) and Collen et al. (2011) have noted that contamination of trace metals, and persistent organic pollutants in sediments that were tested were relatively low, although higher concentrations were observed in Suva Harbour. Mercury levels for the native oyster (*S. mordax*) have also been tested, with results ranging from 0.02 mg/kg to 0.061 mg/kg, and these results are regarded to be below the limits imposed by the World Health Organization (Kumar et al. n.d.; Morrison et al. 2006).

Effluent from pig pens, and the disposal of untreated human sewage into Suva Lagoon pose a constant threat to human health (see Naidu et al. 1991; Naidu and Morrison 1994; Morrison et al. 2006; Lal et al. 2007; Singh et al. 2009; Lata 2010; Collen et al. 2011; Roba 2014). Surveying levels of faecal coliform in the waters where oysters are harvested from, or may be grown out in the future, is important as the consumption of shellfish with high faecal coliform content can result in bacterial and viral diseases such as typhoid and paratyphoid infections caused by salmonella, as well as amoebic dysentery, cholera, shigella, type A hepatitis, and poliomyelitis.

In the late-1980s, faecal coliform was tested in the native oyster (*S. mordax*) taken from various points across the Suva Lagoon, with results ranging from 0.7 to 24,000 faecal coliform/g (Naidu et al. 1991; Morrison et al. 2006, 2013). Additional research from this period to 2005 shows that faecal coliform densities have ranged from 0 to 410,000 colony forming units/100 ml (Morrison et al. 2006, 2013). These results show high variation and further work is needed. Factors that can affect faecal coliform levels include rainfall and tidal conditions, as well as variations in population and size of the oysters collected for testing.

All female respondents that sold oysters stated that they received good consumer feedback from their relatives, friends and other purchasers and that their oysters were considered safe to eat.

Discussion

Exploring alternative pathways for oyster harvesters to reach greater economic independence through oyster farming could help reduce dependence on wild harvesting. At present, oyster harvesting is a supplementary economic activity for the

Table 4. Return costs for charter trips from Muaniara Village using motorised dinghies

From	To	Type	Amount (FJD)
Village	Bailey Bridge Market	Charter	40
Village	Bailey Bridge Market	Passenger	5
Village	Nausori	Charter	40
Village	Nausori	Passenger	5
Village	Nasali	Charter	20–25
Village	Nasali	Passenger	3
		Freight	5

women of Muaniara Village, with most sales being made to order by relatives and friends living in Suva. There is, however, interest by women at Muaniara Village to pursue oyster farming as evident by the attendance and participation with SPC and Fiji's MoF staff during the training on the making of oyster baskets for grow-out. For this to happen, however, there are several issues that need to be further investigated.

The first activity includes obtaining better biological data of oyster distribution and species composition, as well as determining what the actual costs would be to transfer effort from harvesting oysters to oyster farming. Conducting a detailed cost–benefit analysis as well as a market and value-chain analysis would, therefore, assist with determining overall feasibility and commercial viability. This is important as 11 female respondents stated that they would still harvest wild oysters even if oyster farming was successful, and nine female respondents noted that if they had their own vessels to access the oyster harvesting area, then harvesting oysters would be much easier.

Future climate change impacts also need to be considered, particularly with regards to water levels and quality across the Rewa River delta area due to sea level rise, as well as associated impacts from increased storm surges and cyclones. Eight female respondents have already noted that they percieved that mangroves where they harvest oysters were suffereing from dieback, while another four thought that floods were affecting oyster populations.

Also, to make oyster farming successful, it would be necessary for someone to take on a strong coordination role to ensure that production was stable and that markets were accessed. Further investigation is required as to how best to achieve this through specific women's groups or a cooperative style approach.

If the production of oysters through farming was successful for Muaniara Villagers, there could also be the potential to trial oyster farming at similar sites throughout Fiji in areas such as Mago Island, Navua and Rakiraki where native oysters (*S. mordax*) are also found and consumed, but rarely taken to market. This could present opportunities for additional technical, economic and social research, and could lead to further development and diversification of the edible oyster industry for Fiji.

Increasing the marketability of oysters in Fiji, especially for supplying Fiji's tourism industry, would require ensuring confidence in consumers that the oysters are safe to eat. Taking into account the high and variable values of faecal coliform reference points noted by Morrison et al. (2006, 2013), the implementation of an epidemiological surveillance programme of both native and introduced oysters would be critical, both at the places they are harvested and at potential farm sites. Once further data are available, the classification of harvesting and potential farm sites according to one of the three production areas (i.e. A, B or C) – as defined in the 'Codex Alimentaius' for bivalves – can be concluded (ISO 2016). If, after further testing, faecal coliforms values fall within groups B and C, a basic depuration process will be neccessary, whereby oysters that are to be marketed are treated in filtered water for 24 to 48 hours before being sold at market.

Overall, there are opportunities to expand livelihood options through oyster farming, but further questions need to be answered. This will require continued collaboration between SPC and Fiji's MoF, and potentially other research partners, such as the University of the South Pacific's School of Marine Studies.

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Annex A

Oyster introductions to Fiji

Type	Year	Type/Quantity	From	To	Comments
Crassostrea echinata (Australian oyster)	1910	Individual oysters	Australia	Mago Island in the Lau Group	
	1981	2280 seed oysters	Tahiti	Laucala Bay near Suva; and Namarai Bay	Project terminated in the same year due to high mortality
Crassostrea gigas (Pacific/Japanese oyster)	1968	Individual oysters	Japan	Unknown	Project terminated in 1969 due to theft
	1969	Seed oysters	Japan	Bay of Islands near Lami	Good growth and survival
	1969	Seed oysters	Japan	Namarai Bay	Harvested
	1970	Seed oysters	Japan	Namarai Bay	High mortality
	1971	5000 seed oysters	USA (California)	Bay of Islands near Lami	Damaged in 1973 cyclone
	1972	200,000 cultchless seed oysters	USA (California)	Unknown	Poor survival
	1973	900,000 culched spat	Japan	Unknown	High mortality in transit
	1973	20,000 spat	Australia	Bay of Islands near Lami	
	1973	1 million cultchless spat	USA (California)	Unknown	
	1974	900,000 culched spat	Japan	Unknown	
	1974	1 million cultchless spat	USA	Rewa River Delta	Heavy predation by mudcrabs (*Scylla serrata*)
	1975	Unknown	Unknown	Unknown	
	1976	Unknown	Philippines	Unknown	Poor growth
	1977	100,000 cultchless spat	USA	Unknown	100% mortality
Crassostrea iredalei (Philippine oyster)	1975	300 oysters	Philippines	Rewa River Delta	100% mortality due to flood
	1976	Individual oysters	Philippines	Rewa River Delta	22% mortality
Crassostrea virginica (American oyster)	1970	Individual oysters	USA (Hawaii)	Bilo Bay near Suva	
Ostrea edulis (European oyster)	1977	Spat	Japan	Unknown	Introduced by private operation which closed after oysters reached marketable size
Saccostrea commercialis/ S. glomerata/ Crassostrea commercialis (Sydney/ Australian rock oyster)	1880s	Individual oysters	Australia	Savusavu on Vanua Levu	
	1968	Unknown	Australia	Unknown	
	1970	Unknown	Australia	Bilo Bay near Suva	
	1973	Unknown	USA (California)	Savusavu and Labasa on Vanua Levu; and Taveuni Island	
Unidentified	1973	200,000 cultchless spat	USA (California)	Unknown	